

App. 2.3-4 Existing Field Water Requirement in Liyangastota Scheme Walawe RB/LB (1985/86) (1/10)

Paddy : 105 days Variety

KC:	Maha												Yala			
		Yala	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG		
Growth Stage and Crop Factors	1st Stagger	Mamadala	0%	30%												
	2nd Stagger	Oluwila	0%	40%												
	3rd Stagger	Lunania	0%	30%												
ETo (Evapotranspiration of Reference Crop)			5.14	4.81	3.82	3.96	4.13	4.21	4.88	4.32	5.18	5.06	5.14	5.95		
1. LP (Land Preparation)	Ls	(4.0inch/6days)								1.20						
	Lt	(7.5inch/25days)								1.60						
	Total LP		0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.25	1.20	1.80	2.25	5.25		
2. E (Evapo. during LP) (E=ETo)			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.30	0.86	1.55	0.00	0.00		
3. Sd (Standing Water)			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
4. ETC			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.90	2.10	1.55	1.16	1.23		
Crop Water Requirement (ETc=ETo x KC)	ETc (S ₁)									0.60	0.61	0.51	0.39	0.48		
	ETc (S ₂)									1.55	1.94	2.06	1.18	1.43		
	ETc (S ₃)									1.52	0.58	0.62	1.61	1.61		
Total ETC			0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.70	6.32	6.87	5.65	5.65		
5. Farm Loss at ETC (Farm Loss + ETC)			0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.17	10.53	11.45	9.42	9.42		
6. FWR (1+2+3+5) Field Water Requirement	Average	(inch/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.15	13.52	10.53	11.45	9.42		
		(mm/month)	0	0	0	0	0	0	0	182	343	267	291	239		
		(mm/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.05	11.45	8.91	9.69	7.98		
	Peak	(mm/day)								14.72						

Total FWR = 1,323 mm

Liy(85-86)

App. 2.3-4 Existing Field Water Requirement in Liyangastota Scheme Walawe RB/LB (1986/87) (2/10)

Paddy : 105 days Variety

KC:	Maha			Yala								
	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
Growth Stage and Crop Factors	Maha Yala 30% 30%	30% 40%	30% 40%	30% 40%	30% 40%	30% 40%	30% 40%	30% 40%	30% 40%	30% 40%	30% 40%	30% 40%
1st Stagger	Mamadala											
2nd Stagger	Oluwila											
3rd Stagger	Lunama											
ETo (Evapotranspiration of Reference Crop)	5.14	4.81	3.82	3.96	4.13	4.21	4.88	4.32	5.18	5.06	5.14	5.95
1. LP (Land Preparation)												
LS (4.0inch/5days)		1.20						1.20				
LT (7.5inch/25days)		1.60	1.20					1.60				
Total LP	0.00	2.25	1.80	2.25	0.00	0.00	0.00	2.25	5.25	0.00	0.00	0.00
2. E (Evapo. during LP) (E=ETo)		1.44	0.76	1.15				0.86	1.55			
Total Evapo (3.0inch)	0.00	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Sd (Standing Water)		0.90	2.10					0.90	2.10			
4. ETC Crop Water Requirement (ETc-ETo x KC)												
ETc (S _i)		1.15	1.15	0.91	0.99			1.55	1.16	1.23		
ETc (S _o)		0.44	0.44	0.48	1.12			0.60	0.61	1.39		
ETc (S ₁)		1.15	1.15	0.40	0.32			1.55	0.51	0.39		
ETc (S ₂)				1.52	1.65				1.94	2.06		
Total ETC	0.00	0.00	2.73	4.94	5.52	4.00	0.00	3.70	6.32	6.87	5.65	
5. Farm Loss at ETC (Farm Loss + ETC)												
Total ETC(60%)	0.00	0.00	4.55	8.24	9.20	6.67	0.00	6.17	10.53	11.45	9.42	
6. FWR (1+2+3+5) Field Water Requirement												
Average (inch/month)	0.00	7.15	11.90	8.24	9.20	6.67	0.00	7.15	13.52	10.53	11.45	9.42
(mm/month)	0	182	302	209	234	169	0	182	343	267	291	239
(mm/day)	0.00	6.05	10.08	6.98	7.79	5.64	0.00	6.05	11.45	8.91	9.69	7.98
Peak (mm/day)			13.86					14.72				

Total FWR = 2.419 mm

App. 2.3-4 Existing Field Water Requirement in Liyangastota Scheme Walawe RB/LB (1987/88)

(3/10)

Paddy : 105 days Variety

KC.	Maha												Yala					
	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	Growth Stage and Crop Factors	Maha Yala	30%	40%	30%	
1. LP (Land Preparation)	Ls	1.20	1.60	1.20	1.20	1.20	1.20	1.20	1.00	1.15	1.20	1.20						1.20
	Lt	0.90	1.20	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
	Total LP	0.00	2.10	2.10	2.10	2.10	2.10	2.10	2.10	1.90	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
2. E (Evapo. during LP) (E-ETo)		0.72	1.53	0.57	0.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Sd (Standing Water)		0.00	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4. ETC Crop Water Requirement (ETc=ETo x KC)	ETc (S)	0.86	0.30	1.14	1.58	0.61	0.89	0.24	1.19	1.26	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32
	ETc (S)	1.20	1.60	1.20	1.20	1.20	1.20	1.20	1.00	1.15	1.20	1.20	1.20	1.00	1.15	1.20	1.20	1.20
	ETc (S)	0.90	1.35	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
	ETc (S)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total ETC	0.00	0.86	1.43	2.17	1.81	2.17	1.81	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17
5. Farm Loss at ETC (Farm Loss + ETC)	Total ETC/60%	0.00	1.43	2.17	3.27	3.02	3.27	3.02	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27
6. FWR (1+2+3+5) Field Water Requirement	Average (inch/month)	0.00	2.10	2.94	2.48	2.07	2.44	2.07	2.07	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44
	(mm/month)	0	53	75	62	53	62	53	53	62	62	62	62	62	62	62	62	62
	(mm/day)	0.00	1.78	2.48	2.07	1.71	2.07	1.71	1.71	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07
	Peak (mm/day)																	

Total FWR = 2.410 mm

Liy(87-88)

App. 2.3-4 Existing Field Water Requirement in Liyangastota Scheme Walawe RB/LB (1988/89) (4/10)

Paddy : 105 days Variety

KC:	Maha			Yala											
	Yala	30%	40%	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
Growth Stage and Crop Factors	30%	40%	30%												
	1st Stagger	LBM/NRB/NCB													
	2nd Stagger	SLB/SCB													
	3rd Stagger	SRB													
ETc (Evapotranspiration of Reference Crop)			5.14	4.81	3.82	3.96	4.13	4.21	4.88	4.32	5.18	5.06	5.14	5.95	
1. LP (Land Preparation)	LS	(4.0inch/5days)	1.20	1.60					1.20	1.20					
	Lt	(7.5inch/25days)	0.90	1.35					2.25	1.80					
	Total LP		2.10	3.00	1.35				6.25	5.25	0.00				
2. E (Evapo. during LP) (E=ETc)			0.77	0.90	0.90				1.46	0.86					
	Total Evapo	(3.0inch)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Sd (Standing Water)			2.10	2.10	0.90				0.90	2.10					
4. ETC (Crop Water Requirement) (ETc=ETo x KC)	ETc (S.)		1.08	1.08	0.29	0.23	0.25	0.25	1.30	1.30	1.19	1.21	1.21	1.21	1.21
	ETc (S.)		1.53	1.53	1.10	1.19	1.12	1.12	0.50	0.50	0.62	0.37	0.37	0.37	0.41
	ETc (S.)		0.59	0.63	0.59	0.63	1.49	1.49	1.30	1.30	0.52	0.39	0.39	0.41	0.41
	Total ETC		0.00	0.00	0.86	0.30	0.24	0.24	1.99	1.99	1.55	1.16	1.16	1.23	1.23
	Farm Loss at ETC (Farm Loss + ETC)	Total ETC/60%	0.00	1.08	4.36	4.70	5.65	5.65	3.09	3.09	6.47	6.76	6.76	4.88	0.00
6. FWR (1+2+3+5) Field Water Requirement	Average	(inch/month)	2.10	11.95	9.51	7.83	9.41	9.41	2.32	2.32	10.78	11.27	11.27	8.14	0.00
	Peak	(mm/day)	53	304	242	199	239	239	59	59	274	286	286	207	0
	Peak	(mm/day)	1.78	10.12	8.05	6.63	7.97	7.97	1.96	1.96	10.58	9.12	9.54	6.89	0.00
	Peak	(mm/day)	14.48	14.48					14.17	14.17					

Total FWR = 2,361 mm

Liy(88-89)

App. 2.3-4 Existing Field Water Requirement in Liyangastota Scheme Walawe RB/LB (1989/90) (5/10)
Paddy : 105 days Variety

KC:	Maha												Yala											
	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
Growth Stage and Crop Factors	1st Stagger	LBM/NRB/NCB	30%	30%	1.00	1.15	1.20	0.90	0.90	1.20	1.15	1.20	0.90	1.20	1.15	1.20	0.90	1.00	1.15	1.20	1.20	0.90	1.20	0.90
	2nd Stagger	SLB/SCB	40%	40%	1.00	1.15	1.20	0.90	0.90	1.20	1.15	1.20	0.90	1.20	1.15	1.20	0.90	1.00	1.15	1.20	1.20	0.90	1.20	0.90
	3rd Stagger	SRB	30%	30%	1.00	1.15	1.20	0.90	0.90	1.20	1.15	1.20	0.90	1.20	1.15	1.20	0.90	1.00	1.15	1.20	1.20	0.90	1.20	0.90
ETo (Evapotranspiration of Reference Crop)																								
1. LP (Land Preparation)	Ls	(4.0inch/5days)	1.20	1.60	1.20	1.60	1.20	1.60	1.20	1.60	1.20	1.60	1.20	1.60	1.20	1.60	1.20	1.60	1.20	1.60	1.20	1.60	1.20	1.60
	Lt	(7.5inch/25-days)	0.90	1.20	1.35	1.80	1.20	1.80	1.20	1.80	1.20	1.80	1.20	1.80	1.20	1.80	1.20	1.80	1.20	1.80	1.20	1.80	1.20	1.80
	Total LP		2.10	2.80	2.70	3.60	2.40	3.60	2.40	3.60	2.40	3.60	2.40	3.60	2.40	3.60	2.40	3.60	2.40	3.60	2.40	3.60	2.40	3.60
2. E (Evapo. during LP) (E=ETo)			0.77	1.92	0.57	0.72	1.92	0.57	0.72	1.92	0.57	0.72	1.92	0.57	0.72	1.92	0.57	0.72	1.92	0.57	0.72	1.92	0.57	
3. Sd (Standing Water)	(3.0inch)		2.10	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
4. ETC Crop Water Requirement (ETc=ETo x KC)	ETc (S ₁)		1.08	0.29	1.10	1.19	1.12	1.32	1.49	1.24	1.24	1.49	1.24	1.24	1.49	1.24	1.24	1.49	1.24	1.24	1.49	1.24	1.24	
	ETc (S ₂)		1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	
	ETc (S ₃)		0.59	0.63	0.86	0.50	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
	Total ETC		3.28	2.45	3.04	3.03	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30
5. Farm Loss at ETC (Farm Loss + ETC)																								
6. FWR (1+2+3+5) Field Water Requirement	Total ETC/60%		2.10	1.80	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	
	Average (inch/month)		53	304	242	199	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239
	Peak (mm/day)		1.78	10.12	8.05	6.63	7.97	7.97	7.97	7.97	7.97	7.97	7.97	7.97	7.97	7.97	7.97	7.97	7.97	7.97	7.97	7.97	7.97	7.97
Total FWR = 2,361 mm																								

App. 2.3-4 Existing Field Water Requirement in Liyangastota Scheme Walawe RB/LB (1990/91) (6/10)

Paddy : 105 days Variety

KC.	Growth Stage and Crop Factors	Maha												Yala			
		Maha	Yala	30%	30%	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
	1st Stagger	LBM/NRB/NCB	30%	30%	1.20	1.20	0.90						1.00	1.15	1.20	0.90	
	2nd Stagger	SLB/SCB	40%	40%	1.20	1.20	0.90						1.00	1.15	1.20	0.90	
	3rd Stagger	SRB	30%	30%	1.20	1.20	0.90						1.00	1.15	1.20	0.90	
ETo (Evapotranspiration of Reference Crop)					5.14	4.81	3.82	3.95	4.13	4.21	4.88	4.32	5.18	5.06	5.14	5.95	
1. LP	(Land Preparation)	Ls			1.20	1.20											
		Lt			2.25	1.80						1.20					
		Total LP			6.25	5.25	0.00					6.25	5.25	0.00			
2. E	(Evapo. during LP)				1.54	0.00						1.46	0.86				
	(E-ETo)				1.03	0.96						0.98	1.30				
		Total Evapo			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Sd	(Standing Water)				0.90	2.10						0.90	2.10				
4. Etc	Crop Water Requirement	ETc (S _i)			1.44	1.44	0.88	0.95	1.21	1.19		1.30	1.19	1.21	1.21	1.21	
		ETc (S _i)			0.55	1.44	0.46	1.07	1.37	0.62		0.50	0.62	1.37	1.37	1.37	
		ETc (S _i)			1.44	1.44	0.38	0.30	0.33	0.52		1.30	0.52	0.39	0.39	0.41	
		ETc (S _i)			1.46	1.58	1.46	0.99	1.49	1.99		1.99	1.99	2.02	2.02	1.85	
		Total Etc			1.15	0.91	1.15	0.91	1.12	1.14		1.14	1.14	1.16	1.16	1.23	
					0.00	3.44	4.77	5.29	3.92	1.39		3.09	6.47	6.76	4.88	0.00	
5. Farm Loss at Etc	(Farm Loss + Etc)	Total Etc/60%			0.00	5.73	7.95	8.82	6.54	2.32		5.15	10.78	11.27	8.14	0.00	
6. FWR	(1+2+3+5)	Average	(inch/month)		7.15	13.08	7.95	8.82	6.54	2.32		12.50	10.78	11.27	8.14	0.00	
			(mm/month)		182	332	202	224	166	59		317	274	286	207	0	
			(mm/day)		6.05	11.08	6.73	7.47	5.54	1.96		10.58	9.12	9.54	6.89	0.00	
		Peak	(mm/day)									14.17					

Total FWR = 2.431 mm

Liy(90-91)

App. 2.3-4 Existing Field Water Requirement in Liyangastota Scheme Walawe RB/LB (1991/92) (7/10)
Paddy : 105 days Variety

KC:	Growth Stage and Crop Factors	Maha												Yala												
		Maha			Yala			Maha			Yala			Maha			Yala									
		SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	
	1st Stagger	LBM/NRB/NCB	30%	30%	1.00	1.00	1.15	1.20	0.90	1.00	1.15	1.20	0.90	1.00	1.15	1.20	0.90	1.00	1.15	1.20	0.90	1.00	1.15	1.20	0.90	
	2nd Stagger	SLB/SCB	40%	40%	1.00	1.00	1.15	1.20	0.90	1.00	1.15	1.20	0.90	1.00	1.15	1.20	0.90	1.00	1.15	1.20	0.90	1.00	1.15	1.20	0.90	
	3rd Stagger	SRB	30%	30%	1.00	1.00	1.15	1.20	0.90	1.00	1.15	1.20	0.90	1.00	1.15	1.20	0.90	1.00	1.15	1.20	0.90	1.00	1.15	1.20	0.90	
ETo (Evapotranspiration of Reference Crop)				5.14	4.81	3.82	3.96	4.13	4.21	4.88	4.32	5.18	5.06	5.14	5.95											
1. LP	LS	(4.0inch/5days)		1.20																						
	Lf	(7.5inch/25days)		1.60	1.20																					
	Total LP			2.25	1.80																					
2. E	(Evapo. during LP)			1.54	0.00																					
	(E=ETo)			1.03	0.96																					
	Total Evapo			0.00	1.44																					
3. Sd (Standing Water)		(3.0inch)		0.90	2.10																					
4. Etc	Etc (S)			1.44	0.88																					
	Crop Water Requirement			0.55	1.07																					
	(Etc=ETo x KC)			1.44	0.38																					
				1.46	1.58																					
				1.15	0.91																					
				0.44	0.48																					
				4.77	5.29																					
5. Farm Loss at Etc	(Farm Loss + Etc)	Total Etc/60%		0.00	5.73	7.95	8.82	6.54	2.32	0.00	5.15	10.78	11.27	8.14	0.00											
6. FWR (1+2+3+5)	Field Water Requirement	Average (inch/month)		7.15	13.08	7.95	8.82	6.54	2.32	7.15	12.50	10.78	11.27	8.14	0.00											
		(mm/month)		182	332	202	224	166	59	182	317	274	286	207	0											
		(mm/day)		6.05	11.08	6.73	7.47	5.54	1.96	6.05	10.58	9.12	9.54	6.89	0.00											
		(mm/day)		14.17																						

Total FWR = 2,431 mm

App. 2.3-4 Existing Field Water Requirement in Liyangastota Scheme Walawe RB/LB (1992/93)

(8/10)

Paddy : 105 days Variety

K.C.	Growth Stage and Crop Factors	Maha												Yala			
		SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	Yala	Yala	Yala	
	1st Stagger Mamadala			1.00	1.15	1.20	0.90							1.00	1.15	1.20	0.90
	2nd Stagger Oluwila				1.00	1.15	1.20	0.90							1.00	1.15	1.20
	3rd Stagger Lunama					1.00	1.15	1.20	0.90							1.00	1.15
	ETo (Evapotranspiration of Reference Crop)	5.14	4.81	3.82	3.96	4.13	4.21	4.88	4.32	5.18	5.06	5.14	5.95				
1. LP	(Land Preparation)																
	LS		1.20														
	LI		1.60	1.20													
	Total LP		2.25	1.80													
2. E	(Evapo. during LP)		1.20	1.80													
	(E=ETo)		2.25	2.25													
	Total LP	0.00	6.25	5.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total Evapo	0.00	0.90	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Sd	(Standing Water)																
	ETe (S.)		0.91	1.15	0.91	0.99	1.12	1.15	0.48	0.32	0.34	0.51	0.61	0.60	0.51	0.39	0.48
	Crop Water Requirement		0.44	1.15	0.40	1.65	1.52	1.01	1.19	0.95	1.14	1.18	1.94	1.52	1.18	2.06	2.14
	(ETc=ETo x KC)		0.46	1.15	0.46	1.19	0.95	1.01	1.19	0.95	1.14	1.18	1.94	1.52	1.18	2.06	2.14
	Total ETC	0.00	2.73	2.73	4.94	5.52	4.00	3.70	6.32	6.87	5.65	6.87	6.87	6.87	6.87	6.87	6.87
5. Farm Loss at ETC	(Farm Loss + ETC)	0.00	0.00	4.55	8.24	9.20	6.67	0.00	0.00	0.00	6.17	10.53	11.45	9.42	9.42	9.42	9.42
6. FWR	(1-2+3+5)	0.00	7.15	11.90	8.24	9.20	6.67	0.00	7.15	13.52	10.53	11.45	9.42	9.42	9.42	9.42	9.42
	Average	0	182	302	209	234	169	0	182	343	267	291	239	239	239	239	239
	Field Water Requirement	0.00	6.05	10.08	6.98	7.79	5.64	0.00	6.05	11.45	8.91	9.69	7.98	7.98	7.98	7.98	7.98
	Peak		13.86							14.72							

Total FWR = 2.419 mm

Liy(92-93)

App. 2.3-4 Existing Field Water Requirement in Liyangastota Scheme Walawe RB/LB (1993/94) (9/10)

Paddy : 105 days Variety

KC:	Maha												Yala		
	Maha Yala			SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
	LBM/NRB/NCB	30%	30%	1.00	1.00	1.15	1.20	0.90	1.20	0.90	1.00	1.15	1.20	0.90	1.20
Growth Stage and Crop Factors	SLB/SCB	40%	40%	1.00 <td>1.00 <td>1.15</td> <td>1.20 <td>0.90</td> <td>1.20 <td>0.90</td> <td>1.00 <td>1.15</td> <td>1.20 <td>0.90</td> <td>1.20</td> </td></td></td></td></td>	1.00 <td>1.15</td> <td>1.20 <td>0.90</td> <td>1.20 <td>0.90</td> <td>1.00 <td>1.15</td> <td>1.20 <td>0.90</td> <td>1.20</td> </td></td></td></td>	1.15	1.20 <td>0.90</td> <td>1.20 <td>0.90</td> <td>1.00 <td>1.15</td> <td>1.20 <td>0.90</td> <td>1.20</td> </td></td></td>	0.90	1.20 <td>0.90</td> <td>1.00 <td>1.15</td> <td>1.20 <td>0.90</td> <td>1.20</td> </td></td>	0.90	1.00 <td>1.15</td> <td>1.20 <td>0.90</td> <td>1.20</td> </td>	1.15	1.20 <td>0.90</td> <td>1.20</td>	0.90	1.20
	SRB	30%	30%	1.00 <td>1.00 <td>1.15</td> <td>1.20 <td>0.90</td> <td>1.20 <td>0.90</td> <td>1.00 <td>1.15</td> <td>1.20 <td>0.90</td> <td>1.20</td> </td></td></td></td></td>	1.00 <td>1.15</td> <td>1.20 <td>0.90</td> <td>1.20 <td>0.90</td> <td>1.00 <td>1.15</td> <td>1.20 <td>0.90</td> <td>1.20</td> </td></td></td></td>	1.15	1.20 <td>0.90</td> <td>1.20 <td>0.90</td> <td>1.00 <td>1.15</td> <td>1.20 <td>0.90</td> <td>1.20</td> </td></td></td>	0.90	1.20 <td>0.90</td> <td>1.00 <td>1.15</td> <td>1.20 <td>0.90</td> <td>1.20</td> </td></td>	0.90	1.00 <td>1.15</td> <td>1.20 <td>0.90</td> <td>1.20</td> </td>	1.15	1.20 <td>0.90</td> <td>1.20</td>	0.90	1.20
ETc (Evapotranspiration of Reference Crop)				5.14	4.81	3.82	3.96	4.13	4.21	4.88	4.32	5.18	5.06	5.14	5.95
1. LP (Land Preparation)	Ls	(4.0inch/5days)		1.20	1.60					1.20					
	Lt	(7.5inch/25days)		0.90	1.20					2.25					
	Total LP			2.10	3.00	1.35				6.25	0.00				
2. E (Evapo. during LP) (E-ETc)				0.77	1.92	0.57				0.98	0.86				
	Total Evapo			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Sd (Standing Water)		(3.0inch)		2.10		0.90				0.90	2.10				
4. ETc (Crop Water Requirement) (ETc=ETo x KC)	ETc (S ₁)			1.08		0.29	0.23	0.25			1.30	1.19	1.21		
	ETc (S ₂)					1.10	1.19	1.12			0.50	0.62	1.37		
	ETc (S ₃)					1.53	1.21	1.32			1.30	0.52	0.39	0.41	
	ETc (S ₄)					0.59	0.63	1.49			1.99	2.02	1.85		
	ETc (S ₅)					0.86	0.30	0.24			1.55	1.16	1.23		
	Total ETc			0.00	1.08	4.36	4.70	5.65			3.09	6.47	6.76	4.88	0.00
5. Farm Loss at ETc (Farm Loss + ETc)		Total ETc/60%		0.00	1.80	7.26	7.83	9.41			5.15	10.78	11.27	8.14	0.00
6. FWR (1+2+3+5) Field Water Requirement	Average	(inch/month)		2.10	11.95	9.51	7.83	9.41			12.50	10.78	11.27	8.14	0.00
		(mm/month)		53	304	242	199	239			317	274	286	207	0
		(mm/day)		1.78	10.12	8.05	6.63	7.97			10.58	9.12	9.54	6.89	0.00
	Peak	(mm/day)		14.48							14.17				

Total FWR = 2,361 mm

Liy(93-94)

App. 2.3-4 Existing Field Water Requirement in Liyangastota Scheme Walawe RB/LB (1994/95) (10/10)

Paddy : 105 days Variety

KC:	Maha												Yala																			
	1st Stagger	2nd Stagger	3rd Stagger	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	1st Stagger	2nd Stagger	3rd Stagger	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG		
Growth Stage and Crop Factors	LBM/NRB/NCB	SLB/SCB	SRB	30%	40%	30%	30%	40%	30%	1.00	1.15	1.20	0.90	0.90	1.20	1.15	1.20	0.90	1.00	1.15	1.20	0.90	0.90	1.20	1.15	1.20	0.90	1.20	1.15	1.20	0.90	
ETc (Evapotranspiration of Reference Crop)				5.14	4.81	3.82	3.96	4.13	4.21	4.88	4.32	5.18	5.06	5.14	5.95																	
1. LP (Land Preparation)	Ls			1.20	1.20					1.20	1.60					1.20	1.20															
	Lc			2.25	1.80	2.25	1.20	2.25	1.80	2.25	1.20	2.25	1.80	2.25	1.20	2.25	1.80	2.25	1.20	2.25	1.80	2.25	1.20	2.25	1.80	2.25	1.20	2.25	1.80	2.25	1.20	2.25
	Total LP			6.25	5.25	0.00	0.00	0.00	0.00	6.25	5.25	0.00	0.00	0.00	0.00	6.25	5.25	0.00	0.00	6.25	5.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2. E (Evapo. during LP)				1.54	0.00					0.86	1.46					0.86	1.46															
	(E-ETc)			1.03	0.96					1.30	0.98					1.30	0.98															
3. Sd (Standing Water)				0.90	0.00					0.00	0.00					0.00	0.00															
4. Etc (Crop Water Requirement)	ETc (S _i)			0.90	2.10					0.90	2.10					0.90	2.10															
	ETc (S _i)			1.44	1.44					0.88	0.95					0.88	0.95															
	ETc (S _i)			0.55	1.44					0.46	1.07					0.46	1.07															
	ETc (S _i)			1.44	1.44					0.38	0.30					0.38	0.30															
	ETc (S _i)			1.46	1.48					1.15	0.91					1.15	0.91															
	ETc (S _i)			0.44	1.12					0.44	1.12					0.44	1.12															
	Total Etc			0.00	3.44					4.77	5.29					4.77	5.29															
5. Farm Loss at Etc (Farm Loss + Etc)				0.00	5.73					7.95	8.82					7.95	8.82															
6. FWR (1+2+3+5) Field Water Requirement	Average			7.15	13.08					7.95	8.82					7.95	8.82															
	(mm/month)			182	332					202	224					202	224															
	(mm/day)			6.05	11.08					6.73	7.47					6.73	7.47															
	(mm/day)			0.00	14.48					14.48	14.48					14.48	14.48															
			Total FWR = 2.431 mm																													

Liy(94-95)

App. 2.3-6 Existing Field Water Requirement in Muruthawela LB Scheme (1991/92)

(1/4)

KC:	Maha			Yala											
	Maha	Yala		SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
Growth Stage and Crop Factors	30%	60%			1.00	1.15	1.20	0.90				1.00	1.15	1.20	0.90
	40%	40%				1.00	1.15	1.20	0.90			1.00	1.15	1.20	0.90
	30%						1.00	1.15	1.20	0.90					
ETo (Evapotranspiration of Reference Crop)			5.14	4.81	3.82	3.96	4.13	4.21	4.88	4.32	5.18	5.06	5.14	5.95	
1. LP	LS		1.20	1.60					2.40	1.60					
(Land Preparation)	Lt	(4.0inch/5days)	1.35	1.20					0.90	3.60					
		(7.5inch/25days)	1.80	1.20					0.90	2.40					
	Total LP		2.55	5.95	3.45				3.30	7.60	0.60				
2. E			1.03	0.48					0.98	1.73					
(Evapo. during LP)			0.64	0.51					1.44	1.73					
(E-ETo)			0.48	1.27					0.00	0.00					
Total Evapo			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Sd (Standing Water)			0.90	0.90	2.10					1.80					
4. Etc		(3.0inch)	1.44	1.44	1.32	1.43	1.12			1.30					
Crop Water Requirement	Etc (S)									1.55			1.16	1.23	
	Etc (S)									2.38			2.43	2.78	
	Etc (S)									2.07			1.94	2.06	1.07
(ETc=ETo x KC)	Etc (S)									0.79			0.40	0.93	
	Total Etc		0.00	1.44	3.13	4.82	4.55	3.41	0.00	1.30	6.80	5.94	6.99	1.07	
	5. Farm Loss at Etc		0.00	2.89	6.26	9.64	9.11	6.82	0.00	2.59	13.61	11.87	13.98	2.14	
(Farm Loss + Etc)		2.55	9.74	11.81	9.64	9.11	6.82	3.30	11.99	15.41	11.87	13.98	2.14		
6. FWR (1+2+3+5)		65	247	300	245	231	173	84	305	391	302	355	54		
(Field Water Requirement)															

Total FWR = 2.752 mm

Mu(91-92)

App. 2.3-6 Existing Field Water Requirement in Muruthawela LB Scheme (1992/93)

(2/4)

Paddy : 105 days Variety

KC:	Growth Stage and Crop Factors	Maha												Yala					
		SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	Yala	Yala	Yala			
	1st Stagger	30%	100%																
	2nd Stagger	40%	0%																
	3rd Stagger	30%	0%																
ETo (Evapotranspiration of Reference Crop)		5.14	4.81	3.82	3.96	4.13	4.21	4.88	4.32	5.18	5.06	5.14	5.95						
1. LP	Ls													4.00					
	Li													3.00	4.50				
	Total LP	0.00	0.00	0.00										7.00	4.50				
2. E														2.59	2.53				
(Evapo. during LP) (E-ETo)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Sd (Standing Water)																			
4. ETC																			
	ETc (S ₁)														3.80	0.86	1.14		
	ETc (S ₂)															4.93	5.95		
	ETc (S ₃)																		
	Total ETc	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.80	5.78			7.09
5. Farm Loss at ETc		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.59	11.57			14.18
6. FWR (1+2+3+5)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.09	11.57			14.18
(Field Water Requirement) (mm)		0	0	0	0	0	0	0	0	0	0	0	0	178	383	294			360

Total FWR = 1.215 mm

Mu(92-93)

App. 2.3-6 Existing Field Water Requirement in Muruthawela LB Scheme (1993/94)

(3/4)

Paddy : 105 days Variety

KC:	Growth Stage and Crop Factors	Maha												Yala				
		SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG					
	1st Stagger	0.90	1.00	1.15	1.20	0.90			1.00	1.15	1.20	0.90						
	2nd Stagger		0.90	1.00	1.15	1.20	0.90											
	3rd Stagger			1.00	1.15	1.20	0.90											
				1.00	1.15	1.20	0.90											
ETo (Evapotranspiration of Reference Crop)		5.14	4.81	3.82	3.96	4.13	4.21	4.88	4.32	5.18	5.06	5.14	5.95					
1. LP	LS (4.0inch/5days)	1.20	1.60					4.00										
	Lt (7.5inch/25days)	0.90	1.20					3.00	4.50									
	Total LP	2.10	2.80	1.35				7.00	4.50									
2. E		0.77	0.72					2.44	2.16									
	(Evapo. during LP) (E-ETo)	0.00	0.72	0.76				0.00	0.00									
	Total Evapo (3.0inch)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Sd (Standing Water)			2.10	0.90														
4. Etc	Etc (S)	0.31	1.08	0.29	0.23	0.25												
	Crop Water Requirement	1.39	1.10	1.10	1.19	1.12												
	(ETc=ETo x KC)		1.53	0.59	1.21	1.32												
	Total Etc		0.86	0.86	0.30	0.24	0.25											
		1.70	1.08	4.36	4.70	5.65	1.14	1.14	6.26	6.03	5.65	6.03	5.65	0.00				
5. Farm Loss at Etc	Total Etc/50%	3.39	2.16	8.72	9.40	11.30	2.78	0.00	6.48	12.52	12.06	11.31	0.00					
6. FWR (1+2+3+5)	(inch)	5.49	12.31	10.97	9.40	11.30	2.78	7.00	13.98	12.52	12.06	11.31	0.00					
	(Field Water Requirement) (mm)	140	313	279	239	287	71	178	355	318	306	287	0					
		Total FWR = 2,771 mm																

App. 2.3-6 Existing Field Water Requirement in Muruthawela LB Scheme (1994/95)

(4/4)

Paddy : 105 days Variety

KC:	Maha												Yala				
	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	Maha	Yala	60%	40%	30%
Growth Stage and Crop Factors																	
1st Stagger																	
2nd Stagger																	
3rd Stagger																	
ETc (Evapotranspiration of Reference Crop)	5.14	4.81	3.82	3.96	4.13	4.21	4.88	4.32	5.18	5.06	5.14	5.95					
1. LP	1.20	1.60					2.40										
(Land Preparation)	0.45	1.20					4.50										
Ls							1.20										
Lt							1.80										
Total LP	1.65	6.85	3.00				8.10	1.80	0.00								
2. E	0.51	0.96					1.46	1.30									
(Evapo. during LP)																	
(E-ETo)	0.00	0.48	0.76				0.00	0.00	0.00	0.00	0.00	0.00					
Total Evapo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
3. Sd (Standing Water)	0.90	0.90	2.10				1.80	1.20									
4. ETc	0.72	0.72	0.57	0.46	0.50			2.59	2.38	2.43							
(ETc (S _i))								0.99	1.24	2.73							
Crop Water Requirement	1.53	1.53	1.53	1.82	1.98	1.52		1.30	0.52	0.39	0.41						
(ETc-ETo x KC)	0.57	0.57	0.57	0.59	0.47	0.51			1.99	2.02	1.85						
Total ETc	0.00	0.72	3.55	4.73	5.06	3.16	0.00	4.88	6.13	7.57	2.26	0.00					
5. Farm Loss at ETc (Farm Loss + ETc)	0.00	1.44	7.11	9.46	10.12	6.32	0.00	9.76	12.26	15.15	4.52	0.00					
6. FWR (1+2+3+5)	42	234	310	240	257	160	251	324	311	385	115	0					
(Field Water Requirement) (mm)																	

Total FWR = 2,630 mm

Mu(94-95)

App. 2.3-8 Existing Field Water Requirement in Urubokka Oya Scheme (1991/92)

(1/4)

Paddy : 105 days Variety

KC:	Maha												Yala					
	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG						
Growth Stage and Crop Factors	Maha 70%	30%	30%	40%														
1st Stagger	1.00	1.00	1.00	1.00	1.20	0.90	1.00	1.15	1.20	1.20	0.90							
2nd Stagger	1.00	1.00	1.00	1.00	1.15	1.20	1.00	1.15	1.00	1.15	1.20	0.90						
3rd Stagger													1.00	1.15	1.20	0.90		
ETo (Evapotranspiration of Reference Crop)	5.14	4.81	3.82	3.96	4.13	4.21	4.88	4.32	5.18	5.06	5.14	5.95						
1. LP (Land Preparation)	2.80	1.20					1.20	1.20										
LS (4.0inch/5days)																		
Lt (7.5inch/25days)	1.05	4.20	1.35				2.25	2.25										
Total LP	3.85	6.30	1.35				3.45	6.25	1.80									
2. E (Evapo. during LP)	1.20	2.24	0.57				1.46	1.30	1.04									
(E=ETO)	0.00	0.72	0.00				0.86	0.00	0.00									
Total Evapo (3.0inch)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.90	1.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Sd (Standing Water)	2.10	1.68	0.90	1.06	1.16	1.20	0.90	1.30	1.19	1.21	1.21							
4. ETC Crop Water Requirement	1.34	2.05	0.86	2.22	2.60	2.60	0.50	0.50	0.62	1.37	1.16	1.23						
(ETc=ETO x KC)	1.14	1.14	1.14	1.14	1.24	1.24	1.14	1.19	1.55	0.61	1.39	0.48						
Total ETC	1.68	4.25	4.72	5.23	6.11	6.80	5.07	2.06	2.14	2.62								
5. Farm Loss at ETC (Farm Loss + ETC)	0.00	2.81	7.08	7.86	8.72	2.32	0.00	2.99	10.19	11.33	8.45	4.36						
6. FWR (1+2+3+5)	3.85	11.21	9.33	7.86	8.72	2.32	4.35	10.14	13.19	11.33	8.45	4.36						
(Field Water Requirement) (mm)	98	285	237	200	222	59	110	258	335	288	215	111						

Total FWR = 2.416 mm

App238(1)

App. 2.3-8 Existing Field Water Requirement in Urubokka Oya Scheme (1992/93)

(2/4)

Paddy : 105 days Variety

KC:	Maha			Yala											
	Maha	Yala		SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
Growth Stage and Crop Factors	55%	25%				1.00	1.15	1.20	0.90			1.00	1.15	1.20	0.90
	30%	30%				1.00	1.15	1.20	0.90			1.00	1.15	1.20	0.90
	15%	45%				1.00	1.00	1.15	1.20	0.90			1.00	1.15	1.20
ETo (Evapotranspiration of Reference Crop)			5.14	4.81	3.82	3.96	4.13	4.21	4.88	4.32	5.18	5.06	5.14	5.95	
1. LP	Ls		2.20	1.20	0.60						1.00				
(Land Preparation)	Lr	(4.0inch/5days)	4.13	1.80	0.45						1.88	1.80			
		(7.5inch/25days)	7.13	2.65	2.18						5.43	6.08			
	Total LP		0.47	1.20	1.15						1.08	0.52			
2. E	(Evapo. during LP)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total ETo		1.65	1.35	1.35						0.75	2.25			
3. Sd (Standing Water)		(3.0inch)	0.66	0.66	1.38	1.25	1.36				1.30	0.48			
4. ETC	ETc (S)		1.21	1.14	0.57	1.14	2.04				0.99	0.51			
Crop Water Requirement	ETc (S)		0.22	0.22	0.22	0.24	0.56				1.55	1.75			
(ETc=ETo x KC)	ETc (S)		0.59	0.47	0.51	0.59	0.47				2.28	1.77			
	Total ETC		0.66	0.66	3.58	4.76	5.93				3.84	5.89			
5. Farm Loss at ETC			0.00	1.10	5.96	7.93	9.88				0.00	6.40			
(Farm Loss + ETC)		Total ETC/60%	2.20	9.88	9.49	7.93	9.88				6.18	14.73			
6. FWR (1+2+3+5)		(inch)	56	251	241	201	251				157	374			
(Field Water Requirement)		(mm)													

Total FWR = 2,305 mm

App238(2)

App. 2.3-8 Existing Field Water Requirement in Urubokka Oya Scheme (1993/94)

(3/4)

Paddy : 105 days Variety

KC:	Growth Stage and Crop Factors	Maha												Yala				
		SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	ETc	ETc	ETc		
	1st Stagger	15%	70%	15%	1.00	1.15	1.20	0.90	1.20	0.90	1.00	1.15	1.20	0.90	1.20	0.90	1.20	0.90
	2nd Stagger	70%	45%	15%	1.00	1.15	1.20	0.90	1.20	0.90	1.00	1.15	1.20	0.90	1.20	0.90	1.20	0.90
	3rd Stagger	15%	20%	15%	1.00	1.15	1.20	0.90	1.20	0.90	1.00	1.15	1.20	0.90	1.20	0.90	1.20	0.90
ETc (Evapotranspiration of Reference Crop)			5.14	4.81	3.82	3.96	4.13	4.21	4.88	4.32	5.18	5.06	5.14	5.95				
1. LP	LS	0.60	2.80	0.60					1.40	0.80								
	LT		1.13	1.05					2.10	2.03								
	Total LP	0.60	8.13	2.78					6.65	4.33								
2. E	(Evapo. during LP)	0.13	0.72	0.45					1.42	0.25								
	(E=ETc)	0.00	2.81	2.67					0.73	1.30								
	Total Evapo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Sd (Standing Water)	(3.0inch)	0.45	0.45	2.55					3.00									
4. ETc	ETc (S)		0.18	0.43	0.34	0.37			1.74	1.77								
	Crop Water Requirement		0.33	0.36	0.36	0.56			0.29	0.80								
	(ETc=ETc x KC)		1.34	1.34	2.66	2.89			0.97	0.87								
	Total ETC		0.51	0.51	0.55	1.30			1.79	1.82								
	Farm Loss at ETC		0.59	0.47	0.51	0.47			1.04	0.78								
	(Farm Loss + ETC)		0.23	0.25	0.23	0.25			0.40	0.40								
	FWR (1+2+3+5)		0.18	2.61	4.73	5.84			2.77	6.44								
	(Field Water Requirement)	15	225	246	200	247			169	303								
	Total ETC/60%	0.00	0.30	4.35	7.88	9.74			0.00	4.62								
	(inch)	0.60	8.88	9.67	7.88	9.74			6.65	11.95								
	(mm)	15	225	246	200	247			169	303								

Total FWR = 2.291 mm

App238(3)

App. 2.3-8 Existing Field Water Requirement in Urubokka Oya Scheme (1994/95)

(4/4)

Paddy : 105 days Variety

KC:	Maha												Yala																			
	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG																				
Growth Stage and Crop Factors	Maha	30%	20%	1.00	1.15	1.20	0.90	1.00	1.15	1.20	0.90	1.00	1.15	1.20	0.90	1.20	1.15	1.20	0.90													
	Yala	40%	65%	1.00	1.15	1.20	0.90	1.00	1.15	1.20	0.90	1.00	1.15	1.20	0.90	1.20	1.15	1.20	0.90													
		30%	15%	1.00	1.15	1.20	0.90	1.00	1.15	1.20	0.90	1.00	1.15	1.20	0.90	1.20	1.15	1.20	0.90													
ETo (Evapotranspiration of Reference Crop)																																
1. LP	1.20	1.60	1.20	0.90	1.80	0.45	2.25	3.45	1.03	0.48	0.64	0.48	0.00	0.90	1.44	1.32	1.43	1.82	1.53	0.29	0.68	0.74	1.14	0.76	3.41	3.30	5.86	0.73	0.80	0.98		
(Land Preparation)	Ls	(4.0inch/5days)	Lt	(7.5inch/25days)																												
2. E	0.80	2.60	1.50	1.95	6.85	3.98	0.98	1.59	0.32	0.39	0.00	0.00	0.60	1.95	0.86	0.33	0.41	0.84	2.11	3.23	0.58	0.19	0.73	0.77	4.59	6.56	0.15	0.18	0.80			
(Evapo. during LP)	Total Evapo	(3.0inch)																														
3. Sd (Standing Water)	0.00	0.90	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
4. Etc	Etc (S)	Etc (S)	Etc (S)	Etc (S)																												
5. Farm Loss at Etc	0.00	2.41	5.22	8.04	7.59	5.68	0.00	5.50	9.77	10.93	7.66	1.64	0.00	5.50	9.77	10.93	7.66	1.64	0.00	5.50	9.77	10.93	7.66	1.64	0.00	5.50	9.77	10.93	7.66	1.64		
6. FWR (1+2+3+5)	65	235	274	204	193	144	189	290	259	278	194	42	65	235	274	204	189	290	259	278	194	42	65	235	274	204	189	290	259	278	194	42
(Field Water Requirement)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	
Total FWR = 2,367 mm																																

App. 2.3-9 Existing Water Balance Study in Kirama Oya Scheme (1984/85~1994/95)

Command Area = 1,511 ha

Year	Calculation for Kirama Oya Flow			Rainfall ER (mm) (mm)	Field Water Requirement (FWR)		Field Irrigation Requirement (FIR)				Water Balance		Cultivated Area							
	Month	Kirama Effective Flow			(Paddy: 100%)		FIR Paddy (Maha: 100%)		Required Water		Actual Required		Volume		Possible Area		Success Area			
		Runoff	(a)		(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)
<p>1984/85</p> <p>CA=45km² (a) (b) (c) (m³/km²) (mm) (mm)</p>																				
Sep	0.0123	1,432	573	84	40	53	806	14	209	121	88	485								
Oct	0.0136	1,586	634	119	63	304	4,586	241	3,639	688	2,951	-2,317								
Nov	0.0551	6,425	2,570	272	165	242	3,650	76	1,151	547	604	1,966								
Dec	0.0347	4,051	1,620	368	229	199	3,065	0	0	451	0	1,670								
Jan	0.0323	3,763	1,505	142	78	239	3,611	161	2,431	542	1,890	-385								
Feb	0.0239	2,782	1,113	95	46	59	888	32	186	133	53	1,060								
Maha total		20,039	8,016	1,080	622	1,095	16,547	504	7,616	2,482	5,585	2,431	222	1,732	100%	1,208	80%			
Mar	0.0371	4,325	1,730	155	87	166	2,513	80	1,264	377	828	902								
Apr	0.0243	2,870	1,132	59	229	269	4,058	40	605	609	0	1,132								
May	0.0197	2,295	918	183	105	299	4,522	194	2,931	678	2,253	-1,335								
Jun	0.0651	7,557	2,943	499	310	285	4,298	0	0	645	0	2,943								
Jul	0.0107	1,244	498	28	0	191	2,892	191	2,892	434	2,458	-1,961								
Aug	0.0071	829	332	8	0	68	1,027	68	0	154	0	-541								
Yala total		18,840	7,552	921	733	1,278	19,311	573	8,660	2,897	6,412	1,140	89	1,600	100%	604	40%			
Total		38,619	15,568	2,001	1,353	2,374	35,857	1,678	16,277	5,379	11,997	3,571	331							
<p>1985/86</p>																				
Sep	0.0010	116	47	12	0	53	806	53	806	121	685	-638								
Oct	0.0273	3,187	1,275	212	125	304	4,586	179	2,693	688	2,610	-135								
Nov	0.0301	3,506	1,402	122	65	242	3,650	177	2,674	547	2,123	-124								
Dec	0.0291	4,555	1,822	338	209	199	3,065	0	0	451	0	1,822								
Jan	0.0212	2,475	990	174	99	239	3,611	180	2,112	542	1,570	-580								
Feb	0.0143	1,666	667	60	0	59	888	59	888	133	755	-89								
Maha total		15,507	6,203	917	498	1,095	16,547	608	9,178	2,482	7,147	-944	-86	1,424	94%	1,208	80%			
Mar	0.0157	1,829	732	158	89	166	2,513	77	1,169	377	792	-60								
Apr	0.0183	2,138	855	238	129	269	4,058	40	605	609	0	855								
May	0.0010	116	47	0	0	299	4,522	299	4,522	678	3,844	-3,797								
Jun	0.0010	116	47	24	0	285	4,298	285	4,298	645	3,653	-3,607								
Jul	0.0010	116	47	48	0	191	2,892	191	2,892	434	2,458	-2,412								
Aug	0.0056	649	260	145	80	68	1,027	0	0	154	0	260								
Yala total		4,965	1,986	614	398	1,278	19,311	893	13,487	2,897	10,747	-8,761	-685	825	55%	604	40%			
Total		20,472	8,189	1,531	896	2,374	35,857	1,500	22,664	5,379	17,894	-9,705	-647							
<p>1986/87</p>																				
Sep	0.0047	543	217	552	353	53	806	0	0	121	0	217								
Oct	0.0085	993	397	114	60	304	4,586	244	3,686	688	2,998	-2,601								
Nov	0.0181	2,109	843	167	95	242	3,650	147	2,222	547	1,674	-831								
Dec	0.0111	1,299	520	50	0	199	3,065	199	3,065	451	2,554	-2,035								
Jan	0.0124	1,444	579	48	0	239	3,611	239	3,611	542	3,070	-2,491								
Feb	0.0063	736	294	81	37	59	888	21	323	133	189	105								
Maha total		7,427	2,851	1,012	545	1,095	16,547	850	12,846	2,482	10,485	-7,635	-697	814	54%	1,208	80%			
Mar	0.0181	2,115	846	89	43	166	2,513	124	1,870	377	1,493	-647								
Apr	0.0283	4,465	1,785	53	229	269	4,058	40	605	609	0	1,785								
May	0.0228	2,659	1,064	39	0	299	4,522	299	4,522	678	3,844	-2,780								
Jun	0.0099	1,160	464	0	0	285	4,298	285	4,298	645	3,653	-3,189								
Jul	0.0051	597	239	501	319	191	2,892	0	0	434	0	239								
Aug	0.0240	2,893	1,121	173	99	68	1,027	0	0	154	0	1,121								
Yala total		15,799	5,520	854	688	1,278	19,311	748	11,296	2,897	8,990	-3,471	-271	1,239	82%	604	40%			
Total		20,926	8,370	1,866	1,233	2,374	35,857	1,598	24,142	5,379	19,476	-11,105	-695							
<p>1987/88</p>																				
Sep	0.0155	1,803	721	613	393	53	806	0	0	121	0	721								
Oct	0.0568	6,625	2,650	334	234	304	4,586	70	1,057	688	569	2,281								
Nov	0.0415	4,845	1,938	224	133	242	3,650	109	1,641	547	1,694	845								
Dec	0.0511	5,961	2,385	125	66	199	3,065	133	2,002	451	1,551	833								
Jan	0.0095	1,108	443	12	0	239	3,611	239	3,611	542	3,070	-2,627								
Feb	0.0133	1,553	621	67	28	59	888	21	471	133	238	283								
Maha total		21,896	8,759	1,414	854	1,095	16,547	581	8,783	2,482	6,422	2,336	213	1,724	100%	1,208	80%			
Mar	0.0337	3,925	1,570	110	57	166	2,513	110	1,658	377	1,281	289								
Apr	0.0425	4,962	1,985	173	229	269	4,058	40	605	609	0	1,985								
May	0.0160	1,871	749	119	63	299	4,522	237	3,574	678	2,895	-2,147								
Jun	0.0183	2,133	853	67	28	285	4,298	257	3,881	645	3,236	-2,383								
Jul	0.0075	879	351	85	40	191	2,892	151	2,286	434	1,852	-1,502								
Aug	0.0042	492	197	163	92	68	1,027	0	0	154	0	197								
Yala total		14,260	5,784	717	508	1,278	19,311	795	12,004	2,897	9,265	-3,561	-279	1,232	82%	604	40%			
Total		36,156	14,463	2,730	1,362	2,374	35,857	1,376	20,787	5,379	15,687	-11,224	-89							
<p>1988/89</p>																				
Sep	0.0180	2,101	840	199	116	53	806	0	0	121	0	840								
Oct	0.0052	611	244	148	82	304	4,586	221	3,342	688	2,655	-2,410								
Nov	0.0639	7,925	3,170	250	150	242	3,650	91	1,377	547	829	2,340								
Dec	0.0207	2,418	967	43	0	199	3,065	199	3,065	451	2,554	-1,587								
Jan	0.0031	366	146	87	41	239	3,611	198	2,892	542	2,450	-2,304								
Feb	0.0010	116	47	0	0	59	888	59	888	133	755	-709								
Maha total		13,537	5,415	727	390	1,095	16,547	768	11,605	2,482	9,241	-3,829								

App. 2.3-9 Existing Water Balance Study in Kirama Oya Scheme (1984/85~1994/95)

(2/2)

Command Area = 1,511 ha

	Calculation for Kirama Oya Flow			Rainfall ER (d) (mm)	Field Water Requirement (FWR) (Paddy: 100%)		Field Irrigation Requirement (FIR)			Water Balance		Cultivated Area					
	Munakwada Runoff (a) (m³/sec)	Kirama Inflow (b) (m³/sec)	Effective Flow (c) (m³/sec)		(f) (mm)	Paddy		Re-use Water (q) (m³/sec)	Actual Required (i-j) (m³/sec)	Volume (m) (m³/ha)	Area (n) (ha)	Possible Area (o) (ha)	Success Area Maha: (80%) Yala: (40%) (p) (%)	(r) (ha)	(s) (%)		
						(h) (mm)	(g) x A) (mm)									(k) (mm)	(l) (mm)
	CA=45km² (m³/sec)	(b) (m³/sec)	(c) (m³/sec)		(f)	(g) x A)	(h)	(i)	(k)	(l)	(m)	(n)	(o)	(p)	(r)	(s)	
1990/91 Sep	0.0078	909	364	56	0	53	806	53	806	121	685	-321					
Oct	0.0299	3,483	1,393	116	61	304	4,586	243	3,670	688	2,982	-1,589					
Nov	0.0384	4,483	5,010	182	105	242	3,650	137	2,066	547	1,519	3,491					
Dec	0.0116	1,355	542	53	0	199	3,005	165	2,491	451	2,040	-247					
Jan	0.0090	1,046	418	44	0	39	888	39	888	132	755	-337					
Maha total	23,401	9,520	527	200		1,095	16,547	896	13,533	2,482	11,051	-1,530	140	1,371	91%	1,208	80%
Yala total	11,276	4,510	372	370		1,278	19,311	909	13,728	2,897	10,831	-6,324	495	1,016	67%	604	40%
Total	35,677	14,031	900	569		2,374	35,857	1,805	27,260	5,379	21,882	-7,854	-435				
1991/92 Sep	0.0010	116	47	53	0	63	950	63	950	142	807	-761					
Oct	0.0213	2,484	993	308	190	328	4,960	139	2,096	744	1,352	-359					
Nov	0.0388	4,527	3,111	147	81	224	3,380	142	2,152	507	1,645	166					
Dec	0.0094	1,100	410	37	0	199	2,999	199	2,999	450	2,549	-2,109					
Jan	0.0047	551	221	0	0	257	3,878	257	3,878	582	3,296	-3,076					
Feb	0.0036	422	169	0	0	23	350	23	350	52	297	-129					
Maha total	9,200	3,580	545	271		1,095	16,516	822	12,424	2,477	9,946	-6,267	-579	937	62%	1,208	80%
Yala total	4,264	1,746	812	362		1,307	19,750	945	14,282	2,962	11,319	-9,574	-732	778	52%	604	40%
Total	13,464	5,425	1,357	633		2,401	36,266	1,768	26,705	5,440	21,266	-15,840	-896				
1992/93 Sep	0.0130	1,513	605	103	52	103	1,554	51	765	233	532	73					
Oct	0.0131	1,531	612	172	98	245	3,705	147	2,217	556	1,662	-1,049					
Nov	0.0539	6,283	2,513	163	92	299	3,152	117	1,764	473	1,291	1,222					
Dec	0.0199	2,322	929	26	0	197	2,982	197	2,982	447	2,534	-1,606					
Jan	0.0010	116	47	0	0	220	3,328	220	3,328	499	2,828	-2,762					
Feb	0.0113	1,319	523	50	0	32	485	32	485	73	412	116					
Maha total	13,085	5,234	515	243		1,007	15,204	764	11,541	2,281	9,260	-4,025	-400	1,111	74%	1,208	80%
Yala total	19,896	7,958	462	243		1,312	19,820	1,071	16,178	2,973	13,205	-5,246	-400	1,111	74%	604	40%
Total	32,981	13,192	976	486		2,319	35,024	1,835	27,719	5,254	22,465	-9,271	-800				
1993/94 Sep	0.0050	585	234	4	0	49	739	49	739	111	628	-394					
Oct	0.0416	4,855	1,942	458	229	336	5,075	107	1,622	761	861	1,081					
Nov	0.0753	8,778	3,511	301	185	226	3,412	41	623	512	111	3,400					
Dec	0.0132	1,536	614	339	210	197	2,980	0	0	447	0	614					
Jan	0.0275	3,209	1,284	0	0	264	3,986	254	3,986	598	3,388	-2,104					
Feb	0.0199	2,322	929	0	0	20	295	20	295	43	252	677					
Maha total	21,286	8,514	1,111	623		1,092	16,487	481	7,266	2,473	5,239	-3,275	300	1,811	100%	1,208	80%
Yala total	5,661	2,264	485	243		1,235	18,655	1,042	15,732	2,798	12,934	-10,670	-864	647	43%	604	40%
Total	26,947	10,779	1,596	866		2,327	35,142	1,523	22,998	5,271	18,173	-7,395	-486				
1994/95 Sep	0.0147	1,714	686	164	93	63	950	0	0	142	0	686					
Oct	0.0273	3,182	1,273	232	138	328	4,960	190	2,871	744	2,127	-855					
Nov	0.0779	9,091	3,637	380	229	224	3,380	0	0	507	0	3,637					
Dec	0.0473	5,516	2,206	202	119	199	2,999	80	1,208	450	758	1,448					
Jan	0.0250	2,918	1,167	242	145	257	3,878	112	1,686	582	1,104	63					
Feb	0.0119	1,391	556	103	52	23	350	0	0	52	0	556					
Maha total	23,812	9,525	1,323	776		1,093	16,516	382	5,265	2,477	3,990	-5,535	586	2,017	100%	1,208	80%
Yala total	6,089	1,667	403	123	65	14	209	0	0	31	0	303					
Total	16,901	6,760	951	497		1,266	19,120	820	12,384	2,868	9,516	-2,787	-220	1,290	85%	604	40%
Total	41,773	16,285	2,274	1,273		2,359	35,637	1,202	18,450	5,345	13,538	-2,748	-229				

App. 2.3-10 Existing Field Water Requirement in Kirama Oya Scheme (1991/92)

(1/4)

Paddy : 105 days Variety

KC:	Maha												Yala				
	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG					
Growth Stage and Crop Factors	Maha Yala												Yala				
1st Stagger	80%																
2nd Stagger	45%																
3rd Stagger	20%																
	10%																
ETc (Evapotranspiration of Reference Crop)	5.14	4.81	3.82	3.96	4.13	4.21	4.88	4.32	5.18	5.06	5.14	5.95					
1. LP	1.80	1.80					3.20										
(Land Preparation)								0.80									
Ls		1.80															
Lt		0.40					1.20	4.80	1.50								
Total LP		2.70					5.20	5.60	1.50								
2. E	0.77	1.44					1.30	2.30	0.86								
(Evapo. during LP)		2.16						0.14									
(E=ETc)	0.00	0.16	0.25				0.00	0.00	0.00	0.00	0.00	0.00					
3. Sd (Standing Water)	2.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
4. ETC	1.08	1.08	0.86	0.68	0.74	0.86	2.40	1.73	2.07	1.55	1.64	1.79					
Crop Water Requirement																	
(ETc=ETc x KC)																	
Total ETC	0.00	1.08	4.75	4.69	6.06	0.55	0.00	1.73	5.51	6.13	6.55	1.79					
5. Farm Loss at ETC	0.00	1.80	7.91	7.82	10.11	0.91	0.00	2.88	9.18	10.22	10.92	2.98					
6. FWR (1+2+3+5)	2.48	12.93	8.81	7.82	10.11	0.91	5.20	10.88	11.28	10.22	10.92	2.98					
(Field Water Requirement)	63	328	224	199	257	23	132	276	287	260	277	76					
(mm)																	

Total FWR = 2,401 mm

App2310(1)

App. 2.3-10 Existing Field Water Requirement in Kirama Oya Scheme (1992/93)

(2/4)

Paddy : 105 days Variety

KC	Maha									Yala					
	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG			
Growth Stage and Crop Factors	25%	35%	40%	1.00	1.15	1.20	0.90	1.00	1.15	1.20	0.90	1.00	1.15	1.20	0.90
1st Stagger															
2nd Stagger															
3rd Stagger															
ETo (Evapotranspiration of Reference Crop)	5.14	4.81	3.82	3.96	4.13	4.21	4.88	4.32	5.18	5.06	5.14	5.14	5.06	5.14	5.95
1. LP	1.40	1.60					2.40	1.60							
(Land Preparation)	1.00	0.75					0.90	3.60							
2. E	1.15	2.10					1.80	1.80							
(Evapo. during LP)	0.53	2.40	0.60				3.30	7.00	1.20						
(E=ETo)	4.05	4.45	0.60				0.98	1.73	0.69						
3. Sd (Standing Water)	0.86	0.40					0.00	1.15	0.00						
4. Etc	0.60	1.12	0.25				0.00	1.15	0.00						
Crop Water Requirement	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(ETc=ETo x KC)	1.80	1.20	1.20	1.19	0.93		1.80	1.30	1.55	1.16	1.23	1.23	1.16	1.23	1.07
5. Farm Loss at Etc	1.20	0.84	0.67	0.53	0.58		0.98	1.30	1.55	1.16	1.23	1.23	1.16	1.23	1.07
(Farm Loss + Etc)	0.84	1.03	1.11	1.11	1.30		0.98	1.30	1.55	1.16	1.23	1.23	1.16	1.23	1.07
6. FWR (1+2+3+5)	0.76	0.76	0.76	0.76	0.76		0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
(Field Water Requirement)	0.29	0.29	0.32	0.32	0.74		0.00	3.02	6.32	6.02	5.86	5.86	6.02	5.86	1.07
Total ETC	3.85	4.66	4.66	4.66	5.20		0.00	3.02	6.32	6.02	5.86	5.86	6.02	5.86	1.07
Total ETC/60%	6.41	7.77	7.77	7.77	8.67		0.00	5.04	10.53	10.04	9.77	9.77	10.04	9.77	1.79
Total ETC/60% (inch)	8.21	7.77	7.77	7.77	8.67		3.30	13.84	12.93	10.04	9.77	9.77	10.04	9.77	1.79
Total ETC/60% (mm)	209	197	197	197	220		84	352	328	255	248	248	255	248	45

Total FWR = 2,319 mm

App. 2.3-10 Existing Field Water Requirement in Kirama Oya Scheme (1993/94)

(3/4)

KC:	Maha												Yala		
	Maha	Yala	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	
Growth Stage and Crop Factors	35%	25%			1.00	1.15	1.20	0.90		1.00	1.15	1.20	0.90		
	55%	30%			1.00	1.15	1.20	0.90		1.00	1.15	1.20	0.90		
	10%	45%			1.00	1.15	1.20	0.90		1.00	1.15	1.20	0.90		
ETo (Evapotranspiration of Reference Crop)			5.14	4.81	3.82	3.96	4.13	4.21	4.88	4.32	5.18	5.06	5.14	5.95	
1. LP	Ls		1.40					1.00							
(Land Preparation)	Lt	(4.0inch/5days)		2.20					1.20						
		(7.5inch/25days)	0.53	0.40					1.80						
	Total LP		1.93	9.13	0.45				6.90						
2. E			0.60	1.12				0.18	1.02						
(Evapo. during LP)				2.65					0.98						
(E=ETo)			0.00	0.24	0.19				0.73	1.30				0.00	
3. St (Standing Water)			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
4. ETC	ETc (St)	(3.0inch)		2.70	0.30				0.75	2.25					
Crop Water Requirement	ETc (S ₁)			0.84	0.67	0.53	0.58		0.31	0.81	0.74				
	ETc (S ₂)				1.03	1.11	1.30		0.62	0.62	0.78				
	ETc (S ₃)				2.10	1.67	1.82		1.30	1.30	1.79			1.39	
(ETc=ETo x KC)	ETc (S ₄)				0.81	0.87	2.04			0.97	1.17			0.93	
					0.29	0.10	0.08			0.38	0.38			2.08	
	Total ETc		0.00	0.84	4.89	4.66	6.23	0.46	0.31	3.70	6.26	6.41	4.39	0.00	
5. Farm Loss at ETc															
(Farm Loss + ETc)	Total ETc/60%		0.00	1.40	8.14	7.77	10.39	0.77	0.51	6.17	10.44	10.69	7.32	0.00	
6. FWR (1+2+3+5)	(inch)		1.93	13.23	8.89	7.77	10.39	0.77	8.16	12.02	10.44	10.69	7.32	0.00	
	(Field Water Requirement) (mm)		49	336	226	197	264	20	207	305	265	272	186	0	

Total FWR = 2,327 mm

App. 2.3-10 Existing Field Water Requirement in Kirama Oya Scheme (1994/95)

(4/4)

KC:	Maha			Yala											
	Maha	Yala		SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
Growth Stage and Crop Factors	1st Stagger	45%	10%					1.20	0.90		1.00	1.15	1.20	0.90	
	2nd Stagger	45%	85%					1.20	0.90		1.00	1.15	1.20	0.90	
	3rd Stagger	10%	5%					1.20	0.90		1.00	1.15	1.20	0.90	
ETo (Evapotranspiration of Reference Crop)				5.14	4.81	3.82	3.96	4.13	4.21	4.88	4.32	5.18	5.06	5.14	5.95
1. LP	Ls		1.80		1.80					0.40					
(Land Preparation)	Lt	(4.0inch/5days)	0.68		0.40					3.40	0.20				
		(7.5inch/25days)		2.70						0.75					
	Total LP		2.48	3.38	0.15	0.60				2.55	3.83	0.15	0.23		
2. E			0.77	1.44	1.44					7.10	4.18	0.25			
(Evapo. during LP)				2.16						0.49	1.84				
(E-ETo)			0.00	0.16	0.25					2.07	0.11	0.13			
3. Sd (Standing Water)		(3.0inch)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4. ETC	ETc (S)		1.08	1.08	0.86	0.68	0.74	0.74	0.74	0.30	2.55	0.15	0.40	0.40	
Crop Water Requirement (ETc=ETo x KC)	ETc (S)				1.32	1.43	1.67	1.67	1.67		0.43	0.21	0.46	0.46	
	ETc (S)				1.72	1.37	1.49	1.49	1.49		2.75	1.10	0.82	0.82	
	ETc (S)				0.66	0.71	0.67	0.67	0.67		4.22	4.30	0.06	0.05	0.06
Total ETC		0.00	1.08	4.75	4.69	6.06	6.06	6.06	6.06	0.00	3.55	6.12	6.29	5.11	0.53
5. Farm Loss at ETc (Farm Loss + ETc)			0.00	1.80	7.91	7.82	10.11	10.11	10.11	0.00	5.59	10.20	10.49	8.52	0.55
6. FWR (1+2+3+5)		(inch)	2.48	12.93	8.81	7.82	10.11	10.11	10.11	7.40	12.31	10.57	10.49	8.52	0.55
(Field Water Requirement)		(mm)	63	328	224	199	257	257	23	188	313	269	266	216	14

Total FWR = 2,359 mm

App2310(4)

App. 2.3-11 Water Issue Record of Badagiriya Tank (1984 Sep. ~ 1996 Jan.)

	Tank Water Level	Rainfall (mm)	Changes in Tank Volume (appearance) (a)	Q outflow			Q Inflow			Runoff			
				Tank Issue Record (at Sluice) (b) (Ac.ft)	Evaporation A-1200acs (c) (Ac.ft)	Total Outflow (b+c) (Ac.ft)	BCW Record (at Karambagas) (d) (Ac.ft)	Feeder Canal No. 2 (e) (Ac.ft)	Inflow from Badagiriya Catchment Area (a+b+c-d+e) (Ac.ft) (000/m3)	CA=135.05 mile ² (CA=345.0 km ²)	CA=135.05 mile ² (CA=345.0 km ²)	CA=135.05 mile ² (CA=345.0 km ²)	
1984.85	Sep	11.2	27.0	-2,468	0	493.2	493.2	0	0	725	895	5.37	0.0010
	Oct	8.2	173.0	-916	1,350	463.2	1,813.2	0	0	897	1,107	6.64	0.0012
	Nov	7.0	147.0	6,180	840	372.0	1,212.0	0	0	7,392	9,121	54.73	0.0102
	Dec	14.0	148.0	0	2,360	372.0	2,732.0	0	0	2,732	3,371	20.23	0.0038
	Jan	14.0	161.0	-1,133	2,160	429.6	2,589.6	0	0	1,456	1,797	10.78	0.0020
	Feb	13.0	251.0	472	0	418.8	418.8	0	0	891	1,100	6.60	0.0012
	Maha total (average)	907.0		2,135	6,710	2,548.8	9,258.8	0	0	14,093	17,391	117.39	0.0032
	Mar	13.4	125.0	661	0	464.4	464.4	0	0	1,126	1,389	8.33	0.0016
	Apr	14.0	110.0	-1,865	1,490	469.2	1,959.2	0	0	725	895	5.37	0.0010
	May	12.3	12.0	-1,720	1,400	495.6	1,895.6	0	0	725	895	5.37	0.0010
	Jun	10.3	13.0	-1,221	465	518.4	983.4	0	0	725	895	5.37	0.0010
	Jul	8.8	0.0	-2,654	1,420	528.0	1,948.0	0	0	725	895	5.37	0.0010
	Aug	4.8	0.0	-1,428	730	536.4	1,266.4	0	0	725	895	5.37	0.0010
	Yala total (average)	260.0		-3,227	5,505	3,012.0	8,517.0	0	0	4,751	5,862	5.86	0.0011
	Total (Average)	1,167.0		-6,092	12,215	5,560.8	17,775.8	0	0	18,844	23,253	11.63	0.0022
1985.86	Sep	0.8	39.0	345	0	493.2	493.2	0	0	838	1,034	6.21	0.0012
	Oct	2.3	156.0	2,054	0	463.2	463.2	0	0	2,517	3,106	18.64	0.0035
	Nov	6.5	237.0	3,550	665	372.0	1,037.0	0	0	4,587	5,660	33.97	0.0063
	Dec	11.0	31.0	2,373	1,180	372.0	1,552.0	0	0	3,925	4,843	29.06	0.0054
	Jan	13.5	38.0	-378	3,100	429.6	3,529.6	0	0	3,152	3,889	23.34	0.0043
	Feb	13.2	82.0	-2,139	1,885	418.8	2,303.8	0	0	725	895	5.37	0.0010
	Maha total (average)	583.0		5,805	6,830	2,548.8	9,378.8	0	0	15,744	19,428	119.43	0.0036
	Mar	10.8	139.0	-717	1,065	464.4	1,529.4	0	0	813	1,003	6.02	0.0011
	Apr	10.0	68.0	573	0	469.2	469.2	0	0	1,043	1,286	7.72	0.0014
	May	10.7	32.0	-1,122	1,100	495.6	1,595.6	0	0	725	895	5.37	0.0010
	Jun	9.3	77.0	-2,287	1,155	518.4	1,673.4	0	0	725	895	5.37	0.0010
	Jul	6.3	9.0	-1,639	410	528.0	938.0	0	0	725	895	5.37	0.0010
	Aug	3.0	4.0	435	1,085	536.4	1,621.4	0	0	2,056	2,538	15.23	0.0028
	Yala total (average)	329.0		-4,755	4,815	3,012.0	7,827.0	0	0	6,087	7,511	7.51	0.0014
	Total (Average)	912.0		1,050	11,645	5,560.8	17,205.8	0	0	21,830	26,939	13.47	0.0025
1986.87	Sep	4.0	80.0	-948	875	493.2	1,368.2	0	0	725	895	5.37	0.0010
	Oct	1.4	61.2	2,490	0	463.2	463.2	0	0	2,953	3,644	21.87	0.0041
	Nov	6.8	59.9	1,490	0	372.0	372.0	0	0	1,862	2,298	13.79	0.0026
	Dec	8.8	70.7	1,006	0	372.0	372.0	0	0	1,378	1,701	10.21	0.0019
	Jan	10.0	20.9	-287	50	429.6	479.6	0	0	725	895	5.37	0.0010
	Feb	9.7	70.8	-523	0	418.8	418.8	0	0	725	895	5.37	0.0010
	Maha total (average)	363.5		3,229	925	2,548.8	3,473.8	0	0	8,369	10,327	10.33	0.0019
	Mar	9.0	88.9	-262	20	464.4	464.4	0	0	725	895	5.37	0.0010
	Apr	8.7	45.1	196	30	469.2	499.2	0	0	725	895	5.37	0.0010
	May	8.9	0.0	-393	80	495.6	575.6	0	0	725	895	5.37	0.0010
	Jun	8.4	0.0	-589	0	518.4	518.4	0	0	725	895	5.37	0.0010
	Jul	7.7	9.0	-737	60	528.0	588.0	0	0	725	895	5.37	0.0010
	Aug	6.7	32.1	-338	110	536.4	646.4	0	0	725	895	5.37	0.0010
	Yala total (average)	175.1		-2,122	300	3,012.0	3,312.0	0	0	4,350	5,368	5.37	0.0010
	Total (Average)	538.6		1,107	1,225	5,560.8	6,785.8	0	0	12,719	15,695	7.85	0.0015
1987.88	Sep	6.1	289.1	-435	45	493.2	538.2	0	0	725	895	5.37	0.0010
	Oct	8.2	0.0	-916	1,350	463.2	1,813.2	0	0	897	1,107	6.64	0.0012
	Nov	7.0	0.0	6,180	840	372.0	1,212.0	0	0	7,392	9,121	54.73	0.0102
	Dec	14.0	0.0	0	2,360	372.0	2,732.0	0	0	2,732	3,371	20.23	0.0038
	Jan	14.0	161.0	-1,133	2,160	429.6	2,589.6	0	0	1,456	1,797	10.78	0.0020
	Feb	13.0	22.2	472	0	418.8	418.8	0	0	891	1,100	6.60	0.0012
	Maha total (average)	482.3		4,168	6,755	2,548.8	9,303.8	0	0	14,093	17,391	117.39	0.0032
	Mar	13.4	41.9	661	0	464.4	464.4	0	0	1,126	1,389	8.33	0.0016
	Apr	14.0	103.0	-1,865	1,490	469.2	1,959.2	0	0	725	895	5.37	0.0010
	May	12.3	158.0	-1,720	1,400	495.6	1,895.6	0	0	725	895	5.37	0.0010
	Jun	10.3	16.1	-1,221	465	518.4	983.4	0	0	725	895	5.37	0.0010
	Jul	8.8	27.0	-2,654	1,420	528.0	1,948.0	0	0	725	895	5.37	0.0010
	Aug	4.8	77.0	-1,428	730	536.4	1,266.4	0	0	725	895	5.37	0.0010
	Yala total (average)	423.0		-8,227	5,505	3,012.0	8,517.0	0	0	4,751	5,862	5.86	0.0011
	Total (Average)	905.3		-4,060	12,260	5,560.8	17,820.8	0	0	18,844	23,253	11.63	0.0022
1988.89	Sep	11.2	116.2	-2,468	0	493.2	493.2	0	0	725	895	5.37	0.0010
	Oct	2.0	200.9	362	0	463.2	463.2	0	0	825	1,018	6.11	0.0011
	Nov	3.1	111.6	8,254	0	372.0	372.0	0	0	8,626	10,645	63.87	0.0119
	Dec	14.0	0.0	0	0	372.0	372.0	0	0	725	895	5.37	0.0010
	Jan	14.0	42.9	-94	40	429.6	469.6	0	0	725	895	5.37	0.0010
	Feb	13.9	57.5	-1,197	120	418.8	538.8	0	0	725	895	5.37	0.0010
	Maha total (average)	529.1		4,858	160	2,548.8	2,708.8	0	0	12,352	15,242	15.24	0.0028
	Mar	12.9	41.2	-1,720	3,070	464.4	3,534.4	0	0	1,814	2,239	13.44	0.0025
	Apr	10.9	37.0	-1,664	1,390	469.2	1,859.2	0	0	725	895	5.37	0.0010
	May	8.9	11.0	-1,815	1,040	495.6	1,535.6	0	0	725	895	5.37	0.0010
	Jun	6.5	95.4	-1,160	490	518.4	1,008.4	0	0	725	895	5.37	0.0010
	Jul	4.4	0.7	918	315	528.0	843.0	0	0	1,761	2,173	13.04	0.0024
	Aug	6.1	0.0	-691	200	536.4	736.4	0	0	725	895	5.37	0.0010
	Yala total (average)	185.3		-6,131	6,505	3,012.0	9,517.0	0	0	6,473	7,990	7.99	0.0015
	Total (Average)	714.4		-3,273	6,665	5,560.8	12,225.8	0	0	18,827	23,232	11.62	0.0022
1989.90	Sep	4.9	69.5	-227	80	493.2	573.2	0	0	725	895	5.37	0.0010
	Oct	4.4	184.3	725	0	463.2	463.2	0	0	1,188	1,466	8.79	0.0016
	Nov	5.8	0.0	1,138	0	372.0	372.0	0	0	1,510	1,863	11.18	0.0021
	Dec	7.5	71.6	-65	60	372.0	432.0	0	0	725	895	5.37	0.0010
	Jan	7.4	0.0	-196	0	429.6	429.6	0	0	725	895	5.37	0.0010
	Feb	2.2	39.1	-159	0	418.8	418.8	0	0	725	895	5.37	0.0010
	Maha total (average)	344.5		1,174	140	2,548.8	2,688.8	0	0	5,597	6,907	6.91	0.0013
	Mar	6.9	101.7	-193	0	464.4	464.4	0	0	725	895	5.37	0.0010
	Apr	6.6	66.5	-2,758	0	469.2	469.2	0	0	725	895	5.37	0.0010
	May	0.0	10.5	2,227	0	495.6	495.6	0	0	2,722	3,359	20.16	0.0038
	Jun	5.7	0.0	290	2,161	518.4	2,679.3	0	0	2,969	3,664	21.99	0.0041

App. 2.3-11 Water Issue Record of Badagirlya Tank (1984 Sep. ~ 1996 Jan.)

	Tank Water Level	Rainfall in Badagirya (mm)	Changes in Tank Volume (appearance) (a)	Q outflow			Q Inflow			Runoff			
				Tank Issue Record (at Stulse) (b) (Ac.ft)	Evaporation (at Tissa) A-1,207acs (c) (Ac.ft)	Total Outflow (b+c) (Ac.ft)	BCW Record (at Karambagas) (d) (Ac.ft)	Feeder Canal No. 2 (e) (Ac.ft)	Inflow from Badagirya Catchment Area (a+b+c+d+e) (Ac.ft) (000m3)	CA=135.05 mile2 (CA=345.0 km2) (Ac.ft/m2) (m3/km2)			
1990-91													
	Sep	4.5	95.8	-76	1,656	493.2	2,149.1	0	0	2,073	2,559	15.35	0.0029
	Oct	4.3	233.7	4,747	81	463.2	544.3	0	0	5,292	6,530	39.18	0.0073
	Nov	11.0	268.1	3,317	1,883	372.0	2,254.9	0	0	5,572	6,876	41.26	0.0077
	Dec	14.3	69.3	-472	2,465	372.0	2,836.6	0	0	2,364	2,918	17.51	0.0033
	Jan	13.9	0.0	-472	3,715	429.6	4,144.4	0	0	3,672	4,531	27.19	0.0051
	Feb	13.5	0.0	-1,298	2,500	418.8	2,918.9	0	0	1,621	2,000	12.00	0.0022
	Maha total (average)	11.8	685.9	5,747	12,299	2,548.8	14,848.1	0	0	20,593	25,414	125.42	0.0047
	Mar	12.3	61.3	-860	1,875	464.4	2,339.1	0	0	1,479	1,875	10.95	0.0020
	Apr	11.3	87.2	215	245	469.2	714.1	0	0	929	1,147	6.88	0.0013
	May	11.5	116.2	-2,035	1,638	495.6	2,133.4	0	0	725	895	5.37	0.0010
	Jun	9.1	25.6	-1,047	1,630	518.4	2,148.7	0	0	1,102	1,360	8.16	0.0015
	Jul	7.8	52.1	-899	1,642	528.0	2,169.9	0	0	1,271	1,569	9.41	0.0018
	Aug	6.5	0.0	-138	1,216	536.4	1,752.8	0	0	1,414	1,745	10.47	0.0020
	Yala total (average)	11.8	343.4	-4,963	8,246	3,012.0	11,257.9	0	0	6,921	8,540	48.54	0.0016
	Total (Average)	11.8	1,030.3	783	20,545	5,560.8	26,105.9	0	0	27,515	33,954	166.98	0.0032
1991-92													
	Sep	5.9	104.7	0	0	493.2	493.2	0	0	725	895	5.37	0.0010
	Oct	5.9	102.1	-290	831	463.2	1,294.1	0	0	1,004	1,239	7.44	0.0014
	Nov	5.4	149.7	-342	1,170	372.0	1,542.1	0	0	1,200	1,481	8.89	0.0017
	Dec	4.8	7.9	-378	1,133	372.0	1,505.4	0	0	1,127	1,391	8.45	0.0016
	Jan	4.0	0.0	-378	1,338	429.6	1,767.2	0	0	1,389	1,714	10.29	0.0019
	Feb	3.2	0.0	151	489	418.8	908.2	0	0	1,059	1,307	7.85	0.0015
	Maha total (average)	5.5	364.4	-1,237	4,961	2,548.8	7,510.2	0	0	6,505	8,027	48.03	0.0015
	Mar	3.5	10.9	38	0	464.4	464.4	0	0	725	895	5.37	0.0010
	Apr	3.6	84.4	-227	0	469.2	469.2	0	0	725	895	5.37	0.0010
	May	3.1	0.0	76	0	495.6	495.6	0	0	725	895	5.37	0.0010
	Jun	3.3	0.0	-219	0	518.4	518.4	0	0	725	895	5.37	0.0010
	Jul	2.8	0.0	-219	0	528.0	528.0	0	0	725	895	5.37	0.0010
	Aug	2.0	0.0	-268	0	536.4	536.4	0	0	725	895	5.37	0.0010
	Yala total (average)	4.9	95.3	-819	0	3,012.0	3,012.0	0	0	4,350	5,368	27.37	0.0010
	Total (Average)	4.9	459.7	-2,057	4,961	5,560.8	10,522.2	0	0	10,855	13,395	67.70	0.0012
1992-93													
	Sep	0.8	0.0	-37	0	493.2	493.2	0	0	725	895	5.37	0.0010
	Oct	0.0	244.2	0	0	463.2	463.2	0	0	725	895	5.37	0.0010
	Nov	0.0	63.6	2,239	1,000	372.0	1,372.1	0	0	3,611	4,456	26.74	0.0050
	Dec	6.2	17.0	1,092	3,520	372.0	3,892.4	0	0	4,984	6,151	36.91	0.0069
	Jan	7.8	0.0	-1,189	3,167	429.6	3,596.7	0	0	2,408	2,971	17.83	0.0033
	Feb	6.0	32.7	-483	2,879	418.8	3,298.0	0	0	2,815	3,473	20.84	0.0039
	Maha total (average)	4.2	382.5	1,622	10,567	2,548.8	13,115.6	0	0	15,268	18,841	118.84	0.0035
	Mar	5.2	62.6	-235	1,801	464.4	2,265.3	0	0	2,031	2,506	15.04	0.0028
	Apr	4.8	120.8	138	0	469.2	469.2	0	0	725	895	5.37	0.0010
	May	5.0	28.9	73	0	495.6	495.6	0	0	725	895	5.37	0.0010
	Jun	5.1	44.9	-362	0	518.4	518.4	0	0	725	895	5.37	0.0010
	Jul	4.4	0.0	-303	0	528.0	528.0	0	0	725	895	5.37	0.0010
	Aug	3.8	18.2	-422	0	536.4	536.4	0	0	725	895	5.37	0.0010
	Yala total (average)	4.2	275.4	-1,801	0	3,012.0	3,012.0	0	0	4,350	5,368	27.37	0.0010
	Total (Average)	4.2	657.9	-2,208	12,568	5,560.8	17,928.7	0	0	20,923	25,820	112.91	0.0034
1993-94													
	Sep	2.8	145.0	-413	28	493.2	521.2	0	0	725	895	5.37	0.0010
	Oct	1.4	109.6	986	0	463.2	463.2	0	0	1,449	1,788	10.73	0.0020
	Nov	4.1	277.9	6,294	1,797	372.0	2,168.6	335	0	8,128	10,029	60.18	0.0112
	Dec	12.7	292.7	1,506	747	372.0	1,119.3	684	0	1,942	2,396	14.38	0.0027
	Jan	14.0	50.3	-378	2,347	429.6	2,776.3	666	0	1,733	2,138	12.83	0.0024
	Feb	13.7	0.0	-1,344	1,982	418.8	2,401.1	481	0	725	895	5.37	0.0010
	Maha total (average)	7.8	620.9	2,652	6,901	2,548.8	9,449.7	2,165	0	14,702	18,142	118.14	0.0034
	Mar	12.4	58.0	-358	1,153	464.4	1,617.7	603	0	725	895	5.37	0.0010
	Apr	12.0	15.0	-430	841	469.2	1,310.3	0	0	880	1,086	6.52	0.0012
	May	11.5	12.0	-2,689	2,565	495.6	3,060.4	242	0	725	895	5.37	0.0010
	Jun	8.3	0.0	-2,337	1,868	518.4	2,386.8	331	0	725	895	5.37	0.0010
	Jul	4.7	43.1	-151	248	528.0	775.8	2,185	480	725	895	5.37	0.0010
	Aug	4.3	28.0	-340	272	536.4	808.5	1,324	0	725	895	5.37	0.0010
	Yala total (average)	7.8	156.1	-6,306	6,948	3,012.0	9,959.5	4,685	480	4,505	5,560	27.37	0.0010
	Total (Average)	7.8	777.0	-346	13,848	5,560.8	19,409.2	6,850	480	19,207	23,701	118.85	0.0022
1994-95													
	Sep	3.6	145.0	265	0	493.2	493.2	8	0	750	926	5.55	0.0010
	Oct	4.2	114.6	1,080	69	463.2	532.5	166	0	1,446	1,784	10.74	0.0020
	Nov	6.2	209.7	290	1,833	372.0	2,204.7	171	24	2,348	2,897	17.38	0.0032
	Dec	6.7	52.1	-1,029	1,616	372.0	1,988.0	1,544	0	725	895	5.37	0.0010
	Jan	4.9	57.6	-76	957	429.6	1,386.6	1,513	433	725	895	5.37	0.0010
	Feb	4.8	99.9	-189	888	418.8	1,306.3	1,397	274	725	895	5.37	0.0010
	Maha total (average)	5.8	678.9	340	5,363	2,548.8	7,911.3	4,299	731	6,719	8,291	48.29	0.0015
	Mar	4.3	6.9	-605	660	464.4	1,124.5	117	115	725	895	5.37	0.0010
	Apr	3.0	266.5	3,748	0	469.2	469.2	19	0	4,198	5,180	31.08	0.0058
	May	9.1	121.6	-589	872	495.6	1,367.5	198	0	1,758	2,170	13.02	0.0024
	Jun	9.8	29.4	-327	663	518.4	1,181.4	1,894	0	725	895	5.37	0.0010
	Jul	9.4	15.0	-1,112	1,108	528.0	1,635.8	848	0	725	895	5.37	0.0010
	Aug	8.0	22.7	-1,240	1,334	536.4	1,869.9	462	0	725	895	5.37	0.0010
	Yala total (average)	6.2	462.1	-1,052	4,645	3,012.0	7,657.3	3,537	113	8,856	10,929	58.93	0.0020
	Total (Average)	6.2	1,141.0	1,393	10,008	5,560.8	15,568.6	8,336	844	15,575	19,220	96.11	0.0018
1995-96													
	Sep	6.3	44.6	-483	337	493.2	830.5	0	0	725	895	5.37	0.0010
	Oct	5.4	131.4	-1,766	1,998	463.2	2,461.1	653	246	725	895	5.37	0.0010
	Nov	1.1	n.a.	73	0	372.0	372.0	0	837	1,282	1,582	9.49	0.0018
	Dec	1.3	n.a.	972	1,033	372.0	1,405.0	10	445	2,813	3,471	20.83	0.0039
	Jan	4.0	n.a.	-454	933	429.6	1,363.0	1,673	546	725	895	5.37	0.0010
	Feb	3.0	n.a.	-908	480	418.8	898.5	491	0	725	895	5.37	0.0010
	Maha total (average)	4.0	176.0	-2,565	4,781	2,548.8	7,350.2	2,826	2,074	6,995	8,631	4	

App. 2.3-12 Existing Water Balance Study in Badagiriya Scheme (1984/85 ~ 1994/95) (2/2)

Command Area = 594 ha

Year	Badagiriya Tank Issue Records					Rainfall (at Badagiriya) ER		Unit FWR	Unit FIR	FIR	Water Balance		Cultivated Area			
	Tank Issue (at Sluice)	Feeder Canal	Total Issue			(mm)	(mm)	(mm)	(mm)	A-594.0ha (100%)	Volume	Area	Possible Area		Success Area Maha: (80%) Yala: (55%)	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	
1991/91	1,656	0	1,656	2,043	1,022	96	47	0	0	0	1,022					
Oct	81	0	81	100	50	234	140	53	0	0	50					
Nov	1,883	0	1,883	2,323	1,162	288	176	293	117	696	465					
Dec	2,465	0	2,465	3,041	1,521	69	29	237	207	1,232	269					
Jan	3,715	0	3,715	4,584	2,292	0	0	216	216	1,283	1,009					
Feb	2,500	0	2,500	3,085	1,543	0	0	243	243	1,441	102					
Maha total	12,299	0	12,299	15,177	7,589	687	392	1,042	783	4,652	2,936	282	876	100%	475	80%
Mar	1,875	0	1,875	2,313	1,157	61	0	65	65	355	772					
Apr	245	0	245	302	151	87	41	182	140	833	-682					
May	1,638	0	1,638	2,021	1,011	116	61	337	276	1,639	-629					
Jun	1,630	0	1,630	2,012	1,006	27	0	274	274	1,626	-620					
Jul	1,642	0	1,642	2,026	1,013	52	0	299	299	1,775	-762					
Aug	1,216	0	1,216	1,501	751	0	0	216	216	1,280	-530					
Yala total	8,246	0	8,246	10,175	5,088	343	102	1,371	1,269	7,538	-2,451	-179	415	70%	327	55%
Total	20,545	0	20,545	25,353	12,676	1,030	494	2,413	2,052	12,191						
1991/92	0	0	0	0	0	165	53	0	0	0	0					
Oct	831	0	831	1,025	513	102	51	53	2	12	501					
Nov	1,170	0	1,170	1,444	722	150	83	293	210	1,247	-525					
Dec	1,133	0	1,133	1,399	695	8	0	237	237	1,407	-707					
Jan	1,338	0	1,338	1,651	825	0	0	216	216	1,283	-458					
Feb	489	0	489	604	302	0	0	243	243	1,441	-1,139					
Maha total	4,961	0	4,961	6,122	3,061	364	188	1,042	907	5,389	-2,328	-223	371	62%	475	80%
Mar	0	0	0	0	0	11	0	65	65	355	-385					
Apr	0	0	0	0	0	84	40	182	142	814	-814					
May	0	0	0	0	0	0	0	337	337	2,001	-2,001					
Jun	0	0	0	0	0	0	0	274	274	1,626	-1,626					
Jul	0	0	0	0	0	0	0	299	299	1,775	-1,775					
Aug	0	0	0	0	0	0	0	216	216	1,280	-1,280					
Yala total	0	0	0	0	0	95	40	1,371	1,332	7,911	-7,911	-577	17	3%	0	0%
Total	4,961	0	4,961	6,122	3,061	460	227	2,413	2,239	13,300						
1992/93	0	0	0	0	0	244	147	53	0	0	0					
Oct	0	0	0	0	0	89	42	293	251	1,490	-873					
Nov	1,000	0	1,000	1,234	617	17	0	237	237	1,407	765					
Dec	3,520	0	3,520	4,344	2,172	0	0	216	216	1,283	671					
Jan	3,167	0	3,167	3,968	1,954	0	0	243	243	1,441	336					
Feb	2,879	0	2,879	3,553	1,776	33	0	243	243	1,441	336					
Maha total	10,567	0	10,567	13,039	6,520	383	189	1,042	936	5,621	899	86	680	100%	475	80%
Mar	1,801	0	1,801	2,223	1,111	63	0	65	65	355	726					
Apr	0	0	0	0	0	121	64	182	118	699	-699					
May	0	0	0	0	0	29	0	337	337	2,001	-2,001					
Jun	0	0	0	0	0	45	0	274	274	1,626	-1,626					
Jul	0	0	0	0	0	0	0	299	299	1,775	-1,775					
Aug	0	0	0	0	0	18	0	216	216	1,280	-1,280					
Yala total	1,801	0	1,801	2,223	1,111	275	64	1,371	1,307	7,766	-6,655	-455	109	18%	0	0%
Total	12,368	0	12,368	15,262	7,631	658	253	2,413	2,234	13,387						
1993/94	28	0	28	35	17	145	80	0	0	0	17					
Oct	0	0	0	0	0	110	56	53	0	0	0					
Nov	1,797	0	1,797	2,217	1,108	278	169	293	124	737	372					
Dec	747	0	747	922	461	293	179	237	58	343	118					
Jan	2,347	0	2,347	2,896	1,448	50	0	216	216	1,283	165					
Feb	1,982	0	1,982	2,416	1,223	0	0	243	243	1,441	-218					
Maha total	6,901	0	6,901	8,516	4,258	621	455	1,042	640	3,804	454	44	638	100%	475	80%
Mar	1,153	0	1,153	1,423	712	58	0	65	65	355	327					
Apr	841	0	841	1,038	519	15	0	182	182	1,079	-560					
May	2,565	0	2,565	3,165	1,582	12	0	337	337	2,001	-418					
Jun	1,868	0	1,868	2,306	1,153	0	0	274	274	1,626	-473					
Jul	248	480	728	898	449	43	0	299	299	1,775	-1,326					
Aug	272	0	272	336	168	28	0	216	216	1,280	-1,113					
Yala total	6,948	480	7,428	9,166	4,583	156	0	1,371	1,371	8,146	-3,563	-260	334	56%	327	55%
Total	13,848	480	14,328	17,681	8,841	777	455	2,413	2,012	11,932						
1994/95	0	0	0	0	0	145	80	0	0	0	0					
Oct	69	0	69	86	43	115	60	53	0	0	43					
Nov	1,833	24	1,857	2,291	1,146	210	123	293	170	1,008	137					
Dec	1,616	0	1,616	1,994	997	52	0	237	237	1,407	410					
Jan	957	433	1,390	1,715	858	58	0	216	216	1,283	-425					
Feb	858	274	1,132	1,434	717	100	50	243	193	1,441	-428					
Maha total	5,363	731	6,094	7,520	3,760	679	313	1,042	815	4,812	-1,683	-104	490	83%	475	80%
Mar	669	113	782	965	483	7	0	65	65	355	98					
Apr	0	0	0	0	0	267	162	182	20	119	-119					
May	872	0	872	1,076	538	122	64	337	272	1,618	-1,080					
Jun	663	0	663	818	409	29	0	274	274	1,626	-1,217					
Jul	1,108	0	1,108	1,367	684	15	0	299	299	1,775	-1,091					
Aug	1,334	0	1,334	1,646	823	23	0	216	216	1,280	-458					
Yala total	4,645	113	4,758	5,972	2,936	462	226	1,371	1,145	6,803	-3,667	-282	312	53%	327	55%
Total	10,008	811	10,819	13,391	6,696	1,141	539	2,413	1,961	11,646						

APPENDIX-2.4 AGRICULTURE

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2.4.1 National Policy Framework in Agriculture (Brief)

D.M.Ariyaratna
Secretary, MOA

1. Introduction

NPF emphasizes five items in Agricultural Sector:

01. High quality seeds provision
02. Agricultural extension services including farm inputs
03. Integrated farm planning including storage, marketing, export, etc.
04. Restructure of Agrarian Service Centre as Production Centres
05. Integrated approach by the State, private, and NGO

Particular emphasis is given to the horticulture development with export promotion as the ultimate objective. A Floor Price Scheme to be operated through Paddy Marketing Board (PMB) as a Specialized Rural Financial Institution.

Agricultural research policies and programmes have to be determined by the Council for Agricultural Research Policy (CARP).

All the agricultural land (approx. 1.5 million ha) under the provision of the Agrarian Services Act should be geared to enhancing agricultural productivity and their contribution to the national economy through constant review, monitoring of leases, sales of State land and title registration.

The Ministry prepared a "Statement of Policy and Programmes" and "Implementation Strategy" in Dec.1994 by the Advisory Committee with the Ministry officials.

2. Inter-Ministrial Consultation

Farmer Organizations in the implementation of the National Irrigation Rehabilitation Programme / Village Irrigation Rehabilitation Programme funded by the World Bank so as to improve performance and ensure comprehensive coverage of the minor irrigation network. Both Ministries to evolve an integrated approach to water management and land use in the context of the programmes of crop diversification under irrigation set out in the National Policy Framework: Agriculture Land and Forestry.

3. Paddy

About 1.8 million farmers or 10% of the total population are engaged in paddy cultivation. Rice accounts for 45% and 40% of the per capita calories and proteins respectively in the Sri Lankan diet. Hence food security by pursuing a policy towards achieving self-sufficiency in the major staple, rice should be a major policy goal.

The total extent of paddy increased from 487,000ha in 1957 to 835,000ha in 1993 showing an increase of 74% during this period with Mahaweli Programme by 139,000 ha or 40%.

Presently the annual increase in rice demand is about 25,321 ton. Assuming the population growth pre year is 2 million, the rice demand by 2000, 2010 and 2020 will be 2.12, 2.37 and 2.63 million ton respectively. To achieve such an increase at the present levels of cultivation, the yield per ha has to be increased from 3.5 to 4.5 t/ha as a target.

Major problems in paddy cultivation

01. Stagnant yields/ ha

Both production and yield /ha have been stagnant since 1984 with around 2.5 million ton and 3.5 t/ha respectively. The yield increase to 4.5 t/ha are urgently required with concerted research efforts.

02. Low Cropping Intensity

A declining trend has been noted in cropping intensities in all the paddy area during 1980-90 except in the mid-country wet zone. In the major areas the cropping intensity is around 130%.

03. Inadequacy of Certified Seed

Certified seed is available for only 4% of the total demand. During 1991-94, issue of seed paddy has been only 190,000 bushels although the requirement has been in the range of 4.7 million bushels. The yield increases due to high quality seed has been estimated at 5-20%.

04. Use of Long-aged Varieties

4 1/2 months variety is on the decline as a trend in the past decade. The cultivation of long-aged varieties should be encouraged by issue of certified seeds and timely water issues in the major irrigation schemes, since the long-aged varieties yield more and tolerate stress conditions, too.

05. High Cost of Production

High cost of production is a serious problem facing the paddy farmers. The average production cost / acre is Rs 9,900 in Maha and Rs 8,800 in Yala. The labour cost component is highest, on average 44-48% in irrigated paddy due to the use of additional man-days (124).

06. Crop Diversification

In terms of increasing farmer income, switching to other field crops, particularly with export potential, diversification will be an alternative attractive proposition. The rainfed areas will have a wider choice of this option. However, paddy under high potential major/ minor irrigation areas should be intensified to maintain high yield levels.

07. Marketing

Paddy marketing is dealt by Paddy Marketing Board(PMB) and private traders. The retail prices fluctuate, lowest during the harvest season with price-down by about 20%, which is a disincentive to the farmers.

Policy Recommendations

01. Rice yield would be increased to 4.5 t/ha through a package of practices; (a) supply of seed paddy preferably of long-aged varieties from 4% upto 10%. (b) increasing cropping intensity.
02. Reduction of high production cost; A 30% fertilizer subsidy announced by the Gov. effective from the 94/95 Maha.
03. Marketing of paddy would be streamlined; PMB system would be continued. Farm input supply and credit would be organized through farmer organizations, and farmer group.
04. R&D should focus on the breeding of high yielding rice varieties suitable for different agro-ecological regions.

4. Other Field Crops (OFC)

OFCs are an important group of crops grown under rainfed upland or under minor irrigation schemes in the dry zone.

They are grouped into four main categories comprising of twelve important crops.

Grain Legumes : green gram, cowpea, black gram and pigeon pea .
Coarse Grains : maize and kurakkan .

Oil Seeds : groundnuts, gingelly and soy bean .
Condiments : chillies, large onion, and red onion.

There is high potential for self-employment opportunities with OFCs. On a rough estimate about 250,000 people are directly involved in the cultivation of OFCs.

Presently about 40,000ha or 10% of the total irrigable paddy lands are diversified although the estimated available extent is over 80,000ha. The crops diversified are chillies, onion, greengram, blackgram, cowpea, soybean, groundnuts and vegetables.

OFCs are high income generating group of crops, however, at present the profit margins are small due to low market prices, high input and high labour costs.

Major Constraints :

01. Lack of adequate marketing facilities and exploitation by traders. The floor price should be fixed.
02. Inadequate transport, assembling, sorting, grading, storage and packing facilities hamper the expansion of OFC cultivation.
03. The current policies with regard to import of commodities falling within this group of crops have a negative effect on the efforts to increase production.
04. High costs of inputs in fertilizer, insecticides, lift irrigation, labour, etc.
05. Heavy post-harvest losses.

Policy Recommendations :

01. To reduce the import of pulses, coarse grains, vegetable oils and livestock feed.
02. To increase the production to meet the annual domestic demand. New crops or new varieties with comparative advantage has vast potential as export.
03. To develop new and appropriate technology on OFCs production.
04. To provide adequate and proper storage facilities
05. To develop a stable marketing strategy with a floor price scheme.
06. To encourage and assist medium scale private sector enterprises at district or village level.
07. R & D on OFC-based rotation and cropping systems.
08. To rehabilitate minor irrigation tanks.

5. Horticulture

Horticulture includes fruits, vegetables and floriculture production. Approx. 100,000ha in fruits production with 35 species, approx. 90,000ha in vegetables with 40 species and 500ha in floriculture are roughly estimated. Seasonality of production is most evident in fruits, lesser in vegetables and least in floriculture.

The annual production value of fruits and vegetables is estimated at Rs 20 billion which is half the value of all food crops. Average yield at 7-11t/ha is much higher than rice of 3.5t/ha, and the crops have a higher income generating potential, around 4 times income value / ha compared to paddy cultivation.

Production of fresh fruits and vegetables is estimated at about 800,000 ton, of which about 60% is consumed and 30-40% lost due to drayage and wastage respectively. A small quantity is exported. Per capita consumption of fruits and vegetables is still much lower than the recommended values and the potential exists to double the consumption within a short period.

A significant change in the industry has been the growth in export earnings from horticultural crops. Within a decade (1983-1993), horticultural exports have exceeded

Rs.1 billion, and has made horticulture the fastest growing sub-sector in agriculture.

Total export value

	<u>fresh fruits & vegetables</u>	<u>processed products</u>	<u>floriculture</u>
1983	Rs.48.4 mil. (100)	Rs.31.2 mil. (100)	Rs. 30.7mil.(100)
1993	Rs.259 mil. (535)	Rs.628 mil. (2013)	Rs.287.4mil.(936)

In the world market, the values of trade in horticultural products amounts to US\$ 30 billion in 1991, US\$ 17bil. for fruits, US\$ 7bil. for vegetables and US\$ 5.5bil. for floriculture. Therefore Sri Lanka could seek to attain a target of Rs.5 billion (US\$ 100 million) of export by the year 2000.

Policy Recommendation

01. Provision of Suitable Varieties
02. Provision of Seed and Planting Materials
03. Provision of Large Farm to private sector entrepreneurs of foreign collaborators to establish the nucleus farms.
04. Reduction of Post-Harvest Losses
05. Reduction of Financial Disincentives
06. Provision of Freight Space
07. Avoidance of Ad-Hoc Subsidies
08. Organizational Necessities
09. Expanded Institutional Goals
10. Research Investment
11. Monitoring and Evaluation

2.4.2 Present Conditions in Agriculture

This report was written in March 1995 for the progress report in phase I study. The description and figures were reviewed and corrected. Descriptions on the Drainage schemes and Kachigala scheme were excluded.

1. General

The three schemes in F/S study are divided into two agro-climatological zones; Intermediate zone and Dry zone.

Two schemes in Liyangastota and Muruthawela belong to Inter-mediate zone. Paddy crop area in Yala season has been increased remarkably at Hambantota district in these five years(1991-95). This seems to be brought about by the preferable rainfall and the discharge from Uda Walawe reservoir after 1990s, Liyangastota scheme in particular. These schemes have much benefited recently although two area in downstreams of Muruthawela LB and Kirama Oya have suffered by water shortage in Yala.

One scheme in Badagiriya is included in Dry zone. Farmers in this scheme are suffering from insufficient irrigation water in Yala season in particular.

2. Farm Households and Land Use for Farming

Numbers of farm households and acreage of paddy fields in each scheme were mostly asked from farmers leaders(Chairmen of Farmers Organizations-FOs). In some cases the answered figures were modified as shown in footnotes.

	Farm Families	Ac	Ha	Ha/FF
Intermediate-Zone				
1. Liyangastota LB	3,100*	6,310	2,554	0.82
2. Liyangastota RB	2,600*	6,065	2,454	0.94
3. Uruboku Oya Scheme	3,700	5,590	2,262	0.61
4. Kirama Oya Scheme	4,100	3,733	1,511	0.37
Dry-zone				
5. Muruthawela LB	2,500	4,199	1,700	0.64
6. Badagiriya Scheme	686	1,698	686	1.00
TOTAL	16,700	27,635	11,167	0.67

* Landless farmers(3,000) in Liyangastota are not included

3. Farm Production

(1) Paddy Yield and Production

According to the questionnaire survey for farmers leaders in the three project sites(Muruthawela, Liyangastota, and Badagiriya), approx. 60 Bu/Ac(3.5 t/ha) is an average yield last Maha season in 94/95. In Yala season, about 10% of yield reduction is estimated by those farmers.

National statistical data on paddy yield by the crop cutting survey shows 4.0-4.3 t/ha (68-73 Bu/Ac) for Major project area in Hambantota district in 93/94 Maha.

Generally 70-80 Bu/Ac of the high average is reported in the well irrigated area in the upstream area; but on the contrary, 30-40 Bu/Ac of the low average is shown in the

downstream area due to water shortage or flooding damages.

The paddy production in each scheme can be estimated by acreage and yield. According to the crop data by DOA last Maha and Yala in Liyangastota, the paddy crop area makes no difference between Maha and Yala.

	Area Ha	Crop Area(ha) Maha & Yala		Estimated yield Maha & Yala	Production Ton
1. Liyangas.LB	2,554	2,433	2,43	3.9 +3.8 t/ha	18,700
2. Liyangas.RB	2,454	2,338	2,338	3.9 +3.8 t/ha	18,000
3. Murutha.LB	1,700	984	915	3.8 +3.5 t/ha	7,000
4. Urubokka Oya	2,262	1,923	1,877	3.2 +3.1 t/ha	12,300
5. Kirama Oya	1,511	1,239	982	3.2 +3.1 t/ha	7,200
6. Badagiriya	686	536	367	3.6 +3.0 t/ha	3,000
Total	11,167	9,453	8,912	Av. 3.6 t/ha	66,200 t

(2) OFC (Other Field Crop) Production

OFC cultivation has been studied for 94 Yala and 94/95 Maha in Hambantota district. Approx. 50% of those figures are estimated for the production in Project area, including in Chena cultivation.

Crop	Hambantota OFC Production*			* Source: DOA, Hambantota.		
	Ha	Yield	Production	Ha	Yield	Production
1) Chili	503	0.5t/ha	252 t	869	0.5 t/ha	435 t
2) Onion	37	8	292	34	8	268
3) Legume	88	0.8	73	7,229	0.8	6,013
4) Grain	150	0.8	120	408	1.5	327
5) Sesame	127	0.65	83	269	0.65	175
6) Cassava	-	-	-	403	12.6	5,078
7) Sweet potato	-	-	-	124	10	1,240
8) Vegetable	1,042	8.7	9,077	1,582	9.6	15,217
TOTAL	1,947 ha	5.1t/ha	9,897 t	10,918 ha	2.6t/ha	28,753 t

4. Farming Practice

(1) Paddy Cropping

Usually the cropping calendar of paddy cultivation starts in October for Maha season, and in March for Yala. Varieties of paddy in Hambantota district are mostly 3-3.5 months varieties in Maha(98%) as well as in Yala(99%). By field observation, delayed harvesting fields were seen here and there even in the end of March, partly due to stagnant water. In case of the low land, the paddy has to be dried up with round accumulations for one week after the harvesting. Generally speaking, the cropping calendar of paddy in the project area looks very much flexible with surplus water which cannot be managed.

(2) OFC Cropping

- 1) OFC cannot be seen in Liyangastota, Urubokka Oya and Kirama Oya schemes.

- OFC is cropped only in high land or homestead there.
- 2) As the tenant farmers cultivate paddy in more than 50% of paddy land, OFC crop ratio is estimated very low by 0.5 and 1.0 % for Maha and Yala, respectively, in the Schemes of Uruboku Oya, Kirama Oya, and Liyangastota LB & RB schemes.
 - 3) In Muruthawela LB Scheme, paddy cultivation is allowed only one season per year due to water shortage, then farmers cultivate OFC in another season with a high ratio by 25 % every season.
 - 4) In the case of Badagiriya scheme, which is a part of Kirindi Oya project, farmers intention for OFC introduction is very high. Agricultural extension service is also a little better than other schemes because of Kirindi Oya project. Here the OFC cropping ratio in paddy land is estimated at 6% for Yala season.

(3) Cropping Pattern

With the estimates of OFC crop area mentioned above, the cropping patterns in each schemes are tabulated as follows:

		<u>MAHA</u>	<u>+ YALA</u>	
1) Liyangastota LB	95%	Paddy	+ Paddy	(2,443ha)
2) Liyangastota RB	95%	Paddy	+ Paddy	(2,338ha)
3) Muruthawela LB scheme	52%	Paddy	+ Non crop	(883ha)
	5%	Paddy	+ OFC	(101ha)
	41%	Non crop+	Paddy	(701ha)
4) Uruboku Oya scheme	10%	OFC	+ Paddy	(214ha)
	83%	Paddy	+ Paddy	(1,877ha)
	2%	Paddy	+ Non crop	(46ha)
5) Kirama Oya scheme	5%	Paddy	+ Paddy	(1,648ha)
	17%	Paddy	+ Non crop	(257ha)
6) Badagiriya scheme	54%	Paddy	+ Paddy	(367ha)
	19%	Paddy	+ Non crop	(129ha)
	1%	Paddy	+ OFC	(40ha)

(4) Land Preparation

95% of land preparation is carried out by tractors in Hambantota. This ratio of tractors use in Hambantota is very high standard when compared with the ratio in other districts in Southern province, Matara(53%) or Kalutara(12%), where the sizes of land ownership are smaller than in Hambantota. In F/S study areas, even in Muruthawela scheme, draught animal or manual cultivation are used by farmers of only 1%.

(5) Broadcasting Method

Method of paddy establishment is broadcasting (direct sowing) by 93% of farmers in Hambantota. According to the result of farmers interview survey, the ratio of transplanting is around 10% in Liyangastota and Badagiriya scheme, and 5% in Muruthawela scheme.

(6) Fertilizer Application

According to answers in hearing at the farmers leaders meeting, fertilizer efficiency on yield performance is seemed to be lower than the standard, because of excess water or water shortage in some fields. 330 kg/ha(130 kg/Ac) of the application results only 3.2 t /ha(65 Bu/Ac) of paddy yield in Badagiriya case.

(6) Agro-chemical Dosage

Weedicide dosage is prevailing with 66% of farmers, fungicide dosage is 18%(Yala) and 38%(Maha), and pesticide is used occasionally.

(7) Labour Exchange

Labour exchange called "Attam System" is commonly seen in the harvest work. 10-15 farmers of cooperated working for the harvest were seen everywhere along the roads.

5. Agricultural Support System

(1) Project Office

Liyangastota Scheme has two Project Managers in both left bank and right bank. The office of the right bank P.M. is at Ambalantota ID office, and the office of left bank P.M. attached to Ambalantota ASC (DO office).

Muruthawela LB Scheme has a Project Manager sent from Irrigation Management Division (IMD). He has one room in Weeraketiya Agrarian Service Center (ASC or DO office), and holds one assistant and two Institutional Organizers (IOs) in order to promote "INMAS Program". Badagiriya Scheme is managed by the branch office of Kirindi Oya Project Office.

(2) Department of Agriculture(DOA)

There are two Assistant Directors in Hambantota: one is a provincial staff attached to Provincial Agricultural Director in southern province, and another is an inter-provincial staff attached to central DOA. Provincial AD holds one Agricultural Officer (AO) and four Subject Matter Officers (SMOs): paddy, other field crop, plant protection, and farm women extension. Inter-provincial AD holds three AOs. Under AOs or SMOs, Agricultural Instructors (AIs) are working. AI attaches to ASC (DO office), and they have one room each for the extension work.

(3) Department of Agrarian Service(DAS)

There is an Assistant Commissioner in Hambantota. He is working under Provincial Commissioner and central DAS. He holds 16 Divisional Officers (DOs) who have responsible to each Agrarian Service Center (ASC).

DO organizes the Farmers Organizations (FOs), which are registered by Agrarian Service Act, and arranges the farm inputs such as seeds, fertilizer and agro-chemicals. In case of Hambantota district, approx. 5% of the marketing share in farm inputs are dealt with by ASC.

(4) AGA-Divisional Secretariat Office

There are 11 AGA divisions in Hambantota district, and three of them are important for the projects as follows:

Weeraketiya AGA-- Muruthawela, Urubokka Oya, Kiraima Oya

Ambalantota AGA-- Liyangastota LB, Liyangastota RB

Hambantota AGA--- Badagiriya

(5) Rice Research Station and Seed Farm

Rice Research Station is situated along the main road in Ambalantota. New rice varieties such as AT-353 and AT-402 are developed in this station, and recommended in 1992. Seed Farm is located neighbouring to Ambalantota ASC.

They produce approx. 80-100 t /season of Registered seeds including AT-353, and they distribute a half(50 t) of the seeds to Hambantota contract farmers(seed growers) in order to produce Certified seeds.

(6) Regional Agricultural Research and Development Center

There are six Regional Research Centers in Sri Lanka, and one of them is situated at

Angunakolapelessa in Hambantota.

Horticulture researches, especially banana studies such as water requirement of banana, varieties characteristics, etc. are carried out with one co-ordinator, three special experts and about 20 staff. They are also conducting extension services on banana cultivation for 300 neighbouring farmers.

Agricultural School of Sri Lanka (Diploma course), holding 450 students, is attached to this center. In-service Training Institute, which is used for officers' trainings in short term(3 days-3 months), also belongs to the center. AO, AI, and some farmers are trained in this institute.

(7) Coconuts Cultivation Board

Every coconuts cultivation board has an office at ASC with one coconuts cultivation officer. The subsidy for coconuts cultivation is given through this office; Rs 10,000/Ac for new planting or Rs 2,000 per Ac for rehabilitation(60 organic manuring pits with coconuts husk).

(8) Veterinary Service Center

Hambantota districts holds 104,221 heads of cattle and 134,917 heads of buffaloes. They are all given a vaccination once a year. This service is conducted by Veterinary Officer(VO), who is attached to every AGA office. There are three Veterinary Service Center in Hambantota with one veterinary doctor each. The doctor instructs three VOs each and manages the vaccination schedule.

(9) Cooperatives

There are two cooperatives in Hambantota; Hungama and Tissamaharama. Hungama office is situated in Ambalantota, where Liyangastota scheme is situated. They support farmers in marketing services of farm inputs and products. Seeds supply and produce marketing of paddy or legume grains are very successful business in Hambantota.

6. Agricultural Issue

(1) Improvement of Paddy Cultivation

In the upstream, abusing water reduces the effect of fertilizer application. While, in the downstream, stagnant water makes it difficult to use fertilizer effectively. For the effective usage of fertilizer on good timing, water management on-farm level as well as rehabilitation of irrigation system is essential.

(2) Tenant Farmers in Paddy Cultivation

As for planning for crop diversification, paddy tenancy is one of the constraints since it is reported by DOA that 40-50% of paddy crop area is cultivated by tenant farmers on an average of 1 Ac in Hambantota ("Agricultural Statistics of Sri Lanka 1992").

(3) Crop Diversification

Banana, chili, and onion are the prospective crops in Hambantota. Banana in Kirindi Oya is famous for its high return of Rs. 100,000 per Ac. Uda walawe also has a large area(2,500ha) in banana extension. As for chili, the southern province has a local variety named "Ruhunu", which has resisting power from virus diseases.

(4) Farming Support System

In the stage of project implementation, this rehabilitation program would be carried out only by the Irrigation Department. However, the benefit could not be realized without farming support system with staff of specialized technology.

2.4.3 Agricultural Development Plan

1. Basic Approach in Agricultural Development Plan

Agricultural Constraints and Development Potentials

As for the formulation of agricultural development plan in the rehabilitation project, some agricultural constraints and development potentials in each scheme should be taken into consideration.

(1) Improvement of paddy cultivation

In the upstream, abusing water reduces the effect of fertilizer application, while, in the downstream, stagnant water makes it difficult to use fertilizer effectively. For the effective usage of fertilizer on good timing, water management on-farm level as well as rehabilitation of irrigation and drainage systems are essential.

(2) Farmers intention to OFC cultivation in paddy land

Farmers in Badagiriya and Muruthawela L/B schemes have some experience and intention of OFC in paddy land because those schemes belong to dry zone and the irrigation water is sometimes insufficient.

On the contrary, farmers in Liyangastota, Muruthawela(Urubokka & Kirama Oya) have no intention of OFC introduction on paddy land. The reasons why they have no intention are; 1) They can cultivate OFC in the rainfed upland. 2) Irrigation water is always sufficient, and paddy has no risk. 3) Tenant farmers on paddy occupies more than half of the total paddy land.

(3) Extension support service

Generally speaking, agricultural extension is not enough in villages without KVS any more. Only in Badagiriya and Muruthawela L/B schemes, there are Project Offices which hold Institutional Organizers.

(4) Reduction of crop area and yield in Without- Project

In case of Without-project, reduction of crop area and yield should be proposed especially in dry zone.

Observation on Land Tenure

(1) Liangastota Scheme

As this scheme is one of the largest major irrigation systems in Hambantota district and there are a lot of chena cultivation land around the scheme area, Divisional area of Ambalantota including this scheme holds comparatively rich farmers. Thus, most paddy land owners leave their lands to tenant farmers, and some of tenants lease the land again. The size of paddy cultivation has become small to a standard size of around one Ac. Data on land ownership in 1982 Agro-Census can be shown as below:

Div. area	Nos. of	Below			Over
	Owners	0.4ha	0.4-0.8ha	0.8-1.2ha	1.2ha
	Average (ha)	(0.2ha)	(0.6ha)	(1.0ha)	(2.0ha)
Ambalantota	7,897	1,421	1,895	1,817	2,764
	(100)	(18)	(24)	(23)	(35)
	8,491ha	284ha	1,137ha	1,817ha	5,253ha
	(100)	(3)	(13)	(22)	(62)
District Total	68,000	16,320	17,680	14,960	19,040
	(100)	(24)	(26)	(22)	(28)
	66,800ha	3,264ha	10,608ha	14,960ha	37,968ha
	(100)	(5)	(16)	(22)	(57)

Source: "Hambantota District Environmental Report" HIRDP, March 1990

(2) Muruthawela LB(Tract I, II, and III)

Although it is not complete to identify the numbers of farmers and farm land acreage of both paddy and upland in Tract I, rough estimates by the nine leaders of the nine FOs, covering all the area of Tract I, are tabulated as follows.

	F.O./ Total	Paddy/		Paddy yield	OFC
	members/ farmers	Land /	Upland	Maha / Yala	Cultivation
01.	21 / 150	26Ac	100Ac	90 / 60	Veg., Banana, Fruits
02.	40 / 80	50	40	75 / 50	Banana, Veg., GG,
03.	45 / 200	200	200	70 / 55	Banana, Veg
04.	25 / 30	45	190	75 / 55	Banana, GG
05.	90 / 175	147	250	90 / 70	Banana, Veg
06.	28 / 45	38	30	75 / 55	GG, Sw P.
07.	75 / 100	85	50	75 / 55	Veg. GG. Banana
08.	25 / 30	80	30	80 / 60	Veg. Banana
09.	30 / 60	25	80	70 / 60	Veg. Banana, Fruits
Total	379 / 870	696Ac	970Ac	Bu / Ac	--
	(44%)	(278ha)	(388ha)		
Per Farmer		0.8Ac	1.1Ac	78 / 59	Banana, Vegetable, GG

Those figures are almost the same as the numbers of Phase I survey last year, and Project Manager in Muruthawela Scheme agreed to this table. Double cropping of paddy cannot be changeable since the average size of paddy cultivation is too small to introduce OFC cultivation. OFC cultivation can be introduced in upland area.

(3) Urubokka Oya and Kirama Oya Scheme

This scheme area belongs to intermediate zone in agro-ecological classification. The population density here shows 1,000 persons / sq. mile, being more than two times of the density in the dry zone, which occupies 80% of area in Hambantota.

Thus, the cultivated land has been divided into small sizes, and around 70% of land owners are very small holders of 0.5 ha each in Divisional area Beliatta, where Kirama Oya

Scheme is partially included.

Divisional area Weeraketiya, where Urubokka Oya Scheme is included, is a little better than Beliatta area though it still shows smaller sizes than the District average. Farmers in this scheme have not so much farm working opportunity as those in dry zone due to the limited chena cultivation land in the outside. Most of farmers seem to be engaged in farming as a part-time job in order to produce rice for self-consumption.

Distribution of land tenure and land acreage (1982)

DS area	Nos.of Owners Average (ha)	Below 0.4ha (0.2ha)	0.4-0.8ha (0.6ha)	0.8-1.2ha (1.0ha)	Over 1.2ha (2.0ha)
Beliatta	8,091 (100) 6,397ha (100)	3,641 (45) 1,279ha (20)	1,870 (22) 1,122ha (18)	1,052 (13) 1,052ha (16)	1,618 (20) 2,944ha (46)
Weeraketiya	11,760 (100) 11,455ha (100)	2,940 (25) 588ha (5)	3,410 (29) 2,046ha (18)	2,352 (20) 2,352ha (21)	3,058 (26) 6,469ha (56)
District Total	68,000 (100) 66,800ha (100)	16,320 (24) 3,264ha (5)	17,680 (26) 10,608ha (16)	14,960 (22) 14,960ha (22)	19,040 (28) 37,968ha (57)

Source: "Hambantota District Environmental Report" HIRDP, March 1990.

(4) Badagiriya Scheme

Badagiriya Scheme area is composed by five Grama Sevakas (villages). According to the information by GN, numbers of farm families, land owners and paddy land/upland are summarized as the following table. Those figures will be a basic data for analyses of present condition and for the formation of agricultural development plan.

Name of G.S.	Families	Registered		Paddy Cultivation		
		Owner	Upland	Paddyland	Owner	Tenant
01. Badagiriya	306	23	180Ac	75 Ac	17	8
02. Tammanawa	200	54	-	97	42	23
03. Yahangala E.	238	91	185	736	64	34
04. Yahangala W.	260	202	252	332	150	55
05. Julgamuwa	106	87	106	179*	25	10
Total	1,110	457	723Ac	1,419Ac	298	130

* 150Ac in Julgamuwa is not cultivated.

Among the acreage of the above upland and paddy land, classifications of authorized / not authorized acreage are reported as follows by GN(Grama Niladari).

	Total	Upland		Total	Paddy land	
		Authorized	Unauthorized		Authorized	Unauthorized
01. Badagiriya	180Ac	160Ac	20Ac	75Ac	65Ac	10Ac
02. Tammannawa	-	-	-	97	78	19
03. Yahangala E.	185	166	19	332	210	122
04. Yahangala W.	252	252	-	736	661	75
05. Julugamuwa	106	81	25	179	156	23
Total	723Ac	659Ac	64Ac	1,419Ac	1,170Ac	249Ac

2. Agricultural Development Plan

(1) Introduction

As mentioned in the above Basic Approach, the agricultural plan should be formulated through considering on the countermeasures to constraints and promoting for the development potentials in each scheme.

1) Technical improvement in paddy cultivation should be concentrate the efforts on realizing the fertilizer effects with proper on-farm water management initiated by FO with helps of ID, DOA and DAS.

2) OFC introduction in large scale is limited at Muruthawela L/B and Badagiriya schemes in dry done. Major OFC is designed for Banana, which is famous in Uda Walawe project, and Chili cultivation, which is popular and not risky in virus deseases with a southern local variety "Ruhunu".

3) In Without-project case, the yield reduction is planned at 90% of the present yield in all the three schemes, and the crop area reduction at 95% in all the shemes, compared with present condition.

(2) Proposed Cropping Pattern

Cropping pattern with Paddy and OFC cultivation is tabulated below. Paddy variety is generally planned by 3.5 months varieties. 4-4.5 months varieties are proposed in Liyangastota scheme by 40% in each season, and in Badagiriya scheme by 5-10% only in Maha season. The OFC is mainly designed for Banana and Chili cultivation.

Proposed Cropping Pattern in each Scheme

* Area identified by Study team and confirmed with ID

1) Liyangastota LB	Irigable area*	2,554 ha	(100%)
	Proposed Crop area	2,554 ha	(100%)
	Cropping Intensity / year: 200%		
	100% <u>Maha</u> Paddy + <u>Yala</u> Paddy		(2,554ha)
2) Liyangastota RB	Irigable area*	2,454 ha	(100%)
	Proposed Crop area	2,454ha	(100%)
	Cropping Intensity / year: 200%		
	100% <u>Maha</u> Paddy + <u>Yala</u> Paddy		(2,454ha)

3) Muruthawela I/B	Irrigable area*	1,700 ha	(100%)
	Proposed Crop area	1,387 ha	(82%)
	Cropping Intensity / year: 170%		
	37%	Paddy + Paddy	(631ha)
	10%	Paddy + OFC	(170ha)
	5%	Paddy + Non crop	(76ha)
4) Uruboku Oya	Irrigable area*	2,262 ha	(100%)
	Proposed Crop area	2,149 ha	(95%)
	Cropping Intensity / year: 185%		
	90%	Paddy + Paddy	(2,036ha)
	5%	Paddy + Non crop	(113ha)
	5) Kirama Oya	Irrigable area*	1,511 ha
Proposed Crop area		1,435ha	(95%)
Cropping Intensity / year: 175%			
80%		Paddy + Paddy	(1,209ha)
15%		Paddy + Non crop	(226ha)
6) Badagiriya S.		Irrigable area	686 ha
	Proposed Crop area	686 ha	(100%)
	Cropping Intensity / year: 170%		
		<u>Maha</u>	<u>Yala</u>
	50%	Paddy + Paddy	(343ha)
	30%	Paddy + Non crop	(205ha)
10%	Paddy + OFC	(69ha)	
10%	Banana(yr. round crop)	(69ha)	

(3) Proposed Farming Practice

Seed paddy

Governmental seed paddy (Certificated Seeds) and Commercial Seeds (produced by Certified Seeds) should be proposed in all the proposed areas since there are enough seeds of new varieties developed in Rice Research Station and produced in Seed Farm within the project area.

Fertilizer application

450kg/ ha of fertilizer application recommended by DOA is proposed for the expected yield of 5.5 t/ ha.

Ineffective use of fertilizer due to difficulty of water management, observed at Liyangastota and Urubokka Oya in farmers survey, should be improved by the rehabilitation of irrigation facilities and operation. It is proposed that the improvement of on-farm water control by FO on the application of fertilizer, and the split application method on time should be instructed through the farmers organizations with helps of DOA and DAS.

(4) Expected Yield and Production

Paddy

In the schemes Liyangastota, Muruthawela and Badagiriya located in Hambantota district, the expected paddy yield with the project is proposed at 5.5 t/ ha in both Maha and Yala. This yield standard is already achieved by excellent farmers in preferable paddy land. Without the project, the yield will be reduced by 10% from the yield at present. The

cropping area will be also reduced by 5% in all the schemes.

OFC

Banana and Chili cultivation is mainly proposed for OFC introduction in Muruthawela LB and Badagiriya schemes. The expected yield with the project is planned at 1,000 kg/ ha in dry pods of Chili, and 450 kg/ ha without the project, compared with 500 kg/ ha of yield at present.

Banana yield is proposed at 15 ton /ha /year on the average of 5 ton in the first year and 20 ton in the second and the third year. These yield estimates and the plant renewal every three years are recommended by Resional Agricultural Research and Development Center(RARDC) in Angunakolapelessa.

Production

Total crop production in each scheme is summarized as follows:

	<u>Irrigable Area</u>	<u>Without-Project</u>		<u>With-Project</u>	
		<u>Crop area</u>	<u>Production</u>	<u>Crop area</u>	<u>Production</u>
1) Liyangastota					
Paddy	5,008 ha	9,065 ha	3,1410 t	10,016 ha	55,088 t
2) Muruthawela					
Paddy	5,473 ha	7,524 ha	22,350 t	8,340 ha	45,870 t
OFC(Chili)		299 ha	135 t	340 ha	340 t
(Banana)		-	-	340 ha	5,100 t
3) Badagiriya					
Paddy	686 ha	858 ha	2,470 t	960 ha	5,280 t
OFC(Chili)		38 ha	17 t	69 ha	69 t
(Banana)		-	-	69 ha	1,030 t
Total					
Irr. area	11,167 ha				
Paddy		17,447 ha	56,230 t	19,316 ha	106,238 t
OFC(Chili)		337 ha	152 t	409 ha	409 t
(Banana)		-	-	409 ha	6,130 t

(5) Crop Budget

Crop budget at present is estimated from farmers survey, and that for the Without-Project is planned as same as the present one.

As for the crop budget for the With-Project, Governmental seed paddy and DOA recommended application of fertilizer were adopted in paddy and chili cultivation. The crop budget for reeds cultivation was estimated by hearing from farmers.

The detail tables of those crop budgets are shown in Annex-AG-6

2.4.4 Project Report on Muruthawela LB

This report was written by the former Project Manager in Feb. 1995, with 'INMAS program' in Muruthawela LB scheme covering Tract II and Tract III.

1. OUTLINE OF THE SCHEME

(1) Location of the Scheme

This scheme is situated in Southern Province of Sri Lanka to the Northeast of Tangalle city, 16 miles interior from Tangalla-Katharagama main road. The boundaries are Northwest Weerakatiya town to south Angunakolapalassa. It is one of the major irrigation projects in Hambantota District. 85% of the area comes under Divisional Secretariat area of Angunakolapalassa and 15% under Weerakatiya DS area. The only access is a by-path which connects Weerakatiya-Debbokkawa main road at Morayaya junction and 3.5 miles away from Weerakatiya town.

There is no main road running through the scheme. People use the agriculture roads of the scheme. There are no transport facilities to the main town from the scheme.

(2) Financial and Social Status in the Scheme

Settlement allocation in the scheme was started in the year of 1968. The scheme consists of three Tracts. But Tract (I) is not included in the scheme and settlements have been done in Tract (II) & (III) only. Beneficiaries are allocated a land of two Acres for cultivation purpose, but irrigation water is provided only once a year. According to the situation and the condition of the soil, average yield of paddy is about 60-70 bushels per Acre. Therefore, the income of the people is very low from the paddy cultivation.

Other income are very little and a limited numbers of people earn their income working as casual labourers by part time job.

(3) Settling down of Farmers

Settling of beneficiary was started in the year of 1968. The beneficiaries are selected from the same people who lost their lands and from those who had no lands.

Each beneficiary is given 1/2 an acre for homestead and two acre for paddy cultivation. But the planner had not looked into the distance from homestead to the paddy lands. About 60% of the beneficiary have settled from the neighbouring villages. They had not settled down in the scheme, and their homestead area were kept vacant. 22% of the beneficiary own their private lands in near by the Urubokka Oya scheme.

(4) Facilities

Roads: The nearest main road is about 4 miles away from the center of the scheme. There are no paved roads within the scheme and no public transport facilities connecting with the scheme.

Education: There is one secondary school and 4 primary schools in the scheme. Children have to travel about 5 miles to the school. School-age children have left the school due to traveling difficulty and poverty.

Medical Facilities: There are two government dispensaries in the scheme. But no doctors are appointed. People have to travel 05 miles to the closest government hospital to get their treatments. There is an indigenous hospital in Tract (II) and the service is satisfactory.

Post and Telecommunication: Post office is situated in Tract(II). There are no facilities

for telecommunication close to the scheme area.

Electricity: Prospects of electricity line are very few possibility.

Drinking water: Main source is the well. People use irrigation canals water in Urubokka Oya and Udawalawe. There is no canal water in Yala season due to the drying up of irrigation canals.

2. IRRIGATION SYSTEM

(1) **Tank** S: Area : 1230 Ac (supply level)
 Catchment covered : 43.0 sq. miles.
 Capacity : 38,875 Ac ft
 Length of the dam : 4800 ft.
 Area covered by the tank : 1380 Ac.

(2) **Water Supply by Tank** Area benefited : valley of Urubokka Oya.
 Water supply by : Urubokka Oya.
 Length of the river : 15.7 miles.
 Irrigable area : 7680 Ac / per year.

(3) **Canal System**

	I.B	RB
Length of the canal :	9.0 miles	4.5 miles.
Capacity :	75 cu.ft /second	50 cu.ft / second.
Main structure :	03(large drains out of concert)	
Distributory Canal :	09 (D canal)	09 (D canal)

(4) Distributory Canal

	D Canal	Length	Benefit Area
Tract (II)	No.01	2 miles 3,900 ft	380Ac
	02	5,200 ft	50
	03	2,700 ft	74
	04	2,400 ft	120
	05	1,200 ft	60
	06	3,800 ft	160
	07	2,400 ft	174
	08	11,600 ft	152
	09	11,280 ft	348
Total	09		1,518Ac
Tract (III)	No.01	43,600 ft	560 Ac
	02	12,700 ft	314
	03	1,200 ft	110
	04	2,000 ft	58
	05	2,200 ft	84
	06	4,100 ft	224
	07	3,000 ft	130
	08	2,700 ft	178
	09	1,700 ft	92
Total	09		1,750 Ac
G.Total	18		3,268 Ac

(5) Field Canal

Tract (II)	D. Canal	Nos. of field Canal	Nos. of Farmers
	D 01	130	190
	D 02	07	25
	D 03	13	37
	D 04	14	60
	D 05	07	30
	D 06	16	80
	D 07	18	87
	D 08	16	76
	D 09	33	174
	Total	154	759
	D 01	46	280
Tract (III)	D 02	36	157
	D 03	09	55
	D 04	06	29
	D 05	09	42
	D 06	10	112
	D 07	10	65
	D 08	11	89
	D 09	06	46
	Total	143	875
	G.Total	297	1634

This scheme was established in the year of 1968. Since then no rehabilitation has done. Since there were no rehabilitations for long years, the canal system and the structures in this scheme need an immediate action for repairs. According to the design, it is said that 150 cu. ft per second should be carried by the main canal of left bank. But at present it has reduced to 75 cu. ft. per second. At the beginning of the whole scheme, Tract (II) & (III) were both cultivated. But now the acreage has reduced and only one Tract is cultivated each season.

About 380 acres are left barren due to lack of irrigation water service.

It is very difficult to control the water distribution due to lack of essential canals and gates. This amount of acreage is cultivated under the surveillance of "INMAS" Program. If there are no farmers organizations under the "INMAS" Program, it is doubtful whether even this extent could have been cultivated.

3. THE SITUATION BEFORE INMAS PROGRAM

The following short comings were found when operating the INMAS Program was initiated in 1987.

- a) Serious disputes among farmers.
- b) Confrontation between officers and farmers.
- c) Lack of co-ordination among government departments.

There were disputes between the permanent dwellers and settled farmers due to anomaly in land distribution. Permant dwellers were reduced to a helpless position.

The farmers in Tract (I) get unlimited water supply without authority from the main canal in left bank, which runs about 7 miles through Tract (I). Hence the farmers in Tract (II) and (III) were unable to get their water. In case of an emergency, the farmers cannot call the officers at the irrigation office, which is situated 05 miles away from the scheme. Farmers have encroached more lands than what they have got from the scheme. Because

the lands are not demarcated properly and the officers are unable to solve this problem.

Due to lack of confidence, farmers had become stubborn; so much so that officers was reluctant to visit the scheme. Farmers could meet officers only at Kanna meetings.

4. FARMERS ORGANIZATION (01. 11th. 1993-upto)

Serial No	D. Canal Organisation	Area covered(Ac)	Nos.of farmers	Nos. of members
Tract (II)				
1	D 01 (up) Kemegala Sama	380	190	167
2	D 01 (lower) Perakum	50	25	21
3	D 2/3 Thisara	74	37	36
4	D 04 Samagi	120	60	57
5	D 05 Branch canal	60	30	26
6	D 06 Perakum	160	80	74
7	D 07 Branch canal	174	87	81
8	D 08 Eksath	152	76	66
9	D 09 Branch canal	348	174	146
Tract (III)				
10	No. 01 Branch canal	234	117	87
11	No. 02 Gamunu	314	157	122
12	No. 03 Gajaba	110	55	49
13	No. 04 Wijaya	58	29	41
14	No. 05 Branch canal	84	42	29
15	No. 06 Pragathi	224	112	84
16	No. 07 Pubudu	130	65	51
17	No. 08 Branch canal	178	89	63
18	No. 09 Branch canal	324	162	129
TOTAL		3,174Ac	1,587farmers	1,309members

Fund of Farmers Organization (upto 11.01.95)

Serial No.	Farmers Organization	Fund (Rs.)	Remark.
Tract (II)			
1	D 01 (up) Kemagala Sama	14,343.25	
2	D 01 (lower) Perakum	12,865.52	
3	D 2/3 Thisara	12,300.37	
4	D 04 Samagi	10,950.41	
5	D 05 Branch canal	10,053.24	
6	D 06 Perakum	20,852.32	
7	D 07 Branch canal	20,860.82	
8	D 08 Eksath	14,712.9	
9	Branch canal	31,658.13	Tractor
Tract (III)			
10	No. 01 Branch canal	5,160.-	
11	No. 02 Gamunu	11,280.18	
12	No. 03 Gajaba	6,573.-	
13	No. 04 Wijaya	7,413.-	
14	No. 05 Branch canal	5,750.70	
15	No. 06 Pragathi	16,058.70	
16	No. 07 Pubudu	17,058.80	
17	No. 08 Branch canal	15,169.40	
18	No. 09 Branch canal	18,295.20	
Total		251,555.30	

The farmers organization of D canal, D-09 in Tract (III) have used their funds for purchasing a two wheels tractor by paying in yearly installment from the Agrarian Service Department.

5. TRAINING PROGRAM (1988-1993)

Field Training	Nos. of Participant Farmers						
	88	89	90	91	92	93	94
1. Training of Home Industry	65	-	120	-	-	38	-
2. Training of Agriculture Agent	68	-	120	70	-	-	-
3. Training of Operation	-	-	1000	360	200	-	-
4. Management Training (canals)	-	-	-	90	30	17	-
5. Management Training (finance)	-	-	-	-	24	23	-
6. Training of FOs (canals)	-	-	-	90	30	-	-
7. On-farm water management	-	-	-	-	-	-	45
8. Group using of Irrigation water	-	-	-	-	-	-	111
9. Officers Training	19	-	25	20	-	-	-
10. D Canal Maintenance	-	-	-	-	-	-	52

The INMAS program was started in the year of 1987, when the main task was to establish the farmers organization, but it was unable to hold the training classes in that year. In 1989 also there were no training classes held due to terrorism, which happened almost throughout the year. Training classes were held mostly in the second quarter and the fourth quarter due to delay of financial allocation in each year.

The improvement after training classes were as follows:

- a) Proper maintenance of canals.
- b) Organization of meetings.
- c) Organization of Shramadana.
- d) Maintenance of accounts in FOs.
- e) Cultivation of other field crops when water is limited.

6. PRODUCTION PLAN AND OPERATION DONE BY FOs

Paddy cultivation in Tract (II) and (III) were done once a year due to poor supply of water. Therefore meetings were held only in the respective Tract, and for another Tract, water is released every 10 days and the people can cultivate short term crops. The following shortcomings were found during the operation.

- (1) Dilapidated irrigation facilities.
- (2) Living outside the scheme.
- (3) Not getting water in proper time due to Tract (I) farmers drawing unlimited quantity of water
- (4) Damage by stray cattle.

FO cultivation meeting

Item	Duration	Activity
01. Decision of season's cultivation:	08 weeks before	Decision on Tract & D canals
02. To decided paddy target paddy crop target	06 weeks before starting the season	To prepare the program according to F-canals Decision by D.C.O.
03. To approval of Cultivation Program	04 weeks before	For approval in P.M.C.
4. Pre- Kanna meeting	03 weeks before	To inspect and discussion on the difficulties of the program
05. Seasonal meetings (Kanna meeting)	02 Weeks before starting season	To regularize the program
06. Following up	Fort-night meetings throughout the season	

7. AGRICULTURAL PRODUCTION

Target Achieved

Season Cultivation	Paddy (Ha)	OFC Crop (Ha)	Yield (Bu/Ac)	Production (Tons)
87/88 Maha	524.0	-	70	2,155
88 Yala	616.4	-	65	2,346
88/89 Maha	680.0	-	75	2,993
89 Yala	600.0	53.2	75	2,641
89/90 Maha	607.2	-	85	3,029
90 Yala	600.0	251.0	70	2,463
90/91 Maha	638.0	287.0	90	3,370
91 Yala	670.0	184.0	75	2,949
91/92 Maha	700.0	128.0	88	3,615
92 Yala	640.0	65.0	70	2,629
92/93 Maha	1000.0*	228.0	85	4,988
93 Yala	602.0	54.1	75	2,649
93/94 Maha	780.0	177.0	-	-

Crop area only

* Cropped area in 92/93 Maha is included Tract I (278 ha).

8. CONTRACT WORKS DONE BY FOs

Year	No. of Contract	No. of Participated	Progress	Financial Value
1987	-	-	-	-
1988	-	-	-	-
1989	-	-	-	-
1990	-	-	-	-
1991	05	05	100%	167429.76
1992	02	02	100%	53390.00
1993	02	01	100%	180999.22
<hr/>				
	09	08	100%	401818.98

Shramadana Done by FOs

Maintenance of all the D canal since 1991 was done by FOs on shramadana basis. The money paid by the Irrigation Department for this purpose Has been deposited in the accounts of those respective FOs.

9. OPERATION AND MAINTENANCE

<u>Year</u>	<u>Nos. of Distribution Canal</u>	<u>Nos. of FOs</u>	<u>Amount Paid for FOs (Rs)</u>	<u>Amount Paid for Others (Rs)</u>	<u>Total Amount for Maintenance (Rs)</u>
1987	8	-	-	-	-
1988	18	-	-	-	-
1989	18	-	-	-	-
1990	18	-	-	-	-
1991	18	09	-	-	46,669.60
1992	18	05	-	-	28,953.80
1993	18	18	27,149.00	31,226.00	58,375.00
					134,020.40

It is understood that the money allocated for the operation and maintenance of the canals in 1991 and 92 is not properly distributed by the Irrigation Department between the two Tracts. Only for the areas under cultivation, the funds were given. In 1993, all of FOs in Tract (II) were allocated funds for O & M for the first time.

10. HANDING OVER D-CANAL OPERATION TO FOs

<u>NOS. OF D CANAL</u>	<u>NOS. OF GIVEN FOR O&M</u>	<u>NOS. TO BE GIVEN</u>
18	18	--

In 1991, all the D-canals were handed over to FOs for O & M, and it has continued until now.

Ministry has decided to hand over D-canal operation to FOs, however, they have refused to take over the canals since the facilities are not rehabilitated.

11. MONITORING AND EVALUATION PROGRAM

The ABCD progress report system done by the "INMAS" program was not close to the farmers. This is only a progress report and confined to the officers.

After the introduction of M.E. 1,2,3,4,5, the program was very close to the farmers. This is a very good program to evaluate the progress of the scheme, when the operation should be done in a widespread manner. For this reason it is very essential to appoint officers to each scheme especially for this activity. In the inspection of the report of M.E. 6, it appears that some general problems were seen in every monthly meeting held by the D. canal organizations. The officers are unable to solve these problems. If the problems presented monthly are not solved by officers, farmers will lose confidence in the organization. Hence the Head Office should set up a program to resolve those problems.

12. EFFORTS MADE BY THE MANAGEMENT TO INCREASE PRODUCTION AND INCOME.

According to the initial plan of the cultivation area was 1,440 Ha in Tract (II) and (III). But it has reduced to 1,350 Ac. by now. This brought about the unsatisfactory irrigation schemes and various social problems. It would have been worse, but for the "INMAS" Program introduced in 1987.

Due to the neglect of the scheme, until 1987 the extent of land abandoned due to lack

of irrigation was increasing each year; if this continued by now, around half of the land would have been abandoned. The weakness of the irrigation system and other social problems were responsible for this. Under the INMAS program, by educating the farmers the extent of land abandoned has been brought under control. This is of special significance.

Specially by this "INMAS" program, it was able to control the water supply in Tract (I), which was earlier taken illegally, and in Tract (II) & (III), people got the maximum use of the limited amount of water by the rotational operation system.

Since handing over the maintenance of D canals to FOs, farmers were able to maintain the canals in order; therefore the acreage was increased every year and was well controlled.

The participation of the officers and farmers in the management committee, which is conducted in the scheme, was kept at a high standard. By the training program, it was able to change the attitude of the farmers and officers. With the INMAS program, farmers and officers got close to each other. Officers showed much interest in working with farmers helping to solve their problem through participation. Earlier it was very difficult to compel farmers for the cultivation of subsidiary food crops. Due to timely supply of water and changes in the cropping patterns, high yield were realized.

The FOs were supplied with two-wheel tractor by the Agrarian Service Department on a credit scheme. Then, farmers were able to reduce their expenditures on agriculture production. In 1994, the FOs supplied agro-chemicals and this funds are given as a credit supported by C.W.E and the co-operative society to keep the prices of their crops at optimum levels. Also the NGO ("FORUT") had helped to store the paddy in 1992/93.

(1) Using Resources for Investment

In addition to the membership fee, the members had to pay an extra amount of money which is equal to half a bushel of paddy per acre / year. This money is deposited in the FOs account. Since 1992, the NGO has introduced a program which supplies fertilizer and agro-chemicals to the farmers.

(2) Educating FOs Members

In the year of 1988 during the terrorism period, it was not possible to carry out the meeting. Before, the meeting were held monthly and the attendance was very high. There is a meeting hall already constructed, and another one is still under construction.

The FOs have showed much improvement in these few year. All the organizations have maintained their accounts in order so far. The support given by the various institutions and the works in all the FOs are very sound.

Overall, Over the several years the FOs have made a considerable headway. In this regard, the support received from Institutional Organizer(IO) is very high. It must be stated, however, that the organizations have not reached a level of development to warrant the withdrawal of Institutional Organizers(IOs).

2.4.5 Outline of Tract I in Muruthawela LB by F.O.

Outline of Tract I in Muruthawela LB by F.O.

Name of FO	Name of leader	F.O. / total members/farmers	Paddy/Land / Upland	Nos. of Coconuts	Nos. of Cattle(Buffalo)	Nos of Chicken	Paddy yield Maha/ Yala	Fertilizer Kg/Ac	OFC Cultivation
01. Weera I	W.Ramaik	21/150	26Ac 100Ac	800trees	50heads	15	90/60 (Bu/Ac)	150	Banana, Veg.
02. Weera II	AMK.Gunasena	40/80	50 40	1,000	40	50	75/50	150	Banana, Veg. G.G.
03. Barashakthi	L.P. Piyadasa	45/200	200 200	800	30	40	70/55	150	Banana, Veg. Sweet potato
04. Pubudu	M.A. Jayatilaka	25/30	45 190	1,000	200	60	75/55	150	Banana, GG Veg.
05. Eksath	P. Wijesingh	90/175	147 250	200	20	10	90/70	150	Banana, Veg. Fruits
06. Piyakaru	P.P. Karunadasa	28/45	38 30	1,000	30	50	75/55	150	GG, Sw P.
07. Ekamutsu	D.F.Hetiarachchi	75/100	85 50	1,000	30	60	75/55	150	Veg.GG. Banana
08. Kuda Vivula Right	D.B.P. Sadinis	25/30	80 50	1,000	20	15	80/60	150	Veg.Banana
09. Meegasara	R.P. Pamadasa	30/60	25 80	1,000	20	10	70/60	150	Banana, Veg
Total 9 FOs			379/870 (44%)	696Ac 970Ac (27Sha)(388ha)	7,800	440	310	--/--	--
Per Family (Total Av.)			0.8Ac/1.1Ac	9trees	0.5head	0.4head	78/59	150	Banana, Veg G.G.

2.4.6 Crop Budget With/Without Project

Paddy Crop Budget per ha

(1) Liyangastota Scheme

	<u>Present Condition</u>		<u>Without Project</u>		<u>With Project</u>	
1) Seeds	(150kg) Rs	1,300	(150kg) Rs	1,300	(100kg) Rs	1,250
2) Machinery	Rs	6,336	Rs	6,336	Rs	6,336
3) Fertilizer	(345kg) Rs	3,450	(345kg) Rs	3,450	(450kg) Rs	4,500
4) Agro-chemicals	Rs	2,684	Rs	2,684	Rs	2,684
5) Hired-labour	(58m.d) Rs	5,800	(58m.d) Rs	5,800	(58m.d) Rs	5,800
6) Family-labour	man-days	80 m.d.	man-days	80 m.d.	man-days	100 m.d
7) Total cash cost	Rs	19,570	Rs	19,570	Rs	20,550
8) Unit yield	kg	3,850	kg	3,470	kg	5,500
9) Gross return	Rs	36,190	Rs	32,570	Rs	51,700
10) Net return	Rs	16,620	Rs	13,000	Rs	31,150

(2) Muruthawela LB Scheme

	<u>Present Condition</u>		<u>Without Project</u>		<u>With Project</u>	
1) Seeds	(150kg) Rs	1280	(150kg) Rs	1280	(100kg) Rs	1,250
2) Machinery	Rs	6,670	Rs	6,670	Rs	6,670
3) Fertilizer	(275kg) Rs	2,750	(275kg) Rs	2,750	(450kg) Rs	4,500
4) Agro-chemicals	Rs	840	Rs	840	Rs	2,300
5) Hired-labour	(19m.d) Rs	1,900	(19m.d) Rs	1,900	(19m.d) Rs	1,900
6) Family-labour	man-days	111 m.d	man-days	111 m.d	man-days	120 m.d
7) Total cash cost	Rs	13,440	Rs	13,440	Rs	16,620
8) Unit yield	kg	3,700	kg	3,330	kg	5,500
9) Gross return	Rs	34,780	Rs	31,300	Rs	51,700
10) Net return	Rs	21,340	Rs	17,860	Rs	35,080

(3) Urubokka & Kirama Oya Scheme

	<u>Present Condition</u>		<u>Without Project</u>		<u>With Project</u>	
1) Seeds	(150kg) Rs	1280	(150kg) Rs	1280	(100kg) Rs	1,250
2) Machinery	Rs	6,670	Rs	6,670	Rs	6,670
3) Fertilizer	(250kg) Rs	2,500	(250kg) Rs	2,500	(450kg) Rs	4,500
4) Agro-chemicals	Rs	720	Rs	720	Rs	2,300
5) Hired-labour	(19m.d) Rs	1,900	(19m.d) Rs	1,900	(19m.d) Rs	1,900
6) Family-labour	man-days	111 m.d	man-days	111 m.d	man-days	120 m.d
7) Total cash cost	Rs	13,070	Rs	13,070	Rs	16,620
8) Unit yield	kg	3,200	kg	2,880	kg	5,500
9) Gross return	Rs	30,080	Rs	27,070	Rs	51,700
10) Net return	Rs	17,010	Rs	14,000	Rs	35,080

Paddy Crop Budget per ha

(4) Badagiriya Scheme

	<u>Present Condition</u>		<u>Without Project</u>		<u>With Project</u>	
1) Seeds	(150kg) Rs	1,840	(150kg) Rs	1,840	(100kg) Rs	1,250
2) Machinery	Rs	7,925	Rs	7,925	Rs	7,925
3) Fertilizer	(330kg) Rs	3,300	(330kg) Rs	3,300	(450kg) Rs	4,500
4) Agro-chemicals	Rs	2,155	Rs	2,155	Rs	2,155
5) Hired-labour	(29m.d) Rs	2,900	(29m.d) Rs	2,900	(29m.d) Rs	2,900
6) Family-labour	man-days	114 m.d	man-days	114 m.d	man-days	130 m.d
7) Total cash cost	Rs	18,120	Rs	18,120	Rs	18,730
8) Unit yield	kg	3,200	kg	2,880	kg	5,500
9) Gross return	Rs	30,080	Rs	27,070	Rs	51,700
10) Net return	Rs	11,960	Rs	8,950	Rs	32,970

Chili Crop Budget per ha (Muruthawela LB & Badagiriya Scheme)

	<u>Present Condition</u>		<u>Without Project</u>		<u>With Project</u>	
1) Seeds	(2kg) Rs	1600	(2kg) Rs	1600	(2kg) Rs	1,600
2) Machinery	Rs	1,800	Rs	1,800	Rs	1,800
3) Fertilizer	(500kg) Rs	4,500	(500kg) Rs	4,500	(900kg) Rs	8,100
4) Agro-chemicals	Rs	2,500	Rs	2,500	Rs	2,500
5) Hired-labour	(135m.d)Rs	13,500	(135m.d)Rs	13,500	(135md)Rs	13,500
6) Family-labour	man-days	350	man-days	350	man-days	350 m.d
7) Total cash cost	Rs	23,900	Rs	23,900	Rs	27,500
8) Unit yield	kg	500	kg	450	kg	1,000
9) Gross return	Rs	50,000	Rs	45,000	Rs	100,000
10) Net return	Rs	26,100	Rs	21,100	Rs	72,500

Banana Crop Budget per ha (Muruthawela LB & Badagiriya Scheme)

	<u>With Project (1st yr.)</u>		<u>With Project (2nd/3rd yr.)</u>	
1) Seed material	100pcs	Rs 6,000		
2) Machinery cost				
3) Fertilizer	250kg	Rs 2,500	500kg	Rs 5,000
4) Agro-chemicals		Rs 1,500		Rs 1,500
5) Hired-labour	100md	Rs 10,000	100md	Rs 10,000
6) Family-labour	150md		150md	
7) Total cash cost		Rs 20,000		Rs 16,500
8) Unit yield	5 ton		20 ton	
9) Gross return		Rs 50,000		Rs 200,000
10) Net return		Rs 30,000		Rs 183,500

2.4.7 Crop Selection in Crop Diversification

(Crop area / Population in Hambantota, Province, and Sri Lanka)

In order to select suitable crops in crop diversification for irrigable area at Hambantota, we studied data on actual crop extent in thirty kinds of crops comparing to population every province and district.

The crop area was calculated into square meter per person in each crop.

Data source: "Agricultural Implementation Programme 1994/95"
by Ministry of Agriculture, Land and Forestry

Data year of the Population: 1993

Crop Acreage: 01.Paddy -- 10.Potato: Extent in past 10 yrs. average
11.Tomato--21.Brinjol: Target of crop area, 1995
22.Mango-- 29.Pepper Existing extent, 1994

	<u>Hambantota</u>	<u>Southern Prov.</u>	<u>Sri Lanka Total</u>
01. Paddy	616 sq.m/person	468 sq.m/p.	486 sq.m/person
02. Chili	29.3	7.9	20.1
03. R.Onion	0.6	0.2	4.6
04. Cowpea	39.6	9.5	16.6
05. Greengram	92.7	22.3	44.8
06. Maize	14.3	3.4	27.5
07. Groundnuts	12.2	2.9	10.7
08. Kurakkan	13.3	3.2	6.4
09. Gingerly	10.0	2.4	8.0
10. Potato	0	0	5.6
11. Tomato	5.2	1.2	2.7
12. Cabbage	0	0	2.2
13. Carrot	0	0	1.3
14. Raddish	1.8	0.7	2.1
15. Leeks	0	0	0.6
16. Longbean	7.3	2.5	2.9
17. Okra	11.6	3.5	3.9
18. Bittergourd	6.4	2.0	1.9
19. Cucumber	4.3	1.3	1.2
20. Pumpkin	7.5	1.8	3.3
21. Brinjol	7.5	2.4	3.6
22. Mango	12.5	3.6	6.3
23. Banana	36.1	11.9	25.8
24. Lime	6.3	1.8	4.6
25. Papaya	1.6	0.6	0.8
26. Cocoa	0	0	9.1
27. Coffee	2.8	3.5	6.7
28. Cinnamon	22.2	58.9	7.5

According to this table, Hambantota district counts 19 crops(block letters) out of 29 crops, showing larger cropped extent than Sri Lankan total average, although Southern province counts only three crops.

Those crops can be classified as follows;

Vegetables:	Bittergourd, Cucumber, Okra, Longbean, Pumpkin, Brinjol, Tomato
Fruits:	Mango, Papaya, Banana, Lime
Grains:	Greengram, Kurakkan, Cowpea, Groundnuts
Spicy Crops:	Cinnamon, Gingerly(Sesame), Chili

Most crops except fruits are grown in rainfed upland or chena(sifting) cultivation in Maha season. Fruit crops are usually grown in the home garden. Vegetables and fruits are sent to Colombo from the market(pola) in every village. There are special markets for shipping of banana, papaya, and some vegetables in some areas.

Quality of vegetables in Hambantota is not so good as that in other area because of chena cultivation without enough fertilization and pest control. As grain crops are easily cultivated in chena, they can be main source of income for landless farmers, counting one third of total farm families. There are some Cooperatives helping farmers with marketing for grains.

Cinnamon in plantation and Sesami in chena cultivation are the export crops. The buyers(exporters) of sesami comes to Agricultural office. They are proposing the quality improvement of produce by good seeds prepared through buyers.

Introduction of the above crops to irrigable area is very difficult due to following conditions:

- (1) Those experienced farmers are mostly landless farmers.
- (2) Their cost-saving technology is not suitable for irrigable paddy land.
- (3) Marketing prices are hazardous even in Yala(dry) season.

In consideration of the above circumstances, the crop selection suitable for crop diversification in paddy land can be designed to be banana and chili, including some vegetables such as bitter gourds, okra etc.

Banana is famous for its development in Uda Walawe area near the project area. The crop area is still increasing around the project area. Banana in Sri Lanka, and Banana cultivation in Uda Walawe can be reviewed in Annex AG-8 and AG-9.

Chili is always the first crop for crop diversification in all the dry zone major irrigation areas such as Mahaweli systems because of marketing stability or regional self-consumption.

Those two crops are also desired by farmers in Badagiriya and Muruthawela LB.

2.4.8 Present Status of Banana Production in Sri Lanka (brief)

This report was written in "Banana Pamphlet" by Uda Walawe Project. The reporter, H. Samarasinghe, is Deputy Director (Research), HORDI, DOA, Peradeniya; Chairman of Fruits Task Force and Fruit Crop Development Board.

1. INTRODUCTION

Banana is the most popular home garden fruit crop as well as an important cash crop among a wide variety of fruit crops grown in Sri Lanka. Banana is grown under a wide range of climates except in the higher elevation where temperature is a limiting factor. A large number of varieties are available mostly indigenous and some are introduced. They are used as a fruit, for cooking and for preparation of food products such as chips.

It is doubtful that the present acreage can increase appreciably. Hence increase in production per hectare should be the major aim in the present context. However the recently appointed Task Force on Fruits have identified the most suitable Banana cultivators for different districts according to Agro-ecological suitability, as a first step towards increased production.

It is anticipated that the extent under Banana will rise provided that the grower is linked to appropriate marketing channels, and if necessary steps are taken to reduce post harvest losses; also by offering a fair price for every kilo of good quality Banana thus produced.

2. DISTRIBUTION

The Banana are tropical by origin. In cultivation they are distributed throughout the warmer countries and hardly transgress 40 degrees N and S latitudes. South East Asia is thought to be the original home of the cultivated bananas. Sri Lanka is situated 7 degrees N of the equator, where banana is grown as fruit crop, mainly for domestic consumption.

3. VARIETIES AND INTRODUCTIONS

According to Chandraratna and Nanayakara (1951), the banana collection in Sri Lanka amounted to twenty nine varieties, the greater number of which appear to be indigenous. They further add that the distinction between banana (dessert varieties) and plantains (cooking varieties) is not emphasized in banana growing countries, and possesses little systematic justification. The term banana therefore is used here to cover both dessert and cooking types.

Some varieties native to Sri Lanka are Rathambala, Alukuhel, Pitwalu, Sapumal-Anamalu, and Monthan. Among introductions the Indian "Gros Michel" and Indian (Bombay) "red" banana were introduced in 1927. Variety "Cavendish" from Mauritius was introduced in early 20th century.

4. DISTRIBUTION, ACREAGE AND YIELD

Banana is the most popular and historically also the earliest fruit crop grown in Sri Lanka, where climate is ideally suited for its cultivation. Banana thrives well in the tropics under warm and humid conditions, with a uniform temperature and sunlight and well distributed rainfall of about 1,000-1,500mm per year. In Sri Lanka it grows well up to an elevation of 900 meters.

There are no accurate statistics available for the acreage of banana. The total extent recorded in 1995 is about 45,000 hectares. The highest acreage was recorded in the dry zone. Large plantations are very rare. It is distributed all over the country except in the higher elevations where temperature and wind limits its growth and yield. Low temperatures affect the fruit quality and fruit size. In Sri Lanka, banana is grown under irrigated as well as rainfed conditions.

The average yields recorded in Sri Lanka are 15-30 t/ha. Under Government farms and Research station conditions, an average yield of 30 t/ha have been recorded.

Under well-managed commercial situations as in the West Indies, an average yield of 40-60 t/ha has been possible. Recent statistics reveal that the annual banana production in 1994-95 is around 400,000 ton, with an average yield of 7.8 t/ha.

Poor management practices, lack of technical know how and poor quality of planting material, are the major reasons for low yields in Sri Lanka.

5. GOVERNMENT POLICY

Under the present governments National Agricultural Policy, twelve fruit crops have been selected for the national fruit production programme, where banana receives the top priority.

A task force and fruit crop development board have been appointed by the Honourable Minister of Agriculture, Land and Forestry for the development of the fruit sector.

6. PROBLEMS AND LIMITATIONS

In a traditional home garden with a few banana plants, there is no systematic planting or maintenance. The plant grows and yields with available soil fertility. Cultural practices are primitive. Marketing problems do not arise as the crop is used for family consumption only. But in an emergency, the farmer disposes his crop to the nearest market to obtain cash.

However, in organized cultivations, a major limiting factor is the quantity and type of suitable planting material. Other limitations in general are; lack of know how on clump management, production of planting material, transport, post harvest handling, fertilizer application, protection from stray cattle and from theft, and marketing.

7. FUTURE

Most of the limiting factors mentioned above can be easily dealt with by means of awareness, training and demonstration programmes, which will be held at District and Agriculture Service Centre level very soon.

The task force on fruits is very much concerned about the production of quality planting material, post harvest handling and marketing aspects.

A work plan has prepared for discussion with relevant agencies who are responsible in implementing at the District and ASC levels, whatever the development and production programmes on banana.

2.4.9 OFC and Banana in Uda Walawe Project

This part of Annex was studied through reviewing the report of IIMI (International Irrigation Management Institute), "Seasonal Report Yala 1992; Uda Walawe Project", and "Banana Pamphlet" published by RPM (Resident Project Manager) office in 1995.

I. Result of the OFC Survey

IIMI prepared a proposal for a crop diversification program for two Blocks in the Right Bank, Uda Walawe Project; Angunakolapellassa and Embilipitiya, in 1992. IIMI provided guidance to the Block-level AO and Unit-level FA(Field Assistant) for implementing the program.

OFC Survey was conducted on 60 sample farmers (60ha) for the achievement in 1992 Yala .

(1) Cropped OFC and the extent

Banana	4.5 ac	3.0%	20%
Chili	8.5 ac	5.5%	37%
Onion	1.0 ac	0.6%	4%
Mung	0.5 ac	0.3%	2%
Vegetables	8.5 ac	5.5%	37%
OFC Total	23.0 ac	15.0%	100%
Total land	150.0 ac	100%	-----

Nos. of OFC farmers: 37 (62%); 0.62 ac(0.25ha) / farmer
Total average in all the farmers: approx. 0.38 ac(0.15ha)

(2) Reasons for OFC cultivation (multiple answers by OFC farmers)

Only for domestic consumption	38%
To get a better income	47%
Irrigation difficulties	38%
Officer's instructions/ As a trial	44%
Unsuitable soil for paddy	11%

(3) Better income by OFC

(17 OFC farmers for better income had grown following crops.)

Only Chili	40%	Chili	65%
Only Banana	12%	Vegetable	41%
Only Vegetable	6%	Banana	29%
Chili, Veget. & Banana	12%	Onion	6%
Vegetable & Chili	12%		
Vegetable & Banana	12%		
Onion & Vegetable	6%		

(4) Problems faced by OFC farmers (multiple answers)

No problem	24%
Constraints in production cost	48%
Pests and diseases	46%
Time consuming	43%
Marketing (Low price)	35%
Insufficient instructions	24%
Irrigation problem	22%

Damaged by stray cattle	19%
Nurseries failure	16%
Thefts	13%
Difficulty in finding seed materials	11%
Less yield than expected	11%
Labour shortage	8%
Method of land preparation	3%

(5) Benefits in growing OFC in paddy land (multiple answers)

To save water	82%
To get more income	55%
To grow crops in suitable soil	10%
Food expenditure can be reduced.	9%

(6) Request to be provided to OFC cultivation (multiple answers)

Subsidies for cost and material	98%
Proper water supply	95%
Instructions for cultivation	93%
Credit facilities	86%
Marketing facilities	3%
Seed material	2%

(7) Reasons not to grow OFC (multiple answers by non-OFC farmers)

Financial problem	76%
Labour problem	71%
Pest and diseases	68%
Better knowledge and experience on paddy	65%
Not adequate instruction	47%
Marketing problem	47%
Doubt of water supply	29%
Problems of seed material	21%

2. Economic Feasibility of OFC Cultivation

The main objective of farmers is to maximize profit and to minimize risk. Farmers will take risk to some extent if the profit margins are sufficiently high. Table below gives a comparison between economic performance of some OFC and rice. According to this information, Chili and Onion are the more attractive crops. Banana and Sugarcane are also economically attractive crops. However, these high performance crops require lot of labour and cash cost. This could be a constraint to many farmers.

The profitability of OFC mainly depends on two factors: cost of cultivation and output price. However, it also depends on the yield performance of crops. The major problem in getting a higher price for OFC is due to the poor demand, marketing structure and excess supply to the market in some seasons. Since demand elasticity is low for many OFC, supply is the most important factor in determining the price.

Due to the lack of bargaining power and low competition among buyers, farmers may not get the correct prices. Introduction of a guaranteed price scheme is one of the strategies to stabilize the prices.

Economic Returns of some OFC

	Potential Yield t/ha	Reported Yield t/ha	Production Cost Rs 1,000/ha	Returns to Farmer Rs 1,000/ha	Return to Labour Rs/day
Big Onion	20	8.5	21	139	410
Chili	2.5	1.2	23	56	115
Red Onion	20	10.0	35	54	150
Banana	20	8.0	5	43	n.d.
Sugarcane	139	n.d.	32	37	267
Groundnut	2	1.0	3	15	180
Greengram	1.3	1.0	7	12	90
Soya	2.5	1.5	3	7	70
Cowpea	1.4	1.0	3	7	40
Rice	6.0	5.5	11	19	296

3. Banana Cultivation in Uda Walawe Project

Banana cultivation in Uda Walawe started with 135 ha in 1982. It has shown 19 times of extent within 15 years by 2,582 ha in 1995.

1982	135 ha	1989	476 ha
1983	155 ha	1990	891 ha
1984	205 ha	1991	1,114 ha
1985	235 ha	1992	1,488 ha
1986	251 ha	1993	1,833 ha
1987	304 ha	1994	2,406 ha
1988	410 ha	1995	2,582 ha

There are seven Blocks in Uda Walawe project, and numbers of Banana farmers with their distribution in size of banana cultivation are shown as follows:

	EP	CW	MH	BK	AP	KW	SW	Total
Banana extent(ha)	365	362	651	321	213	366	304	2,582
Nos. farmers	1,090	891	1,555	859	975	826	800	6,996
Less 0.2ha	505	197	225	344	400	103	319	2,093
0.2-0.4ha	358	483	628	344	437	491	371	3,111
over 0.4ha	227	211	702	164	138	232	110	1,784

EP: Embilipitiya AP: Angunakolapellassa CW: Chandrikawewa
 KW: Kiribanwewa MH: Murawesihena SW: Suriyawewa BK: Binkama

4. Crop Budget in Banana Cultivation

Crop budget in banana cultivation per ha in Uda Walawe is reported as follows;

Input	(1) Land preparation(Tractor cost):	Rs 3,000
	(2) Planting materials: 1,000 pieces	Rs 5,500
	(3) Chemical fertilizer: 750kg	Rs 7,500
	(4) Organic matter: -	-
	(5) Agro-chemical: 8 litter	Rs 2,000

(6) Shipping cost (Transportation etc.): Rs 4,600
(7) Family labour: 132 man-days -
(8) Hired labour : 65 man-days Rs 6,500

Output (1) Yield: t / ha: 18 t/ha
(2) Farm Gate Price: Rs 10 / kg
(3) Gross return: Rs 180,000
(4) Production cost: Rs 29,100
(5) Net Return: Rs 150,900

2.4.10 Fertilizer Application and Paddy Yield

(1) Introduction

Farmers interview survey in Phase I (Feb.1995) revealed over-use in fertilizer application, compared with the reported average yield, due to water shortage or excess water by inadequate water management.

The conditions in water management depend on irrigation facilities such as intakes(gates), canals, etc. And it is in this point of view that the rehabilitation of irrigation system is urgently needed and studied in our three project areas.

Here, we would study and review how many kg of fertilizer is over-used ineffectively or how much yield reduction can be estimated in the project areas, comparing with the standard correlation between fertilizer application and the yield, based on the study in Mahaweli System 'C' by Agronomist in the study team.

(2) Fertilizer Efficiency to Paddy Yield

Effect of fertilizer application to yield performance depend on land fertility, soil conditions such as sandy land, organic contents, water management on-farm level, etc., except the points for the timing problem in application and other factors such as seed paddy quality.

In the new developed irrigation areas like Mahaweli Systems, fertilizer application shows rather higher yield performance than ordinary areas due to the virgin land fertility. After a few years, however, soil condition whether sandy or clayey comes to be more important factor than the land fertility because effective organic matter is washed and lost by irrigation water in sandy areas.

Mahaweli System 'C' area holds around 30% of sandy land area within the irrigation system, and it was said there for farmers to use water much more than necessity in their paddy cultivation. Therefore, the efficiency in fertilizer application was very important point because the effect of fertilizer was apt to lose due to excess water in the upstream and due to water shortage in the downstream.

Yield standards by farmers interview survey were 3.5 to 3.8 t/ha there in 1992-93 with 280 to 320 kg/ha of fertilizer application although the formal data based on the crop cutting survey were showing 4.0 to 4.3 t/ha in the typical irrigation paddy land.

According to the report by the project AO in Uda Walawe, farmers have achieved 4.7 t/ha of paddy yield on the average with 390 kg of fertilizer application in 1995. It is also noted that they uses the recommended good seed paddy.

(3) Fertilizer Amount and Yield Performance

Fertilizer application and the yield performance depends on lots of factors above mentioned, however, here we would show a rough estimates on the correlation between the amount of fertilizer application and the yield performance through the experience of Agronomist in Mahaweli System 'C'.

Fertilizer amounts and paddy yield are summarized as follows:

<u>Amount of Fertilizer</u>	<u>Standard Yield Yield Range</u>		
150 kg	2.7 t/ha	2.2--3.2 t/ha	
180	2.9	2.4--3.4	
210	3.1	2.6--3.7	
240	3.4	2.9--3.9	250kg/ 3.3t(*1)
270	3.7	3.2--4.2	
300	3.9	3.4--4.5	300kg/ 3.7t(*2)
330	4.3	3.8--4.8	330kg/ 3.2t(*3)
360	4.5	4.0--5.1	345kg/ 3.9t(*4)
390	4.9	4.5--5.4	390kg/ 4.7t(*5)
420	5.4	4.9--5.9	
450	5.8	5.3--6.4	

Fertilizers in this table are the total amount of V-mixture, TDM and Urea, being usually used in the project areas. In the case of single fertilizer such as TSP or MP, the amount should be reduced to two third. Recommendation by DOA for single fertilizer is 300 kg/ ha although the above fertilizer, V-mixture, TDM and Urea, is 450kg /ha.

- (*1) Munuthawela scheme: The yield performance is lower than the standard yield by around 5%.
- (*2) Mahaweli System 'C': a little lower than the standard yield.
- (*3) Badagiriya scheme: The yield performance is lower than the standard yield by around 20%.
- (*4) Liyangastota scheme: The yield performance is lower than the standard yield by around 10%.
- (*5) Mahaweli Uda Walawe: a little lower than the standard.

(4) Importance of Timing in Fertilizer Application

The timing of fertilizer with split applications is very important. Exact dates of 7 days before and after the paddy flowering should be counted and instructed for the second and third split applications to farmers by Agricultural Instructors(AI). Flowering stage is the date of 35 days (7 weeks) before the harvest. It is said 4-4.5 months varieties has much more flexibility in the application. In the project areas, most farmers are growing 3-3.5 months by direct sowing. Instruction of good timing in fertilizer application is the most important subject of DOA, as well as extension of good quality of seed paddy. Recommendable method of fertilizer application by variety in each growing period is tabulated below.

(Numbers indicate weeks after sowing.)

	<u>3 months</u>	<u>3.5 months</u>	<u>4 months</u>	<u>4.5 months</u>
Basal application	-1	-1	-1	-1
1st split application	3	3	3	4
2nd split application	8	10	10	12
3rd split application	10	12	13	15
Flowering stage	9	11	12	14
Harvesting stage	14	16	17	19

Basal dressing	:	V-Mixture	200 kg/ha
1st top dressing	:	Urea	50 kg/ha
2nd top dressing	:	TDM	150 kg/ha
3rd top dressing	:	Urea	50 kg/ha
		<u>Total</u>	<u>450 kg/ha</u>

APPENDIX-2.5

COST ESTIMATION

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App. 2.5-1 Project Cost

<Programme wise>

Description	Area	Total (Mil.Rs.)	F/C (Mil.Rs.)	L/C (Mil.Rs.)	US\$/ha
A. Construction Cost for Rehabilitation Works					
I. Liyangastota Scheme	5,007 ha	791.62	158.32	633.30	US\$ 3,162
II. Muruthawela Reservoir Scheme	5,473 ha	918.85	189.06	729.79	US\$ 3,358
III. Badagiriya Scheme	686 ha	156.18	31.36	124.81	US\$ 4,553
Total	11,166 ha	1,866.64	378.74	1,487.90	US\$ 3,343
B. Plan to the Operation and Maintenance Capacity					
1. Range Maintenance Unit (RMU)		161.20	138.76	22.44	
2. Operation Unit (OU)					
I. Liyangastota Scheme		37.51	34.91	2.60	
II. Muruthawela Reservoir Scheme		37.51	34.91	2.60	
III. Badagiriya Scheme		37.51	34.91	2.60	
sub-total		112.53	104.73	7.80	
Total	11,166 ha	273.73	243.49	30.24	US\$ 490
C. Plan to the Strengthen and Support Farmer Organization					
I. Liyangastota Scheme		83.58	69.78	13.80	
II. Muruthawela Reservoir Scheme		125.37	104.67	20.70	
III. Badagiriya Scheme		13.93	11.63	2.30	
Total	11,166 ha	222.88	186.08	36.80	US\$ 399
D. Training Programme					
1. Overseas Training		17.50	17.50	0.00	
2. In-County Training		2.50	0.00	2.50	
Total		20.00	17.50	2.50	
Total (B+C+D)	11,166 ha	516.61	447.07	69.54	US\$ 925
Ground Total (A+B+C+D)	11,166 ha	2,383.25	825.81	1,557.44	US\$ 4,269

<Scheme wise>

Description	Area	Total (Mil.Rs.)	F/C (Mil.Rs.)	L/C (Mil.Rs.)	US\$/ha
I. Liyangastota Scheme					
A. Construction Cost for Rehabilitation Works		791.62	158.32	633.30	
B. Plan to the Operation and Maintenance Capacity		109.80	97.14	12.66	
C. Plan to the Strengthen and Support Farmer Organization		83.58	69.78	13.80	
D. Training Programme		8.97	7.85	1.12	
Total	5,007 ha	993.97	333.09	660.88	US\$ 3,970
II. Muruthawela Reservoir Scheme					
A. Construction Cost for Rehabilitation Works		918.85	189.06	729.79	
B. Plan to the Operation and Maintenance Capacity		116.51	102.92	13.60	
C. Plan to the Strengthen and Support Farmer Organization		125.37	104.67	20.70	
D. Training Programme		9.80	8.58	1.23	
Total	5,473 ha	1,170.53	405.22	765.31	US\$ 4,278
III. Badagiriya Scheme					
A. Construction Cost for Rehabilitation Works		156.18	31.36	124.81	
B. Plan to the Operation and Maintenance Capacity		47.41	43.43	3.98	
C. Plan to the Strengthen and Support Farmer Organization		13.93	11.63	2.30	
D. Training Programme		1.23	1.08	0.15	
Total	686 ha	218.75	87.50	131.25	US\$ 6,377
Ground Total (I+II+III+IV)	11,166 ha	2,383.25	825.81	1,557.44	US\$ 4,269