

**APPENDIX VI**

**IRRIGATION**



APPENDIX VI

IRRIGATION

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## 1. Present Irrigation Condition

A spot interview survey on some DTW, STW and LLP irrigation schemes on operation was conducted and the output of this survey is summarized in Table VI-1 and VI-2.

The location of the existing DTWs, STWs and LLPs in the Project area are shown in Fig. VI-1.

## 2. Irrigation Plan

### 2-1. Irrigation Area

Based on survey results, the present land use in the Study area is given in Table VI-3. It is proposed that the area for each type of land use will remain unchanged and the whole area of cultivated land will be irrigated in the "will project part".

Table VI-3. Net Irrigable Area

Land Use	Area(ha)	(%)
Gross area	42,800	100
Settlements	5,290	12.3
Grass land	350	0.8
Charland	120	0.3
Water bodies	1,180	2.8
Rivers & bills etc.	760	1.8
Cultivated land	35,100	82.0
Right of Way	2,300	5.4
Net Irrigable Area	32,800	76.6

Table VI-1 Results from Spot Interview Survey on D.T.W

Upazila	Kurigram	Kurigram	Nageswari	Fulbari	Fulbari	Fulbari	Bhuranga- mari	Bhuranga- mari
Union	Bhogdanga	Ghogadah	Nageswari	Kashipur	Kashipur	Kashipur	Andhari- jhar	Andhari- jhar
Village	Parmali	Purba Komor	Kamarpara	Kashipur	Kashipur	Kashipur	Khamar Ar- dhari jhar	Khamar Ar- dhari jhar
Setting date	1978.	1978.2.	1978.2.	1978.11.	1978.11.	1978.11.	1979.11.	1983.3.
Command area	32.4 ha	32.4 ha	32.4 ha	32.4 ha	32.4 ha	32.4 ha	41.5 ha	41.5 ha
Actual								
Irrigated area	28.3 ha	24.9 ha	29.1 ha	29.1 ha	37.4 ha	37.4 ha	35.3 ha	29.1 ha
Number of	92 Nos	80 Nos	59 Nos	85 Nos	125 Nos	125 Nos	55 Nos	130 Nos
Beneficiaries								
Pump Head	4.88 m	4.11 m	3.96 m	3.96 m	3.96 m	3.96 m	5.18 m	4.57 m
Pump	2.0 ft <sup>3</sup> /s	2.0 ft <sup>3</sup> /s	1.9 ft <sup>3</sup> /s	1.9 ft <sup>3</sup> /s	1.9 ft <sup>3</sup> /s	1.9 ft <sup>3</sup> /s	1.9 ft <sup>3</sup> /s	2.0 ft <sup>3</sup> /s
Discharge								
Type	Turbin	Turbin	Turbin	Turbin	Turbin	Turbin	Turbin	Turbin
Size	8"dia	6"dia	8"dia	8"dia	8"dia	8"dia	8"dia	8"dia
Power	21.0 HP	21.0 HP	20.0 HP	21.5 HP	21.5 HP	21.5 HP	25.0 HP	21.5 HP
Operation	1,080 hr	1,855 hr	1,122.5r	981 hr	1,740 hr	1,740 hr	1,636 hr	1,824 hr
Hours								
Aquifer (dry)	4.88 m	4.11 m	3.96 m	3.96 m	3.96 m	3.96 m	5.18 m	4.57 m
Position (wet)	2.00 m	2.29 m	2.44 m	2.20 m	2.13 m	2.13 m	2.75 m	2.74 m
Draw Down	—	4.57 m	1.50 m	1.10 m	1.50 m	1.50 m	3.60 m	2.74 m
Invest. Cost	0.5 M TK	0.5 M TK	0.5 M TK	0.5 M TK	0.5 M TK	0.5 M TK	0.5 M TK	0.5 M TK
Gov. Subsidy	0.325 M TK	0.325 M TK	0.325 M TK	0.325 M TK	0.325 M TK	0.325 M TK	0.325 M TK	0.325 M TK
Irrigation								
Canal (lined)	—	190 m	122 m	Nil	200 m	200 m	120 m	120 m
(unlined)	—	1,830 m	1,829 m	2,439 m	2,700 m	2,700 m	3,000 m	3,000 m
Const. Cost	0.5 M TK	0.5 M TK	0.5 M TK	0.5 M TK	0.5 M TK	0.5 M TK	0.5 M TK	0.5 M TK
Pump&well	—	316 TK/m	220 TK/m	—	250 TK/m	250 TK/m	—	450 TK/m
Canal (lined)	—	3.50 TK/m	2.50 TK/m	1.20 TK/m	2.25 TK/m	2.25 TK/m	3.75 TK/m	4.50 TK/m
(unlined)	—	1.75 TK/m	2.25 TK/m	1.00 TK/m	2.62 TK/m	2.62 TK/m	1.20 TK/m	1.20 TK/m
Maint. Cost	—	—	—	—	—	—	—	—
of Canal	—	—	—	—	—	—	—	—

Table VI-2 Average Irrigated Area for DTW, STW and LLP

## DTW

Upazila	No. of DTW Visited	Total Discharge (cusec)	Total Area (acre)	Discharge per DTW (cusec)	Coverage Area per DTW (acre)
Kurigram	17	34.0	1,001.00	2.0	58.822
Nageswari	46	92.0	2,039.67	2.0	44.341
Fulbari	14	28.0	918.34	2.0	65.596
Bhurangamari	5	10.0	231.00	2.0	46.200
Total	82	164.0	419.01	2.0	51.098

## STW

Upazila	No. of STW Visited	Total Discharge (cusec)	Total Area (acre)	Discharge per STW (cusec)	Coverage Area per STW (acre)
Kurigram	61	54.00	622.50	0.885	10.205
Nageswari	279	235.89	2,711.31	0.846	9.718
Fulbari	181	149.50	1,767.00	0.826	9.762
Bhurungamari	58	45.00	590.99	0.828	10.189
Total	579	486.64	5,691.80	0.842	9.830

## LLP

Upazila	No. of LLP Visited	Total Discharge (cusec)	Total Area (acre)	Discharge per LLP (cusec)	Coverage Area per LLP (acre)
Kurigram	5	8.25	131.00	1.650	26.200
Nageswari	16	29.50	531.50	1.844	33.219
Fulbari	6	12.00	197.00	2.000	32.833
Bhurungamari	4	5.50	39.00	1.375	9.750
Total	31	55.25	898.50	1.782	28.984

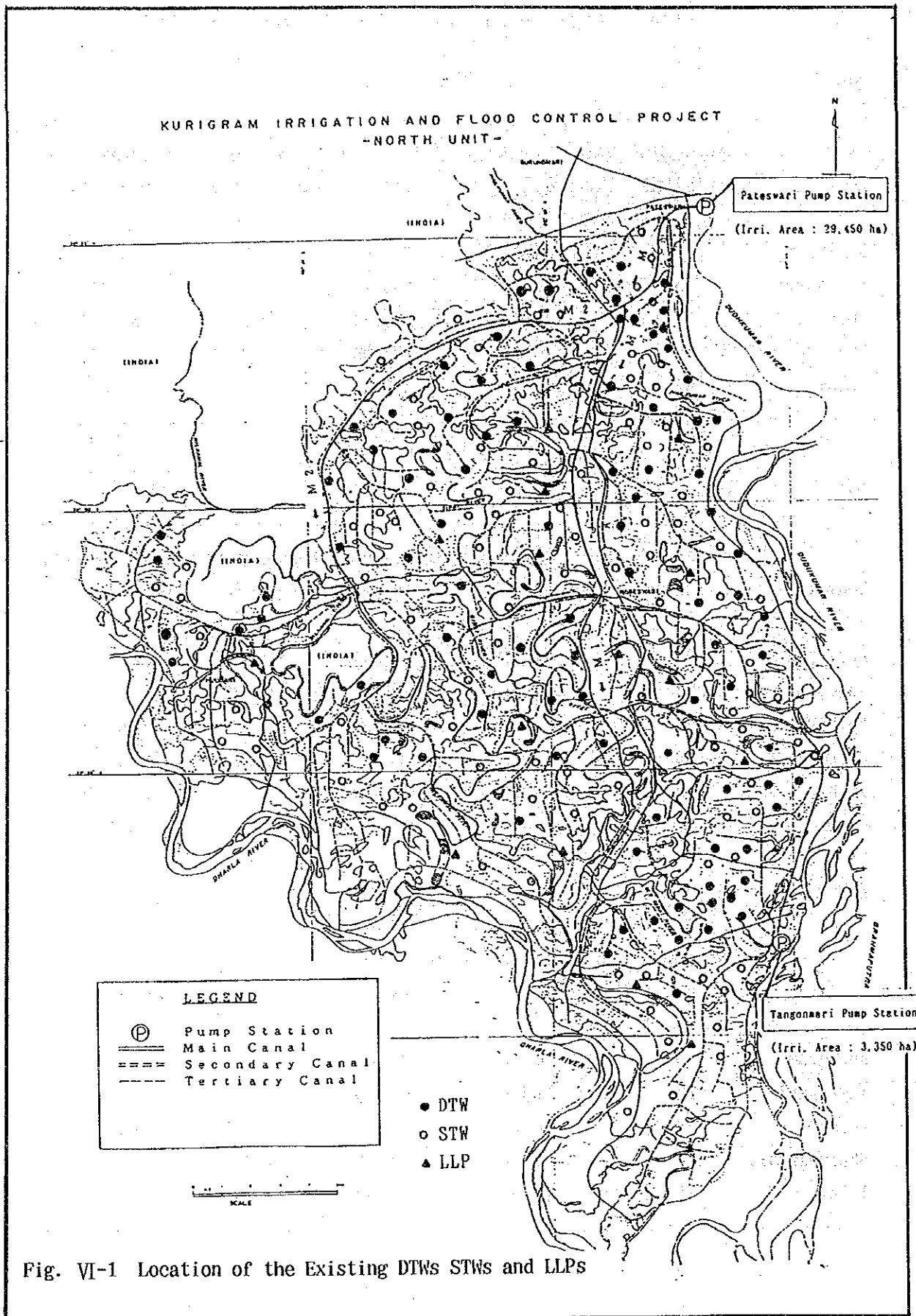


Fig. VI-1 Location of the Existing DTWs STWs and LLPs



## 2-2. Irrigation Water Requirements

### (1) Crop coefficient (Kc)

Kc values for respective crops are selected as shown in Table VI-4 and summarized as follows:

Crops	Kc Values
HYV. Boro	0.85 - 1.29
HYV. T. Aman	0.85 - 1.10
HYV. Wheat	0.45 - 1.15
HYV. Jute	0.60 - 1.15

### (2) Effective rainfall

Regarding the effective rainfall at the Bhrungamari and Kurigram rainfall stations, results are shown in Table VI-5.

### (3) Diversion water requirements

Table VI-6 and Fig. VI-2 show the diversion water requirements for the project computed for 10 years from 1979 to 1988.

## 2-3. Water Intake

Based on river conditions, water requirements and water conveyance system, the basic conditions for planning Pateswari and Tangonmari pump stations are presented in Table VI-7.

Table VI-7 Basic Condition for Planning Pump Stations

Item	Pateswari Pump Station	Tangonmari Pump Station	Total
Location	Pateswari	Tangonmari	
Command Area (ha)	29,450	3,350	32,800
Pump Discharge (m <sup>3</sup> /s)	42.78	4.87	47.65
Intake Water Level (m)	25.5	20.0	
Suction Water Level(m)	25.4	19.9	
Outlet Water Level (m)	33.5	27.3	
Actual Pump Head (m)	8.1	7.4	

The planning outline of these pump stations and intake works are given in Appendix VIII.

Table VI-4 Crop Coefficients (Kc) for Major Crops for 10-day Periods

Crop	P e r i o d s											
	1	2	3	4	5	6	7	8	9	10	11	12
B. Aus	0.46	0.57	0.74	0.94	1.07	1.10	1.10	1.10	1.05	0.95	0.85	
HYV Aus	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.05	0.95	0.85		
L. T. Aman	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.05	0.95	0.85
HYV Aman	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.05	0.95	0.85	
L. Boro	1.10	1.10	1.10	1.11	1.15	1.22	1.29	1.29	1.22	1.10	0.85	
HYV Boro	1.10	1.10	1.10	1.10	1.11	1.15	1.22	1.29	1.29	1.22	1.10	0.85
HYV Wheat	0.45	0.57	0.74	0.94	1.07	1.13	1.15	1.12	1.03	0.88	0.50	
Potato	0.40	0.50	0.85	1.09	1.15	1.15	1.12	1.05	0.80			
Pulse	0.46	0.61	0.85	1.04	1.10	1.11	1.10	1.01	0.70			
Mastard	0.46	0.65	0.92	1.13	1.15	1.15	1.12	1.03	0.80			

Source : MPO, Second Interim Report, Vol-VI, June, 1984.

Table VI-5 Effective Rainfall for 10-day Periods (Station : Bhrungamari)(1/2)

Year	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88
JAN	1	0	0	0	0	0	0	0	0.6	0
	2	0	0	0	0	0.4	0	0	0	0
	3	0	0	0	0	0	0	0	0	0
FEB	1	0	0	0	0	0	0.8	0	0	0
	2	0	0.8	1.3	0	0	0.9	0	0	0
	3	0	0	0	0	1.6	0	0	1.3	8.6
MAR	1	0	1.4	0	0	0	0	0	0	1.5
	2	0	0	1.5	1.5	0	0	0	5.2	0.6
	3	0	0	0.6	0.7	2.3	4.1	7.3	0	0
APR	1	0.6	0	4.3	1.2	0	2.1	0	0.7	2.6
	2	0.4	0.4	4.1	1.1	2.3	3.1	1.5	3.3	0
	3	0.6	1.0	4.1	6.6	8.7	12.2	4.9	14.5	7.1
MAY	1	2.8	11.4	11.6	3.0	2.4	8.3	1.1	5.3	14.9
	2	9.6	10.1	10.7	4.3	9.5	19.5	11.2	5.7	0.6
	3	1.1	7.1	5.3	4.8	7.1	21.1	8.7	1.5	15.3
JUN	1	1.0	12.0	0	19.6	18.9	12.5	19.3	19.8	7.5
	2	9.8	17.0	4.6	8.2	8.6	18.0	6.0	20.8	8.9
	3	1.3	0.4	11.6	12.6	5.9	4.4	6.9	26.8	40.3
JUL	1	7.0	1.3	5.0	23.2	17.5	15.3	24.2	17.3	24.2
	2	11.2	21.9	28.1	10.2	4.0	17.1	21.3	4.0	3.6
	3	25.4	11.5	12.9	9.6	29.4	39.1	24.0	12.8	31.3
AUG	1	0	6.4	5.0	16.8	1.1	5.4	0	6.3	24.4
	2	11.6	43.2	4.1	1.2	5.9	9.6	7.7	0.4	26.4
	3	18.0	14.4	13.7	10.8	27.6	7.4	11.6	14.6	5.3
SEP	1	17.9	5.0	6.7	8.8	7.7	14.6	13.7	11.7	7.9
	2	12.8	7.1	3.6	31.5	24.5	30.6	8.2	19.0	9.1
	3	8.3	14.8	3.2	13.1	12.6	0.4	12.0	10.0	13.4
OCT	1	15.7	0.8	0	0	3.8	14.3	0	17.3	0.8
	2	1.6	1.3	0	0	6.1	1.8	9.4	1.7	10.2
	3	0	0.6	0	5.9	0.8	1.8	0	0	1.0
NOV	1	0	0	0	0	0	0	0	1.3	0
	2	0	0	0	0	0	0	0	2.8	0
	3	1.4	0	0	0	0	0	0	0	0
DEC	1	0	0	0	0	0	0	0	0	0
	2	0	0	0.7	0	0	0.4	0	0.7	0
	3	0	0	0	0	2.2	0	1.1	0	0

Table VI-5 Effective Rainfall for 10-day Periods (Station : Kurigram) (2/2)

Year	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88
JAN	1	0	0	0.7	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0
FEB	1	0	0	0	0	0	0	0	0	0
	2	0	1.4	1.4	0	0	0	0.7	0	0
	3	0	0	0	0	2.2	0	0	3	5.9
MAR	1	0	2.1	0	0	0	0	0	0	1.0
	2	0	0	1.5	2.4	0	0	0	2.9	1.2
	3	0	0	0.6	0	3.0	0	1.6	0.6	0
APR	1	0	6.7	0.9	0	0	0	0	1.4	0
	2	0	0	2.7	1.6	0.5	1.2	2.6	1.6	0
	3	1.0	2.6	2.6	3.5	7.3	5.0	9.0	7.8	8.5
MAY	1	3.9	10.3	4.6	3.0	5.2	2.5	7.1	8.4	4.9
	2	0	14.7	20.3	7.8	13.0	12.0	14.7	7.1	0
	3	2.8	7.8	4.2	5.9	5.1	13.1	2.5	1.9	7.2
JUN	1	3.7	5.6	2.2	8.0	8.8	16.5	26.3	4.5	11.4
	2	13.7	12.5	0	15.2	15.3	23.6	9.1	12.0	4.7
	3	4.2	0	6.5	9.4	2.8	7.5	7.7	10.0	22.3
JUL	1	7.2	2.4	8.7	19.6	11.9	8.1	23.2	18.6	15.1
	2	20.9	21.3	17.6	2.6	8.4	19.1	2.4	4.9	3.2
	3	22.1	0.4	8.1	3.5	16.8	26.6	25.8	18.0	30.9
AUG	1	1.4	5.1	2.6	13.5	3.0	0	1.2	7.4	11.2
	2	12.0	8.7	12.6	1.2	0	5.2	9.1	1.5	19.2
	3	20.0	3.0	4.4	5.0	19.3	4.7	4.4	4.0	0.7
SEP	1	13.4	3.0	1.4	6.5	3.8	11.7	12.3	9.6	6.0
	2	9.3	7.8	8.9	41.5	15.8	26.5	5.4	16.4	6.8
	3	6.9	11.3	1.7	0	4.7	3.2	12.2	12.1	10.9
OCT	1	8.7	1.2	0	0	4.1	6.8	0	24.8	8.7
	2	3.6	0	0	0	9.4	1.8	5.8	2.3	9.9
	3	0	2.9	0	4.5	1.1	0.6	0	0	0
NOV	1	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0.4	0
	3	0	0	0	0	0	0	0	0	6.5
DEC	1	0	0	0	0	0	0	0	0	0
	2	0	0	1.7	0	0	0	0	1.0	0
	3	0	0	0	0	1.8	0	1.5	0	0

Table VI-6 Gross Irrigation Water Requirement at Pateswari Pump Station(1/10)  
and Tangonmari Pump Station

Year : 1979

Month	Total (A=32,800ha)			Pateswari ST(A=29,450ha)		Tangonmari ST(A=3,350ha)		
	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Gross Irri. Req. (mill m <sup>3</sup> )	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Gross Irri. Req. (mill m <sup>3</sup> )
JAN	1	25,660	17.18	23,040	15.43	2,620	1.75	
	2	28,280	23.29	25,390	20.91	2,890	2.38	
	3	30,760	26.49	27,620	23.78	3,140	2.71	6.1
FEB	1	30,490	33.51	27,380	30.09	3,110	3.42	
	2	26,700	27.71	23,970	24.88	2,730	2.83	
	3	23,560	25.71	21,150	23.08	2,410	2.63	7.2
MAR	1	23,360	28.75	20,970	25.81	2,390	2.94	
	2	23,730	28.88	21,310	25.93	2,420	2.95	
	3	23,530	28.26	21,130	25.37	2,400	2.89	7.8
APR	1	22,110	30.52	19,850	27.40	2,260	3.12	
	2	25,710	41.53	23,080	37.29	2,630	4.24	
	3	29,310	47.65	26,320	42.78	2,990	4.87	10.6
MAY	1	32,800	37.94	29,450	34.07	3,350	3.87	
	2	31,850	19.39	28,600	17.41	3,250	1.98	
	3	29,010	38.90	26,050	34.93	2,960	3.97	8.8
JUN	1	25,510	32.25	22,900	28.96	2,610	3.29	
	2	22,880	2.96	20,540	2.66	2,340	0.30	
	3	19,710	24.62	17,700	22.11	2,010	2.51	5.3
JUL	1	19,330	11.01	17,360	9.89	1,970	1.12	
	2	17,360	1.96	15,590	1.76	1,770	0.20	
	3	22,270	0	20,000	0	2,270	0	1.1
AUG	1	21,830	36.10	19,600	32.41	2,230	3.69	
	2	23,080	1.35	20,720	1.21	2,360	0.14	
	3	23,080	0	20,720	0	2,360	0	3.3
SEP	1	24,680	0	22,160	0	2,520	0	
	2	24,680	0.33	22,160	0.30	2,520	0.03	
	3	24,680	6.03	22,160	5.41	2,520	0.62	0.6
OCT	1	24,600	0.51	22,090	0.46	2,510	0.05	
	2	24,530	27.07	22,020	24.31	2,510	2.76	
	3	24,310	33.72	21,830	30.28	2,480	3.44	5.7
NOV	1	23,380	26.64	20,990	23.92	2,390	2.72	
	2	22,930	22.24	20,590	19.97	2,340	2.27	
	3	25,480	15.09	22,880	13.55	2,600	1.54	5.6
DEC	1	28,130	17.27	25,260	15.51	2,870	1.76	
	2	28,780	16.81	25,840	15.09	2,940	1.72	
	3	26,530	15.75	23,820	14.14	2,710	1.61	4.5
TOTAL					587.0		66.6	

Table VI-6 Gross Irrigation Water Requirement at Pateswari Pump Station(2/10)  
and Tangonmari Pump Station

Year : 1980

Month	Total (A=32,800ha)			Pateswari ST(A=29,450ha)		Tangonmari ST(A=3,350ha)		
	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Gross Irri. Req. (millim <sup>3</sup> )	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Gross Irri. Req. (millim <sup>3</sup> )
JAN	1	25,660	17.18	23,040	15.43		2,620	1.75
	2	28,280	23.29	25,390	20.91		2,890	2.38
	3	30,760	26.49	27,620	23.78	54.0	3,140	2.71
FEB	1	30,490	33.51	27,380	30.09		3,110	3.42
	2	26,700	22.64	23,970	20.33		2,730	2.31
	3	23,560	25.71	21,150	23.08	59.4	2,410	2.63
MAR	1	23,360	21.58	20,970	19.38		2,390	2.20
	2	23,730	28.88	21,310	25.93		2,420	2.95
	3	23,530	28.26	21,130	25.37	63.3	2,400	2.89
APR	1	22,110	22.29	19,850	20.01		2,260	2.28
	2	25,710	41.53	23,080	37.29		2,630	4.24
	3	29,310	43.12	26,320	38.72	83.0	2,990	4.40
MAY	1	32,800	4.07	29,450	3.65		3,350	0.42
	2	31,850	4.02	28,600	3.61		3,250	0.41
	3	29,010	12.78	26,050	11.47	17.2	2,960	1.31
JUN	1	25,510	2.45	22,900	2.20		2,610	0.25
	2	22,880	0	20,540	0		2,340	0
	3	19,710	31.02	17,700	27.85	26.0	2,010	3.17
JUL	1	19,330	27.98	17,360	25.12		1,970	2.86
	2	17,360	0	15,590	0		1,770	0
	3	22,270	3.59	20,000	3.22	24.8	2,270	0.37
AUG	1	21,830	14.71	19,600	13.21		2,230	1.50
	2	23,080	1.06	20,720	0.95		2,360	0.11
	3	23,080	2.58	20,720	2.32	14.4	2,360	0.26
SEP	1	24,680	15.39	22,160	13.82		2,520	1.57
	2	24,680	8.55	22,160	7.68		2,520	0.87
	3	24,680	0	22,160	0	18.6	2,520	0
OCT	1	24,600	31.62	22,090	28.39		2,510	3.23
	2	24,530	29.56	22,020	26.54		2,510	3.02
	3	24,310	30.08	21,830	27.01	73.1	2,480	3.07
NOV	1	23,380	26.64	20,990	23.92		2,390	2.72
	2	22,930	22.24	20,590	19.97		2,340	2.27
	3	25,480	19.56	22,880	17.56	53.1	2,600	2.00
DEC	1	28,130	17.27	25,260	15.51		2,870	1.76
	2	28,780	16.81	25,840	15.09		2,940	1.72
	3	26,530	15.75	23,820	14.14	40.0	2,710	1.61
TOTAL					527.0			59.8

Table VI-6 Gross Irrigation Water Requirement at Pateswari Pump Station(3/10)  
and Tangonmari Pump Station

Year : 1981

		Total (A=32,800ha)			Pateswari ST(A=29,450ha)			Tangonmari ST(A=3,350ha)	
Month		Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Gross Irri. Req. (mill m <sup>3</sup> )	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Gross Irri. Req. (mill m <sup>3</sup> )
JAN	1	25,660	15.86	23,040	14.24		2,620	1.62	
	2	28,280	23.29	25,390	20.91		2,890	2.38	
	3	30,760	26.49	27,620	23.78	53.0	3,140	2.71	6.0
FEB	1	30,490	33.51	27,380	30.09		3,110	3.42	
	2	26,700	20.52	23,970	18.42		2,730	2.10	
	3	23,560	25.71	21,150	23.08	57.9	2,410	2.63	6.6
MAR	1	23,360	28.75	20,970	25.81		2,390	2.94	
	2	23,730	22.10	21,310	19.84		2,420	2.26	
	3	23,530	9.06	21,130	8.13	47.2	2,400	0.93	5.4
APR	1	22,110	21.35	19,850	19.17		2,260	2.18	
	2	25,710	26.09	23,080	23.43		2,630	2.66	
	3	29,310	32.28	26,320	28.98	61.8	2,990	3.30	7.0
MAY	1	32,800	9.94	29,450	8.92		3,350	1.02	
	2	31,850	2.52	28,600	2.26		3,250	0.26	
	3	29,010	21.23	26,050	19.06	27.8	2,960	2.17	3.2
JUN	1	25,510	37.69	22,900	33.84		2,610	3.85	
	2	22,880	22.07	20,540	19.82		2,340	2.25	
	3	19,710	1.19	17,700	1.07	47.3	2,010	0.12	5.4
JUL	1	19,330	15.04	17,360	13.50		1,970	1.54	
	2	17,360	0	15,590	0		1,770	0	
	3	22,270	1.93	20,000	1.73	13.3	2,270	0.20	1.5
AUG	1	21,830	19.62	19,600	17.62		2,230	2.00	
	2	23,080	17.22	20,720	15.46		2,360	1.76	
	3	23,080	2.31	20,720	2.07	30.5	2,360	0.24	3.5
SEP	1	24,680	11.70	22,160	10.51		2,520	1.19	
	2	24,680	17.37	22,160	15.60		2,520	1.77	
	3	24,680	21.52	22,160	19.32	39.3	2,520	2.20	4.5
OCT	1	24,600	35.26	22,090	31.66		2,510	3.60	
	2	24,530	34.77	22,020	31.22		2,510	3.55	
	3	24,310	33.72	21,830	30.28	83.1	2,480	3.44	9.4
NOV	1	23,380	26.64	20,990	23.92		2,390	2.72	
	2	22,930	22.24	20,590	19.97		2,340	2.27	
	3	25,480	19.56	22,880	17.56	53.1	2,600	2.00	6.0
DEC	1	28,130	17.27	25,260	15.51		2,870	1.76	
	2	28,780	10.58	25,840	9.50		2,940	1.08	
	3	26,530	15.75	23,820	14.14	35.0	2,710	1.61	4.0
TOTAL						549.3			62.5



Table VI-6 Gross Irrigation Water Requirement at Pateswari Pump Station(4/10)  
and Tangonmari Pump Station

Year : 1982

		Total (A=32,800ha)			Pateswari ST(A=29,450ha)		Tangonmari ST(A=3,350ha)		
Month		Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Gross Irri. Req. (mill m <sup>3</sup> )	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Gross Irri. Req. (mill m <sup>3</sup> )
JAN	1	25,660	17.18	23,040	15.43		2,620	1.75	
	2	28,280	23.29	25,390	20.91		2,890	2.38	
	3	30,760	26.49	27,620	23.78	54.0	3,140	2.71	6.1
FEB	1	30,490	33.51	27,380	30.09		3,110	3.42	
	2	26,700	27.71	23,970	24.88		2,730	2.83	
	3	23,560	25.71	21,150	23.08	63.4	2,410	2.63	7.2
MAR	1	23,360	28.75	20,970	25.81		2,390	2.94	
	2	23,730	20.85	21,310	18.72		2,420	2.13	
	3	23,530	26.38	21,130	23.69	61.0	2,400	2.69	6.9
APR	1	22,110	29.13	19,850	25.15		2,260	2.98	
	2	25,710	36.50	23,080	32.77		2,630	3.73	
	3	29,310	24.02	26,320	21.57	69.5	2,990	2.45	7.9
MAY	1	32,800	38.58	29,450	34.64		3,350	3.94	
	2	31,850	24.21	28,600	21.74		3,250	2.47	
	3	29,010	20.71	26,050	18.60	66.4	2,960	2.12	7.6
JUN	1	25,510	1.36	22,900	1.22		2,610	0.14	
	2	22,880	5.83	20,540	5.23		2,340	0.60	
	3	19,710	0.32	17,700	0.29	5.8	2,010	0.03	0.7
JUL	1	19,330	0	17,360	0		1,970	0	
	2	17,360	3.26	15,590	2.93		1,770	0.33	
	3	22,270	5.84	20,000	5.24	7.5	2,270	0.60	0.9
AUG	1	21,830	0.16	19,600	0.14		2,230	0.02	
	2	23,080	32.12	20,720	28.94		2,360	3.28	
	3	23,080	2.84	20,720	3.55	28.5	2,360	0.29	3.1
SEP	1	24,680	4.92	22,160	4.42		2,520	0.50	
	2	24,680	0	22,160	0		2,520	0	
	3	24,680	3.27	22,160	2.94	6.4	2,520	0.33	0.7
OCT	1	24,600	35.26	22,090	31.66		2,510	3.60	
	2	24,530	34.77	22,020	31.22		2,510	3.55	
	3	24,310	11.70	21,830	10.51	64.3	2,480	1.19	7.3
NOV	1	23,380	26.64	20,990	23.92		2,390	2.72	
	2	22,930	22.24	20,590	19.97		2,340	2.27	
	3	25,480	19.56	22,880	17.56	53.1	2,600	2.00	6.0
DEC	1	28,130	17.27	25,260	15.51		2,870	1.76	
	2	28,780	16.81	25,840	15.09		2,940	1.72	
	3	26,530	15.75	23,820	14.14	40.0	2,710	1.61	4.5
TOTAL						519.9			58.9

Table VI-6 Gross Irrigation Water Requirement at Pateswari Pump Station(5/10)  
and Tangonmari Pump Station

Year : 1983

		Total(A=32,800ha)			Pateswari ST(A=29,450ha)			Tangonmari ST(A=3,350ha)		
Month		Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Gross Irri. Req. (mill m <sup>3</sup> )	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Gross Irri. Req. (mill m <sup>3</sup> )	
JAN	1	25,660	17.18	23,040	15.43		2,620	1.75		
	2	28,280	23.29	25,390	20.91		2,890	2.38		
	3	30,760	26.49	27,620	23.78	54.0	3,140	2.71	6.1	
FEB	1	30,490	33.51	27,380	30.09		3,110	3.42		
	2	26,700	27.71	23,970	24.88		2,730	2.83		
	3	23,560	17.82	21,150	16.00	58.6	2,410	1.82	6.7	
MAR	1	23,360	28.75	20,970	25.81		2,390	2.94		
	2	23,730	28.88	21,310	25.93		2,420	2.95		
	3	23,530	6.77	21,130	6.08	50.5	2,400	0.69	5.7	
APR	1	22,110	31.95	19,850	28.69		2,260	3.26		
	2	25,710	35.08	23,080	31.50		2,630	3.58		
	3	29,310	14.48	26,320	13.00	63.2	2,990	1.48	7.2	
MAY	1	32,800	37.28	29,450	33.44		3,350	3.80		
	2	31,850	5.64	28,600	5.06		3,250	0.58		
	3	29,010	14.83	26,050	13.32	45.9	2,960	1.51	5.2	
JUN	1	25,510	0.99	22,900	0.89		2,610	0.10		
	2	22,880	5.17	20,540	4.64		2,340	0.53		
	3	19,710	13.76	17,700	12.35	15.4	2,010	1.41	1.8	
JUL	1	19,330	0	17,360	0		1,970	0		
	2	17,360	19.82	15,590	17.80		1,770	2.02		
	3	22,270	0	20,000	0	15.4	2,270	0	1.7	
AUG	1	21,830	32.11	19,600	28.83		2,230	3.28		
	2	23,080	17.69	20,720	15.88		2,360	1.81		
	3	23,080	0	20,720	0	38.6	2,360	0	4.4	
SEP	1	24,680	8.46	22,160	7.60		2,520	0.86		
	2	24,680	0	22,160	0		2,520	0		
	3	24,680	1.77	22,160	1.59	7.9	2,520	0.18	0.9	
OCT	1	24,600	18.50	22,090	16.61		2,510	1.89		
	2	24,530	10.19	22,020	9.15		2,510	1.04		
	3	24,310	30.13	21,830	27.05	48.0	2,480	3.08	5.5	
NOV	1	23,380	26.64	20,990	23.92		2,390	2.72		
	2	22,930	22.24	20,590	19.97		2,340	2.27		
	3	25,480	19.56	22,880	17.56	53.1	2,600	2.00	6.0	
DEC	1	28,130	17.27	25,260	15.51		2,870	1.76		
	2	28,780	16.81	25,840	15.09		2,940	1.72		
	3	26,530	4.27	23,820	3.83	30.1	2,710	0.44	3.4	
TOTAL						480.7	54.6			

Table VI-6 Gross Irrigation Water Requirement at Pateswari Pump Station(6/10)  
and Tangonmari Pump Station

Year : 1984

		Total (A=32,800ha)			Pateswari ST(A=29,450ha)		Tangonmari ST(A=3,350ha)		
Month		Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Gross Irri. Req. (mill m <sup>3</sup> )	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Gross Irri. Req. (mill m <sup>3</sup> )
JAN	1	25,660	17.18	23,040	15.43		2,620	1.75	
	2	28,280	21.73	25,390	19.51		2,890	2.22	
	3	30,760	26.49	27,620	23.78	52.8	3,140	2.71	6.0
FEB	1	30,490	33.51	27,380	30.09		3,110	3.42	
	2	26,700	27.71	23,970	24.88		2,730	2.83	
	3	23,560	25.71	21,150	23.08	63.4	2,410	2.63	7.2
MAR	1	23,360	28.75	20,970	25.81		2,390	2.94	
	2	23,730	28.88	21,310	25.93		2,420	2.95	
	3	23,530	19.85	21,130	17.82	61.6	2,400	2.03	7.0
APR	1	22,110	27.00	19,850	24.42		2,260	2.76	
	2	25,710	31.50	23,080	28.28		2,630	3.22	
	3	29,310	9.47	26,320	8.50	52.7	2,990	0.97	6.0
MAY	1	32,800	22.19	29,450	19.92		3,350	2.27	
	2	31,850	0	28,600	0		3,250	0	
	3	29,010	0	26,050	0	17.2	2,960	0	2.0
JUN	1	25,510	0	22,900	0		2,610	0	
	2	22,880	0	20,540	0		2,340	0	
	3	19,710	14.77	17,700	13.26	11.5	2,010	1.51	1.3
JUL	1	19,330	0.42	17,360	0.38		1,970	0.04	
	2	17,360	0	15,590	0		1,770	0	
	3	22,270	0	20,000	0	0.3	2,270	0	0.0
AUG	1	21,830	18.89	19,600	16.96		2,230	1.93	
	2	23,080	5.74	20,720	5.15		2,360	0.59	
	3	23,080	10.73	20,720	9.63	28.3	2,360	1.10	3.2
SEP	1	24,680	0	22,160	0		2,520	0	
	2	24,680	0	22,160	0		2,520	0	
	3	24,680	32.76	22,160	29.41	25.4	2,520	3.35	2.9
OCT	1	24,600	1.11	22,090	1.00		2,510	0.11	
	2	24,530	26.89	22,020	24.14		2,510	2.75	
	3	24,310	26.47	21,830	23.77	44.3	2,480	2.70	5.0
NOV	1	23,380	26.64	20,990	23.92		2,390	2.72	
	2	22,930	22.24	20,590	19.97		2,340	2.27	
	3	25,480	19.56	22,880	17.56	53.1	2,600	2.00	6.0
DEC	1	28,130	17.27	25,260	15.51		2,870	1.76	
	2	28,780	15.09	25,840	13.55		2,940	1.54	
	3	26,530	15.75	23,820	14.14	38.5	2,710	1.61	4.4
TOTAL						449.1			51.0

Table VI-6 Gross Irrigation Water Requirement at Pateswari Pump Station(7/10)  
and Tangonmari Pump Station

Year : 1985

Month	Total (A=32,800ha)			Pateswari ST(A=29,450ha)		Tangonmari ST(A=3,350ha)		
	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Gross Irri. Req. (mill m <sup>3</sup> )	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Gross Irri. Req. (mill m <sup>3</sup> )
JAN	1	25,660	17.18	23,040	15.43	2,620	1.75	
	2	28,280	23.29	25,390	19.51	2,890	2.22	
	3	30,760	26.49	27,620	23.78	3,140	2.71	6.1
FEB	1	30,490	29.91	27,380	26.86	3,110	3.05	
	2	26,700	23.09	23,970	20.73	2,730	2.36	
	3	23,560	25.71	21,150	23.08	2,410	2.63	6.5
MAR	1	23,360	28.75	20,970	25.81	2,390	2.94	
	2	23,730	28.88	21,310	25.93	2,420	2.95	
	3	23,530	13.61	21,130	12.22	2,400	1.39	6.4
APR	1	22,110	31.95	19,850	28.69	2,260	3.26	
	2	25,710	33.45	23,080	30.03	2,630	3.42	
	3	29,310	21.73	26,320	19.51	2,990	2.22	7.7
MAY	1	32,800	40.41	29,450	36.28	3,350	4.13	
	2	31,850	1.30	28,600	1.17	3,250	0.13	
	3	29,010	14.83	26,050	13.32	2,960	1.51	5.1
JUN	1	25,510	0	22,900	0	2,610	0	
	2	22,880	10.61	20,540	9.53	2,340	1.08	
	3	19,710	9.09	17,700	8.16	2,010	0.93	1.7
JUL	1	19,330	0	17,360	0	1,970	0	
	2	17,360	0.53	15,590	0.48	1,770	0.05	
	3	22,270	0	20,000	0	2,270	0	0.0
AUG	1	21,830	36.15	19,600	32.46	2,230	3.69	
	2	23,080	9.71	20,720	8.72	2,360	0.99	
	3	23,080	2.85	20,720	2.56	2,360	0.29	4.3
SEP	1	24,680	0	22,160	0	2,520	0	
	2	24,680	6.72	22,160	6.03	2,520	0.69	
	3	24,680	0	22,160	0	2,520	0	0.6
OCT	1	24,600	35.26	22,090	31.66	2,510	3.60	
	2	24,530	2.32	22,020	2.08	2,510	0.24	
	3	24,310	33.72	21,830	30.28	2,480	3.44	6.6
NOV	1	23,380	26.64	20,990	23.92	2,390	2.72	
	2	22,930	22.24	20,590	19.97	2,340	2.27	
	3	25,480	19.56	22,880	17.56	2,600	2.00	6.0
DEC	1	28,130	17.27	25,260	15.51	2,870	1.76	
	2	28,780	16.81	25,840	15.09	2,940	1.72	
	3	26,530	8.53	23,820	7.66	2,710	0.87	3.8
TOTAL					483.6		54.8	

Table VI-6 Gross Irrigation Water Requirement at Pateswari Pump Station(8/10)  
and Tangonmari Pump Station

Year : 1986

Month	Total (A=32,800ha)			Pateswari ST(A=29,450ha)		Tangonmari ST(A=3,350ha)		
	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Gross Irri. Req. (mill m <sup>3</sup> )	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Gross Irri. Req. (mill m <sup>3</sup> )
JAN	1	25,660	17.18	23,040	15.43	2,620	1.75	
	2	28,280	23.29	25,390	20.91	2,890	2.38	
	3	30,760	26.49	27,620	23.78	3,140	2.71	6.1
FEB	1	30,490	33.51	27,380	30.09	3,110	3.42	
	2	26,700	27.71	23,970	24.88	2,730	2.83	
	3	23,560	25.71	21,150	23.08	2,410	2.63	7.2
MAR	1	23,360	28.75	20,970	25.81	2,390	2.94	
	2	23,730	28.88	21,310	25.93	2,420	2.95	
	3	23,530	28.26	21,130	25.37	2,400	2.89	7.8
APR	1	22,110	30.33	19,850	27.23	2,260	3.10	
	2	25,710	30.21	23,080	27.12	2,630	3.09	
	3	29,310	4.26	26,320	3.83	2,990	0.44	5.7
MAY	1	32,800	22.43	29,450	20.14	3,350	2.29	
	2	31,850	19.33	28,600	17.36	3,250	1.97	
	3	29,010	38.79	26,050	34.83	2,960	3.96	7.4
JUN	1	25,510	3.61	22,900	3.24	2,610	0.37	
	2	22,880	0	20,540	0	2,340	0	
	3	19,710	0.15	17,700	0.13	2,010	0.02	0.3
JUL	1	19,330	9.45	17,360	8.43	1,970	0.97	
	2	17,360	19.86	15,590	17.83	1,770	2.03	
	3	22,270	1.22	20,000	1.10	2,270	0.12	2.7
AUG	1	21,830	14.61	19,600	13.12	2,230	1.49	
	2	23,080	34.81	20,720	31.25	2,360	3.56	
	3	23,080	2.18	20,720	1.96	2,360	0.22	4.6
SEP	1	24,680	0.24	22,160	0.22	2,520	0.02	
	2	24,680	0	22,160	0	2,520	0	
	3	24,680	0.66	22,160	0.59	2,520	0.07	0.1
OCT	1	24,600	0	22,090	0	2,510	0	
	2	24,530	19.20	22,020	17.24	2,510	1.96	
	3	24,310	33.72	21,830	30.28	2,480	3.44	5.0
NOV	1	23,380	26.64	20,990	23.92	2,390	2.72	
	2	22,930	14.45	20,590	12.97	2,340	1.48	
	3	25,480	19.56	22,880	17.56	2,600	2.00	5.4
DEC	1	28,130	17.27	25,260	15.51	2,870	1.76	
	2	28,780	11.81	25,840	10.60	2,940	1.21	
	3	26,530	15.75	23,820	14.14	2,710	1.61	4.1
TOTAL					496.3		54.4	

Table VI-6 Gross Irrigation Water Requirement at Pateswari Pump Station(9/10)  
and Tangonmari Pump Station

Year : 1987

Month	Total (A=32,800ha)			Pateswari ST(A=29,450ha)			Tangonmari ST(A=3,350ha)		
	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Gross Irri. Req. (mill m <sup>3</sup> )	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Gross Irri. Req. (mill m <sup>3</sup> )	
JAN	1	25,660	14.81	23,040	13.30		2,620	1.51	
		28,280	23.29	25,390	20.91		2,890	2.38	
	3	30,760	26.49	27,620	23.78	52.2	3,140	2.71	5.9
FEB	1	30,490	33.51	27,380	30.09		3,110	3.42	
	2	26,700	27.71	23,970	24.88		2,730	2.83	
	3	23,560	20.89	21,150	18.76	60.5	2,410	2.13	6.9
MAR	1	23,360	28.75	20,970	25.81		2,390	2.94	
	2	23,730	7.28	21,310	6.54		2,420	0.74	
	3	23,530	27.16	21,130	24.39	51.1	2,400	2.77	5.8
APR	1	22,110	27.25	19,850	24.47		2,260	2.78	
	2	25,710	42.70	23,080	38.34		2,630	4.36	
	3	29,310	16.74	26,320	15.03	67.3	2,990	1.71	7.6
MAY	1	32,800	6.40	29,450	5.75		3,350	0.65	
	2	31,850	45.55	28,600	40.90		3,250	4.65	
	3	29,010	2.35	26,050	2.11	42.3	2,960	0.24	4.8
JUN	1	25,510	8.04	22,900	7.22		2,610	0.82	
	2	22,880	7.80	20,540	7.00		2,340	0.80	
	3	19,710	0	17,700	0	12.3	2,010	0	1.4
JUL	1	19,330	0	17,360	0		1,970	0	
	2	17,360	21.34	15,590	19.16		1,770	2.18	
	3	22,270	0	20,000	0	16.6	2,270	0	1.9
AUG	1	21,830	0.40	19,600	0.36		2,230	0.04	
	2	23,080	0	20,720	0		2,360	0	
	3	23,080	17.34	20,720	15.57	15.1	2,360	1.77	1.7
SEP	1	24,680	7.20	22,160	6.46		2,520	0.74	
	2	24,680	4.08	22,160	3.66		2,520	0.42	
	3	24,680	0	22,160	0	8.7	2,520	0	1.0
OCT	1	24,600	29.21	22,090	26.33		2,510	2.98	
	2	24,530	0.25	22,020	0.22		2,510	0.03	
	3	24,310	29.78	21,830	26.74	48.3	2,480	3.04	5.5
NOV	1	23,380	22.38	20,990	20.09		2,390	2.29	
	2	22,930	22.24	20,590	19.97		2,340	2.27	
	3	25,480	19.56	22,880	17.56	49.8	2,600	2.00	5.7
DEC	1	28,130	17.27	25,260	15.51		2,870	1.76	
	2	28,780	16.81	25,840	15.09		2,940	1.72	
	3	26,530	15.75	23,820	14.14	39.9	2,710	1.61	4.5
TOTAL					464.1			52.7	

Table VI-6 Gross Irrigation Water Requirement at Pateswari Pump Station(10/10)  
and Tangonmari Pump Station

Year : 1988

Month	Total (A=32,800ha)			Pateswari ST(A=29,450ha)			Tangonmari ST(A=3,350ha)		
	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Gross Irri. Req. (mill m <sup>3</sup> )	Cropped Area (ha)	Gross Irri. Req. (m <sup>3</sup> /s)	Gross Irri. Req. (mill m <sup>3</sup> )	
JAN	1	25,660	17.18	23,040	15.43		2,620	1.75	
		28,280	23.29	25,390	20.91		2,890	2.38	
	3	30,760	26.49	27,620	23.78	54.0	3,140	2.71	6.1
FEB	1	30,490	33.51	27,380	30.09		3,110	3.42	
	2	26,700	27.71	23,970	24.88		2,730	2.83	
	3	23,560	4.63	21,150	4.16	50.4	2,410	0.47	5.7
MAR	1	23,360	22.68	20,970	20.36		2,390	2.32	
	2	23,730	9.52	21,310	8.55		2,420	0.97	
	3	23,530	28.26	21,130	25.37	49.1	2,400	2.89	5.6
APR	1	22,110	31.95	19,850	28.69		2,260	3.26	
	2	25,710	22.77	23,080	20.44		2,630	2.33	
	3	29,310	35.29	26,320	31.69	69.8	2,990	3.60	7.9
MAY	1	32,800	27.12	29,450	24.35		3,350	2.77	
	2	31,850	16.96	28,600	15.23		3,250	1.73	
	3	29,010	0	26,050	0	34.2	2,960	0	3.9
JUN	1	25,510	33.71	22,900	30.27		2,610	3.44	
	2	22,880	0	20,540	0		2,340	0	
	3	19,710	17.14	17,700	15.39	39.5	2,010	1.75	4.5
JUL	1	19,330	2.42	17,360	2.17		1,970	0.25	
	2	17,360	0.05	15,590	0.04		1,770	0.01	
	3	22,270	0	20,000	0	1.9	2,270	0	0.2
AUG	1	21,830	22.39	19,600	20.10		2,230	2.29	
	2	23,080	10.72	20,720	9.63		2,360	1.09	
	3	23,080	0	20,720	0	25.7	2,360	0	2.9
SEP	1	24,680	0	22,160	0		2,520	0	
	2	24,680	34.00	22,160	30.53		2,520	3.47	
	3	24,680	0.57	22,160	0.51	26.8	2,520	0.06	3.0
OCT	1	24,600	9.95	22,090	8.93		2,510	1.02	
	2	24,530	34.53	22,020	31.00		2,510	3.53	
	3	24,310	33.72	21,830	30.28	63.3	2,480	3.44	7.2
NOV	1	23,380	26.64	20,990	23.92		2,390	2.72	
	2	22,930	22.24	20,590	19.97		2,340	2.27	
	3	25,480	13.47	22,880	12.09	48.4	2,600	1.38	5.5
DEC	1	28,130	17.27	25,260	15.51		2,870	1.76	
	2	28,780	16.81	25,840	15.09		2,940	1.72	
	3	26,530	15.75	23,820	14.14	39.9	2,710	1.61	4.5
TOTAL					503.0			57.0	

Fig. VI-2 Water Intake Pattern in Pateswari Pump Station

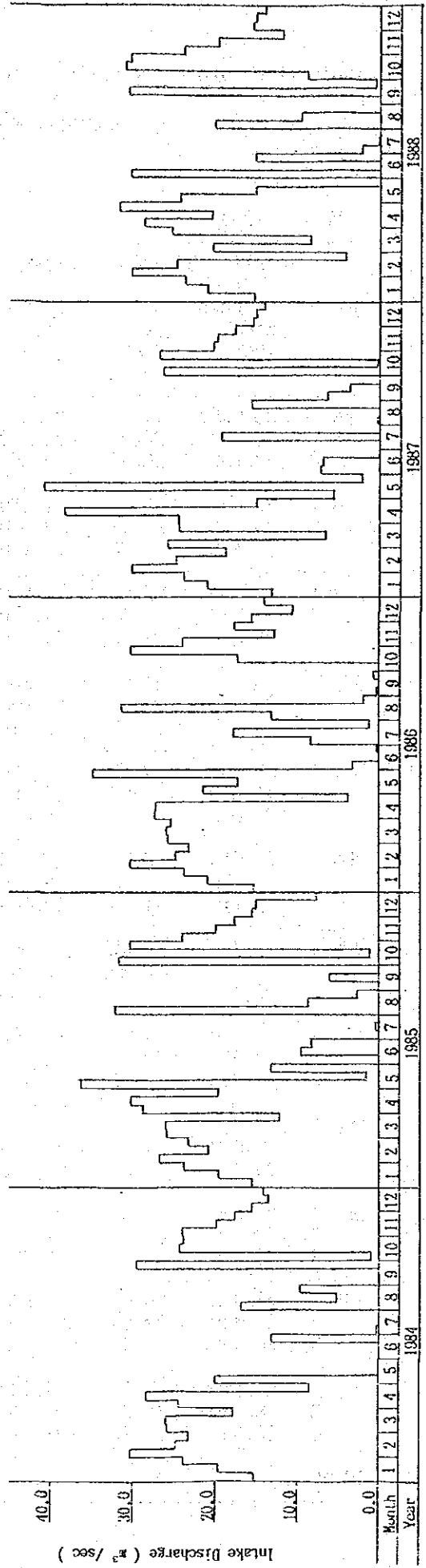
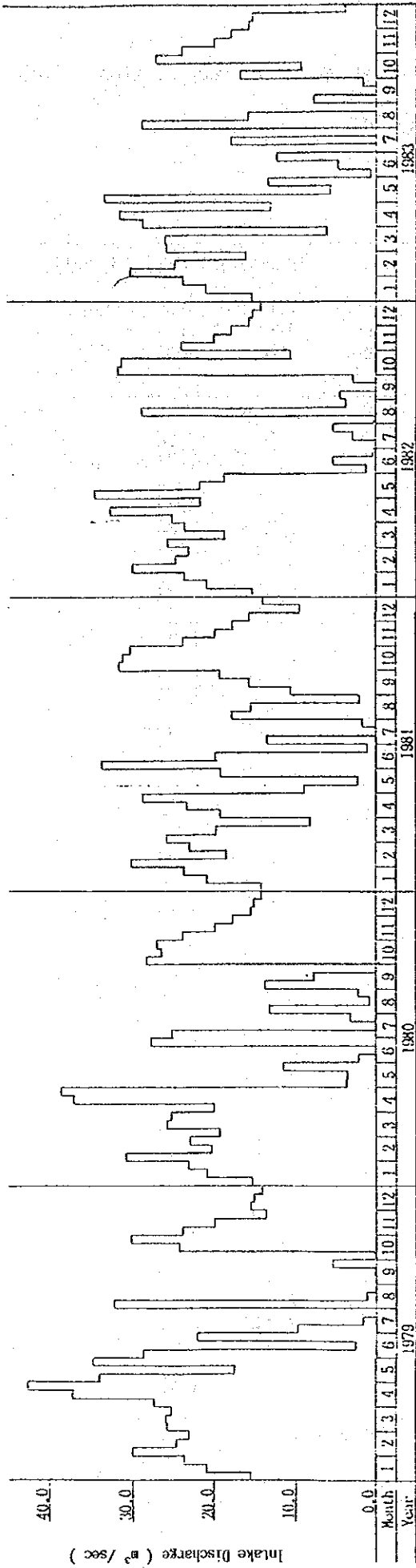
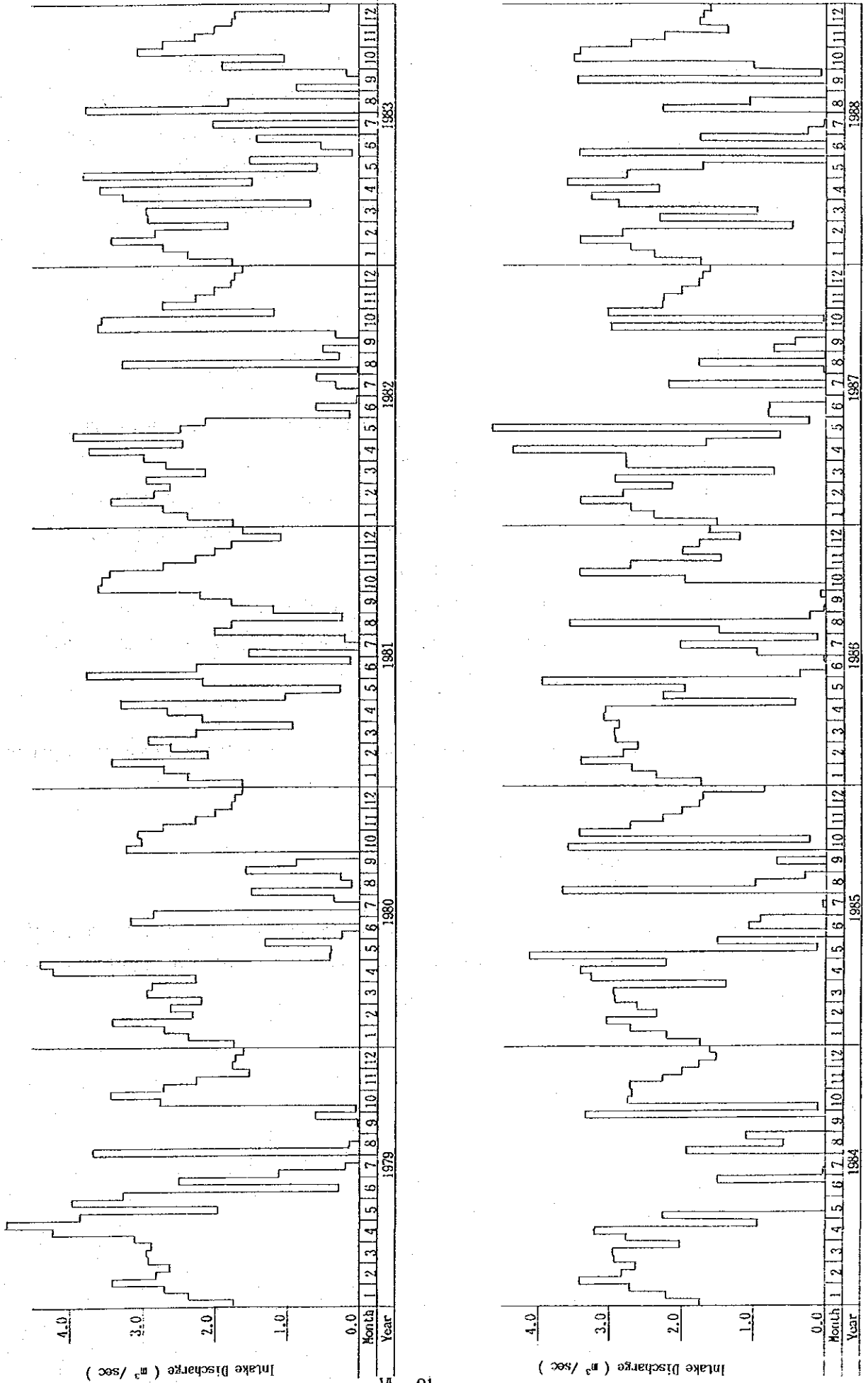




Fig. VI-3 Water Intake Pattern in Tangonmari Pump Station



## 2-4. Comparative Study on Water Conveyance for the Western Part

For the purpose of selecting the optimal water conveyance system for the western canal route ( $M_2$ ), has been done in consideration of minimizing the canal construction cost and the total pumping energy cost.

### (1) Comparative cases

The following three cases were studied:

Case-1 ; To pump up water for the whole area by the main pump station( main pump station only)

Case-2 ; To pump up water for the most of western area by a booster pump station at the upper site of the main canal  $M_2$  (main pump st. & booster pump station)

Case-3 ; To pump up water limited for the highest portions in the western area by a booster pump station at the secondary canal  $M_2S_6$  (main pump st. & booster pump st.)

The general plan and the longitudinal profile for the above comparative cases are shown in Fig. VI-4(a) and Fig. VI-4(b).

### (2) Result of the comparative study

Among the above three cases, Case-3 was selected as the optimal water conveyance system from an economic point of view. The results of the comparative study are shown in Table VI-8 and VI-9.

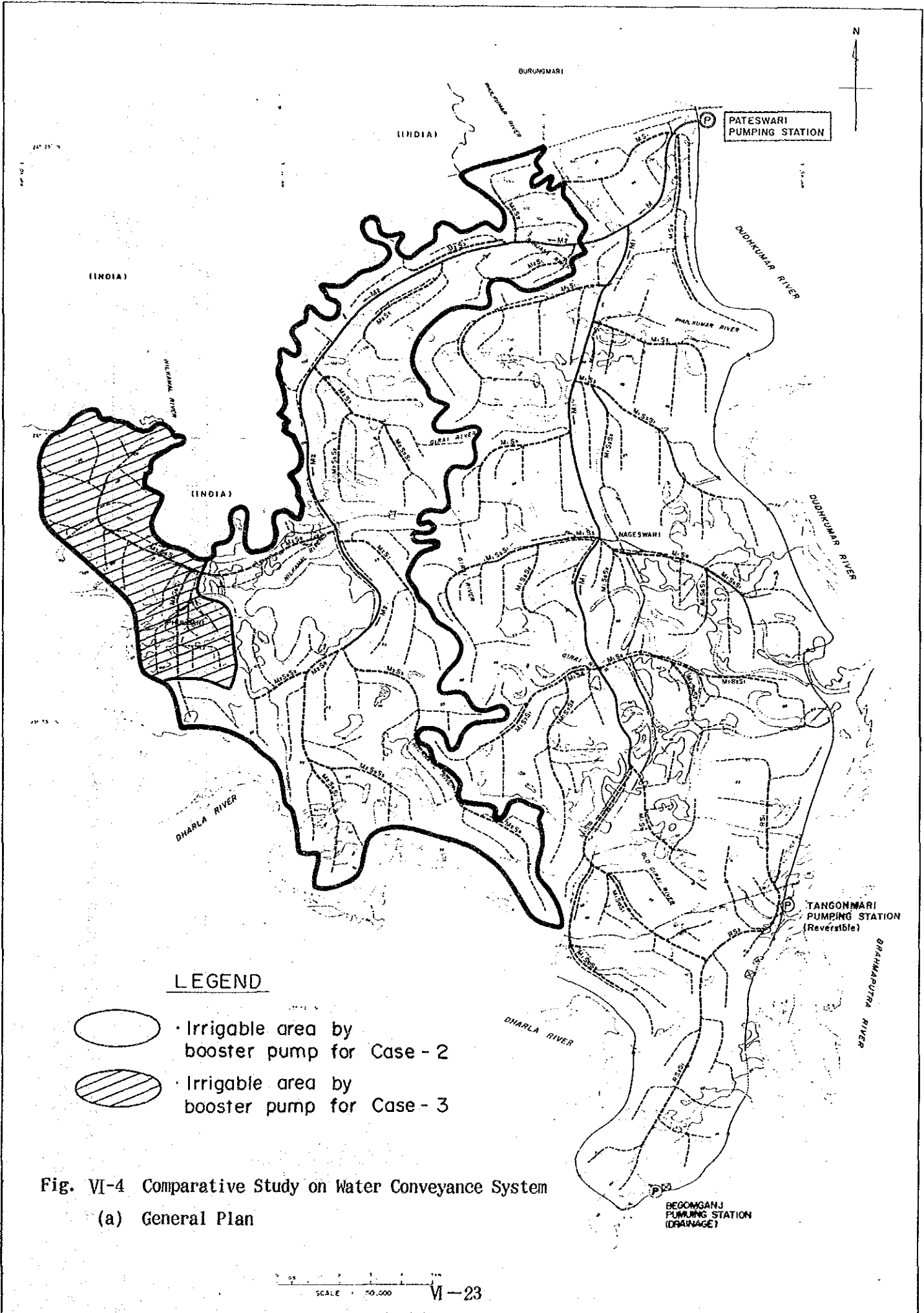


Fig. VI-4 Comparative Study on Water Conveyance System

(a) General Plan

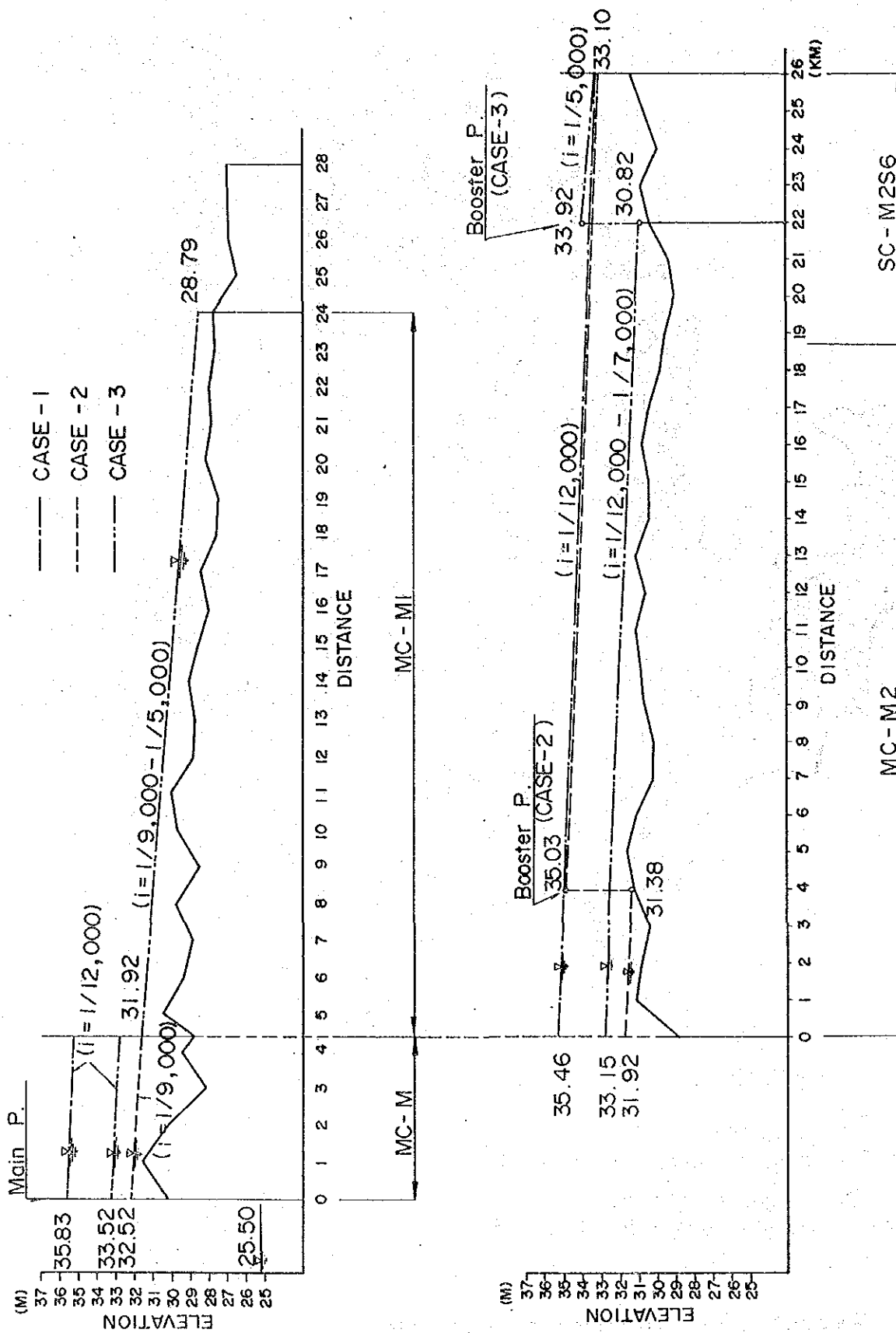


Fig. VI-4 Comparative Study on Water Conveyance System

(b) Longitudinal Profile

Table VI-8 Comparison of Water Conveyance System

Item / Comparative Cases	CASE - 1	CASE - 2	CASE - 3
1. Canal embankment height	Generally very high	Very high except upper part of the booster pump station	Generally low except the part of M. C.-1
2. Commanded area by booster pump	-	10,760 ha	1,800 ha
3. Numbers of booster pump station	-	1	1
4. Discharge of pumps	Main pumps : 42.8 m <sup>3</sup> /s	Main pumps : 42.8 m <sup>3</sup> /s Booster pumps : 15.6 m <sup>3</sup> /s	Main pumps : 42.8 m <sup>3</sup> /s Booster pumps : 2.6 m <sup>3</sup> /s
5. Total head of pumps	Main pumps : 11.0 m	Main pumps : 7.6 m Booster pumps : 4.7 m	Main pumps : 8.6m Booster pump : 4.1m
6. Total pump power	6,200 kw	5,300 kw	5,000 kw
7. Judgement	Low	Medium	High
a) Stability of canal embankment			
b) Canal cost	High	Medium	Low
c) Electric charge of pumps	High	Medium	Low
Ranking :	3	2	1

Table VI-9 Dimensions of Comparative Pump Facilities

Item	Case		
	CASE - 1	CASE - 2	CASE - 3
<b>1 Main Pumps (Vertical Mixed Flow Type)</b>			
a) Discharge (m <sup>3</sup> /sec)	42.8	42.8	42.8
b) Total Head (m)	11.0	7.6	8.6
*-1 Ha (m)	(10.4)	(7.0)	(8.0)
*-2 Hf (m)	(0.6)	(0.6)	(0.6)
c) Numbers of Pumps	4	4	4
d) Discharge/1 Pump (m <sup>3</sup> /min)	642	642	642
e) Dia of Pumps (mm)	2,200	2,200	2,200
f) Pump Power/1 Pump (KW)	1,550	1,070	1,220
g) Total Pump Power (KW)	6,200	4,280	4,880
<b>2 Booster Pumps (Horizontal Mixed Flow Type)</b>			
a) Discharge (m <sup>3</sup> /sec)	—	15.6	2.6
b) Total Head (m)	—	4.7	4.1
*-1 Ha (m)	—	(3.7)	(3.1)
*-2 Hf (m)	—	(1.0)	(1.0)
c) Numbers of Pumps	—	3	2
d) Discharge/1 Pump (m <sup>3</sup> /min)	—	312	78
e) Dia of Pump s(mm)	—	1,500	800
f) Pump Power/1 Pump (KW)	—	330	80
g) Total Pump Power (KW)	—	990	160
<b>TOTAL</b>			
Numbers of Pump Stations	1	2	3
Total Pump Power (KW)	6,200	5,270	5,040
	±6,200	±5,300	±5,000

\*-1 Ha ; Actual head (m)

\*-2 Hf ; Loss head inside of pump facilities (m)  
(Friction, Bend, Valve etc)

### 3. Ground Water Availability and Influence of River Water Intake

#### 3-1. Availability of Ground Water for Irrigation

The potential storage capacity of the ground upper strata in the project area is considered to be large enough for irrigation from the geological survey results. Therefore, it can be said that the determining factor of the available ground water amount is the potential recharge amount, of which, practically, the whole amount stems from vertical percolation of the rain water ponding on the ground surface in the rainy season.

The actual water consumption amount in paddy fields measured at deep tube well irrigation schemes is approximately 10 mm / day. The percolation rate was determined as 6 mm / day, subtracting 4 mm / day of the evapo-transpiration from the above 10 mm / day. (refer to 3-4 and 4-4, Main Report) Assuming that 75 % of the percolation rate is effective for recharge and the net recharge period is 75% of 120 days from June to September, the recharge amount (Rc) in depth in a rainy season is obtained as follows:

$$R_c = 6 \times 0.75 \times 120 \times 0.75 = 410 \text{ mm/year}$$

On the other hand, it is supposed that the net irrigation period is 190 days which is 80% of 240 days from October to May and the water requirement per day is obtained based on the evapotranspiration, 4 mm / day, the irrigation efficiency, 0.70 and the conveyance efficiency, 0.85. The annual water requirement (Wa) is obtained as follows:

$$W_a = 4 \times 1/0.70 \times 1/0.85 \times 190 = 1280 \text{ mm}$$

The rate of potential irrigated area to the total cultivable area is obtained as follows:

$$410 / 1,280 = 0.32$$

### 3-2. Influence of River Water Intake to the Downstream

In order to assess the influence of the river water intake to the downstream, it should be taken into account that a part of the water taken from the two rivers is drained to the Brahmaputra.

The rate of the drained water to the irrigation water for paddy and that for upland crops are given as follows:

$$\text{For paddy; } 0.10 + 0.85 \times 0.10 + 6/10 \times 1/0.85 \times 0.85 = 0.62$$

where; the conveyance loss ratio is 0.15 of which 0.10 is for percolation, the on-farm ditch loss ratio is 0.15 of which 0.10 is for percolation and the water requirement in the paddy field is 10 mm / day of which 6 mm / day is for percolation.

$$\text{For upland crops; } 0.10 + 0.85 \times 0.25 = 0.31$$

where; the conveyance loss ratio is 0.15 of which 0.10 is for percolation and the field loss ratio is 0.30 of which 0.25 is for percolation.

In the case of 1979, the most drought year for last 10 years, the gross water intake amount in the drought period (from February to April), the drained water from the irrigated water and the net reduction of the river discharge are supposed as follows:

Unit: m<sup>3</sup>/sec.

Months	Water intake			Drained water			Discharge reduction
	Paddy	Upland	Total	Paddy	Upland	Total	
Feb.	15.2	13.8	29.0	9.4	4.3	13.7	15.3
Mar.	21.5	7.1	28.6	13.3	2.2	15.5	13.1
Apr.	31.1	8.8	39.9	19.3	2.7	22.0	17.9

Note: The time lag between the water intake at a period and the drained water from that is ignored for simplification.







**APPENDIX VII**

**DRAINAGE AND FLOOD CONTROL**

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## APPENDIX VII

### DRAINAGE AND FLOOD CONTROL

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## 1. Outline of Project Area and Drainage and Flood Control Facilities

Table VII-1-1 Drainage Area by Drainage Block (sq. km)

Drainage Block	Drainage Area	in the Study Area	out of the Study Area	in Indian territory
1 Shagon-Upper Nilkamal	113.3	34.0	79.3	79.3
2 Girai-Lower Nilkamal	192.4	191.4	1.0	1.0
3 Phulkumar	236.4	55.0	181.4	133.0
4 Baharampur	38.6	38.6	—	—
5 Tangonmari-Old Girai	64.2	64.2	—	—
6 South Tail	33.9	33.9	—	—
Others	8.3	8.3	—	—
<b>Total</b>	<b>687.1</b>	<b>425.4</b>	<b>261.7</b>	<b>213.3</b>

Table VII-1-2 Existing Drainage Regulator in the Project Area

Location (km)	Name	Dimension Nos.-B×H(m)	Sill EL (m)	Construc. (FY)
(along the Dudhkumar Right Embankment)				
10+07	Phlkumar Reg.	8-1.52×1.83	23.77	'83-'84
12+95	Borobari Red.	3-1.52×1.83	25.91	'89-'90
21+76	Baharampur Reg.	5-1.52×1.83	23.47	'83-'84
30+72	Tangonmari Reg.	4-1.52×1.83	22.25	'86-'87
38+11	Jatrapur Reg.	2-1.52×1.83	22.25	'88-'90
(along the Dharla left Embankment)				
10+45	Paschin Daniram Reg.	2-1.52×1.83	25.60	'89-'90
12+13	Shagon Chara Reg.	3-1.52×1.83	24.99	'83-'84
29+43	Pateswari Chara Reg.	12-1.52×1.83	22.56	'89-'90
34+09	Kachichara Reg.	3-1.52×1.83	22.56	'83-'84

Table VII-1-3 Accomplishment in Construction of Flood Embankment

(as of Feb. 1990)

(unit :km)

Construction Status	Dudhkumar R. Embankment	Dharla Left Embankment	Total
1. Constructed	40.06	21.87	61.93
2. To be constructed	1.58	15.03	16.61
3. Exist. roads to be imp'vd as embank.	-	5.40	5.40
Total	41.64	42.30	83.94

Table VII-1-4: Accomplishment in Repair of Flood Embankment

FY	From-To (Chainage)	Length
Dudhkumar Right Embankment		
87-88	0 + 00 - 3 + 60	9,870 m
83-84 84-85	329 + 60 - 713 + 00	11,694
88-89	329 + 60 - 713 + 00	11,694
86-87 87-88 87-88 88-89	Baharampur - Kaligong Tangonmari - rasulpur Jatrapur - Begonganj Gogadada - Jatrapur	16,930
88-89	Breached embankment	3 ples
Dharla Left Embankment		
87-88	418 + 20 - 504 + 00	12,617 m
88-89	471 + 00 - 478 + 00	213.5
85-86	1,104 + 86 -1,205 + 22	3,061
87-88	1,198 + 02 -1,205 + 22	219.6
88-89	1,060 + 22 -1,133 + 22	2,226.5
88-89	1,055 + 00 -1,067 + 30	375
84-85	Breached embankment	1 ples
88-89	Breached embankment	11 ples

Table VII-1-5 Existing Gaps of Flood Embankment

(as of Feb. 1990)

From (KM)	To (KM)	Length (M)	Remarks	
[along Dudhkumar Righth Embankment]				
0+01		5	Cut by farmers for local drainage	
9+86	10+07	210	Phulkumar River running through	
31+88	32+95	1,070	Swamp of old Girai River; a regulator planned	
41+34		aprx.300	Swamp of old Dharla River; a regulator planned	
[along Dharla Left Embankment]				
0+00	6+00	6,000	Not constructed yet	
12+10		90	Shagon Chara River running through; additional regulator planned	
13+		5	Cut by farmers for local drainage	
15+13	18+93	3,800	Existing road	
20+43	29+43	9,000	Not constructed yet; a regulator planned	
29+43	31+03	1,600	Existing road	
		Not constructed	6 plc	16,670m
		Cut by farmers	2	10
		Use of existing road	2	5,400
		Total	10 places	22,080 m

Table VII-1-6 Elevation - Area - Retention Volume Calibration

H (m)	Area (ha)	Net Area (ha)	Reten. v (x1000 cu. m)
BLOCK 1			
27.13	65	0	0
.43	65	0	200
.74	87	22	430
28.04	117	52	740
.35	233	168	1,270
.65	292	227	2,100
.96	642	577	3,500
29.26	720	655	5,600
.57	875	810	8,000
.87	1,303	1,238	11,300
BLOCK 2			
24.38	480	0	0
.69	480	0	1,460
.99	500	20	3,000
25.30	550	70	4,600
.60	608	128	6,300
.91	736	256	8,400
26.22	1,221	741	11,400
.52	1,454	974	15,400
.82	1,942	1,461	21,000
27.13	2,502	2,022	27,000
.43	3,823	3,343	37,000
.74	4,227	3,747	49,000
BLOCK 3			
27.43	450	0	0
.74	450	0	1,370
28.04	587	137	3,000
.35	783	333	5,000
.65	900	450	7,600
.96	1,194	744	10,800
29.26	1,390	940	14,700
.57	1,840	1,390	20,000

DEPRESSION/CHANNEL AREA	
BLOCK 1	65 HA
BLOCK 2	480
BLOCK 3	450
BLOCK 4	215
BLOCK 5	410
BLOCK 6	374
<b>TOTAL</b>	<b>1,994 HA</b>

H (m)	Area (ha)	Net Area (ha)	Reten. v (x1000 cu. m)
BLOCK 4			
25.60	215	0	0
.91	215	0	660
26.22	290	75	1,420
.52	344	129	2,400
.82	487	272	3,700
27.13	879	664	5,700
.43	1,261	1,046	9,000
.74	1,547	1,332	13,300
28.04	1,776	1,561	18,000
.35	2,006	1,791	24,000
.65	2,426	2,211	31,000
BLOCK 5			
24.08	410	0	0
.38	410	0	1,250
.69	541	131	2,700
.99	812	402	4,800
25.30	1,353	943	8,100
.60	1,663	1,253	12,700
.91	2,185	1,775	18,500
26.22	3,209	2,799	27,000
.52	3,906	3,496	38,000
.82	4,297	3,882	50,000
27.13	4,679	4,269	64,000
.43	5,820	5,410	80,000
.74	6,149	5,739	98,000
BLOCK 6			
23.47	374	0	0
.77	374	0	1,140
24.08	452	78	2,400
.38	1,008	634	4,600
.69	1,279	905	8,100
.99	1,705	1,331	12,700
25.30	1,937	1,563	18,200
.60	2,364	1,990	25,000
.91	2,887	2,513	33,000
26.22	2,887	2,513	42,000
.52	3,178	2,804	51,000
.82	3,236	2,862	61,000
27.13	3,314	2,940	71,000
.43	3,390	3,016	81,000

Fig. VII-1-1 Catchment of Dharla and Dudhkumar Rivers

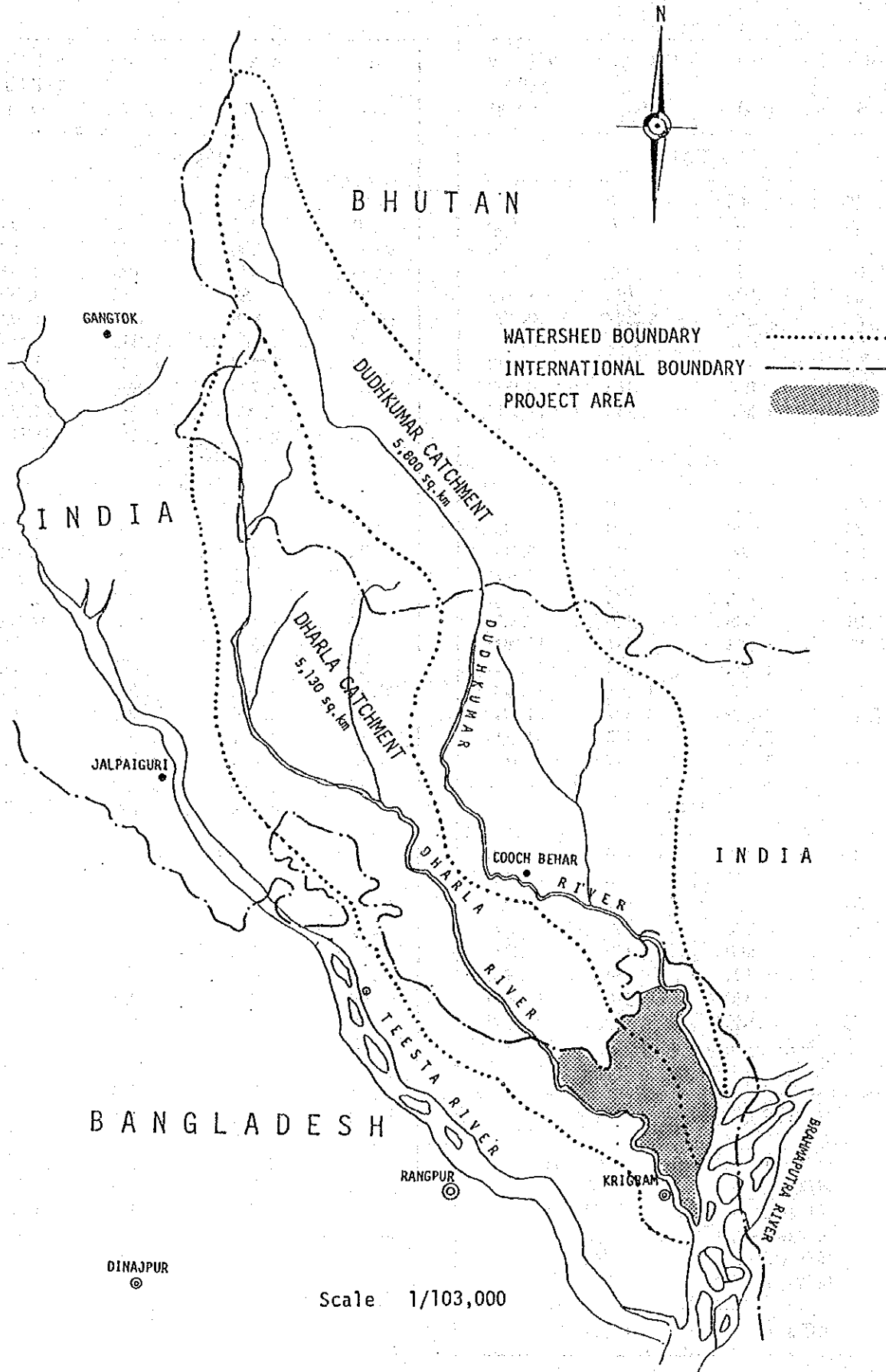


Fig. VII-1-2 Catchment of the Project Area and Drainage Blocks

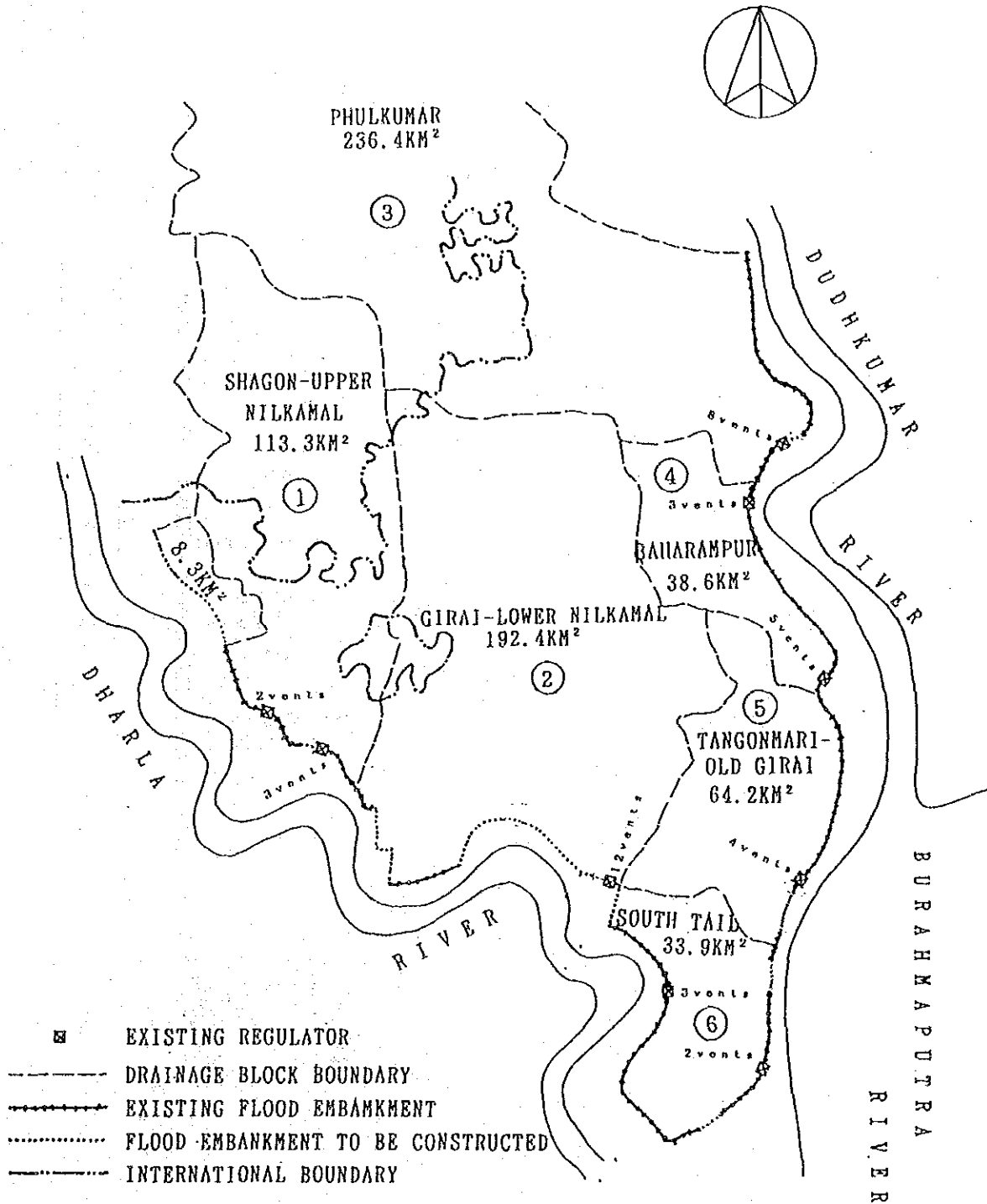
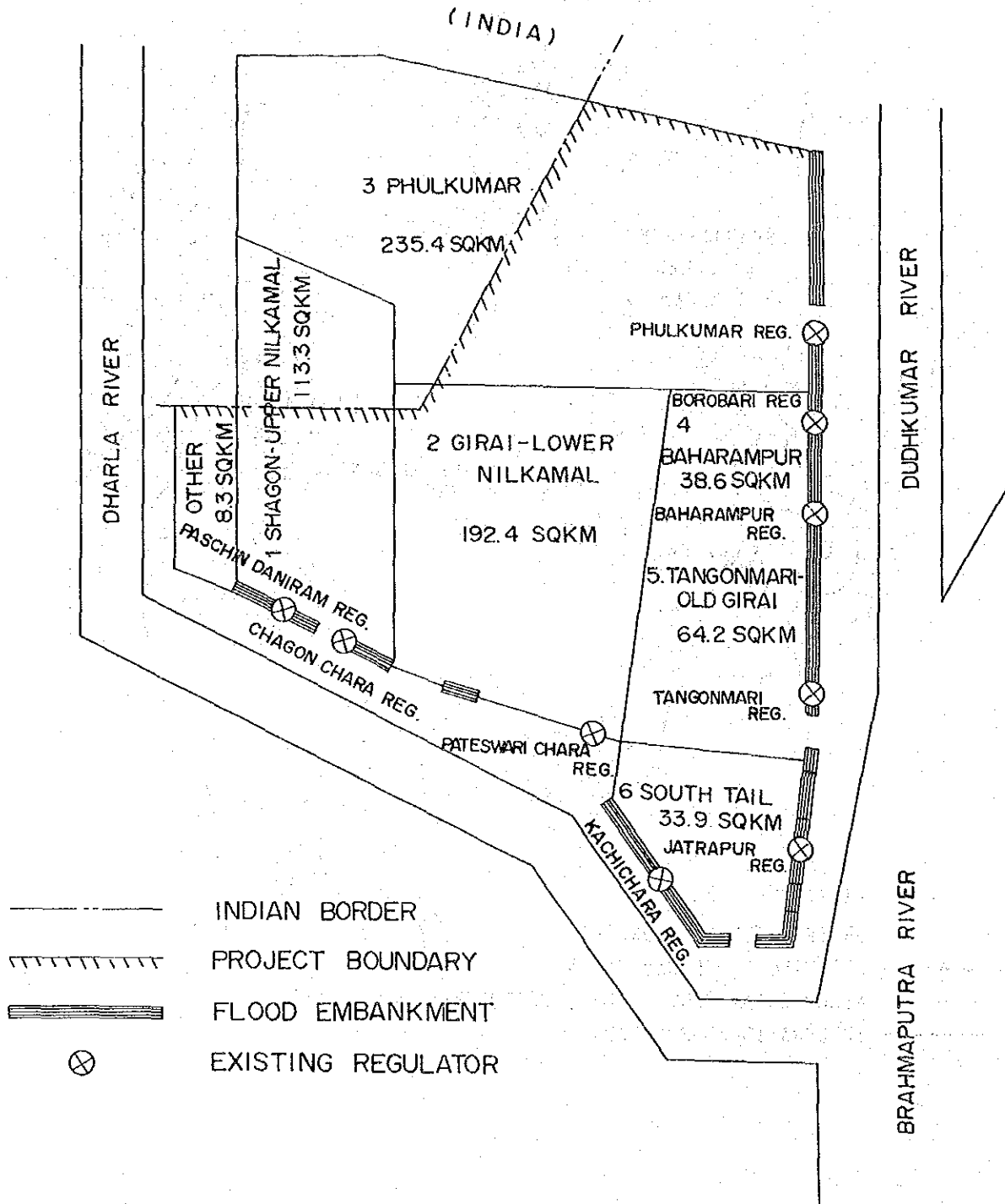


Fig. VII-1-3 Drainage Blocks, Regulators and Present Flood Embankment





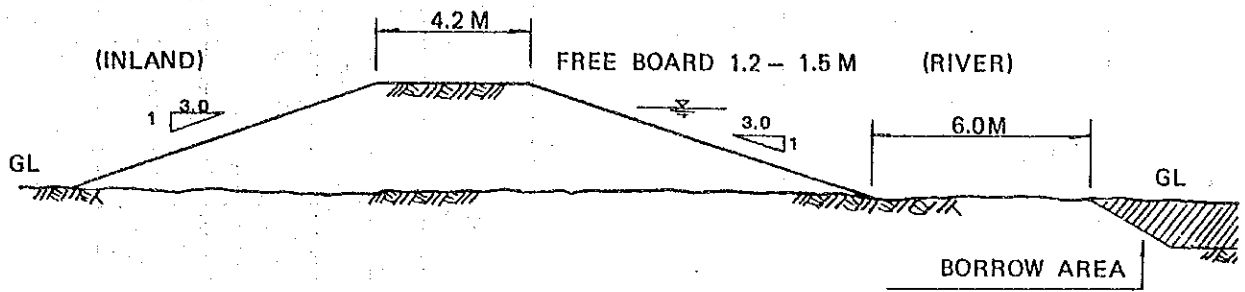


Fig. VII-1-4 Standard Cross-Section of Present Flood Embankment

Fig. VI-1-5 Accomplishment in Construction and Repair of Flood Embankment

DUDHKUMAR RIGHT EMBANKMENT

		Old Railway		Pulkumar Reg.		Baharampur Reg.		Tappanmari Reg.		Jatrapur Reg.	
NEED FOR REPAIR	TYPE	MJ	MN	NR	SP	SP	SP	MN	MN	MN	SP
		LENGTH	LENGTH	LENGTH	LENGTH	LENGTH	LENGTH	LENGTH	LENGTH	LENGTH	LENGTH
REPAIR		5.30	4.56	2.60	9.09	6.96	2.00	1.16	1.17	1.20	1.36
YEAR			'87 - '88		'83 - '84, '84 - '85, '88 - '89	'86 - '87	'87 - '88	'87 - '88	'80 - '89	'88 - '89	'87 - '88
CONSTRUCTION			'86 - '88		'84 - '85	'84 - '87	'85 - '87	'80 - '81			'80 - '81
DISTANCE (KM)			9.86 KM		11.69 KM	8.96 KM			2.37 KM		4.59 KM

DHARLA LEFT EMBANKMENT

		Paschin Daniram Shagon Chara Reg.		Pateswari Reg.		Kachichara Reg.	
NEED FOR REPAIR	TYPE	MN	MJ	NR	SP	NR	SP
		LENGTH	LENGTH	LENGTH	LENGTH	LENGTH	LENGTH
REPAIR		3.50	0.95	1.50	4.66	1.50	3.06
YEAR		'87 - '88	'87 - '88	'87 - '88	'88 - '89	'85 - '86	'88 - '89
CONSTRUCTION		'87 - '88	'86 - '87	(ROAD)	'88 - '89	(ROAD)	'82 - '83
DISTANCE (KM)		3.50	2.61	3.00	3.00	1.50	3.06

RC: Reconstruction 0.20 km SP: Shaping 28.86 km  
 MJ: Major Repair 12.45 NR: No Repair Needed 6.80  
 MN: Minor Repair 12.39 Total 60.71

## 2. Rainfall Analysis for Inland Runoff

### 2-1. Criteria

- Consecutive 5-day rainfall with a 5-year return period
- Spot rainfall records at Bhurungamari in 1965-88 for probability analysis
- Areal rainfall with the Thiessen Method from records at 3 stations; Bhurungamari, Kurigram and Lalmonirat

### 2-2. Consecutive 5-day Rainfall Design

Among the 3 raingauge stations in/near the project area, the Bhurungamari Station is located in the project area sharing the largest command area (57%) and the largest rainfall amount which is why this station was employed for this probability analysis.

Consecutive 5-day rainfall with a 5-year return period at Bhurungamari = 508 mm

The recorded 5-day rainfalls near to 508 mm has been examined on their distribution patterns as shown in the following table. Among them, a rainfall distribution of the most due convex -shaped records from 2nd.Oct.'77(515.5 mm) have been employed for design spot rainfall.

Table VII-2-1 5-day Rainfall near 508 mm at Bhurungamari (mm)

Ist date	25, Jul. '84	30, Aug. '74	2, Oct. '77	27, Jun. '68	21, Aug '66
Day-1	64	229	142.2	180	78
Day-2	91	55	121.9	68	79
Day-3	70	89	129.5	35	106
Day-4	74	114	81.3	36	192
Day-5	236	34	40.6	196	22
Total	535	521	515.5	515	477
			(employed)		

### 2-3. Area Rainfall

Total drainage area of the project area = 687 sq. km

Command area of the Thiessen Polygon

- Bhurungamari Station = 392 sq. km (57 %)
- Kurigram Station = 213 sq. km (31 %)
- Lalmonirhat Station = 82 sq. km (12 %)

Table VII-2-2 Area Rainfall by the Thiessen Method (mm)

Oct. '77	Bhurungamari	Kurigram	Lalmonirhat	Areal
	(x 0.57)	(x 0.31)	(x 0.12)	Rainfall
2nd	142.2	5.1	53.6	89.1
3rd	121.9	45.7	102.4	95.9
4nd	129.5	76.2	83.1	107.4
5nd	81.3	50.8	27.9	65.4
6nd	40.6	12.7	21.6	29.7
Total	515.5	190.5	288.6	387.5

### 2-4. Effective Rainfall for Runoff

Criteria:	Paddy Land	Non-paddy Land
- Daily evapotranspiration	5 mm/day	4 mm/day
- Water retention	50 mm	-
- Deep percolation	0 mm/day	10 mm/day
- Land use in monsoon seasons	77 %	23 %

Accordingly, the effective rainfall for runoff is shown in the following table.

Effective Rainfall for Runoff (unit : mm)

D a y	Areal Rain- fall	Paddy Land(77%)			Non Paddy Land (23%)				Effective Rain for Runoff
		Evp	Retn	Eff.R	Int	Evp	Inf1	Eff.R	
1	89.1	5.0	50.0	34.1	6.0	4.0	10.0	69.1	42.2
2	95.9	5.0	0	90.9	0	4.0	10.0	81.9	88.8
3	107.4	5.0	0	102.4	0	4.0	10.0	93.4	100.3
4	65.4	5.0	0	60.4	0	4.0	10.0	51.4	58.3
5	29.7	5.0	0	24.7	0	4.0	10.0	15.7	22.6

### 3. Runoff Analysis

#### 3-1. Background

In view of the topographical and hydrological nature of the project area, the upper part of the watershed is in Indian territory (31%) and runoff therein flows into the project area to cause inundation in the lower reaches in the project area.

Topographical information on the watershed is available from the topo-map produced in the 1960's. No water level and flow records inside the project area along major drainage channels are available. Instead, inquiries with local engineers and residents in the project area have been made to collect information on nature, patterns and the degree of flood occurrence and recession in the past.

A runoff analysis method, which is mathematical and requires fewer parameters and popularly applied in Japan, has been selected. "Integrated Unit-hydro-graph", thus selected, requires two parameters; flood concentration time and recession parameters.

### 3-2. Integrated Unit-hydrograph Method

Key parameters to control patterns of unit hydrograph are (1) peak discharge, (2) flood concentration time and (3) recession parameter. By employing this functional formula to represent characteristics of basins without sufficient flood records, it enables the construction of approximate unit hydrographs. The Integrated Unit-hydrograph Method established by Dr. Nakayas is thus selected for application.

Nakaysu examined unit hydrographs of various rivers, and proposed the following functional formula.

$$Q_p = \frac{AR_0 / 3.6}{0.3 t_p + t_k}$$

Aggression curve :  $t < t_p$

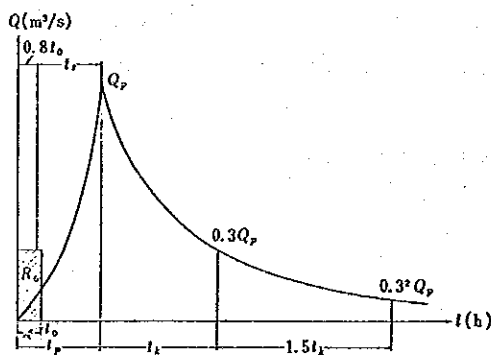
$$\frac{Q}{Q_p} = \left( \frac{t}{t_p} \right)^{2.4}$$

Recession curve :  $t > t_p$

$$\text{If } 1 \geq \frac{Q}{Q_p} \geq 0.3, \text{ then } \frac{Q}{Q_p} = 0.3^{\frac{(t-t_p)}{t_k}}$$

$$\text{If } 0.3 \geq \frac{Q}{Q_p} \geq 0.3^2, \text{ then } \frac{Q}{Q_p} = 0.3 \times 0.3^{\frac{[t - (t_p + t_k)]}{1.5 t_k}}$$

$$\text{If } 0.3^2 \geq \frac{Q}{Q_p}, \text{ then } \frac{Q}{Q_p} = 0.3^2 \times 0.3^{\frac{[t - (t_p + t_k + 1.5 t_k)]}{2.0 t_k}}$$



where,

$Q_p$  : maximum discharge in cms

$Q$  : discharge at the time of  $t$  in cms

$R_o$  : unit rainfall in mm

$t_p$  : flood peak concentration time in hr

$t_k$  : time of discharge recession in hr from  $Q_p$  till  $0.3 Q_p$

$A$  : drainage area in sq. km

The patterns of unit hydrographs are thus determined by two parameters  $t_p$  and  $t_k$ . These two parameters can be estimated from another formula developed and proposed by him for the application to mild or hilly basins found in Japan. The parameters therefore need to be verified with flood records and/or with the knowledge of local engineers and residents.

### 3-3. Input Data

#### Unit time of calculation

Drainage Block	1	2	3	4	5	6
Drain. Area (sq. km)	113.4	192.4	236.4	38.6	64.2	33.9
$t_p$ (hr)	34	37	55	21	15	8
$t_k$ (hr)	68	74	110	42	30	16

Effective Rainfall	Day-1	Day-2	Day-3	Day-4	Day-5	Total
for Runoff (mm/hr)	10.6	22.2	25.1	14.6	5.7	515.5

N.B.  $t_p$  and  $t_k$  have been calculated as follows. The results have been examined by local engineers and residents' experiences in the project area.

$$t_p = L/w$$

$$t_k = t_p \times C$$

where,

$$w = 72 \times (I)^{0.6}$$

whereas,

- I : land slope
- L : longest straight length of drainage in km
- C : multiplier for estimation of  $t_k$  (=2.0)

For the value of C, values between 1.0 and 3.0 are applicable depending on basin characteristics. The value 2.0 has been assumed from the topography, Land use and the outcome of inquiries with local residents and engineers.

### 3-4. Flood Concentration Time ( $t_p$ )

Table VII-3-1 Estimated Flood Concentration Time

Drainage Block	L (km)	I	w (km/hr)	$t_p$ (hr)
1 Upper Nilkamal Shagon	13 6 19	1/3, 300	0.56	34
2 Upper Girai Lower Girai	10 12 22	1/3, 000	0.59	37
3 Upper Phulkmar Lower Phulkumar	18 10	1/3, 300 1/5, 000	0.56 0.43	32 23 55
4 Baharampur	11	1/3, 600	0.53	21
5 Tangonmari Old girai	9	1/3, 000	0.59	15
6 South Tail	3	1/6, 000	0.39	8

### 3-5. Flood Hydrograph Synthesis

The application of the afore-mentioned Integrated Unit-hydrograph Method, flood hydrographs synthesized unit hydrographs are presented in the following Table. (Table VII-3-2)



Table VII-3-2 Synthesized Flood Runoff

DAY	HR	BLOCK 1	BLOCK 2	BLOCK 3	BLOCK 4	BLOCK 5	BLOCK 6
1	0 - 6	.024265	.0300042	.00844	.041146	.26164	1.53291
	-12	.254255	.320045	.09706	.43255	2.76621	8.9464
	-18	1.00753	1.26861	.38824	1.71543	9.58889	12.0291
	-24	2.6797	3.37381	1.0339	4.22949	15.2554	13.4249
2	0 - 6	5.74806	7.23747	2.21743	6.53157	19.5226	15.8329
	-12	10.7516	13.7436	4.21218	8.76995	25.0809	26.4385
	-18	16.3257	22.5437	7.36218	11.6319	34.7113	29.8426
	-24	22.3627	31.8495	12.0599	15.5644	42.626	31.3839
3	0 - 6	29.431	42.3268	18.7362	18.9928	48.3975	32.5915
	-12	38.0101	54.8142	27.108	21.8673	53.1967	37.2831
	-18	46.3427	68.6194	36.1575	24.4797	58.1863	38.1232
	-24	53.981	81.3593	46.1743	27.0155	62.2223	38.5036
4	0 - 6	61.1326	93.2469	57.4868	29.1061	66.0453	37.1728
	-12	67.8057	104.363	69.5322	30.4889	64.9194	30.4537
	-18	73.3033	114.222	80.8641	30.7104	59.9902	27.3856
	-24	77.1714	121.796	91.385	29.4736	55.8829	25.9965
5	0 - 6	79.066	126.601	101.062	28.2646	52.6723	23.9878
	-12	78.565	127.977	109.54	27.0568	48.5694	15.3085
	-18	77.1631	126.49	116.201	25.3355	41.3634	12.7006
	-24	75.1312	124.119	120.736	22.7558	35.4877	11.5199
6	0 - 6	72.0336	120.405	122.806	20.5123	30.8321	10.0938
	-12	67.5982	114.727	122.765	18.5398	26.2271	4.07704
	-18	63.012	107.548	121.688	16.4404	20.0943	2.42611
	-24	58.6059	100.548	119.341	15.878	15.094	1.57861
7	0 - 6	53.7041	93.3741	115.439	13.6586	11.3049	1.29554
	-12	48.5076	85.6148	110.319	11.8483	8.47256	0
	-18	43.7007	77.6164	104.989	10.3535	6.27255	0
	-24	39.5137	70.5591	99.3467	11.2334	4.47641	0
8	0 - 6	35.8087	64.3641	93.2426	10.0942	3.30635	0
	-12	32.5589	58.8807	86.9319	9.12313	2.35963	0
	-18	29.6994	53.9954	81.1106	8.2788	1.59356	0
	-24	27.1781	49.6447	75.7754	8.06717	.94242	0
9	0 - 6	24.9856	45.7681	70.8876	7.39988	.64523	0
	-12	22.9579	42.2829	66.4142	6.81572	.396065	0
	-18	21.1439	39.1255	62.329	6.30086	.18758	0
	-24	19.5195	36.2667	58.6065	3.94347	0	0
10	0 - 6	18.0973	33.6737	55.2168	3.65166	0	0
	-12	16.7601	31.3054	52.1352	3.3931	0	0
	-18	15.5255	29.1318	49.3096	3.16238	0	0
	-24	14.4129	27.1385	46.7032	1.33792	0	0
11	0 - 6	13.1917	25.3086	44.2988	1.24582	0	0
	-12	12.0428	23.6323	42.0838	1.16333	0	0
	-18	10.9884	22.0986	40.0197	1.08989	0	0
	-24	10.0162	20.6978	38.0823	0	0	0
12	0 - 6	8.84785	19.0379	36.263	0	0	0
	-12	7.76584	17.5009	34.5552	0	0	0
	-18	6.75997	16.0736	32.9369	0	0	0
	-24	5.82026	14.7484	31.395	0	0	0
13	0 - 6	4.87609	13.0969	29.9257	0	0	0
	-12	3.99394	11.5491	28.5247	0	0	0
	-18	3.16736	10.0951	27.1885	0	0	0
	-24	2.39011	8.72787	25.9185	0	0	0
14	0 - 6	1.9054	7.34058	24.7156	0	0	0
	-12	1.44976	6.03048	23.5744	0	0	0
	-18	1.02171	4.79259	22.4926	0	0	0
	-24	.61924	3.62155	21.4709	0	0	0
15	0 - 6	.44974	2.89546	20.51	0	0	0
	-12	.29041	2.20838	19.606	0	0	0
	-18	.140685	1.55942	18.7571	0	0	0
	-24	0	.945369	17.9601	0	0	0
16	0 - 6	0	.689164	17.2129	0	0	0
	-12	0	.44635	16.5126	0	0	0
	-18	0	.216926	15.8588	0	0	0
	-24	0	0	15.2442	0	0	0
17	0 - 6	0	0	14.6623	0	0	0
	-12	0	0	14.1114	0	0	0
	-18	0	0	13.5915	0	0	0
	-24	0	0	13.0992	0	0	0
18	0 - 6	0	0	12.3188	0	0	0
	-12	0	0	11.5696	0	0	0
	-18	0	0	10.8503	0	0	0
	-24	0	0	10.1598	0	0	0
19	0 - 6	0	0	9.15209	0	0	0
	-12	0	0	8.18004	0	0	0
	-18	0	0	7.24175	0	0	0
	-24	0	0	6.33617	0	0	0
20	0 - 6	0	0	5.37894	0	0	0
	-12	0	0	4.45585	0	0	0
	-18	0	0	3.56544	0	0	0
	-24	0	0	2.70472	0	0	0
21	0 - 6	0	0	2.1827	0	0	0
	-12	0	0	1.67931	0	0	0
	-18	0	0	1.19396	0	0	0
	-24	0	0	.72433	0	0	0
22	0 - 6	0	0	.53336	0	0	0
	-12	0	0	.34917	0	0	0
	-18	0	0	.17176	0	0	0
	-24	0	0	0	0	0	0
	0	0	0	0	0	0	0

### 3-6. Design Flood Water Level in the Outer Rivers

Before flood routings for the project area, water levels in the Dharla, Dudhkumar and Brahmaputra rivers have to be worked out when planned inland flood runoff and planned river floods occur. Planned floods, either inland or in rivers, are of a 5-year return period.

Places required for river water levels for flood routings and their location distances among existing water level gauging stations and themselves are presented in the following Figure. The water surface between existing gauging stations are herein assumed linear. Existing gauging stations thus employed are:

#### Chilmari Station in the Brahmaputra

- Noonkhawa Station in the Brahmaputra
- Kurigram Station in the Dharla
- Taluk Simulbari Station in the Dharla
- Pateswari Station in the Dudhkumar

#### (1) Flood water level when a design 5-day rainfall occurs

First of all, at the 5 stations, peak water levels and dates when the annual maximum 5-day rainfall occurs have been collected from past records. Median values of peak levels have then been worked out.

Water level records at the 5 stations during and after the design 5day rainfall (2-6, Oct. '77) have occurred and then been tabulated and the peaks have been adjusted to be equal to the median values. Water levels at drainage control structures have subsequently been worked out as presented in the following Table. (Table VII-3-3)

#### (2) Water level of a one-in-5-year flood

Annual maximum water levels and dates at the 5 stations have been collected from available records in the past 20 years and the fourth largest value has been extracted to imply the one-in-5-year peak flood water levels

Table VII-3-3 River Water Level When Once-in-5-Year Rainfall Occurs

D a y	Chil- mari Sta.	Noon- Khawa Sta.	Pates- wari Sta.	Kiri- gram Sta.	Taluk- Simul. Sta.	Shago- Chara Reg.	Pates. Chara Reg.	Phulk- mar Reg.	Baha- rampur Reg.	Tango- mari Reg.	Tango- mari Gap	Goga- dada Gap	Jatra- pur Reg.	Begon- gon Gap
1	22.56	29.25	28.32	25.01	28.56	27.02	25.25	27.41	26.61	26.04	25.88	25.46	25.25	24.53
2	.59	.36	.67	.17	.85	.26	.42	.66	.76	.14	.98	.55	.34	.63
3	.77	.42	.70	.54	29.15	.59	.78	.70	.81	.21	26.06	.64	.43	.82
4	.88	.47	.80	.63	.49	.82	.89	.78	.87	.26	.11	.70	.50	.90
5	23.05	.70	29.14	.83	.93	28.15	26.10	28.07	27.12	.49	.34	.92	.71	25.10
6	.23	.85	.21	26.01	30.01	.28	.28	.18	.26	.64	.49	26.07	.87	.27
7	.32	.87	28.91	25.91	29.71	.06	.16	.02	.22	.67	.52	.11	.91	.27
8	.42	.95	.62	.84	.45	27.89	.08	27.89	.24	.75	.60	.19	.99	.33
9	.47	27.04	.52	.71	.21	.69	25.94	.87	.29	.84	.68	.28	26.07	.34
10	.46	.02	.37	.63	28.95	.51	.85	.78	.25	.82	.66	.26	.05	.31
11	.38	26.86	.27	.46	.73	.31	.68	.65	.10	.66	.51	.11	25.92	.18
12	.23	.55	.33	.30	.57	.15	.52	.55	26.86	.36	.22	25.84	.65	24.97
13	22.93	.26	.42	.22	.45	.05	.44	.48	.63	.07	25.93	.55	.36	.73
14	.66	.04	.49	.04	.34	26.91	.26	.42	.46	25.85	.70	.32	.12	.51
15	.28	25.87	.40	24.94	.31	.85	.16	.29	.30	.66	.51	.10	24.90	.28

Table VII-3-4 Once-in-5-Year Flood Water Level in River Along Project Area

D a y	Chil- mari Sta.	Noon- Khawa Sta.	Pates- wari Sta.	Kiri- gram Sta.	Taluk- Simul. Sta.	Shago- Chara Reg.	Pates. Chara Reg.	Phulk- mar Reg.	Baha- rampur Reg.	Tango- mari Gap	Begon- gon Gap
1	23.62	27.89	29.45	25.21	28.56	28.08	25.55	28.77	28.16	26.71	26.32
2	.67	.88	.97	.32	.85	.05	.64	29.06	.24	.82	.42
3	.70	.85	30.18	.31	29.15	.05	.63	.16	.25	.92	.51
4	.73	.82	.17	.32	.49	.03	.64	.14	.22	.23	.52
5	.83	.79	.00	.45	.93	.33	.79	.03	.17	27.02	.61
6	24.08	.82	.25	26.46	30.01	29.32	26.80	.19	.24	.30	.89
7	.24	.88	.40	.65	29.71	.42	.98	.30	.31	.53	27.12
8	.26	.96	.46	.99	.45	.65	27.30	.37	.39	.57	.15
9	.21	.95	.34	.79	.21	.33	.09	.29	.36	.54	.12
10	.20	.89	.09	.38	28.95	.12	26.70	.13	.27	.49	.07
11	.10	.82	29.57	.17	.73	28.86	.49	28.80	.12	.44	.02
12	.01	.71	.25	25.94	.57	.67	.26	.58	27.97	.30	26.88
13	23.85	.59	.81	.89	.45	.62	.21	.28	.80	.06	.66
14	.72	.41	.70	.83	.34	.48	.14	.14	.63	26.92	.51
15	.56	.24	.54	.56	.31	.24	25.88	27.97	.36	.82	.40

at the station as follows.

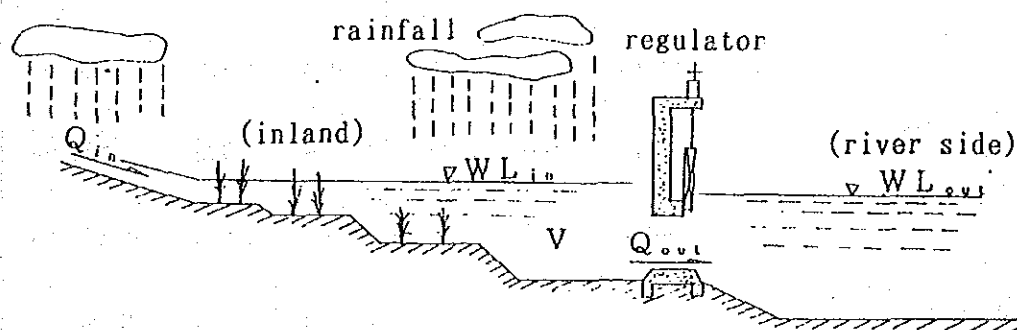
- Pateswari Station	HWL 30.46
- Noonkhama Station	HWL 27.96
- Chilmari Station	HWL 24.26
- Kurigram Station	HWL 26.99
- Taluk Simulbari Station	HWL 31.68

Dates when the annual maximum water levels as much as the above values occurred at the nearest two stations have been searched from the past records and found that 5th, Aug. '74 for Pateswari (WL 30.24) and Noonkhawa (WL 27.99) Stations, 19th, Aug. '80 for Noonkhawa (WL 27.96) and Chilmari (WL 24.25) and 18th, Sep. '84 for Kurigram (WL 27.38) and Taluk Simulbari (WL 31.74).

Water levels before and after the dates at the 5 stations have then been tabulated and adjusted to be equal to the one-in-5-year flood water levels as mentioned above by adding/ subtracting constant values. Water levels for drainage control have then been worked out as presented in the following Table. (Table VII-3-4)

### 3-7. Flood Routing

#### (1) Imaginary Concept of Drainage Simulation Model Applied



$$Q_{in} - Q_{out} = V_t - V_{t-1}$$

Where,  $t$  denotes time; unit time for simulation interval 6 hrs employed.

$Q_{in}$ ; by the aforementioned method.

$$Q_{out} = C.A.N \sqrt{2g (WL_{in} - WL_{out})}$$

$C$ ; denotes flow coefficient. (=0.85)

$A$ ; denotes X-sectional area of a gate vent. (=2.78 m<sup>2</sup>)

$N$ ; denotes number of gate vents.

$V$ ; denotes retained water volume.

## (2) Present Case

Under the present conditions, flood embankments along the project area have not been completed yet and a number of embankment gaps are left unclosed to allow influx to the project area whenever outer river water levels exceed the inland ones. That is, inundated inland water level always becomes equal to river water level at the exit of each drainage block. Flooding caused by once-in 5-year flood in the outer river has been analyzed to indicate as follow.

Results of Drainage Simulation Analysis (1)

Drainage Block Item	① Shagon Up. Nilk	② Girai-Lw. Nilk	③ Phulk-mar	④ Bahara-mpur	⑤ Tango-O. Girai	⑥ South Tail	Total
PRESENT CASE							
Max. Flood Level (m)	29.65	27.30	29.37	28.38	27.57	27.15	
Max. Submgd Area (ha)	989	3,251	1,550	2,062	5,969	3,319	17,140 ha
Ditto except Depress (ha)	924	2,771	1,100	1,845	5,559	2,945	15,146 ha
Damaged Area (ha)	51	881	621	1,485	4,307	2,843	10,188 ha
No. of Regulator (vent)	5	12	8	8	4	5	42 vents

(3) Case-1 :Protection of Crop Damage over 90% of Submerged Area

This is a case to protect crops from flood damage in terms of farm land area over 90% in each drainage block. In the simulation analysis on drainage improvement measures, more vents of regulators have firstly been considered. In case regulator cannot improve drainage till the planned level, pumping drainage has secondly been studied. Results of simulation analysis are presented in the following Table.

Results of Drainage Simulation Analysis (2)

Drainage Block Item	① Shagon Up. Nilk	② Girai-Lw. Nilk	③ Phulk-mar	④ Bahara-mpur	⑤ Tango. O. Girai	⑥ South Tail	Total
CASE-1 OVER 90% OF SUBMERGED AREA PROTECTED							
Max. Flood Level (m)	28.46	26.45	28.35	27.23	25.59	24.62	
Max. Submgd exc Dprss(ha)	189	911	334	797	1,243	845	3,996 ha
Damaged Area (ha)	6	169	0	185	556	295	1,211 ha
No. of Reg. req'd (vent)	15	22	26	8	8	8	87 vents
Pump Capac. req'd (cms)	0	0	0	7	14	7	28 cms

- N.B. 1. "No. of Reg. req'd" includes number of existing ones  
2. Two more vents of a regulator in Taluk Simulbari along the Dharla

(4) Case-2 :Protection of Crop Damage over 80% of Submerged Area

Similar considerations as to Case-1 has also been made to this case. The results are as shown in the following Table.

**Results of Drainage Simulation Analysis (3)**

Drainage Block Item	① Shagon Up. Nilk	② Girai-Lw. Nilk	③ Phulk-mar	④ Bahara-mpur	⑤ Tango. O. Girai	⑥ South Tail	Total
<b>CASE-2 OVER 80% OF SUBMERGED AREA PROTECTED</b>							
Max. Flood Level (m)	28.46	26.45	28.35	27.27	25.83	24.70	
Max. Submrgd exc Dprss (ha)	189	911	334	841	1,687	913	4,826 ha
Damaged Area (ha)	6	169	0	379	1,112	589	2,255 ha
No. of Reg. req'd (vent)	15	22	26	8	8	8	87 vents
Pump Capac. req'd (cms)	0	0	0	0	5	5	10 cms

N.B. 1. "No. of Reg. req'd" includes number of existing ones

2. Two more vents of a regulator in Taluk Simulbari along the Dharla

**Datum Field Level**

Block No.	1	2	3	4	5	6
Max. Flood Level (m)	29.65	27.30	29.37	28.39	27.57	27.15
Max. Submrgd Area (ha)	989	3,251	1,550	2,062	5,969	3,319
Ditto exc. Depress. (ha)	924	2,771	1,100	1,845	5,559	2,945
10% Area exc. Depress (ha)	92.4	277.1	110.0	184.5	555.9	294.5
Datum Field Level (m)	28.15	25.92	27.98	26.64	25.08	24.20
20% Area exc. Depress (ha)	184.8	554.2	220.0	369.0	111.8	589.0
Datum Field Level (m)	28.44	26.10	28.17	26.90	25.46	24.36



#### 4. Case Study on Flood Routing Simulation

Table VII-4-1 Case Study on Flood Routing Simulation

PAGE NO.	BLOCK NO.	NO. OF REG. VENTS	PUMPING CAPACITY (CMS)	FIELD DATUM LEVEL	WL>0.3M ABOVE FDL		REMARKS
					DURATION(DAY+HR)		
VII-28	1	15	0	28.15 28.44	0 DAYS & 6 HRS 0 0		PROPOSED
-29	2	22	0	25.92 26.10	3 1	0 0	PROPOSED
-30	3	26	0	27.98 28.17	1 0	0 0	PROPOSED
-31	4	8	0	26.64 26.90	7 5	18 0	PROPOSED
-32	4	8	5	26.64	7	6	
-33	4	8	6	26.64	7	0	
-34	4	8	7	26.64	7	0	
-35	4	8	8	26.64	6	18	
-36	4	8	9	26.64	5	18	
-37	4	8	10	26.64	4	12	
-38	4	8	11	26.64	2	12	
-39	4	8	12	26.64	0	0	
-40	5	8	5	25.08 25.46	OVER 9 DAYS 4 18		PROPOSED
-41	5	8	6	25.08	OVER 8 DAYS		
-42	5	8	8	25.08	OVER 8 DAYS		
-43	5	8	10	25.08	OVER 8 DAYS		

(to be continued)

PAGE NO.	BLOCK NO.	NO. OF REG. VENTS	PUMPING CAPACITY (CMS)	FIELD DATUM LEVEL	WL>0.3M ABOVE FDL		REMARKS
					DURATION(DAY+HR)		
-44	5	8	12	25.08	5	12	
-45	5	8	14	25.08	5	6	
-46	5	8	15	25.08	4	18	
-47	5	8	16	25.08	4	0	
-48	5	8	18	25.08	3	0	
-49	6	8	3	24.20 24.36	OVER 9 DAYS 6 18		
-50	6	8		24.20	OVER 9 DAYS		
-51	6	8	5	24.20 24.36	7 12 4 0		PROPOSED
-52	6	8	6	24.20	5	12	
-53	6	8	7	24.20	4	6	
-54	6	8	8	24.20	3	0	
-55	6	8	10	24.20	1	18	

KURIGRAM IIRRI & FLOOD CONTROL PROJECT

SHAGONCHARA BLOCK

BLOCK NO. = 1 RIV-WL NO.= 1 CASE NO.= 2  
 NO. OF GATE= 15 PUMP = 0

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	0.02	0.02	0.00	0.	0.	27.13	27.02
1	12	0.25	0.25	0.00	0.	0.	27.13	27.02
1	18	1.01	1.01	0.00	0.	0.	27.13	27.08
1	24	2.68	0.00	0.00	58.	0.	27.22	27.14
2	6	5.75	6.18	0.00	48.	0.	27.20	27.20
2	12	10.75	0.00	0.00	281.	8.	27.54	27.26
2	18	16.33	22.11	0.00	156.	0.	27.36	27.34
2	24	22.36	19.93	0.00	208.	1.	27.44	27.43
3	6	29.43	26.16	0.00	279.	8.	27.54	27.51
3	12	38.01	34.47	0.00	355.	15.	27.64	27.59
3	18	46.34	43.53	0.00	416.	21.	27.72	27.65
3	24	53.98	50.25	0.00	497.	28.	27.80	27.71
4	6	61.13	56.82	0.00	590.	37.	27.89	27.76
4	12	67.81	63.50	0.00	683.	46.	27.98	27.82
4	18	73.30	67.25	0.00	813.	68.	28.08	27.90
4	24	77.17	69.55	0.00	978.	104.	28.18	27.99
5	6	79.07	71.40	0.00	1144.	140.	28.28	28.07
5	12	78.57	71.73	0.00	1291.	170.	28.36	28.15
5	18	77.16	72.17	0.00	1399.	177.	28.40	28.18
5	24	75.13	71.53	0.00	1477.	183.	28.42	28.22
6	6	72.03	69.41	0.00	1534.	187.	28.45	28.25
6	12	67.60	65.82	0.00	1572.	189.	28.46	28.28
6	18	63.01	68.26	0.00	1459.	181.	28.42	28.23
6	24	58.51	67.14	0.00	1272.	168.	28.35	28.17
7	6	53.70	60.57	0.00	1124.	136.	28.26	28.12
7	12	48.51	54.95	0.00	985.	106.	28.18	28.06
7	18	43.70	49.06	0.00	869.	80.	28.12	28.02
7	24	39.51	44.39	0.00	763.	57.	28.05	27.98
8	6	36.81	39.14	0.00	691.	47.	27.99	27.93
8	12	32.56	35.21	0.00	634.	42.	27.94	27.89
8	18	29.70	32.29	0.00	578.	36.	27.88	27.84
8	24	27.18	30.01	0.00	517.	30.	27.82	27.79
9	6	24.99	27.43	0.00	464.	25.	27.77	27.74
9	12	22.96	25.24	0.00	415.	21.	27.72	27.69
9	18	21.14	22.92	0.00	377.	17.	27.67	27.65
9	24	19.52	21.15	0.00	341.	14.	27.62	27.60
10	6	18.10	19.73	0.00	306.	10.	27.57	27.56
10	12	16.75	18.36	0.00	271.	7.	27.53	27.51
10	18	15.53	17.24	0.00	234.	3.	27.48	27.46
10	24	14.41	16.40	0.00	191.	0.	27.42	27.41
11	6	13.19	14.72	0.00	158.	0.	27.37	27.36
11	12	12.04	13.54	0.00	126.	0.	27.32	27.31
11	18	10.99	12.31	0.00	97.	0.	27.28	27.27
11	24	10.02	0.00	0.00	314.	11.	27.58	27.23
12	6	8.85	20.94	0.00	53.	0.	27.21	27.19
12	12	7.77	9.41	0.00	17.	0.	27.16	27.15
12	18	6.76	7.55	0.00	0.	0.	27.13	27.13
12	24	5.82	5.82	0.00	0.	0.	27.13	27.10

KURIGRAM IRRI & FLOOD CONTROL PROJECT

PATESWARI CHARA BLOCK

BLOCK NO. = 2 RIV-WL NO. = 2 CASE NO. = 2  
 NO. OF GATE = 22 PUMP = 0

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	0.03	0.00	0.00	1.	0.	24.38	25.25
1	12	0.32	0.00	0.00	8.	0.	24.38	25.25
1	18	1.27	0.00	0.00	35.	0.	24.39	25.29
1	24	3.37	0.00	0.00	108.	0.	24.40	25.34
2	6	7.24	0.00	0.00	264.	0.	24.44	25.38
2	12	13.74	0.00	0.00	561.	0.	24.50	25.42
2	18	22.54	0.00	0.00	1048.	0.	24.60	25.51
2	24	31.85	0.00	0.00	1736.	4.	24.74	25.60
3	6	42.33	0.00	0.00	2650.	15.	24.92	25.69
3	12	54.81	0.00	0.00	3834.	46.	25.15	25.78
3	18	68.62	0.00	0.00	5316.	94.	25.43	25.81
3	24	81.36	0.00	0.00	7074.	175.	25.71	25.84
4	6	93.25	37.22	0.00	8284.	249.	25.89	25.86
4	12	104.36	68.50	0.00	9058.	362.	25.98	25.89
4	18	114.22	78.54	0.00	9829.	487.	26.06	25.94
4	24	121.80	86.89	0.00	10583.	609.	26.14	26.00
5	6	126.60	93.37	0.00	11301.	725.	26.21	26.05
5	12	127.98	94.46	0.00	12025.	777.	26.27	26.10
5	18	126.49	95.81	0.00	12687.	816.	26.32	26.15
5	24	124.12	95.98	0.00	13295.	851.	26.36	26.19
6	6	120.41	94.90	0.00	13846.	883.	26.40	26.24
6	12	114.73	92.98	0.00	14316.	911.	26.44	26.28
6	18	107.55	102.57	0.00	14424.	917.	26.45	26.25
6	24	100.55	107.41	0.00	14275.	908.	26.44	26.22
7	6	93.37	108.71	0.00	13944.	889.	26.41	26.19
7	12	85.61	107.42	0.00	13473.	862.	26.38	26.16
7	18	77.62	102.31	0.00	12939.	831.	26.34	26.14
7	24	70.56	96.39	0.00	12382.	798.	26.29	26.12
8	6	64.36	90.70	0.00	11813.	765.	26.25	26.10
8	12	58.88	83.01	0.00	11292.	723.	26.21	26.08
8	18	54.00	77.28	0.00	10789.	642.	26.16	26.05
8	24	49.64	71.93	0.00	10307.	564.	26.11	26.01
9	6	45.77	67.08	0.00	9847.	490.	26.06	25.98
9	12	42.28	63.64	0.00	9386.	415.	26.01	25.94
9	18	39.13	55.84	0.00	9025.	357.	25.97	25.92
9	24	36.27	50.21	0.00	8723.	308.	25.94	25.90
10	6	33.67	47.30	0.00	8429.	261.	25.91	25.87
10	12	31.31	41.97	0.00	8199.	244.	25.88	25.85
10	18	29.13	42.32	0.00	7914.	226.	25.84	25.81
10	24	27.14	39.84	0.00	7640.	210.	25.80	25.77
11	6	25.31	38.86	0.00	7347.	192.	25.75	25.72
11	12	23.63	37.37	0.00	7050.	174.	25.71	25.68
11	18	22.10	35.38	0.00	6763.	156.	25.67	25.64
11	24	20.70	35.20	0.00	6450.	137.	25.62	25.60
12	6	19.04	31.82	0.00	6174.	124.	25.58	25.56
12	12	17.50	27.88	0.00	5950.	116.	25.54	25.52
12	18	16.07	22.72	0.00	5807.	111.	25.51	25.50
12	24	14.75	21.05	0.00	5670.	107.	25.49	25.48

3 days  
 1 day

KURIGRAM IRRI & FLOOD CONTROL PROJECT

PHULKUMAR BLOCK

BLOCK NO. = 3 RIV-WL NO. = 3 CASE NO. = 2  
 NO. OF GATE = 26 PUMP = 0

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	0.01	0.01	0.00	0.	0.	27.43	27.41
1	12	0.10	0.10	0.00	0.	0.	27.43	27.41
1	18	0.39	0.00	0.00	8.	0.	27.43	27.47
1	24	1.03	0.00	0.00	31.	0.	27.44	27.54
2	6	2.22	0.00	0.00	79.	0.	27.45	27.60
2	12	4.21	0.00	0.00	170.	0.	27.47	27.66
2	18	7.36	0.00	0.00	329.	0.	27.50	27.67
2	24	12.06	0.00	0.00	589.	0.	27.56	27.68
3	6	18.74	0.00	0.00	994.	0.	27.65	27.69
3	12	27.11	17.81	0.00	1195.	0.	27.70	27.70
3	18	36.16	30.06	0.00	1326.	0.	27.73	27.72
3	24	46.17	39.21	0.00	1477.	9.	27.76	27.74
4	6	57.49	49.09	0.00	1658.	24.	27.79	27.76
4	12	69.53	60.82	0.00	1846.	40.	27.83	27.78
4	18	80.85	62.05	0.00	2253.	74.	27.90	27.85
4	24	91.39	68.56	0.00	2746.	116.	27.99	27.93
5	6	101.06	77.11	0.00	3263.	163.	28.08	28.00
5	12	109.54	85.00	0.00	3793.	215.	28.16	28.07
5	18	116.20	97.70	0.00	4192.	254.	28.22	28.10
5	24	120.74	104.81	0.00	4537.	288.	28.28	28.13
6	6	122.81	110.49	0.00	4803.	314.	28.32	28.15
6	12	122.77	112.76	0.00	5019.	334.	28.35	28.18
6	18	121.69	124.04	0.00	4968.	330.	28.35	28.14
6	24	119.34	127.85	0.00	4784.	312.	28.32	28.10
7	6	115.44	127.71	0.00	4519.	286.	28.28	28.06
7	12	110.32	125.01	0.00	4202.	255.	28.23	28.02
7	18	104.99	119.62	0.00	3886.	224.	28.18	27.99
7	24	99.35	113.85	0.00	3573.	193.	28.13	27.96
8	6	93.24	108.06	0.00	3253.	162.	28.08	27.92
8	12	86.93	101.22	0.00	2944.	132.	28.03	27.89
8	18	81.11	90.65	0.00	2738.	115.	27.99	27.89
8	24	75.78	80.70	0.00	2632.	106.	27.97	27.88
9	6	70.89	75.39	0.00	2534.	98.	27.95	27.88
9	12	66.41	69.84	0.00	2460.	92.	27.94	27.87
9	18	62.33	69.84	0.00	2298.	78.	27.91	27.85
9	24	58.61	66.02	0.00	2138.	65.	27.88	27.83
10	6	55.22	62.41	0.00	1982.	51.	27.85	27.80
10	12	52.14	59.37	0.00	1826.	38.	27.82	27.78
10	18	49.31	57.53	0.00	1649.	23.	27.79	27.75
10	24	46.70	55.93	0.00	1450.	7.	27.75	27.72
11	6	44.30	52.02	0.00	1283.	0.	27.72	27.68
11	12	42.08	49.30	0.00	1127.	0.	27.69	27.65
11	18	40.02	46.68	0.00	983.	0.	27.65	27.63
11	24	38.08	43.55	0.00	865.	0.	27.63	27.60
12	6	36.26	42.00	0.00	741.	0.	27.60	27.58
12	12	34.56	39.61	0.00	632.	0.	27.57	27.55
12	18	32.94	37.81	0.00	527.	0.	27.55	27.53
12	24	31.40	35.60	0.00	436.	0.	27.53	27.52

KURIGRAM IRRIGATION & FLOOD CONTROL PROJECT

BAHARAMPUR BLOCK

BLOCK NO. = 4 RIV-WL NO. = 4 CASE NO. = 2  
 NO. OF GATE = 8 PUMP = 0

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	0.04	0.00	0.00	1.	0.	25.60	26.61
1	12	0.43	0.00	0.00	10.	0.	25.60	26.61
1	18	1.72	0.00	0.00	47.	0.	25.62	26.65
1	24	4.23	0.00	0.00	139.	0.	25.67	26.69
2	6	6.53	0.00	0.00	280.	0.	25.73	26.72
2	12	8.77	0.00	0.00	469.	0.	25.82	26.76
2	18	11.63	0.00	0.00	720.	6.	25.93	26.77
2	24	15.56	0.00	0.00	1057.	39.	26.07	26.79
3	6	18.99	0.00	0.00	1467.	78.	26.23	26.80
3	12	21.87	0.00	0.00	1939.	104.	26.38	26.81
3	18	24.48	0.00	0.00	2468.	136.	26.54	26.83
3	24	27.02	0.00	0.00	3051.	201.	26.67	26.84
4	6	29.11	0.00	0.00	3680.	270.	26.82	26.86
4	12	30.49	10.19	0.00	4119.	354.	26.88	26.87
4	18	30.71	11.27	0.00	4539.	436.	26.95	26.93
4	24	29.47	11.01	0.00	4937.	515.	27.01	27.00
5	6	28.26	10.18	0.00	5328.	591.	27.07	27.06
5	12	27.06	9.11	0.00	5716.	666.	27.13	27.12
5	18	25.34	8.47	0.00	6080.	708.	27.16	27.16
5	24	22.76	6.68	0.00	6427.	748.	27.20	27.19
6	6	20.51	4.47	0.00	6774.	788.	27.23	27.23
6	12	18.54	2.66	0.00	7117.	828.	27.26	27.26
6	18	16.44	11.82	0.00	7217.	840.	27.27	27.25
6	24	15.88	15.17	0.00	7232.	841.	27.27	27.24
7	6	13.66	16.34	0.00	7174.	835.	27.26	27.23
7	12	11.85	16.53	0.00	7073.	823.	27.25	27.22
7	18	10.35	13.58	0.00	7003.	815.	27.25	27.23
7	24	11.23	11.70	0.00	6993.	814.	27.25	27.23
8	6	10.09	9.94	0.00	6997.	814.	27.25	27.24
8	12	9.12	8.37	0.00	7013.	816.	27.25	27.24
8	18	8.28	4.79	0.00	7088.	825.	27.26	27.25
8	24	8.07	3.51	0.00	7186.	836.	27.27	27.27
9	6	7.40	2.75	0.00	7287.	848.	27.27	27.28
9	12	6.82	0.00	0.00	7434.	865.	27.29	27.29
9	18	6.30	6.90	0.00	7421.	863.	27.29	27.28
9	24	3.94	7.99	0.00	7334.	853.	27.28	27.27
10	6	3.65	8.35	0.00	7232.	841.	27.27	27.26
10	12	3.39	8.41	0.00	7124.	829.	27.26	27.25
10	18	3.16	14.13	0.00	6887.	801.	27.24	27.21
10	24	1.34	16.25	0.00	6565.	764.	27.21	27.18
11	6	1.25	17.52	0.00	6213.	723.	27.18	27.14
11	12	1.16	17.85	0.00	5853.	682.	27.14	27.10
11	18	1.09	19.75	0.00	5450.	615.	27.09	27.04
11	24	0.00	18.66	0.00	5046.	536.	27.03	26.98
12	6	0.00	18.83	0.00	4640.	456.	26.97	26.92
12	12	0.00	18.44	0.00	4241.	378.	26.90	26.86
12	18	0.00	17.85	0.00	3856.	303.	26.84	26.80
12	24	0.00	15.40	0.00	3523.	253.	26.78	26.75

7 days 18 hrs  
5 days

KURIGRAM IRRI & FLOOD CONTROL PROJECT

BAHARAMPUR BLOCK

BLOCK NO. = 4 RIV-WL NO. = 4 CASE NO. = 3  
 NO. OF GATE = 8 PUMP = 5

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	0.04	0.00	0.04	0.	0.	25.60	26.61
1	12	0.43	0.00	0.43	0.	0.	25.60	26.61
1	18	1.72	0.00	1.72	0.	0.	25.60	26.65
1	24	4.23	0.00	4.23	0.	0.	25.60	26.69
2	6	6.53	0.00	5.00	33.	0.	25.62	26.72
2	12	8.77	0.00	5.00	115.	0.	25.65	26.76
2	18	11.63	0.00	5.00	258.	0.	25.72	26.77
2	24	15.56	0.00	5.00	486.	0.	25.83	26.79
3	6	18.99	0.00	5.00	788.	13.	25.96	26.80
3	12	21.87	0.00	5.00	1153.	49.	26.11	26.81
3	18	24.48	0.00	5.00	1573.	83.	26.27	26.83
3	24	27.02	0.00	5.00	2049.	110.	26.41	26.84
4	6	29.11	0.00	5.00	2570.	148.	26.56	26.86
4	12	30.49	0.00	5.00	3120.	208.	26.69	26.87
4	18	30.71	0.00	5.00	3675.	269.	26.81	26.93
4	24	29.47	0.00	5.00	4204.	371.	26.90	27.00
5	6	28.26	0.00	5.00	4707.	469.	26.98	27.06
5	12	27.06	0.00	5.00	5183.	563.	27.05	27.12
5	18	25.34	0.00	5.00	5622.	649.	27.12	27.16
5	24	22.76	0.00	5.00	6006.	699.	27.16	27.19
6	6	20.51	0.00	5.00	6341.	738.	27.19	27.23
6	12	18.54	0.00	5.00	6633.	772.	27.21	27.26
6	18	16.44	0.00	5.00	6880.	801.	27.24	27.25
6	24	15.88	9.02	0.00	7028.	818.	27.25	27.24
7	6	13.66	13.10	0.00	7041.	819.	27.25	27.23
7	12	11.85	14.49	0.00	6984.	813.	27.25	27.22
7	18	10.35	12.01	0.00	6948.	808.	27.24	27.23
7	24	11.23	10.64	0.00	6961.	810.	27.24	27.23
8	6	10.09	9.25	0.00	6979.	812.	27.25	27.24
8	12	9.12	7.99	0.00	7004.	815.	27.25	27.24
8	18	8.28	0.00	5.00	7074.	823.	27.25	27.25
8	24	8.07	0.00	5.00	7141.	831.	27.26	27.27
9	6	7.40	0.00	5.00	7192.	837.	27.27	27.28
9	12	6.82	0.00	5.00	7232.	841.	27.27	27.29
9	18	6.30	0.00	5.00	7260.	845.	27.27	27.28
9	24	3.94	0.00	5.00	7237.	842.	27.27	27.27
10	6	3.65	5.99	0.00	7186.	836.	27.27	27.26
10	12	3.39	7.38	0.00	7100.	826.	27.26	27.25
10	18	3.16	13.74	0.00	6872.	800.	27.24	27.21
10	24	1.34	16.03	0.00	6555.	763.	27.21	27.18
11	6	1.25	17.38	0.00	6206.	723.	27.18	27.14
11	12	1.16	18.24	0.00	5837.	680.	27.14	27.10
11	18	1.09	19.47	0.00	5440.	613.	27.09	27.04
11	24	0.00	18.95	0.00	5031.	533.	27.03	26.98
12	6	0.00	18.52	0.00	4631.	454.	26.96	26.92
12	12	0.00	18.26	0.00	4236.	377.	26.90	26.86
12	18	0.00	17.74	0.00	3853.	302.	26.84	26.80
12	24	0.00	15.32	0.00	3522.	252.	26.78	26.75

7 days 6 hrs

KURIGRAM IRRI & FLOOD CONTROL PROJECT

BAHARAMPUR BLOCK

BLOCK NO. = 4 RIV-WL NO. = 4 CASE NO. = 3  
 NO. OF GATE = 8 PUMP = 6

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	0.04	0.00	0.04	0.	0.	25.60	26.61
1	12	0.43	0.00	0.43	0.	0.	25.60	26.61
1	18	1.72	0.00	1.72	0.	0.	25.60	26.65
1	24	4.23	0.00	4.23	0.	0.	25.60	26.69
2	6	6.53	0.00	6.00	11.	0.	25.61	26.72
2	12	8.77	0.00	6.00	71.	0.	25.63	26.76
2	18	11.63	0.00	6.00	193.	0.	25.69	26.77
2	24	15.56	0.00	6.00	400.	0.	25.79	26.79
3	6	18.99	0.00	6.00	680.	2.	25.92	26.80
3	12	21.87	0.00	6.00	1023.	36.	26.06	26.81
3	18	24.48	0.00	6.00	1422.	75.	26.22	26.83
3	24	27.02	0.00	6.00	1876.	100.	26.36	26.84
4	6	29.11	0.00	6.00	2375.	128.	26.51	26.86
4	12	30.49	0.00	6.00	2904.	184.	26.64	26.87
4	18	30.71	0.00	6.00	3438.	243.	26.76	26.93
4	24	29.47	0.00	6.00	3945.	320.	26.86	27.00
5	6	28.26	0.00	6.00	4426.	414.	26.93	27.06
5	12	27.06	0.00	6.00	4881.	503.	27.00	27.12
5	18	25.34	0.00	6.00	5298.	585.	27.07	27.16
5	24	22.76	0.00	6.00	5660.	656.	27.12	27.19
6	6	20.51	0.00	6.00	5974.	696.	27.15	27.23
6	12	18.54	0.00	6.00	6244.	727.	27.18	27.26
6	18	16.44	0.00	6.00	6470.	753.	27.20	27.25
6	24	15.88	0.00	6.00	6683.	778.	27.22	27.24
7	6	13.66	0.00	6.00	6849.	797.	27.23	27.23
7	12	11.85	11.11	0.00	6865.	799.	27.24	27.22
7	18	10.35	9.67	0.00	6880.	801.	27.24	27.23
7	24	11.23	9.22	0.00	6923.	806.	27.24	27.23
8	6	10.09	8.43	0.00	6959.	810.	27.24	27.24
8	12	9.12	7.53	0.00	6993.	814.	27.25	27.24
8	18	8.28	0.00	6.00	7043.	819.	27.25	27.25
8	24	8.07	0.00	6.00	7087.	825.	27.26	27.27
9	6	7.40	0.00	6.00	7118.	828.	27.26	27.28
9	12	6.82	0.00	6.00	7135.	830.	27.26	27.29
9	18	6.30	0.00	6.00	7142.	831.	27.26	27.28
9	24	3.94	0.00	6.00	7097.	826.	27.26	27.27
10	6	3.65	0.00	6.00	7047.	820.	27.25	27.26
10	12	3.39	0.00	6.00	6990.	813.	27.25	27.25
10	18	3.16	11.80	0.00	6804.	792.	27.23	27.21
10	24	1.34	14.98	0.00	6509.	758.	27.20	27.18
11	6	1.25	16.73	0.00	6175.	719.	27.17	27.14
11	12	1.16	17.81	0.00	5815.	677.	27.14	27.10
11	18	1.09	19.07	0.00	5427.	610.	27.09	27.04
11	24	0.00	18.69	0.00	5023.	531.	27.03	26.98
12	6	0.00	18.37	0.00	4626.	454.	26.96	26.92
12	12	0.00	18.18	0.00	4234.	377.	26.90	26.86
12	18	0.00	17.68	0.00	3852.	302.	26.84	26.80
12	24	0.00	15.28	0.00	3522.	252.	26.78	26.75



KURIGRAM IRRI & FLOOD CONTROL PROJECT

BAHARAMPUR BLOCK

BLOCK NO. = 4 RIV-WL NO. = 4 CASE NO. = 3  
 NO. OF GATE = 8 PUMP = 7

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	0.04	0.00	0.04	0.	0.	25.60	26.61
1	12	0.43	0.00	0.43	0.	0.	25.60	26.61
1	18	1.72	0.00	1.72	0.	0.	25.60	26.65
1	24	4.23	0.00	4.23	0.	0.	25.60	26.69
2	6	6.53	0.00	6.53	0.	0.	25.60	26.72
2	12	8.77	0.00	7.00	38.	0.	25.62	26.76
2	18	11.63	0.00	7.00	138.	0.	25.67	26.77
2	24	15.56	0.00	7.00	323.	0.	25.75	26.79
3	6	18.99	0.00	7.00	582.	0.	25.87	26.80
3	12	21.87	0.00	7.00	903.	24.	26.01	26.81
3	18	24.48	0.00	7.00	1281.	61.	26.16	26.83
3	24	27.02	0.00	7.00	1713.	91.	26.31	26.84
4	6	29.11	0.00	7.00	2191.	117.	26.46	26.86
4	12	30.49	0.00	7.00	2698.	162.	26.59	26.87
4	18	30.71	0.00	7.00	3210.	218.	26.71	26.93
4	24	29.47	0.00	7.00	3696.	272.	26.82	27.00
5	6	28.26	0.00	7.00	4155.	361.	26.89	27.06
5	12	27.06	0.00	7.00	4588.	446.	26.96	27.12
5	18	25.34	0.00	7.00	4984.	524.	27.02	27.16
5	24	22.76	0.00	7.00	5325.	590.	27.07	27.19
6	6	20.51	0.00	7.00	5617.	648.	27.12	27.23
6	12	18.54	0.00	7.00	5866.	683.	27.15	27.26
6	18	16.44	0.00	7.00	6070.	707.	27.16	27.25
6	24	15.88	0.00	7.00	6261.	729.	27.18	27.24
7	6	13.66	0.00	7.00	6405.	746.	27.19	27.23
7	12	11.85	0.00	7.00	6510.	758.	27.20	27.22
7	18	10.35	0.00	7.00	6582.	766.	27.21	27.23
7	24	11.23	0.00	7.00	6674.	777.	27.22	27.23
8	6	10.09	0.00	7.00	6741.	784.	27.22	27.24
8	12	9.12	0.00	7.00	6787.	790.	27.23	27.24
8	18	8.28	0.00	7.00	6814.	793.	27.23	27.25
8	24	8.07	0.00	7.00	6837.	796.	27.23	27.27
9	6	7.40	0.00	7.00	6846.	797.	27.23	27.28
9	12	6.82	0.00	7.00	6842.	796.	27.23	27.29
9	18	6.30	0.00	7.00	6827.	794.	27.23	27.28
9	24	3.94	0.00	7.00	6761.	787.	27.23	27.27
10	6	3.65	0.00	7.00	6688.	778.	27.22	27.26
10	12	3.39	0.00	7.00	6611.	769.	27.21	27.25
10	18	3.16	0.00	7.00	6528.	760.	27.21	27.21
10	24	1.34	10.05	0.00	6340.	738.	27.19	27.18
11	6	1.25	14.12	0.00	6061.	706.	27.16	27.14
11	12	1.16	16.03	0.00	5740.	669.	27.13	27.10
11	18	1.09	17.66	0.00	5382.	602.	27.08	27.04
11	24	0.00	17.82	0.00	4998.	526.	27.02	26.98
12	6	0.00	17.86	0.00	4612.	451.	26.96	26.92
12	12	0.00	17.89	0.00	4225.	375.	26.90	26.86
12	18	0.00	17.51	0.00	3847.	301.	26.84	26.80
12	24	0.00	15.16	0.00	3520.	252.	26.78	26.75

KURIGRAM IRRI & FLOOD CONTROL PROJECT

BAHARAMPUR BLOCK

BLOCK NO. = 4 RIV-WL NO. = 4 CASE NO. = 3  
 NO. OF GATE = 8 PUMP = 8

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	0.04	0.00	0.04	0.	0.	25.60	26.61
1	12	0.43	0.00	0.43	0.	0.	25.60	26.61
1	18	1.72	0.00	1.72	0.	0.	25.60	26.65
1	24	4.23	0.00	4.23	0.	0.	25.60	26.69
2	6	6.53	0.00	6.53	0.	0.	25.60	26.72
2	12	8.77	0.00	8.00	17.	0.	25.61	26.76
2	18	11.63	0.00	8.00	95.	0.	25.64	26.77
2	24	15.56	0.00	8.00	258.	0.	25.72	26.79
3	6	18.99	0.00	8.00	496.	0.	25.83	26.80
3	12	21.87	0.00	8.00	795.	13.	25.97	26.81
3	18	24.48	0.00	8.00	1151.	48.	26.11	26.83
3	24	27.02	0.00	8.00	1562.	83.	26.26	26.84
4	6	29.11	0.00	8.00	2018.	108.	26.40	26.86
4	12	30.49	0.00	8.00	2504.	140.	26.54	26.87
4	18	30.71	0.00	8.00	2994.	194.	26.66	26.93
4	24	29.47	0.00	8.00	3458.	245.	26.76	27.00
5	6	28.26	0.00	8.00	3896.	310.	26.85	27.06
5	12	27.06	0.00	8.00	4308.	391.	26.91	27.12
5	18	25.34	0.00	8.00	4682.	464.	26.97	27.16
5	24	22.76	0.00	8.00	5001.	527.	27.02	27.19
6	6	20.51	0.00	8.00	5271.	580.	27.06	27.23
6	12	18.54	0.00	8.00	5499.	625.	27.10	27.26
6	18	16.44	0.00	8.00	5681.	660.	27.13	27.25
6	24	15.88	0.00	8.00	5851.	681.	27.14	27.24
7	6	13.66	0.00	8.00	5973.	696.	27.15	27.23
7	12	11.85	0.00	8.00	6056.	705.	27.16	27.22
7	18	10.35	0.00	8.00	6107.	711.	27.17	27.23
7	24	11.23	0.00	8.00	6177.	719.	27.17	27.23
8	6	10.09	0.00	8.00	6222.	724.	27.18	27.24
8	12	9.12	0.00	8.00	6247.	727.	27.18	27.24
8	18	8.28	0.00	8.00	6253.	728.	27.18	27.25
8	24	8.07	0.00	8.00	6254.	728.	27.18	27.27
9	6	7.40	0.00	8.00	6241.	727.	27.18	27.28
9	12	6.82	0.00	8.00	6216.	724.	27.18	27.29
9	18	6.30	0.00	8.00	6179.	719.	27.17	27.28
9	24	3.94	0.00	8.00	6091.	709.	27.17	27.27
10	6	3.65	0.00	8.00	5997.	698.	27.16	27.26
10	12	3.39	0.00	8.00	5898.	687.	27.15	27.25
10	18	3.16	0.00	8.00	5793.	675.	27.14	27.21
10	24	1.34	0.00	8.00	5649.	654.	27.12	27.18
11	6	1.25	0.00	8.00	5504.	625.	27.10	27.14
11	12	1.16	0.00	8.00	5356.	597.	27.08	27.10
11	18	1.09	8.51	0.00	5196.	565.	27.05	27.04
11	24	0.00	13.84	0.00	4897.	507.	27.01	26.98
12	6	0.00	15.76	0.00	4556.	440.	26.95	26.92
12	12	0.00	16.75	0.00	4194.	369.	26.90	26.86
12	18	0.00	16.85	0.00	3830.	298.	26.84	26.80
12	24	0.00	14.70	0.00	3513.	251.	26.78	26.75

KURIGRAM IIRI & FLOOD CONTROL PROJECT

BAHARAMPUR BLOCK

BLOCK NO. = 4 RIV-WL NO. = 4 CASE NO. = 3  
 NO. OF GATE = 8 PUMP = 9

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	0.04	0.00	0.04	0.	0.	25.60	26.61
1	12	0.43	0.00	0.43	0.	0.	25.60	26.61
1	18	1.72	0.00	1.72	0.	0.	25.60	26.65
1	24	4.23	0.00	4.23	0.	0.	25.60	26.69
2	6	6.53	0.00	6.53	0.	0.	25.60	26.72
2	12	8.77	0.00	8.77	0.	0.	25.60	26.76
2	18	11.63	0.00	9.00	57.	0.	25.63	26.77
2	24	15.56	0.00	9.00	199.	0.	25.69	26.79
3	6	18.99	0.00	9.00	414.	0.	25.79	26.80
3	12	21.87	0.00	9.00	692.	3.	25.92	26.81
3	18	24.48	0.00	9.00	1027.	36.	26.06	26.83
3	24	27.02	0.00	9.00	1416.	75.	26.22	26.84
4	6	29.11	0.00	9.00	1850.	99.	26.35	26.86
4	12	30.49	0.00	9.00	2314.	124.	26.49	26.87
4	18	30.71	0.00	9.00	2783.	171.	26.61	26.93
4	24	29.47	0.00	9.00	3226.	220.	26.71	27.00
5	6	28.26	0.00	9.00	3642.	266.	26.81	27.06
5	12	27.06	0.00	9.00	4032.	337.	26.87	27.12
5	18	25.34	0.00	9.00	4385.	406.	26.93	27.16
5	24	22.76	0.00	9.00	4682.	464.	26.97	27.19
6	6	20.51	0.00	9.00	4930.	513.	27.01	27.23
6	12	18.54	0.00	9.00	5136.	554.	27.04	27.26
6	18	16.44	0.00	9.00	5297.	585.	27.07	27.25
6	24	15.88	0.00	9.00	5446.	614.	27.09	27.24
7	6	13.66	0.00	9.00	5546.	634.	27.11	27.23
7	12	11.85	0.00	9.00	5608.	646.	27.12	27.22
7	18	10.35	0.00	9.00	5637.	652.	27.12	27.23
7	24	11.23	0.00	9.00	5685.	661.	27.13	27.23
8	6	10.09	0.00	9.00	5709.	665.	27.13	27.24
8	12	9.12	0.00	9.00	5712.	665.	27.13	27.24
8	18	8.28	0.00	9.00	5696.	663.	27.13	27.25
8	24	8.07	0.00	9.00	5676.	659.	27.13	27.27
9	6	7.40	0.00	9.00	5641.	652.	27.12	27.28
9	12	6.82	0.00	9.00	5594.	643.	27.11	27.29
9	18	6.30	0.00	9.00	5536.	632.	27.10	27.28
9	24	3.94	0.00	9.00	5427.	610.	27.09	27.27
10	6	3.65	0.00	9.00	5311.	588.	27.07	27.26
10	12	3.39	0.00	9.00	5190.	564.	27.05	27.25
10	18	3.16	0.00	9.00	5064.	539.	27.03	27.21
10	24	1.34	0.00	9.00	4898.	507.	27.01	27.18
11	6	1.25	0.00	9.00	4731.	474.	26.98	27.14
11	12	1.16	0.00	9.00	4562.	441.	26.95	27.10
11	18	1.09	0.00	9.00	4391.	407.	26.93	27.04
11	24	0.00	0.00	9.00	4196.	369.	26.90	26.98
12	6	0.00	0.00	9.00	4002.	331.	26.87	26.92
12	12	0.00	0.00	9.00	3808.	293.	26.84	26.86
12	18	0.00	0.00	9.00	3613.	262.	26.80	26.80
12	24	0.00	0.00	9.00	3419.	241.	26.76	26.75

KURIGRAM IIRI & FLOOD CONTROL PROJECT

BAHARAMPUR BLOCK

BLOCK NO. = 4 RIV-WL NO. = 4 CASE NO. = 3  
 NO. OF GATE = 8 PUMP = 10

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	0.04	0.00	0.04	0.	0.	25.60	26.61
1	12	0.43	0.00	0.43	0.	0.	25.60	26.61
1	18	1.72	0.00	1.72	0.	0.	25.60	26.65
1	24	4.23	0.00	4.23	0.	0.	25.60	26.69
2	6	6.53	0.00	6.53	0.	0.	25.60	26.72
2	12	8.77	0.00	8.77	0.	0.	25.60	26.76
2	18	11.63	0.00	10.00	35.	0.	25.62	26.77
2	24	15.56	0.00	10.00	155.	0.	25.67	26.79
3	6	18.99	0.00	10.00	350.	0.	25.76	26.80
3	12	21.87	0.00	10.00	606.	0.	25.88	26.81
3	18	24.48	0.00	10.00	919.	26.	26.02	26.83
3	24	27.02	0.00	10.00	1286.	62.	26.17	26.84
4	6	29.11	0.00	10.00	1699.	90.	26.31	26.86
4	12	30.49	0.00	10.00	2142.	115.	26.44	26.87
4	18	30.71	0.00	10.00	2589.	150.	26.56	26.93
4	24	29.47	0.00	10.00	3010.	196.	26.66	27.00
5	6	28.26	0.00	10.00	3404.	239.	26.75	27.06
5	12	27.06	0.00	10.00	3772.	286.	26.83	27.12
5	18	25.34	0.00	10.00	4104.	351.	26.88	27.16
5	24	22.76	0.00	10.00	4379.	405.	26.93	27.19
6	6	20.51	0.00	10.00	4606.	450.	26.96	27.23
6	12	18.54	0.00	10.00	4791.	486.	26.99	27.26
6	18	16.44	0.00	10.00	4930.	513.	27.01	27.25
6	24	15.88	0.00	10.00	5057.	538.	27.03	27.24
7	6	13.66	0.00	10.00	5136.	553.	27.04	27.23
7	12	11.85	0.00	10.00	5176.	561.	27.05	27.22
7	18	10.35	0.00	10.00	5183.	563.	27.05	27.23
7	24	11.23	0.00	10.00	5210.	568.	27.05	27.23
8	6	10.09	0.00	10.00	5212.	568.	27.05	27.24
8	12	9.12	0.00	10.00	5193.	565.	27.05	27.24
8	18	8.28	0.00	10.00	5156.	557.	27.05	27.25
8	24	8.07	0.00	10.00	5114.	549.	27.04	27.27
9	6	7.40	0.00	10.00	5058.	538.	27.03	27.28
9	12	6.82	0.00	10.00	4989.	525.	27.02	27.29
9	18	6.30	0.00	10.00	4909.	509.	27.01	27.28
9	24	3.94	0.00	10.00	4779.	483.	26.99	27.27
10	6	3.65	0.00	10.00	4641.	457.	26.97	27.26
10	12	3.39	0.00	10.00	4499.	429.	26.94	27.25
10	18	3.16	0.00	10.00	4351.	400.	26.92	27.21
10	24	1.34	0.00	10.00	4164.	363.	26.89	27.18
11	6	1.25	0.00	10.00	3975.	326.	26.86	27.14
11	12	1.16	0.00	10.00	3784.	288.	26.83	27.10
11	18	1.09	0.00	10.00	3592.	260.	26.80	27.04
11	24	0.00	0.00	10.00	3376.	236.	26.75	26.98
12	6	0.00	0.00	10.00	3160.	213.	26.70	26.92
12	12	0.00	0.00	10.00	2944.	189.	26.65	26.86
12	18	0.00	0.00	10.00	2728.	165.	26.60	26.80
12	24	0.00	0.00	10.00	2512.	141.	26.55	26.75

4 days 12 hrs

KURIGRAM IIRRI & FLOOD CONTROL PROJECT

BAHARAMPUR BLOCK

BLOCK NO. = 4 RIV-WL NO. = 4 CASE NO. = 3  
 NO. OF GATE = 8 PUMP = 11

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	0.04	0.00	0.04	0.	0.	25.60	26.61
1	12	0.43	0.00	0.43	0.	0.	25.60	26.61
1	18	1.72	0.00	1.72	0.	0.	25.60	26.65
1	24	4.23	0.00	4.23	0.	0.	25.60	26.69
2	6	6.53	0.00	6.53	0.	0.	25.60	26.72
2	12	8.77	0.00	8.77	0.	0.	25.60	26.76
2	18	11.63	0.00	11.00	14.	0.	25.61	26.77
2	24	15.56	0.00	11.00	112.	0.	25.65	26.79
3	6	18.99	0.00	11.00	285.	0.	25.73	26.80
3	12	21.87	0.00	11.00	520.	0.	25.84	26.81
3	18	24.48	0.00	11.00	811.	15.	25.97	26.83
3	24	27.02	0.00	11.00	1157.	49.	26.11	26.84
4	6	29.11	0.00	11.00	1548.	82.	26.26	26.86
4	12	30.49	0.00	11.00	1969.	105.	26.39	26.87
4	18	30.71	0.00	11.00	2395.	129.	26.52	26.93
4	24	29.47	0.00	11.00	2794.	172.	26.61	27.00
5	6	28.26	0.00	11.00	3166.	213.	26.70	27.06
5	12	27.06	0.00	11.00	3513.	251.	26.78	27.12
5	18	25.34	0.00	11.00	3823.	296.	26.84	27.16
5	24	22.76	0.00	11.00	4077.	346.	26.88	27.19
6	6	20.51	0.00	11.00	4282.	386.	26.91	27.23
6	12	18.54	0.00	11.00	4445.	418.	26.94	27.26
6	18	16.44	0.00	11.00	4563.	441.	26.95	27.25
6	24	15.88	0.00	11.00	4668.	462.	26.97	27.24
7	6	13.66	0.00	11.00	4725.	473.	26.98	27.23
7	12	11.85	0.00	11.00	4744.	477.	26.98	27.22
7	18	10.35	0.00	11.00	4730.	474.	26.98	27.23
7	24	11.23	0.00	11.00	4735.	475.	26.98	27.23
8	6	10.09	0.00	11.00	4715.	471.	26.98	27.24
8	12	9.12	0.00	11.00	4675.	463.	26.97	27.24
8	18	8.28	0.00	11.00	4616.	452.	26.96	27.25
8	24	8.07	0.00	11.00	4553.	439.	26.95	27.27
9	6	7.40	0.00	11.00	4475.	424.	26.94	27.28
9	12	6.82	0.00	11.00	4385.	406.	26.93	27.29
9	18	6.30	0.00	11.00	4283.	386.	26.91	27.28
9	24	3.94	0.00	11.00	4131.	356.	26.89	27.27
10	6	3.65	0.00	11.00	3972.	325.	26.86	27.26
10	12	3.39	0.00	11.00	3808.	293.	26.84	27.25
10	18	3.16	0.00	11.00	3638.	265.	26.81	27.21
10	24	1.34	0.00	11.00	3430.	242.	26.76	27.18
11	6	1.25	0.00	11.00	3219.	219.	26.71	27.14
11	12	1.16	0.00	11.00	3006.	196.	26.66	27.10
11	18	1.09	0.00	11.00	2792.	172.	26.61	27.04
11	24	0.00	0.00	11.00	2555.	146.	26.56	26.98
12	6	0.00	0.00	11.00	2317.	124.	26.49	26.92
12	12	0.00	0.00	11.00	2080.	111.	26.42	26.86
12	18	0.00	0.00	11.00	1842.	98.	26.35	26.80
12	24	0.00	0.00	11.00	1604.	85.	26.28	26.75

2 days 12 hrs

KURIGRAM IIRI & FLOOD CONTROL PROJECT

BAHARAMPUR BLOCK

BLOCK NO. = 4 RIV-WL NO. = 4 CASE NO. = 3  
 NO. OF GATE = 8 PUMP = 12

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	0.04	0.00	0.04	0.	0.	25.60	26.61
1	12	0.43	0.00	0.43	0.	0.	25.60	26.61
1	18	1.72	0.00	1.72	0.	0.	25.60	26.65
1	24	4.23	0.00	4.23	0.	0.	25.60	26.69
2	6	6.53	0.00	6.53	0.	0.	25.60	26.72
2	12	8.77	0.00	8.77	0.	0.	25.60	26.76
2	18	11.63	0.00	11.63	0.	0.	25.60	26.77
2	24	15.56	0.00	12.00	77.	0.	25.64	26.79
3	6	18.99	0.00	12.00	228.	0.	25.71	26.80
3	12	21.87	0.00	12.00	441.	0.	25.81	26.81
3	18	24.48	0.00	12.00	711.	5.	25.93	26.83
3	24	27.02	0.00	12.00	1035.	37.	26.06	26.84
4	6	29.11	0.00	12.00	1405.	73.	26.21	26.86
4	12	30.49	0.00	12.00	1804.	96.	26.34	26.87
4	18	30.71	0.00	12.00	2208.	118.	26.46	26.93
4	24	29.47	0.00	12.00	2585.	149.	26.56	27.00
5	6	28.26	0.00	12.00	2937.	188.	26.64	27.06
5	12	27.06	0.00	12.00	3262.	224.	26.72	27.12
5	18	25.34	0.00	12.00	3550.	256.	26.79	27.16
5	24	22.76	0.00	12.00	3782.	288.	26.83	27.19
6	6	20.51	0.00	12.00	3966.	324.	26.86	27.23
6	12	18.54	0.00	12.00	4108.	352.	26.88	27.26
6	18	16.44	0.00	12.00	4203.	371.	26.90	27.25
6	24	15.88	0.00	12.00	4287.	387.	26.91	27.24
7	6	13.66	0.00	12.00	4323.	394.	26.92	27.23
7	12	11.85	0.00	12.00	4320.	393.	26.92	27.22
7	18	10.35	0.00	12.00	4284.	387.	26.91	27.23
7	24	11.23	0.00	12.00	4268.	383.	26.91	27.23
8	6	10.09	0.00	12.00	4226.	375.	26.90	27.24
8	12	9.12	0.00	12.00	4164.	363.	26.89	27.24
8	18	8.28	0.00	12.00	4084.	347.	26.88	27.25
8	24	8.07	0.00	12.00	3999.	331.	26.87	27.27
9	6	7.40	0.00	12.00	3900.	311.	26.85	27.28
9	12	6.82	0.00	12.00	3788.	289.	26.83	27.29
9	18	6.30	0.00	12.00	3665.	268.	26.81	27.28
9	24	3.94	0.00	12.00	3491.	249.	26.77	27.27
10	6	3.65	0.00	12.00	3310.	229.	26.73	27.26
10	12	3.39	0.00	12.00	3124.	209.	26.69	27.25
10	18	3.16	0.00	12.00	2933.	188.	26.64	27.21
10	24	1.34	0.00	12.00	2703.	162.	26.59	27.18
11	6	1.25	0.00	12.00	2471.	137.	26.54	27.14
11	12	1.16	0.00	12.00	2237.	120.	26.47	27.10
11	18	1.09	0.00	12.00	2001.	107.	26.40	27.04
11	24	0.00	0.00	12.00	1742.	93.	26.32	26.98
12	6	0.00	0.00	12.00	1483.	78.	26.24	26.92
12	12	0.00	0.00	12.00	1223.	56.	26.14	26.86
12	18	0.00	0.00	12.00	964.	30.	26.03	26.80
12	24	0.00	0.00	12.00	705.	4.	25.93	26.75

KURIGRAM IRRI & FLOOD CONTROL PROJECT

TANGONMARI/OLD GIRAI BLOCK

BLOCK NO. = 5 RIV-WL NO. = 6 CASE NO. = 3  
 NO. OF GATE = 8 PUMP = 5

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	0.26	0.00	0.26	0.	0.	24.08	26.04
1	12	2.77	0.00	2.77	0.	0.	24.08	26.04
1	18	9.59	0.00	5.00	99.	0.	24.10	26.07
1	24	15.26	0.00	5.00	321.	0.	24.16	26.09
2	6	19.52	0.00	5.00	634.	0.	24.23	26.12
2	12	25.08	0.00	5.00	1068.	0.	24.34	26.14
2	18	34.71	0.00	5.00	1710.	42.	24.48	26.16
2	24	42.63	0.00	5.00	2523.	115.	24.65	26.18
3	6	48.40	0.00	5.00	3460.	229.	24.80	26.19
3	12	53.20	0.00	5.00	4501.	363.	24.95	26.21
3	18	58.19	0.00	5.00	5650.	541.	25.07	26.22
3	24	62.22	0.00	5.00	6886.	744.	25.19	26.24
4	6	65.05	0.00	5.00	8183.	949.	25.31	26.25
4	12	64.92	0.00	5.00	9477.	1036.	25.39	26.26
4	18	59.99	0.00	5.00	10665.	1116.	25.47	26.32
4	24	55.88	0.00	5.00	11764.	1190.	25.54	26.38
5	6	52.67	0.00	5.00	12794.	1261.	25.61	26.43
5	12	48.57	0.00	5.00	13735.	1346.	25.66	26.49
5	18	41.36	0.00	5.00	14520.	1417.	25.70	26.53
5	24	35.49	0.00	5.00	15179.	1476.	25.73	26.57
6	6	30.83	0.00	5.00	15737.	1526.	25.76	26.60
6	12	26.23	0.00	5.00	16195.	1568.	25.79	26.64
6	18	20.09	0.00	5.00	16521.	1597.	25.80	26.65
6	24	15.09	0.00	5.00	16739.	1617.	25.82	26.66
7	6	11.30	0.00	5.00	16876.	1629.	25.82	26.66
7	12	8.47	0.00	5.00	16951.	1636.	25.83	26.67
7	18	6.27	0.00	5.00	16978.	1638.	25.83	26.69
7	24	4.48	0.00	5.00	16967.	1637.	25.83	26.71
8	6	3.31	0.00	5.00	16930.	1634.	25.83	26.73
8	12	2.36	0.00	5.00	16873.	1629.	25.82	26.75
8	18	1.59	0.00	5.00	16800.	1622.	25.82	26.77
8	24	0.94	0.00	5.00	16712.	1614.	25.81	26.80
9	6	0.65	0.00	5.00	16618.	1606.	25.81	26.82
9	12	0.40	0.00	5.00	16518.	1597.	25.80	26.84
9	18	0.19	0.00	5.00	16414.	1587.	25.80	26.84
9	24	0.00	0.00	5.00	16306.	1578.	25.79	26.83
10	6	0.00	0.00	5.00	16198.	1568.	25.79	26.83
10	12	0.00	0.00	5.00	16090.	1558.	25.78	26.82
10	18	0.00	0.00	5.00	15982.	1548.	25.78	26.78
10	24	0.00	0.00	5.00	15874.	1539.	25.77	26.74
11	6	0.00	0.00	5.00	15766.	1529.	25.76	26.70
11	12	0.00	0.00	5.00	15658.	1519.	25.76	26.66
11	18	0.00	0.00	5.00	15550.	1510.	25.75	26.59
11	24	0.00	0.00	5.00	15442.	1500.	25.75	26.51
12	6	0.00	0.00	5.00	15334.	1490.	25.74	26.44
12	12	0.00	0.00	5.00	15226.	1480.	25.74	26.36
12	18	0.00	0.00	5.00	15118.	1471.	25.73	26.29
12	24	0.00	0.00	5.00	15010.	1461.	25.72	26.22

over 9 days  
 18 hrs  
 4 days

KURIGRAM IIRI & FLOOD CONTROL PROJECT

TANGONMARI/OLD GIRAI BLOCK

BLOCK NO. = 5 RIV-WL NO. = 6 CASE NO. = 3  
 NO. OF GATE = 8 PUMP = 6

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	0.26	0.00	0.26	0.	0.	24.08	26.04
1	12	2.77	0.00	2.77	0.	0.	24.08	26.04
1	18	9.59	0.00	6.00	78.	0.	24.10	26.07
1	24	15.26	0.00	6.00	277.	0.	24.15	26.09
2	6	19.52	0.00	6.00	570.	0.	24.22	26.12
2	12	25.08	0.00	6.00	982.	0.	24.32	26.14
2	18	34.71	0.00	6.00	1602.	32.	24.46	26.16
2	24	42.63	0.00	6.00	2393.	103.	24.62	26.18
3	6	48.40	0.00	6.00	3309.	210.	24.78	26.19
3	12	53.20	0.00	6.00	4328.	341.	24.92	26.21
3	18	58.19	0.00	6.00	5455.	509.	25.05	26.22
3	24	62.22	0.00	6.00	6670.	709.	25.17	26.24
4	6	65.05	0.00	6.00	7945.	918.	25.29	26.25
4	12	64.92	0.00	6.00	9218.	1018.	25.37	26.26
4	18	59.99	0.00	6.00	10384.	1097.	25.45	26.32
4	24	55.88	0.00	6.00	11462.	1170.	25.52	26.38
5	6	52.67	0.00	6.00	12470.	1237.	25.59	26.43
5	12	48.57	0.00	6.00	13389.	1315.	25.64	26.49
5	18	41.36	0.00	6.00	14153.	1384.	25.68	26.53
5	24	35.49	0.00	6.00	14790.	1441.	25.71	26.57
6	6	30.83	0.00	6.00	15326.	1489.	25.74	26.60
6	12	26.23	0.00	6.00	15763.	1529.	25.76	26.64
6	18	20.09	0.00	6.00	16068.	1556.	25.78	26.65
6	24	15.09	0.00	6.00	16264.	1574.	25.79	26.66
7	6	11.30	0.00	6.00	16379.	1584.	25.80	26.66
7	12	8.47	0.00	6.00	16432.	1589.	25.80	26.67
7	18	6.27	0.00	6.00	16438.	1589.	25.80	26.69
7	24	4.18	0.00	6.00	16405.	1586.	25.80	26.71
8	6	3.31	0.00	6.00	16347.	1581.	25.79	26.73
8	12	2.36	0.00	6.00	16268.	1574.	25.79	26.75
8	18	1.59	0.00	6.00	16173.	1566.	25.79	26.77
8	24	0.94	0.00	6.00	16064.	1556.	25.78	26.80
9	6	0.65	0.00	6.00	15948.	1545.	25.77	26.82
9	12	0.40	0.00	6.00	15827.	1534.	25.77	26.84
9	18	0.19	0.00	6.00	15702.	1523.	25.76	26.84
9	24	0.00	0.00	6.00	15572.	1511.	25.75	26.83
10	6	0.00	0.00	6.00	15442.	1500.	25.75	26.83
10	12	0.00	0.00	6.00	15313.	1488.	25.74	26.82
10	18	0.00	0.00	6.00	15183.	1476.	25.73	26.78
10	24	0.00	0.00	6.00	15054.	1465.	25.73	26.74
11	6	0.00	0.00	6.00	14924.	1453.	25.72	26.70
11	12	0.00	0.00	6.00	14794.	1441.	25.71	26.66
11	18	0.00	0.00	6.00	14665.	1430.	25.71	26.59
11	24	0.00	0.00	6.00	14535.	1418.	25.70	26.51
12	6	0.00	0.00	6.00	14406.	1407.	25.69	26.44
12	12	0.00	0.00	6.00	14276.	1395.	25.68	26.36
12	18	0.00	0.00	6.00	14146.	1383.	25.68	26.29
12	24	0.00	0.00	6.00	14017.	1372.	25.67	26.22



KURIGRAM IRRIGATION & FLOOD CONTROL PROJECT

TANGONMARI/OLD GIRAI BLOCK

BLOCK NO. = 5 RIV-WL NO. = 6 CASE NO. = 3  
 NO. OF GATE = 8 PUMP = 8

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	0.26	0.00	0.26	0.	0.	24.08	26.04
1	12	2.77	0.00	2.77	0.	0.	24.08	26.04
1	18	9.59	0.00	8.00	34.	0.	24.09	26.07
1	24	15.26	0.00	8.00	191.	0.	24.13	26.09
2	6	19.52	0.00	8.00	440.	0.	24.19	26.12
2	12	25.08	0.00	8.00	809.	0.	24.27	26.14
2	18	34.71	0.00	8.00	1386.	12.	24.41	26.16
2	24	42.63	0.00	8.00	2134.	80.	24.57	26.18
3	6	48.40	0.00	8.00	3006.	171.	24.73	26.19
3	12	53.20	0.00	8.00	3983.	297.	24.87	26.21
3	18	58.19	0.00	8.00	5067.	446.	25.02	26.22
3	24	62.22	0.00	8.00	6238.	638.	25.13	26.24
4	6	65.05	0.00	8.00	7470.	840.	25.24	26.25
4	12	64.92	0.00	8.00	8699.	983.	25.34	26.26
4	18	59.99	0.00	8.00	9822.	1059.	25.41	26.32
4	24	55.88	0.00	8.00	10857.	1129.	25.48	26.38
5	6	52.67	0.00	8.00	11822.	1194.	25.54	26.43
5	12	48.57	0.00	8.00	12698.	1253.	25.60	26.49
5	18	41.36	0.00	8.00	13419.	1318.	25.64	26.53
5	24	35.49	0.00	8.00	14012.	1371.	25.67	26.57
6	6	30.83	0.00	8.00	14506.	1416.	25.70	26.60
6	12	26.23	0.00	8.00	14899.	1451.	25.72	26.64
6	18	20.09	0.00	8.00	15161.	1474.	25.73	26.65
6	24	15.09	0.00	8.00	15314.	1488.	25.74	26.66
7	6	11.30	0.00	8.00	15385.	1495.	25.74	26.66
7	12	8.47	0.00	8.00	15395.	1496.	25.74	26.67
7	18	6.27	0.00	8.00	15358.	1492.	25.74	26.69
7	24	4.48	0.00	8.00	15282.	1485.	25.74	26.71
8	6	3.31	0.00	8.00	15181.	1476.	25.73	26.73
8	12	2.36	0.00	8.00	15059.	1465.	25.73	26.75
8	18	1.59	0.00	8.00	14920.	1453.	25.72	26.77
8	24	0.94	0.00	8.00	14768.	1439.	25.71	26.80
9	6	0.65	0.00	8.00	14609.	1425.	25.70	26.82
9	12	0.40	0.00	8.00	14445.	1410.	25.69	26.84
9	18	0.19	0.00	8.00	14276.	1395.	25.68	26.84
9	24	0.00	0.00	8.00	14103.	1379.	25.68	26.83
10	6	0.00	0.00	8.00	13930.	1364.	25.67	26.83
10	12	0.00	0.00	8.00	13758.	1348.	25.66	26.82
10	18	0.00	0.00	8.00	13585.	1333.	25.65	26.78
10	24	0.00	0.00	8.00	13412.	1317.	25.64	26.74
11	6	0.00	0.00	8.00	13239.	1302.	25.63	26.70
11	12	0.00	0.00	8.00	13066.	1286.	25.62	26.66
11	18	0.00	0.00	8.00	12894.	1270.	25.61	26.59
11	24	0.00	0.00	8.00	12721.	1255.	25.60	26.51
12	6	0.00	0.00	8.00	12548.	1243.	25.59	26.44
12	12	0.00	0.00	8.00	12375.	1231.	25.58	26.36
12	18	0.00	0.00	8.00	12202.	1219.	25.57	26.29
12	24	0.00	0.00	8.00	12030.	1208.	25.56	26.22

KURIGRAM IIRI & FLOOD CONTROL PROJECT

TANGONMARI/OLD GIRAI BLOCK

BLOCK NO. = 5 RIV-WL NO. = 6 CASE NO. = 3  
 NO. OF GATE = 8 PUMP = 10

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	0.26	0.00	0.26	0.	0.	24.08	26.04
1	12	2.77	0.00	2.77	0.	0.	24.08	26.04
1	18	9.59	0.00	9.59	0.	0.	24.08	26.07
1	24	15.26	0.00	10.00	114.	0.	24.11	26.09
2	6	19.52	0.00	10.00	319.	0.	24.16	26.12
2	12	25.08	0.00	10.00	645.	0.	24.23	26.14
2	18	34.71	0.00	10.00	1179.	0.	24.36	26.16
2	24	42.63	0.00	10.00	1883.	57.	24.52	26.18
3	6	48.40	0.00	10.00	2713.	133.	24.69	26.19
3	12	53.20	0.00	10.00	3646.	253.	24.83	26.21
3	18	58.19	0.00	10.00	4687.	387.	24.97	26.22
3	24	62.22	0.00	10.00	5815.	568.	25.09	26.24
4	6	65.05	0.00	10.00	7004.	763.	25.20	26.25
4	12	64.92	0.00	10.00	8190.	949.	25.31	26.26
4	18	59.99	0.00	10.00	9270.	1022.	25.38	26.32
4	24	55.88	0.00	10.00	10261.	1089.	25.44	26.38
5	6	52.67	0.00	10.00	11183.	1151.	25.50	26.43
5	12	48.57	0.00	10.00	12016.	1207.	25.56	26.49
5	18	41.36	0.00	10.00	12693.	1253.	25.60	26.53
5	24	35.49	0.00	10.00	13244.	1302.	25.63	26.57
6	6	30.83	0.00	10.00	13694.	1342.	25.65	26.60
6	12	26.23	0.00	10.00	14044.	1374.	25.67	26.64
6	18	20.09	0.00	10.00	14262.	1394.	25.68	26.65
6	24	15.09	0.00	10.00	14372.	1403.	25.69	26.66
7	6	11.30	0.00	10.00	14400.	1406.	25.69	26.66
7	12	8.47	0.00	10.00	14367.	1403.	25.69	26.67
7	18	6.27	0.00	10.00	14287.	1396.	25.68	26.69
7	24	4.48	0.00	10.00	14168.	1385.	25.68	26.71
8	6	3.31	0.00	10.00	14023.	1372.	25.67	26.73
8	12	2.36	0.00	10.00	13858.	1357.	25.66	26.75
8	18	1.59	0.00	10.00	13676.	1341.	25.65	26.77
8	24	0.94	0.00	10.00	13481.	1323.	25.64	26.80
9	6	0.65	0.00	10.00	13279.	1305.	25.63	26.82
9	12	0.40	0.00	10.00	13071.	1286.	25.62	26.84
9	18	0.19	0.00	10.00	12859.	1267.	25.61	26.84
9	24	0.00	0.00	10.00	12643.	1249.	25.60	26.83
10	6	0.00	0.00	10.00	12427.	1235.	25.58	26.83
10	12	0.00	0.00	10.00	12211.	1220.	25.57	26.82
10	18	0.00	0.00	10.00	11995.	1206.	25.55	26.78
10	24	0.00	0.00	10.00	11779.	1191.	25.54	26.74
11	6	0.00	0.00	10.00	11563.	1176.	25.53	26.70
11	12	0.00	0.00	10.00	11347.	1162.	25.51	26.66
11	18	0.00	0.00	10.00	11131.	1147.	25.50	26.59
11	24	0.00	0.00	10.00	10915.	1133.	25.48	26.51
12	6	0.00	0.00	10.00	10699.	1118.	25.47	26.44
12	12	0.00	0.00	10.00	10483.	1104.	25.46	26.36
12	18	0.00	0.00	10.00	10267.	1089.	25.44	26.29
12	24	0.00	0.00	10.00	10051.	1075.	25.43	26.22

KURIGRAM IRRI & FLOOD CONTROL PROJECT

TANGONMARI/OLD GIRAI BLOCK

BLOCK NO. = 5 RIV-WL NO. = 6 CASE NO. = 3  
 NO. OF GATE = 8 PUMP = 12

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	0.26	0.00	0.26	0.	0.	24.08	26.04
1	12	2.77	0.00	2.77	0.	0.	24.08	26.04
1	18	9.59	0.00	9.59	0.	0.	24.08	26.07
1	24	15.26	0.00	12.00	70.	0.	24.10	26.09
2	6	19.52	0.00	12.00	233.	0.	24.14	26.12
2	12	25.08	0.00	12.00	515.	0.	24.20	26.14
2	18	34.71	0.00	12.00	1006.	0.	24.32	26.16
2	24	42.63	0.00	12.00	1667.	38.	24.47	26.18
3	6	48.40	0.00	12.00	2454.	109.	24.64	26.19
3	12	53.20	0.00	12.00	3343.	214.	24.78	26.21
3	18	58.19	0.00	12.00	4341.	343.	24.92	26.22
3	24	62.22	0.00	12.00	5426.	505.	25.05	26.24
4	6	65.05	0.00	12.00	6572.	692.	25.16	26.25
4	12	64.92	0.00	12.00	7715.	880.	25.26	26.26
4	18	59.99	0.00	12.00	8751.	987.	25.34	26.32
4	24	55.88	0.00	12.00	9699.	1051.	25.40	26.38
5	6	52.67	0.00	12.00	10578.	1110.	25.46	26.43
5	12	48.57	0.00	12.00	11368.	1163.	25.51	26.49
5	18	41.36	0.00	12.00	12002.	1206.	25.55	26.53
5	24	35.49	0.00	12.00	12509.	1240.	25.59	26.57
6	6	30.83	0.00	12.00	12916.	1272.	25.61	26.60
6	12	26.23	0.00	12.00	13223.	1300.	25.63	26.64
6	18	20.09	0.00	12.00	13398.	1316.	25.64	26.65
6	24	15.09	0.00	12.00	13465.	1322.	25.64	26.66
7	6	11.30	0.00	12.00	13450.	1321.	25.64	26.66
7	12	8.47	0.00	12.00	13374.	1314.	25.64	26.67
7	18	6.27	0.00	12.00	13250.	1303.	25.63	26.69
7	24	4.48	0.00	12.00	13088.	1288.	25.62	26.71
8	6	3.31	0.00	12.00	12900.	1271.	25.61	26.73
8	12	2.36	0.00	12.00	12692.	1252.	25.60	26.75
8	18	1.59	0.00	12.00	12467.	1237.	25.58	26.77
8	24	0.94	0.00	12.00	12228.	1221.	25.57	26.80
9	6	0.65	0.00	12.00	11983.	1205.	25.55	26.82
9	12	0.40	0.00	12.00	11732.	1188.	25.54	26.84
9	18	0.19	0.00	12.00	11477.	1171.	25.52	26.84
9	24	0.00	0.00	12.00	11218.	1153.	25.50	26.83
10	6	0.00	0.00	12.00	10958.	1136.	25.49	26.83
10	12	0.00	0.00	12.00	10699.	1118.	25.47	26.82
10	18	0.00	0.00	12.00	10440.	1101.	25.45	26.78
10	24	0.00	0.00	12.00	10181.	1083.	25.44	26.74
11	6	0.00	0.00	12.00	9922.	1066.	25.42	26.70
11	12	0.00	0.00	12.00	9662.	1048.	25.40	26.66
11	18	0.00	0.00	12.00	9403.	1031.	25.39	26.59
11	24	0.00	0.00	12.00	9144.	1013.	25.37	26.51
12	6	0.00	0.00	12.00	8885.	996.	25.35	26.44
12	12	0.00	0.00	12.00	8626.	978.	25.33	26.36
12	18	0.00	0.00	12.00	8366.	961.	25.32	26.29
12	24	0.00	0.00	12.00	8107.	943.	25.30	26.22

12 hrs  
5 days

KURIGRAM IRRI & FLOOD CONTROL PROJECT

TANGONMARI/OLD GIRAI BLOCK

BLOCK NO. = 5 RIV-WL NO. = 6 CASE NO. = 3  
 NO. OF GATE = 8 PUMP = 14

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	0.26	0.00	0.26	0.	0.	24.08	26.04
1	12	2.77	0.00	2.77	0.	0.	24.08	26.04
1	18	9.59	0.00	9.59	0.	0.	24.08	26.07
1	24	15.26	0.00	14.00	27.	0.	24.09	26.09
2	6	19.52	0.00	14.00	146.	0.	24.12	26.12
2	12	25.08	0.00	14.00	386.	0.	24.17	26.14
2	18	34.71	0.00	14.00	833.	0.	24.28	26.16
2	24	42.63	0.00	14.00	1451.	18.	24.42	26.18
3	6	48.40	0.00	14.00	2194.	85.	24.58	26.19
3	12	53.20	0.00	14.00	3041.	175.	24.74	26.21
3	18	58.19	0.00	14.00	3996.	298.	24.88	26.22
3	24	62.22	0.00	14.00	5037.	441.	25.01	26.24
4	6	65.05	0.00	14.00	6140.	622.	25.12	26.25
4	12	64.92	0.00	14.00	7240.	802.	25.22	26.26
4	18	59.99	0.00	14.00	8233.	952.	25.31	26.32
4	24	55.88	0.00	14.00	9138.	1013.	25.37	26.38
5	6	52.67	0.00	14.00	9973.	1069.	25.42	26.43
5	12	48.57	0.00	14.00	10720.	1120.	25.47	26.49
5	18	41.36	0.00	14.00	11311.	1159.	25.51	26.53
5	24	35.49	0.00	14.00	11775.	1191.	25.54	26.57
6	6	30.83	0.00	14.00	12138.	1215.	25.56	26.60
6	12	26.23	0.00	14.00	12403.	1233.	25.58	26.64
6	18	20.09	0.00	14.00	12534.	1242.	25.59	26.65
6	24	15.09	0.00	14.00	12558.	1243.	25.59	26.66
7	6	11.30	0.00	14.00	12500.	1239.	25.59	26.66
7	12	8.47	0.00	14.00	12380.	1231.	25.58	26.67
7	18	6.27	0.00	14.00	12213.	1220.	25.57	26.69
7	24	4.48	0.00	14.00	12008.	1206.	25.55	26.71
8	6	3.31	0.00	14.00	11777.	1191.	25.54	26.73
8	12	2.36	0.00	14.00	11525.	1174.	25.52	26.75
8	18	1.59	0.00	14.00	11257.	1156.	25.51	26.77
8	24	0.94	0.00	14.00	10975.	1137.	25.49	26.80
9	6	0.65	0.00	14.00	10687.	1117.	25.47	26.82
9	12	0.40	0.00	14.00	10393.	1098.	25.45	26.84
9	18	0.19	0.00	14.00	10094.	1077.	25.43	26.84
9	24	0.00	0.00	14.00	9792.	1057.	25.41	26.83
10	6	0.00	0.00	14.00	9490.	1037.	25.39	26.83
10	12	0.00	0.00	14.00	9187.	1016.	25.37	26.82
10	18	0.00	0.00	14.00	8885.	996.	25.35	26.78
10	24	0.00	0.00	14.00	8582.	976.	25.33	26.74
11	6	0.00	0.00	14.00	8280.	955.	25.31	26.70
11	12	0.00	0.00	14.00	7978.	923.	25.29	26.66
11	18	0.00	0.00	14.00	7675.	873.	25.26	26.59
11	24	0.00	0.00	14.00	7373.	824.	25.23	26.51
12	6	0.00	0.00	14.00	7070.	774.	25.20	26.44
12	12	0.00	0.00	14.00	6768.	725.	25.17	26.36
12	18	0.00	0.00	14.00	6466.	675.	25.15	26.29
12	24	0.00	0.00	14.00	6163.	625.	25.12	26.22

KURIGRAM IRRI & FLOOD CONTROL PROJECT

TANGONMARI-OLD GIRAI BLOCK

BLOCK NO. = 5 RIV-WL NO. = 6 CASE NO. = 3  
 NO. OF GATE = 8 PUMP = 15

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	0.26	0.00	0.26	0.	0.	24.08	26.04
1	12	2.77	0.00	2.77	0.	0.	24.08	26.04
1	18	9.59	0.00	9.59	0.	0.	24.08	26.07
1	24	15.26	0.00	15.00	6.	0.	24.08	26.09
2	6	19.52	0.00	15.00	103.	0.	24.10	26.12
2	12	25.08	0.00	15.00	321.	0.	24.16	26.14
2	18	34.71	0.00	15.00	747.	0.	24.26	26.16
2	24	42.63	0.00	15.00	1343.	8.	24.40	26.18
3	6	48.40	0.00	15.00	2065.	74.	24.55	26.19
3	12	53.20	0.00	15.00	2890.	156.	24.72	26.21
3	18	58.19	0.00	15.00	3823.	276.	24.85	26.22
3	24	62.22	0.00	15.00	4843.	409.	24.99	26.24
4	6	65.05	0.00	15.00	5924.	586.	25.10	26.25
4	12	64.92	0.00	15.00	7002.	763.	25.20	26.26
4	18	59.99	0.00	15.00	7974.	922.	25.29	26.32
4	24	55.88	0.00	15.00	8857.	994.	25.35	26.38
5	6	52.67	0.00	15.00	9671.	1049.	25.40	26.43
5	12	48.57	0.00	15.00	10396.	1098.	25.45	26.49
5	18	41.36	0.00	15.00	10965.	1136.	25.49	26.53
5	24	35.49	0.00	15.00	11408.	1166.	25.52	26.57
6	6	30.83	0.00	15.00	11750.	1189.	25.54	26.60
6	12	26.23	0.00	15.00	11992.	1205.	25.55	26.64
6	18	20.09	0.00	15.00	12102.	1213.	25.56	26.65
6	24	15.09	0.00	15.00	12104.	1213.	25.56	26.66
7	6	11.30	0.00	15.00	12024.	1207.	25.56	26.66
7	12	8.47	0.00	15.00	11883.	1198.	25.55	26.67
7	18	6.27	0.00	15.00	11695.	1185.	25.53	26.69
7	24	4.48	0.00	15.00	11468.	1170.	25.52	26.71
8	6	3.31	0.00	15.00	11215.	1153.	25.50	26.73
8	12	2.36	0.00	15.00	10942.	1135.	25.49	26.75
8	18	1.59	0.00	15.00	10652.	1115.	25.47	26.77
8	24	0.94	0.00	15.00	10349.	1095.	25.45	26.80
9	6	0.65	0.00	15.00	10039.	1074.	25.43	26.82
9	12	0.40	0.00	15.00	9723.	1052.	25.41	26.84
9	18	0.19	0.00	15.00	9403.	1031.	25.39	26.84
9	24	0.00	0.00	15.00	9079.	1009.	25.36	26.83
10	6	0.00	0.00	15.00	8755.	987.	25.34	26.83
10	12	0.00	0.00	15.00	8431.	965.	25.32	26.82
10	18	0.00	0.00	15.00	8107.	943.	25.30	26.78
10	24	0.00	0.00	15.00	7783.	891.	25.27	26.74
11	6	0.00	0.00	15.00	7459.	838.	25.24	26.70
11	12	0.00	0.00	15.00	7135.	785.	25.21	26.66
11	18	0.00	0.00	15.00	6811.	732.	25.18	26.59
11	24	0.00	0.00	15.00	6487.	679.	25.15	26.51
12	6	0.00	0.00	15.00	6163.	625.	25.12	26.44
12	12	0.00	0.00	15.00	5839.	572.	25.09	26.36
12	18	0.00	0.00	15.00	5515.	519.	25.06	26.29
12	24	0.00	0.00	15.00	5191.	466.	25.03	26.22

KURIGRAM IIRI & FLOOD CONTROL PROJECT

TANGONMARI-OLD GIRAI BLOCK

BLOCK NO. = 5 RIV-WL NO. = 6 CASE NO. = 3  
 NO. OF GATE = 8 PUMP = 16

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	0.26	0.00	0.26	0.	0.	24.08	26.04
1	12	2.77	0.00	2.77	0.	0.	24.08	26.04
1	18	9.59	0.00	9.59	0.	0.	24.08	26.07
1	24	15.26	0.00	15.26	0.	0.	24.08	26.09
2	6	19.52	0.00	16.00	76.	0.	24.10	26.12
2	12	25.08	0.00	16.00	272.	0.	24.15	26.14
2	18	34.71	0.00	16.00	676.	0.	24.24	26.16
2	24	42.63	0.00	16.00	1252.	0.	24.38	26.18
3	6	48.40	0.00	16.00	1951.	63.	24.53	26.19
3	12	53.20	0.00	16.00	2755.	138.	24.70	26.21
3	18	58.19	0.00	16.00	3666.	256.	24.83	26.22
3	24	62.22	0.00	16.00	4664.	384.	24.97	26.24
4	6	65.05	0.00	16.00	5724.	553.	25.08	26.25
4	12	64.92	0.00	16.00	6780.	727.	25.18	26.26
4	18	59.99	0.00	16.00	7731.	882.	25.27	26.32
4	24	55.88	0.00	16.00	8592.	976.	25.33	26.38
5	6	52.67	0.00	16.00	9384.	1030.	25.38	26.43
5	12	48.57	0.00	16.00	10088.	1077.	25.43	26.49
5	18	41.36	0.00	16.00	10636.	1114.	25.47	26.53
5	24	35.49	0.00	16.00	11057.	1142.	25.49	26.57
6	6	30.83	0.00	16.00	11377.	1164.	25.51	26.60
6	12	26.23	0.00	16.00	11598.	1179.	25.53	26.64
6	18	20.09	0.00	16.00	11686.	1185.	25.53	26.65
6	24	15.09	0.00	16.00	11667.	1183.	25.53	26.66
7	6	11.30	0.00	16.00	11565.	1177.	25.53	26.66
7	12	8.47	0.00	16.00	11403.	1166.	25.52	26.67
7	18	6.27	0.00	16.00	11193.	1151.	25.50	26.69
7	24	4.48	0.00	16.00	10944.	1135.	25.49	26.71
8	6	3.31	0.00	16.00	10669.	1116.	25.47	26.73
8	12	2.36	0.00	16.00	10375.	1096.	25.45	26.75
8	18	1.59	0.00	16.00	10064.	1075.	25.43	26.77
8	24	0.94	0.00	16.00	9738.	1053.	25.41	26.80
9	6	0.65	0.00	16.00	9407.	1031.	25.39	26.82
9	12	0.40	0.00	16.00	9070.	1008.	25.36	26.84
9	18	0.19	0.00	16.00	8728.	985.	25.34	26.84
9	24	0.00	0.00	16.00	8383.	962.	25.32	26.83
10	6	0.00	0.00	16.00	8037.	933.	25.29	26.83
10	12	0.00	0.00	16.00	7691.	876.	25.26	26.82
10	18	0.00	0.00	16.00	7346.	819.	25.23	26.78
10	24	0.00	0.00	16.00	7000.	763.	25.20	26.74
11	6	0.00	0.00	16.00	6655.	706.	25.16	26.70
11	12	0.00	0.00	16.00	6309.	649.	25.13	26.66
11	18	0.00	0.00	16.00	5963.	593.	25.10	26.59
11	24	0.00	0.00	16.00	5618.	536.	25.07	26.51
12	6	0.00	0.00	16.00	5272.	479.	25.03	26.44
12	12	0.00	0.00	16.00	4927.	423.	25.00	26.36
12	18	0.00	0.00	16.00	4581.	374.	24.96	26.29
12	24	0.00	0.00	16.00	4235.	329.	24.91	26.22

4 days

KURIGRAM IIRI & FLOOD CONTROL PROJECT

TANGONMARI-OLD GIRAI BLOCK

BLOCK NO. = 5 RIV-WL NO. = 6 CASE NO. = 3  
 NO. OF GATE = 8 PUMP = 18

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	0.26	0.00	0.26	0.	0.	24.08	26.04
1	12	2.77	0.00	2.77	0.	0.	24.08	26.04
1	18	9.59	0.00	9.59	0.	0.	24.08	26.07
1	24	15.26	0.00	15.26	0.	0.	24.08	26.09
2	6	19.52	0.00	18.00	33.	0.	24.09	26.12
2	12	25.08	0.00	18.00	186.	0.	24.12	26.14
2	18	34.71	0.00	18.00	547.	0.	24.21	26.16
2	24	42.63	0.00	18.00	1079.	0.	24.34	26.18
3	6	48.40	0.00	18.00	1735.	44.	24.48	26.19
3	12	53.20	0.00	18.00	2496.	113.	24.65	26.21
3	18	58.19	0.00	18.00	3364.	217.	24.78	26.22
3	24	62.22	0.00	18.00	4319.	340.	24.92	26.24
4	6	65.05	0.00	18.00	5335.	490.	25.04	26.25
4	12	64.92	0.00	18.00	6348.	656.	25.14	26.26
4	18	59.99	0.00	18.00	7255.	805.	25.22	26.32
4	24	55.88	0.00	18.00	8074.	939.	25.30	26.38
5	6	52.67	0.00	18.00	8823.	992.	25.35	26.43
5	12	48.57	0.00	18.00	9483.	1036.	25.39	26.49
5	18	41.36	0.00	18.00	9988.	1070.	25.42	26.53
5	24	35.49	0.00	18.00	10365.	1096.	25.45	26.57
6	6	30.83	0.00	18.00	10643.	1114.	25.47	26.60
6	12	26.23	0.00	18.00	10820.	1126.	25.48	26.64
6	18	20.09	0.00	18.00	10865.	1129.	25.48	26.65
6	24	15.09	0.00	18.00	10803.	1125.	25.48	26.66
7	6	11.30	0.00	18.00	10658.	1115.	25.47	26.66
7	12	8.47	0.00	18.00	10452.	1102.	25.45	26.67
7	18	6.27	0.00	18.00	10199.	1084.	25.44	26.69
7	24	4.48	0.00	18.00	9907.	1065.	25.42	26.71
8	6	3.31	0.00	18.00	9589.	1043.	25.40	26.73
8	12	2.36	0.00	18.00	9252.	1021.	25.38	26.75
8	18	1.59	0.00	18.00	8897.	997.	25.35	26.77
8	24	0.94	0.00	18.00	8529.	972.	25.33	26.80
9	6	0.65	0.00	18.00	8154.	947.	25.30	26.82
9	12	0.40	0.00	18.00	7774.	890.	25.27	26.84
9	18	0.19	0.00	18.00	7389.	826.	25.23	26.84
9	24	0.00	0.00	18.00	7000.	763.	25.20	26.83
10	6	0.00	0.00	18.00	6611.	699.	25.16	26.83
10	12	0.00	0.00	18.00	6223.	635.	25.12	26.82
10	18	0.00	0.00	18.00	5834.	571.	25.09	26.78
10	24	0.00	0.00	18.00	5445.	508.	25.05	26.74
11	6	0.00	0.00	18.00	5056.	444.	25.01	26.70
11	12	0.00	0.00	18.00	4667.	385.	24.97	26.66
11	18	0.00	0.00	18.00	4279.	335.	24.92	26.59
11	24	0.00	0.00	18.00	3890.	285.	24.86	26.51
12	6	0.00	0.00	18.00	3501.	234.	24.80	26.44
12	12	0.00	0.00	18.00	3112.	184.	24.75	26.36
12	18	0.00	0.00	18.00	2723.	134.	24.69	26.29
12	24	0.00	0.00	18.00	2335.	98.	24.61	26.22

3 days

# KURIGRAM IRRI & FLOOD CONTROL PROJECT

## SOUTH TAIL BLOCK

BLOCK NO. = 6    RIV-WL NO. = 9    CASE NO. = 3  
 NO. OF GATE = 8    PUMP = 3

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	1.53	0.00	1.53	0.	0.	23.47	25.88
1	12	8.95	0.00	3.00	128.	0.	23.50	25.88
1	18	12.03	0.00	3.00	323.	0.	23.56	25.91
1	24	13.42	0.00	3.00	549.	0.	23.61	25.93
2	6	15.83	0.00	3.00	826.	0.	23.69	25.96
2	12	26.44	0.00	3.00	1332.	12.	23.82	25.98
2	18	29.84	0.00	3.00	1912.	48.	23.96	26.00
2	24	31.38	0.00	3.00	2525.	110.	24.10	26.02
3	6	32.59	0.00	3.00	3164.	271.	24.18	26.04
3	12	37.28	0.00	3.00	3905.	458.	24.29	26.06
3	18	38.12	0.00	3.00	4663.	639.	24.39	26.07
3	24	38.50	0.00	3.00	5430.	698.	24.45	26.09
4	6	37.17	0.00	3.00	6168.	755.	24.52	26.10
4	12	30.45	0.00	3.00	6761.	801.	24.57	26.11
4	18	27.39	0.00	3.00	7288.	842.	24.62	26.17
4	24	26.00	0.00	3.00	7785.	881.	24.66	26.23
5	6	23.99	0.00	3.00	8238.	918.	24.70	26.28
5	12	15.31	0.00	3.00	8504.	942.	24.72	26.34
5	18	12.70	0.00	3.00	8714.	962.	24.73	26.38
5	24	11.52	0.00	3.00	8898.	979.	24.74	26.42
6	6	10.09	0.00	3.00	9051.	993.	24.75	26.45
6	12	4.08	0.00	3.00	9074.	995.	24.75	26.49
6	18	2.43	0.00	3.00	9062.	994.	24.75	26.50
6	24	1.68	0.00	3.00	9033.	991.	24.75	26.51
7	6	1.30	0.00	3.00	8996.	988.	24.75	26.51
7	12	0.00	0.00	3.00	8932.	982.	24.74	26.52
7	18	0.00	0.00	3.00	8867.	976.	24.74	26.54
7	24	0.00	0.00	3.00	8802.	970.	24.74	26.56
8	6	0.00	0.00	3.00	8737.	964.	24.73	26.58
8	12	0.00	0.00	3.00	8672.	958.	24.73	26.60
8	18	0.00	0.00	3.00	8608.	952.	24.72	26.62
8	24	0.00	0.00	3.00	8543.	946.	24.72	26.64
9	6	0.00	0.00	3.00	8478.	940.	24.71	26.66
9	12	0.00	0.00	3.00	8413.	934.	24.71	26.68
9	18	0.00	0.00	3.00	8348.	928.	24.71	26.68
9	24	0.00	0.00	3.00	8284.	922.	24.70	26.67
10	6	0.00	0.00	3.00	8219.	916.	24.70	26.67
10	12	0.00	0.00	3.00	8154.	910.	24.69	26.66
10	18	0.00	0.00	3.00	8089.	904.	24.69	26.62
10	24	0.00	0.00	3.00	8024.	899.	24.68	26.59
11	6	0.00	0.00	3.00	7960.	894.	24.68	26.55
11	12	0.00	0.00	3.00	7895.	889.	24.67	26.51
11	18	0.00	0.00	3.00	7830.	884.	24.67	26.44
11	24	0.00	0.00	3.00	7765.	879.	24.66	26.37
12	6	0.00	0.00	3.00	7700.	874.	24.65	26.29
12	12	0.00	0.00	3.00	7636.	869.	24.65	26.22
12	18	0.00	0.00	3.00	7571.	864.	24.64	26.15
12	24	0.00	0.00	3.00	7506.	859.	24.64	26.08

6 days 12 hrs



KURIGRAM IIRRI & FLOOD CONTROL PROJECT

SOUTH TAIL BLOCK

BLOCK NO. = 6 RIV-WL NO. = 9 CASE NO. = 3  
 NO. OF GATE = 8 PUMP = 4

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	1.53	0.00	1.53	0.	0.	23.47	25.88
1	12	8.95	0.00	4.00	107.	0.	23.50	25.88
1	18	12.03	0.00	4.00	280.	0.	23.54	25.91
1	24	13.42	0.00	4.00	484.	0.	23.60	25.93
2	6	15.83	0.00	4.00	739.	0.	23.66	25.96
2	12	26.44	0.00	4.00	1224.	5.	23.79	25.98
2	18	29.84	0.00	4.00	1782.	40.	23.93	26.00
2	24	31.38	0.00	4.00	2374.	76.	24.07	26.02
3	6	32.59	0.00	4.00	2991.	227.	24.16	26.04
3	12	37.28	0.00	4.00	3710.	409.	24.26	26.06
3	18	38.12	0.00	4.00	4447.	595.	24.36	26.07
3	24	38.50	0.00	4.00	5193.	680.	24.43	26.09
4	6	37.17	0.00	4.00	5909.	735.	24.50	26.10
4	12	30.45	0.00	4.00	6481.	780.	24.55	26.11
4	18	27.39	0.00	4.00	6986.	819.	24.59	26.17
4	24	26.00	0.00	4.00	7461.	856.	24.63	26.23
5	6	23.99	0.00	4.00	7893.	889.	24.67	26.28
5	12	15.31	0.00	4.00	8137.	908.	24.69	26.34
5	18	12.70	0.00	4.00	8325.	926.	24.70	26.38
5	24	11.52	0.00	4.00	8487.	941.	24.72	26.42
6	6	10.09	0.00	4.00	8619.	953.	24.72	26.45
6	12	4.08	0.00	4.00	8620.	953.	24.72	26.49
6	18	2.43	0.00	4.00	8586.	950.	24.72	26.50
6	24	1.68	0.00	4.00	8536.	945.	24.72	26.51
7	6	1.30	0.00	4.00	8478.	940.	24.71	26.51
7	12	0.00	0.00	4.00	8392.	932.	24.71	26.52
7	18	0.00	0.00	4.00	8305.	924.	24.70	26.54
7	24	0.00	0.00	4.00	8219.	916.	24.70	26.56
8	6	0.00	0.00	4.00	8132.	908.	24.69	26.58
8	12	0.00	0.00	4.00	8046.	901.	24.69	26.60
8	18	0.00	0.00	4.00	7960.	894.	24.68	26.62
8	24	0.00	0.00	4.00	7873.	887.	24.67	26.64
9	6	0.00	0.00	4.00	7787.	881.	24.66	26.66
9	12	0.00	0.00	4.00	7700.	874.	24.65	26.68
9	18	0.00	0.00	4.00	7614.	867.	24.65	26.68
9	24	0.00	0.00	4.00	7528.	861.	24.64	26.67
10	6	0.00	0.00	4.00	7441.	854.	24.63	26.67
10	12	0.00	0.00	4.00	7355.	847.	24.62	26.66
10	18	0.00	0.00	4.00	7268.	841.	24.62	26.62
10	24	0.00	0.00	4.00	7182.	834.	24.61	26.59
11	6	0.00	0.00	4.00	7096.	827.	24.60	26.55
11	12	0.00	0.00	4.00	7009.	821.	24.59	26.51
11	18	0.00	0.00	4.00	6923.	814.	24.59	26.44
11	24	0.00	0.00	4.00	6836.	807.	24.58	26.37
12	6	0.00	0.00	4.00	6750.	800.	24.57	26.29
12	12	0.00	0.00	4.00	6664.	794.	24.56	26.22
12	18	0.00	0.00	4.00	6577.	787.	24.56	26.15
12	24	0.00	0.00	4.00	6491.	780.	24.55	26.08

KURIGRAM IRRI & FLOOD CONTROL PROJECT

SOUTH TAIL BLOCK

BLOCK NO. = 6 RIV-WL NO. = 9 CASE NO. = 3  
 NO. OF GATE = 8 PUMP = 5

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	1.53	0.00	1.53	0.	0.	23.47	25.88
1	12	8.95	0.00	5.00	85.	0.	23.49	25.88
1	18	12.03	0.00	5.00	237.	0.	23.53	25.91
1	24	13.42	0.00	5.00	419.	0.	23.58	25.93
2	6	15.83	0.00	5.00	653.	0.	23.64	25.96
2	12	26.44	0.00	5.00	1116.	0.	23.76	25.98
2	18	29.84	0.00	5.00	1653.	32.	23.90	26.00
2	24	31.38	0.00	5.00	2223.	67.	24.04	26.02
3	6	32.59	0.00	5.00	2819.	184.	24.14	26.04
3	12	37.28	0.00	5.00	3516.	360.	24.23	26.06
3	18	38.12	0.00	5.00	4231.	541.	24.33	26.07
3	24	38.50	0.00	5.00	4955.	661.	24.41	26.09
4	6	37.17	0.00	5.00	5650.	715.	24.47	26.10
4	12	30.45	0.00	5.00	6200.	758.	24.52	26.11
4	18	27.39	0.00	5.00	6683.	795.	24.56	26.17
4	24	26.00	0.00	5.00	7137.	830.	24.60	26.23
5	6	23.99	0.00	5.00	7547.	862.	24.64	26.28
5	12	15.31	0.00	5.00	7770.	879.	24.66	26.34
5	18	12.70	0.00	5.00	7936.	892.	24.68	26.38
5	24	11.52	0.00	5.00	8077.	903.	24.69	26.42
6	6	10.09	0.00	5.00	8187.	913.	24.70	26.45
6	12	4.08	0.00	5.00	8167.	911.	24.69	26.49
6	18	2.43	0.00	5.00	8111.	906.	24.69	26.50
6	24	1.68	0.00	5.00	8040.	900.	24.68	26.51
7	6	1.30	0.00	5.00	7960.	894.	24.68	26.51
7	12	0.00	0.00	5.00	7852.	886.	24.67	26.52
7	18	0.00	0.00	5.00	7744.	877.	24.66	26.54
7	24	0.00	0.00	5.00	7636.	869.	24.65	26.56
8	6	0.00	0.00	5.00	7528.	861.	24.64	26.58
8	12	0.00	0.00	5.00	7420.	852.	24.63	26.60
8	18	0.00	0.00	5.00	7312.	844.	24.62	26.62
8	24	0.00	0.00	5.00	7204.	836.	24.61	26.64
9	6	0.00	0.00	5.00	7096.	827.	24.60	26.66
9	12	0.00	0.00	5.00	6988.	819.	24.59	26.68
9	18	0.00	0.00	5.00	6880.	811.	24.58	26.68
9	24	0.00	0.00	5.00	6772.	802.	24.57	26.67
10	6	0.00	0.00	5.00	6664.	794.	24.56	26.67
10	12	0.00	0.00	5.00	6556.	785.	24.55	26.66
10	18	0.00	0.00	5.00	6448.	777.	24.54	26.62
10	24	0.00	0.00	5.00	6340.	769.	24.53	26.59
11	6	0.00	0.00	5.00	6232.	760.	24.52	26.55
11	12	0.00	0.00	5.00	6124.	752.	24.51	26.51
11	18	0.00	0.00	5.00	6016.	744.	24.51	26.44
11	24	0.00	0.00	5.00	5908.	735.	24.50	26.37
12	6	0.00	0.00	5.00	5800.	727.	24.49	26.29
12	12	0.00	0.00	5.00	5692.	719.	24.48	26.22
12	18	0.00	0.00	5.00	5584.	710.	24.47	26.15
12	24	0.00	0.00	5.00	5476.	702.	24.46	26.08

KURIGRAM IIRI & FLOOD CONTROL PROJECT

SOUTH TAIL BLOCK

BLOCK NO. = 6 RIV-WL NO. = 9 CASE NO. = 3  
 NO. OF GATE = 8 PUMP = 6

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	1.53	0.00	1.53	0.	0.	23.47	25.88
1	12	8.95	0.00	6.00	64.	0.	23.49	25.88
1	18	12.03	0.00	6.00	194.	0.	23.52	25.91
1	24	13.42	0.00	6.00	354.	0.	23.56	25.93
2	6	15.83	0.00	6.00	567.	0.	23.62	25.96
2	12	26.44	0.00	6.00	1008.	0.	23.74	25.98
2	18	29.84	0.00	6.00	1523.	24.	23.86	26.00
2	24	31.38	0.00	6.00	2071.	58.	24.00	26.02
3	6	32.59	0.00	6.00	2646.	140.	24.11	26.04
3	12	37.28	0.00	6.00	3321.	311.	24.21	26.06
3	18	38.12	0.00	6.00	4015.	486.	24.30	26.07
3	24	38.50	0.00	6.00	4717.	643.	24.39	26.09
4	6	37.17	0.00	6.00	5391.	695.	24.45	26.10
4	12	30.45	0.00	6.00	5919.	736.	24.50	26.11
4	18	27.39	0.00	6.00	6381.	772.	24.54	26.17
4	24	26.00	0.00	6.00	6813.	805.	24.58	26.23
5	6	23.99	0.00	6.00	7201.	835.	24.61	26.28
5	12	15.31	0.00	6.00	7402.	851.	24.63	26.34
5	18	12.70	0.00	6.00	7547.	862.	24.64	26.38
5	24	11.52	0.00	6.00	7666.	871.	24.65	26.42
6	6	10.09	0.00	6.00	7755.	878.	24.66	26.45
6	12	4.08	0.00	6.00	7713.	875.	24.66	26.49
6	18	2.43	0.00	6.00	7636.	869.	24.65	26.50
6	24	1.68	0.00	6.00	7543.	862.	24.64	26.51
7	6	1.30	0.00	6.00	7441.	854.	24.63	26.51
7	12	0.00	0.00	6.00	7312.	844.	24.62	26.52
7	18	0.00	0.00	6.00	7182.	834.	24.61	26.54
7	24	0.00	0.00	6.00	7052.	824.	24.60	26.56
8	6	0.00	0.00	6.00	6923.	814.	24.59	26.58
8	12	0.00	0.00	6.00	6793.	804.	24.57	26.60
8	18	0.00	0.00	6.00	6664.	794.	24.56	26.62
8	24	0.00	0.00	6.00	6534.	784.	24.55	26.64
9	6	0.00	0.00	6.00	6404.	774.	24.54	26.66
9	12	0.00	0.00	6.00	6275.	764.	24.53	26.68
9	18	0.00	0.00	6.00	6145.	754.	24.52	26.68
9	24	0.00	0.00	6.00	6016.	744.	24.51	26.67
10	6	0.00	0.00	6.00	5886.	734.	24.49	26.67
10	12	0.00	0.00	6.00	5756.	724.	24.48	26.66
10	18	0.00	0.00	6.00	5627.	713.	24.47	26.62
10	24	0.00	0.00	6.00	5497.	703.	24.46	26.59
11	6	0.00	0.00	6.00	5368.	693.	24.45	26.55
11	12	0.00	0.00	6.00	5238.	683.	24.44	26.51
11	18	0.00	0.00	6.00	5108.	673.	24.43	26.44
11	24	0.00	0.00	6.00	4979.	663.	24.41	26.37
12	6	0.00	0.00	6.00	4849.	653.	24.40	26.29
12	12	0.00	0.00	6.00	4720.	643.	24.39	26.22
12	18	0.00	0.00	6.00	4590.	631.	24.38	26.15
12	24	0.00	0.00	6.00	4460.	599.	24.36	26.08

5 days 12 hrs

KURIGRAM IRRI & FLOOD CONTROL PROJECT

SOUTH TAIL BLOCK

BLOCK NO. = 6 RIV-WL NO. = 9 CASE NO. = 3  
 NO. OF GATE = 8 PUMP = 7

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	1.53	0.00	1.53	0.	0.	23.47	25.88
1	12	8.95	0.00	7.00	42.	0.	23.48	25.88
1	18	12.03	0.00	7.00	151.	0.	23.51	25.91
1	24	13.42	0.00	7.00	289.	0.	23.55	25.93
2	6	15.83	0.00	7.00	480.	0.	23.60	25.96
2	12	26.44	0.00	7.00	900.	0.	23.71	25.98
2	18	29.84	0.00	7.00	1394.	16.	23.83	26.00
2	24	31.38	0.00	7.00	1920.	48.	23.96	26.02
3	6	32.59	0.00	7.00	2473.	96.	24.09	26.04
3	12	37.28	0.00	7.00	3127.	262.	24.18	26.06
3	18	38.12	0.00	7.00	3799.	432.	24.27	26.07
3	24	38.50	0.00	7.00	4480.	604.	24.36	26.09
4	6	37.17	0.00	7.00	5132.	675.	24.43	26.10
4	12	30.45	0.00	7.00	5638.	714.	24.47	26.11
4	18	27.39	0.00	7.00	6078.	748.	24.51	26.17
4	24	26.00	0.00	7.00	6489.	780.	24.55	26.23
5	6	23.99	0.00	7.00	6856.	809.	24.58	26.28
5	12	15.31	0.00	7.00	7035.	823.	24.60	26.34
5	18	12.70	0.00	7.00	7158.	832.	24.61	26.38
5	24	11.52	0.00	7.00	7256.	840.	24.62	26.42
6	6	10.09	0.00	7.00	7323.	845.	24.62	26.45
6	12	4.08	0.00	7.00	7260.	840.	24.62	26.49
6	18	2.43	0.00	7.00	7161.	832.	24.61	26.50
6	24	1.68	0.00	7.00	7046.	823.	24.60	26.51
7	6	1.30	0.00	7.00	6923.	814.	24.59	26.51
7	12	0.00	0.00	7.00	6772.	802.	24.57	26.52
7	18	0.00	0.00	7.00	6620.	790.	24.56	26.54
7	24	0.00	0.00	7.00	6469.	779.	24.55	26.56
8	6	0.00	0.00	7.00	6318.	767.	24.53	26.58
8	12	0.00	0.00	7.00	6167.	755.	24.52	26.60
8	18	0.00	0.00	7.00	6016.	744.	24.51	26.62
8	24	0.00	0.00	7.00	5864.	732.	24.49	26.64
9	6	0.00	0.00	7.00	5713.	720.	24.48	26.66
9	12	0.00	0.00	7.00	5562.	708.	24.47	26.68
9	18	0.00	0.00	7.00	5411.	697.	24.45	26.68
9	24	0.00	0.00	7.00	5260.	685.	24.44	26.67
10	6	0.00	0.00	7.00	5108.	673.	24.43	26.67
10	12	0.00	0.00	7.00	4957.	662.	24.41	26.66
10	18	0.00	0.00	7.00	4806.	650.	24.40	26.62
10	24	0.00	0.00	7.00	4655.	638.	24.38	26.59
11	6	0.00	0.00	7.00	4504.	610.	24.37	26.55
11	12	0.00	0.00	7.00	4352.	571.	24.35	26.51
11	18	0.00	0.00	7.00	4201.	533.	24.33	26.44
11	24	0.00	0.00	7.00	4050.	495.	24.31	26.37
12	6	0.00	0.00	7.00	3899.	457.	24.28	26.29
12	12	0.00	0.00	7.00	3748.	419.	24.26	26.22
12	18	0.00	0.00	7.00	3596.	380.	24.24	26.15
12	24	0.00	0.00	7.00	3445.	342.	24.22	26.08

4 days 6 hrs

KURIGRAM IIRI & FLOOD CONTROL PROJECT

SOUTH TAIL BLOCK

BLOCK NO. = 6 RIV-WL NO.= 9 CASE NO.= 3  
 NO. OF GATE= 8 PUMP = 8

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	1.53	0.00	1.53	0.	0.	23.47	25.88
1	12	8.95	0.00	8.00	20.	0.	23.48	25.88
1	18	12.03	0.00	8.00	107.	0.	23.50	25.91
1	24	13.42	0.00	8.00	225.	0.	23.53	25.93
2	6	15.83	0.00	8.00	394.	0.	23.57	25.96
2	12	26.44	0.00	8.00	792.	0.	23.68	25.98
2	18	29.84	0.00	8.00	1264.	8.	23.80	26.00
2	24	31.38	0.00	8.00	1769.	39.	23.92	26.02
3	6	32.59	0.00	8.00	2300.	72.	24.06	26.04
3	12	37.28	0.00	8.00	2933.	213.	24.15	26.06
3	18	38.12	0.00	8.00	3583.	377.	24.24	26.07
3	24	38.50	0.00	8.00	4242.	544.	24.33	26.09
4	6	37.17	0.00	8.00	4872.	655.	24.40	26.10
4	12	30.45	0.00	8.00	5357.	693.	24.45	26.11
4	18	27.39	0.00	8.00	5776.	725.	24.48	26.17
4	24	26.00	0.00	8.00	6165.	755.	24.52	26.23
5	6	23.99	0.00	8.00	6510.	782.	24.55	26.28
5	12	15.31	0.00	8.00	6668.	794.	24.56	26.34
5	18	12.70	0.00	8.00	6770.	802.	24.57	26.38
5	24	11.52	0.00	8.00	6846.	808.	24.58	26.42
6	6	10.09	0.00	8.00	6891.	811.	24.58	26.45
6	12	4.08	0.00	8.00	6806.	805.	24.58	26.49
6	18	2.43	0.00	8.00	6686.	795.	24.56	26.50
6	24	1.68	0.00	8.00	6549.	785.	24.55	26.51
7	6	1.30	0.00	8.00	6404.	774.	24.54	26.51
7	12	0.00	0.00	8.00	6232.	760.	24.52	26.52
7	18	0.00	0.00	8.00	6059.	747.	24.51	26.54
7	24	0.00	0.00	8.00	5886.	734.	24.49	26.56
8	6	0.00	0.00	8.00	5713.	720.	24.48	26.58
8	12	0.00	0.00	8.00	5540.	707.	24.46	26.60
8	18	0.00	0.00	8.00	5368.	693.	24.45	26.62
8	24	0.00	0.00	8.00	5195.	680.	24.43	26.64
9	6	0.00	0.00	8.00	5022.	667.	24.42	26.66
9	12	0.00	0.00	8.00	4849.	653.	24.40	26.68
9	18	0.00	0.00	8.00	4676.	640.	24.39	26.68
9	24	0.00	0.00	8.00	4504.	610.	24.37	26.67
10	6	0.00	0.00	8.00	4331.	566.	24.34	26.67
10	12	0.00	0.00	8.00	4158.	522.	24.32	26.66
10	18	0.00	0.00	8.00	3985.	479.	24.30	26.62
10	24	0.00	0.00	8.00	3812.	435.	24.27	26.59
11	6	0.00	0.00	8.00	3640.	391.	24.25	26.55
11	12	0.00	0.00	8.00	3467.	348.	24.23	26.51
11	18	0.00	0.00	8.00	3294.	304.	24.20	26.44
11	24	0.00	0.00	8.00	3121.	260.	24.18	26.37
12	6	0.00	0.00	8.00	2948.	217.	24.15	26.29
12	12	0.00	0.00	8.00	2776.	173.	24.13	26.22
12	18	0.00	0.00	8.00	2603.	129.	24.11	26.15
12	24	0.00	0.00	8.00	2430.	86.	24.08	26.08

KURIGRAM IRRIGATION & FLOOD CONTROL PROJECT

SOUTH TAIL BLOCK

BLOCK NO. = 6 RIV-WL NO. = 9 CASE NO. = 3  
 NO. OF GATE = 8 PUMP = 10

DAY	HR	INFLOW (CMS)	Q-GATE (CMS)	Q-PUMP (CMS)	RETENT (T-CUM)	SUBMGD (HA)	WL-IN (EL-M)	WL-OUT (EL-M)
1	6	1.53	0.00	1.53	0.	0.	23.47	25.88
1	12	8.95	0.00	8.95	0.	0.	23.47	25.88
1	18	12.03	0.00	10.00	44.	0.	23.48	25.91
1	24	13.42	0.00	10.00	118.	0.	23.50	25.93
2	6	15.83	0.00	10.00	244.	0.	23.53	25.96
2	12	26.44	0.00	10.00	599.	0.	23.63	25.98
2	18	29.84	0.00	10.00	1027.	0.	23.74	26.00
2	24	31.38	0.00	10.00	1489.	22.	23.86	26.02
3	6	32.59	0.00	10.00	1977.	52.	23.98	26.04
3	12	37.28	0.00	10.00	2567.	120.	24.10	26.06
3	18	38.12	0.00	10.00	3174.	274.	24.19	26.07
3	24	38.50	0.00	10.00	3790.	429.	24.27	26.09
4	6	37.17	0.00	10.00	4377.	578.	24.35	26.10
4	12	30.45	0.00	10.00	4819.	651.	24.40	26.11
4	18	27.39	0.00	10.00	5194.	680.	24.43	26.17
4	24	26.00	0.00	10.00	5540.	707.	24.46	26.23
5	6	23.99	0.00	10.00	5842.	730.	24.49	26.28
5	12	15.31	0.00	10.00	5956.	739.	24.50	26.34
5	18	12.70	0.00	10.00	6015.	744.	24.51	26.38
5	24	11.52	0.00	10.00	6048.	746.	24.51	26.42
6	6	10.09	0.00	10.00	6050.	746.	24.51	26.45
6	12	4.08	0.00	10.00	5922.	736.	24.50	26.49
6	18	2.43	0.00	10.00	5758.	724.	24.48	26.50
6	24	1.68	0.00	10.00	5578.	710.	24.47	26.51
7	6	1.30	0.00	10.00	5390.	695.	24.45	26.51
7	12	0.00	0.00	10.00	5174.	678.	24.43	26.52
7	18	0.00	0.00	10.00	4958.	662.	24.41	26.54
7	24	0.00	0.00	10.00	4742.	645.	24.39	26.56
8	6	0.00	0.00	10.00	4526.	615.	24.37	26.58
8	12	0.00	0.00	10.00	4310.	561.	24.34	26.60
8	18	0.00	0.00	10.00	4094.	506.	24.31	26.62
8	24	0.00	0.00	10.00	3878.	452.	24.28	26.64
9	6	0.00	0.00	10.00	3662.	397.	24.25	26.66
9	12	0.00	0.00	10.00	3446.	342.	24.22	26.68
9	18	0.00	0.00	10.00	3230.	288.	24.19	26.68
9	24	0.00	0.00	10.00	3014.	233.	24.16	26.67
10	6	0.00	0.00	10.00	2798.	179.	24.13	26.67
10	12	0.00	0.00	10.00	2582.	124.	24.10	26.66
10	18	0.00	0.00	10.00	2366.	76.	24.07	26.62
10	24	0.00	0.00	10.00	2150.	63.	24.02	26.59
11	6	0.00	0.00	10.00	1934.	49.	23.97	26.55
11	12	0.00	0.00	10.00	1718.	36.	23.91	26.51
11	18	0.00	0.00	10.00	1502.	22.	23.86	26.44
11	24	0.00	0.00	10.00	1286.	9.	23.81	26.37
12	6	0.00	0.00	10.00	1070.	0.	23.75	26.29
12	12	0.00	0.00	10.00	854.	0.	23.69	26.22
12	18	0.00	0.00	10.00	638.	0.	23.64	26.15
12	24	0.00	0.00	10.00	422.	0.	23.58	26.08

## 5. Examination of Drainage Channel Cross-Sections

### 5-1. Introduction

In the course of studying the drainage system through various data, information, inquiries and field investigations, two channels in the Girai-Lower Nilkamal Drainage Block have been found necessary for the captioned examination so as to meet the planned improvements of the drainage system.

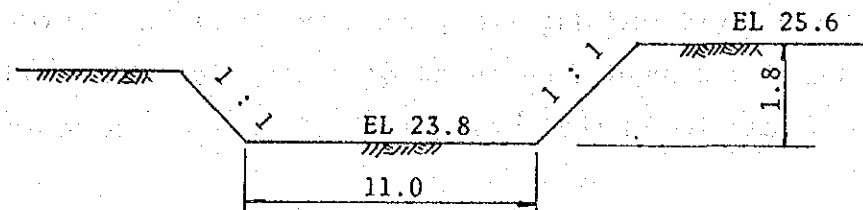
A channel to short-cut the flow from the Girai to the downstream end of the Nilkamal into the Pateswari Chara at Madhya Kumarpur, say "Girai-Nilkamal Pass", plays an important role though the cross-section of the channel seem to be smaller for the required capacity. The channel functions to prevent flood water in the Girai from going east across Pateswari-Bhurungamari Road to accelerate floods in the areas along the Brahmaputra and to safely drain flood water to the Dharla through Pateswari Chara and drainage regulators constructed thereof.

Another is the channel in the Nilkamal River at its exit to Pateswari Chara, say "Nilkamal End Channel", which is the same as Madhya Kumarpur and seems to be the bottle neck of the channel.

No other channels have been found necessary for improvement/rehabilitation/repair during the study. Major and key drainage channels have been investigated in the field and carefully judged as above by paying attention not to cause more flooding in the downstream reaches by improving a whole or a part of the channels.

## 5-2. Girai-Nilkamal Pass

### (1) Typical Cross-section



### (2) Hydraulic Examination

BLOCK 2 total capacity of regulator ;	128 cms
BLOCK 2 drainage area ;	192.4 sq. km
Drainage area of the Pass ;	67.2 sq. km
Design flow velocity (150% of 0.6 m/s:sandy loam) ;	0.9 m/s
HWL ;	26.40 m

then,

Required flow sectional area

$$= 128 \times 67.2 / 192.4 / 0.9$$

$$= 49.7 \text{ sq.m}$$

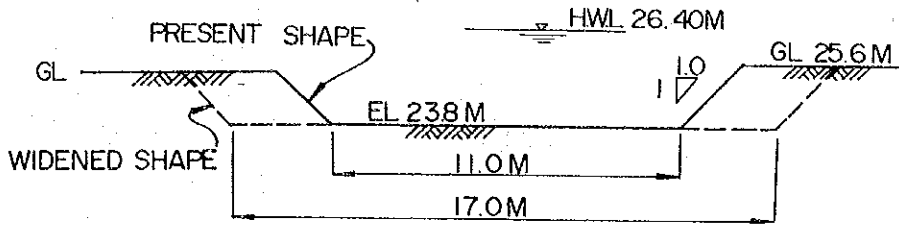
Present flow sectional area

$$= (11.0 + 2.6) \times 2.6$$

$$= 35.4 \text{ sq.m}$$



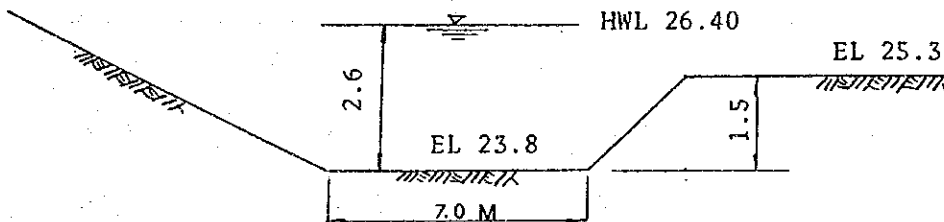
(3) Widening of the Cross-section



$$\begin{aligned} \text{Flow sectional area} &= (18.0 + 2.6) \times 2.6 \\ &= 51.0 \text{ sq.m} > 49.7 \text{ sqm} \end{aligned}$$

5-3. Nilkamal End Channel

(1) Typical Cross-section



(2) Hydraulic Examination

Drainage area of the channel ;	26.3 sq.km
Design flow velocity ;	0.9 m/s
HWL ;	26.40 m

then,

$$\begin{aligned} \text{Required flow sectional area} \\ &= 128 \times 26.3 / 192.4 / 0.9 \\ &= 19.4 \text{ sq.m} \end{aligned}$$

while,

Present flow sectional area

$$\begin{aligned} &= (7.0 \times 2 + 2.6 \times 3) \times 2.6 \times 1/2 \\ &= 28.3 \text{ sq.m} > 19.4 \text{ sq.m} \end{aligned}$$

consequently,

no cross-sectional widening is necessary

#### 5-4. Conclusion

- (1) The Girai-Nilkamal Pass is proposed to enlarge the channel's cross-section giving 18.0 m bed width at EL 23.8 and 1:1 side slopes.
- (2) The Nilkamal End Channel is not proposed for widening.

#### 6. Flood Embankment

Table VII-6-1 Needs for Repair for Flood Embankment

Degree of Needs	Dudhkumar Right Embankment	Dharla Left Embankment	Total
Reconstruction	0.20 km	- km	0.20 km
Major Repair	8.33	3.95	12.28
Minor Repair	8.89	3.50	12.39
Shaping	18.61	10.22	28.83
No Repair	2.60	4.20	6.80
Total	38.63 km	21.87 km	60.50 km

Source : Field inspection by the Study Team in Feb. '90

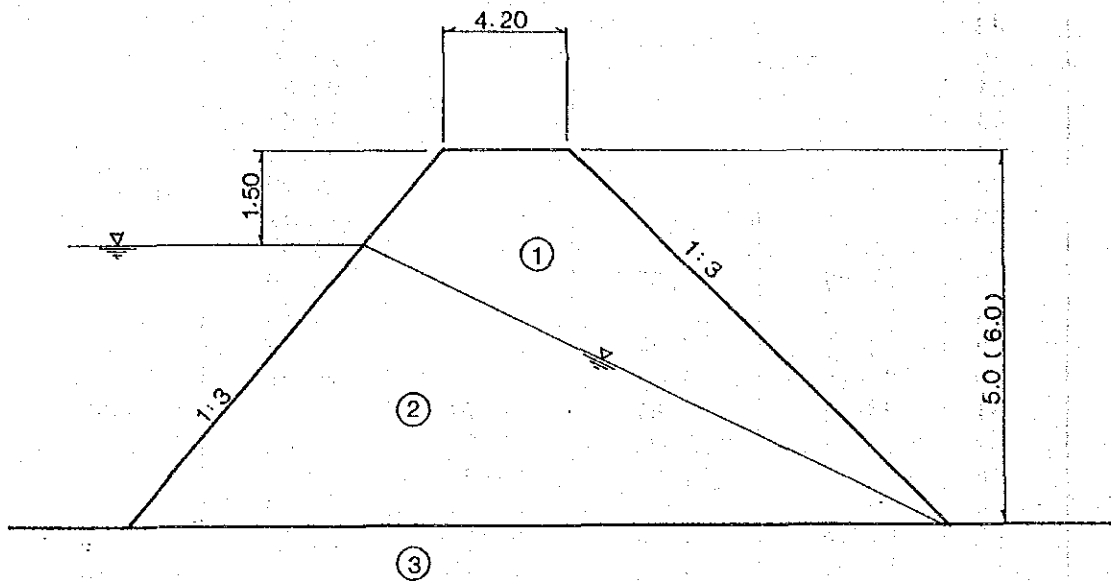
Table VII-6-2 Annual Maximum Water Level and HWL for Embankment Design

Year	Chilmari	Noonkhawa	Pateswari	Kurigram	Taluk Simul.
1946				25.78	
47				25.84	
48				26.56	
49				26.65	
50				26.56	
51				26.83	
52				27.41	
53				26.51	
54				27.40	
55				27.12	
56				26.85	
57	23.97	27.55		26.56	
58	24.25	27.52		26.93	
59	23.40	26.93		25.82	
60	23.72	27.17		26.49	
61	23.28	26.61	29.74	-	29.87
62	* 25.07	**28.07	29.94	27.02	30.43
63	-	27.71	29.93	-	-
64	-	-	30.26	26.70	-
65	23.26	27.59	29.87	26.61	30.58
66	23.81	27.45	29.42	26.35	30.76
67	23.97	27.39	29.64	26.32	30.65
68	24.04	27.53	30.08	26.53	30.89
69	23.79	27.58	29.17	25.87	29.96
70	24.19	27.88	29.48	26.28	29.97
71	24.08	27.11	-	-	-
72	24.09	27.96	29.10	27.04	30.12
73	23.88	27.79	29.52	26.20	30.41
74	24.46	27.99	30.24	26.72	30.54
75	23.78	27.55	29.52	26.52	31.14
76	23.90	27.63	29.38	26.31	30.97
77	24.11	27.77	30.15	26.18	30.94
78	23.68	27.41	29.69	25.83	30.99
79	-	27.32	29.95	26.37	30.62
80	24.25	27.96	29.93	26.58	31.20
81	-	27.30	29.64	26.58	30.79
82	-	-	30.29	26.48	30.85
83	24.12	26.71	30.67	26.62	31.44
84	23.26	26.45	* 30.86	27.38	31.74
85	23.93	26.51	30.00	26.75	31.13
86	23.44	26.12	29.72	25.91	**31.73
87	24.56	26.70	30.46	* 27.50	* 32.05
88	**25.06	* 28.10	**30.69	**27.41	-
# HWL (Nos.)	25.07 (27)	28.09 (30)	30.82 (27)	27.41 (40)	11.99 (24)

N.B. \* : largest value      \*\* : second largest value  
# : design HWL upon once-in-50-year flood for the Dudhmar  
and the Dharla and once-in-100-year flood for the  
Brahmaputra

# Slope Stability Analysis of Flood Embankment

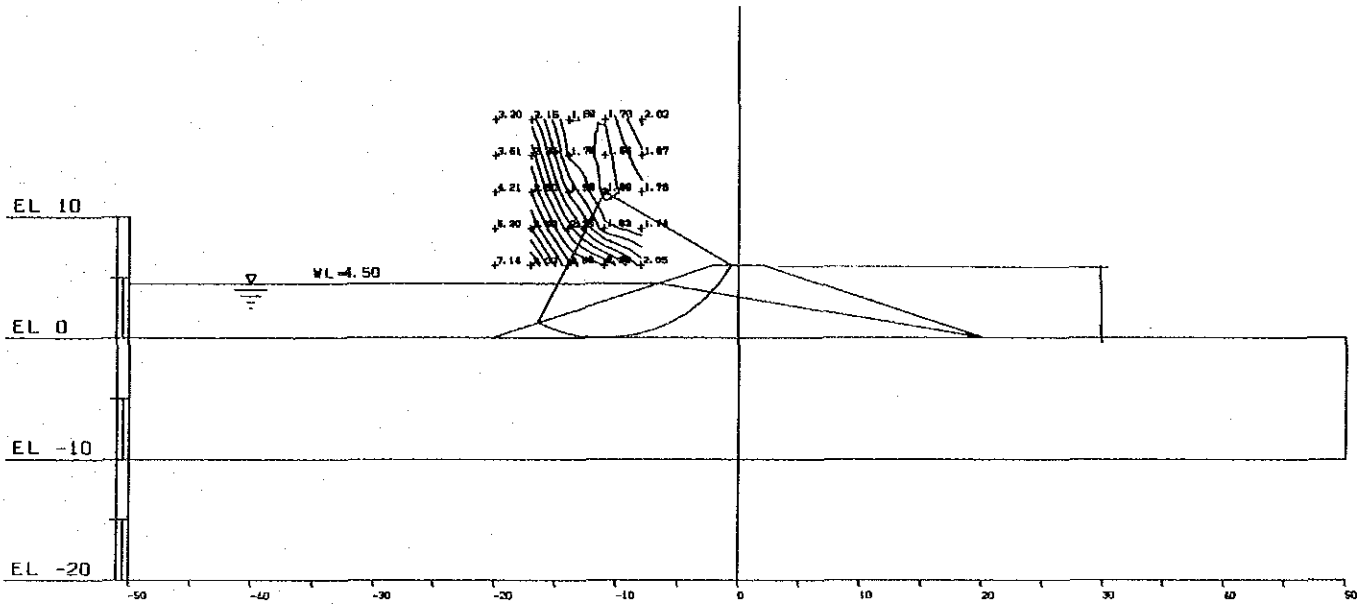
## (1) Conditions



	$\gamma$ (t/m <sup>3</sup> )	$\phi$ (°)	$c$ (t/m <sup>2</sup> )
- Zone ① :	1.65	20	0.4
- Zone ② :	2.0	20	0.4
- Zone ③ :	2.0	20	0.4

(2) Results

- Case 1 : Minimum safety factor( $F_s$ ) = 1.662 > 1.5



- Case 2 : Minimum safety factor( $F_s$ ) = 1.724 > 1.5

