

1.5 Breakdown of Construction Cost

UC1110

(1) Irrigation Development

No: I-1-(1) Item: Construction cost of Head Work (Unit : 1,000 TK)								
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
Intake Canal	Unit	1	40,184	40,184	44,010	44,010	84,194	1,111
Intake Regulator	Unit	1	12,243	12,243	13,365	13,365	25,608	1,112
Bank Rivetment	1000m	0.6	11,347	6,808	7,042	4,225	11,033	135
TOTAL				59,235		61,600	120,835	99

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No: I-1-(1)-a Item: Construction cost of Intake Canal (Unit : 1,000TK)								
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
Excavation	100 m ³	1340.837	(TK) 6,881	(1,000 TK) 9,226	(TK) 0	(1,000 TK) 0	(1,000 TK) 9,226	84
Rivetment for Canal Slope (TK/m)	m	1130	19,191	21,685	29,960	33,854	55,539	134
Sub-TOTAL				30,911		33,854	64,765	98
Direct Temporary Work	30%			9,273		10,156	19,429	91
TOTAL				40,184		44,010	84,194	99

No: I-1-(1)-b		Item: Construction cost of Intake Regulator		(Unit : 1,000TK)				
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)	
Excavation foundation, trenches	100 m3	123.315	1,499	184	0	0	184	30
Backfilling in foundation	100 m3	49.49	1,136	56	0	0	56	1
Mass concrete Structure, 1:3:6	m3	138.8	1,601	222	795	110	332	40
Shuttering normal	m2	124.9	127	15	0	0	15	60
Reinforced concrete 1:2:4	m3	2080.4	1,766	3,673	1,188	2,471	6,144	46
Reinforcement by wire binding	ton	166.4	13,050	2,171	13,920	2,316	4,487	54
Shuttering for colum, steir case,...	m2	5201	140	728	0	0	728	57
Water Stop I=230 PVC	m	110	0	0	968	106	106	72
Steel Sheet Pile U-II	m2	462.5	608	281	3,600	1,665	1,946	67
Steel Sheet Pile U-II	m2	785	608	477	3,600	2,826	3,303	67
Sluice Gate incl. M.L. 1.52 x 1.83	nos	12	96,000	1,152	24,000	288	1,440	61
Sand cement block 1:8	m3	260	874	227	761	197	424	56
Graval t=7cm	m2	110	164	18	0	0	18	83
Geotextyle setting	m2	730	0	0	158	115	115	34
Sand cement block 1:8	m3	245.9	874	214	761	187	401	56
Sub-TOTAL				9,418		10,281	19,699	98
Direct Temporary Work 30%				2,825		3,084	5,909	91
TOTAL				12,243		13,365	25,608	99

No: I-1-(2)		Item: Construction cost of Irrigation Canal		(Existing Rivers & Drainage Channels)					(Unit : 1,000 TK)	
Work	Unit	Quantity	Local Currency		Foreign Currency		Total			
			Unit Price	Amount	Unit Price	Amount				
Main Channel A	Unit	1	73,408	73,408	15,274	15,274	88,682	1,121		
Main Channel B	Unit	1	54,755	54,755	9,685	9,685	64,440	1,122		
Main Channel C	Unit	1	40,812	40,812	11,501	11,501	52,313	1,123		
Main Channel D	Unit	1	16,175	16,175	5,355	5,355	21,530	1,124		
Main Channel E	Unit	1	22,750	22,750	8,886	8,886	31,636	1,125		
Main Channel F	Unit	1	3,139	3,139	1,204	1,204	4,343	1,126		
Secondary Channels & Bils	Unit	1	62,544	62,544	0	0	62,544	1,127		
TOTAL				273,583		51,905	325,488	99		

No: I-1-(2)-a								
Item: Construction cost of Main Channel A								
(Unit : 1,000TK)								
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)	
Excavation new canal	100 m3	32329.61	1,281	41,414	0	0	41,414	31
Embankment canal bank	100 m3	2482.77	1,164	2,889	0	0	2,889	25
Regulator, Closed Type A	unit	2	4,641,085	9,282	2,611,714	5,223	14,505	101
Regulator, Closed Type D-1 (B=3.0)	unit	1	950,203	950	602,472	602	1,552	105
Regulator, Open Type A	unit	1	9,834,884	9,834	4,340,822	4,340	14,174	109
Regulator, Open Type B	unit	1	4,252,346	4,252	2,143,134	2,143	6,395	110
Regulator, Open Type H	unit	3	1,595,729	4,787	988,993	2,966	7,753	116
Sub-TOTAL				73,408		15,274	88,682	98
TOTAL				73,408		15,274	88,682	98

No: I-1-(2)-b								
Item: Construction cost of Main Channel B								
(Unit : 1,000TK)								
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)	
Excavation new canal	100 m3	25949.34	1,281	33,241	0	0	33,241	31
Embankment canal bank	100 m3	3212.5	1,164	3,739	0	0	3,739	25
Regulator, Closed Type B	unit	2	3,000,825	6,001	1,704,665	3,409	9,410	102
Regulator, Closed Type C-2 (B=4.5)	unit	1	1,546,714	1,546	931,141	931	2,477	104
Regulator, Closed Type D-2 (B=4.5)	unit	1	992,793	992	630,688	630	1,622	106
Regulator, Closed Type E-1 (B=3.0)	unit	1	1,140,428	1,140	733,903	733	1,873	107
Regulator, Open Type D	unit	1	4,748,818	4,748	2,253,179	2,253	7,001	112
Regulator, Open Type I-1 (B=3.0)	unit	1	3,348,248	3,348	1,729,639	1,729	5,077	117
TOTAL				54,755		9,685	64,440	98

No: I-1-(2)-c								
Item: Construction cost of Main Channel C								
(Unit: 1,000TK)								
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)	
Excavation new canal	100 m3	12021.5	1,281	15,399	0	0	15,399	31
Embankment canal bank	100 m3	2414.6	1,164	2,810	0	0	2,810	25
Regulator, Closed Type C-1	unit	1	1,589,885	1,589	864,594	864	2,453	103
Regulator, Closed Type D-2 (B=4.5)	unit	1	992,793	992	630,688	630	1,622	106
Regulator, Closed Type E-2 (B=4.5)	unit	1	1,195,707	1,195	771,719	771	1,966	108
Regulator, Open Type J	unit	1	263,929	263	213,913	213	476	119
Regulator, Open Type C	unit	1	8,879,339	8,879	4,293,295	4,293	13,172	111
Regulator, Open Type E	unit	2	3,062,524	6,125	1,424,621	2,849	8,974	113
Regulator, Open Type I-2 (B=4.5)	unit	1	3,560,679	3,560	1,881,315	1,881	5,441	118
TOTAL				40,812		11,501	52,313	99

No: I-1-(2)-d								
Item: Construction cost of Main Channel D								
(Unit: 1,000TK)								
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)	
Excavation new canal	100 m3	3087.04	1,281	3,954	0	0	3,954	31
Embankment canal bank	100 m3	720	1,164	838	0	0	838	25
Regulator, Closed Type D-1 (B=3.0)	unit	1	950,203	950	602,472	602	1,552	105
Regulator, Open Type F	unit	1	8,838,577	8,838	3,765,762	3,765	12,603	114
Regulator, Open Type H	unit	1	1,595,729	1,595	988,993	988	2,583	116
TOTAL				16,175		5,355	21,530	99

No: I-1-(2)-e								Item: Construction cost of Main Channel E	
								(Unit : 1,000TK)	
Work	Unit	Quantity	Local Currency		Foreign Currency		Total		
			Unit Price	Amount	Unit Price	Amount			
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)		
Excavation new canal	100 m3	988.56	1,281	1,266	0	0	1,266	31	
Embankment canal bank	100 m3	510	1,164	593	0	0	593	25	
Regulator, Closed Type D-2 (B=4.5)	unit	1	992,793	992	630,688	630	1,622	106	
Regulator, Open Type G	unit	2	9,949,930	19,899	4,128,343	8,256	28,155	115	
TOTAL				22,750		8,886	31,636	99	

No: I-1-(2)-f								Item: Construction cost of Main Channel F	
								(Unit : 1,000TK)	
Work	Unit	Quantity	Local Currency		Foreign Currency		Total		
			Unit Price	Amount	Unit Price	Amount			
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)		
Excavation new canal	100 m3	742.5	1,281	951	0	0	951	31	
Embankment canal bank	100 m3	247.5	1,164	288	0	0	288	25	
Regulator, Closed Type D-1 (B=3.0)	unit	2	950,203	1,900	602,472	1,204	3,104	105	
TOTAL				3,139		1,204	4,343	99	

No: I-1-(2)-g									
Item: Construction cost of Secondary Channels & Bils									
(Unit : 1,000TK)									
Work	Unit	Quantity	Local Currency		Foreign Currency		Total		
			Unit Price	Amount	Unit Price	Amount			
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)		
Excavation new canal	100 m3	48825	1,281	62,544	0	0	62,544		31
TOTAL				62,544		0	62,544		99

[U192]

No: I-1-(3)									
Item: Unit Construction Cost of LLP Development per Ha.									
(Unit : TK)									
Work	Unit	Amount	Local Currency		Foreign Currency		Total	others	
			Unit Price	Amount	Unit Price	Amount			No.
			(TK)	(TK)	(TK)	(TK)	(TK)		
Banagram LLP Farm Construction	LS	1	848,792	848,792	256,425	256,425	1,105,217		90
Farm Area (ha.) >>> Banagram		70							
Unit Cost per ha.				12,125		3,663	15,788		

No: I-1-(4)									
Item: Unit Construction Cost of STW Development per unit									
(Unit : TK)									
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	others	
			Unit Price	Amount	Unit Price	Amount		No	
			(TK)	(TK)	(TK)	(TK)	(TK)		
1. Well and Base Slab									
Well Drilling 30 m depth	m3	1	10,000	10,000	0	0	10,000		90
Mass concrete Structure, 1:3:6	m3	0.4	1,601	640	795	318	958		40
Shuttering normal	m2	0.8	127	101	0	0	101		60
Reinforcement by wire binding	ton	0.0036	13,050	46	13,920	50	96		54
Picked Jama	m3	0.6	632	379	0	0	379		90
Sub Total				11,166		368	11,534		
2. Delivery Box									
Piced Jama	m3	0.084	632	53	0	0	53		90
Brick masonry mortar 1:4	m3	0.325	1,256	408	363	117	525		5
Plastering t=12.7, mortar 1:4	m2	5.05	40	202	20	101	303		42
Wood work jam/sheel/korai	m3	0.0022	15,731	34	0	0	34		74
Sub Total				697		218	915		
3. Pump Facilities and Well Materials									
G1 pipe ϕ 100	m	18	0	0	492	8,856	8,856		90
Bail Plug ϕ 100	No	1	0	0	1,000	1,000	1,000		90
Brass Filter ϕ 100	m	12	0	0	820	9,840	9,840		90
Pump ϕ 100 mm	No	1	5,000	5,000	0	0	5,000		90
Engine 10.5 HP	No	1	0	0	22,000	22,000	22,000		90
Delivery pipe ϕ 100	m	3	0	0	492	1,476	1,476		90
Hand pump and others	LS	1	500	500	0	0	500		90
Sub Total				5,500		43,172	48,672		

No: I-1-(4)									
Item: Unit Construction Cost of STW Development per unit									
(Unit : TK)									
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	others	
			Unit Price	Amount	Unit Price	Amount		No	
4. Field Canal									
Embankment canal bank	100 m3	0.619	1,164	720	0	0	720		25
5. bamboo hat									
	LS	1	500	500	0	0	500		90
TOTAL				18,583		43,758	62,341		

No: I-16)								
Item: Construction cost of Demonstration Farm								
(Unit : 1,000 TK)								
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
Banagram	Unit	1	1,179,609	1,179	755,173	755	1,934	1,151
Pratap	Unit	1	1,546,891	1,546	924,506	924	2,470	1,152
Narikelbari	Unit	1	1,221,494	1,221	1,829,673	1,829	3,050	1,153
TOTAL				3,946		3,508	7,454	99

[UC1151]

No: UC-1151									
Item: Construction cost of Demonstration Farm (Banagram)									
(Unit : TK)									
Work	Unit	Quantity	Local Currency		Foreign Currency		Total		
			Unit Price	Amount	Unit Price	Amount			
			(TK)	(TK)	(TK)	(TK)	(TK)		
1 LLP Farm Construction									
(1) Civil Work									
Excavation	foundation, trenches	100 m3	0.0942	1,499	141	0	0	141	30
Picked Jama	#REF!	m3	1.35	632	853	0	0	853	90
Mass concrete	Structure, 1:3:6	m3	5.5	1,601	8,805	795	4,372	13,177	40
Shuttering	normal	m2	27.5	127	3,492	0	0	3,492	60
Reinforced concrete	1:2:4	m3	1.7	1,766	3,002	1,188	2,019	5,021	46
Reinforcement	by wire binding	ton	0.6	13,050	7,830	13,920	8,352	16,182	54
Shuttering	normal	m2	8.5	127	1,079	0	0	1,079	60
Sub-TOTAL					25,202		14,743	39,945	98
(2) Pump House									
		LS	1	1,000	1,000	0	0	1,000	90
(3) Pump facilities and pipes									
Pump	φ 150mm, 2 cusecs	No	2	6,000	12,000	0	0	12,000	90
Suction pipe (M.S.)	φ 150mm	m	20	0	0	980	19,600	19,600	90
Food Valve (M.S.)	φ 150mm	No	2	0	0	3,000	6,000	6,000	90
Delivery Bend 90	φ 150mm	No	2	0	0	1,500	3,000	3,000	90
Derivery Pipe			6	0	0	980	5,880	5,880	90
Flange, Nur, Bolt, Rubber Packing, etc.,		LS	1	0	0	1,500	1,500	1,500	90
Trolley with Handle		No	1	2,000	2,000	0	0	2,000	90

No: UC-1151							
Item: Construction cost of Demonstration Farm (Banagram)							
(Unit: TK)							
Work	Unit	Quantity	Local Currency		Foreign Currency		Total
			Unit Price	Amount	Unit Price	Amount	
Engine 15 HP	No	2	0	0	45,000	90,000	90,000
Sub-TOTAL				14,000		125,980	139,980
(4) Discharge Box for LLP & DTW	Unit	1	2,728	2,728	629	629	3,357
(5) Diversion Box	m	5	2,728	13,640	629	3,145	16,785
(6) Field Canal							
Field Canal of LLP Model Area (Type A) / pe	Unit	1200	447	536,400	58	69,600	606,000
Field Canal of LLP Model Area (Type B) / pe	m	500	380	190,000	45	22,500	212,500
Field Canal of LLP Model Area (Type C) / pe	m	1640	3	4,920	0	0	4,920
				731,320		92,100	
(7) Outlet	No	20	1,809	36,180	618	12,360	48,540
(8) Other works 3%				24,722		7,468	32,190
Total of LLP farm				848,792		256,425	1,105,217
2 DTW Farm Improvement							
(1) Pump Facilities							
Pump turbin	set	1	120,000	120,000	0	0	120,000

No: UC-1151							
Item: Construction cost of Demonstration Farm (Banagram)							
(Unit: TK)							
Work	Unit	Quantity	Local Currency		Foreign Currency		Total
			Unit Price	Amount	Unit Price	Amount	
Engine	set	1	0	0	150,000	150,000	150,000
Gear Head with Spicer Shaft	set	1	0	0	20,000	20,000	20,000
Suction Pipe	m	15	0	0	2,500	37,500	37,500
Discharge Pipe	m	3	0	0	2,500	7,500	7,500
Sub-Total				120,000		215,000	335,000
(2) Discharge Box for LLP & DTW	Unit	1	2,728	2,728	629	629	3,357
(3) Diversion Box	m	2	2,728	5,456	629	1,258	6,714
(4) Field Canal							
Field Canal (Type B)	m	280	380	106,400	45	12,600	119,000
Field Canal (Type C)	m	280	3	840	0	0	840
				107,240		12,600	
(5) Outlet	No	4	1,809	7,236	618	2,472	9,708
(6) Other works 3%				7,279		231,959	239,238
Total of DTW Farm Improvement				249,939		463,918	713,857

No: UC-1151								
Item: Construction cost of Demonstration Farm (Banagram)								
(Unit : TK)								
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
3 STW Farm Improvement								
(1) Pump Facilities								
Pump	set	1	5,000	5,000	0	0	5,000	90
Engine	set	1	0	0	22,000	22,000	22,000	90
Discharge Pipe ϕ 100mm	set	3	0	0	492	1,476	1,476	90
Sub-Total				5,000		23,476	28,476	
(2) Delivery Box for STW	Unit	1	697	697	218	218	915	154
(3) Field Canal								
Field Canal (Type B)	m	170	380	64,600	45	7,650	72,250	144
Field Canal (Type C)	m	330	3	990	0	0	990	145
				65,590		7,650		
(4) Outlet	No	4	1,809	7,236	618	2,472	9,708	140
(5) Other works	3%			2,355		1,014	3,369	
Total of STW Farm Improvement				80,878		34,830	115,708	
4 GRAND TOTAL				1,179,609		755,173	1,934,782	

No: UC-1152								
Item: Construction cost of Demonstration Farm (Pratap)								
(Unit : TK)								
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
Pump	set	1	5,000	5,000	0	0	5,000	90
Engine	set	1	0	0	22,000	22,000	22,000	90
Discharge Pipe ϕ 100mm	set	3	0	0	492	1,476	1,476	90
Sub-Total				5,000		23,476	28,476	
(2) Delivery Box for STW	Unit	1	697	697	218	218	915	154
(3) Field Canal								
Field Canal (Type B)	m	350	380	133,000	45	15,750	148,750	144
Field Canal (Type C)	m	370	3	1,110	0	0	1,110	145
				134,110		15,750		
(4) Outlet	No	7	1,809	12,663	618	4,326	16,989	140
(5) Other works	3%			4,574		1,313	5,887	
Total of STW Farm Improvement				157,044		45,083	202,127	
4 GRAND TOTAL				1,546,891		924,506	2,471,397	

No: UC-1152 Item: Cosntruction cost of Demonstration Farm (Pratap)								(Unit : TK)
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
Engine	set	1	0	0	150,000	150,000	150,000	
Gear Head with Spicer Shaft	set	1	0	0	20,000	20,000	20,000	
Suction Pipe	m	15	0	0	2,500	37,500	37,500	
Discharge Pipe	m	3	0	0	2,500	7,500	7,500	
Sub-Total				120,000		215,000	335,000	
(2) Discharge Box for LLP & DTW	Unit	1	2,728	2,728	629	629	3,357	
(4) Field Canal								
Field Canal (Type B)	m	660	380	250,800	45	29,700	280,500	
Field Canal (Type C)	m	200	3	600	0	0	600	
				251,400		29,700		
(5) Outlet from Type A and Type B Canal	No	4	1,809	7,236	618	2,472	9,708	
(6) Other works	3%			11,440		7,434	18,874	
Total of DTW Farm Improvement				392,804		255,235	648,039	
3 STW Farm Improvement								
(1) Pump Facilities								

No: UC-1152 Item: Cosntruction cost of Demonstration Farm (Pratap)								(Unit : TK)
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
Engine 15 HP	No	1	0	0	45,000	45,000	45,000	
PVC Pipe Setting (φ 25)	m	650	511	332,150	720	468,000	800,150	
Reducer Pipe φ 150-250	No	1	600	600	900	900	1,500	
Air Pipe φ 1", 1=7.0mx5 Nos	m	35	56	1,960	84	2,940	4,900	
Sub-TOTAL				342,710		535,580	878,290	
(4) Discharge Box for LLP & DTW	Unit	1	2,728	2,728	629	629	3,357	
(5) Field Canal								
Field Canal of LLP Model Area (Type B) / p	m	990	380	376,200	45	44,550	420,750	
Field Canal of LLP Model Area (Type C) / p	m	970	3	2,910	0	0	2,910	
				379,110		44,550		
(7) Outlet from Type A and Type B Canal	No	17	1,809	30,753	618	10,506	41,259	
(8) Other works	3%			29,040		18,180	47,220	
Total of LLP farm				997,043		624,188	1,621,231	
2 DTW Farm Improvement								
(1) Pump Facilities								
Pump turbin	set	1	120,000	120,000	0	0	120,000	

No: UC-1152									
Item: Construction cost of Demonstration Farm (Pratap)									
(Unit : TK)									
Work	Unit	Quantity	Local Currency		Foreign Currency		Total		
			Unit Price	Amount	Unit Price	Amount			
			(TK)	(TK)	(TK)	(TK)	(TK)		
1 LLP Farm Construction									
(1) Civil Work									
Excavation	foundation, trenches	100 m3	0.0942	1,499	141	0	0	141	30
Picked Jama	#REF!	m3	1.35	632	853	0	0	853	90
Mass concrete	Structure, 1:3:6	m3	5.5	1,601	8,805	795	4,372	13,177	40
Shuttering	normal	m2	27.5	127	3,492	0	0	3,492	60
Reinforced concrete	1:2:4	m3	1.7	1,766	3,002	1,188	2,019	5,021	46
Reinforcement	by wire binding	ton	0.6	13,050	7,830	13,920	8,352	16,182	54
Shuttering	normal	m2	8.5	127	1,079	0	0	1,079	60
Sub-TOTAL					25,202		14,743	39,945	98
(2) Pump House									
		LS	6.25	30,000	187,500	0	0	187,500	90
(3) Pump facilities and pipes									
Pump	φ 150mm, 2 cusecs	No	1	6,000	6,000	0	0	6,000	90
Suction pipe (M.S.)	φ 150mm	m	10	0	0	980	9,800	9,800	90
Food Valve (M.S.)	φ 150mm	No	1	0	0	3,000	3,000	3,000	90
Delivery Bend 90	φ 150mm	No	1	0	0	1,500	1,500	1,500	90
Delivery Pipe			3	0	0	980	2,940	2,940	90
Flange, Nur, Bolt, Rubber Packing, etc.,		LS	1	0	0	1,500	1,500	1,500	90
Trolley with Handle		No	1	2,000	2,000	0	0	2,000	90

No: UC-1153									
Item: Construction cost of Demonstration Farm (Narikelbari)									
(Unit : TK)									
Work	Unit	Quantity	Local Currency		Foreign Currency		Total		
			Unit Price	Amount	Unit Price	Amount			
			(TK)	(TK)	(TK)	(TK)	(TK)		
1 LLP Farm Construction									
(1) Civil Work									
Excavation	foundation, trenches	100 m3	0.0942	1,499	141	0	0	141	30
Excavation	new canal	100 m3	33	1,281	42,273	0	0	42,273	31
Picked Jama		m3	1.35	632	853	0	0	853	90
Mass concrete	Structure, 1:3:6	m3	5.5	1,601	8,805	795	4,372	13,177	40
Shuttering	normal	m2	27.5	127	3,492	0	0	3,492	60
Reinforced concrete	1:2:4	m3	1.7	1,766	3,002	1,188	2,019	5,021	46
Reinforcement	by wire binding	ton	0.6	13,050	7,830	13,920	8,352	16,182	54
Shuttering	normal	m2	8.5	127	1,079	0	0	1,079	60
Sub-TOTAL					67,475		14,743	82,218	98
(2) Pump House									
		LS	1	1,000	1,000	0	0	1,000	90
(3) Pump facilities and pipes									
Pump	φ 150mm, 2 cusecs	No	2	6,000	12,000	0	0	12,000	90
Suction pipe (M.S.)	φ 150mm	m	20	0	0	980	19,600	19,600	90
Food Valve (M.S.)	φ 150mm	No	2	0	0	3,000	6,000	6,000	90
Delivery Bend 90	φ 150mm	No	2	0	0	1,500	3,000	3,000	90
Delivery Pipe			6	0	0	980	5,880	5,880	90
Flange, Nur, Bolt, Rubber Packing, etc.,		LS	1	0	0	1,500	1,500	1,500	90

No: UC-1153							
Item: Construction cost of Demonstration Farm (Narikelbari)							
(Unit : TK)							
Work	Unit	Quantity	Local Currency		Foreign Currency		Total
			Unit Price	Amount	Unit Price	Amount	
Trolley with Handle	No	1	2,000	2,000	0	0	2,000
Engine 15 HP	No	2	0	0	45,000	90,000	90,000
Sub-TOTAL				14,000		125,980	139,980
(4) Discharge Box for LLP & DTW	Unit	1	2,728	2,728	629	629	3,357
(5) Field Canal							
PVC Pipe Setting (φ 300mm) /per m	m	350	654	228,900	930	325,500	554,400
PVC Pipe Setting (φ 250mm) /per m	m	340	511	173,740	720	244,800	418,540
PVC Pipe Setting (φ 200mm) /per m	m	635	248	157,480	330	209,550	367,030
PVC Pipe Setting (φ 150mm) /per +	m	1210	174	210,540	222	268,620	479,160
PVC Pipe Setting (φ 100mm) /per +	m	540	118	63,720	141	76,140	139,860
Field Canal (Type C)	m	770	3	2,310	0	0	2,310
Air Pipe φ 1", l=7m x 5	m	35	56	1,960	84	2,940	4,900
Mass concrete	m ³	9	1,601	14,409	795	7,155	21,564
Shuttering	m ²	7.8	127	990	0	0	990
Sub-TOTAL				854,049		1,134,705	
(7) Outlet from Pipeline	No	39	3,853	150,267	10,643	415,077	565,344
(8) Other works	3%			32,685		50,734	83,419

No: UC-1153							
Item: Construction cost of Demonstration Farm (Narikelbari)							
(Unit : TK)							
Work	Unit	Quantity	Local Currency		Foreign Currency		Total
			Unit Price	Amount	Unit Price	Amount	
Total of LLP farm				1,122,204		1,741,868	2,864,072
2 STW Farm Improvement							
(1) Pump Facilities							
Pump	set	3	5,000	15,000	0	0	15,000
Engine	set	3	0	0	22,000	66,000	66,000
Discharge Pipe φ 100mm	set	9	0	0	492	4,428	4,428
Sub-Total				15,000		70,428	85,428
(2) Delivery Box for STW	Unit	3	697	2,091	218	654	2,745
(3) Field Canal							
Field Canal (Type B)	m	150	380	57,000	45	6,750	63,750
Field Canal (Type C)	m	200	3	600	0	0	600
				57,600		6,750	
(4) Outlet	No	12	1,809	21,708	618	7,416	29,124
(5) Other works	3%			2,891		2,557	5,448
Total of STW Farm Improvement				99,290		87,805	187,095

No: UC-1153							
Item: Cosntruction cost of Demonstration Farm (Nankelbari)							
(Unit : TK)							
Work	Unit	Quantity	Local Currency		Foreign Currency		Total
			Unit Price	Amount	Unit Price	Amount	
4 GRAND TOTAL				1,221,494		1,829,673	3,051,167

(2) Drainage Improvement

No: I-2-(1)								
Item: Construction cost of Ratnai River Diversion Canal								
(Unit: 1,000TK)								
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)	
Excavation new canal	100 m3	1443.45	1,281	1,849	0	0	1,849	31
Embankment canal bank	100 m3	82.47	1,164	95	0	0	95	25
TOTAL				1,944		0	1,944	

No: I-2-(2)								
Item: Reconstruction cost of Ratnai Regulator								
(Unit: 1,000TK)								
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)	
Excavation	100 m3	42.3	6,881	291	0	0	291	84
Backfilling in foundation	100 m3	29.88	1,136	33	0	0	33	1
Removal of old broken regulator	Unit	1	600,000	600	0	0	600	90
Excavation new canal	100 m3	217.17	1,281	278	0	0	278	31
Turfing including fine dressing	100m3	6.75	220	1	0	0	1	71
Mass concrete Structure, 1:3:6	m3	56.1	1,601	89	795	44	133	46
Shuttering normal	m2	50.5	127	6	0	0	6	60
Reinforced concrete 1:2:4	m3	660.9	1,766	1,167	1,188	785	1,952	46
Reinforcement by wire binding	ton	52.9	13,050	690	13,920	736	1,426	54
Shuttering for roof slab	m2	1652.3	159	262	0	0	262	59
Water Stop 1=230 PVC	m	61.7	0	0	968	59	59	72
Sluice Gate incl. M.L. 1.52 x 1.83	nos	8	96,000	768	24,000	192	960	61
Steel Sheet Pile U-II	m2	214.2	608	130	3,600	771	901	67
Steel Sheet Pile U-II	m2	112.5	608	68	3,600	405	473	67
Sand cement block /Riprap	m3	105.5	874	92	761	80	172	56
Gravel /Riprap	m3	54	164	8	0	0	8	83
Geotextyle setting	m2	318.9	0	0	158	50	50	34
Sand cement block /River side protection	m3	38.9	874	33	761	29	62	56
Bank Rivetment	m	200	11,347	2,269	7,042	1,408	3,677	133
other works 3%	m		11,347	203	7,042	136	339	133
Sub TOTAL				6,988		4,695	11,683	
Direct Temporary Work 30%				2,096		1,408	3,504	91
TOTAL				9,084		6,103	15,187	

No: 1-2-(3)								
Item: Rehabilitation cost of Harichai Regulator								
(Unit: 1,000TK)								
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)	
Sand cement block 1:6	m3	247.9	949	235	926	229	464	55
Sand cement block 1:6	m3	80.6	949	76	926	74	150	55
Steel Sheet Pile U-II	m2	175.8	608	106	3,600	632	738	67
other works	3%			12		28	40	90
Sub-TOTAL				429		963	1,392	
Removal of Old Struttur	30% unit			128		288	416	
Direct Temporary Work	10%			42		96	138	91
TOTAL				599		1,347	1,946	

No: 1-2-(4)								
Item: Construction cost of Add. Regulators								
(Unit: 1,000 TK)								
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
Palashibari Add. Regulator (2 vent)	Unit	1	2,969	2,969	2,815	2,815	5,784	1,231
Harichai Add. Regulator (8 vent)	Unit	1	4,608	4,608	4,191	4,191	8,799	1,232
Kishorpur Add. Regulator (12 vent)	Unit	1	6,418	6,418	5,591	5,591	12,009	1,233
Gharialdanga Add. Regulator (2 vent)	Unit	1	2,969	2,969	2,815	2,815	5,784	1,234
TOTAL				16,964		15,412	32,376	99

No: 1-2-(4)-a		Item: Construction cost of Palashibari Add. Regulator (2 vent)		(Unit : 1,000TK)				
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price (TK)	Amount (1,000 TK)	Unit Price (TK)	Amount (1,000 TK)		
Excavation new canal	100 m3	30.06	1,281	38	0	0	38	
Excavation reexcavation of exit can	100 m3	47.03	1,281	60	0	0	60	
Backfilling in foundation	100 m3	24.98	1,136	28	0	0	28	
Mass concrete Structure, 1:3:6	m3	23.3	1,601	37	795	18	55	
Shuttering normal	m2	21	127	2	0	0	2	
Reinforced concrete 1:2:4	m3	334.1	1,766	590	1,188	396	986	
Reinforcement by wire binding	ton	26.7	13,050	348	13,920	371	719	
Shuttering for roof slab	m2	835.3	159	132	0	0	132	
Water Stop 1=230 PVC	m	37.7	0	0	968	36	36	
Steel Sheet Pile U-II	m2	142.2	608	86	3,600	511	597	
Steel Sheet Pile U-II	m2	52.5	608	31	3,600	189	220	
Sand cement block 1:8	m3	33.5	874	29	761	25	54	
Gravel	m3	18	164	2	0	0	2	
Sluice Gate incl. M.L. 1.52 x 1.83	nos	2	96,000	192	24,000	48	240	
Geotextyle setting	m2	102.9	0	0	158	16	16	
Sand cement block /Canal slope protection	m3	648	874	566	761	493	1,059	
Turfing including fine dressing	100m3	351	220	77	0	0	77	
other works	3%			66		63	129	
Sub-TOTAL				2,284		2,166	4,450	
Direct Temporary Work	30%			685		649	1,334	
TOTAL				2,969		2,815	5,784	

No: 1-2-(4)-b		Item: Construction cost of Harichai Add. Regulator (8 vent)		(Unit : 1,000TK)				
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price (TK)	Amount (1,000 TK)	Unit Price (TK)	Amount (1,000 TK)		
Excavation new canal	100 m3	57.8	1,281	74	0	0	74	
Excavation reexcavation of exit can	100 m3	58.56	1,281	75	0	0	75	
Backfilling in foundation	100 m3	32.42	1,136	36	0	0	36	
Turfing including fine dressing	100m3	6.75	220	1	0	0	1	
Concrete lining Mass con. t=10cm	m2	56.1	160	8	80	4	12	
Shuttering normal	m2	50.5	127	6	0	0	6	
Reinforced concrete 1:2:4	m3	660.9	1,766	1,167	1,188	785	1,952	
Reinforcement by wire binding	ton	52.9	13,050	690	13,920	736	1,426	
Shuttering for roof slab	m2	1652.3	159	262	0	0	262	
Water Stop 1=230 PVC	m	61.7	0	0	968	59	59	
Steel Sheet Pile U-II	m2	214.2	608	130	3,600	771	901	
Steel Sheet Pile U-II	m2	112.5	608	68	3,600	405	473	
Sand cement block /Riprap	m3	105.5	874	92	761	80	172	
Gravel /Riprap	m3	54	164	8	0	0	8	
Sluice Gate incl. M.L. 1.52 x 1.83	nos	8	96,000	768	24,000	192	960	
Geotextyle setting	m2	318.9	0	0	158	50	50	
Sand cement block /Canal Slope Protection	m3	64.8	874	56	761	49	105	
Turfing /Canal Slope Protection	100m3	6.75	220	1	0	0	1	
other works	3%			103		93	196	
Sub-TOTAL				3,545		3,224	6,769	
Direct Temporary Work	30%			1,063		967	2,030	
TOTAL				4,608		4,191	8,799	

No: I-2-(4)-c									
Item: Construction cost of Kishorpur Add. Regulator (12 vent)									
(Unit : 1,000TK)									
Work	Unit	Quantity	Local Currency		Foreign Currency		Total		
			Unit Price	Amount	Unit Price	Amount			
Excavation	new canal	100 m3	76.3	1,281	97	0	0	97	31
Excavation	reexcavation of exit cana	100 m3	78.24	1,281	100	0	0	100	32
Backfilling in foundation		100 m3	37.38	1,136	42	0	0	42	1
Turfing	including fine dressing	100m3	8.91	220	1	0	0	1	71
Mass concrete	Structure, 1:3:6	m3	77.9	1,601	124	795	61	185	40
Shuttering	normal	m2	70.1	127	8	0	0	8	60
Reinforced concrete	1:2:4	m3	878.8	1,766	1,551	1,188	1,044	2,595	46
Reinforcement	by wire binding	ton	70.3	13,050	917	13,920	978	1,895	54
Shuttering	for roof slab	m2	2197	159	349	0	0	349	59
Water Stop	1=230 PVC	m	77.7	0	0	968	75	75	72
Steel Sheet Pile	U-II	m2	262.2	608	159	3,600	943	1,102	67
Steel Sheet Pile	U-II	m2	152.5	608	92	3,600	549	641	67
Sand cement block	/Riprap	m3	153.5	874	134	761	116	250	56
Gravel	/Riprap	m3	78	164	12	0	0	12	83
Sluice Gate incl. M.L.	1.52 x 1.83	nos	12	96,000	1,152	24,000	288	1,440	61
Geotextyle setting		m2	462.9	0	0	158	73	73	34
Sand cement block	/Canal Slope Protection	m3	64.8	874	56	761	49	105	56
other works	3%				143		125	268	90
Sub-TOTAL					4,937		4,301	9,238	
Direct Temporary Work	30%				1,481		1,290	2,771	91
TOTAL					6,418		5,591	12,009	

No: I-2-(4)-d									
Item: Construction cost of Gharialdanga Add. Regulator (2 vent)									
(Unit : 1,000TK)									
Work	Unit	Quantity	Local Currency		Foreign Currency		Total		
			Unit Price	Amount	Unit Price	Amount			
Excavation	new canal	100 m3	30.06	1,281	38	0	0	38	31
Excavation	reexcavation of exit cana	100 m3	47.03	1,281	60	0	0	60	32
Backfilling in foundation		100 m3	24.98	1,136	28	0	0	28	1
Mass concrete	Structure, 1:3:6	m3	23.3	1,601	37	795	18	53	40
Shuttering	normal	m2	21	127	2	0	0	2	60
Reinforced concrete	1:2:4	m3	334.1	1,766	590	1,188	396	986	46
Reinforcement	by wire binding	ton	26.7	13,050	348	13,920	371	719	54
Shuttering	for roof slab	m2	835.3	159	132	0	0	132	59
Water Stop	1=230 PVC	m	37.7	0	0	968	36	36	72
Steel Sheet Pile	U-II	m2	142.2	608	86	3,600	511	597	67
Steel Sheet Pile	U-II	m2	52.5	608	31	3,600	189	220	67
Sand cement block	1:8	m3	33.5	874	29	761	25	54	56
Gravel		m3	18	164	2	0	0	2	83
Sluice Gate incl. M.L.	1.52 x 1.83	nos	2	96,000	192	24,000	48	240	61
Geotextyle setting		m2	102.9	0	0	158	16	16	34
Sand cement block	/Canal slope protection	m3	648	874	566	761	493	1,059	56
Turfing	including fine dressing	100m3	351	220	77	0	0	77	71
other works	3%				66		63	129	90
Sub-TOTAL					2,284		2,166	4,450	
Direct Temporary Work	30%				685		649	1,334	91
TOTAL					2,969		2,815	5,784	

No: 1-2-(5) Item: Rehab. & Const. cost of Pipe Sluices								(Unit : 1,000 TK)	
Work	Unit	Quantity	Local Currency		Foreign Currency		Total		
			Unit Price	Amount	Unit Price	Amount			
Existing Pipe Sluice	Unit	10	188	1,880	94	940	2,820	1,241	
New Pipe Sluice	Unit	1	451	451	224	224	675	1,242	
TOTAL				2,331		1,164	3,495	99	

No: 1-2-(5)-a Item: Unit Rehabili. Cost of Existing Pipe Sluice								(Unit : 1,000 TK)	
Work	Unit	Quantity	Local Currency		Foreign Currency		Total		
			Unit Price	Amount	Unit Price	Amount			
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)		
Excavation new canal	100 m3	1.104	1,281	1	0	0	1	31	
Backfilling in foundation	100 m3	0.636	1,136	0	0	0	0	1	
Mass concrete Structure, 1:3:6	m3	1.9	1,601	3	795	1	4	49	
Shuttering normal	m2	1.7	127	0	0	0	0	69	
Reinforced concrete 1:2:4	m3	25.6	1,766	45	1,188	30	75	46	
Reinforcement by wire binding	ton	2.1	13,050	27	13,920	29	56	54	
Shuttering for roof slab	m2	128	159	20	0	0	20	59	
RCC Pipe setting $\phi = 1000$	m	2	2,077	4	0	0	4	50	
Sand cement block / Riprap	m3	4	949	3	926	3	6	55	
Sand cement block / Slope Protection	m3	0.9	874	0	761	0	0	56	
Flap gate $\phi = 100$	nos	1	34,400	34	8,600	8	42	33	
Wood work /Stop log Timber	m3	0.3	15,731	4	0	0	4	74	
other works	3%			4		2	6	90	
Sub-TOTAL				145		73	218		
Direct Temporary Work	30%			43		21	64	91	
TOTAL				188		94	282		

No: 1-2-(5)-b								
Item: Construction cost of New Pipe Sluice								
(Unit : 1,000TK)								
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)	
Excavation	new canal	100 m3	5.363	1,281	6	0	6	31
Backfilling in foundation		100 m3	4.382	1,136	4	0	4	1
Turfing	including fine dressing	100m3	1.3	220	0	0	0	71
Mass concrete	Structure, 1:3:6	m3	6	1,601	9	795	4	40
Shuttering	normal	m2	4.8	127	0	0	0	60
Reinforced concrete	1:2:4	m3	64.5	1,766	113	1,188	76	46
Reinforcement	by wire binding	ton	5.2	13,050	67	13,920	72	54
Shuttering	for roof slab	m2	322.5	159	51	0	51	59
RCC Pipe setting	φ = 1000	m	20	2,077	41	0	41	50
Sand cement block	/ Rip rap	m3	8	949	7	926	7	55
Sand cement block	/ Slope protection	m3	1.7	874	1	761	1	56
Flap gate	φ = 100	nos	1	34,400	34	8,600	8	33
Wood work	/Stop Timber	m3	0.3	15,731	4	0	4	74
other works	3%				10		5	90
Sub-TOTAL					347		173	520
Direct Temporary Work	30%				104		51	91
TOTAL					451		224	675

No: 1-2-(6)								
Item: Construction cost of Desilting Works of Existing Drainage Channeles								
(Unit : 1,000TK)								
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)	
Excavation	reexcavation of exit canal	100 m3	5700	1,281	7,301	0	0	32
TOTAL					7,301		0	7,301

(3) Flood Protection Works

No: 1-3-(1)								
Item: Construction cost of Ratnai River Closure at Durakuti								
(Unit : 1,000TK)								
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)	
Embankment	flood embankment by n	100 m3	103.615	1,767	183	0	183	27
Turfing	including fine dressing	100m3	28.877	220	6	0	6	71
Bank Rivetment		m	200	11,347	2,269	7,042	1,408	135
TOTAL					2,458		1,408	3,866

No: 1-3-(2)								
Item: Reconstruction cost of Breached Embankment								
(TK) (1,000 TK) (TK) (1,000 TK) (Unit: 1,000TK)								
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)	
(a) Bunka Site (170 m)								
Embankment	repairing embankment	100 m3	41.531	1,164	48	0	48	28
Turfing	including fine dressing	100m3	21.503	220	4	0	4	71
Sub-TOTAL					52		0	98
(b) Char Khatamari Site (284 m)								
Embankment	repairing embankment	100 m3	136.934	1,164	159	0	159	28
Turfing	including fine dressing	100m3	58.507	220	12	0	12	71
Sub-TOTAL					171		0	98
(c) Ratnai Regulator Site (133 m)								
Embankment	repairing embankment	100 m3	134.516	1,164	156	0	156	28
Turfing	including fine dressing	100m3	39.803	220	8	0	8	71
Sub-TOTAL					164		0	98
(d) Pangla Site (64 m)								
Embankment	repairing embankment	100 m3	69.655	1,164	81	0	81	28
Turfing	including fine dressing	100m3	29.847	220	6	0	6	71
Sub-TOTAL					87		0	98
(e) Joykumar Site (350 m)								
Embankment	repairing embankment	100 m3	350	1,164	407	0	407	28
Bank Rivetment		0 m	350	11,347	3,971	7,042	2,464	135
Turfing	including fine dressing		140	220	30	0	30	71
Sub-TOTAL					4,408		2,464	98
TOTAL					4,882		2,464	7,346

No: I-3-(3)									
Item: Rehabilitation Cost of Flood Embankment									
(Unit: 1,000TK)									
Work	Unit	Quantity	Local Currency		Foreign Currency		Total		
			Unit Price	Amount	Unit Price	Amount			
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)		
Embankment	repairing embankment	100 m3	864	1,164	1,005	0	0	1,005	28
Turfing	including fine dressing	100m3	1080	220	237	0	0	237	71
TOTAL					1,242		0	1,242	

No: I-3-(4)									
Item: Rehabilitation Cost of Approach Road of Flood Embankment (10 sites)									
(Unit: 1,000TK)									
Work	Unit	Quantity	Local Currency		Foreign Currency		Total		
			Unit Price	Amount	Unit Price	Amount			
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)		
Embankment	road	100 m3	36	1,164	41	0	0	41	29
Turfing	including fine dressing	100m3	8	220	1	0	0	1	71
TOTAL					42		0	42	

(4) Rural Infrastructure Improvement

No: 1-4								
Item: Construction cost of Rural Infrastructure Improvement (Existing Rivers & Drainage Channels) (Unit : 1,000 TK)								
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
Rural Infrastructure for Main Channel A	Unit	1	34,196	34,196	21,972	21,972	56,168	1,401
Rural Infrastructure for Main Channel B	Unit	1	28,374	28,374	18,070	18,070	46,444	1,402
Rural Infrastructure for Main Channel C	Unit	1	21,290	21,290	13,507	13,507	34,797	1,403
Rural Infrastructure for Main Channel D	Unit	1	2,468	2,468	1,529	1,529	3,997	1,404
Rural Infrastructure for Channel E	Unit	1	4,147	4,147	2,727	2,727	6,874	1,405
Rural Infrastructure for Channel F	Unit	1	2,986	2,986	1,845	1,845	4,831	1,406
Rural Infrastructure for Rainai Diversion Canal	Unit	1	5,060	5,060	3,194	3,194	8,254	1,407
Bridge for O/M	Unit	1	1,478	1,478	943	943	2,421	1,408
TOTAL				99,999		63,787	163,786	99

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No: 1-4-a								
Item: Construction cost of Rural Infrastructure for Main Channel A (Unit : 1,000TK)								
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)	
Rural Road Bridge, Type A-1 (B=3.0)	unit	3	1,640,263	4,920	1,043,022	3,129	8,049	120
Rural Road Bridge, Type A-2 (B=4.5)	unit	9	1,960,025	17,640	1,261,768	11,355	28,995	121
Rural Road Bridge, Type D-1 (B=3.0)	unit	3	574,724	1,724	353,679	1,061	2,785	126
Rural Road Bridge, Type D-2 (B=4.5)	unit	2	631,469	1,262	392,073	784	2,046	127
Metal Road Bridge, Type MA	unit	1	3,847,552	3,847	2,537,649	2,537	6,384	128
Culvert, Type CA	unit	1	1,652,218	1,652	1,142,676	1,142	2,794	131
Culvert, Type CB	unit	1	1,373,782	1,373	949,248	949	2,322	132
Rail Way Bridge, Type RA	unit	1	1,778,558	1,778	1,015,484	1,015	2,793	129
Sub-TOTAL				34,196		21,972	56,168	98
TOTAL				34,196		21,972	56,168	99

No: I-4-b								
Item: Construction cost of Rural Infrastructure for Main Channel B								
(Unit : 1,000TK)								
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)	
Rural Road Bridge, Type B-1 (B=3.0)	unit	3	1,265,191	3,795	798,738	2,396	6,191	122
Rural Road Bridge, Type A-2 (B=4.5)	unit	2	1,960,025	3,920	1,261,768	2,523	6,443	121
Rural Road Bridge, Type C-1 (B=3.0)	unit	4	967,232	3,868	607,954	2,431	6,299	124
Rural Road Bridge, Type C-2 (B=4.5)	unit	4	1,126,526	4,506	715,469	2,861	7,367	125
Rural Road Bridge, Type D-1 (B=3.0)	unit	2	574,724	1,149	353,679	707	1,856	126
Rural Road Bridge, Type D-2 (B=4.5)	unit	9	631,469	5,683	392,073	3,528	9,211	127
Culvert, Type CA	unit	1	1,652,218	1,652	1,142,676	1,142	2,794	131
Culvert, Type CB	unit	1	1,373,782	1,373	949,248	949	2,322	132
Culvert, Type CC	unit	1	1,211,518	1,211	833,263	833	2,044	133
Rail Way Bridge, Type RB	unit	1	1,217,033	1,217	700,059	700	1,917	130
Sub-TOTAL				28,374		18,070	46,444	98
TOTAL				28,374		18,070	46,444	99

No: I-4-c								
Item: Construction cost of Rural Infrastructure for Main Channel C								
(Unit : 1,000TK)								
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)	
Rural Road Bridge, Type B-2 (B=4.5)	unit	1	1,478,103	1,478	943,797	943	2,421	123
Rural Road Bridge, Type C-1 (B=3.0)	unit	1	967,232	967	607,954	607	1,574	124
Rural Road Bridge, Type C-2 (B=4.5)	unit	7	1,126,526	7,885	715,469	5,008	12,893	125
Rural Road Bridge, Type D-1 (B=3.0)	unit	4	574,724	2,298	353,679	1,414	3,712	126
Rural Road Bridge, Type D-2 (B=4.5)	unit	7	631,469	4,420	392,073	2,744	7,164	127
Culvert, Type CA	unit	1	1,652,218	1,652	1,142,676	1,142	2,794	131
Culvert, Type CB	unit	1	1,373,782	1,373	949,248	949	2,322	132
Rail Way Bridge, Type RB	unit	1	1,217,033	1,217	700,059	700	1,917	130
TOTAL				21,290		13,507	34,797	99

No: I-4-d								Item: Construction cost of Rural Infrastructure for Main Channel D	
								(Unit : 1,000TK)	
Work	Unit	Quantity	Local Currency		Foreign Currency		Total		
			Unit Price	Amount	Unit Price	Amount			
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)		
Rural Road Bridge, Type D-1 (B=3.0)	unit	1	574,724	574	353,679	353	927	126	
Rural Road Bridge, Type D-2 (B=4.5)	unit	3	631,469	1,894	392,073	1,176	3,070	127	
TOTAL					2,468		1,529	3,997	99

No: I-4-e								Item: Construction cost of Rural Infrastructure for Channel E	
								(Unit : 1,000TK)	
Work	Unit	Quantity	Local Currency		Foreign Currency		Total		
			Unit Price	Amount	Unit Price	Amount			
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)		
Rural Road Bridge, Type D-1 (B=3.0)	unit	3	574,724	1,724	353,679	1,061	2,785	126	
Culvert, Type CC	unit	2	1,211,518	2,423	833,263	1,666	4,089	133	
TOTAL					4,147		2,727	6,874	99

No: I-4-f								
Item: Construction cost of Rural Infrastructure for Channel F								
(Unit : 1,000TK)								
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)	
Rural Road Bridge, Type D-1 (B=3.0)	unit	3	574,724	1,724	353,679	1,061	2,785	126
Rural Road Bridge, Type D-2 (B=4.5)	unit	2	631,469	1,262	392,073	784	2,046	127
TOTAL				2,986		1,845	4,831	99

No: I-4-g								
Item: Construction cost of Rural Infrastructure for Rainai Diversion Canal								
(Unit : 1,000TK)								
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)	
Rural Road Bridge, Type B-1 (B=3.0)	unit	4	1,265,191	5,060	798,738	3,194	8,254	122
TOTAL				5,060		3,194	8,254	

1.6 Unit Construction Cost (1)

code	Work	Unit	Unit Price(L)	Unit Price(F)	Total
			(TK)	(TK)	(TK)
101	Regulator, Closed Type A	unit	4,641,085	2,611,714	7,252,799
102	Regulator, Closed Type B	unit	3,000,825	1,704,665	4,705,490
103	Regulator, Closed Type C-1	unit	1,589,885	864,594	2,454,479
104	Regulator, Closed Type C-2 (B=4.5)	unit	1,546,714	931,141	2,477,855
105	Regulator, Closed Type D-1 (B=3.0)	unit	950,203	602,472	1,552,675
106	Regulator, Closed Type D-2 (B=4.5)	unit	992,793	630,688	1,623,481
107	Regulator, Closed Type E-1 (B=3.0)	unit	1,140,428	733,903	1,874,331
108	Regulator, Closed Type E-2 (B=4.5)	unit	1,195,707	771,719	1,967,426
109	Regulator, Open Type A	unit	9,834,884	4,340,822	14,175,706
110	Regulator, Open Type B	unit	4,252,346	2,143,134	6,395,480
111	Regulator, Open Type C	unit	8,879,339	4,293,295	13,172,634
112	Regulator, Open Type D	unit	4,748,818	2,253,179	7,001,997
113	Regulator, Open Type E	unit	3,062,524	1,424,621	4,487,145
114	Regulator, Open Type F	unit	8,838,577	3,765,762	12,604,339
115	Regulator, Open Type G	unit	9,949,930	4,128,343	14,078,273
116	Regulator, Open Type H	unit	1,595,729	988,993	2,584,722
117	Regulator, Open Type I-1 (B=3.0)	unit	3,348,248	1,729,639	5,077,887
118	Regulator, Open Type I-2 (B=4.5)	unit	3,560,679	1,881,315	5,441,994
119	Regulator, Open Type J	unit	263,929	213,913	477,842
120	Rural Road Bridge, Type A-1 (B=3.0)	unit	1,640,263	1,043,022	2,683,285
121	Rural Road Bridge, Type A-2 (B=4.5)	unit	1,960,025	1,261,768	3,221,793
122	Rural Road Bridge, Type B-1 (B=3.0)	unit	1,265,191	798,738	2,063,929
123	Rural Road Bridge, Type B-2 (B=4.5)	unit	1,478,103	943,797	2,421,900

1.6 Unit Construction Cost (2)

code	Work	Unit	Unit Price(L)	Unit Price(F)	Total
			(TK)	(TK)	(TK)
124	Rural Road Bridge, Type C-1 (B=3.0)	unit	967,232	607,954	1,575,186
125	Rural Road Bridge, Type C-2 (B=4.5)	unit	1,126,526	715,469	1,841,995
126	Rural Road Bridge, Type D-1 (B=3.0)	unit	574,724	353,679	928,403
127	Rural Road Bridge, Type D-2 (B=4.5)	unit	631,469	392,073	1,023,542
128	Metal Road Bridge, Type MA	unit	3,847,552	2,537,649	6,385,201
129	Rail Way Bridge, Type RA	unit	1,778,558	1,015,484	2,794,042
130	Rail Way Bridge, Type RB	unit	1,217,033	700,059	1,917,092
131	Culvert, Type CA	unit	1,652,218	1,142,676	2,794,894
132	Culvert, Type CB	unit	1,373,782	949,248	2,323,030
133	Culvert, Type CC	unit	1,211,518	833,263	2,044,781
134	Rivertment for Canal Slope (TK/m)	m	19,191	29,960	49,151
135	Bank Rivertment	m	11,347	7,042	18,389
136	Diversion Box	m	2,728	629	3,357
137	Field Canal of LLP Model Area (Type A) / per. m	Unit	447	58	505
138	Field Canal of LLP Model Area (Type B) / per. m	m	380	45	425
139	Field Canal of LLP Model Area (Type C) / per. m	m	3	0	3
140	Outlet	m	1,809	618	2,427
141	Discharge Box for LLP & DTW	Unit	2,728	629	3,357
142	Diversion Box for Brick lining Canal (Type A and B)	Unit	2,728	629	3,357
143	Field Canal (Type A)	Unit	447	58	505
144	Field Canal (Type B)	m	380	45	425
145	Field Canal (Type C)	m	3	0	3
146	Outlet from Type A and Type B Canal	m	1,809	618	2,427

1.6 Unit Construction Cost (3)

code	Work	Unit	Unit Price(L)	Unit Price(F)	Total
			(TK)	(TK)	(TK)
147	PVC Pipe Setting (φ 300mm) /per m	m	654	930	1,584
148	PVC Pipe Setting (φ 250mm) /per m	m	511	720	1,231
149	PVC Pipe Setting (φ 200mm) /per m	m	248	330	578
150	PVC Pipe Setting (φ 150mm) /per +	m	174	222	396
151	PVC Pipe Setting (φ 100mm) /per +	m	118	141	259
152	Outlet from Pipeline	Unit	3,853	10,643	14,496
153	Well and Base Slab for STW	Unit	11,166	368	11,534
154	Delivery Box for STW	Unit	697	218	915
155	Pump facilities and Well for STW	Unit	5,500	43,172	48,672

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1.7 Breakdown of Land Acquisition Cost

(Unit : 1,000TK)

Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)	
Intake Canal (private land)	m2	32,000	11	352	0	0	352	37
Main Channel A: (private land)	m2	907,740	11	9,985	0	0	9,985	37
Main Channel A: (govt. land)	m2	848,163	5	4,240	0	0	4,240	16
Main Channel B: (private land)	m2	1,359,768	11	14,957	0	0	14,957	37
Main Channel B: (govt. land)	m2	181,271	5	906	0	0	906	16
Main Channel C: (private land)	m2	830,148	11	9,131	0	0	9,131	37
Main Channel C: (govt. land)	m2	75,360	5	376	0	0	376	16
Main Channel D: (private land)	m2	236,160	11	2,597	0	0	2,597	37
Main Channel D: (govt. land)	m2	12,000	5	60	0	0	60	16
Main Channel E: (private land)	m2	136,680	11	1,503	0	0	1,503	37
Main Channel E: (govt. land)	m2	13,440	5	67	0	0	67	16
Main Channel F: (private land)	m2	74,250	11	816	0	0	816	37
Main Channel F: (govt. land)	m2	0	5	0	0	0	0	16
Ratnai Diversion Canal (private land)	m2	82,212	11	904	0	0	904	37
Secondary Channels & Bils (govt. land)	m2	3,255,000	5	16,275	0	0	16,275	16
Demonstration Farm (private land)	m2	23,503	11	258	0	0	258	37
TOTAL		8,067,695		62,427		0	62,427	

1.8 Breakdown of Consulting Service (1)							
Work	Unit	Quantity	Local Currency		Foreign Currency		Total (1,000 TK)
			Unit Price	Amount	Unit Price	Amount	
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	
A Detailed Design Stage							
1 Foreign Currency							
1) Remuneration	month	72	0	0	550,000	39,600	39,600
2) Direct Cost							
-International Travel Expense	trip	22	0	0	111,000	2,442	2,442
-International Communication Cost	month	18	0	0	25,000	450	450
-Printing and Duplication Cost	LS.	1	0	0	1,000,000	1,000	1,000
-Equipment Cost	LS.	1	0	0	2,000,000	2,000	2,000
-Other Cost (5 %)	LS.	1	0	0		2,275	2,275
Sub-Total				0		47,767	47,767
2 Local Currency							
1) Remuneration	month	148	45,000	6,660	0	0	6,660
2) Direct Cost							
-Per diem allowance							
-> Foreign Consultants	day	2,160	2,000	4,320	0	0	4,320
-> Local Consultants	day	4,440	1,000	4,440	0	0	4,440
-Local communication and transportation	LS.	1	500,000	500	0	0	500
-Topo-survey, Boring and Soil Investigation	LS.	1	10,000,000	10,000	0	0	10,000
-Office Rental Fee	month	18	50,000	900	0	0	900
-Other Cost (5 %)				1,341			1,341
Sub-Total				28,161		0	28,161
3 Total of D/D Stage				28,161		47,767	75,928

1.8 Breakdown of Consulting Service (2)							
Work	Unit	Quantity	Local Currency		Foreign Currency		Total (1,000 TK)
			Unit Price	Amount	Unit Price	Amount	
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	
B Supervision Stage							
1 Local Currency							
1) Remuneration	month	344	45,000	15,480	0	0	15,480
2) Direct Cost							
-Per diem allowance							
-> Local Consultants	day	10,320	1,000	10,320	0	0	10,320
-Local communication and transportation	LS.	1	2,500,000	2,500	0	0	2,500
-Office Rental Fee	month	98	30,000	2,940	0	0	2,940
-Other Cost (5 %)				1,562			1,562
Sub-Total				32,802		0	32,802
2 Total of S/V Stage				32,802		0	32,802
C Grand Total				60,963		47,767	108,730

1.9 Breakdown of Administration Cost (1)								(Unit : 1,000TK)
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)	
1 Personal Cost								
(1) Executive Engineer	1 person	month	12	7,000	84.0	0	0.0	84.0
(2) Sub-Divisional Engineer	3 persons	month	36	5,000	180.0	0	0.0	180.0
(3) Assistant Engineer	9 persons	month	108	3,000	324.0	0	0.0	324.0
(4) E/E Office Staff								
Sub-assistant officer	1 person	month	12	4,000	48.0	0	0.0	48.0
Accountant	1 person	month	12	3,200	38.4	0	0.0	38.4
Clerk	1 person	month	12	2,800	33.6	0	0.0	33.6
Typist	1 person	month	12	2,400	28.8	0	0.0	28.8
Surveyer	2 person	month	24	2,400	57.6	0	0.0	57.6
Store keeper	1 person	month	12	2,100	25.2	0	0.0	25.2
Driver	2 person	month	24	3,000	72.0	0	0.0	72.0
Tracer	2 person	month	24	2,100	50.4	0	0.0	50.4
Choukider	1 person	month	12	2,400	28.8	0	0.0	28.8
Night Guard	3 person	month	36	2,200	79.2	0	0.0	79.2
Sweeper	1 person	month	12	1,800	21.6	0	0.0	21.6
Peon	1 person	month	12	2,000	24.0	0	0.0	24.0
Sub Total of E/E Office Staff				500,000	507.6	0.0	0.0	507.6
(5) Total Cost of (1)-(4)					1,095.6	0.0	0.0	1,095.6
10 years					10,956.0	0.0	0.0	10,956.0
(6) Consultant Office Staff								
Secretary	1 person	month	12	4,000	48.0	0	0.0	48.0

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1.9 Breakdown of Administration Cost (2)								(Unit : 1,000TK)
Work	Unit	Quantity	Local Currency		Foreign Currency		Total	
			Unit Price	Amount	Unit Price	Amount		
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	(1,000 TK)	
Driver	3 person	month	36	3,000	108.0	0	0.0	108.0
Tracer	2 person	month	24	2,100	50.4	0	0.0	50.4
Surveyer	1 person	month	12	2,400	28.8	0	0.0	28.8
Typist	1 person	month	12	2,400	28.8	0	0.0	28.8
Sweepwe	1 person	month	12	1,800	21.6	0	0.0	21.6
Peon	1 person	month	12	2,000	24.0	0	0.0	24.0
Sub-Total of Consultant Office Staff					309.6			309.6
6 years					1,857.6			1,857.6
(7) Total Cost of Personnel					12,813.6			12,813.6
2 Equipment Cost								
(1) Jeep(4x4)	No	3	470,000	1,410.0	780,000	2,340.0	3,750.0	
(2) Pickup	No	3	375,000	1,125.0	625,000	1,875.0	3,000.0	
(3) Motorcycle	No	10	10,000	100.0	50,000	500.0	600.0	
(4) Other Equipment 30%	LS	1		790.0		1,415.0	2,205.0	
Total				3,425.0		6,130.0	9,555.0	
3 Operation Cost								
(1) Repair & Spairparts for Equipment	LS	1	8,595,000	8,595.0	0	0.0	8,595.0	
10% / year and 9 years								
(2) Fuel (a)D/D Stage	LS	1	113,600	113.6	1,022,000	1,022.0	1,135.6	
301/dayx300daysx6nosx1.5year=1,135,600TK								

1.9 Breakdown of Administration Cost (3)							
Work	Unit	Quantity	Local Currency		Foreign Currency		Total
			Unit Price	Amount	Unit Price	Amount	
			(TK)	(1,000 TK)	(TK)	(1,000 TK)	
(b) S/V Stage 30 l/day x 300 days x 6 nos x 10 year = 6,056,640 TK	LS	1	605,680	605.6	5,451,000	5,451.0	6,056.6
Sub Total				9,314.2		6,473.0	15,787.2
4 Training Cost 3 person/ year x 8 year = 24 persons 20 days/ 1 time							
(1) Foreign Currency Portion							
International Travel Expence	trip	30	0	0.0	111,000	3,330.0	3,330.0
Acomodation Charge, 20 x 24	day	480	0	0.0	4,000	1,920.0	1,920.0
Allowance, 20 x 24	day	480	0	0.0	1,500	720.0	720.0
Transportation Charge	time	30	0	0.0	100,000	3,000.0	3,000.0
Sub-Total				0.0		8,970.0	8,970.0
(2) Local Currency Portion							
Domestic Transportation Charge	time	30	2,000	60.0	0	0.0	60.0
Allowance, 20 x 24	day	480	1,000	480.0	0	0.0	480.0
Sub-total				540.0	0	0.0	540.0
(3) Total of Training Cost				540.0		8,970.0	9,510.0
5 Grand Total				26,092.8		21,573.0	47,665.8

1.10 Breakdown of Maintenance Cost during Construction Period

Item	Phase-I										Phase-II					TOTAL						
	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year	Sub-Total	7th Year	8th Year	9th Year	10th Year	Sub-Total										
1 Irrigation Development																						
(1) Head Work				30,000	30,000	30,000	90,000	30,000	30,000	30,000	30,000	120,000										210,000
(2) Main Channel A				273,015	546,030	681,480	1,500,525	681,480	681,480	681,480	681,480	2,725,920										4,226,445
(3) Main Channel B							0					1,478,832										1,478,832
(4) Main Channel C							0					379,894										379,894
(5) Main Channel D						60,317	60,317	139,682	139,682	139,682	139,682	558,728										619,045
(6) Main Channel E						0	0	105,820	105,820	105,820	105,820	423,280										423,280
(7) Main Channel F						0	0	108,995	108,995	108,995	108,995	435,980										435,980
(8) Secondary Channels & Bilis						0	0															
Sub-Total				303,015	576,030	771,797	1,650,842	1,065,977	1,361,743	1,657,510	2,037,404	6,122,634										7,773,476
2 Drainage Improvement																						
(1) Ratnai River Diversion Canal			6,500	13,020	13,020	13,020	45,560	13,020	13,020	13,020	13,020	52,080										97,640
(2) Ratnai Regulator				6,000	6,000	6,000	18,000	6,000	6,000	6,000	6,000	126,000										144,000
(3) Hanchai Regulator																						
(4) Add. Regulators																						
(5) Pipe Sluices																						
(6) Desilting Works of Existing Channels																						
Sub-Total			6,500	19,020	19,020	19,020	63,560	19,020	37,020	49,020	152,820	257,880										321,440
3 Flood Control																						
(1) Ratnai River Closure																						
(2) Breached Embankment					1,848,000	1,848,000	3,696,000	1,848,000	1,848,000	1,848,000	1,848,000	7,392,000										11,088,000
(3) Flood Embankment																						
Sub-Total					1,848,000	1,848,000	3,696,000	1,848,000	1,848,000	1,848,000	1,848,000	7,392,000										11,088,000
4 Rural Infrastructure Improvement																						
(1) Bridge, Culvert				40,320	80,640	120,960	241,920	161,280	101,600	241,920	294,000	798,800										1,040,720
TOTAL			6,500	362,355	2,523,690	2,759,777	5,652,322	3,094,277	3,348,363	3,796,450	4,332,224	14,571,314										20,223,636

Estimation of Annual O&M costs

(1) Irrigation Development

- (a) Head work
- | | | |
|--------------|---|------------------|
| Regulator | 1 person x 12 month x 1,500 TK/month | = 18,000 TK/year |
| Intake canal | 1 person x 20 days x 12 month x 50 TK/day | = 12,000 TK/year |
| sub-total | | = 30,000 TK/year |
- (b) Main channel
- | | | |
|-----------|---|--------------------|
| Channel | 189.7 km x 1 person/km x 20 days x 12 month x 35 TK/day | = 1,593,480TK/year |
| Regulator | 16 no. x 1 person/no. x 6 month x 1,500 TK/month | = 144,000 TK/year |
| | 15 no.s x 1 person/no. x 12 month x 1,500 TK/month | = 270,000 TK/year |
| sub-total | | = 2,007,480TK/year |
- (c) Total O/M cost of Irrigation development = 2,037,480TK/year

(2) Flood control

- (a) Flood embankment 110 km x 2 persons/km x 20 days x 12 month x 35 TK/day
= 1,848,000TK/year
- (b) Ratnai div. canal 3.1 km x 1 person/km x 20 days x 6 month x 35 TK/day
= 13,020 TK/year
- (c) Total O/M cost of Flood control = 1,861,020TK/year

(3) Drainage improvement

- (a) Drainage regulator 10 no.s x 1 person/no. x 20 days x 6 month x 35 TK/day
= 60,000 TK/year
- (b) Drainage channels 19.0 km x 1 person/km x 20 days x 6 month x 35 TK/day
= 79,800 TK/year
- (c) Total O/M cost of Drainage improvement = 139,800 TK/year

(4) Rural infrastructure improvement

- (a) Bridges & culverts 91 sites x 0.4 person/site x 20 days x 12 month x 35 TK/day
= 305,760 TK/year

(5) Administration of O/M office

- (a) Personal cost
- | | | |
|---------------------|---------------------------|-------------------|
| Executive engineer | 1 person x 7,000 TK x 12 | = 84,000 TK/year |
| Sub-divisional eng. | 3 persons x 5,000 TK x 12 | = 180,000 TK/year |
| Asst. engineer | 9 persons x 3,000 TK x 12 | = 324,000 TK/year |

Office staff

- Sub-Assistant	1 person x 4,000TK x12	= 48,000 TK/year
- Accountant	1 person x 3,200 TK x 12	= 38,400 TK/year
- Clerk	1 person x 2,800 TK x 12	= 33,600 TK/year
- Surveyor	2 persons x 2,400 TK x 12	= 57,600 TK/year
- Typist	1 person x 2,400 TK x 12	= 28,800 TK/year
- Store keeper	1 person x 2,1000TK x 12	= 25,200 TK/year
- Driver	2 persons x 3,000 TK x 12	= 72,000 TK/year
- Chaukider	1 person x 2,400 TK x 12	= 28,800 TK/year
- Night guard	2 persons x 2,200 TK x 12	= 52,800 TK/year
- Sweeper	1 Person x 1,800 TK x 12	= 21,600 TK/year
- Peon	1 person x 2,000 TK x 12	= 24,000 TK/year
- Tracer	2 persons x 2,100 TK x 12	= 50,400 TK/year

Sub-total of O/M Administration = 1,095,000 TK/year

(b) Repair & spairparts for equipment 9,555,000TK x 10 %
= 955,000TK/year

(c) Fuel 30 l/day x 300 days/year x 6 no.s x 14.02TK/l = 757,080 TK/year

(d) Total of Administration = 2,807,080TK/year

(6) Total of O/M cost = 7,151,140TK/year

1.11 Breakdown of Annual O&M Cost of Demonstration Farm

(1) Banagram

LLP	:	70.0 ha x TK 2,836 /year/ha	= TK 198,520
DTW	:	17.5 ha x TK 8,792 /year/ha	= TK 153,860
STW	:	13.5 ha x TK 8,792 /year/ha	= TK 118,692

Total = TK.471,072

(2) Pratap

LLP	:	34.0 ha x TK 2,836 /year/ha	= TK 96,424
DTW	:	24.8 ha x TK 8,792 /year/ha	= TK 218,041
STW	:	10.5 ha x TK 8,792 /year/ha	= TK 92,316

Total = TK.406,781

(3) Narikelbari

LLP	:	69.1 ha x TK 2,836 /year/ha	= TK 195,967
STW	:	19.8 ha x TK 8,792 /year/ha	= TK 174,071

Total = TK.370,048

(4) O/M Cost of LLP Development Area (70 ha)

(a) Pump Operator (24 hours operation per day)

1 person/unit/day x 24hr./8hr. = 3 persons/unit/day
3 persons x 30 days x 5 month x 35 TK/day = TK 15,750 /year

(b) Field Canal

1 persons x 20 days x 6 month x 35 TK/day = TK 4,200 /year

(c) Fuel

12.5 HP x 24hr/day x 30days x 5month x 0.25 l/hr*14.02 TK/l
= TK 157,725 /year

(d) Other materials

10 (%) of Fuel = TK 15,772 /year

(e) Repair of pump and engine

10 (%) of Pump and Engine Cost = TK 5,100 /unit/year

(f) Total

= TK 198,547 /unit/year

TK198,547 / 70ha = TK2,836 year/ha

(5) O/M Cost of STW Development Area (5 ha)

- (a) Pump Operator (10 hrs operation per day)
1 person x (10 /8 hr) x 30 days x 5month x 35 TK/day
= TK 6,562 /year
- (b) Fuel
6.0 HP x 10hr/day x 30days x 5month x 0.25 l/hr HP x 14.02 TK/l
= TK 31,545 /year
- (c) Other materials
10 (%) of Fuel = TK 3,154 /year
- (d) Repair of pump and engine
10 (%) of Pump and Engine Cost = TK 2,700 /unit/year

(f) Total = TK 43,961 /unit/year

TK43,961 / 5ha = TK8,792 year/ha

(6) O/M Cost of DTW Development Area

Per ha. cost : same as STW.

1.1.2 Annual Disbursement Schedule (1)

Work	Phase-I											
	1st Year			2nd Year			3rd Year			4th Year		
	L.C.	F.C.	Total	L.C.	F.C.	Total	L.C.	F.C.	Total	L.C.	F.C.	Total
L Construction Cost												
I-1 Irrigation Development												
(1) Head Work			0			0			59,235	61,500	120,835	0
(2) Irrigation Canal			0			0			29,362	6,110	35,472	6,110
a. Main Channel A			0			0						0
b. Main Channel B			0			0						0
c. Main Channel C			0			0						0
d. Main Channel D			0			0						0
e. Main Channel E			0			0						0
f. Main Channel F			0			0						0
g. Secondary Channels & Bils			0			0			7,818	7,818	7,818	7,818
h. Sub-Total			0			0			37,180	6,110	43,290	6,110
(3) LLP Development			0			0			26,027	7,798	33,825	7,548
(4) STW Development			0			0			3,475	8,183	11,658	8,183
(5) Demonstration Farm			0			0			1,179	755	1,934	0
(6) Sub-Total of Irrigation Development			0			0			1,179	755	1,934	0
I-2 Drainage Improvement									127,463	84,615	212,078	21,841
(1) Rainai River Diversion Canal			0			0			1,944	0	1,944	0
(2) Rainai Regulator			0			0						0
(3) Harichai Regulator			0			0						0
(4) Add. Regulators			0			0						0
(5) Pipe Sluices			0			0						0
(6) Desilting Works of Existing Drainage Channels			0			0						0
(7) Sub-Total of Drainage Improvement			0			0			1,944	0	1,944	0
I-3 Flood Control & River Protection Works									2,458	1,408	3,866	0
(1) Rainai River Closure at Durakuti			0			0						0
(2) Breached Embankment			0			0						0
(3) Flood Embankment			0			0			2,458	1,408	3,866	2,464
(4) Sub-Total of Flood Control & R. P. Works			0			0			2,458	1,408	3,866	2,464
I-4 Rural Infrastructure Improvement									13,333	8,505	21,838	8,505
I-5 Total of Construction Cost			0			0			145,198	94,528	239,726	38,913
II Land Acquisition									9,151	0	9,151	5,943
III Consulting Service	19,408	34,498	53,906			0			9,230	13,269	22,499	4,672
IV Administration	4,915	7,440	12,355			0			2,398	341	2,739	4,226
V Maintenance Cost	0	0	0			0			0	0	0	362
VI O&M Cost of Demonstration Farm	0	0	0			0			0	0	0	404
Sub-Total (II-VI)	24,323	41,938	66,261			0			20,779	13,610	34,389	15,607
VII Physical Contiguency									176	113	289	5,836
Sub-Total (I-VII)	24,323	41,938	66,261			0			22,134	14,478	36,612	19,807
VIII Price Escalation	0.000%	0.000%	0			0			2,213	1,013	3,226	46,475
									10.000%	7.000%	0	10,458
GRAND TOTAL	24,323	41,938	66,261			0			221,456	126,432	347,888	56,951
												22.504%
									161,051	21,841	182,892	217,982

1.12 Annual Disbursement Schedule (2)

Work	Phase-I			Phase-II			5th Year			6th Year			7th Year			8th Year			Total	
	L.C.	F.C.	Total	L.C.	F.C.	Total	L.C.	F.C.	Total	L.C.	F.C.	Total	L.C.	F.C.	Total	L.C.	F.C.	Total		
I. Construction Cost																				
I-1 Irrigation Development																				
(1) Head Work																				
(2) Irrigation Canal																				
a. Main Channel A	14,684	3,054	17,738	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
b. Main Channel B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
c. Main Channel C	5,392	1,785	7,177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
d. Main Channel D				10,783	3,570	14,353														
e. Main Channel E				22,750	8,886	31,636														
f. Main Channel F				3,139	1,204	4,343														
g. Secondary Channels & Bils	7,818		7,818	7,818		7,818														
h. Sub-Total	27,894	4,839	32,733	44,490	13,660	58,150														
(3) LLP Development	15,163	4,543	19,706	30,803	9,229	40,032														
(4) STW Development	3,475	8,183	11,658	3,475	8,183	11,658														
(5) Demonstration Farm	0	0	0	0	0	0														
(6) Sub-Total of Irrigation Development	46,532	17,565	64,097	78,768	31,072	109,840														
I-2 Drainage Improvement																				
(1) Ratnai River Diversion Canal				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2) Ratnai Regulator				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(3) Hanichai Regulator				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(4) Add. Regulators				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(5) Pipe Sluices				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(6) Desilting Works of Existing Drainage Channels				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(7) Sub-Total of Drainage Improvement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I-3 Flood Control & River Protection Works																				
(1) Ratnai River Closure at Durakut				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2) Breached Embankment				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(3) Flood Embankment				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(4) Sub-Total of Flood Control & R. P. Works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I-4 Rural Infrastructure Improvement																				
I-5 Total of Construction Cost	13,333	8,505	21,838	13,333	8,505	21,838														
II Land Acquisition	59,865	26,070	85,935	92,101	39,577	131,678														
III Consurting Service	6,014	0	6,014	10,054	0	10,054														
IV Administration	2,502	1,724	4,226	2,956	0	2,956														
V Maintenance Cost	2,524	0	2,524	2,502	1,724	4,226														
VI O&M Cost of Demonstration Farm	878	0	878	2,760	0	2,760														
Sub-Total (II-VI)	14,588	1,724	16,312	878	0	878														
VII Physical Congiuency	8,979	3,910	12,889	19,150	1,724	20,874														
Sub-Total (I-VII)	83,432	31,704	115,136	125,066	47,237	172,303														
VIII Price Escalation	38,720	9,853	48,573	76,354	19,015	95,369														
GRAND TOTAL	122,152	41,557	163,709	201,420	66,252	267,672														

1.1.2 Annual Disbursement Schedule (3)

Work	9th Year		10th Year		Total	F.C.	Total	10th Year		Total
	L.C.	F.C.	L.C.	F.C.				L.C.	F.C.	
I. Construction Cost										
I-1 Irrigation Development										
(1) Head Work										
(2) Irrigation Canal										
a. Main Channel A										
b. Main Channel B										
c. Main Channel C										
d. Main Channel D	40,812	11,501			52,313					
e. Main Channel E	0	0			0					
f. Main Channel F	0	0			0					
g. Secondary Channels & Bils	7,818	0			7,818			7,818	0	7,818
h. Sub-Total	48,630	11,501			60,131			7,818	0	7,818
(3) LLP Development	49,667	14,881			64,548			5,252	1,576	6,828
(4) STW Development	3,475	8,182			11,657			3,475	8,182	11,657
(5) Demonstration Farm	0	0			0			0	0	0
(6) Sub-Total of Irrigation Development	101,772	34,564			136,336			16,545	9,758	26,303
I-2 Drainage Improvement										
(1) Rainai River Diversion Canal										
(2) Rainai Regulator										
(3) Harichai Regulator	599	1,347			1,946					
(4) Add. Regulators										
(5) Pipe Sluices										
(6) Desilting Works of Existing Drainage Channels	7,301				7,301					
(7) Sub-Total of Drainage Improvement	7,900	1,347			9,247			0	0	0
I-3 Flood Control & River Protection Works										
(1) Rainai River Closure at Durakuti										
(2) Breached Embankment										
(3) Flood Embankment								1,284	0	1,284
(4) Sub-Total of Flood Control & R. P. Works	0	0			0			1,284	0	1,284
I-4 Rural Infrastructure Improvement										
I-5 Total of Construction Cost	13,333	8,505			21,838			6,668	4,252	10,920
II Land Acquisition	123,005	44,416			167,421			24,497	14,010	38,507
III Consulting Service	0	0			0			0	0	0
IV Administration	4,386	0			4,386			2,384	0	2,384
V Maintenance Cost	2,193	1,724			3,917			2,193	1,724	3,917
VI O&M Cost of Demonstration Farm	3,797	0			3,797			4,332	0	4,332
Sub-Total (II-VI)	370	0			370			370	0	370
VII Physical Contiguency	10,746	1,724			12,470			9,279	1,724	11,003
Sub-Total (I-VII)	18,450	6,662			25,112			3,674	2,101	5,775
VIII Price Escalation	152,201	52,802			205,003			37,450	17,835	55,285
	174,055	37,921			211,976			50,855	14,953	65,808
	114.359%	71.818%						135.795%	83.845%	
GRAND TOTAL	326,256	90,723			416,979			88,305	32,788	121,093

2. Implementation Schedule

2.1 Project Component

Construction works of the proposed project will broadly consist of;

- (1) Flood protection works
 - a) Rehabilitation of existing embankment
- (2) Drainage Improvement
 - a) Diversion of Ratnai river
 - b) Rehabilitation and improvement of existing Regulators
 - c) Desilting works of drainage channels, creeks and beels
- (3) Irrigation Development
 - a) Irrigation Intake and irrigation canal system
 - b) Command area development with LLPs
 - c) Groundwater development
- (4) Rural Infrastructure improvement

BWDB will be responsible for construction of (1) flood protection works, (2) drainage improvement works and (3)-a) irrigation intake and canal system. BRDB and LGED will be responsible for (3)-b) command area development with LLPs and (3)-c) groundwater development under close coordination by BWDB. Organizational set-up for implementation of the proposed project is discussed in Chapter IX (Organization and Management).

2.2 Work Volume

The project works are described in Chapter 7. Work volumes of these project works are as shown in Table XIII-2-1;

2.3 Construction Schedule

Construction schedule is prepared under the following assumptions;

- (1) The Proposed project facilities will be constructed by local contractors. Work volumes of the proposed project facilities are rather large, but the kinds and natures of the required works are of those commonly executed by the local contractors in Bangladesh. Local contractors can undertake all kind of the construction works.
- (2) Most of the construction works will be executed by manual labour. Re-excavation of the existing drainage channels / creeks occupies major part of the construction works. Use of heavy equipment is not suitable for these works,

because transportation of such equipment to the construction sites is difficult under the present road conditions, and also more land is required for temporary works at the construction sites which seems to be unpractical under the present land tenure condition. Manual execution is suitable for these works. It will contribute to creation of employment opportunity in the area.

- (3) Construction supervision will be made by local consultants with technical assistance of foreign consultants for initial 2 years. In and after third year of the construction works, it will be solely made by local consultants without assistance of foreign consultants.
- (4) Construction period will be 12 years in total including 2 year period of detailed design and tendering procedures, include consideration of work volumes and construction management capacity.
- (5) Construction works will commence in the north with the diversion works of the Ratnai river, closing of the embankment, construction of irrigation intake structure and irrigation main canal-A, and construction sites will then move downwards from north to south.
- (6) Command area development(CAD) with LLPs will be executed at private initiative immediately after completion of the canal construction, and the farmers will start irrigation practices simultaneously.

The proposed project construction schedule is shown on Fig.XIII.2.1.

Table XIII.2.1 Work Volume

Work	Excavation (m ³)	Backfill / Embankment (m ³)	Mass Concrete (m ³)	Reinforced Concrete (m ³)	Reinforcement (ton)	Shuttering (m ²)	Sheet Pile (m)	SC-Brock (m ³)	Water Stop (m)	Geo-Textile (m ²)
I-1 Irrigation Development										
(1) Head Work Construction	165,072	4,949	1,383	2,080	0	5,203	4,638	18,348	110	38,020
Intake Canal	152,729	0	1,243	0	0	0	3,390	18,080	0	37,290
Intake Regulator	12,332	4,949	139	2,080	0	5,201	1,248	260	110	730
Bank Rivetment	11	0	1	0	0	2	0	8	0	0
(2) Irrigation Canal										
a. Main Channel A	3,254,462	256,413	281	4,014	272	7,500	0	417	320	324
b. Main Channel B	2,611,415	330,632	211	2,510	180	5,232	0	195	302	255
c. Main Channel C	1,210,954	254,186	180	2,910	187	4,488	0	316	308	135
d. Main Channel D	382,819	2,088	85	1,273	80	2,066	0	124	114	24
e. Main Channel E	152,678	2,431	144	1,842	113	2,926	0	232	166	24
f. Main Channel F	99,492	2,098	22	312	26	780	0	24	72	48
g. Secondary Channels & Bils Desilting Works	4,882,500	0	0	0	0	0	0	0	0	0
h. Sub-Total	12,594,300	847,848	923	12,861	838	22,992	0	1,308	1,282	810
(3) LLP Development	2,406	0	16,426	435	154	14,848	0	0	0	0
(4) STW Development	0	0	598	5	0	0	0	0	0	0
(5) Demonstration Farm	3,327	9,870	138	6	3	189	0	0	0	0
(6) Sub-Total of Irrigation Development	12,765,105	862,667	19,488	15,387	1,015	43,232	4,638	19,656	1,392	38,830
I-2 Drainage Improvement										
(1) Rainai Regulator Construction	4,230	2,988	56	661	53	1,652	337	106	62	319
(2) Harichai Regulator Rehabilitation	0	0	0	0	0	0	176	329	0	0
(3) Add. Regulators Construction	42,508	11,976	124	2,208	177	4,705	1,132	328	216	988
(4) Pipe Sluices Rehabilitation	646	502	8	91	7	325	0	15	0	0
(5) Desilting Works of Existing Drainage Channels	570,000	0	0	0	0	0	0	0	0	0
(6) Sub-Total	617,384	15,466	188	2,960	237	6,682	1,645	778	278	1,307
I-3 Flood Protection Works										
(1) Rainai River Closure at Durakuti	12,562	0	112	0	0	300	0	1,680	0	0
(2) Rainai River Diversion Canal	144,345	8,245	0	0	0	0	0	0	0	0
(3) Breached Embankment	0	73,264	0	0	0	0	0	0	0	0
(4) Flood Embankment Rehabilitation	90,000	0	0	0	0	0	0	0	0	0
(5) Sub-Total	246,907	81,509	112	0	0	300	0	1,680	0	0
I-4 Rural Infrastructure Improvement										
a. Main Channel A	17,310	18,317	217	5,791	624	27,892	0	803	0	0
b. Main Channel B	20,525	18,863	249	4,798	511	22,513	0	556	0	0
c. Main Channel C	16,132	15,041	204	3,590	383	16,853	0	372	0	0
d. Main Channel D	2,304	2,379	20	417	47	2,105	0	0	0	0
e. Main Channel E	4,642	2,453	57	768	77	2,924	0	84	0	0
f. Main Channel F	2,880	2,923	25	502	57	2,528	0	0	0	0
g. Secondary Channels & Bils	2,724	3,256	32	880	97	4,432	0	100	0	0
h. Sub-Total	66,517	63,232	804	16,736	1,796	79,247	0	1,915	0	0
I-5 TOTAL	13,695,913	1,022,874	20,592	35,083	3,048	129,461	6,283	24,029	1,670	40,137

Fig. XIII.2.1 Proposed Project Construction Schedule

Item	Contents	Phase-I						Phase-II						
		1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year	7th Year	8th Year	9th Year	10th Year			
I.	Detailed Design													
1	Survey & Investigation													
2	Detailed Design													
3	Preparation of Tender Document													
II.	Loan Procedure													
III.	Tendering													
IV.	Construction													
1	Land Acquisition													
2	Irrigation Development													
(1)	Head Work													
(2)	Main Channel A													
(3)	Main Channel B													
(4)	Main Channel C													
(5)	Main Channel D													
(6)	Main Channel E													
(7)	Main Channel F													
(8)	Secondary Channels & Bils													
(9)	LLP Development													
(10)	STW Development													
3	Drainage Improvement													
(1)	Ratva River Diversion Canal													
(2)	Ratva Regulator													
(3)	Hancha Regulator													
(4)	Adk Regulators													
(5)	Pye Stices													
(6)	Desling Works of Existing Channels													
4	Flood Control & River Protection Works													
(1)	Ratva River Closure at Darakab													
(2)	Reconstruction of Breached Embankment													
(3)	Rehabilitation of Flood Embankment													
5	Rural Infrastructure Improvement													
(1)	Bridges Culvert													
6	Rehabilitation Farm													
(1)	Navagam													
(2)	Pang													
(3)	Narvelar													
V	Supervision of Construction Work													
VI	CAA, Clearance & Demarcation Farm													

Fig. XIII.2.2 Proposed Schedule for Consulting Services

No	Engineer	Man / Month		Phase-I										Phase-II				
		F	L	Trip	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year	7th Year	8th Year	9th Year	10th Year				
I.	Survey & Detailed Design																	
	1 Team Leader	4	0	4														
	2 Hydrologist	2	6	1														
	3 Irrigation & Drainage Engineer	12	12	2														
	4 Agronomist	3	6	1														
	5 Geologist	3	12	1														
	6 Farmer's Organization Specialist	3	12	1														
	7 Surveyors	3	24	2														
	8 Chief Design Engineer	14	0	2														
	9 Design Engineer : (Canal)	3	12	1														
	10 Design Engineer : (Bridge)	6	24	1														
	11 Design Engineer : (Regulator)	6	24	1														
	12 Construction Planning	3	3	1														
	13 Cost Estimate	3	6	1														
	14 Tender Documents Specialist	3	3	1														
	15 Economist	2	2	1														
	16 O/M Specialist	2	2	1														
	Sub-Total	72	148	22														
II.	Tendering																	
	1 Team Leader	0	2	0														
	2 Tender Document Specialist	0	2	0														
	3 Cost Estimate	0	1	0														
	Sub-Total	0	5	0														
III.	Construction Supervision																	
	1 Team Leader	0	96	0														
	2 Construction Engineer : (Civil)	0	96	0														
	3 Construction Engineer : (Canal)	0	90	0														
	4 Design Engineer	0	21	0														
	5 Geologist	0	21	0														
	6 O/M Specialist	0	15	0														
	Sub-Total	0	339	0														
IV.	Demonstration Farm, O/M Guidance																	
V.	Overseas Training	0	24	24														

APPENDIX - XIV
PROJECT
JUSTIFICATION

FEASIBILITY STUDY ON
KURIGRAM IRRIGATION AND FLOOD CONTROL PROJECT (SOUTH UNIT)

APPENDIX - XIV PROJECT JUSTIFICATION

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APPENDIX-XIV PROJECT JUSTIFICATION

1. General

This appendix was prepared for the project justification on the irrigation development by LLPs realized by the headworks and irrigation channel system and STWs, and drainage improvement in the Kurigram South Unit covering the project area of 35,500 ha. The project was justified through an assessment of the project feasibility in view of economic, financial, social and aspects. This chapter presents the evaluation methodology and results.

2. Economic Evaluation

2.1 Basic Assumption

Economic evaluation was done basically following " Guidelines for Project Assessment " prepared by Flood Coordination Organization, Ministry of Irrigation, Water Development and Flood Control. The basic assumptions applied for the economic evaluation are summarized as follows :

- (1) The economic useful life of the project is 30 years,
- (2) All prices and costs are expressed in mid-1992 prices in Taka,
- (3) The exchange rate of US\$ 1.00 = Tk. 38.8 = ¥ 125 is applied,
- (4) Economic prices of agricultural outputs and inputs are estimated applying the conversion factors prepared by the said Guidelines to the market prices in the project area (See Table XIV.2.1), and
- (5) Economic prices of project works for construction and engineering, O&M, and replacement are estimated same as the agricultural outputs and inputs.
- (6) Economic prices for unskilled labour wage, conversion factor of 0.65 is applied for project works, while 0.75 is applied for agricultural inputs because of seasonal and competitive employment for crop production.

2.2 Economic Benefits

2.2.1 Outline

Direct benefits by the Irrigation, Flood Control and Drainage (FCD) development accrue from the productivity increase in the following activities :

- 1) Crop production in the rainfed and existing irrigated land,
- 2) Inland culture fishery in the main channels, beels, and fish ponds, and

The FCD development under this Study basically aims at the improvement for the present operation and maintenance of FCD facilities. The FCD benefits, hence, will accrue at a limited scale of areas. Significant improvement with a certain extend of areas which could be identified as a project scale for the benefit estimation is not expected. The main channels will function not only for irrigation purpose but also drainage improvement and the irrigation sluice will be for flood protection. The theoretical cost allocation to irrigation and

FCD components is not practically done. The project benefit estimation as one development effect by both irrigation and FCD are considered more reasonable for this Study. The respective benefit on irrigation and FCD are not estimated in this study.

2.2.2 Crop production benefits

Crop production benefits accrue from the irrigation water supply to rainfed area, improvement of present irrigation activities using surface water, alleviation of flood and water logging, and improvement of farming practices and productivity. Economic crop production budgets per ha both for irrigated and rainfed conditions are prepared under (WO) and (W) project conditions on the basis of farm input requirements, present and future crop yields, and economic farm gate prices of farm inputs and outputs as shown in Table XIV.2.2. The O&M and replacement costs for the LLP and STW irrigation in the command area of 35,500 ha are accounted as a production cost in the crop budgets (Details are in Chapter 3).

Economic net crop production values (ENCPV) per ha under (WO) and (W) project conditions are estimated on the basis of the present and proposed cropping patterns and cropping intensities as shown in Table XIV.2.3. Incremental ENCPVs may be estimated as follows :

Item	Project Area (ha)	Total ENCPV (Tk million)	Average ENCPV Per ha (Tk'000/ha)
1. <u>Without Project Condition (WO)</u>	<u>35,500</u>	<u>684.1</u>	<u>19,270</u>
- Rainfed area	25,700	412.2	16,040
- Irrigated area	9,800	271.9	27,740
2. <u>With Project Condition/Irrigated (W)</u>	<u>35,500</u>	<u>1,259.9</u>	<u>35,490</u>
3. <u>Increment, (W) - (WO)</u>	-	<u>575.8</u>	<u>16,220</u>
- Surface irrigation area	18,200	385.3	21,170
- Ground water irrigation area	7,500	190.5	11,010
- Rainfed area	-25,700	-	-

2.2.3 Culture fishery benefits

In addition to crop production, the project will increase the productivity of culture fishery using water body of main channels and beels where year round and fresh water will be available. Economic production budgets per ha for culture fishery are prepared under (WO) and (W) project conditions as shown in Table XIV.2.4. Economic net fish production values (ENFPV) per ha under (WO) and (W) project conditions are estimated on the basis of the future effective area of water body utilized for fish culture as shown in Table XIV.2.5. Incremental ENFPV is estimated at Tk 204,910 per ha and Tk 94,260,000 in total.

2.2.4 Negative benefit

Existing farm land will be acquired and used for the construction of surface water irrigation facilities and the Ratnai diversion canal. The farm land acquired is estimated at around 799 ha for the surface water irrigation and 8 ha for the Ratnai diversion canal. After completion of the project works, any crops won't be able to produce in those land. The annual production foregone as a negative benefit is defined as an annual net return under the

future (WO) project condition in the farm land. The annual production foregone is estimated according to the construction schedule as shown in Table XIV.2.6. The production foregone in the Ratnai diversion canal is allocated to the surface and STW irrigation components according to the proportion of respective command irrigation area. Allocated production foregone at the full development stage is estimated at Tk 15,468,000 for the surface irrigation and Tk 77,000 for STW irrigation.

2.2.5 Annual benefit flow

Incremental development benefits comprising crop and fishery production will be expected to increase year by year after the completion of development according to the implementation schedule. It is assumed that the built-up period to achieve full benefit is five (5) years after the completion of physical works (first year 20% rising by 20% increment per year) on the basis of the " Guidelines for Project Assessment ". The benefit flow in the project life of 30 years is prepared in Table XIV.2.7 according to the annual development area.

2.3 Economic Costs

2.3.1 Cost estimate

The financial costs consisting of (1) construction cost for project works including personnel power, materials, equipment and land acquisition, (2) physical contingency, (3) engineering and administration costs, (4) operation and maintenance (O&M) cost, and (5) replacement cost are converted to the economic costs by applying specific conversion factors prepared by the Guideline for Project Assessment (See Table XIV.2.8). The economic O&M costs cover the head works, main and secondary channels for the surface water irrigation and FCD components newly developed. The O&M and replacement costs for the LLP and STW irrigation in the command area of 35,300ha are accounted as a production cost on the crop budgets. The economic project costs for the surface and STW irrigation as well as FCD components are summarized as follows :

Item		Surface Irrigation	STW Irrigation	FCD Components	Total
1. Project Area	(ha)	18,200	17,300*	35,500	35,500
2. Project Cost	(Tk million)	893.2	67.8	82.0	1,043.0
- Construction		667.7	59.0	62.0	788.7
- Physical contingency		100.2	8.8	9.3	118.3
- Engineering & administration		125.3	0	10.7	136.0
3. Cost Per ha	(Tk'000)	49.1	9.0	2.3	29.4

Note : existing irrigated area of 9,800 ha is included.

2.3.2 Cost allocation and flow

The economic cost for FCD components is allocated to the surface water and ground water (STW) irrigation components according to the proportion of respective command irrigation area. The annual economic cost flow is prepared on the basis of the implementation schedule as shown in Table XIV.2.9.

2.4 Economic Evaluation

2.4.1 EIRR, net present value and benefit-cost ratio

Economic evaluation is made through the estimation of (1) Economic Internal Rate of Return (EIRR), (2) Net Present Value (NPV) and (3) Benefit - Cost Ratio (B/C) both at the discount rate of 12% as shown in Table XIV.2.10. The surface water and STW irrigation components are evaluated taking the FCD benefit and cost into account. The evaluation result is summarized as follows :

Item		Surface Irrigation & FCD	STW Irrigation & FCD	Total
1. EIRR	(%)	24.0	63.9	28.5
2. NPV				
Benefit	(Tk million)	1,521	651	2,172
Cost	(Tk million)	602	67	669
3. Benefit-cost ratio		2.5	9.7	3.2

2.4.2 Sensitivity analysis

In order to evaluate soundness of the project against possible adverse changes in the future, sensitivity analysis is made for the following cases :

Case	Surface Irrigation	STW Irrigation	Total
Case 1: Project cost overrun by 20%	21.4	57.4	25.5
Case 2: Benefit decrease by 20%	20.5	55.8	24.6
Case 3: Delay in construction for 2 years	18.6	41.4	21.7
Case 4: Combination of Case 1 and 2	18.1	50.0	21.8
Case 5: Combination of Case 1 and 3	16.7	38.0	19.6
Case 6: Combination of Case 2 and 3	16.0	37.2	18.9
Case 7: Combination of Case 1, 2 and 3	14.3	34.0	17.0

3. Project Impact Analysis on Income Distribution

In order to evaluate the project from financial aspect of farmers, farm budgets analysis for the household groups such as landless, small, medium, large and very large farmers were made both under (W) and (WO) project conditions. Average operated land sizes for the respective groups under the different flooded condition (F0, F1 and F2&3) in the Study area were clarified by the result of Socio-economic Baseline Survey. Farm budgets are prepared on incomes from agriculture and non-agriculture, and expenditures for agriculture and others including living expenditure. Project impact will accrue from the following changes in the respective household economy :

- 1) Increase in agricultural income through increase in agricultural productivity, employment as a farm labour ; agricultural employment income is estimated at Tk 400 /year for landless household,

- 2) Increase in non-farm income through project construction employment ; construction employment income is estimated at Tk 600/year for landless household during construction period of 12 years,
- 3) Increase in agricultural production cost for surface water and STW irrigation as well as farm inputs, and
- 4) Increase in living expenditure according to increase in the household income ; increase in living expenditure is estimated at 30% of the incremental net income for the respective group household.

Command area development including installation of LLPs and STWs and construction of related structures will be implemented by the beneficiaries' burden. Water user groups need to get a kind of on-farm irrigation development loan and repay through cooperative organizations. Repayment and O&M costs for the on-farm facilities and structures, and replacement for LLPs and STWs are analyzed as shown in Table XIV.3.1 under (WO) project condition and Table XIV.3.2 under (W) project condition. On the basis of existing similar rural credits, the loan conditions for surface water irrigation using LLPs are set at the repayment period of 10 years with an annual interest rate of 16%. The conditions for ground water irrigation using STWs are 5 years with 16%. The financial crop budgets under (WO) and (W) project conditions are prepared taking the above irrigation expenses into consideration as shown in Table XIV.3.3.

For the project impact analysis on the respective groups, the following development cases in the Study area are considered :

Case	(WO)	(W)
1	Rainfed	Irrigated (Surface)
2	Rainfed	Irrigated (STW)

The farm budgets by the respective group at the different flooded conditions are prepared under (WO) and (W) project conditions as shown in Table XIV.3.4. The farmer beneficiaries under the surface water irrigation (LLP) will receive more irrigation benefit than the STW beneficiaries. The incremental net reserve of LLP beneficiaries will be 1.2 - 1.6 times to those of STW as follows :

(Unit : Tk/year)						
Item	Landless (<0.2ha)	Small (0.20-0.5ha)	Medium (0.6-1.9ha)	Large (2.0-3.9ha)	Very Large (4.0ha<)	Total
(1) F0 Area						
(WO/Net reserve)	200	6,860	17,990	49,350	91,150	7,080
(W/Increment)						
- LLP	1,700	8,580	19,070	45,300	74,530	9,040
- STW	1,400	5,550	12,100	28,170	45,500	5,860
- Ratio	1.2	1.6	1.6	1.6	1.6	1.5
(2) F1 Area						
(WO/Net reserve)	270	2,250	10,970	29,310	64,970	4,170
(W/Increment)						
- LLP	1,620	4,500	11,850	25,870	46,250	5,920
- STW	1,400	3,390	8,600	18,420	32,130	4,380
- Ratio	1.2	1.3	1.4	1.4	1.4	1.4
(3) F2&3 Area						
(WO/Net reserve)	60	130	6,840	13,170	38,510	900
(W/Increment)						
- LLP	510	4,210	15,100	26,290	56,270	6,100
- STW	370	3,110	10,670	18,470	40,000	4,450
- Ratio	1.4	1.4	1.4	1.4	1.4	1.4
(4) Total Area/Average						
(WO/Net reserve)	250	3,770	13,890	35,540	73,610	4,910
(W/Increment)						
- LLP	1,150	5,690	13,680	31,500	54,060	6,480
- STW	940	4,010	9,020	20,930	34,770	4,420
- Ratio	1.2	1.4	1.5	1.5	1.6	1.5

The direct construction cost (excluding the physical contingency, engineering and administration costs) for intake structures and main channels as well as those O&M cost is analyzed as shown in Table XIV.3.4. These cost could be paid by the surface water irrigation beneficiaries as a water charge if possible. The payment capacity of beneficiary farmers for the above direct construction and O&M costs is assessed on the basis of their incremental net reserve between (WO) and (W) project conditions. It is concluded that the required water charge be supplemented by the less than 30% of incremental net reserves and be reasonable for the respective group as follows :

Item	Landless (<0.2ha)	Small (0.20-0.5ha)	Medium (0.6-1.9ha)	Large (2.0-3.9ha)	Very Large (4.0ha<)	Total
(1) Water Charge (Tk/year)						
F0 Area	165	1,636	3,575	9,232	15,654	1,719
F1 Area	206	1,060	3,108	7,112	13,483	1,472
F2&3 Area	123	978	3,963	6,988	14,543	1,472
Total Area	165	1,266	3,510	7,966	14,543	1,554
(2) Share of Water Charge (%) within Incremental Net Reserve						
F0 Area	10	19	20	20	21	19
F1 Area	13	24	26	27	29	25
F2&3 Area	24	23	26	27	26	24
Total Area	14	22	26	25	27	24

4. Social Impact Assessment

In addition to direct benefit counted in the economic and financial evaluations, various secondary and intangible benefits are expected from the projects. The major social impacts are as follows :

(1) Increase in Employment Opportunity

The project implementation will increase employment opportunity at several phases in the Study area. The increase in agricultural productivity requires more farm labour inputs, especially for seedling and harvesting of paddy under irrigation condition. Annual employment increased under the (W) project condition is estimated at around 1.8 million man-day as shown in Table XIV.4.1. The project works will accrue construction labour employment from 0.9 to 2.0 million man-day during the 3rd to 9th year of the project life. The O&M activities will need 120,000 man-day /year. In addition, increased production will accelerate agro-based industries and marketing activities. The employment at industrial and service sectors will be also increased.

(2) Increase in Land Value

Economic value of the land will be increased by the project implementation through change of rainfed land to irrigated. It will increase the value of land assets as a mortgage and the larger land owners will have more monetary power in the future. On the contrary, marginal farmers such as landless and small farmers will be hard to acquire farm lands because of increase in land price. It is assumed that income imbalance between marginal and large farmer groups be enlarged without socio-economic incentives to the marginal farmers such as improvement of leasehold tenancy (change from present share tenancy to fixed rent), promotion of agrarian reform, especially to absentees' land, and increase in non-agricultural year-round employment.

(3) Improvement of Local Transportation

Existing bridges over the proposed main channels in the Study area will be newly constructed and accessibility between right and left bank areas be improved. Improvement of rural road network linked with the bridges or between villages and local markets could be accelerated in the future.

Table XIV.2.1 Economic Farm Gate Prices of Agricultural Inputs and Outputs

Item	Conversion Factor / ₁	Unit	Farm Gate Price / ₂	Economic Price / ₃
I. Agricultural Outputs				
(1) Paddy		Tk/ton		
B. Aus	0.88		6,065	5,337
HYV Aus	0.88		6,319	5,561
L.T. Aman	0.88		6,341	5,580
HYV Aman	0.88		6,602	5,810
L. Boro	0.88		5,347	4,705
HYV Boro	0.88		6,606	5,813
(2) HYV Wheat	1.29	Tk/ton	6,007	7,749
(3) Other Crops		Tk/ton		
Potato	0.87		3,259	2,835
Jute	1.06		6,344	6,725
Sugarcane	0.95		942	895
Pulses	0.87		14,841	12,912
Oil Seeds	0.88		14,259	12,548
Spices(Onion)	0.87		10,227	8,897
Vegetables	0.87		2,615	2,275
(4) Fish	0.88	Tk/ton	60,300	53,064
(5) By Product		Tk/ton		
HYV Rice Straw	0.87		715	622
Local Rice Straw	0.87		950	827
Jute Sticks	0.87		2,550	2,219
II. Agricultural Production Inputs				
(1) Fertilizer		Tk/kg		
Urea	1.45		5.54	8.03
TSP	1.88		5.68	10.68
MP	2.02		4.42	8.93
(2) Pesticide	0.87	Tk/kg	146.00	127.02
(3) Seed / Seedling		Tk/kg		
Paddy	0.88		9.53	8.39
HYV Wheat	1.29		9.09	11.73
Potato	0.87		7.52	6.54
Jute	1.06		24.30	25.76
Sugarcane	0.95		1.41	1.34
Pulses	0.87		22.26	19.37
Oil Seeds	0.88		20.58	18.11
Spices(Onion)	0.87		15.34	13.35
Vegetables	0.87		148.84	129.49
(4) Labour (Unskilled)	0.75	Tk/day	19.79	14.84
(5) Draft Power	0.87	Tk/day	37.66	32.76

Note : /₁ : Based on the Guidelines for Project Assessment, Flood Plan coordination Organization

/₂ : Weighted average prices based on the Socio-economic Baseline Survey, JICA.

/₃ : Farm gate prices times conversion factors

Table XIV.2.2 Economic Crop Budget (1/2)

Without Project Condition / Irrigated													
(1) Production Cost	Unit	L. T. Aman			HYV Aman			HYV Boro			HYV Wheat		
		Price (Tk/unit)	Reqmnt (unit/ha)	Value (Tk/ha)	Price (Tk/unit)	Reqmnt (unit/ha)	Value (Tk/ha)	Price (Tk/unit)	Reqmnt (unit/ha)	Value (Tk/ha)	Price (Tk/unit)	Reqmnt (unit/ha)	Value (Tk/ha)
Labour	day	14.84	147	2,180	14.84	204	3,030	14.84	219	3,250	14.84	116	1,720
Draft animal	day	32.76	43	1,410	32.76	49	1,610	32.76	53	1,740	32.76	43	1,410
Seed	kg	8.39	30	250	8.39	30	250	8.39	30	250	11.73	150	1,640
Urea	kg	8.03	28	220	8.03	142	1,140	8.03	141	1,130	8.03	157	1,260
TSP	kg	10.68	18	190	10.68	82	880	10.68	73	780	10.68	118	1,260
MP	kg	8.93	0	0	8.93	20	180	8.93	12	110	8.93	15	130
Pesticide	kg	127.02	0.25	30	127.02	0.5	60	127.02	0.5	60	127.02	0.25	30
Irrigation cost				930			1,580			1,870			840
Miscellaneous	L. S.	10%		520	10%		870	10%		920	10%		830
Total				5,730			9,600			9,200			2,120
(2) Gross Production Value		Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)
Main product		5,580	2.15	12,000	5,810	3.60	20,920	5,813	3.72	21,620	7,749	2.80	21,700
By-product		827	4.30	3,560	622	3.60	2,240	622	3.72	2,310	622	2.80	1,740
Total				15,560			23,160			23,930			23,440
(3) Unit Net Production Value (2) - (1)				9,830			13,560			13,820			14,320

Without Project Condition / Irrigated													
(1) Production Cost	Unit	Potato			Pulses			Oil Seeds			Spices (Onion)		
		Price (Tk/unit)	Reqmnt (unit/ha)	Value (Tk/ha)	Price (Tk/unit)	Reqmnt (unit/ha)	Value (Tk/ha)	Price (Tk/unit)	Reqmnt (unit/ha)	Value (Tk/ha)	Price (Tk/unit)	Reqmnt (unit/ha)	Value (Tk/ha)
Labour	day	14.84	197	2,920	14.84	80	1,190	14.84	90	1,340	14.84	159	2,360
Draft animal	day	32.76	48	1,570	32.76	40	1,310	32.76	37	1,210	32.76	39	1,280
Seed	kg	6.54	1,200	7,850	19.37	30	580	18.11	10	180	13.35	600	8,010
Urea	kg	8.03	50	400	8.03	0	0	8.03	58	470	8.03	33	260
TSP	kg	10.68	37	400	10.68	20	210	10.68	135	1,440	10.68	38	410
MP	kg	8.93	29	260	8.93	0	0	8.93	35	310	8.93	32	290
Pesticide	kg	127.02	0.5	60	127.02	0	0	127.02	0.50	60	127.02	0	0
Irrigation cost				830			680			610			600
Miscellaneous	L. S.	10%		1,430	10%		400	10%		560	10%		1,320
Total				15,720			4,370			6,180			14,530
(2) Gross Production Value		Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)
Main product		2,835	9.80	27,780	12,912	0.90	11,620	12,548	0.80	10,040	8,897	5.20	46,260
By-product				0			0			0			0
Total				27,780			11,620			10,040			46,260
(3) Unit Net Production Value (2) - (1)				12,060			7,250			3,860			31,730

Without Project Condition / Irrigated				
(1) Production Cost	Unit	Vegetable		
		Price (Tk/unit)	Value (Tk/ha)	
Labour	day	14.84	307	4,560
Draft animal	day	32.76	52	1,700
Seed	kg	129.49	6	780
Urea	kg	8.03	83	670
TSP	kg	10.68	53	570
MP	kg	8.93	30	270
Pesticide	kg	127.02	0.25	30
Irrigation cost				600
Miscellaneous	L. S.	10%		920
Total				10,100
(2) Gross Production Value		Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)
Main product		2,275	7.00	15,930
By-product				0
Total				15,930
(3) Unit Net Production Value (2) - (1)				5,830

Without Project Condition / Rained													
(1) Production Cost	Unit	B. Aus			HYV Aus			L. T. Aman			HYV Aman		
		Price (Tk/unit)	Reqmnt (unit/ha)	Value (Tk/ha)	Price (Tk/unit)	Reqmnt (unit/ha)	Value (Tk/ha)	Price (Tk/unit)	Reqmnt (unit/ha)	Value (Tk/ha)	Price (Tk/unit)	Reqmnt (unit/ha)	Value (Tk/ha)
Labour	day	14.84	140	2,080	14.84	170	2,520	14.84	136	2,020	14.84	169	2,510
Draft animal	day	32.76	44	1,440	32.76	46	1,510	32.76	43	1,410	32.76	45	1,470
Seed	kg	8.39	100	840	8.39	25	210	8.39	30	250	8.39	30	250
Urea	kg	8.03	25	200	8.03	108	870	8.03	28	220	8.03	107	860
TSP	kg	10.68	0	0	10.68	63	670	10.68	18	190	10.68	58	620
MP	kg	8.93	0	0	8.93	4	40	8.93	0	0	8.93	8	70
Pesticide	kg	127.02	0	0	127.02	0.50	60	127.02	0.25	30	127.02	0.50	60
Miscellaneous	L. S.	10%		460	10%		590	10%		410	10%		580
Total				5,020			6,470			4,530			6,420
(2) Gross Production Value		Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)
Main product		5,337	1.25	6,670	5,561	2.40	13,350	5,580	1.69	9,430	5,810	2.39	13,890
By-product		827	2.50	2,070	622	2.40	1,490	827	3.38	2,800	622	2.39	1,490
Total				8,740			14,840			12,230			15,380
(3) Unit Net Production Value (2) - (1)				3,720			8,370			7,700			8,960

Without Project Condition / Rained													
(1) Production Cost	Unit	L. Boro			HYV Boro			HYV Wheat			Sugarcane		
		Price (Tk/unit)	Reqmnt (unit/ha)	Value (Tk/ha)	Price (Tk/unit)	Reqmnt (unit/ha)	Value (Tk/ha)	Price (Tk/unit)	Reqmnt (unit/ha)	Value (Tk/ha)	Price (Tk/unit)	Reqmnt (unit/ha)	Value (Tk/ha)
Labour	day	14.84	162	2,400	14.84	206	3,060	14.84	86	1,280	14.84	86	1,280
Draft animal	day	32.76	41	1,340	32.76	51	1,670	32.76	39	1,280	32.76	39	1,280
Seed	kg	8.39	30	250	8.39	30	250	11.73	130	1,520	1.34	130	170
Urea	kg	8.03	32	260	8.03	80	640	8.03	104	840	8.03	104	840
TSP	kg	10.68	12	130	10.68	34	360	10.68	34	360	10.68	34	360
MP	kg	8.93	0	0	8.93	6	50	8.93	5	40	8.93	5	40
Pesticide	kg	127.02	0.12	20	127.02	0.50	60	127.02	0.25	30	127.02	0.25	30
Miscellaneous	L. S.	10%		440	10%		610	10%		540	10%		400
Total				4,840			6,700			5,820			4,400
(2) Gross Production Value		Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)
Main product		4,705	1.84	8,660	5,813	2.33	13,540	7,749	1.76	13,640	895	27.00	24,170
By-product		827	3.68	3,040	622	2.33	1,450	622	1.76	1,090			0
Total				11,700			14,990			14,730			24,170
(3) Unit Net Production Value (2) - (1)				6,860			8,290			8,840			19,770

Table XIV.2.2 Economic Crop Budget (2/2)

Without Project Condition / Rainfed														
		Potato			Jute			Pulses			Oil Seeds			
(1) Production Cost	Unit	Price (Tk/unit)	Rommt (unit/ha)	Value (Tk/ha)	Price (Tk/unit)	Rommt (unit/ha)	Value (Tk/ha)	Price (Tk/unit)	Rommt (unit/ha)	Value (Tk/ha)	Price (Tk/unit)	Rommt (unit/ha)	Value (Tk/ha)	
Description														
Labour	day	14.84	179	2,660	14.84	218	3,240	14.84	46	680	14.84	67	990	
Draft animal	day	32.76	48	1,570	32.76	48	1,570	32.76	30	980	32.76	35	1,150	
Seed	kg	6.54	1000	6,540	25.76	9	230	19.37	30	580	18.11	10	180	
Urea	kg	8.03	40	320	8.03	41	330	8.03	0	0	8.03	25	200	
TSP	kg	10.68	24	260	10.68	12	130	10.68	0	0	10.68	62	660	
MP	kg	8.93	21	190	8.93	10	90	8.93	0	0	8.93	15	130	
Pesticide	kg	127.02	0.5	60	127.02	0.50	60	127.02	0	0	127.02	0.10	10	
Micellaneous	L. S.	10%		1,160	10%		570	10%		220	10%		330	
Total				12,760			6,220			2,360			3,620	
(2) Gross Production Value	Description	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	
	Main product	2,835	7.75	21,970	6,725	1.48	9,950	12,912	0.60	7,750	12,548	0.50	6,270	
	By-product			0	2,219	2.96	6,570			0			0	
	Total			21,970			16,520			7,750			6,270	
(3) Unit Net Production Value	(2) - (1)			9,210			10,300			5,290			2,620	

Without Project Condition / Rainfed														
		Spices (Onion)			Vegetable									
(1) Production Cost	Unit	Price (Tk/unit)	Rommt (unit/ha)	Value (Tk/ha)	Price (Tk/unit)	Rommt (unit/ha)	Value (Tk/ha)							
Description														
Labour	day	14.84	143	2,120	14.84	270	4,010							
Draft animal	day	32.76	39	1,280	32.76	51	1,670							
Seed	kg	13.35	600	8,010	129.49	6	780							
Urea	kg	8.03	30	240	8.03	64	510							
TSP	kg	10.68	25	270	10.68	28	300							
MP	kg	8.93	21	190	8.93	18	160							
Pesticide	kg	127.02	0	0	127.02	0.25	30							
Micellaneous	L. S.	10%		1,210	10%		750							
Total				13,320			8,210							
(2) Gross Production Value	Description	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)							
	Main product	8,897	4.00	35,590	2,275	5.00	11,380							
	By-product			0			0							
	Total			35,590			11,380							
(3) Unit Net Production Value	(2) - (1)			22,270			3,170							

With Project Condition / Irrigated														
		HYV Aus			L. T. Aman			HYV Aman			HYV Boro			
(1) Production Cost	Unit	Price (Tk/unit)	Rommt (unit/ha)	Value (Tk/ha)	Price (Tk/unit)	Rommt (unit/ha)	Value (Tk/ha)	Price (Tk/unit)	Rommt (unit/ha)	Value (Tk/ha)	Price (Tk/unit)	Rommt (unit/ha)	Value (Tk/ha)	
Labour	day	14.84	210	3,120	14.84	153	2,270	14.84	214	3,180	14.84	234	3,470	
Draft animal	day	32.76	51	1,670	32.76	44	1,440	32.76	50	1,640	32.76	55	1,800	
Seed	kg	8.39	30	250	8.39	30	250	8.39	30	250	8.39	30	250	
Urea	kg	8.03	231	1,850	8.03	65	520	8.03	189	1,520	8.03	202	1,620	
TSP	kg	10.68	110	1,170	10.68	33	410	10.68	117	1,250	10.68	117	1,250	
MP	kg	8.93	39	370	8.93	0	0	8.93	36	320	8.93	35	310	
Pesticide	kg	127.02	0.75	100	127.02	0.30	40	127.02	0.75	100	127.02	0.75	100	
Irrigation cost (STW/LLP)				(2,870 / 1,000)			(2,160 / 750)			(3,240 / 1,130)			(3,710 / 1,290)	
Micellaneous (STW/LLP)	10%			(1,130 / 940)	10%		(710 / 570)	10%		(1,150 / 940)	10%		(1,250 / 1,010)	
Total				(12,430 / 10,370)			(7,800 / 6,250)			(12,650 / 10,330)			(13,760 / 11,190)	
(2) Gross Production Value	Main product	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	
		5,561	4.30	23,910	5,580	2.80	15,620	5,810	4.70	27,310	5,294	5.10	27,000	
	By-product	622	4.30	2,670	827	4.60	3,800	622	4.70	2,920	622	5.10	3,170	
	Total			26,580			19,420			30,230			30,170	
(3) Unit Net Production Value	(2) - (1)			(14,150 / 16,210)			(11,620 / 13,170)			(17,580 / 19,900)			(16,410 / 19,070)	

With Project Condition / Irrigated														
		HYV Wheat			Potato			Pulses			Oil Seeds			
(1) Production Cost	Unit	Price (Tk/unit)	Rommt (unit/ha)	Value (Tk/ha)	Price (Tk/unit)	Rommt (unit/ha)	Value (Tk/ha)	Price (Tk/unit)	Rommt (unit/ha)	Value (Tk/ha)	Price (Tk/unit)	Rommt (unit/ha)	Value (Tk/ha)	
Labour	day	14.84	135	2,000	14.84	209	3,100	14.84	80	1,190	14.84	97	1,440	
Draft animal	day	32.76	44	1,440	32.76	49	1,610	32.76	60	1,970	32.76	37	1,210	
Seed	kg	11.73	140	1,640	6.54	1500	9,810	19.37	30	580	18.11	10	180	
Urea	kg	8.03	189	1,520	8.03	84	670	8.03	0	0	8.03	73	590	
TSP	kg	10.68	144	1,540	10.68	60	640	10.68	30	320	10.68	165	1,760	
MP	kg	8.93	35	310	8.93	55	490	8.93	20	180	8.93	48	430	
Pesticide	kg	127.02	0.40	50	127.02	0.75	100	127.02	1.70	220	127.02	0.50	60	
Irrigation cost (STW/LLP)				(1,950 / 680)			(1,950 / 680)			(1,590 / 550)			(1,420 / 490)	
Micellaneous (STW/LLP)	10%			(1,050 / 920)	10%		(1,840 / 1,710)	10%		(610 / 500)	10%		(710 / 620)	
Total				(11,500 / 10,100)			(20,210 / 18,810)			(6,660 / 5,510)			(7,800 / 6,780)	
(2) Gross Production Value	Main product	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	
		7,749	3.25	25,180	2,835	13.00	36,860	12,912	1.20	15,490	12,548	1.40	17,570	
	By-product	622	3.25	2,020			0			0			0	
	Total			27,200			36,860			15,490			17,570	
(3) Unit Net Production Value	(2) - (1)			(15,700 / 17,100)			(16,650 / 18,050)			(8,830 / 9,980)			(9,770 / 10,790)	

With Project Condition / Irrigated														
		Spices (Onion)			Vegetable									
(1) Production Cost	Unit	Price (Tk/unit)	Rommt (unit/ha)	Value (Tk/ha)	Price (Tk/unit)	Rommt (unit/ha)	Value (Tk/ha)							
Labour	day	14.84	175	2,600	14.84	345	5,120							
Draft animal	day	32.76	40	1,310	32.76	53	1,740							
Seed	kg	13.35	600	8,010	129.49	6	780							
Urea	kg	8.03	69	550	8.03	166	1,330							
TSP	kg	10.68	80	850	10.68	102	1,090							
MP	kg	8.93	71	630	8.93	68	610							
Pesticide	kg	127.02	0	0	127.02	0.25	30							
Irrigation cost (STW/LLP)				(1,410 / 490)			(1,410 / 490)							
Micellaneous (STW/LLP)	10%			(1,540 / 1,440)	10%		(1,210 / 1,120)							
Total				(16,900 / 15,880)			(13,320 / 12,310)							
(2) Gross Production Value	Main product	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)							
		8,897	5.70	50,710	2,275	10.60	24,120							
	By-product			0			0							
	Total			50,710			24,120							
(3) Unit Net Production Value	(2) - (1)			(33,810 / 34,830)			(10,800 / 11,810)							

Table XIV.2.3 Economic Net Crop Production Value per Ha

Item	Present/Without Project Condition					
	Rainfed			Irrigated (Ground Water/STW)		
	Net Production Value per ha by Crop (Tk/ha)	Cropping Intensity (%)	Net Production Value per ha at Project Area (Tk/ha)	Net Production Value per ha by Crop (Tk/ha)	Cropping Intensity (%)	Net Production Value per ha at Project Area (Tk/ha)
(1) Rice						
B/L.T Aus	3,720	13.2	490	0	0	0
HYV Aus	8,370	59.2	4,960	0	0	0
L.T Aman	7,700	16.3	1,260	9,830	7.1	700
HYV Aman	8,960	58.8	5,270	13,560	70.4	9,550
L.T Boro	6,860	3.1	210	0	0	0
HYV Boro	8,290	1.2	100	13,820	100.0	13,820
(2) Jute	10,300	13.2	1,360	10,300	1.0	100
(3) Sugarcane	19,770	5.8	1,150	0	0	0
(4) Rabi						
Wheat	8,840	8.2	720	14,320	8.2	1,170
Oil Seed	2,620	2.3	60	3,860	5.1	200
Pulses	5,290	1.9	100	7,250	4.1	300
Potato	9,210	1.6	150	12,060	6.1	740
Spices	22,270	0.8	180	31,730	3.1	980
Vegetables	3,170	0.8	30	5,830	3.1	180
Total		186.4	16,040		208.2	27,740
			(For 25,700 ha : Tk 412,228,000)			(For 9,800 ha : Tk 271,852,000)
			Average at Project Area per ha (rainfed ; 72.394%, irrigated; 27.606%)			19,270
						(For 35,500 ha : 684,080,000)

Item	With Project Condition (Ground Water/STW)			With Project Condition (Surface Water/LLP)		
	Irrigated			Irrigated		
	Net Production Value per ha by Crop (Tk/ha)	Cropping Intensity (%)	Net Production Value per ha at Project Area (Tk/ha)	Net Production Value per ha by Crop (Tk/ha)	Cropping Intensity (%)	Net Production Value per ha at Project Area (Tk/ha)
(1) Rice						
B/L.T Aus	0	0	0	0	0	0
HYV Aus	14,150	27.0	3,820	16,210	27.0	4,380
L.T Aman	11,620	16.9	1,960	13,170	16.9	2,230
HYV Aman	17,580	33.8	5,940	19,900	33.8	6,730
L.T Boro	0	0	0	0	0	0
HYV Boro	16,410	29.3	4,810	19,070	29.3	5,590
(2) Jute/Rainfed	10,300	25.4	2,620	10,300	25.4	2,620
(3) Sugarcane	0	0	0	0	0	0
(4) Rabi						
Wheat	15,700	23.7	3,720	17,100	23.7	4,050
Oil Seed	9,770	13.0	1,270	10,790	13.0	1,400
Pulses	8,830	8.5	750	9,980	8.5	850
Potato	16,650	27.3	4,550	18,050	27.3	4,930
Spices	33,810	9.5	3,210	34,830	9.5	3,310
Vegetables	10,800	9.5	1,030	11,810	9.5	1,120
Total		223.9	33,680		223.9	37,210
			(For 17,300 ha : Tk 582,664,000)			(For 18,200 ha : Tk 677,222,000)
			Average at Project Area per ha (STW : 48.732%, LLP; 51.268%)			35,490
						(For 35,500 ha : 1,259,886,000)

Item	Without Project Condition			With Project Condition	Increment
	Rainfed	Irrigated	Total	Irrigated	
(1) STW Project Area					
Area (ha)	7,500	9,800	17,300	17,300	0
Net Production Value - Per ha (Tk/ha)	16,040	27,740	22,670	33,680	11,010
- Total (Tk'000)	120,300	271,852	392,152	582,664	190,512
(2) LLP Project Area					
Area (ha)	18,200	0	18,200	18,200	0
Net Production Value - Per ha (Tk/ha)	16,040	0	16,040	37,210	21,170
- Total (Tk'000)	291,928	0	291,928	677,222	385,294
(3) Total Project Area					
Area (ha)	25,700	9,800	35,500	35,500	0
Net Production Value - Per ha (Tk/ha)	16,040	27,740	19,270	35,490	16,220
- Total (Tk'000)	412,228	271,852	684,080	1,259,886	575,806

Table XIV.2.4 Economic Fish Culture Budget

Item	Unit	Price (Tk/unit)	Without Project Condition Capture Fishery		With Project Condition Culture Fishery	
			Requirement	Value	Requirement	Value
			(unit/ha)	(Tk/ha)	(unit/ha)	(Tk/ha)
(1) Production Cost						
Labour	day	14.84	150	2,230	200	2,970
Nets	day	174.00	2	350	5	870
Fish fry	kg	2.00	0	0	7410	14,820
Feed	kg	8.03	0	0	740	5,940
Fertilizer	kg	10.00	0	0	490	4,900
Micellaneous	L. S.	10%		260		2,950
Total				2,840		32,450
(2) Gross Production Value						
		Price (Tk/kg)	Yield (kg/ha)	Value (Tk/ha)	Yield (kg/ha)	Value (Tk/ha)
		53	85.00	4,510	4,100	239,030
(3) Unit Net Production Value						
(2) - (1)				1,670		206,580
(4) Incremental Net Production Value						
						204,910

Table XIV.2.5 Economic Annual Benefit for Fishery

(Unit : Tk'000)

Year	Annual Development Area (ha)	Effective Area for Fishery (ha)	Benefit by Year										
			3rd (50 ha)	4th (50 ha)	5th (35 ha)	6th (40 ha)	7th (75 ha)	8th (75 ha)	9th (75 ha)	10th (60 ha)	Total (460 ha)		
1	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0
3	100	50	0	0	0	0	0	0	0	0	0	0	0
4	100	50	2,049	0	0	0	0	0	0	0	0	0	2,049
5	70	35	4,098	2,049	0	0	0	0	0	0	0	0	6,147
6	80	40	6,147	4,098	1,434	0	0	0	0	0	0	0	11,679
7	150	75	8,196	6,147	2,869	1,639	0	0	0	0	0	0	18,851
8	150	75	10,246	8,196	4,303	3,279	3,074	0	0	0	0	0	29,098
9	150	75	10,246	10,246	5,737	4,918	6,147	3,074	0	0	0	0	40,368
10	120	60	10,246	10,246	7,172	6,557	9,221	6,147	3,074	0	0	0	52,663
11	0	0	10,246	10,246	7,172	8,196	12,295	9,221	6,147	3,074	2,459	0	65,982
12	0	0	10,246	10,246	7,172	8,196	15,368	12,295	9,221	4,918	0	0	77,662
13	0	0	10,246	10,246	7,172	8,196	15,368	15,368	12,295	7,377	0	0	86,268
14	0	0	10,246	10,246	7,172	8,196	15,368	15,368	15,368	9,836	0	0	91,800
15	0	0	10,246	10,246	7,172	8,196	15,368	15,368	15,368	12,296	0	0	94,260
16	0	0	10,246	10,246	7,172	8,196	15,368	15,368	15,368	12,296	0	0	94,260
17	0	0	10,246	10,246	7,172	8,196	15,368	15,368	15,368	12,296	0	0	94,260
18	0	0	10,246	10,246	7,172	8,196	15,368	15,368	15,368	12,296	0	0	94,260
19	0	0	10,246	10,246	7,172	8,196	15,368	15,368	15,368	12,296	0	0	94,260
20	0	0	10,246	10,246	7,172	8,196	15,368	15,368	15,368	12,296	0	0	94,260
Total	920	460											

Table XIV.2.6 Economic Annual Production Foregone

(1) Area Acquired (ha/ accumulation)

Year	Surface Irrigation Development										Ratnai Diver- sion	Total
	Intake Canal	A Channel	B Channel	C Channel	D Channel	E Channel	F Channel	2ndary Canal	Demo. Farm	Total		
1	0	0	0	0	0	0	0	0	0	0	0	0
2	3.2	70.2	0	0	0	0	0	40.7	1.5	115.6	8.2	123.8
3	3.2	140.4	0	0	0	0	0	81.4	1.5	226.5	8.2	234.7
4	3.2	175.6	0	0	9.3	0	0	122.1	1.5	311.7	8.2	319.9
5	3.2	175.6	0	0	24.8	15.0	7.4	162.8	1.5	390.3	8.2	398.5
6	3.2	175.6	77.1	0	24.8	15.0	7.4	203.5	2.3	508.9	8.2	517.1
7	3.2	175.6	154.1	0	24.8	15.0	7.4	244.2	2.3	626.6	8.2	634.8
8	3.2	175.6	154.1	90.6	24.8	15.0	7.4	325.5	2.3	798.5	8.2	806.7
9	3.2	175.6	154.1	90.6	24.8	15.0	7.4	325.5	2.3	798.5	8.2	806.7
10	3.2	175.6	154.1	90.6	24.8	15.0	7.4	325.5	2.3	798.5	8.2	806.7
11	3.2	175.6	154.1	90.6	24.8	15.0	7.4	325.5	2.3	798.5	8.2	806.7
12	3.2	175.6	154.1	90.6	24.8	15.0	7.4	325.5	2.3	798.5	8.2	806.7

(2) Production Foregone (Tk'000)

Year	By Project				Allocated		
	Surface Irrigation	STW	FCD	Total	Surface Irrigation	STW	Total
1	0	0	0	0	0	0	0
2	2,228	0	158	2,386	2,309	77	2,386
3	4,365	0	158	4,523	4,446	77	4,523
4	6,006	0	158	6,164	6,087	77	6,164
5	7,521	0	158	7,679	7,602	77	7,679
6	9,807	0	158	9,965	9,888	77	9,965
7	12,075	0	158	12,233	12,156	77	12,233
8	15,387	0	158	15,545	15,468	77	15,545
9	15,387	0	158	15,545	15,468	77	15,545
10	15,387	0	158	15,545	15,468	77	15,545
11	15,387	0	158	15,545	15,468	77	15,545
12	15,387	0	158	15,545	15,468	77	15,545
13	15,387	0	158	15,545	15,468	77	15,545
14	15,387	0	158	15,545	15,468	77	15,545
15	15,387	0	158	15,545	15,468	77	15,545
16	15,387	0	158	15,545	15,468	77	15,545
17	15,387	0	158	15,545	15,468	77	15,545
18	15,387	0	158	15,545	15,468	77	15,545
19	15,387	0	158	15,545	15,468	77	15,545
20	15,387	0	158	15,545	15,468	77	15,545
21	15,387	0	158	15,545	15,468	77	15,545
22	15,387	0	158	15,545	15,468	77	15,545
23	15,387	0	158	15,545	15,468	77	15,545
24	15,387	0	158	15,545	15,468	77	15,545
25	15,387	0	158	15,545	15,468	77	15,545
26	15,387	0	158	15,545	15,468	77	15,545
27	15,387	0	158	15,545	15,468	77	15,545
28	15,387	0	158	15,545	15,468	77	15,545
29	15,387	0	158	15,545	15,468	77	15,545
30	15,387	0	158	15,545	15,468	77	15,545

Note : Net crop production value under (WO) project condition ; Tk 19,270 /ha
 Production foregone by FCD is allocated according to the project area by LLP area (18,200ha) and STW
 area (17,300ha).

Table XIV.2.7 Economic Annual Benefit Flow for Crop and Fishery Production

(1) Annual Development Area (ha)

Year	Surface Irrigation Development							Fish Culture	STW Irrigation	Crop Area Total
	Crop Production Area by Channel									
	A	B	C	D	E	F	Total			
1	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0
3	2,180	0	0	0	0	0	2,180	50	2,162	4,342
4	2,110	0	0	0	0	0	2,110	50	2,162	4,272
5	820	0	0	450	0	0	1,270	35	2,162	3,432
6	0	0	0	560	980	1,040	2,580	40	2,162	4,742
7	0	2,800	0	0	0	0	2,800	75	2,162	4,962
8	0	2,660	0	0	0	0	2,660	75	2,162	4,822
9	0	0	4,160	0	0	0	4,160	75	2,162	6,322
10	0	0	440	0	0	0	440	60	2,166	2,606
11	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0
Total	5,110	5,460	4,600	1,010	980	1,040	18,200	460	17,300	35,500

(2) Annual Benefit (Tk'000)

Year	Surface Irrigation Development			STW Irrigation	Total Irrigation	Production Foregone			Net Benefit		
	Crop Production	Fish Culture	Total			Surface Irrigation	STW Irrigation	Total	Surface Irrigation	STW Irrigation	Total
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	2,309	77	2,386	-2,309	-77	-2,386
3	0	0	0	0	0	4,446	77	4,523	-4,446	-77	-4,523
4	9,230	2,049	11,279	4,762	16,041	6,087	77	6,164	5,192	4,685	9,877
5	27,394	6,147	33,541	14,285	47,826	7,602	77	7,679	25,939	14,208	40,147
6	50,934	11,679	62,613	28,570	91,183	9,888	77	9,965	52,725	28,493	81,218
7	85,399	18,851	104,250	47,616	151,866	12,156	77	12,233	92,094	47,539	139,633
8	131,720	29,098	160,818	71,424	232,242	15,468	77	15,545	145,350	71,347	216,697
9	180,072	40,368	220,440	95,232	315,672	15,468	77	15,545	204,972	95,155	300,127
10	237,105	52,663	289,768	119,040	408,808	15,468	77	15,545	274,300	118,963	393,263
11	290,623	65,982	356,605	142,856	499,461	15,468	77	15,545	341,137	142,779	483,916
12	333,217	77,662	410,879	161,912	572,791	15,468	77	15,545	395,411	161,835	557,246
13	363,956	86,268	450,224	176,205	626,429	15,468	77	15,545	434,756	176,128	610,884
14	383,432	91,800	475,232	185,738	660,970	15,468	77	15,545	459,764	185,661	645,425
15	385,294	94,260	479,554	190,512	670,066	15,468	77	15,545	464,086	190,435	654,521
16	385,294	94,260	479,554	190,512	670,066	15,468	77	15,545	464,086	190,435	654,521
17	385,294	94,260	479,554	190,512	670,066	15,468	77	15,545	464,086	190,435	654,521
18	385,294	94,260	479,554	190,512	670,066	15,468	77	15,545	464,086	190,435	654,521
19	385,294	94,260	479,554	190,512	670,066	15,468	77	15,545	464,086	190,435	654,521
20	385,294	94,260	479,554	190,512	670,066	15,468	77	15,545	464,086	190,435	654,521
21	385,294	94,260	479,554	190,512	670,066	15,468	77	15,545	464,086	190,435	654,521
22	385,294	94,260	479,554	190,512	670,066	15,468	77	15,545	464,086	190,435	654,521
23	385,294	94,260	479,554	190,512	670,066	15,468	77	15,545	464,086	190,435	654,521
24	385,294	94,260	479,554	190,512	670,066	15,468	77	15,545	464,086	190,435	654,521
25	385,294	94,260	479,554	190,512	670,066	15,468	77	15,545	464,086	190,435	654,521
26	385,294	94,260	479,554	190,512	670,066	15,468	77	15,545	464,086	190,435	654,521
27	385,294	94,260	479,554	190,512	670,066	15,468	77	15,545	464,086	190,435	654,521
28	385,294	94,260	479,554	190,512	670,066	15,468	77	15,545	464,086	190,435	654,521
29	385,294	94,260	479,554	190,512	670,066	15,468	77	15,545	464,086	190,435	654,521
30	385,294	94,260	479,554	190,512	670,066	15,468	77	15,545	464,086	190,435	654,521

Table XIV.2.8 Economic Cost Estimate for Project Works

(1) Construction Cost and Others (Tk'000)																			
Item	Surface Water Development										STW				FCD		Total		
	Head Works	Irrigation Canals					2ndary		Total	Rural Infra.	I.P.P.	Demo. Farm	Total	Drainage	Flood & River	Rural Infra.		Total	
I. Financial Construction Cost																			
Unskilled Labour	28,310	51,857	41,843	23,774	7,323	6,067	1,807	62,544	195,215	33,709	36,505	512	294,251	16,653	18,758	4,752	1,778	25,288	336,192
Materials																			
Cement	37,159	9,089	5,714	6,655	2,904	4,294	705	0	29,361	37,374	40,358	465	144,717	1,072	13,196	4,470	1,933	19,599	165,388
Bricks	1,166	0	0	0	0	0	0	0	0	0	0	0	572	134,676	0	0	0	0	140,409
Steel	28,694	20,311	12,193	16,124	8,586	16,668	1,253	0	75,135	56,751	3,673	53	164,306	1,402	137,816	1,060	907	59	1,533
Others	25,309	5,913	3,846	4,453	1,947	2,958	515	0	19,632	26,674	29,497	356	101,468	124	21,151	0	3,097	24,248	188,678
Equipment	187	1,506	840	1,303	768	1,647	62	0	6,126	395	36,917	4,666	48,291	782	7,858	2,327	1,353	11,538	113,788
Other Works	10	6	4	4	2	2	1	0	19	57	772	0	858	9	143	4	2	149	1,016
Total	120,835	88,682	64,440	52,313	21,530	31,636	4,343	62,544	325,488	155,532	282,398	7,454	891,707	93,261	62,249	12,496	8,254	82,999	1,067,967
II. Economic Construction Cost																			
Unskilled Labour	18,402	33,707	27,198	15,453	4,760	3,944	1,175	40,654	126,891	21,911	23,728	333	191,265	10,824	12,193	3,089	1,156	16,438	218,527
Materials																			
Cement	29,356	7,180	4,514	5,257	2,294	3,392	557	0	23,194	29,255	31,883	367	114,325	847	10,425	3,531	1,527	15,483	130,655
Bricks	1,014	0	0	0	0	0	0	0	0	0	0	0	498	117,168	0	0	0	51	1,333
Steel	21,521	15,233	9,145	12,093	6,440	12,501	940	0	56,352	42,563	2,755	40	123,231	922	493	789	0	2,323	18,186
Others	22,019	5,144	3,346	3,874	1,694	2,958	448	0	17,079	23,206	25,662	310	88,276	680	6,836	2,024	1,177	10,037	98,993
Equipment	116	934	521	808	476	1,021	38	0	3,798	245	22,889	2,893	29,941	45,608	357	22	20	399	75,948
Other Works	9	5	3	3	2	2	1	0	16	50	672	0	747	8	124	3	2	129	884
Total	92,437	62,203	44,727	37,488	15,666	23,433	3,159	40,654	227,330	117,998	224,757	5,163	667,685	58,982	46,291	9,458	6,256	62,005	788,672
III. Combined Conversion Factor (II/I)																			
	0.7650	0.7014	0.6941	0.7166	0.7276	0.7407	0.7274	0.6500	0.6984	0.7587	0.7959	0.6926	0.7488	0.6324	0.7436	0.7569	0.7579	0.7471	0.7385
IV. Economic Cost/1																			
Construction cost	92,437	62,203	44,727	37,488	15,666	23,433	3,159	40,654	227,330	117,998	224,757	5,163	667,685	58,982	46,291	9,458	6,256	62,005	788,672
Physical Contingency	13,866	9,330	6,709	5,623	2,350	3,515	474	6,098	34,099	17,700	33,714	774	100,153	8,849	6,944	1,419	938	9,301	118,303
sub-total	106,303	71,533	51,436	43,111	18,016	26,948	3,633	46,752	261,429	135,698	258,471	5,937	767,838	67,831	53,235	10,877	7,194	71,306	906,975
Consultant service	18,189	12,240	8,802	7,376	3,083	4,611	622	8,000	44,734	23,219	0	1,014	87,156	0	5,552	1,134	753	7,439	94,595
Administration	7,974	5,366	3,859	3,234	1,352	2,021	272	3,507	19,611	10,178	0	446	38,209	0	2,434	497	329	3,260	41,469
sub-total	26,163	17,606	12,661	10,610	4,435	6,632	894	11,507	64,345	33,397	0	1,460	125,365	0	7,986	1,631	1,082	10,699	136,064
Total	132,466	89,139	64,097	53,721	22,451	33,580	4,527	58,259	325,774	169,095	258,471	7,397	893,203	67,831	61,221	12,508	8,276	82,005	1,043,039

Note : /1 : Economic costs for consultant service and administration by project component are estimated according to the proportion of those construction costs. Physical contingency is estimated at 15% of the respective construction cost.

(2) Annual Operation and Maintenance Cost at Full Development Stage (Tk'000)

Item	Surface Water Development					FCD			Total	
	Head Works	Main Channel	Rural Infra.	Total	Demo. Farm	Drainage Improvement	Flood & River	Rural Infra.		
I. Financial Cost										
Unskilled Labour	18	1,593	291	1,902	125		134	1,861	15	2,010
Skilled Labour	12	414	0	426	0		0	0	0	0
Others	0	0	0	0	1,123		0	0	0	0
Total	30	2,007	291	2,328	1,248		134	1,861	15	2,010
II. Economic Cost										
Unskilled Labour	12	1,095	189	1,236	51		87	1,210	10	1,307
Skilled Labour	10	360	0	370	0		0	0	0	0
Others	0	0	0	0	752		0	0	0	0
Total	22	1,395	189	1,606	833		87	1,210	10	1,307
III. Combined Conversion Factor										
	0.7333	0.6951	0.6495	0.6899	0.6675		0.6493	0.6502	0.6667	0.6502

(3) Replacement Cost (Tk'000)

Item	Surface Water Development								Total	Drainage Improvement	
	Head Works	A	B	Irrigation Canals			2ndary	Total			
I. Financial Cost											
Equipment	1,440	11,220	7,690	9,810	5,760	12,420	480	0	47,380	48,820	13,313
II. Economic Cost											
Equipment	893	6,956	4,768	6,082	3,571	7,700	298	0	29,375	30,268	8,254
III. Combined Conversion Factor											
	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0	0.62	0.62	0.62

Table XIV.2.9 Economic Annual Cost Flow for Project Works

(Unit : Tk'000)

Year	Surface Water (LLP) Irrigation Development							O&M Cost	Replacement Cost	STW Construction Cost
	Construction Cost				Dem. Farm	Consultant & Administration	Total			
	Head Work	Main Channel	Rural Infra.	LLP						
1	0	0	0	0	0	53,143	53,143	0	0	0
2	0	0	0	0	1,540	20,222	21,762	0	0	0
3	106,303	34,769	11,852	30,960	1,967	7,665	193,516	325	0	8,478
4	0	34,769	19,054	29,966	0	7,130	90,919	515	0	8,479
5	0	26,290	19,054	18,037	0	5,525	68,906	1,059	0	8,479
6	0	46,704	19,054	36,641	0	5,755	108,154	1,222	0	8,479
7	0	32,158	19,054	39,765	2,430	7,188	100,595	847	0	8,479
8	0	32,156	19,054	37,777	0	7,035	96,022	1,265	0	8,479
9	0	48,295	19,054	59,080	0	6,653	133,082	1,566	0	8,479
10	0	6,288	9,522	6,245	0	5,049	27,104	1,863	0	8,479
11	0	0	0	0	0	0	0	1,608	0	0
12	0	0	0	0	0	0	0	1,608	0	0
13	0	0	0	0	0	0	0	1,608	6,064	0
14	0	0	0	0	0	0	0	1,608	1,600	0
15	0	0	0	0	0	0	0	1,608	4,365	0
16	0	0	0	0	0	0	0	1,608	8,333	0
17	0	0	0	0	0	0	0	1,608	1,525	0
18	0	0	0	0	0	0	0	1,608	2,598	0
19	0	0	0	0	0	0	0	1,608	5,785	0
20	0	0	0	0	0	0	0	1,608	0	0
21	0	0	0	0	0	0	0	1,608	0	0
22	0	0	0	0	0	0	0	1,608	0	0
23	0	0	0	0	0	0	0	1,608	6,064	0
24	0	0	0	0	0	0	0	1,608	1,600	0
25	0	0	0	0	0	0	0	1,608	4,365	0
26	0	0	0	0	0	0	0	1,608	8,333	0
27	0	0	0	0	0	0	0	1,608	1,525	0
28	0	0	0	0	0	0	0	1,608	2,598	0
29	0	0	0	0	0	0	0	1,608	5,785	0
30	0	0	0	0	0	0	0	1,608	0	0
Total	106,303	261,429	135,698	258,471	5,937	125,365	893,203	40,822	60,540	67,831

Year	FCD Development				O&M Cost	Replacement Cost	Allocated LLP Irrigation			Allocated STW Irrigation		
	Construction Cost						Total Construction Cost	O&M Cost	Replacement Cost	Total Construction Cost	O&M Cost	Replacement Cost
	FCD	Rural Infra.	Consultant & Administration	Total								
1	0	0	4,502	4,502	0	0	55,453	0	0	2,192	0	0
2	0	0	1,735	1,735	0	0	22,652	0	0	845	0	0
3	4,984	7,194	658	12,836	5	0	200,101	328	0	14,729	2	0
4	19,328	0	612	19,940	13	0	101,148	522	0	18,190	6	0
5	0	0	474	474	1,288	0	69,149	1,720	0	8,710	627	0
6	0	0	493	493	1,288	0	108,407	1,883	0	8,719	627	0
7	18,512	0	617	19,129	1,288	0	110,408	1,508	0	17,795	627	0
8	12,255	0	604	12,859	1,300	0	102,619	1,932	0	14,741	633	0
9	7,932	0	571	8,503	1,309	0	137,444	2,238	0	12,620	637	0
10	1,101	0	433	1,534	1,380	0	27,891	2,571	0	9,226	672	0
11	0	0	0	0	1,380	5,580	0	2,316	2,863	0	672	2,717
12	0	0	0	0	1,380	0	0	2,316	0	0	672	0
13	0	0	0	0	1,380	0	0	2,316	6,064	0	672	0
14	0	0	0	0	1,380	595	0	2,316	1,905	0	672	290
15	0	0	0	0	1,380	0	0	2,316	4,365	0	672	0
16	0	0	0	0	1,380	0	0	2,316	8,333	0	672	0
17	0	0	0	0	1,380	1,190	0	2,316	2,135	0	672	580
18	0	0	0	0	1,380	888	0	2,316	3,054	0	672	412
19	0	0	0	0	1,380	0	0	2,316	5,785	0	672	0
20	0	0	0	0	1,380	0	0	2,316	0	0	672	0
21	0	0	0	0	1,380	5,580	0	2,316	2,863	0	672	2,717
22	0	0	0	0	1,380	0	0	2,316	0	0	672	0
23	0	0	0	0	1,380	0	0	2,316	6,064	0	672	0
24	0	0	0	0	1,380	595	0	2,316	1,905	0	672	290
25	0	0	0	0	1,380	0	0	2,316	4,365	0	672	0
26	0	0	0	0	1,380	0	0	2,316	8,333	0	672	0
27	0	0	0	0	1,380	1,190	0	2,316	2,135	0	672	580
28	0	0	0	0	1,380	888	0	2,316	3,054	0	672	412
29	0	0	0	0	1,380	0	0	2,316	5,785	0	672	0
30	0	0	0	0	1,380	0	0	2,316	0	0	672	0
Total	64,112	7,194	10,699	82,005	35,471	16,506	935,272	59,022	69,008	107,767	17,271	8,058

Note : Cost for FCD component is allocated according to the proportion of project area of LLP (18,200ha) and STW (17,300ha).

Table 10.2.1 Economic Cost and Benefit Stream for Economic Evaluation

(1) Surface Irrigation Development & FCD (Tk'000)						(2) Ground Water Irrigation Development and FCD (Tk'000)							
Year	Cost			Benefit	Balance	Year	Cost			Benefit	Balance		
	Const- ruction	O&M	Replac- ment				Total	Const- ruction	O&M			Replac- ment	Total
1	55,453	0	0	55,453	0	-55,453	1	2,192	0	0	2,192	0	-2,192
2	22,652	0	0	22,652	-2,309	-24,961	2	845	0	0	845	-77	-922
3	200,101	328	0	200,429	-4,446	-204,875	3	14,729	2	0	14,731	-77	-14,808
4	101,148	522	0	101,670	5,192	-96,478	4	18,190	6	0	18,196	4,685	-13,511
5	69,149	1,720	0	70,869	25,939	-44,930	5	8,710	627	0	9,337	14,208	4,871
6	108,407	1,883	0	110,290	52,725	-57,565	6	8,719	627	0	9,346	28,493	19,147
7	110,408	1,508	0	111,916	92,094	-19,822	7	17,795	627	0	18,422	47,539	29,117
8	102,619	1,932	0	104,551	145,350	40,799	8	14,741	633	0	15,374	71,347	55,973
9	137,444	2,238	0	139,682	204,972	65,290	9	12,620	637	0	13,257	95,155	81,898
10	27,891	2,571	0	30,462	274,300	243,838	10	9,226	672	0	9,898	118,963	109,065
11	0	2,316	2,863	5,179	341,137	335,958	11	0	672	2,717	3,389	142,779	139,390
12	0	2,316	0	2,316	395,411	393,095	12	0	672	0	672	161,835	161,163
13	0	2,316	6,064	8,380	434,756	426,376	13	0	672	0	672	176,128	175,456
14	0	2,316	1,905	4,221	459,764	455,543	14	0	672	290	962	185,661	184,699
15	0	2,316	4,365	6,681	464,086	457,405	15	0	672	0	672	190,435	189,763
16	0	2,316	8,333	10,649	464,086	453,437	16	0	672	0	672	190,435	189,763
17	0	2,316	2,135	4,451	464,086	459,635	17	0	672	580	1,252	190,435	189,183
18	0	2,316	3,054	5,370	464,086	458,716	18	0	672	432	1,104	190,435	189,331
19	0	2,316	5,785	8,101	464,086	455,985	19	0	672	0	672	190,435	189,763
20	0	2,316	0	2,316	464,086	461,770	20	0	672	0	672	190,435	189,763
21	0	2,316	2,863	5,179	464,086	458,907	21	0	672	2,717	3,389	190,435	187,046
22	0	2,316	0	2,316	464,086	461,770	22	0	672	0	672	190,435	189,763
23	0	2,316	6,064	8,380	464,086	455,706	23	0	672	0	672	190,435	189,763
24	0	2,316	1,905	4,221	464,086	459,865	24	0	672	290	962	190,435	189,473
25	0	2,316	4,365	6,681	464,086	457,405	25	0	672	0	672	190,435	189,763
26	0	2,316	8,333	10,649	464,086	453,437	26	0	672	0	672	190,435	189,763
27	0	2,316	2,135	4,451	464,086	459,635	27	0	672	580	1,252	190,435	189,183
28	0	2,316	3,054	5,370	464,086	458,716	28	0	672	432	1,104	190,435	189,331
29	0	2,316	5,785	8,101	464,086	455,985	29	0	672	0	672	190,435	189,763
30	0	2,316	0	2,316	464,086	461,770	30	0	672	0	672	190,435	189,763

(3) Total Development (Tk'000)						
Year	Cost			Benefit	Balance	
	Const- ruction	O&M	Replac- ment			Total
1	57,645	0	0	57,645	0	-57,645
2	23,497	0	0	23,497	-2,386	-25,883
3	214,830	330	0	215,160	-4,523	-219,683
4	119,338	528	0	119,866	9,877	-109,989
5	77,859	2,347	0	80,206	40,147	-40,059
6	117,126	2,510	0	119,636	81,218	-38,418
7	128,203	2,135	0	130,338	139,633	9,295
8	117,360	2,565	0	119,925	216,697	96,772
9	150,064	2,875	0	152,939	300,127	147,188
10	37,117	3,243	0	40,360	393,263	352,903
11	0	2,988	5,580	8,568	483,916	475,348
12	0	2,988	0	2,988	557,246	554,258
13	0	2,988	6,064	9,052	610,884	601,832
14	0	2,988	2,195	5,183	645,425	640,242
15	0	2,988	4,365	7,353	654,521	647,168
16	0	2,988	8,333	11,321	654,521	643,200
17	0	2,988	2,715	5,703	654,521	648,818
18	0	2,988	3,486	6,474	654,521	648,047
19	0	2,988	5,785	8,773	654,521	645,748
20	0	2,988	0	2,988	654,521	651,533
21	0	2,988	5,580	8,568	654,521	645,953
22	0	2,988	0	2,988	654,521	651,533
23	0	2,988	6,064	9,052	654,521	645,469
24	0	2,988	2,195	5,183	654,521	649,338
25	0	2,988	4,365	7,353	654,521	647,168
26	0	2,988	8,333	11,321	654,521	643,200
27	0	2,988	2,715	5,703	654,521	648,818
28	0	2,988	3,486	6,474	654,521	648,047
29	0	2,988	5,785	8,773	654,521	645,748
30	0	2,988	0	2,988	654,521	651,533

(4) Calculation					
Item	EIRR (%)	NPV (Tk million)		B-C	B/C
		Cost	Benefit		
(1) Surface	24.0	602	1,521	919	2.5
(2) STW	63.9	67	651	584	9.7
(3) Total	28.5	669	2,172	1,503	3.2

Note :
 EIRR : Economic Internal Rate of Return
 NPV : Net Present Value at discount rate of 12%
 B - C : Benefit minus cost
 B / C : Benefit cost ratio

Table XIV.3.1 O & M and Replacement Costs for STW Irrigation under Without Project Condition

Item	Unit	Basic Data & Cost Estimate			
		Financial Cost (I)	Conversion Factor (II)	Economic Cost (I)x(II)	
I. Conditions / 7 sample average					
Actual irrigated area			5.0 ha		
Operation period			Jan - April		
Total operation hours			1,080 hours		
II. Annual Repayment / Replacement Cost					
Cost for pump and eng	Tk	27,000			
Interest rate	%/year	16			
Repayment period	year	5			
1. Annual replacement cost	Tk	8,246		3,348	
Base cost	Tk	5,400	0.62	3,348	
Interest	Tk	2,846	0	0	
III. O & M Cost per season					
1. Fuel and Materials					
Lubricant cost	Tk	10,311	0.63	6,496	
Pump repair cost	Tk	1,060	0.63	668	
2. Personnel					
Technical fee	Tk	448	0.87	390	
Limeman's pay	Tk	825	0.65	536	
Operator's pay	Tk	2,600	0.65	1,690	
3. Others					
Canal repair	Tk	825	0.65	536	
Transport cost	Tk	366	0.68	249	
Miscellaneous cost	Tk	450	0.87	392	
Total	Tk	16,885		10,957	
IV. Annual Cost (per Ha)					
1. Total	Tk	25,131		14,305	
2. Per ha	Tk/ha	5,030		2,860	
Repayment/replacement cost	Tk/ha	1,650		670	
O&M cost	Tk/ha	3,380		2,190	
		Cropping Intensity (%)	Water Requirement (mm/ha)	Financial Cost (Tk/ha) /_1	Economic Cost(Tk/ha) /_1
V. Annual Cost by Crop for Crop Budget Analysis (per Ha)					
L.T Aman	7.1	362	1,450	930	
HYV Aman	70.4	541	2,650	1,580	
HYV Boro	100.0	622	3,200	1,870	
Jute	1.0	0	10	0	
Wheat	8.2	324	1,320	840	
Oil Seed	5.1	237	960	610	
Pulses	4.1	267	1,060	680	
Potatoes	6.1	324	1,300	830	
Spices	3.1	237	940	600	
Vegetables	3.1	237	940	600	
Total /Average	208.2	875	1,380	850	

Note: /_1; Weighted average reflecting cropping intensity to the repayment and replacement cost and unit water requirement to the O&M cost.

Table XIV.3.2 Command Area Development, O&M and Replacement Costs for Surface Water and STW Irrigation (1/2)

(I) Surface Water Irrigation (LLP)				
Item	Unit	Basic Data & Cost Estimate		
I. Conditions				
Actual irrigated area		70.0 ha		
Operation period		Jan - May		
Total operation hours		3,643 hours		
II. Construction Estimate				
		Financial Cost (I)	Economic Cost (I)x(II)	
			Conversion Factor (II)	
1. Unskilled Laborer		142,590	0.65	
2. Materials				
Cement		157,640	0.79	
Bricks		526,050	0.87	
Steel		14,350	0.75	
Others		115,220	0.87	
3. Equipment		144,200	0.62	
Total Cost (Unit Cost)		1,100,050 (15,720)	875,280 (12,500)	
III. Construction Breakdown for Crop Budget /_1				
1. Construction cost	Tk	998,050	-	
2. Pump, engine and other equipment	Tk	102,000	-	
IV. Annual Repayment/Replacement Cost for Command Area Development				
Interest rate	%/year	16	-	
Repayment period	year	10	10	
1. Construction	Tk	206,498	-	
Base cost	Tk	99,805	-	
Interest	Tk	106,693	-	
2. Pump, engine and other equipment	Tk	21,104	-	
Base cost	Tk	10,200	0.62	
Interest	Tk	10,904	0	
V. Annual O & M Cost				
1. Fuel and Materials				
Lubricant cost	Tk	157,725	0.63	
Pump repair cost	Tk	5,100	0.63	
2. Personnel	Tk	15,750	0.65	
3. Others				
Canal repair	Tk	4,200	0.65	
Others	Tk	15,772	0.68	
Total	Tk	198,547	126,273	
VI. Annual Cost				
1. Total	Tk	426,149	132,597	
2. Per ha	Tk/ha	6,090	1,890	
Repayment/replacement cost	Tk/ha	3,250	90	
O&M cost	Tk/ha	2,840	1,800	
V. Annual Cost by Crop for Crop Budget Analysis (per Ha)				
	Cropping Intensity (%)	Water Requirement (mm/ha)	Financial Cost /_2	Economic Cost /_2
HYV Aus	27.0	480	1,950	1,000
L.T Aman	16.9	362	1,420	750
HYV Aman	33.8	541	2,250	1,130
HYV Boro	29.3	622	2,440	1,290
Jute	25.4	0	370	10
Wheat	23.7	324	1,400	680
Oil Seed	13.0	237	960	490
Pulses	8.5	267	990	550
Potatoes	27.3	324	1,450	680
Spices	9.5	237	910	490
Vegetables	9.5	237	910	490
Total /Average	223.9	875	1,370	690

Note : /_1; Production cost for economic crop budget
/_2; Weighted average reflecting cropping intensity to the repayment and replacement cost and average unit water requirement to the O&M cost.

Table XIV.3.2 Command Area Development, O&M and Replacement Costs for Surface Water and STW Irrigation (2/2)

(2) Ground Water Irrigation (STW)				
Item	Unit	Basic Data & Cost Estimate		
I. Conditions				
Actual irrigated area		5.0 ha		
Operation period		Jan - May		
Total operation hours		3,643 hours		
		Financial Cost	Con- version Factor	Economic Cost
		(I)	(II)	(I)x(II)
II. Construction Estimate				
1. Unskilled Laborer		11,100	0.65	7,220
2. Materials				
Cement		710	0.79	560
Bricks		710	0.87	620
Steel		80	0.75	60
Others		520	0.87	450
3. Equipment		49,040	0.62	30,400
Total Cost		62,160		39,310
(Unit Cost)		(12,430)		(7,860)
III. Construction Breakdown for Crop Budget /_1				
1. Construction cost	Tk	35,160	-	-
2. Pump, engine and other equipment	Tk	27,000	-	-
IV. Annual Repayment/Replacement Cost for Command Area Development				
Interest rate	%/year	16	-	-
Repayment period	year	5	-	10
1. Construction				
Base cost	Tk	10,738	-	-
Interest	Tk	7,032	-	-
Interest	Tk	3,706	-	-
2. Pump, engine and other equipment				
Base cost	Tk	8,246	-	1,674
Base cost	Tk	5,400	0.62	1,674
Interest	Tk	2,846	0	0
V. Annual O & M Cost				
1. Fuel and Materials				
Lubricant cost	Tk	31,545	0.63	19,873
Pump repair cost	Tk	2,700	0.63	1,701
2. Personnel				
Personnel	Tk	3,155	0.65	2,051
3. Others				
Others	Tk	3,155	0.68	2,145
Total	Tk	40,555		25,770
VI. Annual Cost				
1. Total	Tk	59,539		27,444
2. Per ha				
Repayment/replacement cost	Tk/ha	11,910		5,490
O&M cost	Tk/ha	3,800		330
	Tk/ha	8,110		5,160
V. Annual Cost by Crop for Crop Budget Analysis (per Ha)				
	Cropping Intensity (%)	Water Requirement (mm/ha)	Financial Cost(Tk/ha) /_2	Economic Cost(Tk/ha) /_2
HYV Aus	27.0	480	4,910	2,870
L.T Aman	16.9	362	3,640	2,160
HYV Aman	33.8	541	5,590	3,240
HYV Boro	29.3	622	6,260	3,710
Jute	25.4	0	430	40
Wheat	23.7	324	3,410	1,950
Oil Seed	13.0	237	2,420	1,420
Pulses	8.5	267	2,620	1,590
Potatoes	27.3	324	3,470	1,950
Spices	9.5	237	2,360	1,410
Vegetables	9.5	237	2,360	1,410
Total	223.9	875	3,410	1,980

Note : /_1; Production cost for economic crop budget
/_2; Weighted average reflecting cropping intensity to the repayment and replacement cost and average unit water requirement to the O&M cost.

Table XIV.3.3 Financial Crop Budget (1/2)

Without Protect Condition / Irrigated

			L. T. Aman			HYV Aman			HYV Boro			HYV Wheat		
(1) Production Cost	Unit	Price (Tk/unit)	Return	Value	Price (Tk/unit)	Return	Value	Price (Tk/unit)	Return	Value	Price (Tk/unit)	Return	Value	
			(unit/ha)	(Tk/ha)		(unit/ha)	(Tk/ha)		(unit/ha)	(Tk/ha)		(unit/ha)	(Tk/ha)	
Labour	day	19.79	68	1,350	19.79	94	1,860	19.79	101	2,000	19.79	60	1,190	
Draft animal	day	37.66	21	790	37.66	24	900	37.66	25	940	37.66	22	830	
Seed	kg	9.53	30	290	9.53	30	290	9.53	30	290	9.53	30	290	
Urea	kg	5.54	28	160	5.54	142	790	5.54	141	780	5.54	140	780	
TSP	kg	5.68	18	100	5.68	82	470	5.68	73	410	5.68	118	670	
MP	kg	4.42	0	0	4.42	20	90	4.42	12	50	4.42	15	70	
Pesticide	kg	146.00	0.25	40	146.00	0.5	70	146.00	0.5	70	146.00	0.25	40	
Irrigation cost	L. S.	10%		1,450	10%		2,650	10%		3,200	10%		1,320	
Miscellaneous	L. S.	10%		420	10%		710	10%		770	10%		630	
Total				4,600			7,820			8,510			6,890	
(2) Gross Production Value		Price	Yield	Value	Price	Yield	Value	Price	Yield	Value	Price	Yield	Value	
		(Tk/ton)	(ton/ha)	(Tk/ha)	(Tk/ton)	(ton/ha)	(Tk/ha)	(Tk/ton)	(ton/ha)	(Tk/ha)	(Tk/ton)	(ton/ha)	(Tk/ha)	
Main product		6,341	2.15	13,630	6,606	3.60	23,770	6,606	3.72	24,570	6,607	2.80	16,820	
By-product		950	4.30	4,090	715	3.60	2,570	715	3.72	2,660	715	2.80	2,000	
Total				17,720			26,340			27,230			18,820	
(3) Unit Net Production Value				(Tk/ha)			(Tk/ha)			(Tk/ha)			(Tk/ha)	
(2) - (1)				13,120			18,510			18,720			11,930	

Without Project Condition / Irrigated

			Potato			Pulses			Oil Seeds			Spices (Onion)		
(1) Production Cost	Unit	Price (Tk/unit)	Return	Value	Price (Tk/unit)	Return	Value	Price (Tk/unit)	Return	Value	Price (Tk/unit)	Return	Value	
			(unit/ha)	(Tk/ha)		(unit/ha)	(Tk/ha)		(unit/ha)	(Tk/ha)		(unit/ha)	(Tk/ha)	
Labour	day	19.79	102	2,020	19.79	42	830	19.79	48	950	19.79	83	1,640	
Draft animal	day	37.66	24	900	37.66	20	750	37.66	16	600	37.66	21	790	
Seed	kg	7.52	1,200	9,020	22.26	30	670	20.58	10	210	15.34	600	9,200	
Urea	kg	5.54	50	280	5.54	0	0	5.54	58	320	5.54	33	180	
TSP	kg	5.68	37	210	5.68	20	110	5.68	135	770	5.68	38	220	
MP	kg	4.42	29	130	4.42	0	0	4.42	35	150	4.42	32	140	
Pesticide	kg	146.00	0.5	70	146.00	0	0	146.00	0.50	70	146.00	0	0	
Irrigation cost	L. S.	10%		1,300	10%		1,060	10%		960	10%		940	
Miscellaneous	L. S.	10%		1,390	10%		340	10%		400	10%		1,310	
Total				15,320			3,760			4,420			14,420	
(2) Gross Production Value		Price	Yield	Value	Price	Yield	Value	Price	Yield	Value	Price	Yield	Value	
		(Tk/ton)	(ton/ha)	(Tk/ha)	(Tk/ton)	(ton/ha)	(Tk/ha)	(Tk/ton)	(ton/ha)	(Tk/ha)	(Tk/ton)	(ton/ha)	(Tk/ha)	
Main product		3,259	9.80	31,940	14,841	0.90	13,360	14,259	0.80	11,410	10,227	5.20	53,180	
By-product				0			0			0			0	
Total				31,940			13,360			11,410			53,180	
(3) Unit Net Production Value				(Tk/ha)			(Tk/ha)			(Tk/ha)			(Tk/ha)	
(2) - (1)				16,620			9,600			6,980			38,760	

Without Project Condition / Irrigated

			Vegetable				
(1) Production Cost	Unit	Price (Tk/unit)	Return	Value	Price (Tk/unit)	Return	Value
			(unit/ha)	(Tk/ha)		(unit/ha)	(Tk/ha)
Labour	day	19.79	135	2,670			
Draft animal	day	37.66	24	900			
Seed	kg	148.84	6	890			
Urea	kg	5.54	83	460			
TSP	kg	5.68	53	300			
MP	kg	4.42	30	130			
Pesticide	kg	146.00	0.25	40			
Irrigation cost	L. S.	10%		940			
Miscellaneous	L. S.	10%		630			
Total				6,960			
(2) Gross Production Value		Price	Yield	Value			
		(Tk/ton)	(ton/ha)	(Tk/ha)			
Main product		2,615	7.00	18,310			
By-product				0			
Total				18,310			
(3) Unit Net Production Value				(Tk/ha)			
(2) - (1)				11,350			

Without Project Condition / Rainfed

			B. Aus			HYV Aus			L. T. Aman			HYV Aman		
(1) Production Cost	Unit	Price (Tk/unit)	Return	Value	Price (Tk/unit)	Return	Value	Price (Tk/unit)	Return	Value	Price (Tk/unit)	Return	Value	
			(unit/ha)	(Tk/ha)		(unit/ha)	(Tk/ha)		(unit/ha)	(Tk/ha)		(unit/ha)	(Tk/ha)	
Labour	day	19.79	64	1,270	19.79	78	1,540	19.79	63	1,250	19.79	78	1,540	
Draft animal	day	37.66	21	790	37.66	22	830	37.66	21	790	37.66	22	830	
Seed	kg	9.53	100	950	9.53	25	240	9.53	30	290	9.53	30	290	
Urea	kg	5.54	25	140	5.54	108	600	5.54	28	160	5.54	107	590	
TSP	kg	5.68	0	0	5.68	63	360	5.68	18	100	5.68	58	330	
MP	kg	4.42	0	0	4.42	4	20	4.42	0	0	4.42	8	40	
Pesticide	kg	146.00	0	0	146.00	0.50	70	146.00	0.25	40	146.00	0.50	70	
Irrigation cost	L. S.	10%		320	10%		370	10%		260	10%		370	
Miscellaneous	L. S.	10%		320	10%		370	10%		260	10%		370	
Total				3,470			4,030			2,890			4,060	
(2) Gross Production Value		Price	Yield	Value	Price	Yield	Value	Price	Yield	Value	Price	Yield	Value	
		(Tk/ton)	(ton/ha)	(Tk/ha)	(Tk/ton)	(ton/ha)	(Tk/ha)	(Tk/ton)	(ton/ha)	(Tk/ha)	(Tk/ton)	(ton/ha)	(Tk/ha)	
Main product		6,065	1.25	7,580	6,319	2.40	15,170	6,341	1.69	10,720	6,602	2.39	15,780	
By-product		950	2.50	2,380	715	2.40	1,720	950	3.38	3,210	715	2.39	1,710	
Total				9,960			16,890			13,930			17,490	
(3) Unit Net Production Value				(Tk/ha)			(Tk/ha)			(Tk/ha)			(Tk/ha)	
(2) - (1)				6,490			12,860			11,040			13,430	

Without Project Condition / Rainfed

			L. Boro			HYV Boro			HYV Wheat			Sugarcane		
(1) Production Cost	Unit	Price (Tk/unit)	Return	Value	Price (Tk/unit)	Return	Value	Price (Tk/unit)	Return	Value	Price (Tk/unit)	Return	Value	
			(unit/ha)	(Tk/ha)		(unit/ha)	(Tk/ha)		(unit/ha)	(Tk/ha)		(unit/ha)	(Tk/ha)	
Labour	day	19.79	75	1,480	19.79	95	1,880	19.79	45	890	19.79	29	570	
Draft animal	day	37.66	20	750	37.66	24	900	37.66	20	750	37.66	19	720	
Seed	kg	9.53	30	290	9.53	30	290	9.09	130	1,180	1.41	130	180	
Urea	kg	5.54	32	180	5.54	80	440	5.54	104	580	5.54	104	580	
TSP	kg	5.68	12	70	5.68	34	190	5.68	34	190	5.68	34	190	
MP	kg	4.42	0	0	4.42	6	30	4.42	5	20	4.42	5	20	
Pesticide	kg	146.00	0.12	20	146.00	0.50	70	146.00	0.25	40	146.00	0.25	40	
Irrigation cost	L. S.	10%		280	10%		380	10%		370	10%		230	
Miscellaneous	L. S.	10%		280	10%		380	10%		370	10%		230	
Total				3,070			4,180			4,020			2,520	
(2) Gross Production Value		Price	Yield	Value	Price	Yield	Value	Price	Yield	Value	Price	Yield	Value	
		(Tk/ton)	(ton/ha)	(Tk/ha)	(Tk/ton)	(ton/ha)	(Tk/ha)	(Tk/ton)	(ton/ha)	(Tk/ha)	(Tk/ton)	(ton/ha)	(Tk/ha)	
Main product		5,347	1.84	9,840	6,606	2.33	15,390	6,607	1.76	10,570	942	27.00	25,430	
By-product		950	3.68	3,500	715	2.33	1,670	715	1.76	1,260			0	
Total				13,340			17,060			11,830			25,430	
(3) Unit Net Production Value				(Tk/ha)			(Tk/ha)			(Tk/ha)			(Tk/ha)	
(2) - (1)				10,270			12,880			7,810			22,900	

Table XIV.3.3 Financial Crop Budget (2/2)

Without Protect Condition / Rainfed														
(1) Production Cost	Description	Unit	Potato			Jute			Pulses			Oil Seeds		
			Price (Tk/Unit)	Ramunt (unit/ha)	Value (Tk/ha)	Price (Tk/Unit)	Ramunt (unit/ha)	Value (Tk/ha)	Price (Tk/Unit)	Ramunt (unit/ha)	Value (Tk/ha)	Price (Tk/Unit)	Ramunt (unit/ha)	Value (Tk/ha)
Labour	day	19.79	93	1,840	19.79	113	2,240	19.79	24	470	19.79	36	710	
Draft animal	day	37.66	24	900	37.66	23	870	37.66	15	560	37.66	15	560	
Seed	kg	7.52	1000	7,520	24.30	9	220	22.26	30	670	20.58	10	210	
Urea	kg	5.54	40	220	5.54	41	230	5.54	0	0	5.54	25	140	
TSP	kg	5.68	24	140	5.68	12	70	5.68	0	0	5.68	62	350	
MP	kg	4.42	21	90	4.42	10	40	4.42	0	0	4.42	15	70	
Pesticide	kg	146.00	0.5	70	146.00	0.50	70	146.00	0	0	146.00	0.10	10	
Miscellaneous	L. S.	10%		1,080	10%		370	10%		170	10%		210	
Total				11,860			4,110			1,870			2,260	
(2) Gross Production Value	Description	Unit	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)
Main product			3,259	7.75	25,260	6,344	1.48	9,390	14,841	0.60	8,900	14,259	0.50	7,130
By-product					0			2,550			0			0
Total					25,260			16,940			8,900			7,130
(3) Unit Net Production Value	(2) - (1)				13,400			12,830			7,030			4,870

Without Protect Condition / Rainfed												
(1) Production Cost	Description	Unit	Spices (Onion)			Vegetable						
			Price (Tk/Unit)	Ramunt (unit/ha)	Value (Tk/ha)	Price (Tk/Unit)	Ramunt (unit/ha)	Value (Tk/ha)				
Labour	day	19.79	74	1,460	19.79	119	2,360					
Draft animal	day	37.66	21	790	37.66	23	870					
Seed	kg	15.34	600	9,200	148.84	6	890					
Urea	kg	5.54	30	170	5.54	64	350					
TSP	kg	5.68	25	140	5.68	28	160					
MP	kg	4.42	21	90	4.42	18	80					
Pesticide	kg	146.00	0	0	146.00	0.25	40					
Miscellaneous	L. S.	10%		1,190	10%		480					
Total				13,050			5,230					
(2) Gross Production Value	Description	Unit	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)				
Main product			10,227	4.00	40,910	2,615	5.00	13,080				
By-product					0			0				
Total					40,910			13,080				
(3) Unit Net Production Value	(2) - (1)				27,870			7,850				

With Project Condition / Irrigated														
(1) Production Cost	Description	Unit	HYV Aus			L. T. Aman			HYV Aman			HYV Boro		
			Price (Tk/Unit)	Ramunt (unit/ha)	Value (Tk/ha)	Price (Tk/Unit)	Ramunt (unit/ha)	Value (Tk/ha)	Price (Tk/Unit)	Ramunt (unit/ha)	Value (Tk/ha)	Price (Tk/Unit)	Ramunt (unit/ha)	Value (Tk/ha)
Labour	day	19.79	97	1,920	19.79	70	1,350	19.79	98	1,940	19.79	108	2,140	
Draft animal	day	37.66	24	900	37.66	21	790	37.66	24	900	37.66	26	980	
Seed	kg	9.53	30	290	9.53	30	290	9.53	30	290	9.53	30	290	
Urea	kg	5.54	231	1,280	5.54	65	360	5.54	189	1,050	5.54	202	1,120	
TSP	kg	5.68	110	620	5.68	38	220	5.68	117	660	5.68	117	660	
MP	kg	4.42	30	130	4.42	0	0	4.42	36	160	4.42	35	150	
Pesticide	kg	146.00	0.75	110	146.00	0.30	40	146.00	0.75	110	146.00	0.75	110	
Irrigation cost (STW/LLP)			(4,910 /	(1,950)	(3,640 /	(1,420)	(5,590 /	(2,250)	(6,260 /	(2,440)				
Miscellaneous (STW/LLP)	10%		(1,070 /	(720)	(670 /	(450)	(1,070 /	(740)	(1,170 /	(790)				
Total			(11,180 /	7,920)	(7,400 /	4,960)	(11,770 /	8,100)	(12,880 /	8,680)				
(2) Gross Production Value	Description	Unit	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)
Main product			6,319	4.30	27,170	6,341	2.80	17,750	6,602	4.70	31,030	6,606	5.10	33,690
By-product			715	4.30	3,070	950	4.60	4,370	715	4.70	3,360	715	5.10	3,650
Total					30,240			22,120			34,390			37,340
(3) Unit Net Production Value	(2) - (1)	(STW/LLP)	(19,060 /	(22,320)	(14,720 /	(17,160)	(22,620 /	(26,290)	(24,460 /	(28,660)				

With Project Condition / Irrigated														
(1) Production Cost	Description	Unit	HYV Wheat			Potato			Pulses			Oil Seeds		
			Price (Tk/Unit)	Ramunt (unit/ha)	Value (Tk/ha)	Price (Tk/Unit)	Ramunt (unit/ha)	Value (Tk/ha)	Price (Tk/Unit)	Ramunt (unit/ha)	Value (Tk/ha)	Price (Tk/Unit)	Ramunt (unit/ha)	Value (Tk/ha)
Labour	day	19.79	70	1,390	19.79	109	2,160	19.79	42	830	19.79	51	1,010	
Draft animal	day	37.66	22	830	37.66	25	940	37.66	29	1,090	37.66	16	600	
Seed	kg	9.09	140	1,270	7.52	1500	11,280	22.26	30	670	20.58	10	210	
Urea	kg	5.54	189	1,050	5.54	84	470	5.54	0	0	5.54	73	400	
TSP	kg	5.68	144	820	5.68	60	340	5.68	30	170	5.68	165	940	
MP	kg	4.42	35	150	4.42	55	240	4.42	20	90	4.42	48	210	
Pesticide	kg	146.00	0.40	60	146.00	0.75	110	146.00	1.70	250	146.00	0.50	70	
Irrigation cost (STW/LLP)			(3,410 /	(1,400)	(3,470 /	(1,450)	(2,620 /	(990)	(2,420 /	(960)				
Miscellaneous (STW/LLP)	10%		(900 /	(700)	(1,900 /	(1,700)	(570 /	(410)	(590 /	(440)				
Total			(9,880 /	7,670)	(20,910 /	18,680)	(6,290 /	4,500)	(6,450 /	4,810)				
(2) Gross Production Value	Description	Unit	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)
Main product			6,607	3.25	21,470	3,259	13.00	42,370	14,841	1.20	17,810	14,259	1.40	19,960
By-product			715	3.25	2,320			0			0			0
Total					23,790			42,370			17,810			19,960
(3) Unit Net Production Value	(2) - (1)	(STW/LLP)	(13,910 /	(16,120)	(21,460 /	(23,680)	(11,520 /	(13,310)	(13,510 /	(15,120)				

With Project Condition / Irrigated												
(1) Production Cost	Description	Unit	Spices (Onion)			Vegetable						
			Price (Tk/Unit)	Ramunt (unit/ha)	Value (Tk/ha)	Price (Tk/Unit)	Ramunt (unit/ha)	Value (Tk/ha)				
Labour	day	19.79	91	1,800	19.79	152	3,010					
Draft animal	day	37.66	21	790	37.66	24	900					
Seed	kg	15.34	600	9,200	148.84	6	890					
Urea	kg	5.54	69	380	5.54	166	920					
TSP	kg	5.68	80	450	5.68	102	580					
MP	kg	4.42	71	310	4.42	68	300					
Pesticide	kg	146.00	0	0	146.00	0.25	40					
Irrigation cost (STW/LLP)			(2,360 /	(910)	(2,360 /	(910)						
Miscellaneous (STW/LLP)	10%		(1,530 /	(1,380)	(900 /	(760)						
Total			(16,820 /	15,260)	(9,900 /	8,310)						
(2) Gross Production Value	Description	Unit	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)	Price (Tk/ton)	Yield (ton/ha)	Value (Tk/ha)				
Main product			10,227	5.70	58,290	2,615	10.60	27,720				
By-product					0		0					
Total					58,290			27,720				
(3) Unit Net Production Value	(2) - (1)	(STW/LLP)	(41,470 /	(43,070)	(17,820 /	(19,410)						

Table XIV.3.4 Project Impact Analysis on Income Distribution (1/4)
- F0 Area -

(1) Without Project Condition / Raifed							
Item	Unit	Household Classification by Land Holding					Total
		Landless	Small	Medium	Large	Very Large	
- Cultivable owned land	ha	0.02	0.38	0.94	2.44	4.77	0.43
- Net operated land	ha	0.04	0.40	0.92	2.26	3.83	0.42
I. Income	Tk						
1) Agriculture		4,460	15,000	32,520	78,510	131,940	16,710
Crops		1,370	13,660	31,410	77,160	130,760	14,340
Others		380	490	950	1,350	1,180	540
Casual farm wage		2,710	850	160	0	0	1,830
2) Non-Agriculture		4,550	3,660	5,590	11,530	33,240	4,260
Non-farm wage		2,670	1,600	2,620	5,820	16,380	2,300
Others		1,880	2,060	2,970	5,710	16,860	1,960
3) Total Income		9,010	18,660	38,110	90,040	165,180	20,970
II. Expenditure	Tk						
1) Agriculture		330	3,290	7,560	18,580	31,480	3,450
2) Others		8,480	8,510	12,560	22,110	42,550	10,440
3) Total Expenditure		8,810	11,800	20,120	40,690	74,030	13,890
III. Balance	Tk	200	6,860	17,990	49,350	91,150	7,080
(2) With Project Condition / Irrigated							
Item	Unit	Household Classification by Land Holding					Total
		Landless	Small	Medium	Large	Very Large	
I. Income	Tk						
1) Agriculture		6,700	33,420	74,880	182,580	308,310	36,050
Crops		3,210	32,080	73,770	181,230	307,130	33,680
Others		380	490	950	1,350	1,180	540
Casual farm wage		3,110	850	160	0	0	1,830
2) Non-Agriculture		5,150	3,660	5,590	11,530	33,240	4,260
Non-farm wage		3,270	1,600	2,620	5,820	16,380	2,300
Others		1,880	2,060	2,970	5,710	16,860	1,960
3) Total Income		11,850	37,080	80,470	194,110	341,550	40,310
II. Expenditure	Tk						
1) Agriculture							
Surface water irrigation		780	7,810	17,960	44,120	74,760	8,200
STW irrigation		1,080	10,840	24,930	61,250	103,790	11,380
2) Others		9,170	13,830	25,450	55,340	101,110	15,990
3) Total Expenditure							
Surface water irrigation		9,950	21,640	43,410	99,460	175,870	24,190
STW irrigation		10,250	24,670	50,380	116,590	204,900	27,370
III. Balance	Tk						
Surface water irrigation		1,900	15,440	37,060	94,650	165,680	16,120
STW irrigation		1,600	12,410	30,090	77,520	136,650	12,940
(3) Incremental Net Income							
Item	Unit	Household Classification by Land Holding					Total
		Landless	Small	Medium	Large	Very Large	
(1) Without Condition	Tk	200	6,860	17,990	49,350	91,150	7,080
(2) With Condition	Tk						
Surface water irrigation		1,900	15,440	37,060	94,650	165,680	16,120
STW irrigation		1,600	12,410	30,090	77,520	136,650	12,940
(3) Increment	Tk						
Surface water irrigation		1,700	8,580	19,070	45,300	74,530	9,040
STW irrigation		1,400	5,550	12,100	28,170	45,500	5,860

Table XIV.3.4 Project Impact Analysis on Income Distribution (2/4)
- F1 Area -

(1) Without Project Condition / Raifed							
Item	Unit	Household Classification by Land Holding					Total
		Landless	Small	Medium	Large	Very Large	
- Cultivable owned land	ha	0.02	0.27	0.81	2.03	3.78	0.38
- Net operated land	ha	0.05	0.26	0.76	1.74	3.30	0.36
I. Income	Tk						
1) Agriculture		4,550	8,920	23,270	52,090	97,410	12,870
Crops		1,460	7,580	22,160	50,740	96,230	10,500
Others		380	490	950	1,350	1,180	540
Casual farm wage		2,710	850	160	0	0	1,830
2) Non-Agriculture		4,550	3,660	5,590	11,530	33,240	4,260
Non-farm wage		2,670	1,600	2,620	5,820	16,380	2,300
Others		1,880	2,060	2,970	5,710	16,860	1,960
3) Total Income		9,100	12,580	28,860	63,620	130,650	17,130
II. Expenditure	Tk						
1) Agriculture		350	1,820	5,330	12,200	23,130	2,520
2) Others		8,480	8,510	12,560	22,110	42,550	10,440
3) Total Expenditure		8,830	10,330	17,890	34,310	65,680	12,960
III. Balance	Tk	270	2,250	10,970	29,310	64,970	4,170
(2) With Project Condition / Irrigated							
Item	Unit	Household Classification by Land Holding					Total
		Landless	Small	Medium	Large	Very Large	
I. Income	Tk						
1) Agriculture		6,760	18,350	50,840	115,210	217,130	25,930
Crops		3,270	17,010	49,730	113,860	215,950	23,560
Others		380	490	950	1,350	1,180	540
Casual farm wage		3,110	850	160	0	0	1,830
2) Non-Agriculture		5,150	3,660	5,590	11,530	33,240	4,260
Non-farm wage		3,270	1,600	2,620	5,820	16,380	2,300
Others		1,880	2,060	2,970	5,710	16,860	1,960
3) Total Income		11,910	22,010	56,430	126,740	250,370	30,190
II. Expenditure	Tk						
1) Agriculture							
Surface water irrigation		830	4,330	12,660	28,990	54,980	6,000
STW irrigation		1,050	5,440	15,910	36,440	69,100	7,540
2) Others		9,190	10,930	20,950	42,570	84,170	14,100
3) Total Expenditure							
Surface water irrigation		10,020	15,260	33,610	71,560	139,150	20,100
STW irrigation		10,240	16,370	36,860	79,010	153,270	21,640
III. Balance	Tk						
Surface water irrigation		1,890	6,750	22,820	55,180	111,220	10,090
STW irrigation		1,670	5,640	19,570	47,730	97,100	8,550
(3) Incremental Net Income							
Item	Unit	Household Classification by Land Holding					Total
		Landless	Small	Medium	Large	Very Large	
(1) Without Condition	Tk	270	2,250	10,970	29,310	64,970	4,170
(2) With Condition	Tk						
Surface water irrigation		1,890	6,750	22,820	55,180	111,220	10,090
STW irrigation		1,670	5,640	19,570	47,730	97,100	8,550
(3) Increment	Tk						
Surface water irrigation		1,620	4,500	11,850	25,870	46,250	5,920
STW irrigation		1,400	3,390	8,600	18,420	32,130	4,380

Table XIV.3.4 Project Impact Analysis on Income Distribution (3/4)
- F2&3 Area -

(1) Without Project Condition / Raifed							
Item	Unit	Household Classification by Land Holding					Total
		Landless	Small	Medium	Large	Very Large	
- Cultivable owned land	ha	0.03	0.25	1.06	2.00	4.53	0.46
- Net operated land	ha	0.03	0.24	0.97	1.71	3.56	0.36
I. Income	Tk						
1) Agriculture		3,610	5,460	17,760	30,710	62,310	8,550
Crops		520	4,120	16,650	29,360	61,130	6,180
Others		380	490	950	1,350	1,180	540
Casual farm wage		2,710	850	160	0	0	1,830
2) Non-Agriculture		4,550	3,660	5,590	11,530	33,240	4,260
Non-farm wage		2,670	1,600	2,620	5,820	16,380	2,300
Others		1,880	2,060	2,970	5,710	16,860	1,960
3) Total Income		8,160	9,120	23,350	42,240	95,550	12,810
II. Expenditure	Tk						
1) Agriculture		120	980	3,950	6,960	14,490	1,470
2) Others		7,980	8,010	12,560	22,110	42,550	10,440
3) Total Expenditure		8,100	8,990	16,510	29,070	57,040	11,910
III. Balance	Tk	60	130	6,840	13,170	38,510	900

(2) With Project Condition / Irrigated							
Item	Unit	Household Classification by Land Holding					Total
		Landless	Small	Medium	Large	Very Large	
I. Income	Tk						
1) Agriculture		5,050	13,820	51,550	90,270	186,300	21,090
Crops		1,560	12,480	50,440	88,920	185,120	18,720
Others		380	490	950	1,350	1,180	540
Casual farm wage		3,110	850	160	0	0	1,830
2) Non-Agriculture		4,150	3,660	5,590	11,530	33,240	4,260
Non-farm wage		2,270	1,600	2,620	5,820	16,380	2,300
Others		1,880	2,060	2,970	5,710	16,860	1,960
3) Total Income		9,200	17,480	57,140	101,800	219,540	25,350
II. Expenditure	Tk						
1) Agriculture							
Surface water irrigation		410	3,270	13,230	23,320	48,560	4,910
STW irrigation		550	4,370	17,660	31,140	64,830	6,560
2) Others		8,220	9,870	21,970	39,020	76,200	13,440
3) Total Expenditure							
Surface water irrigation		8,630	13,140	35,200	62,340	124,760	18,350
STW irrigation		8,770	14,240	39,630	70,160	141,030	20,000
III. Balance	Tk						
Surface water irrigation		570	4,340	21,940	39,460	94,780	7,000
STW irrigation		430	3,240	17,510	31,640	78,510	5,350

(3) Incremental Net Income							
Item	Unit	Household Classification by Land Holding					Total
		Landless	Small	Medium	Large	Very Large	
(1) Without Condition	Tk	60	130	6,840	13,170	38,510	900
(2) With Condition	Tk						
Surface water irrigation		570	4,340	21,940	39,460	94,780	7,000
STW irrigation		430	3,240	17,510	31,640	78,510	5,350
(3) Increment	Tk						
Surface water irrigation		510	4,210	15,100	26,290	56,270	6,100
STW irrigation		370	3,110	10,670	18,470	40,000	4,450

Table XIV.3.4 Project Impact Analysis on Income Distribution (4/4)
- Total Area -

(1) Without Project Condition / Raifed							
Item	Unit	Household Classification by Land Holding					Total
		Landless	Small	Medium	Large	Very Large	
- Cultivable owned land	ha	0.02	0.31	0.90	2.19	4.28	0.42
- Net operated land	ha	0.04	0.31	0.86	1.95	3.56	0.38
I. Income	Tk						
1) Agriculture		4,300	10,690	27,060	60,180	108,590	13,830
Crops		1,210	9,350	25,950	58,830	107,410	11,460
Others		380	490	950	1,350	1,180	540
Casual farm wage		2,710	850	160	0	0	1,830
2) Non-Agriculture		4,550	3,660	5,590	11,530	33,240	4,260
Non-farm wage		2,670	1,600	2,620	5,820	16,380	2,300
Others		1,880	2,060	2,970	5,710	16,860	1,960
3) Total Income		8,850	14,350	32,650	71,710	141,830	18,090
II. Expenditure	Tk						
1) Agriculture		290	2,240	6,200	14,060	25,670	2,740
2) Others		8,310	8,340	12,560	22,110	42,550	10,440
3) Total Expenditure		8,600	10,580	18,760	36,170	68,220	13,180
III. Balance	Tk	250	3,770	13,890	35,540	73,610	4,910
(2) With Project Condition / Irrigated							
Item	Unit	Household Classification by Land Holding					Total
		Landless	Small	Medium	Large	Very Large	
I. Income	Tk						
1) Agriculture		6,080	21,400	56,750	127,520	231,510	26,960
Crops		2,590	20,060	55,640	126,170	230,330	24,590
Others		380	490	950	1,350	1,180	540
Casual farm wage		3,110	850	160	0	0	1,830
2) Non-Agriculture		4,820	3,660	5,590	11,530	33,240	4,260
Non-farm wage		2,940	1,600	2,620	5,820	16,380	2,300
Others		1,880	2,060	2,970	5,710	16,860	1,960
3) Total Income		10,900	25,060	62,340	139,050	264,750	31,220
II. Expenditure	Tk						
1) Agriculture							
Surface water irrigation		680	5,250	14,570	33,030	60,310	6,440
STW irrigation		890	6,930	19,230	43,600	79,600	8,500
2) Others		8,820	10,350	20,200	38,980	76,770	13,390
3) Total Expenditure							
Surface water irrigation		9,500	15,600	34,770	72,010	137,080	19,830
STW irrigation		9,710	17,280	39,430	82,580	156,370	21,890
III. Balance	Tk						
Surface water irrigation		1,400	9,460	27,570	67,040	127,670	11,390
STW irrigation		1,190	7,780	22,910	56,470	108,380	9,330
(3) Incremental Net Income							
Item	Unit	Household Classification by Land Holding					Total
		Landless	Small	Medium	Large	Very Large	
(1) Without Condition	Tk	250	3,770	13,890	35,540	73,610	4,910
(2) With Condition	Tk						
Surface water irrigation		1,400	9,460	27,570	67,040	127,670	11,390
STW irrigation		1,190	7,780	22,910	56,470	108,380	9,330
(3) Increment	Tk						
Surface water irrigation		1,150	5,690	13,680	31,500	54,060	6,480
STW irrigation		940	4,010	9,020	20,930	34,770	4,420

Table XIV.3.5 Assessment of Capacity to Pay for Water Charge

(1) Cost Estimation for Repayment and O&M

Item	Unit	Head Works	Main Canal	Total
I. Construction Cost	Tk'000	120,835	325,488	446,323
II. Repayment Condition for Construction Cost				
1. Repayment period	year	30	30	30
2. Annual interest rate	%/year	16	16	16
3. Annual repayment amount	Tk'000/year	19,561	52,692	72,253
III. Annual O & M Cost	Tk'000/year	30	2,077	2,107
V. Total Annual Cost (II & III)	Tk'000/year	19,591	54,769	74,360
IV. Unit Cost per Ha (For 18,200ha)				
1. Annual O & M Cost	Tk/year/ha	2	114	116
2. Repayment Cost		1,075	2,895	3,970
3. Total		1,077	3,009	4,086

(2) Assessment of Capacity to Pay

Item / Flooded Condition	Unit	Household Classification by Land Holding					Total
		Landless	Small	Medium	Large	Very Large	
I. Average Net Operated Land							
F0	ha	0.04	0.40	0.92	2.26	3.83	0.42
F1		0.05	0.26	0.76	1.74	3.30	0.36
F2&3		0.03	0.24	0.97	1.71	3.56	0.36
Total		0.04	0.31	0.86	1.95	3.56	0.38
II. Incremental Net Reserve under With Project Condition							
F0	Tk	1,700	8,580	19,070	45,300	74,530	9,040
F1		1,620	4,500	11,850	25,870	46,250	5,920
F2&3		510	4,210	15,100	26,290	56,270	6,100
Total		1,150	5,690	13,680	31,500	54,060	6,480
III. Annual Water Charge Required							
1. O&M Cost							
F0	Tk	5	46	107	262	444	49
F1		6	30	88	202	383	42
F2&3		3	28	113	198	413	42
Total		5	36	100	226	413	44
2. Repayment for Construction							
F0		160	1,590	3,650	8,970	15,210	1,670
F1		200	1,030	3,020	6,910	13,100	1,430
F2&3		120	950	3,850	6,790	14,130	1,430
Total		160	1,230	3,410	7,740	14,130	1,510
3. Total							
F0		165	1,636	3,757	9,232	15,654	1,719
F1		206	1,060	3,108	7,112	13,483	1,472
F2&3		123	978	3,963	6,988	14,543	1,472
Total		165	1,266	3,510	7,966	14,543	1,554
4. Share of Total Water Charge to Incremental Net Reserve							
F0	%	10	19	20	20	21	19
F1		13	24	26	27	29	25
F2&3		24	23	26	27	26	24
Total		14	22	26	25	27	24

Table X.IV.4.1 Estimation of Employment Increase under With Project Condition

(1) Agricultural Employment

Item	Area		Labour Requirement (day/year)				Balance
	Harvest (ha)		Per ha (day)		Total ('000 day)		
	Without	With	Without	With	Without	With	
I. Crop Production							
B/LT Aus	3,400	0	140	0	476	0	-476
HYV Aus	15,200	9,600	170	210	2,584	2,016	-568
LT Aman	4,900	6,000	138	153	676	918	242
HYV Aman	22,000	12,000	180	214	3,960	2,568	-1,392
LT Boro	800	0	162	0	130	0	-130
HYV Boro	10,100	10,400	219	234	2,212	2,434	222
Jute	3,500	9,000	218	0	763	0	-763
Sugarcane	1,500	0	86	0	129	0	-129
Wheat	2,900	8,400	94	135	273	1,134	861
Oil seed	1,100	4,600	77	97	85	446	361
Pulses	900	3,000	61	80	55	240	185
Potatoes	1,000	9,700	190	209	190	2,027	1,837
Spices	500	3,400	153	175	77	595	518
Vegetables	500	3,400	292	345	146	1,173	1,027
sub-total	68,300	79,500	-	-	11,756	13,551	1,795
II. Fish Culture							
	460	460	150	200	69	92	23
III. Total							
	-	-	-	-	-	-	1,818

(2) Construction and O&M Employment ('000 day/year)

Year	Surface Water Irrigation						STW	Total Irrigation
	Head Works	Main Channel	2nd Channel	LLP	Demo. Farm	Total		
1	0	0	0	0	0	0	0	0
2	0	0	0	0	4	4	0	4
3	809	593	223	140	6	1,771	57	1,828
4	0	593	223	140	0	956	58	1,014
5	0	368	223	140	0	731	57	788
6	0	373	223	140	0	736	58	794
7	0	597	223	140	5	965	57	1,022
8	0	597	224	141	0	962	58	1,020
9	0	632	224	141	0	997	58	1,055
10	0	0	224	141	0	365	58	423
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
Total	809	3,753	1,787	1,123	15	7,487	461	7,948

Year	Drainage Improvement	Flood Control	Rural Infra-structure	Total Construction	O&M Employment	Total
1	0	0	0	0	0	0
2	0	0	0	4	0	4
3	55	20	135	2,038	0	2,038
4	109	52	135	1,310	10	1,320
5	0	0	135	923	18	941
6	0	0	135	929	25	954
7	116	0	135	1,273	34	1,307
8	78	0	135	1,233	43	1,276
9	216	0	135	1,406	57	1,463
10	0	30	68	521	93	614
11	0	0	0	0	120	120
12	0	0	0	0	120	120
Total	574	102	1,013	9,637	520	10,157

APPENDIX - XV

***ENVIRONMENTAL
IMPACT ASSESSMENT
(EIA)***

**FEASIBILITY STUDY ON
KURIGRAM IRRIGATION AND FLOOD CONTROL PROJECT (SOUTH UNIT)**

APPENDIX-XV ENVIRONMENTAL IMPACT ASSESSMENT

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APPENDIX-XV ENVIRONMENTAL IMPACT ASSESSMENT

1. Introduction

1.1 Background

The present volume reports the findings of the Environmental Impact Assessment (EIA) survey carried out during December 16, 1991 - July 16, 1992 (Phase I) and July 17, 1992 - November 15, 1992 (Phase II) as part of the requirements for the Feasibility Study on the Kurigram Irrigation & flood Control Project - South Unit. The main objective of the feasibility study is to formulate the irrigation and drainage development and flood control plan in the Kurigram South Unit for the increase and improvement of agricultural production. The study area covers about 70,000 ha spread over five upazilas of Kurigram, Rajarhat, Ulipur, Chilmari and Lalmonirhat. The boundaries of the project area are provided by the Brahmaputra river (Jamuna) on the east, the Dharala river on the northeast, the Teesta river on the southwest and the railway line on the west.

The original feasibility study of this project (1969/71) was revised and updated in 1975. FCD interventions in the area were started in 1973 and a total of 108 km long embankments were completed in 1983/84, along with 11 drainage sluices. The feasibility study was again revised in 1982 and at various stages several options were recommended for irrigation, viz., groundwater use through tubewells, barrage on Dharala, pumping plant as well as gravity drainage sluices in place of drainage pumps.

In accordance with the mandatory requirement for environmental impact assessment (EIA) of any FCD/I project, the present environmental survey of the project area was initiated. The guidelines and frameworks used in this survey included those from FPCO (FAP 16), World Bank and the Department of Environment, Government of Bangladesh. Concurrently, the feasibility studies of the Kurigram project, prepared in 1971 and revised in 1975 and 1982 were reviewed to identify the environmental issues related to various FCD/I alternatives. The FAP16 EIA guidelines provide the most comprehensive methodology for environmental impact assessment of FCD/I projects. The present survey essentially followed these guidelines. The following section of this introduction attempts to provide a summary of the FAP16 EIA guidelines.

Environmental Impact Study (FAP 16) : The major objective of the FAP 16 study was to formulate EIA guidelines for FCD/I projects being taken up in the country. In Addition it also aimed to carry out a number of special EIA studies in selected regions of Bangladesh. The EIA guidelines as issued by the FAP16 study aims to identify and quantify the environmental impacts of proposed FCD/I plans, programs and projects. It also includes an assessment of the social effects of proposed projects, particularly as they relate to environmental resources and the participation of local groups in identifying impacts, assessing their significance and formulating social strategies to mitigate or enhance impacts. The guidelines call for EIA at both prefeasibility and feasibility stages.

The prefeasibility assessment would address broader regional planning options for water resource development. The aim is to assess regional resources and the effects of past interventions, examine the likely interventions and their environmental linkages and interactions, establish the range and potential magnitude of impacts, identify the key regional environmental issues and compare the environmental consequences of project alternatives. At the feasibility level the EIA would include detailed impact assessment of selected project options, mitigation planning to reduce biophysical and social impacts, establishing monitoring programmes and provide ways for people's participation in project construction, operation and maintenance.

In accordance with the above guidelines In two phases the current environment survey activities included, (a) collection of detailed environmental baseline data from the field and from secondary sources; (b) collection and evaluation of information on environmental impact of the current and proposed project activities from the project beneficiaries and (c) formulation of environmental monitoring and management proposals.

1.2 Objectives of the Study

The main objectives of the current survey were to assess the potential impacts from the proposed FCD/I interventions in the project area and identify the major environmental issues.

1.3 Methodology

Data Sources: The information for the survey came from both primary and secondary sources. All relevant published information on the physical and cultural environment of the project area have been surveyed to prepare a baseline environmental profile of the study area following the guidelines and framework suggested by FPCO (Fap 16), the World Bank and the Department of Environment, Government of Bangladesh. Substantial information for the environmental profile came from the several separate surveys done for the current feasibility report. Especially valuable among these are the Fisheries Survey, Soil & Land Use Survey, Socio-economic Baseline Survey and the Public Consultation Survey.

Household Questionnaire & Key Informant Survey: The information on the environmental impacts at the household level came from three detailed field visits to the households in the study area. The first and second of these visits each lasted a week and was used for rapid appraisal of the environmental conditions and interviewing the key informants. The third and the last survey conducted for two weeks in September 1992 involved a detailed questionnaire survey and additional key informant surveys. Sixty head of households spread over different locations in the project area were interviewed. To collect information on the impact of project activities outside the project area several households outside the project were also interviewed.

Check List: The potential sectors of negative effects of the proposed FCD/I measures were identified during the first two visits to the field. In order to prepare the checklist of such negative impacts, the probable impacts from FCD/I interventions listed by the World Bank were used as guidelines. A total of 40 items or sectors from the World Bank list was used and scrutinized in the field to test their applicability and relevance in the project area for conducting EIA. After making rapid appraisal of the conditions in the project area 22 sectors of potential negative impacts were retained in the checklist for assessment. A list of the impacts excluded is provided in appendix 1. These were finally excluded as they were unrelated to the selected alternative FCD/I proposals.

The breakdown of the checklist encompassed interacting systems reflecting both organic and inorganic environment, viz., physical biological, socio-economic and quality of life. For each item or sector on the checklist, its significance, magnitude, scale duration, multiplier effects and reversibility were evaluated. Special attention was given to (a) the significance of the impact (i.e., if the impact is of short term or long term in nature) and (b) the magnitude of the impact (i.e., if the impact is reversible or not).

In evaluating each item on the checklist, four categories were accordingly used to indicate the level of probable environmental impact, i.e., a 4 - point scale was used to rank the impact level. The four rankings are as follows (with their better symbols in parentheses) :

None (N) Low (L) Moderate (M) and High (H)

The above ranks were defined, for operational purposes as:

None : the impact is nil or negligible and does not warrant any special emphasis;

Low : the impact can be identified, but of low magnitude and significance; however, it deserves to be considered adequately for mitigation and/or prevention of greater stress at later periods;

Moderate : the impact might affect a small segment of population or area, but it is of sufficient significance and magnitude to warrant adequate planning for mitigation measures;

High : the impact is severe or critical, and the proposed project actions should be reassessed and/or special priority is required for mitigation measures.

2. Environmental Baseline Description of the Project Area

2.1 Climate

The project area lies above the northern tropics and the area's climate is of sub tropical type with special characteristics derived from its physical configuration, the proximity of the Himalayas and the Garo hills and the Monsoon rainfall. The whole project area is a vast alluvial plain well watered by river and generally covered with vegetation. None of the conditions that give rise to rapid and marked variations in temperature, daily or seasonal are present. On the other hand numerous swamps and marshes and the absorbent properties of the soil lead to the accumulation of much water. The percentage of humidity stands at a high figure long after the rains have ceased, and plant growth is lush and luxuriant throughout the year. Dews and mists are experienced in the cold weather.

December, January and February are usually cold & dry but the mornings and evenings are misty. Ordinarily there are only one or two wet days during the end of December, and this probably accounts for the average humidity of the atmosphere in January. March and April are the hot months, but storms and showers often help to temper the heat. The west winds blowing across the perched plains of Dinajpur make March the least humid month of the year. May is a period of transition. June July August and September are the months of rain, every other day being wet. The weather is steamy and relaxing in August. October and November are transition months: the rains come to an end, the winds veer to the north and the temperature and humidity decrease rapidly.

Maximum temperature varies from about 24 to 34 degrees Celcius, minimum is 10 to 26 degrees Celcius and mean temperatures range between about 17 to 29 degrees Celcius. The humidity is high throughout the year with average humidity varying from 71 to 87 percent. The sunshine hours of average monthly range between from 4.1 to 5.5 hours/day during the monsoon season and from 6.5 to 8.5 hrs/day during dry season. Wind speeds are relatively low except during the premonsoon and monsoon periods when the average wind speed of monthly are from 1.2 to 1.8m/sec. Maximum evaporation of average monthly range between from 2.3 to 6.0 mm/day and annual mean is 4.1 mm/day.

2.2 Physiography Landform & Soils

The project area bounded on the north east and the east by the river Dharala and Brahmaputra respectively and on the west and south-west by the Kaonia-Lalmonirhat railway track and the river Teesta respectively represent a single physiographic unit with a uniform general north-west to south-east slope. The whole area can apparently be divided into three more or less equal sub units based on height from the sea level and drainage characteristics. The northern third of the area (roughly to the north of Kurigram-Rangpur Road) represent the higher grounds. The area south of this road upto Ulipur represent intermediate grounds and the area south of this region represent lower grounds. While overall the whole region represent a single environmental unit, important differences between these sub units will result in environmental impact of different types and intensities.

The most of the study area physiographically extends on the lower Teesta flood plain and is geologically underlain by alluvium which have formed by the interstream and meander deposits of the Teesta, Brahmaputra and Dharala rivers. The alluvium consists of silty materials in the upper most portion, fine sand, fine to medium sand and medium to coarse sand in the deeper portion. Soil survey conducted by Directorate of Soil Survey, Government of Bangladesh, in 1968/69 identified 10 soil associations in the study area. These are again specifically defined as combinations of different soil series. The soils of the study area have been classified into 12 soil series. These are (1) Amgaon, (2) Bonarpara, (3) Chilmari, (4)