表5.3.2　潅漑用水量（通常土壌地1,000haあたり用水量）（1/2）

SUMMARY TABLE :　　(Unit : m3/s)

Month	10 Days	Kharif						Rabi						Total
		Cotton 100ha	Pulses 50ha	Maize 200ha	Fodder 100ha	Sugarcane 100ha	Fruits 50 ha	Wheat . 450 ha	Oil Seeds 100ha	Pluses 100ha	Fodder 100 ha	Oilseeds 50ha	Maize 50ha	
Jan.	1					0.022	0.012	0.152	0.033	0.033	0.011			0.264
	2					0.024	0.012	0.168	0.036	0.037	0.007			0.283
	3					0.017	0.009	0.142	0.031	0.031	0.000			0.231
Feb.	1					0.027	0.015	0.211	0.047	0.047	0.000	0.008	0.008	0.363
	2					0.017	0.011	0.169	0.038	0.039	0.000	0.006	0.006	0.287
	3					0.017	0.012	0.169	0.039	0.040	0.000	0.013	0.014	0.303
Mar.	1					0.028	0.020	0.242	0.056	0.061	0.000	0.018	0.019	0.444
	2					0.017	0.015	0.155	0.033	0.038	0.000	0.009	0.011	0.279
	3					0.018	0.015	0.098	0.020	0.025	0.000	0.016	0.018	0.211
Apr.	1					0.043	0.030	0.129	0.026	0.033	0.000	0.041	0.043	0.344
	2					0.045	0.031	0.055	0.008	0.015	0.000	0.047	0.048	0.251
	3					0.060	0.035	0.024	0.000	0.005	0.000	0.053	0.052	0.228
May	1	0.005				0.087	0.045	0.000				0.064	0.057	0.259
	2	0.012				0.094	0.044	0.000				0.045	0.038	0.233
	3	0.023			0.007	0.107	0.046	0.000				0.029	0.022	0.234
Jun.	1	0.039	0.006	0.023	0.030	0.125	0.051					0.012	0.008	0.293
	2	0.047	0.007	0.028	0.047	0.128	0.048							0.304
	3	0.066	0.012	0.047	0.070	0.137	0.048							0.380
Jul.	1	0.048	0.008	0.032	0.068	0.111	0.035							0.302
	2	0.061	0.014	0.060	0.087	0.113	0.034							0.369
	3	0.072	0.020	0.088	0.085	0.112	0.031							0.408
Aug.	1	0.073	0.019	0.083	0.071	0.098	0.026							0.370
	2	0.094	0.031	0.134	0.063	0.109	0.031							0.463
	3	0.101	0.038	0.162	0.045	0.109	0.031							0.486
Sep.	1	0.092	0.040	0.165	0.027	0.096	0.029		0.000	0.000	0.000			0.449
	2	0.099	0.046	0.188	0.018	0.102	0.032		0.012	0.012	0.019			0.529
	3	0.103	0.050	0.195	0.007	0.107	0.034		0.023	0.023	0.040			0.583
Oct.	1	0.078	0.038	0.125	0.000	0.083	0.027	0.070	0.029	0.029	0.049			0.527
	2	0.071	0.030	0.092	0.000	0.079	0.025	0.075	0.030	0.031	0.057			0.490
	3	0.065	0.022	0.063	0.000	0.074	0.025	0.086	0.033	0.034	0.066			0.468
Nov.	1	0.037	0.012	0.030		0.050	0.018	0.120	0.019	0.021	0.045			0.353
	2	0.027	0.007	0.009		0.047	0.017	0.143	0.021	0.023	0.045			0.339
	3	0.020	0.003			0.046	0.018	0.186	0.027	0.030	0.046			0.375
Dec.	1	0.005				0.024	0.010	0.082	0.018	0.019	0.025			0.183
	2	0.000				0.021	0.009	0.094	0.020	0.022	0.019			0.185
	3					0.016	0.007	0.093	0.020	0.021	0.010			0.167

Irrigation efficiency of 58% is applyed.

表5.3.2　潅漑用水量（砂質土壌地1,000haあたり用水量）（2/2）

(Unit : m3/s)

SUMMARY TABLE :

Month	10 Days	Kharif							Rabi					Total
		Cotton 100ha	Pulses 50ha	Maize 200ha	Fodder 100ha	Sugarcane 100ha	Fruits 50 ha	Wheat 450 ha	Oil Seeds 100ha	Pluses 100ha	Fodder 100 ha	Oilseeds 50ha	Maize 50ha	
Jan.	1					0.043	0.023	0.295	0.063	0.064	0.022			0.510
	2					0.046	0.024	0.324	0.070	0.071	0.013			0.548
	3					0.033	0.018	0.275	0.060	0.061	0.000			0.446
Feb.	1					0.052	0.029	0.408	0.090	0.091	0.000	0.016	0.016	0.702
	2					0.032	0.020	0.328	0.074	0.075	0.000	0.012	0.012	0.554
	3					0.033	0.023	0.326	0.075	0.078	0.000	0.026	0.026	0.586
Mar.	1					0.053	0.039	0.468	0.109	0.119	0.000	0.035	0.037	0.859
	2					0.033	0.029	0.300	0.064	0.074	0.000	0.018	0.021	0.539
	3					0.036	0.030	0.189	0.039	0.049	0.000	0.031	0.035	0.408
Apr.	1					0.083	0.059	0.249	0.050	0.064	0.000	0.078	0.083	0.665
	2					0.087	0.060	0.107	0.016	0.029	0.000	0.091	0.094	0.485
	3					0.116	0.067	0.047	0.001	0.009	0.000	0.102	0.100	0.441
May	1	0.010				0.168	0.087	0.000				0.124	0.111	0.500
	2	0.023				0.181	0.086	0.000				0.087	0.074	0.451
	3	0.044			0.013	0.208	0.090	0.000				0.055	0.042	0.453
Jun.	1	0.075	0.011	0.044	0.058	0.242	0.098					0.024	0.015	0.566
	2	0.091	0.013	0.054	0.091	0.247	0.092							0.588
	3	0.128	0.023	0.090	0.136	0.265	0.093							0.735
Jul.	1	0.092	0.015	0.062	0.132	0.215	0.068							0.584
	2	0.119	0.027	0.116	0.168	0.219	0.066							0.714
	3	0.139	0.038	0.169	0.165	0.216	0.060							0.788
Aug.	1	0.141	0.036	0.161	0.138	0.189	0.050							0.715
	2	0.182	0.061	0.260	0.122	0.210	0.060							0.896
	3	0.195	0.074	0.314	0.088	0.210	0.060							0.940
Sep.	1	0.178	0.077	0.319	0.053	0.186	0.055		0.000	0.000	0.000			0.869
	2	0.191	0.090	0.364	0.035	0.198	0.061		0.024	0.024	0.037			1.023
	3	0.199	0.097	0.377	0.014	0.207	0.066		0.044	0.044	0.078			1.127
Oct.	1	0.150	0.073	0.242	0.000	0.160	0.052	0.136	0.055	0.055	0.094			1.018
	2	0.137	0.057	0.178	0.000	0.153	0.049	0.145	0.058	0.059	0.110			0.947
	3	0.125	0.043	0.122	0.000	0.143	0.048	0.166	0.064	0.066	0.127			0.904
Nov.	1	0.072	0.023	0.058		0.098	0.035	0.231	0.038	0.041	0.087			0.682
	2	0.052	0.013	0.018		0.090	0.034	0.276	0.041	0.045	0.087			0.656
	3	0.038	0.006			0.088	0.035	0.359	0.053	0.057	0.089			0.725
Dec.	1	0.009				0.046	0.019	0.159	0.035	0.037	0.048			0.353
	2	0.000				0.041	0.018	0.182	0.039	0.042	0.036			0.358
	3					0.030	0.014	0.181	0.038	0.040	0.019			0.323

Irrigation efficiency of 30% is applyed.

表5.3.3　潅漑用水量総括表

Month	10 Days	Ordinary Land	Sandy Land	Total (m3/sec)	Total (MCM)
Jan.	1	28.639	3.547	32.186	27.81
	2	30.771	3.811	34.582	29.88
	3	25.089	3.108	28.197	26.80
Feb.	1	39.468	4.888	44.356	38.32
	2	31.139	3.857	34.995	30.24
	3	32.939	4.080	37.018	25.59
Mar.	1	48.286	5.981	54.266	46.89
	2	30.262	3.748	34.010	29.38
	3	22.924	2.839	25.764	24.49
Apr.	1	37.376	4.629	42.006	36.29
	2	27.230	3.373	30.603	26.44
	3	24.805	3.072	27.877	24.09
May	1	28.095	3.480	31.575	27.28
	2	25.347	3.139	28.487	24.61
	3	25.429	3.150	28.578	27.16
Jun.	1	31.819	3.941	35.761	30.90
	2	33.023	4.090	37.114	32.07
	3	41.278	5.113	46.391	40.08
Jul.	1	32.795	4.062	36.857	31.84
	2	40.114	4.968	45.083	38.95
	3	44.299	5.487	49.786	47.32
Aug.	1	40.182	4.977	45.159	39.02
	2	50.327	6.233	56.561	48.87
	3	52.841	6.545	59.386	56.44
Sep.	1	48.809	6.045	54.855	47.39
	2	57.460	7.117	64.577	55.79
	3	63.328	7.844	71.171	61.49
Oct.	1	57.224	7.088	64.312	55.57
	2	53.205	6.590	59.795	51.66
	3	50.817	6.294	57.111	54.28
Nov.	1	38.300	4.744	43.044	37.19
	2	36.864	4.566	41.429	35.80
	3	40.729	5.045	45.774	39.55
Dec.	1	19.844	2.458	22.302	19.27
	2	20.139	2.494	22.633	19.55
	3	18.147	2.248	20.395	19.38
					1,307.7

表5.3.5　計画排水横断構造物の計画規模

No of Cross Drainage	Name of Crossed River	Q1 (Discharge at upper mesured point)	Q2 (Discharge at CRB Canal)	L1 (Dist.between points of Q1 and CRBC:km)	L2 (Dist.between points of Q1 and Lift canal:km)	Catchment Area (km2)	Puttern of Run-off for Plain area *	q (Discharge from Plain Area:(cfs))	Q2' (=Q2-q)	a (=-1/L1xLn(Q2'/Q1))	Q (=Q1exp(-aL2))	Proposed Design Discharge (cfs)	Proposed Design Discharge (cms)
1	Paniala River	-	12,500	-	-	64.5	B	1,685	10,815	0.000	10,815	10,800	306
2	Hauz Khud	52,000	28,000	23.2	11.0	109.3	B	2,856	25,144	0.031	36,975	37,000	1,048
3	Takwara N.	54,600	21,600	68.5	47.6	147.0	B	3,841	17,759	0.016	25,494	25,500	722
4	Gomal diversion	5,000	5,000	-	-	57.6	B	1,505	5,000	0.000	5,000	5,000	142
5	Gomal N.	21,000	18,500	23.0	10.7	97.3	-	-	18,500	0.006	19,691	19,700	558
6	Luni Nouth (1)	7,000	7,000	-	-	77.5	-	-	7,000	0.000	7,000	7,000	198
7	Luni Nouth (2)	2,500	2,500	-	-	29.8	-	-	2,500	0.000	2,500	2,500	71
8	Luni Nouth (3)	5,500	5,500	-	-	82.4	-	-	5,500	0.000	5,500	5,500	156
9	Luni South (1)	32,200	32,200	-	-	117.2	-	-	32,200	0.000	32,200	32,200	912
10	Luni South (2)	24,900	12,200	16.0	6.0	59.6	-	-	12,200	0.045	19,008	19,000	538
11	Toa N.	17,800	17,800	-	-	21.9	B	572	17,228	0.000	17,228	17,200	487
12	Daraban Zam	35,800	35,800	-	-	49.7	B	1,299	34,501	0.000	34,501	34,500	977
13	Chaudwan Zam	60,200	41,200	11.6	7.9	99.3	B	2,594	38,606	0.040	43,889	43,900	1,243
14	Khad Waraki	4,850	4,850	-	-	29.8	A	1,957	2,893	0.000	2,893	2,900	82
15	Kaura Khad	8,820	8,820	-	-	19.9	A	1,307	7,513	0.000	7,513	7,500	212
16	Velheri N.	8,520	5,960	34.0	23.6	64.6	A	1,200	4,760	0.017	5,704	5,700	161
17	Gajistan N.	13,220	15,000	-	-	69.5	A	4,565	10,435	0.000	10,435	10,400	295
18	Sherana N.	14,460	14,460	-	-	34.8	A	2,286	14,460	0.000	14,460	14,500	411
19	Ramak diversion	8,000	2,540	19.2	14.6	24.8	A	1,629	911	0.113	1,540	1,500	42
20	Ramak N.	24,000	19,000	20.4	13.8	59.5	A	3,908	15,092	0.023	17,473	17,500	496

* : Specific discharge of plain area of pattern A, B are applied at 1.86 m3/s/km2 and 0.74 m3/s/km2, respectively.

表5.6.1　チャシュマ右岸開発公社の組織構成

（事業実施ステージ）

C.R.B.D.A. MAIN OFFICE

Item	Number of Staff
I. Board Members	4
Chairman (Grade 21/22)	1
Members (Grade 20/21)	
1. Irrigation	1
2. Agriculture	1
3. Socio-Economic Development	1
Advisor	(2)
II. Technical Staff (Grade 17-19)	71
1. Irrigation	
1-1 Superintending engineer	1
1-2 Super intending engineer	1
1-3 Senior engineer	6
2. Agriculture	
2-1 Director,extension	1
2-2 Director, adaptive research and seed develope	1
2-3 Director, marketing and credit	1
2-4 AD, land develop. and water manage.	1
2-5 AD, Extension	1
2-6 AD, Seed	1
2-7 AD, adaptive research	1
2-8 AD, marketing	1
2-9 AD, agricultural credit	1
2-10 Extension advisor	25
2-11 Seed expert	6
2-12 Agronomist	3
2-13 Insecticide expert	1
2-14 Fertilizer expert	1
2-15 Soil expert	1
3. Socio-Economic Development	
3-1 Director, Infrastructure	1
3-2 Land acquisition collector	1
3-3 Senior engineer	2
3-4 Junior engineer	4
4. Finance	
4-1 G.M.finance	1
4-2 Director finance	1
4-3 Director, audit	1
4-4 Accounts officer	2
4-5 Auditor	4
III. Supporting Staff (Grade 1-16)	165
(Secretary, assistant, typist, drivers, etc.)	
Total	240

→ After completion of construction work, the organization will be sifted.

（維持・管理ステージ）

C.R.B.D.A. MAIN OFFICE

Item	Number of Staff
I. Board Members	4
Chairman (Grade 21/22)	1
Members (Grade 20/21)	
1. Irrigation	1
2. Agriculture	1
3. Socio-Economic Development	1
Advisor	(2)
II. Technical Staff (Grade 17-19)	67
1. Irrigation	
1-1 Superintending engineer	1
1-2 Senior engineer	3
2. Agriculture	
2-1 Director,extension	1
2-2 Director, adaptive research and seed develope	1
2-3 Director, marketing and credit	1
2-4 AD, land develop. and water manage.	1
2-5 AD, Extension	1
2-6 AD, Seed	1
2-7 AD, adaptive research	1
2-8 AD, marketing	1
2-9 AD, agricultural credit	1
2-10 Extension advisor	25
2-11 Seed expert	6
2-12 Agronomist	3
2-13 Insecticide expert	1
2-14 Fertilizer expert	1
2-15 Soil expert	1
3. Socio-Economic Development	
3-1 Director, Infrastructure	1
3-2 Land acquisition collector	1
3-3 Senior engineer	2
3-4 Junior engineer	4
4. Finance	
4-1 G.M.finance	1
4-1 Director finance	1
4-2 Director, audit	1
4-3 Accounts officer	2
4-4 Auditor	4
III. Supporting Staff (Grade 1-16)	139
(Secretary, assistant, typist, drivers, etc.)	
Total	210

INTAKE OPERATION OFFICE

Item	Number of Staff
Officer in charge (Grade 18)	(1/3)
Gauge reader	3
Total	3

PUMP OPERATION OFFICE

Item	Number of Staff
Officer in charge (Grade 18)	(1)
Technical Staff (Grade 17)	
Mechanical engineer	3
Electrical engineer	2
Supporting Staff (Grade 1-16)	
Technical assistant	6
Others	15
Total	26

FEEDER CANAL O&M OFFICE (F-1~2)

Item	Number of Staff
Officer in charge (Grade 18)	(1/3)
Supporting Staff (Grade 1-16)	
Technical assistant	2
Driver	2
Others	4
Total	8

MAIN CANAL O&M OFFICE (M-1~6)

Item	Number of Staff
Officer in charge (Grade 18)	(1/6)
Technical staff (Grade 17)	1/2
Supporting Staff (Grade 1-16)	
Technical assistant	2
Driver	3/2
Others	6
Total	10

DISTRIBUTARY O&M OFFICE (D-1~25)

Item	Number of Staff
Extension advisor	(1)
Supporting Staff (Grade 1-16)	
Technical assistant	2
Driver	1
Others	2
Total	5

表6.1.2　幹線水路水理設計諸元

Section No.	Design Discharge (m3/s)	Roughness Coefficient	Slope (1 :)	Area (m2)	Wetted Perimeter (m)	Water Depth (m)	Base Width (m)	Velocity (m/s)	Freeboard (m)
1	72	0.016	14,000	70.57	26.21	3.94	12.00	1.02	1.21
2	53	0.016	14,000	55.76	23.23	3.53	10.50	0.95	1.22
3	30	0.016	9,000	30.94	17.37	2.60	8.00	0.97	1.20
4	20	0.016	7,000	20.78	14.22	2.14	6.50	0.96	1.06
5	10	0.016	4,000	10.04	9.87	1.49	4.50	1.00	0.91

Note : Canal Side Slope 1 : 1.5

表6.1.3　分岐幹線掛かり潅漑面積及び取水量

Disty No.	Name of Disty	G.C.A. (ha)	C.C.A. Good & Mod (ha)	C.C.A. Margi. (ha)	C.C.A. Total (ha)	Discharge (m3/s)
D- 1	SAKHI MARDAN	1,930	0	1,700	1,700	1.72
D- 2	UMAR KHAN	2,770	400	2,030	2,430	2.27
D- 3	YARIK (1)	2,740	1,350	1,040	2,390	1.76
D- 4	YARIK (2)	1,480	1,260	0	1,260	0.66
D- 5	RODI KHEL	10,470	9,280	0	9,280	4.87
D- 6	REHMAN DHERI	11,470	10,150	0	10,150	5.33
D- 7	BUDH	2,720	2,410	0	2,410	1.26
D- 8	KOT ISA KHAN	8,090	7,060	0	7,060	3.70
D- 9	POTAH	13,430	11,400	0	11,400	5.98
D-10	SHAHID	3,130	2,380	0	2,380	1.25
D-11	SIKANDAR	3,120	2,660	0	2,660	1.40
D-12	MADDI	15,510	13,620	0	13,620	7.15
D-13	KOT ZAFAR	7,500	6,240	0	6,240	3.27
D-14	SWAN	4,470	3,630	0	3,630	1.90
D-15	GANDI ASHIQ	2,300	1,860	0	1,860	0.98
D-16	MOCHIWAL	6,900	5,910	0	5,910	3.10
D-17	GARAH ISA KHAN	11,000	9,150	0	9,150	4.80
D-18	ALI GARAH	3,010	2,560	0	2,560	1.34
D-19	BABRAN	3,060	2,560	0	2,560	1.34
D-20	GAJISTAN	2,800	2,440	0	2,440	1.28
D-21	KAURI HOT	4,110	3,650	0	3,650	1.92
D-22	SHAH GHARBI	3,760	2,750	500	3,250	1.95
D-23	SHERANNA	1,440	1,180	0	1,180	0.62
D-24	CHIRRI BHUHAR	3,370	2,700	250	2,950	1.67
D-25	JHANGI	4,020	2,040	1,440	3,480	2.53

(Note) C.C.A.(1) : Good & Moderate irrigable land (Ordinary Land)
C.C.A.(2) : Marginal irrigable land (Sandy Land)

表6.1.5　調整池の容量及び規模

Distributary	Capacity			Size
	Dead (m3)	Effective (m3)	Total (m3)	(m)*(m)
D- 1	23,600	148,600	172,200	230*230
D- 2	33,100	206,800	239,900	270*270
D- 3	25,800	162,200	188,000	240*240
D- 4	9,400	61,000	70,400	150*150
D- 5	71,200	439,000	510,200	390*390
D- 6	75,000	462,200	537,200	400*400
D- 7	17,500	111,200	128,700	200*200
D- 8	53,500	331,700	385,200	340*340
D- 9	87,000	535,600	622,600	430*430
D-10	17,500	111,200	128,700	200*200
D-11	19,500	123,100	142,600	210*210
D-12	104,500	641,800	746,300	470*470
D-13	47,200	293,000	340,200	320*320
D-14	28,100	176,500	204,600	250*250
D-15	14,000	89,300	103,300	180*180
D-16	44,200	274,600	318,800	310*310
D-17	67,400	416,300	483,700	380*380
D-18	19,500	123,100	142,600	210*210
D-19	19,500	123,100	142,600	210*210
D-20	17,500	111,200	128,700	200*200
D-21	28,100	176,500	204,600	250*250
D-22	28,100	176,500	204,600	250*250
D-23	9,400	61,000	70,400	150*150
D-24	23,600	148,600	172,200	230*230
D-25	35,700	222,800	258,500	280*280

(*)Size : Length of Top Bank
Side Slope : 1:1.5

表 7.1.1　フェーズ別事業費

Project Cost Component	Project Total			Phase I			Phase II		
	Foreign Currency (1,000 Rs.)	Local Currency (1,000 Rs.)	Total Cost (1,000 Rs.)	Foreign Currency	Local Currency	Total Cost	Foreign Currency	Local Currency	Total Cost
I. Direct Construction Cost									
a) Land Acquisition, Compensation & Preliminary (3200ha)	35,604.8	226,407.2	262,012.0	35,604.8	119,407.2	155,012.0	0.0	107,000.0	107,000.0
(I:Camp, 1,000ha and 72 houses II: 2,200ha and 58 houses) b) Feeder Canal (58.6km)	1,479,685.8	808,072.7	2,287,758.4	1,479,685.8	808,072.7	2,287,758.4	0.0	0.0	0.0
c) Pump Station (1 station)	1,193,602.8	395,015.2	1,588,618.0	679,383.4	282,032.4	961,415.8	514,219.3	112,982.8	627,202.1
(I: Major part of Pump equipment and Delivery Pipe) d) Main Canal (113.3km)	1,084,801.2	1,044,497.6	2,129,298.8	471,888.5	454,356.4	926,245.0	612,912.7	590,141.1	1,203,053.8
(I: Sta.0-Sta.32+800 II: Further to the End) e) Distributory Canals (442.6km)	413,238.5	402,778.4	816,016.8	97,111.0	94,652.9	191,764.0	316,127.4	308,125.4	624,252.9
(I: D-1 to D-6 II: D-7 to D-25) f) Regulation Pond (25 nos)	330,307.0	265,176.4	595,483.5	77,622.2	62,316.5	139,938.6	252,684.9	202,860.0	455,544.9
(Same as above) h)Drainage Canals (579.5km)	1,247,968.5	273,147.7	1,521,116.2	293,272.6	64,189.7	357,462.3	954,695.9	208,958.0	1,163,653.9
(Same as above) i) Commercial Roads (32.5km)	11,014.5	7,045.6	18,060.1	2,588.4	1,655.7	4,244.1	8,426.1	5,389.9	13,816.0
(Same as above) j) On-farm Development Cost (32.5km)	346,915.6	292,202.0	639,117.6	81,525.2	68,667.5	150,192.6	265,390.4	223,534.5	488,925.0
(Same as above) k) Sump Well & Domestic Water Supply (L.S.)	10,915.6	9,244.5	20,160.2	2,565.2	2,172.5	4,737.6	8,350.5	7,072.1	15,422.5
(Same as above) l) Other and Miscellaneous Works (L.S.)	97,104.0	145,656.0	242,760.0	38,841.6	58,262.4	97,104.0	58,262.4	87,393.6	145,656.0
(Same as above) **Sub-total of Direct Construction Cost**	**6,251,158.3**	**3,869,243.3**	**10,120,401.6**	**3,260,088.7**	**2,015,785.8**	**5,275,874.5**	**2,991,069.6**	**1,853,457.5**	**4,844,527.1**
II. Indirect Construction Cost									
a) Consultancy Service Cost(10% to D.Cost)	625,115.8	386,924.3	1,012,040.2	326,008.9	201,578.6	527,587.5	299,107.0	185,345.7	484,452.7
b) Implementation Cost(6% of D. Cost)	375,069.5	232,154.6	607,224.1	195,605.3	120,947.2	316,552.5	179,464.2	111,207.4	290,671.6
Sub-total	**1,000,185.3**	**619,078.9**	**1,619,264.3**	**521,614.2**	**322,525.7**	**844,139.9**	**478,571.1**	**296,553.2**	**775,124.3**
III. Physical Contingency (10%)	**625,115.8**	**386,924.3**	**1,012,040.2**	**326,008.9**	**201,578.6**	**527,587.5**	**299,107.0**	**185,345.7**	**484,452.7**
Total Base Construction Cost	**7,876,459.4**	**4,875,246.6**	**12,751,706.0**	**4,107,711.7**	**2,539,890.2**	**6,647,601.9**	**3,768,747.7**	**2,335,356.4**	**6,104,104.1**
IV. Price Contingency*1	**2,281,201.8**	**1,779,755.1**	**4,060,956.9**	**1,148,159.6**	**905,819.8**	**2,053,979.4**	**1,133,042.2**	**873,935.3**	**2,006,977.5**
V. Interest and Service Charge	**218,907.1**	**134,183.2**	**353,090.3**	**87,652.2**	**52,704.1**	**140,356.3**	**131,254.9**	**81,479.2**	**212,734.1**
GRAND TOTAL COST	**10,376,568.4**	**6,789,184.9**	**17,165,753.3**	**5,343,523.5**	**3,498,414.1**	**8,841,937.6**	**5,033,044.8**	**3,290,770.9**	**8,323,815.7**

Note; *1: with annual escalation of 4.5% for F.C. and 5.5 % for L.C.

表7.1.2 年 度 別 事 業 費

Unit; 1,000 Rs.

Project Cost Compone	Project Total Cost FC	LC	Total Cost	Annual Disbursement Schedule 1st(1996) FC	LC	2nd(1997) FC	LC	3rd(1998) FC	LC	4th(1999) FC	LC	5th(2000) FC	LC	6th(2001) FC	LC	7th(2002) FC	LC
I. Direct Cost																	
a) Land Acquisition	35,604.8	226,407.2	262,012.0	35605	20582	0	41165	0	41165	0	41165	0	41165	0	41165	0	0
b) Feeder Canal	1,479,685.8	808,072.7	2,287,758.4	0	0	246614	134679	493229	269358	493229	269358	246614	134679	0	0	0	0
c) Pump Station	1,193,602.8	395,015.2	1,588,618.0	0	0	67938	28203	135877	56406	271753	112813	306659	107206	411375	90386		
d) Main Canal	1,084,801.2	1,044,497.6	2,129,298.8							188755	181743	393060	378456	298682	287585	204304	196714
e) Distributory Canals	413,238.5	402,778.4	816,016.8							38844	37861	144220	140570	124798	121639	105376	102708
f) Regulation Pond	330,307.0	265,176.4	595,483.5							31049	24927	115277	92547	99753	80083	84228	67620
h)Drainage Canals	1,247,968.5	273,147.7	1,521,116.2									386454	84585	479636	104980	381878	83583
i) Farm Roads	11,014.5	7,045.6	18,060.1							647	414	2979	1906	4018	2570	3370	2156
j) On-farm Development	346,915.6	292,202.0	639,117.6							20381	17167	93841	79041	126537	106581	106156	89414
k) Sump Well	10,915.6	9,244.5	20,160.2							1026	869	3810	3226	3297	2792	2783	2357
l) Miscellaneous	97,104.0	145,656.0	242,760.0	13872	20808	13872	20808	13872	20808	13872	20808	13872	20808	13872	20808	13872	20808
Sub-total	**6,251,158.3**	**3,869,243.3**	**10,120,401.6**	49477	41390	328425	224855	642977	387737	1059557	707124	1706786	1084188	1561968	858589	901969	565361
II. Indirect Cost																	
a) Consultancy Service	625,115.8	386,924.3	1,012,040.2	131603	81458	82252	50911	98702	61093	164504	101822	65802	40729	49351	30547	32901	20364
b) Implementation	375,069.5	232,154.6	607,224.1	232296	33165	23796	33165	23796	33165	23796	33165	23796	33165	23796	33165	23796	33165
Sub-total	**1,000,185.3**	**619,078.9**	**1,619,264.3**	363899	114623	106048	84076	122498	94258	188300	134987	89597	73894	73147	63712	56696	53529
III. Phisical Contingency	**625,115.8**	**386,924.3**	**1,012,040.2**	4948	4139	32842	22485	64298	38774	105956	70712	170679	108419	156197	85859	90197	56536
Base Cost	**7,876,459.4**	**4,875,246.6**	**12,751,706.0**	418323	160152	467315	331416	829773	520769	1353813	912823	1967062	1266501	1791311	1008159	1048862	675426
IV. Price Contingency	**2,281,201.8**	**1,779,755.1**	**4,060,956.9**	38496	18101	65969	57746	159747	124372	333284	280200	594564	479805	646416	458389	442725	361141
V. Service Charge	**218,907.1**	**134,183.2**	**353,090.3**	2092	801	6520	3259	13005	7520	23923	14687	40528	25584	59319	36957	73520	45375
TOTAL COST	**10,376,568.4**	**6,789,184.9**	**17,165,753.3**	**458911**	**179054**	**539804**	**392422**	**1002525**	**652661**	**1711020**	**1207711**	**2602154**	**1771890**	**2497046**	**1503506**	**1565108**	**1081942**
VI. Annual O&M	0.0	229,721.6	229,721.6	0	0	0	0	0	0	0	0	0	33210	0	49710	0	146802
TOTAL	**10,376,568.4**	**7,018,906.5**	**17,395,474.9**	**458911**	**179054**	**539804**	**392422**	**1002525**	**652661**	**1711020**	**1207711**	**2602154**	**1805100**	**2497046**	**1553215**	**1565108**	**1228744**
FC ; Foreign Currency, LC ; Local Currency																	
Development Area(ha)			115,600.0	0		0		0		6,800		38,100		80,300		115,600	
Area Under Irrigation(ha)			115,600.0	0		0		0		0		18,140		27,210		80,210	

表 8.1.1 作物生産純増便益（経済価格）

Items	CCA 115,600 ha	Without Project: Cropping Area (ha)	Without Project: Net Production Value Per ha (Rs./ha)	Without Project: Net Production Value Total (Rs.'000)	With Project: Cropping Area (ha)	With Project: Net Production Value Per ha (Rs./ha)	With Project: Net Production Value Total (Rs.'000)	Incremental: Cropping Area (ha)	Incremental: N.P. * Value (Rs.'000)
Kharif Season Crops									
Sorghum		2,440	2,260	5,520				-2,440	-5,520
Millet		2,390	3,080	7,365				-2,390	-7,365
Maize		20	660	13	23,100	9,991	230,792	23,080	230,779
Pluses		10	2,460	25	5,800	13,040	75,632	5,790	75,607
Cotton		60	15,030	902	11,500	20,181	232,082	11,440	231,180
Fodder		10	640	6	11,500	5,662	65,113	11,490	65,107
Guara		210	4,270	896				-210	-896
Vegetables (Eggplant)		30	3,240	97	3,000	21,050	63,150	2,970	63,053
Sub-total		5,170		14,824	54,900		666,769	49,730	651,944
Rabi Season Crops									
Wheat		8,500	5,380	45,694	52,000	19,967	1,038,284	43,500	992,590
Pulses (Gram)		4,280	4,300	18,422	11,500	13,638	156,837	7,220	138,415
Oilseeds (Rape/Mustard)		2,400	2,970	7,121	11,500	13,009	149,604	9,100	142,482
Sugarcane		30	8,720	262	11,500	16,237	186,726	11,470	186,464
Fodder (Berseem)		60	960	58	11,500	8,428	96,922	11,440	96,864
Fruit (Mango)		15	3,670	55	3,000	15,947	47,841	2,985	47,786
Vegetables		15	6,910	104	3,000	38,075	114,225	2,985	114,121
Sub-total		15,300		71,715	104,000		1,790,438	88,700	1,718,723
Spring Season Crops									
Maize					5,800	11,181	64,850	5,800	64,850
Oilseeds					5,800	12,166	70,563	5,800	70,563
Sub-total					11,600		135,413	11,600	135,413
Kharif Season Crops		5,170		14,824	54,900		666,769	49,730	651,944
Rabi Season Crops		15,300		71,715	104,000		1,790,438	88,700	1,718,723
Spring Season Crops					11,600		135,413	11,600	135,413
Total		20,470		86,540	170,500		2,592,619	150,030	2,506,080
								(Rs./ha)	21,679

Note : *) N.P. ; Net Production

表 8.1.2 経済事業費、年間維持管理費、更新費と年別発生費用

Project Cost Component	Financial Cost (Rs.'000)	Construction Conversion Factor	Economic Cost (Rs.'000)	Annual Economic Cost Disbursement (Rs.'000) 1st	2nd	3rd	4th	5th	6th	7th	Total
I. Direct Cost											
a) Land Acquisition	262,012.0	53.6	140,438.4	30,116.4	22,064.4	22,064.4	22,064.4	22,064.4	22,064.4	0.0	140,438.4
b) Feeder Canal	2,287,758.4	92.8	2,123,039.8	0.0	353,840.0	707,679.9	707,679.9	353,840.0	0.0	0.0	2,123,039.8
c) Pump Station	1,588,618.0	95.7	1,520,307.4	0.0	92,007.5	184,015.0	368,030.0	396,069.0	480,185.9	0.0	1,520,307.4
d) Main Canal	2,129,298.8	90.5	1,927,015.4	0.0	0.0	0.0	335,300.7	698,221.9	530,571.6	362,921.2	1,927,015.4
e) Distributory Canals	816,016.8	90.4	737,679.2	0.0	0.0	0.0	69,341.8	257,450.0	222,779.1	188,108.3	737,679.2
f) Regulation Pond	595,483.5	91.8	546,653.9	0.0	0.0	0.0	51,385.5	190,782.2	165,089.5	139,396.7	546,653.9
h) Drainage Canals	1,521,116.2	96.4	1,466,356.0	0.0	0.0	0.0	0.0	454,081.6	563,569.5	448,704.9	1,466,356.0
i) Farm Roads	18,060.1	92.5	16,705.6	0.0	0.0	0.0	981.5	4,518.9	6,093.4	5,111.8	16,705.6
j) On-farm	639,117.6	90.9	580,957.9	0.0	0.0	0.0	34,131.3	157,149.1	211,904.4	177,773.1	580,957.9
k) Sump Well	20,160.2	90.7	18,285.3	0.0	0.0	0.0	1,718.8	6,381.6	5,522.2	4,662.7	18,285.3
l) Miscellaneous	242,760.0	88.5	214,842.6	30,691.8	30,691.8	30,691.8	30,691.8	30,691.8	30,691.8	30,691.8	214,842.6
	10,120,401.6		9,292,281.5	60,808.2	498,603.7	944,451.1	1,621,325.7	2,571,250.5	2,238,471.8	1,357,370.5	9,292,281.5
II. Indirect Cost											
a) Consultancy Service	1,012,040.2	92.6	937,149.2	197,294.6	123,309.1	147,970.9	246,618.2	98,647.3	73,985.5	49,323.6	937,149.2
b) Implementation	607,224.1	92.5	561,682.3	245,551.0	52,688.5	52,688.5	52,688.5	52,688.5	52,688.5	52,688.8	561,682.3
Sub-total	1,619,264.3		1,498,831.5	442,845.6	175,997.6	200,659.4	299,306.7	151,335.8	126,674.0	102,012.4	1,498,831.5
III. Phisical Contingency	1,012,040.2	92.5	936,137.2	8,405.2	51,178.4	95,341.1	163,418.0	258,165.1	223,901.5	135,727.9	936,137.2
Base Cost	12,751,706.0		11,727,250.2	512,059.0	725,779.7	1,240,451.6	2,084,050.4	2,980,751.4	2,589,047.3	1,595,110.8	11,727,250.2
				1st	2nd	3rd	4th	5th	6th	7th	8th
IV. O & M Cost (Full Year)	317,080.0	84.1	266,664.3	0.0	0.0	0.0	0.0	27,929.6	41,806.1	123,460.5	266,664.3
				28st	29nd	30th	31st	32nd	33th	34th	Total
V. Replacement Cost											
a) PumpEquipment	1,080,000.0	96.5	1,042,200.0	0.0	312,660.0	312,660.0	416,880.0	0.0	0.0	0.0	1,042,200.0
b) PumpEquipment	105,500.0	86.6	91,363.0	12,297.2	12,297.2	36,978.2	14,895.2	14,895.2	0.0	0.0	91,363.0
c) Others	4,655.0	96.1	4,473.5	602.1	602.1	1,810.6	729.3	729.4	0.0	0.0	4,473.5

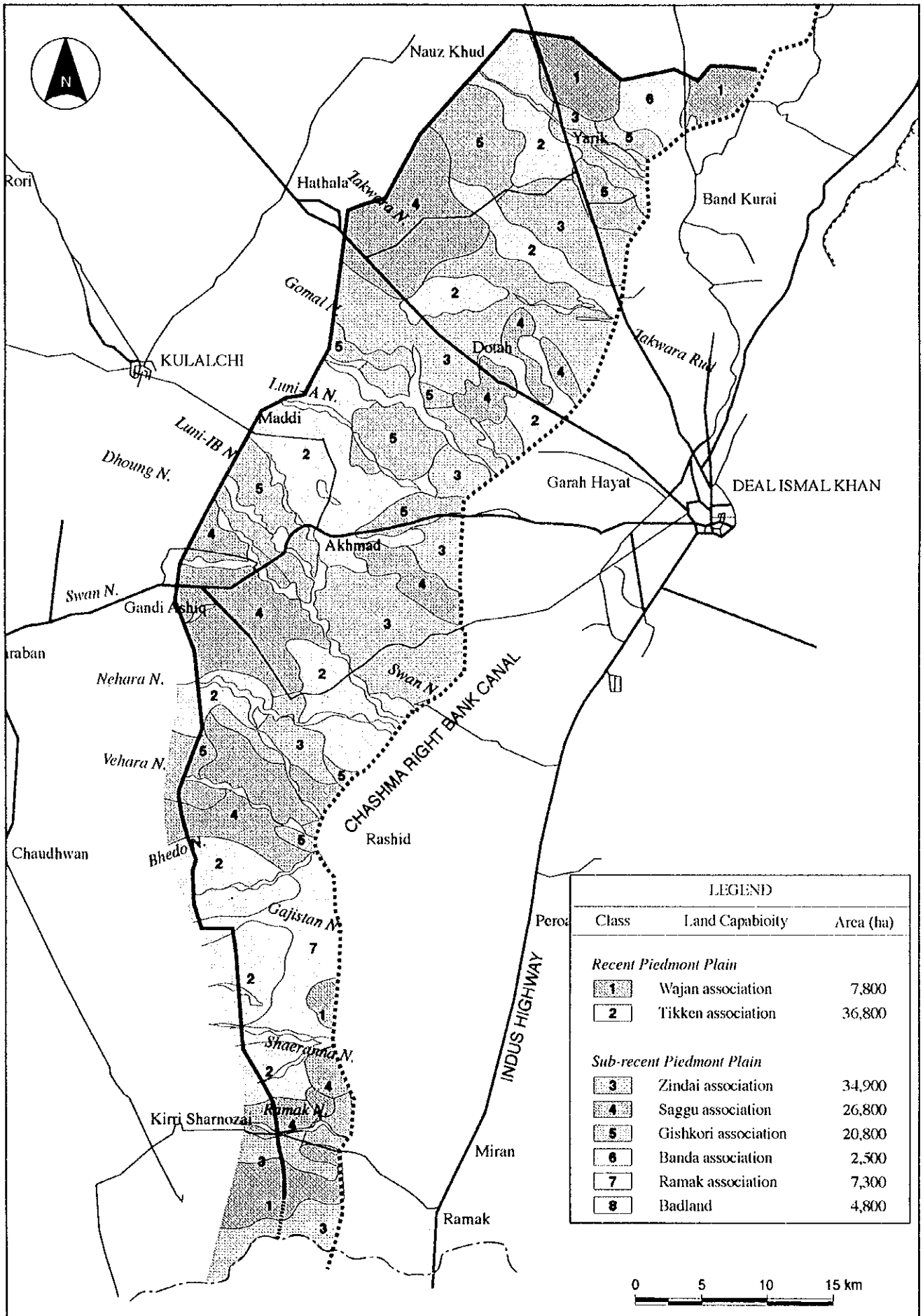
表 8.1.3 経済費用、便益フローと経済内部収益

(Unit :Rs'000)

No. of Year	Cost				Production Area Developed (ha)	Built-up Ratio	Benefit										
	Construction	O&M	Replacement	Total			Crop Production Benefit Area(A)	Area(B)	Area(C)	(ENCPV= Area(D)	21,679) Total	Road Development	Water Right Transfer	Domestic Water Supply	Reduction/ Seasonal Migration	Environment	Total
1	512,059	0	0	512,059	0		0	0	0	0	0	0	0	0	0	0	0
2	725,780	0	0	725,780	0		0	0	0	0	0	0	0	0	0	0	0
3	1,240,452	0	0	1,240,452	0		0	0	0	0	0	0	0	0	0	0	0
4	2,084,050	0	0	2,084,050	0		0	0	0	0	0	0	0	0	0	0	0
5	2,980,751	27,930	0	3,008,681	18,140 (A)	0.50	196,629	0	0	0	196,629	18,582	2,059	3,544	821	3,648	225,283
6	2,589,047	41,806	0	2,630,853	9,070 (B)	0.65	255,617	98,314	0	0	353,931	32,149	3,705	6,132	1,420	6,311	403,648
7	1,595,111	123,461	0	1,718,572	53,000 (C)	0.75	294,943	127,809	574,494	0	997,246	89,197	10,440	17,013	3,940	17,509	1,135,345
8	0	266,664	0	266,664	35,390 (D)	0.85	334,269	147,471	746,842	383,610	1,612,192	144,200	16,878	27,504	6,370	28,306	1,835,450
9	0	266,664	0	266,664	0	0.90	353,931	167,134	861,740	498,693	1,881,498	168,288	19,698	32,098	7,434	33,034	2,142,050
10	0	266,664	0	266,664	0	0.95	373,594	176,966	976,639	575,415	2,102,614	188,065	22,013	35,871	8,308	36,916	2,393,787
11	0	266,664	0	266,664	0	1.00	393,257	186,797	1,034,068	652,137	2,266,279	202,704	23,726	38,663	8,954	39,790	2,580,116
12	0	266,664	0	266,664	0		393,257	196,629	1,091,538	690,498	2,371,922	212,153	24,832	40,465	9,372	41,644	2,700,388
13	0	266,664	0	266,664	0		393,257	196,629	1,148,987	728,859	2,467,732	220,723	25,835	42,100	9,750	43,326	2,809,466
14	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
15	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
16	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
17	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
18	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
19	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
20	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
21	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
22	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
23	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
24	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
25	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
26	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
27	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
28	0	266,664	12,899	279,563	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
29	0	266,664	325,559	592,223	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
30	0	266,664	351,449	618,113	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
31	0	266,664	432,505	699,169	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
32	0	266,664	15,625	282,289	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
33	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
34	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
35	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
36	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
37	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
38	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
39	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
40	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
41	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
42	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
43	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
44	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
45	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
46	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
47	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
48	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
49	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140
50	0	266,664	0	266,664	0		393,257	196,629	1,148,987	767,220	2,506,093	224,154	26,237	42,754	9,902	44,000	2,853,140

No.	Year	Balance With Crop Production	+ Road Development	+ Water Right Transfer	+ Domestic Water Supply	+ Reduction/ Seasonal Migration	All Item
1		-512,059	-512,059	-512,059	-512,059	-512,059	-512,059
2		-725,780	-725,780	-725,780	-725,780	-725,780	-725,780
3		-1,240,452	-1,240,452	-1,240,452	-1,240,452	-1,240,452	-1,240,452
4		-2,084,050	-2,084,050	-2,084,050	-2,084,050	-2,084,050	-2,084,050
5		-2,812,052	-2,793,470	-2,791,411	-2,787,867	-2,787,046	-2,783,398
6		-2,276,922	-2,244,773	-2,241,068	-2,234,936	-2,233,516	-2,227,205
7		-721,326	-632,129	-621,689	-604,676	-600,736	-583,227
8		1,345,528	1,489,728	1,506,606	1,534,110	1,540,480	1,568,786
9		1,614,834	1,783,122	1,802,820	1,834,918	1,842,352	1,875,386
10		1,835,950	2,024,015	2,046,028	2,081,899	2,090,207	2,127,123
11		1,999,615	2,202,319	2,226,045	2,264,708	2,273,662	2,313,452
12		2,105,258	2,317,411	2,342,243	2,382,708	2,392,080	2,433,724
13		2,201,068	2,421,791	2,447,626	2,489,726	2,499,476	2,542,807
14		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
15		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
16		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
17		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
18		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
19		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
20		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
21		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
22		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
23		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
24		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
25		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
26		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
27		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
28		2,226,530	2,450,684	2,476,921	2,519,675	2,529,577	2,573,577
29		1,913,870	2,138,024	2,164,261	2,207,015	2,216,917	2,260,917
30		1,887,980	2,112,134	2,138,371	2,181,125	2,191,027	2,235,027
31		1,806,924	2,031,078	2,057,315	2,100,069	2,108,971	2,153,971
32		2,223,804	2,447,958	2,474,195	2,516,949	2,526,851	2,570,851
33		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
34		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
35		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
36		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
37		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
38		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
39		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
40		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
41		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
42		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
43		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
44		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
45		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
46		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
47		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
48		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
49		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
50		2,239,429	2,463,583	2,489,820	2,532,574	2,542,476	2,586,476
EIRR		13.62%	14.69%	14.81%	15.01%	15.06%	15.26%
NPV(10%) (Rs.'000)							
Benefi		12,504,982	13,624,368	13,755,285	13,968,792	14,018,240	14,237,969
Cost		9,066,355	9,066,355	9,066,355	9,066,355	9,066,355	9,066,355
B/C(10%)		1.38	1.50	1.52	1.54	1.55	1.57

付図



LEGEND

Class	Land Capabioity	Area (ha)
Recent Piedmont Plain		
1	Wajan association	7,800
2	Tikken association	36,800
Sub-recent Piedmont Plain		
3	Zindai association	34,900
4	Saggu association	26,800
5	Gishkori association	20,800
6	Banda association	2,500
7	Ramak association	7,300
8	Badland	4,800

図3.1.1　土壌図

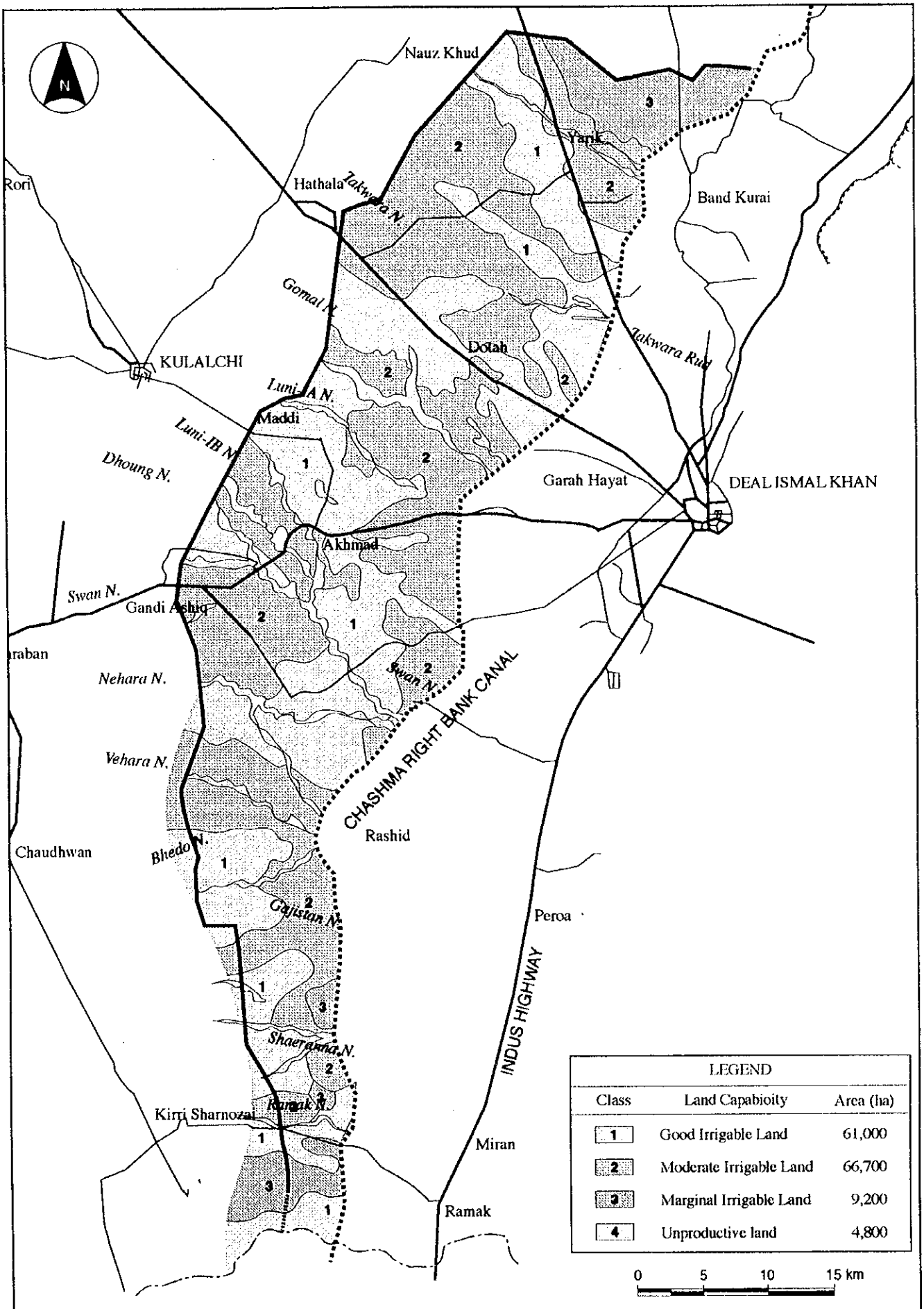

N
Nauz Khud
Yark
Band Kurai
Rori
Hathala
Takwara N.
Gomal N.
Takwara Rud
KULALCHI
Dotah
Luni-A N.
Maddi
Luni-IB N.
Dhoung N.
Garah Hayat
DEAL ISMAL KHAN
Akhmad
Swan N.
Gandi Ashiq
Nehara N.
Swan N.
CHASHMA RIGHT BANK CANAL
Vehara N.
Rashid
Chaudhwan
Bhedo N.
Gajistan N.
Peroa
INDUS HIGHWAY
Shaerasma N.
Ramak N.
Kirri Sharnozai
Miran
Ramak
LEGEND
Class
Land Capabioity
Area (ha)
1 Good Irrigable Land 61,000
2 Moderate Irrigable Land 66,700
3 Marginal Irrigable Land 9,200
4 Unproductive land 4,800
0 5 10 15 km

図3.1.2　土地分級図

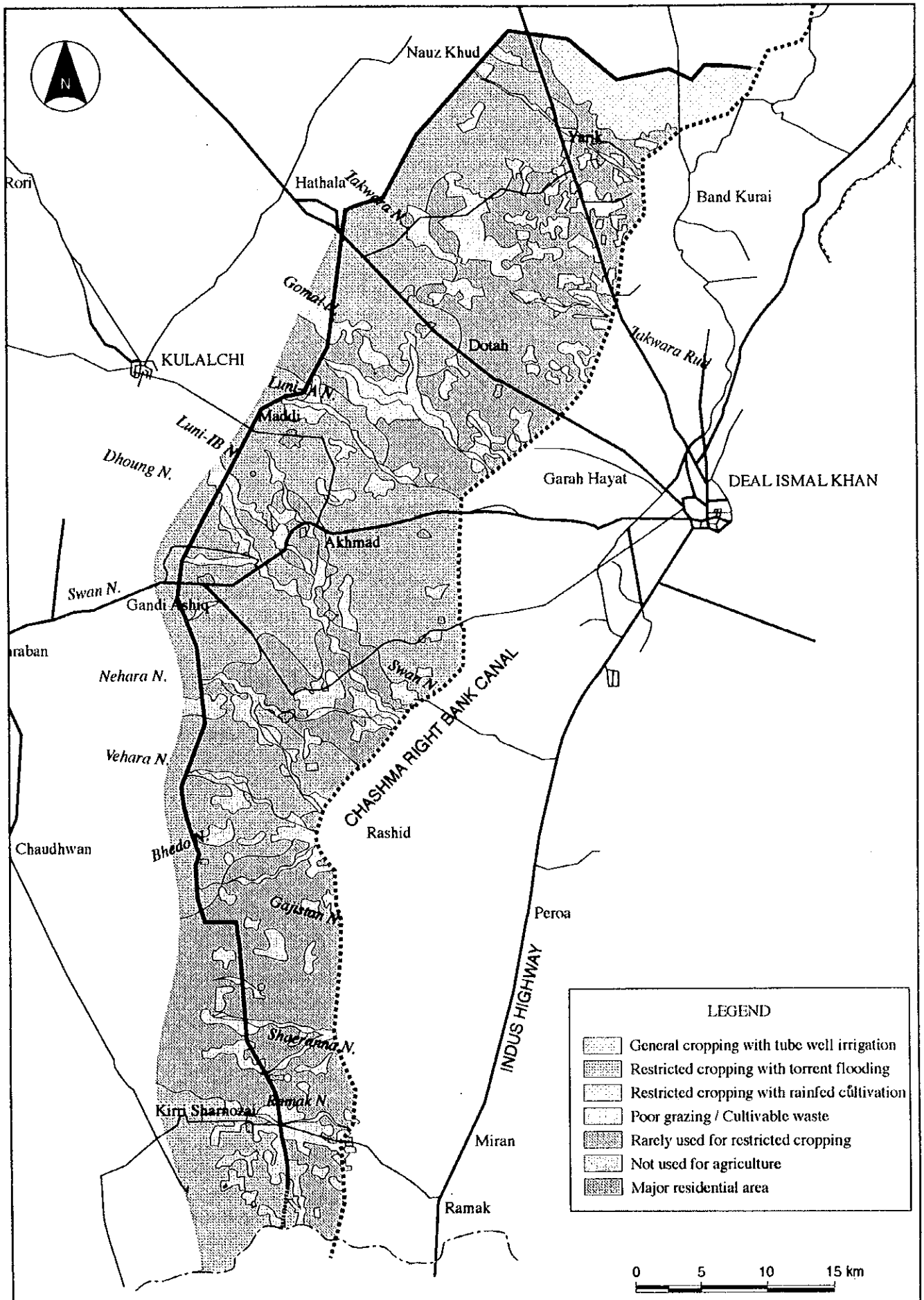
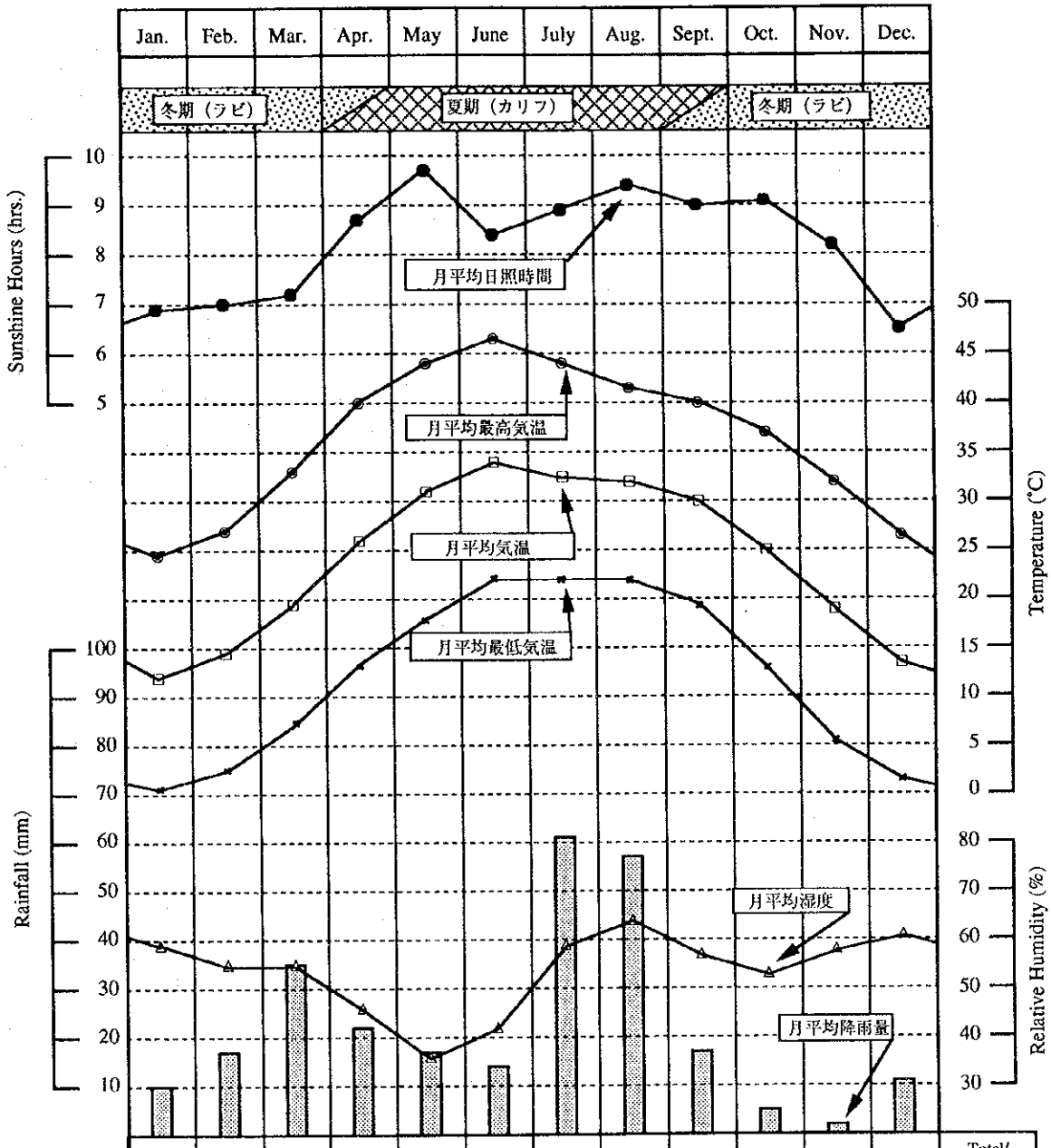


図3.1.3　現況土地利用図



	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total/ Average
Temperature (°C) Monthly Mean	12.2	14.7	19.9	26.0	30.9	34.2	32.7	31.9	30.2	25.3	19.1	13.6	24.2
Mothly Maximum	24.9	27.2	33.1	40.3	44.1	46.7	44.0	41.4	40.1	37.1	32.2	26.5	36.5
Mothly Minimum	0.8	2.6	7.2	13.4	18.0	22.2	22.3	22.3	19.7	12.9	5.5	1.7	12.4
Rainfall (mm)	10.0	17.5	34.8	21.7	17.2	14.4	60.8	57.5	17.6	4.8	2.1	10.4	268.7
Humidity (%)	59.5	55.5	55.5	46.0	36.5	42.0	59.5	64.5	57.5	53.0	58.0	61.5	54.0
Sunshine Hours (hrs)	6.9	7.0	7.2	8.7	9.7	8.4	8.9	9.4	9.0	9.1	8.2	6.6	8.3

Source : D.I. Khan Meteorological Station, 30 years average from 1961 to 1990

図 3.3.1　調査対象地域の気象

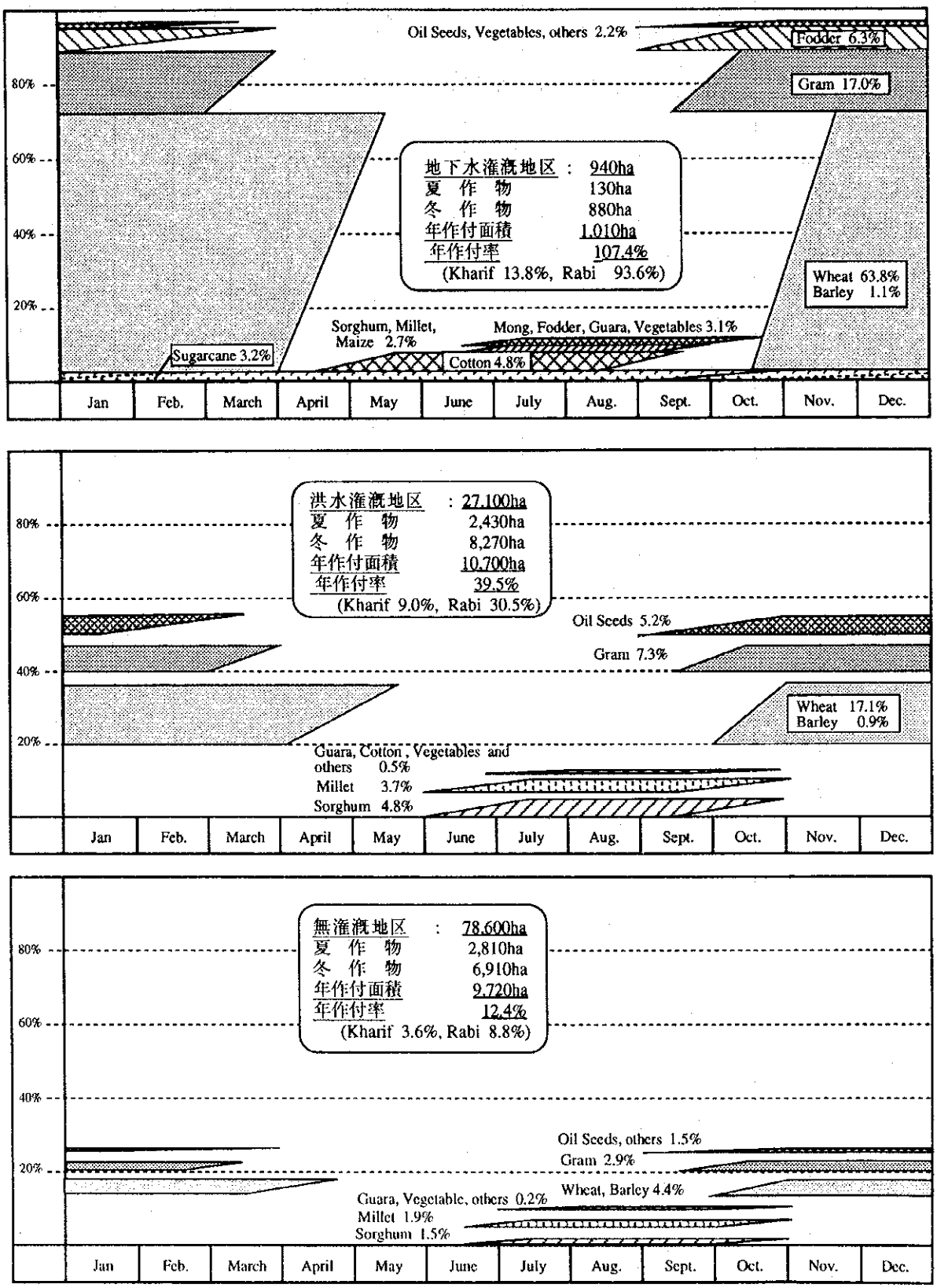
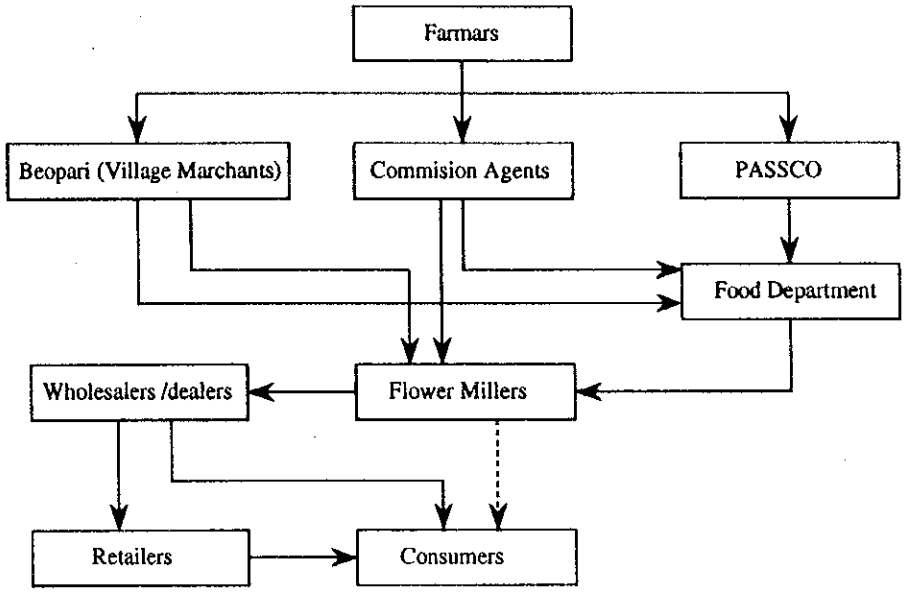
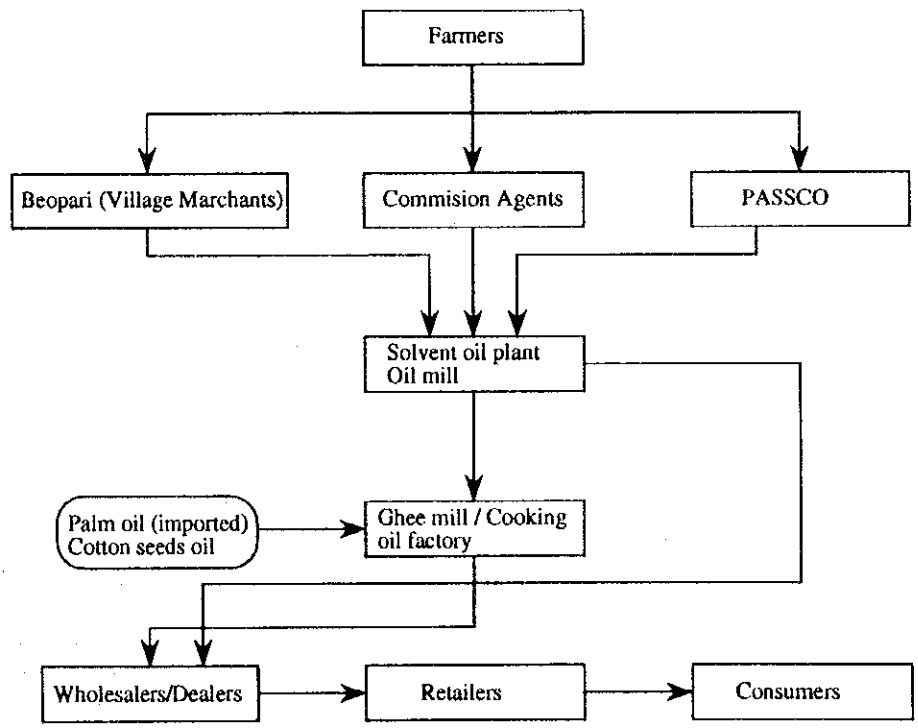


図 3.3.2 調査対象地域の現況作付体系



(a) Marketing Flow of Wheat

(1) 58% and 64% of wheat production are marketed from farms in Study Area and CRBC area, respectively.
(2) 65% and 94% of wheat marketed are through Beopari in Study Area and CRBC area, respectively.
(3) Procurement is conducted through PASSCO by the Food Department in D.I. Khan.



(b) Marketing Flow of Oil seeds (Sunflower)

図 3.3.3　小麦と油料作物の流通経路

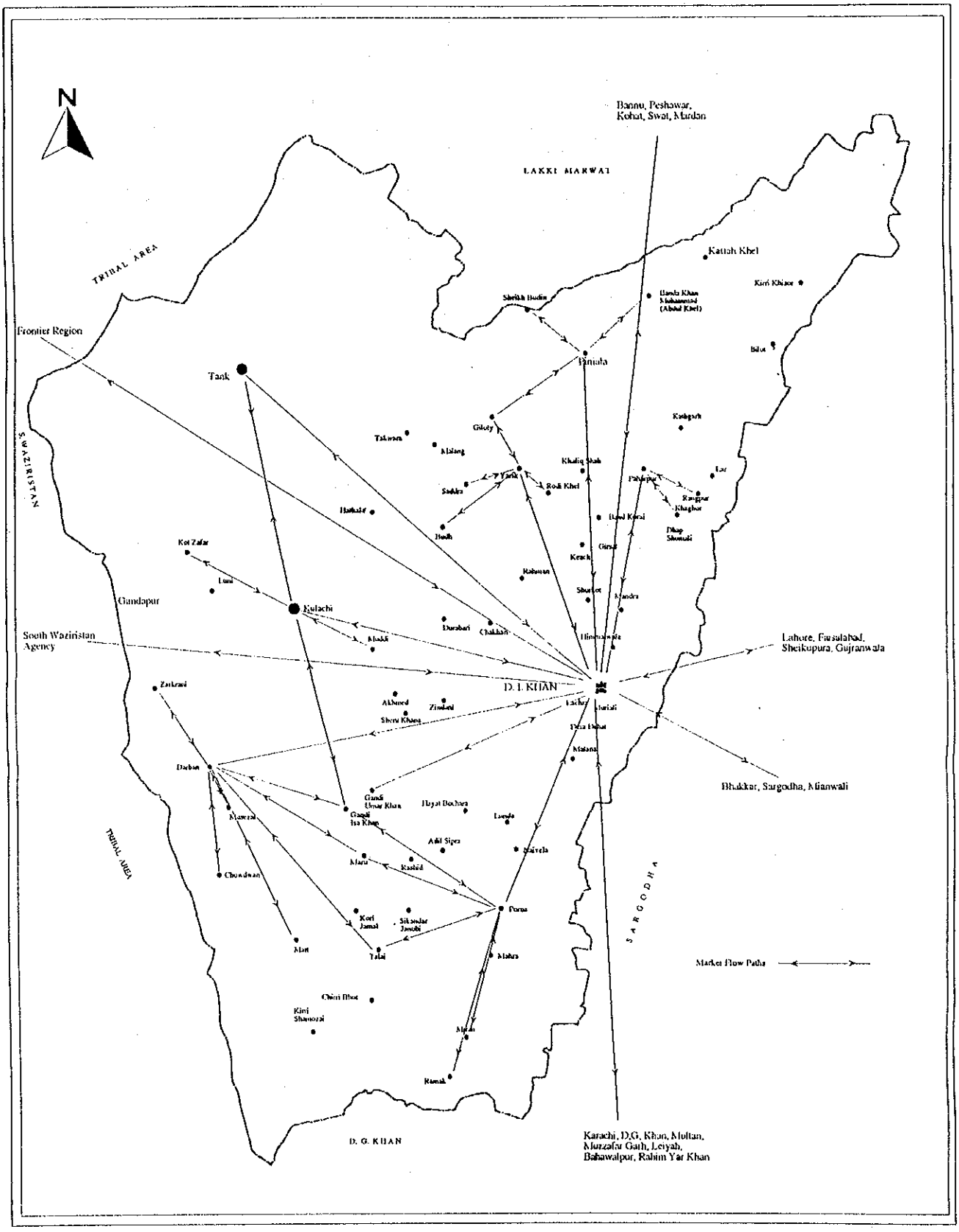


図 3.3.4　D.I. カーン県における農産物の流れ

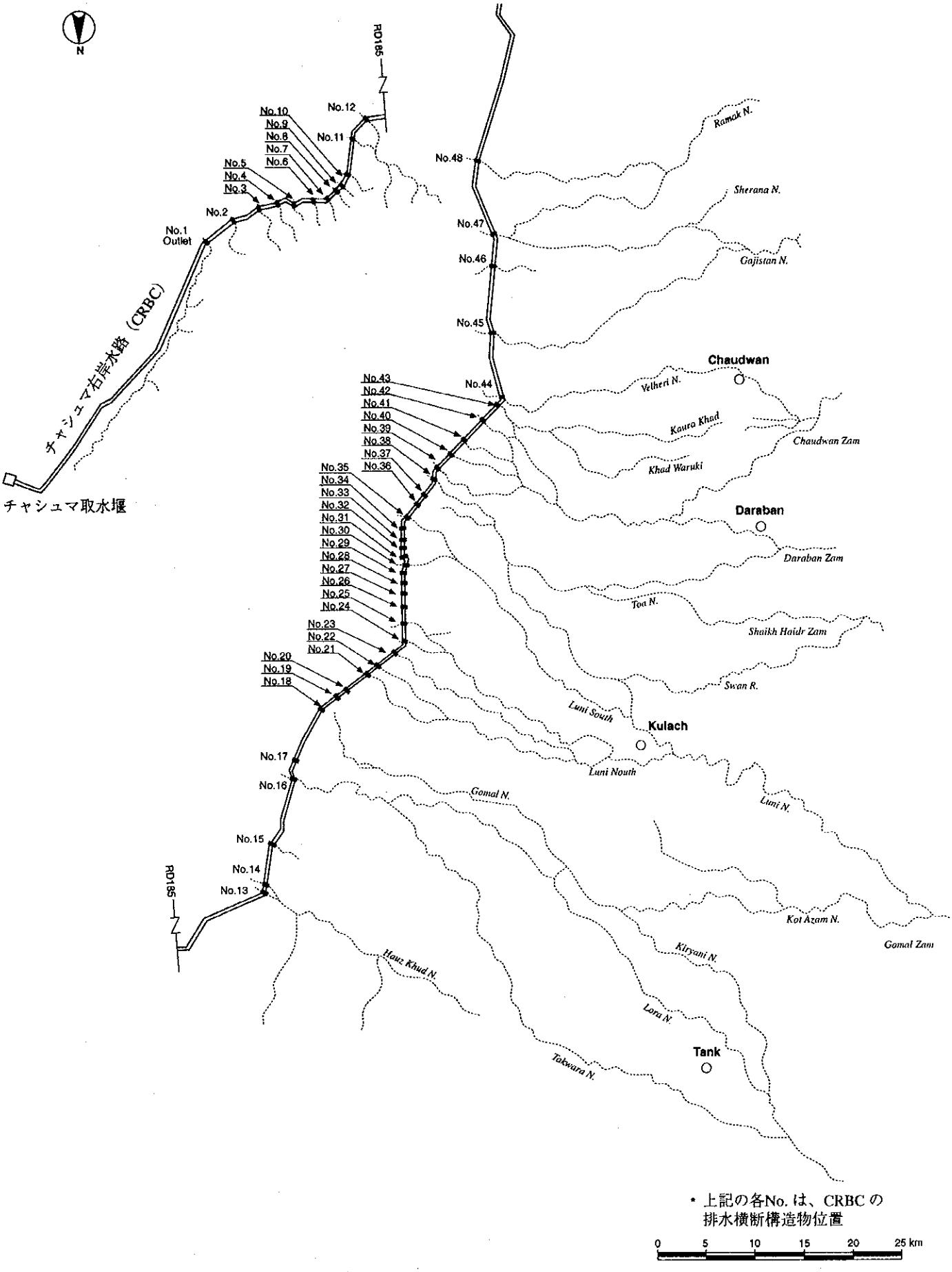


図3.4.1　現況河川システム

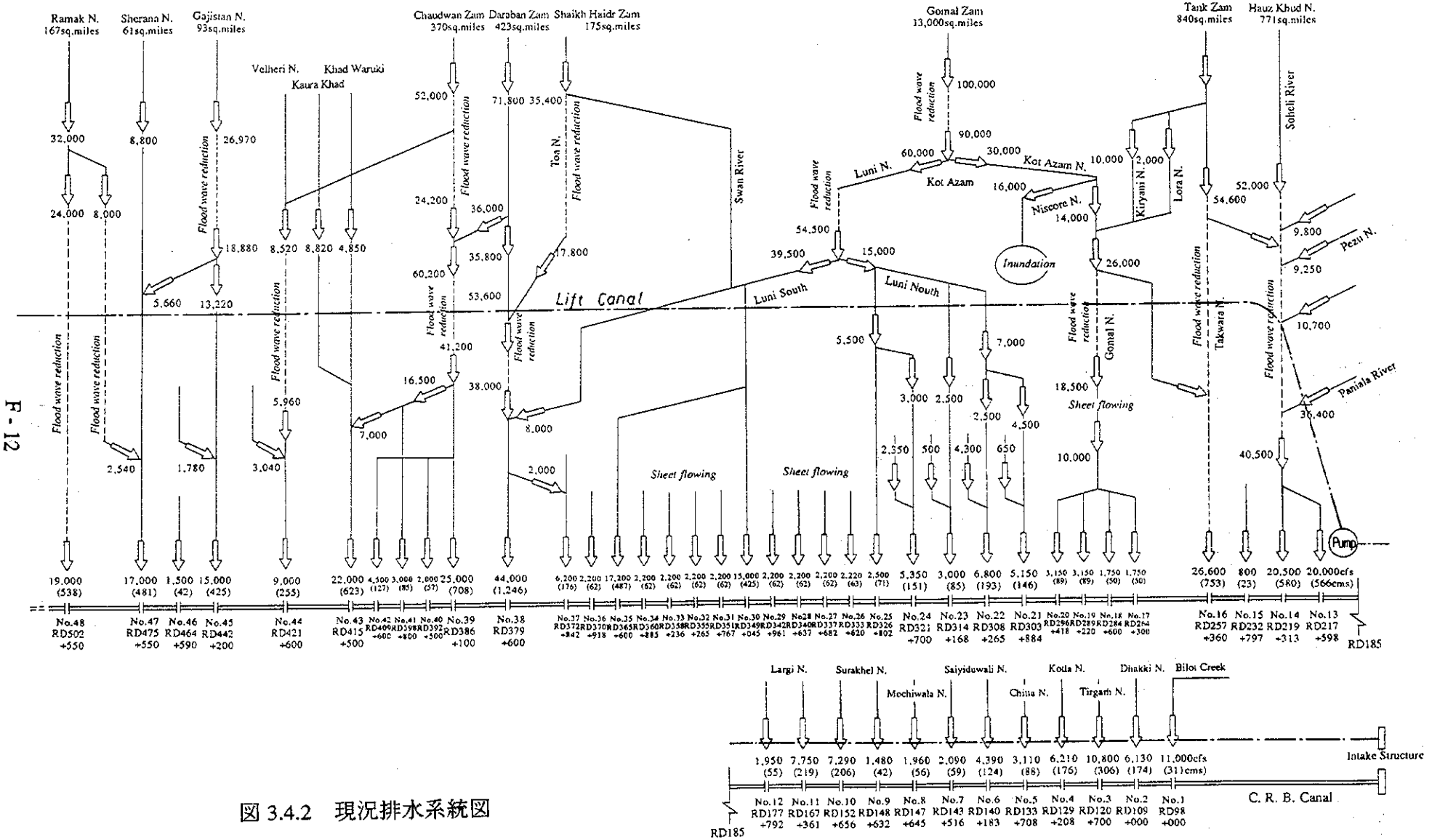


図 3.4.2　現況排水系統図

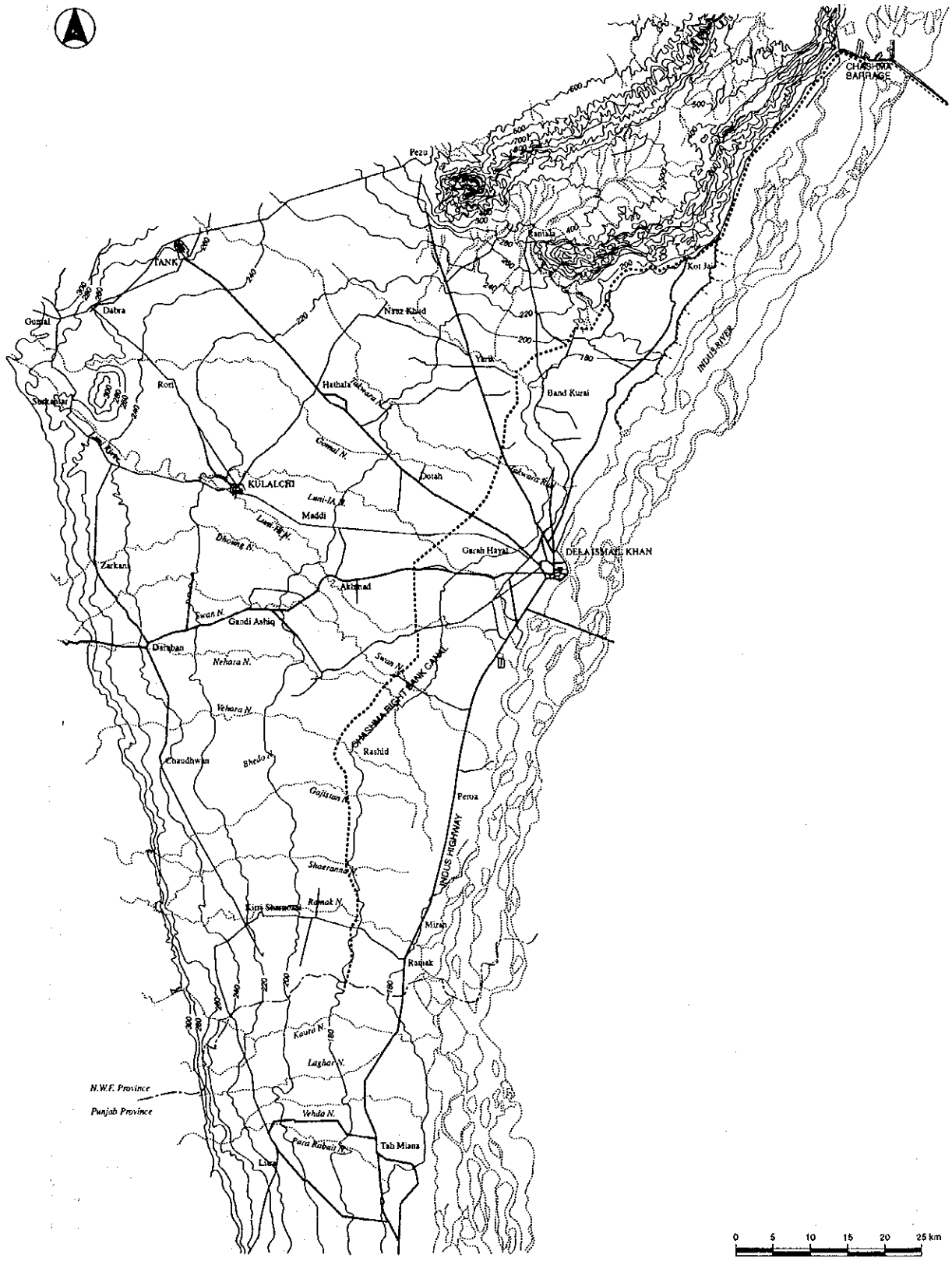


図3.5.1　D.I. カーンにおける主要道路網

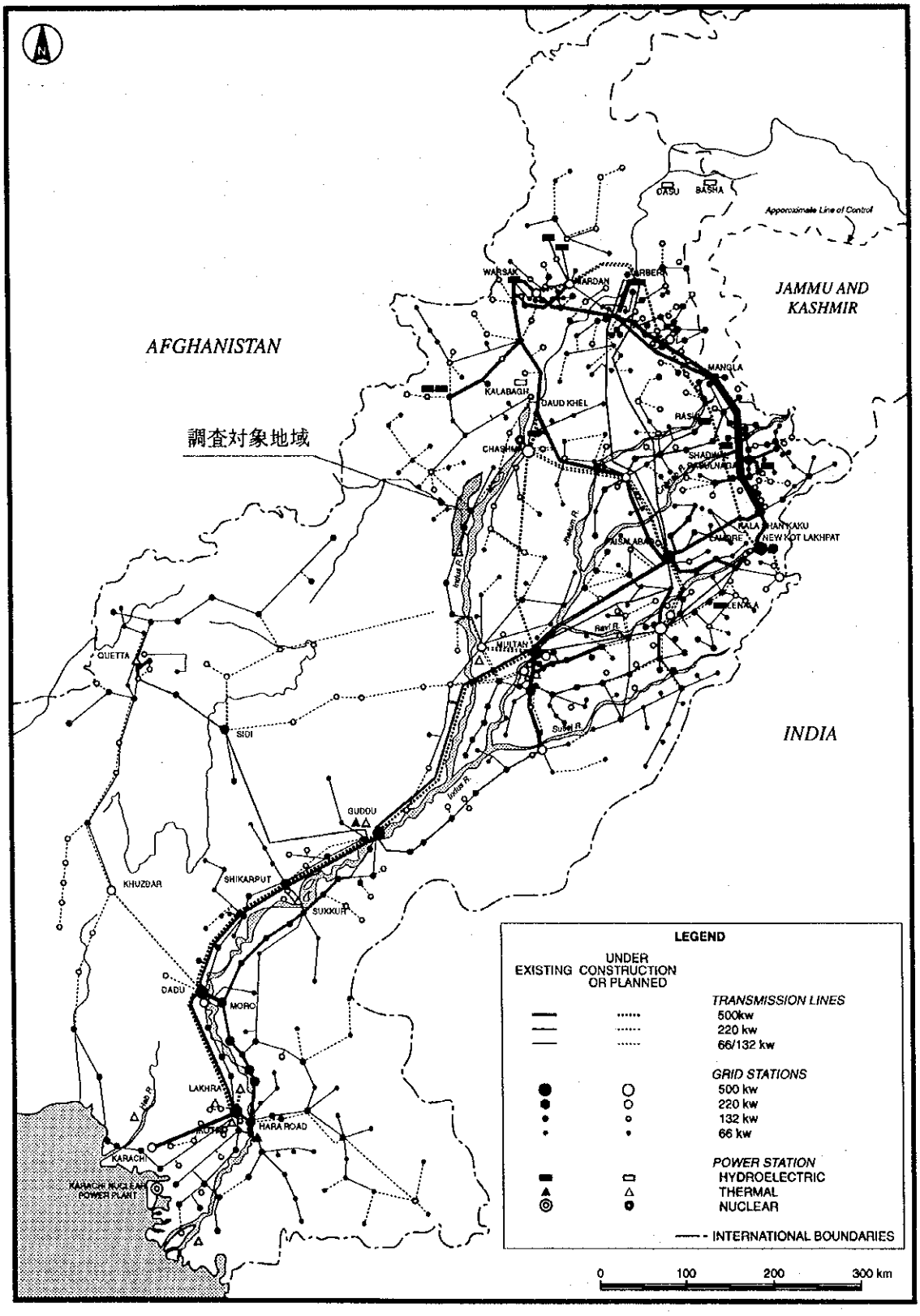


図3.5.2　パキスタン国における送電線グリッド

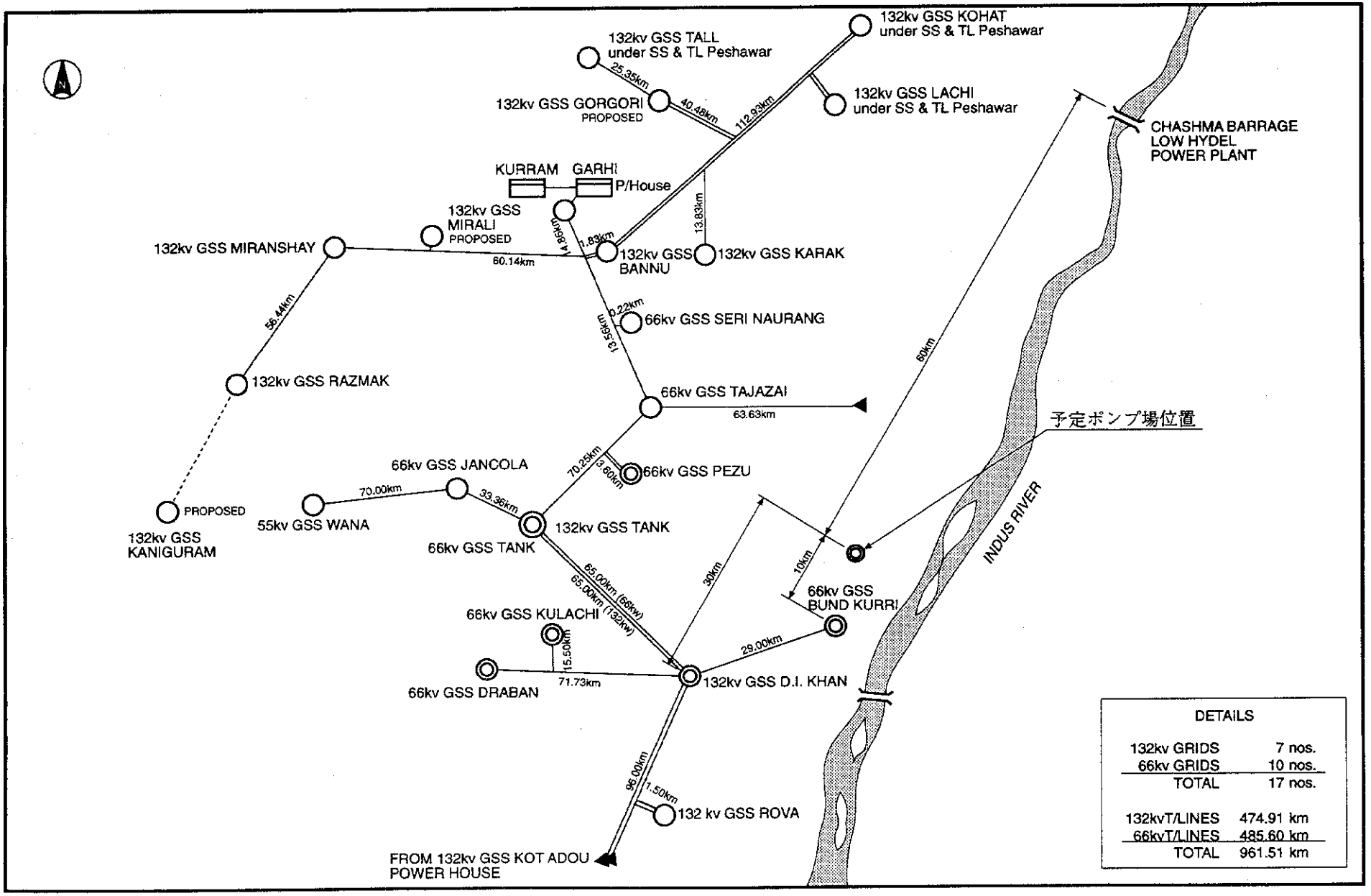


図3.5.3　調査対象地域の詳細送電線網

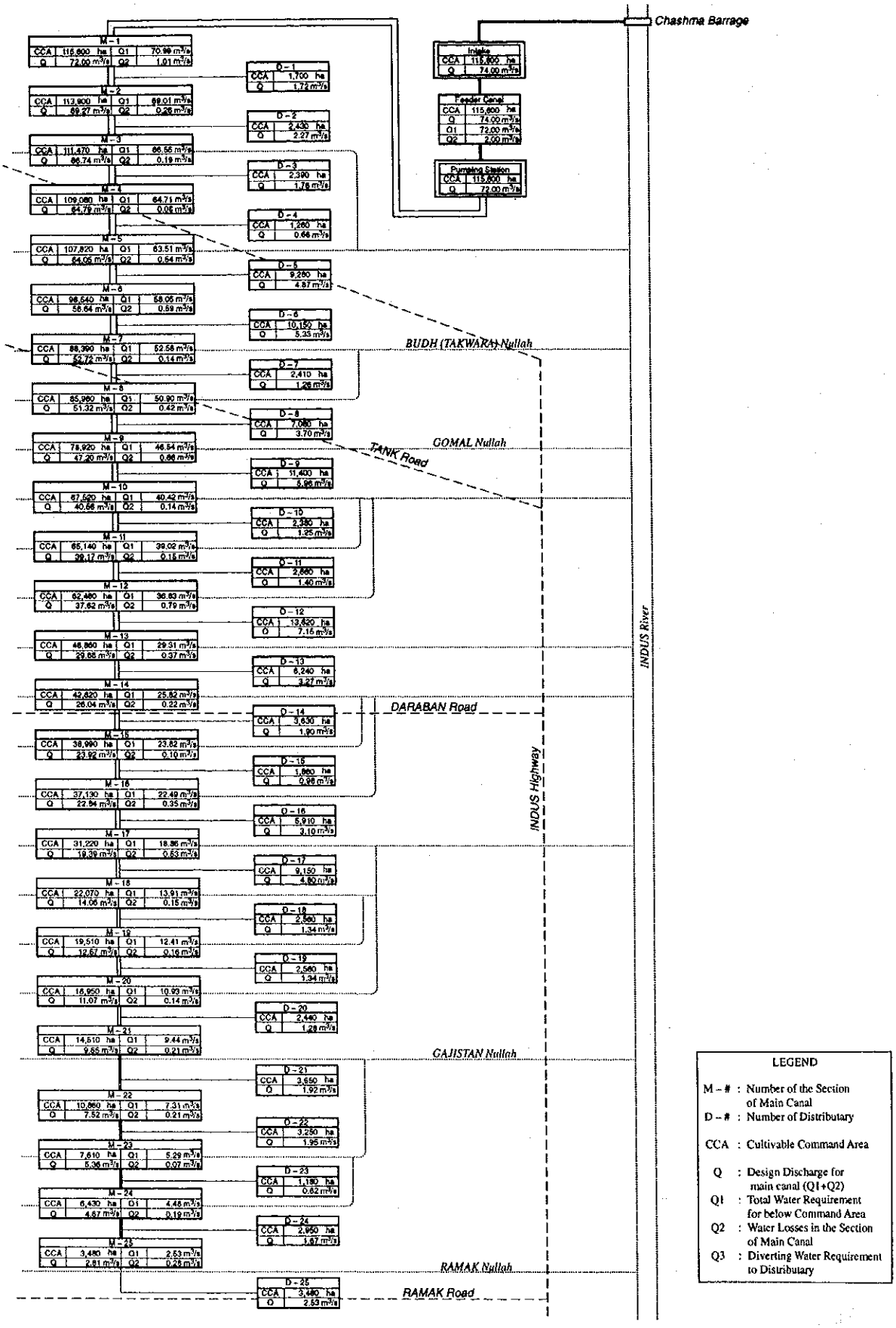
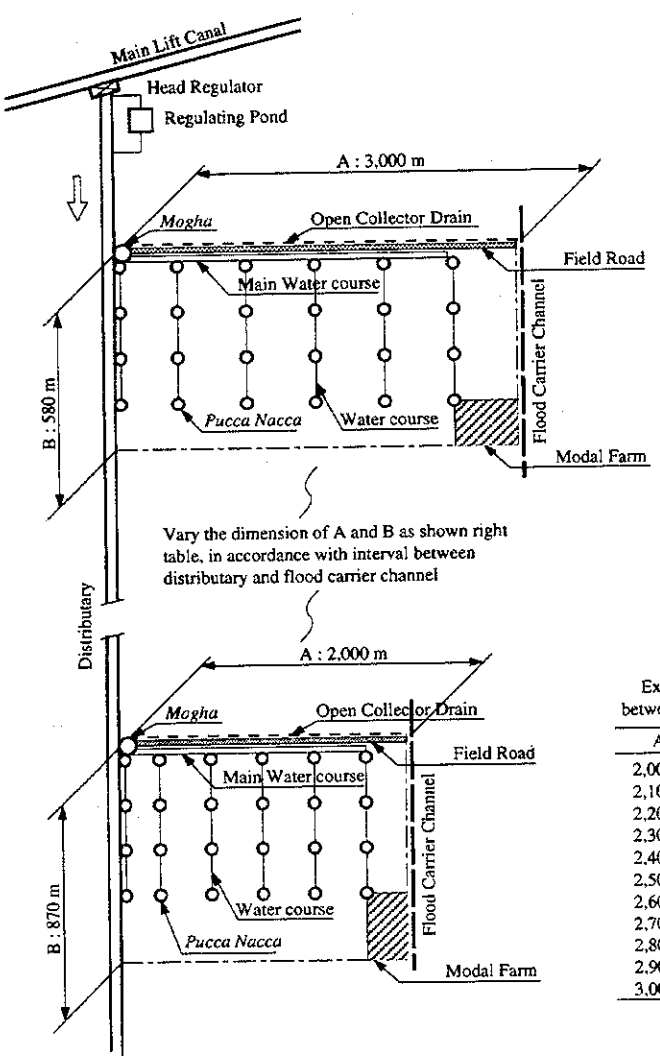


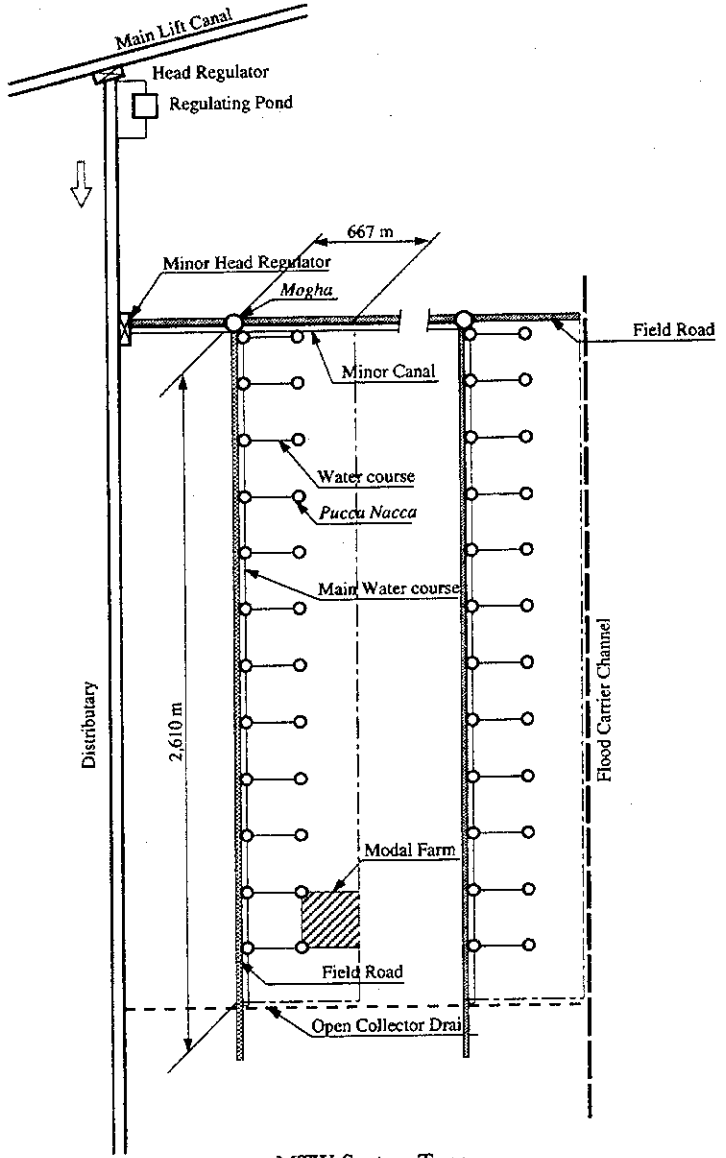
図5.3.4　灌漑用水系統図



Exemplified Table between length A and B

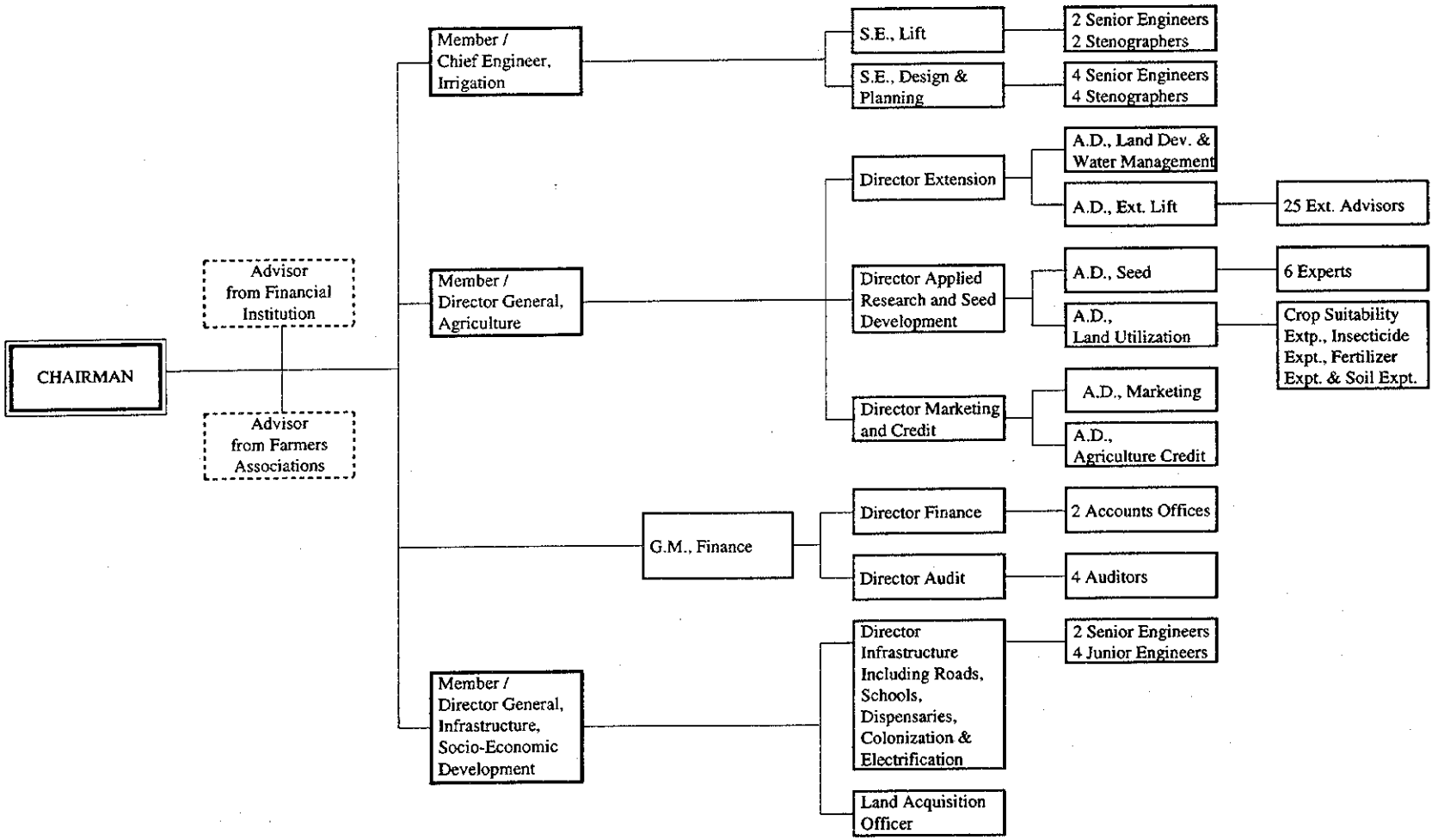
A	B
2,000 m	870 m
2,100	830
2,200	790
2,300	760
2,400	730
2,500	700
2,600	670
2,700	640
2,800	620
2,900	600
3,000	580

DTW System Type



MTW System Type

図5.3.5　圃場整備標準図



Note: 1. Extension Advisors should be located in the field at the rate of one Advisor for each Distributary. 10 Advisor should be recruited each year and given specialized training with foreign exposure. They will be the key functionaries and coordinate between the farmers and authority. They will help the farmers in demand based irrigation system, lay out of water courses, preparation of chack bandi and extension work.
2. The construction staff should be gradually reduced as the canal goes to completion. Operational staff should simultaneously be increased for future operation.
3. In view of a joint project with Punjab, the gravity canal may continue to remain with WAPDA. However, its Distribution System may be taken over by the Authority.
4. During construction stage the design and construction supervision should be done by the consultants. TheAuthority will provide top supervision only.

図5.6.2　チャシュマ右岸開発公社組織図

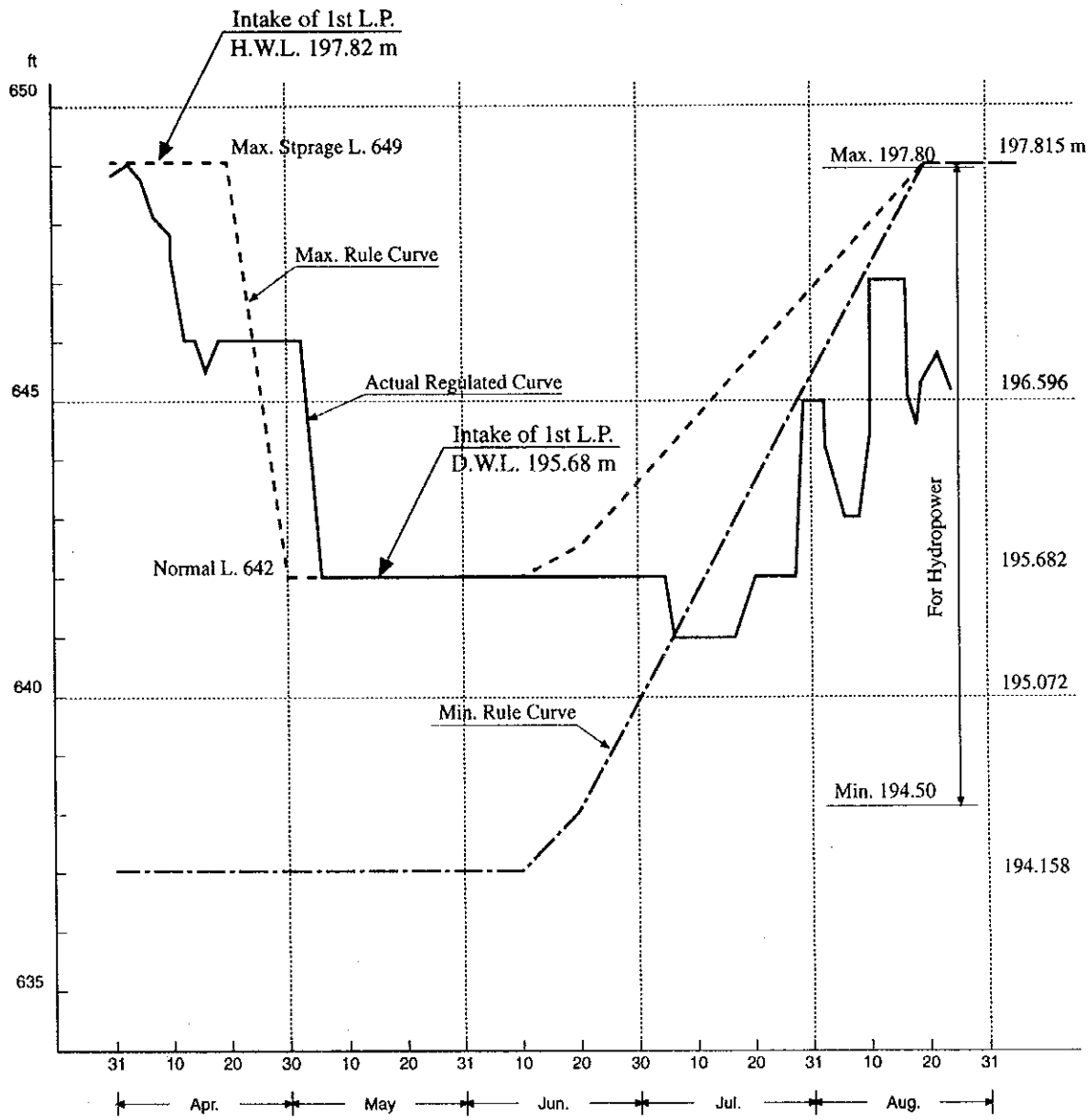


図6.1.1　チャシュマ貯水池の水位変化

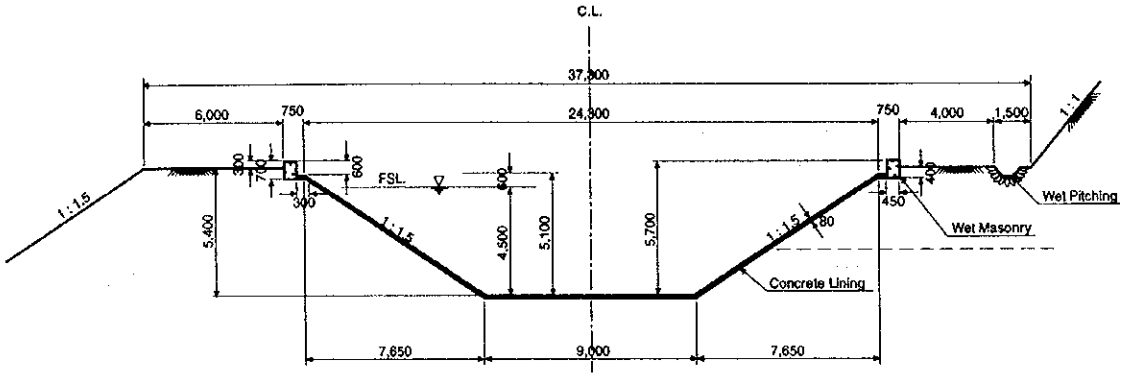


図6.1.2　導水路標準断面

DIMENSION (Unit: mm)

	SECTION OF CANAL				
	1	2	3	4	5
B	12,000	10,500	8,000	6,500	4,500
D	3,940	3,530	2,600	2,140	1,490
Fb	1,200	1,200	1,200	1,050	900

B : BED WIDTH
D : WATER DEPTH
Fb : FREE BOARD

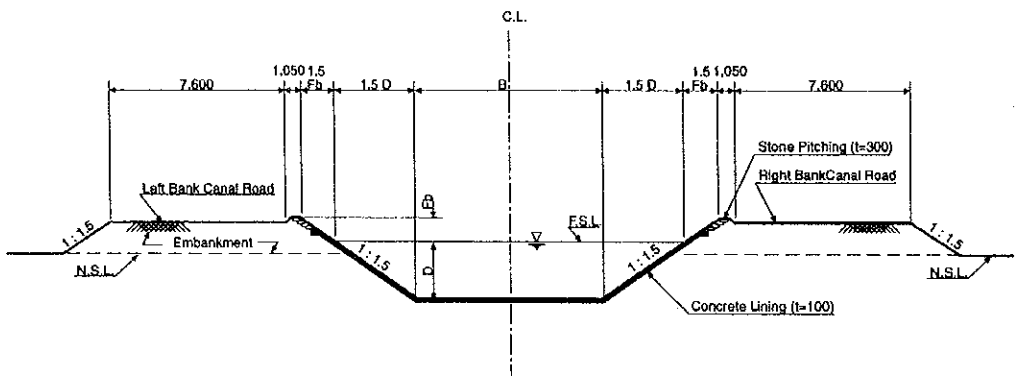


図6.1.3　幹線水路標準断面

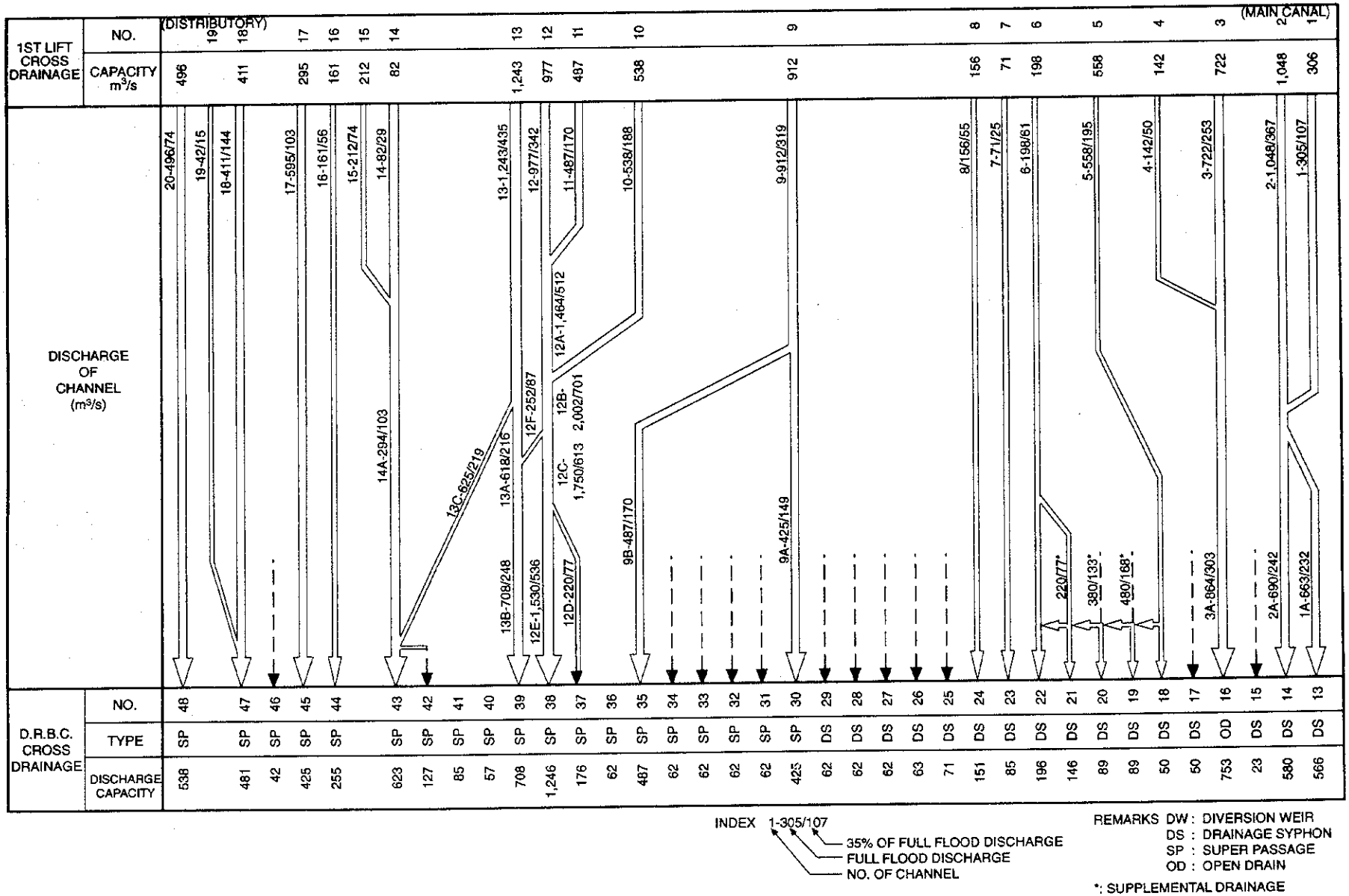

1ST LIFT CROSS DRAINAGE
NO.
CAPACITY m³/s
(DISTRIBUTORY)
(MAIN CANAL)
DISCHARGE OF CHANNEL (m³/s)
D.R.B.C. CROSS DRAINAGE
NO.
TYPE
DISCHARGE CAPACITY
20-496/74
19-42/15
18-411/144
17-595/103
16-161/56
15-212/74
14-82/29
14A-294/103
13C-625/219
13-1,243/435
13A-618/216
13B-708/248
12F-252/87
12-977/342
12E-1,530/536
12A-1,464/512
12B-2,002/701
12C-1,750/613
12D-220/77
11-487/170
10-538/188
9B-487/170
9-912/319
9A-425/149
8/156/55
7-71/25
6-198/61
5-558/195
4-142/50
3-722/253
3A-864/303
2-1,048/367
2A-690/242
1-305/107
1A-663/232
INDEX 1-305/107
35% OF FULL FLOOD DISCHARGE
FULL FLOOD DISCHARGE
NO. OF CHANNEL
REMARKS DW : DIVERSION WEIR
DS : DRAINAGE SYPHON
SP : SUPER PASSAGE
OD : OPEN DRAIN
*: SUPPLEMENTAL DRAINAGE

図 6.1.4　洪水路計画図

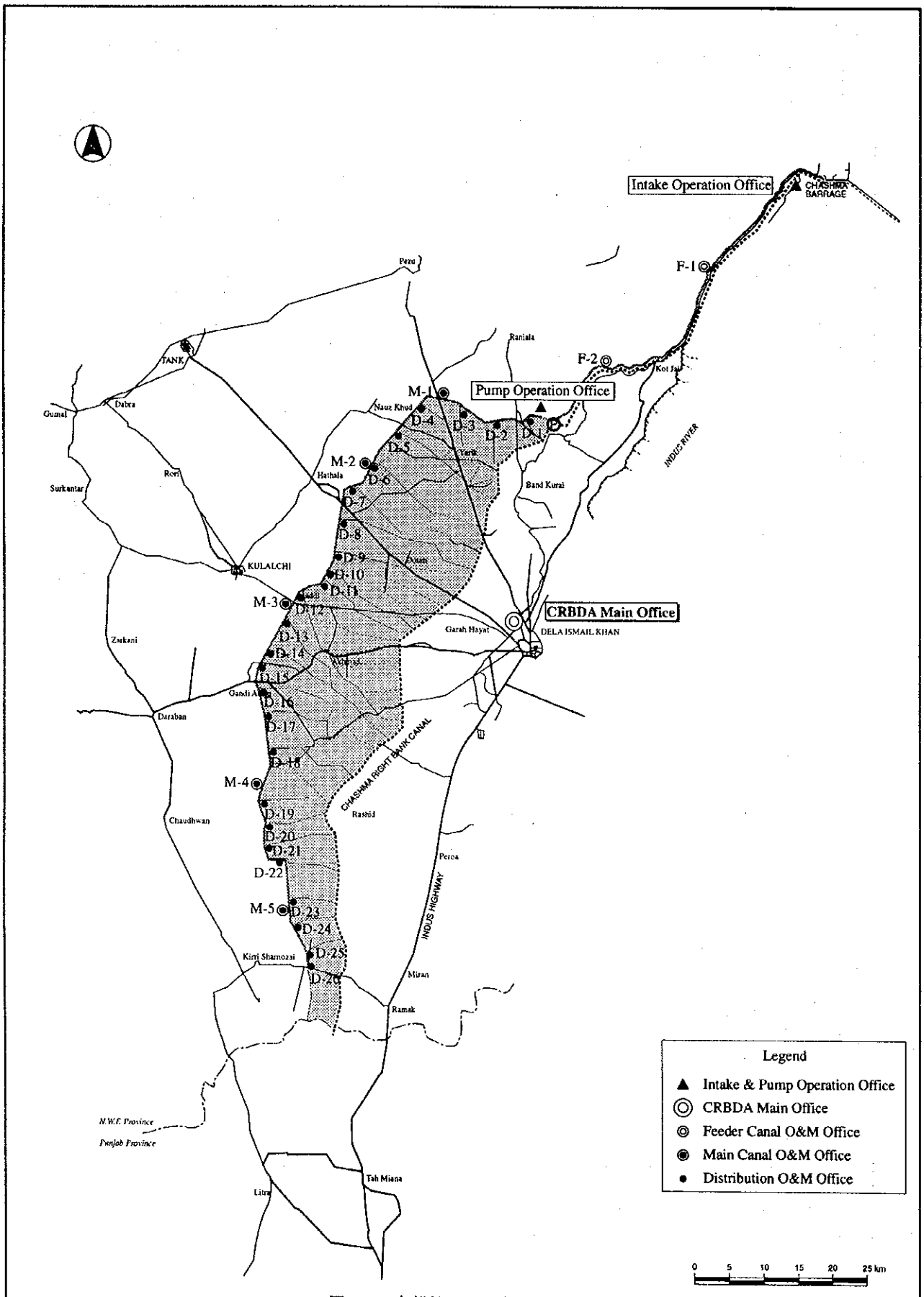


図7.3.1　各維持・管理事務所位置図

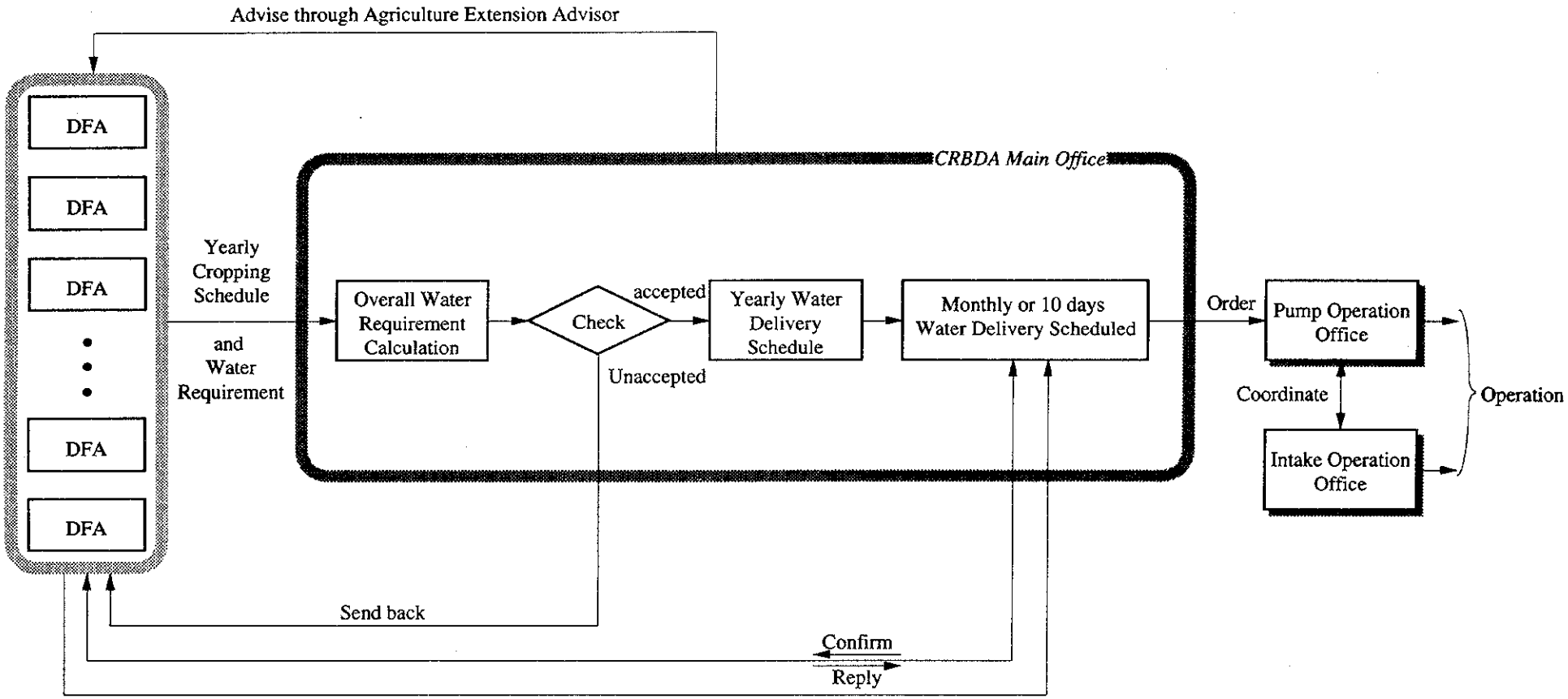


図7.3.2　潅漑用水供給スケジュールの決定手順

添付資料

調査関係者リスト

Name	Position
A. Advisory Committee	
Mr. Osamu Tuji	Chairman of Advisory Committee (MAFF)
Mr. Akira Hashimoto	Member, Irrigation and Drainage (MAFF)
Mr. Yoshizou Ichino	Member, Facilities and Structure (MAFF)
Mr. Akihiko Azumi	Member, Agriculture (MAFF)
Mr. Youichi Yamauchi	Member (MAFF)
Mr. Izumi Ohba	Member (MAFF)
Mr. Osamu Hotta	Member (Ministry of Foreign Affairs)
Mr. Yukio Okuda	Member (OECF)
B. Study Team	
Mr. Tadashi Ohori	Team Leader
Mr. Chikaichi Takahashi	Co-Leader/Irrigation & Drainage
Mr. Abdur Rahim Mahsud	Institution
Dr. Shuichi Matsushima	Meteorology &Hydrology
Mr. Akira Koto	Land Use/Farm Road
Mr. Makoto Suga	Geology/Land Conservation
Mr. Fumihiro Nagao	Soil/Agriculture
Mr. Manabu Fujikawa	Marketing
Mr. Yuichi Fukasaka	Agro-Economy/Project Evaluation
Mr. Keiji Tateyama	Environment
Mr. Motoo Taki	Facility Plan/Topo-survey
Mr. Akihiro Abe	Mechanical Plan/Design
Mr. Koichi Yamamoto	Design/Cost Estimate
C. Counterpart Personnel	
Mr. Akhtar Ali Ismaili	Overall Supervision, Irrigation Department, NWFP
Mr. Parvez Khan	Irrigation/Drainage, Project Irrigation Circle D.I.Khan, NWFP
Mr. Zaman Khan	Irrigation/Drainage, P&I Division,WAPDA, Peshawar
Mr. Shaifulluh Khan	Irrigation/Hydrology, Project Irrigation Div. D.I.Khan, NWFP
Dr. Gul Hassan	Meteorology/Agriculture, ARI, D.I.Khan
Dr. Ahmad Bakhash	Land Use, ARI, D.I.Khan
Mr. Naeem Qasuria	Farm Road, Rural Development, D.I.Khan
Mr. Mehboob Alam	Geology/Land Conservation, P&I Division,WAPDA, Lahore
Dr. Nasir Ud Din	Agriculture, ARI, D.I.Khan
Mr. Inayat Ullah	Marketing, Agricultural Extension, D.I.Khan
Mr. Wahid Ud Din	Project Economy, P&I Division,WAPDA, Lahore
Dr. M.Bashir Khan	Environment, Environmental Protection Agency, Peshawar
Mr. Ghulam Abbas Virk	Design/CostEstimate, P&I Division,WAPDA, Lahore
Mr. Shah Hussain Shah	Agro-Economy, ARI, D.I.Khan
Mr. Amir Reza	Facility design, P&I Division,WAPDA, Lahore
Mr. Syed Ahmed	Facility design, P&I Division,WAPDA, Lahore
Mr. Shafiq Ur Rehman	Mechanical design, HEPO,WAPDA, Lahore

MAFF: Ministry of Agriculture, Forestry and Fisheries

ARI: Agricultural Research Institute

SCOPE OF WORK
FOR
THE FEASIBILITY STUDY
ON
CHASHMA RIGHT BANK 1ST LIFT IRRIGATION PROJECT

AGREED UPON BETWEEN
THE GOVERNMENT OF NORTH WEST FRONTIER PROVINCE,
THE ISLAMIC REPUBLIC OF PAKISTAN
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

PESHAWAR, 11TH NOVEMBER, 1992

Mr. Inamullah Khan
Additional Secretary-I
Planning and Development Department,
The Government of
North West Frontier Province

Mr. Sumio Oishi
Leader,
Preparatory Study Team,
Japan International
Cooperation Agency.

11.11.92

Mr. Faqir Ahmad Paracha
Secretary,
Irrigation and Public Health Department,
The Government of
North West Frontier Province

I. INTRODUCTION

In response to the request of the Government of the Islamic Republic of Pakistan (hereinafter referred to as "GOP"), the Government of Japan (hereinafter referred to as "GOJ") has decided to undertake the Feasibility Study on Chashma Right Bank 1st Lift Irrigation Project (hereinafter referred to as "the Study"), in accordance with the relevant laws and regulations in force in Japan.

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programmes of GOJ will undertake the Study, in close cooperation with the authorities concerned of the Islamic Republic of Pakistan (hereinafter referred to as "Pakistan").

And as for the orginzations concrerned of Pakistan, the Irrigation & Public Health Engineering Department, the Government of North West Frontier Province (hereinafter referred to as "IPHED"), will act as the counterpart agency to the Japanese study team as well as coordinating body in relation with other governmental and non-governmental organizations concerned for smooth implementation of the Study.

The present document sets forth the Scope of Work with regard to the Study.

II. OBJECTIVES OF THE STUDY

The objectives of the Study are:

1. To conduct the feasibility study on agricultural development for the Chashma Right Bank 1st Lift Irrigation Project (hereinafter referred to as "the Project").

2. To carry out technology transfer to the Pakistani counterpart personnel through on-job training in the course of the Study.

III. STUDY AREA

The Study covers the Chashma Right Bank 1st Lift Irrigation Project area, which is approximately 110,000ha (see attached map).

IV. SCOPE OF THE STUDY

The Study will consist of two (2) phases and will cover the following:

1. Phase I

1-1 To collect and review existing data and information and to carry out field survey and investigation in the study area:

- natural condition
  a. meteorology
  b. hydrology
  c. geology
  d. soil
  e. topography
  f. others
- agriculture
  a. land use and tenure
  b. cropping pattern and yeild
  c. agro-economy and institution
  d. others
- agricultural infrastructure
  a. irrigation and drainage facilities
  b. farm roads
  c. others
- socio-economic situation
  a. population
  b. household and farmers
  c. regional socio-economy and household economy
  d. social and farmers organizations
  e. historical right/costums regarding irrigational water usage
  f. others
- other information related to the Project
  a. administrative organizations related to the Project
  b. environmental impacts
  c. others

1-2 To carry out household survey

1-3 To review other projects related to the Project

1-4 To review topographic map covering the study area, which has already been made in Pakistan (scale: 4 inch = 1 mile).

2. Phase II

2-1 Based on the results of the Phase I study, Phase II study covers the following items:

- additional field survey, data collection and analysis including:
  a. hydrology and meteorology
  b. geology and soil classification
  c. land use and tenure
  d. cropping pattern and yeild
  e. irrigation and drainage
  f. hill torrent study for cross drainage, erosion and flood damages
  g. regional socio-economy and farm household economy
  h. social and farmers organizations
  i. environment
  j. others

2-2 To formulate an irrigation and agricultural development programme for the Project

2-3 Preliminary design of the major structures of the Project

2-4 Preparation of the implementation schedule

2-5 Preparation of the operation and maintenance plan for major structures

2-6 Preparation of the environmental preservation plan

2-7 Estimate of the project costs and benefits

2-8 Recommendation

V. STUDY SCHEDULE

The study will be carried out in accordance with the attached tentative schedule.

VI. REPORTS

JICA shall prepare and submit following reports in English to GOP.

(1) Inception Report
Twenty (20) copies at the commencement of the Study.

(2) Progress Report (1)
Twenty (20) copies at the end of the Phase I Study in Pakistan.

(3) Interim Report
Twenty (20) copies at the end of the Phase I study.

(4) Progress Report (2)
Twenty (20) copies at the end of the Phase II Study in Pakistan.

(5) Draft Final Report
Twenty (20) copies at the end of the Phase II study.
GOP provides JICA with its comments on the Draft Final Report within one (1) month after receipt of the Draft Final Report.

(6) Final Report
Fifty (50) copies within two (2) months after receiving GOP's comments on the Draft Final Report.

VII. UNDERTAKING OF THE GOVERNMENT OF PAKISTAN

1. To facilitate smooth conduct of the study, GOP shall take necessary measures;

1-1 to secure the safety of the Japanese study team.

1-2 to permit the members of the Japanese study team to enter, leave and sojourn in Pakistan for the duration of their assignment therein, and exempt them from foreign registration requirements and consular fees.

1-3 to exempt the members of the Japanese study team from taxes, duties, fees and any other charges on equipment, machinery and other materials brought into of Pakistan for the conduct of the study.

1-4 to exempt the members of the Japanese study team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Japanese study team for their services in connection with the implementation of the Study.

1-5 to provide necessary facilities to the Japanese study team for the remittance as well as utilization of the funds introduced into Pakistan from Japan in connection with the implementation of the Study.

1-6 to secure permission for entry into private properties and other areas for the conduct of the Study as and when necessity arises.

1-7 to secure permission for the Japanese study team to take all data and documents related to the Study including photographs and maps, also including aerial photographs necessary for the Study (excluding restricted areas), out of Pakistan to Japan, on case to case bases.

1-8 to provide medical services as needed. Its expense will be chargeable on the members of the Japanese study team.

2. GOP shall bear claims, if any arises, against the members of the Japanese study team, resulting from, occurring in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or wilful misconduct on the part of the members of the Japanese study team.

3. IPHED shall, at own expense, provide the Japanese study team with the followings, in cooperation with the other authorities concerned:
   1) available data and information related to the Study,
   2) counterpart personnel,
   3) suitable office with necessary furniture in Peshawar and project sites,
   4) credentials or identification cards, and
   5) necessary number of vehicles with drivers.

Ⅷ. UNDERTAKING OF JICA

For the conduct of the Study, JICA shall take the following measures:

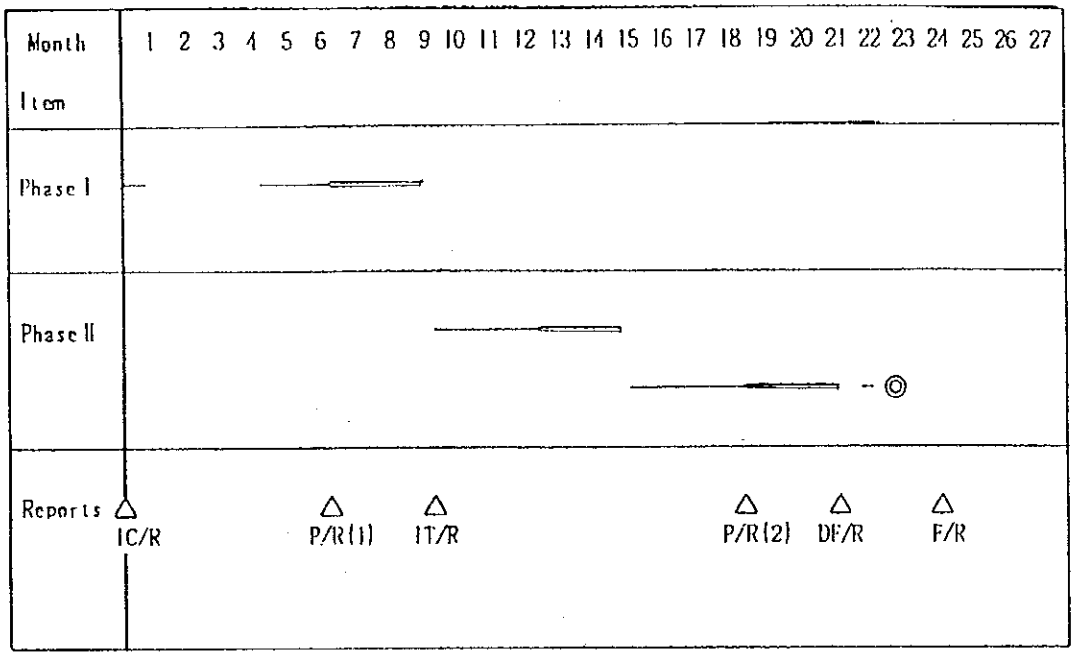
1. To dispatch study teams, at its own expense, to Pakistan, and

2. To conduct technology transfer to the Pakistani counterpart personnel in the course of the Study.

Ⅸ. CONSULTATION

JICA and IPHED will consult each other in respect of any matter that may arise from or in connection with the Study.

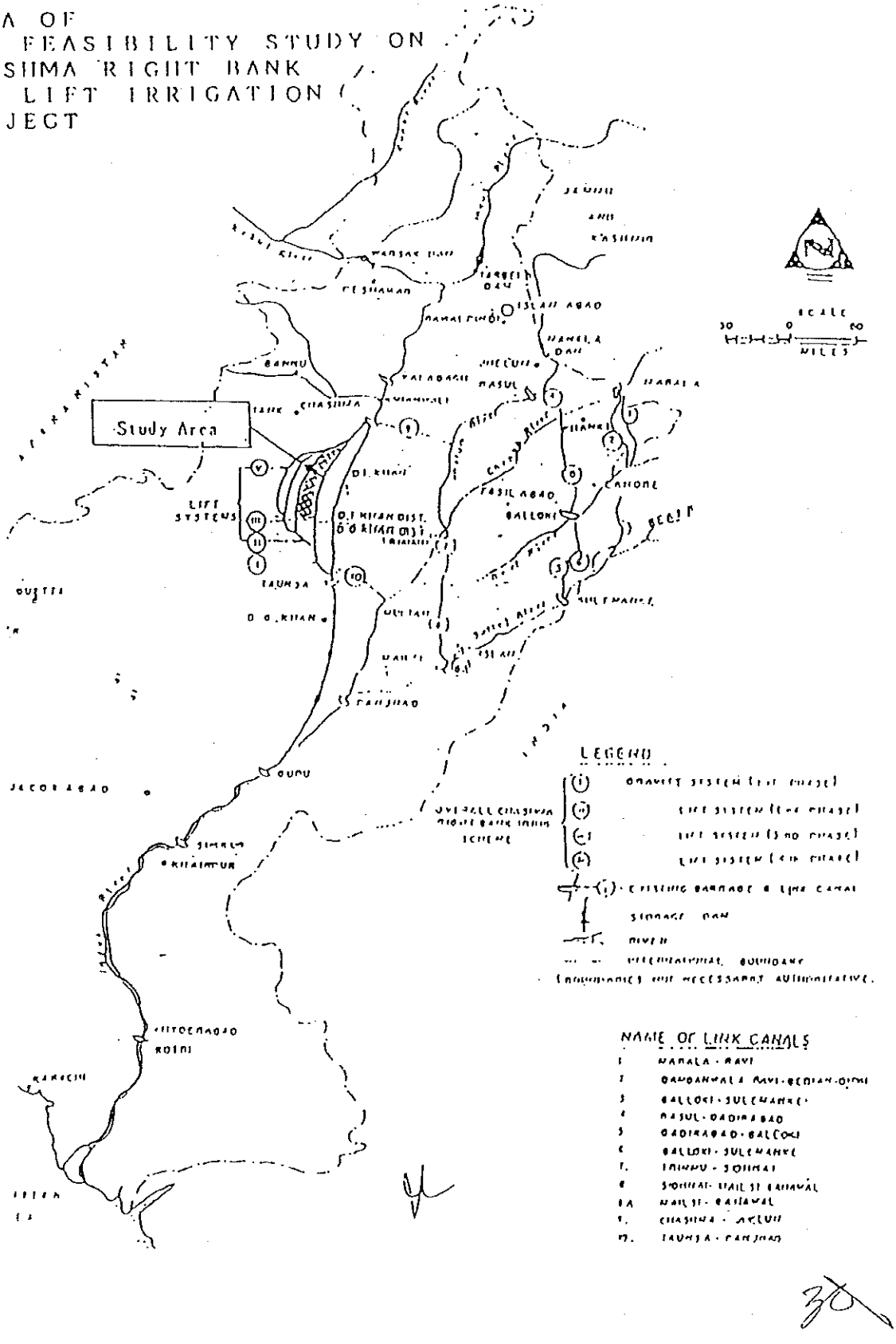
TENTATIVE SCHEDULE



(Remarks) IC/R : Inception Report
IT/R : Interim Report
DF/R : Draft Final Report
P/R(1) : Progress Report (1)
P/R(2) : Progress Report (2)
F/R : Final Report

— : Work in Pakistan
··· : Home Office Work in Japan
◎ : Comments on DF/R by Pakistan side

AREA OF
THE FEASIBILITY STUDY ON
CHASHMA RIGHT BANK
1ST LIFT IRRIGATION
PROJECT



MINUTES OF MEETING
ON
SCOPE OF WORK
FOR
THE FEASIBILITY STUDY
ON
CHASHMA RIGHT BANK 1ST LIFT IRRIGATION PROJECT

The preparatory study team (hereinafter referred to as 'the Team') organized by the Japan International Cooperation Agency (hereinafter referred to as 'JICA'), and headed by Mr. Sumio Oishi, visited the Islamic Republic of Pakistan from October 26 to November 13, 1992 for the purpose of discussing and confirming the Scope of Work for the Feasibility Study on the Chashma Right Bank 1st Lift Irrigation Project (hereinafter referred to as 'the Study').

The team had a series of discussions with the officials concerned of the Irrigation and Public Health Engineering Department, the Government of North West Frontier Province (hereinafter referred to as 'IPHED') on the Scope of Work for the Study. The list of participants in a series of meetings is attached in the Annex.

The following are the main issues discussed and agreed by IPHED and the Team.

1. IPHED and the Team both agreed on the issues mentioned in the Scope of Work.

2. IPHED shall provide the Japanese study team a set of topographic map (scale, 4 inch = 1 mile, contour, 5 feet) which covers the whole Study area before the commencement of the Study, and also will provide the one in scale, 1:5,000, contour, 0.25 metre, until 1(one) year after the commencement of the Study.

3. The Team has decided to conduct the Study according to the confirmation given by IPHED that there are sufficient amount of water and electricity available regarding the implementation of the Chashma Right Bank 1st Lift Irrigation Project.

4. IPHED shall provide the Japanese study team with offices which are equipped with electricity, city water, and telephones in Peshawar and the Study area.

5. IPHED requested that local consultants be associated with the Study to the extent possible. The Team noted this request, but observed that this would be determined by the Japanese study team.

6. IPHED requested that the following equipments necessary for the Study be procured by JICA and be donated to IPHED after the termination of the Study. The Team promised to convey its request to the Government of Japan.
   - vehicles
   - computers
   - copymachines
   - faxmachines
   - survey equipments

7. IPHED requested the counterpart training in Japan. The Team promised to convey its request to the Government of Japan.

8. The Government of North West Frontier Province noted that items mentioned in the Scope of Work, sub-paragraph 1-2 to 1-5, and 1-7 of paragraph Ⅶ, would require clearance by the Federal Government.

Mr. Inamullah Khan
Additional Secretary Ⅱ,
Planning and Development Department
The Government of
North West Frontier Province

Mr. Sumio Oishi
Leader,
Preparatory Study Team,
Japan International
Cooperation Agency

Mr. Faqir Ahmad Paracha
Secretary,
Irrigation and Public Health Engineering Department,
The Government of
North West Frontier Province

LIST OF PARTICIPANTS

ANNEX

PAKISTAN SIDE

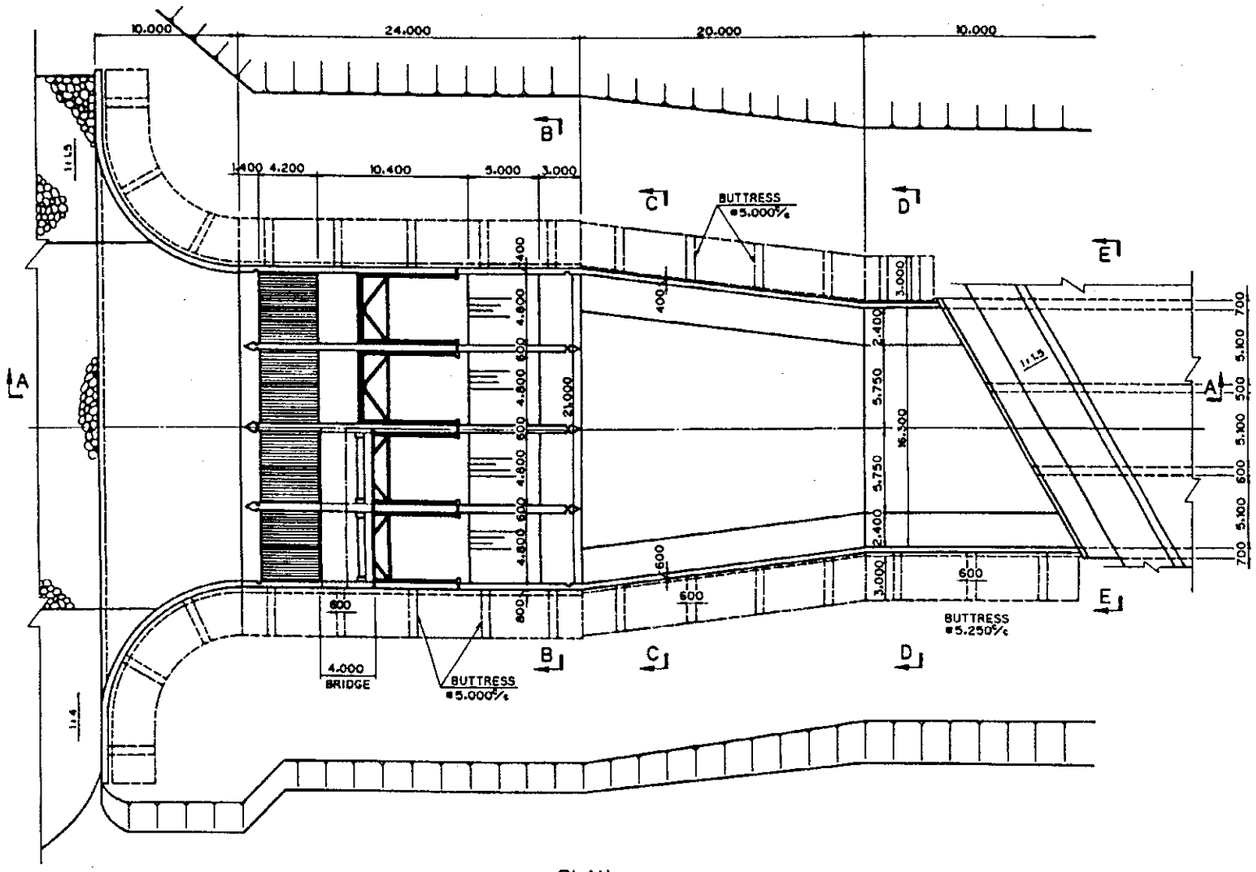
1. Mr. Mohammad Saleem Khan	Secretary	Planning and Development Department, The Government of NWFP
2. Mr. Inamullah Khan	Additional Secretary II	Planning and Development Department, The Government of NWFP
3. Mr. Faqir Ahmad Paracha	Secretary	Irrigation and Public Health Engineering Department, The Government of NWFP
4. Mr. Muhammad Munir	Chief Engineer (P&I)	WAPDA, Lahore
5. Mr. M. Ishhaq Shinwari	Project Director (P&I) North	WAPDA, Lahore
6. Mr. Nawab Khan Masood	Chief Engineer Water Sector Investment Planning	Planning and Development Department, The Government of NWFP
7. Mr. Akhtar Ali Ismaili	Chief Engineer (Development)	Irrigation and Public Health Engineering Department, The Government of NWFP
8. Mr. Jan Sardar Gul	General Manager	WAPDA, North
9. Mr. Mnhammad Zaman Khan	Director (P&I)	WAPDA, Peshawar
10. Mr. Habibullah Khan	Project Director, D. I. Khan	Irrigation and Public Health Engineering Department, The Government of NWFP
11. Mr. Abdul Wasai	Director	WAPDA, Peshawar
12. Dr. Abdul Waheed	Chief Planning Officer	Food, Agriculture and Cooperative Department, The Government of NWFP
13. Mr. Mohammad Yousef	Director, Water Management	Agriculture Department, The Government of NWFP
14. Mr. Attaullah Khan	Director, Planning	Agriculture Extension Department, The Government of NWFP
15. Mr. Amjad Shahid Afridi	Chief (Water & Power)	Planning and Development Department, The Government of NWFP

16. Mr. Ahmad Samad	Project throgh Secretary of Agriculture	Agriculture Extension Department, The Government of NWFP
17. Mr. Muhammad Zulfiqar	Planning Officer	Agriculture Extension Department, The Government of NWFP
18. Mr. Khan Said	Director, Technical	Area Electricity Board, WAPDA, Peshawar

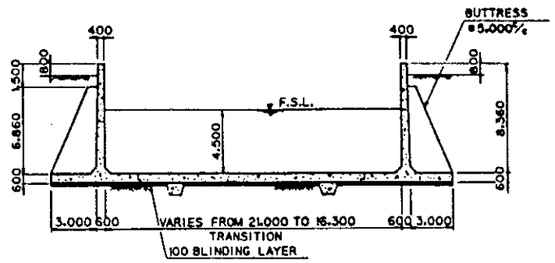
THE TEAM

1. Mr. Sumio Oishi	Leader
2. Mr. Takanobu Kobayashi	Irrigation Engineer
3. Mr. Akihiko Azumi	Agronomist
4. Dr. Katsumi Chida	Environmental Expert
5. Mr. Akira Shimizu	Coordinator

PLATE 1



PLAN
SCALE B



SECTION C-C
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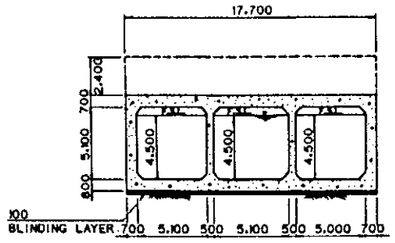
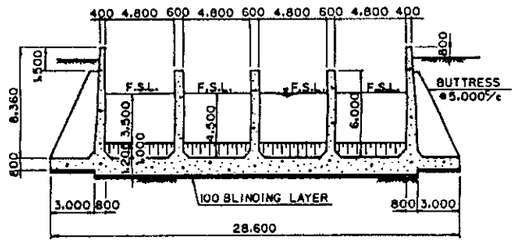
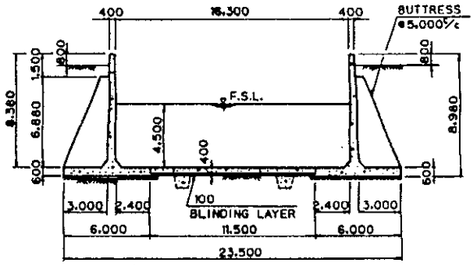


SECTION E-E
SCALE B



SECTION B-B
SCALE B



SECTION D-D
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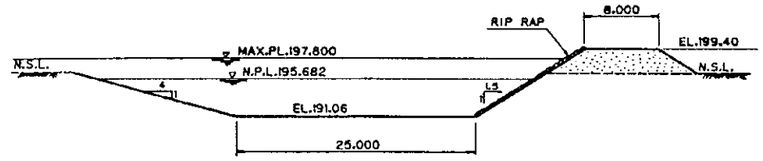
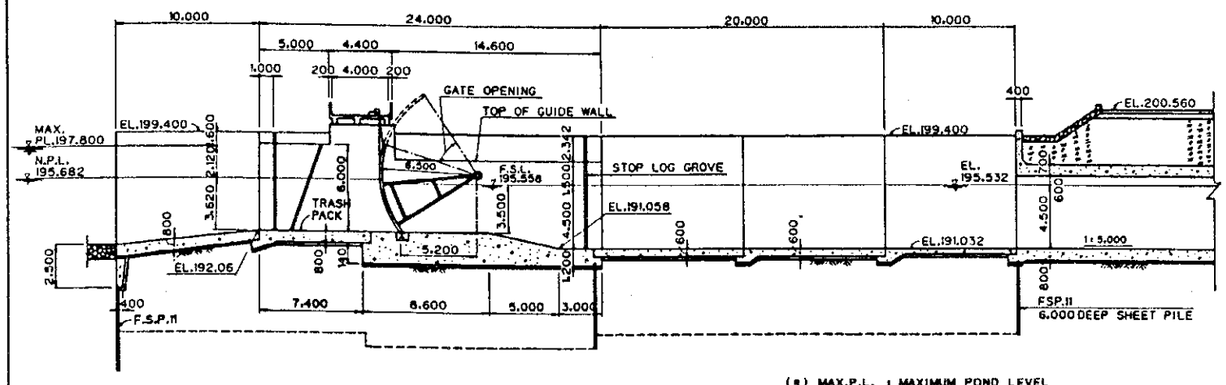
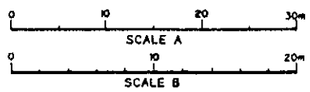


SECTION OF HEAD RACE DRADGING
SCALE A



(*) MAX.P.L. : MAXIMUM POND LEVEL
N.P.L. : NORMAL POND LEVEL

SECTION A-A
SCALE B



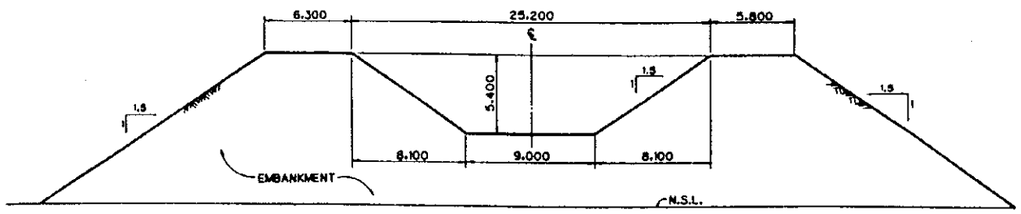
ISLAMIC REPUBLIC OF PAKISTAN
GOVERNMENT OF NORTH WEST FRONTIER PROVINCE

CHASHMA RIGHT BANK 1ST LIFT IRRIGATION PROJECT

INTAKE STRUCTURE WITH CROSSING OF DIKE OF CHASHMA BARRAGE

JAPAN INTERNATIONAL COOPERATION AGENCY | D.W. NO.

PLATE 2



FULL EMBANKMENT SECTION
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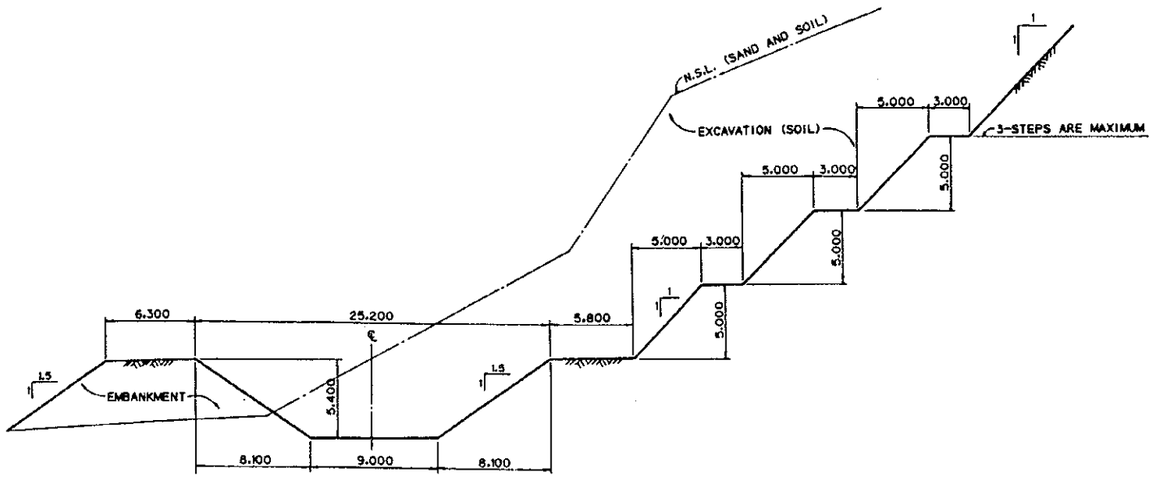
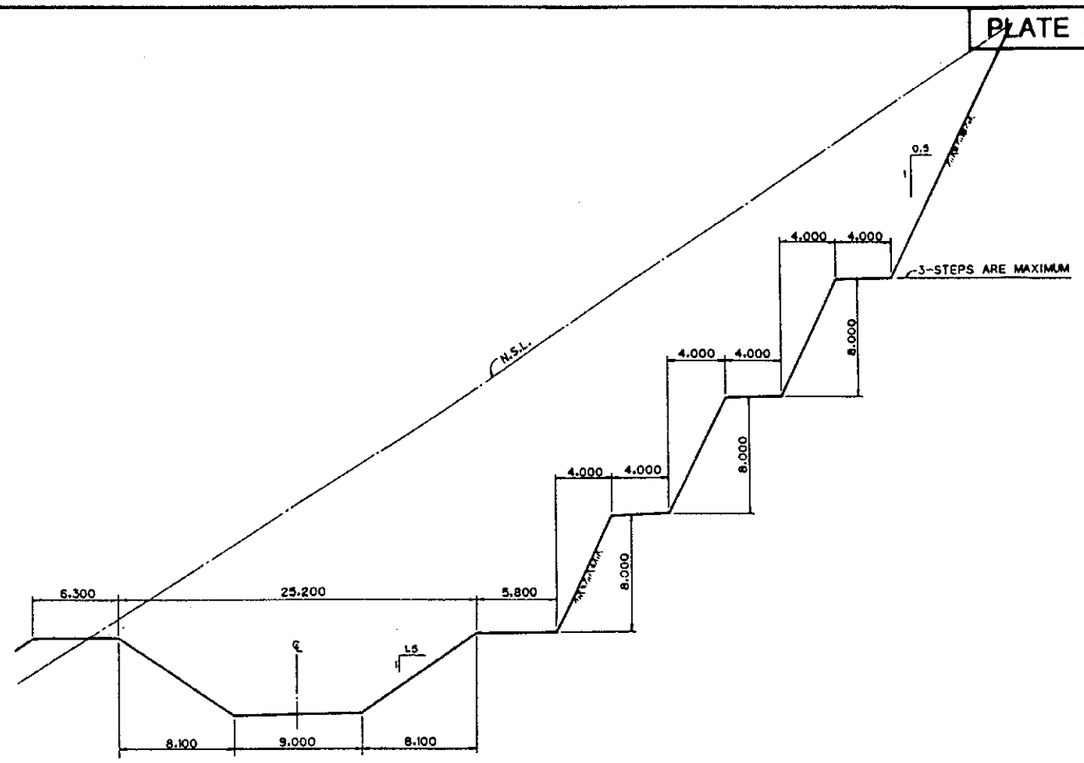
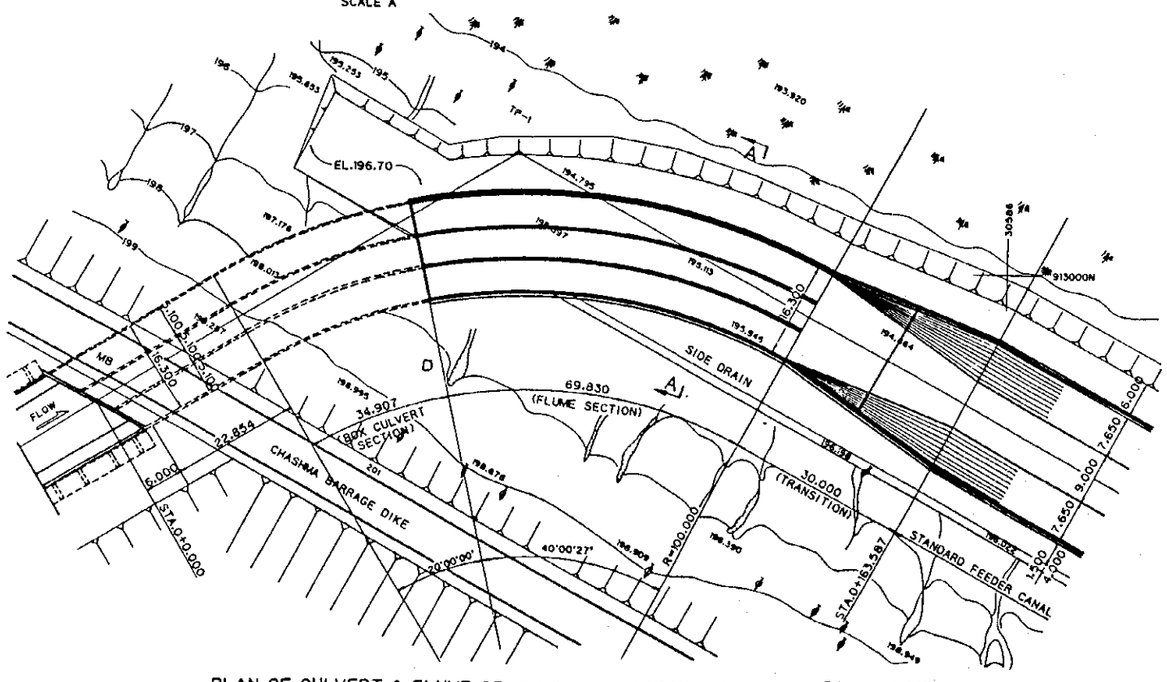


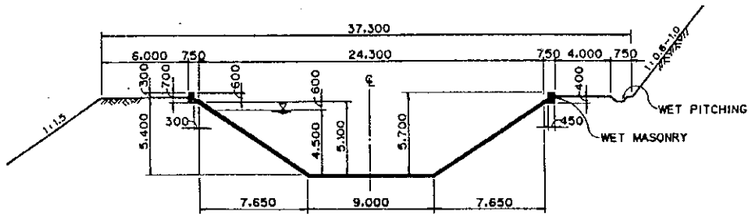
CUTTING WITH PARTIAL EMBANKMENT SECTION
SCALE A



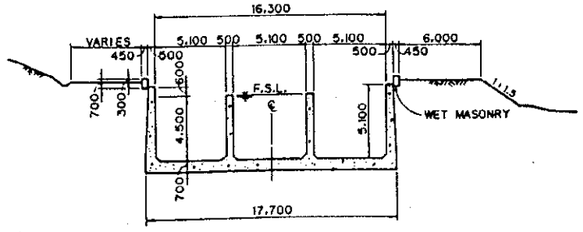
ROCK EXCAVATION SECTION
SCALE A



PLAN OF CULVERT & FLUME SECTION AT BEGINNING POINT OF FEEDER CANAL
(STA.0+0.000–STA.0+163.587) SCALE B



TYPICAL CROSS SECTION OF FEEDER CANAL
SCALE A



SECTION A–A
SCALE A

0 10 20m
SCALE A

0 50m
SCALE B

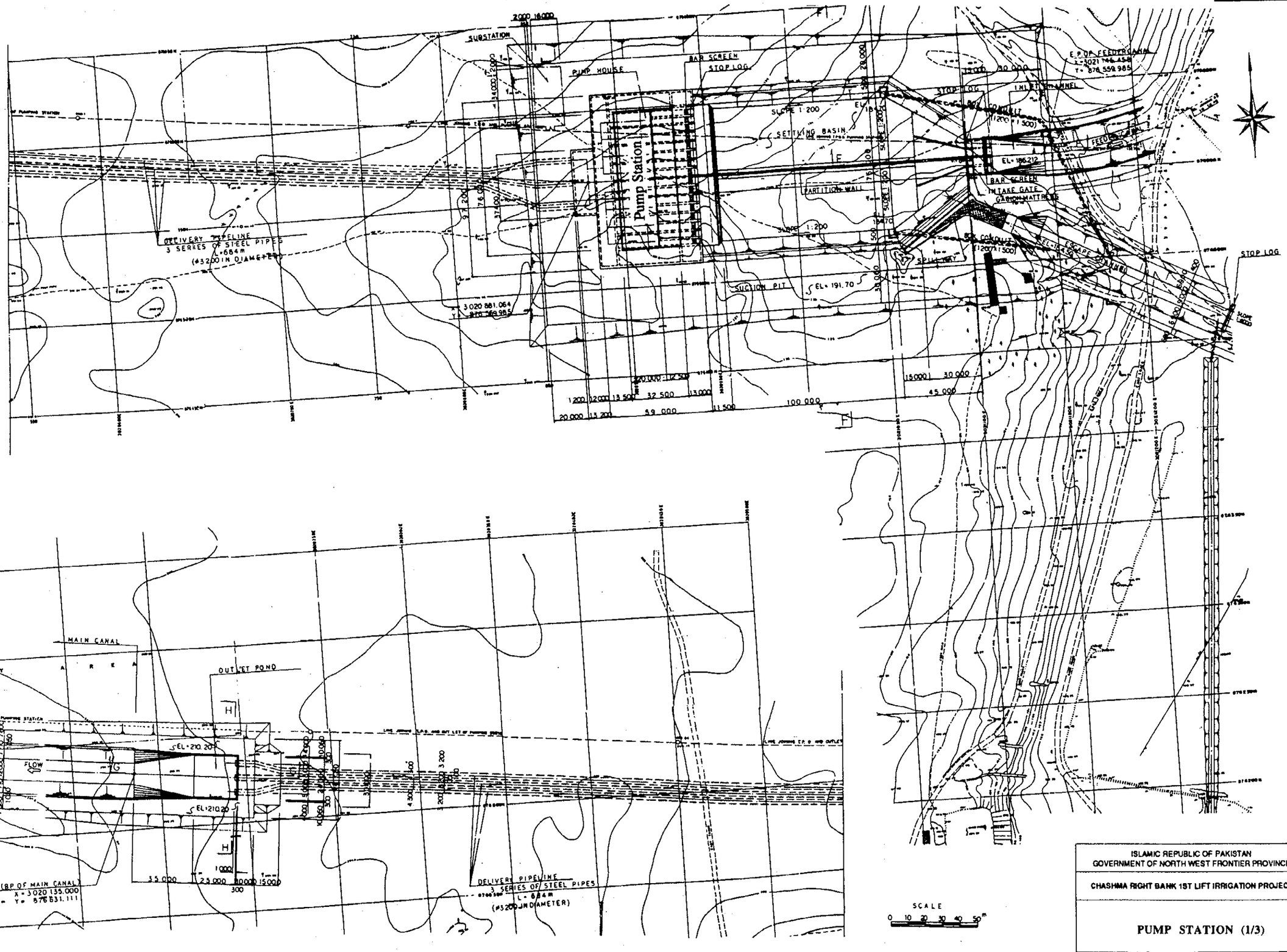
ISLAMIC REPUBLIC OF PAKISTAN
GOVERNMENT OF NORTH WEST FRONTIER PROVINCE

CHASHMA RIGHT BANK 1ST LIFT IRRIGATION PROJECT

TYPICAL CROSS SECTION AND DIKE CROSSING OF FEEDER CANAL

JAPAN INTERNATIONAL COOPERATION AGENCY | D.W. NO.

PLATE 3



ISLAMIC REPUBLIC OF PAKISTAN
GOVERNMENT OF NORTH WEST FRONTIER PROVINCE

CHASHMA RIGHT BANK 1ST LIFT IRRIGATION PROJECT

PUMP STATION (1/3)

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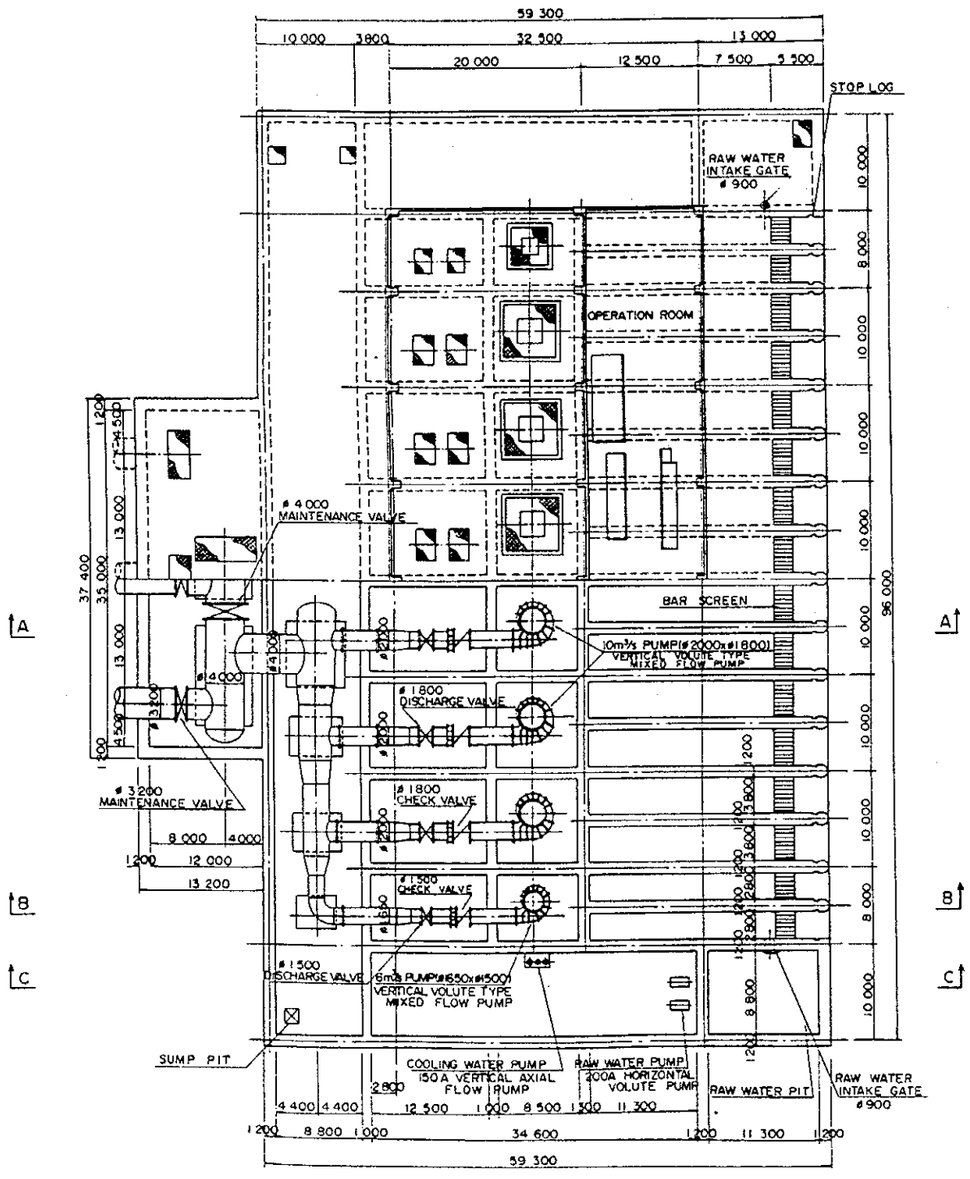
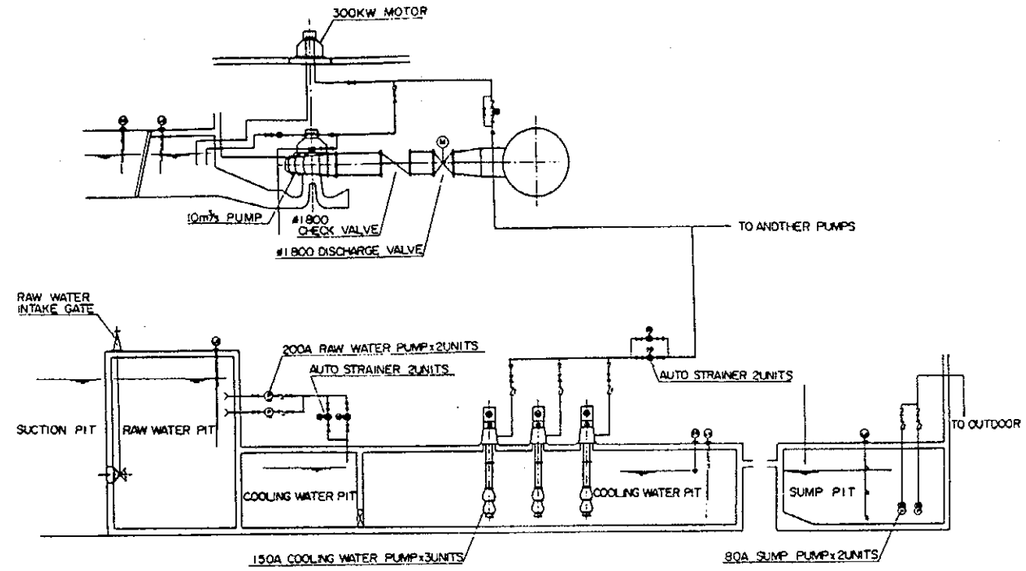
PLATE 4

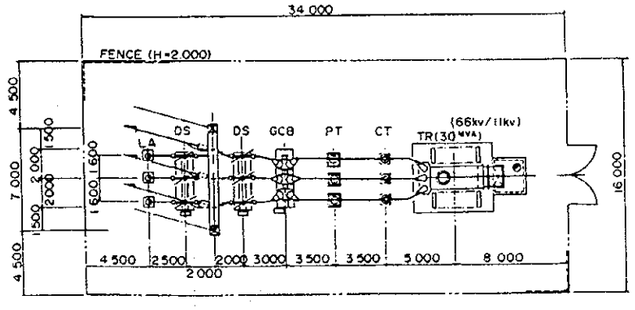


PLAN OF PUMP HOUSE

S = 1 : 300



FLOW SHEET OF AUXILIARY EQUIPMENTS



PLAN OF SUBSTATION

S = 1 : 200

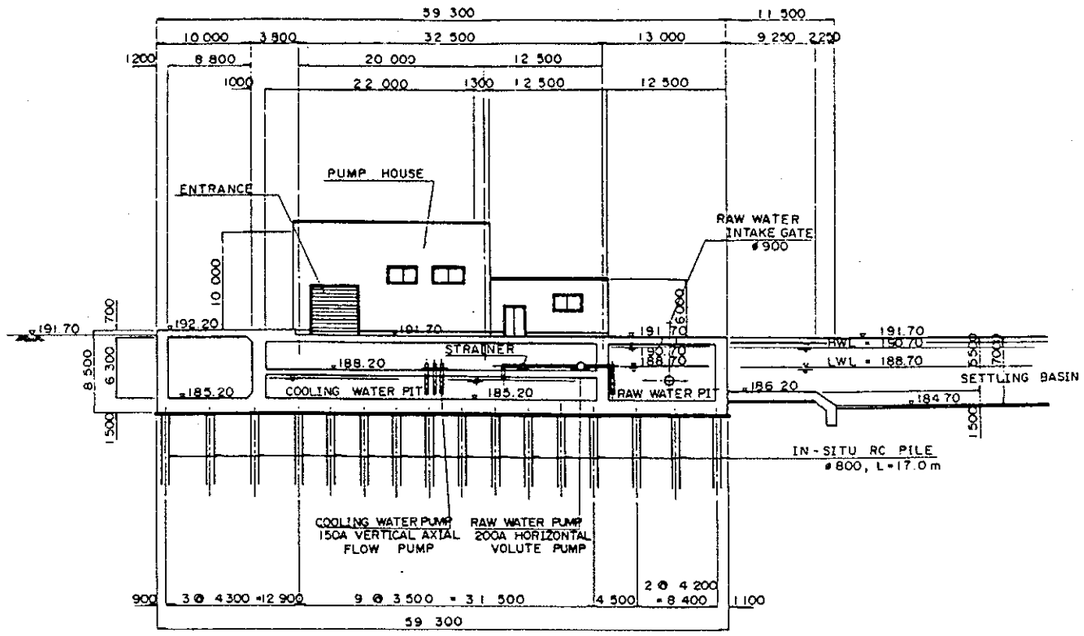
ISLAMIC REPUBLIC OF PAKISTAN
GOVERNMENT OF NORTH WEST FRONTIER PROVINCE

CHASHMA RIGHT BANK 1ST LIFT IRRIGATION PROJECT

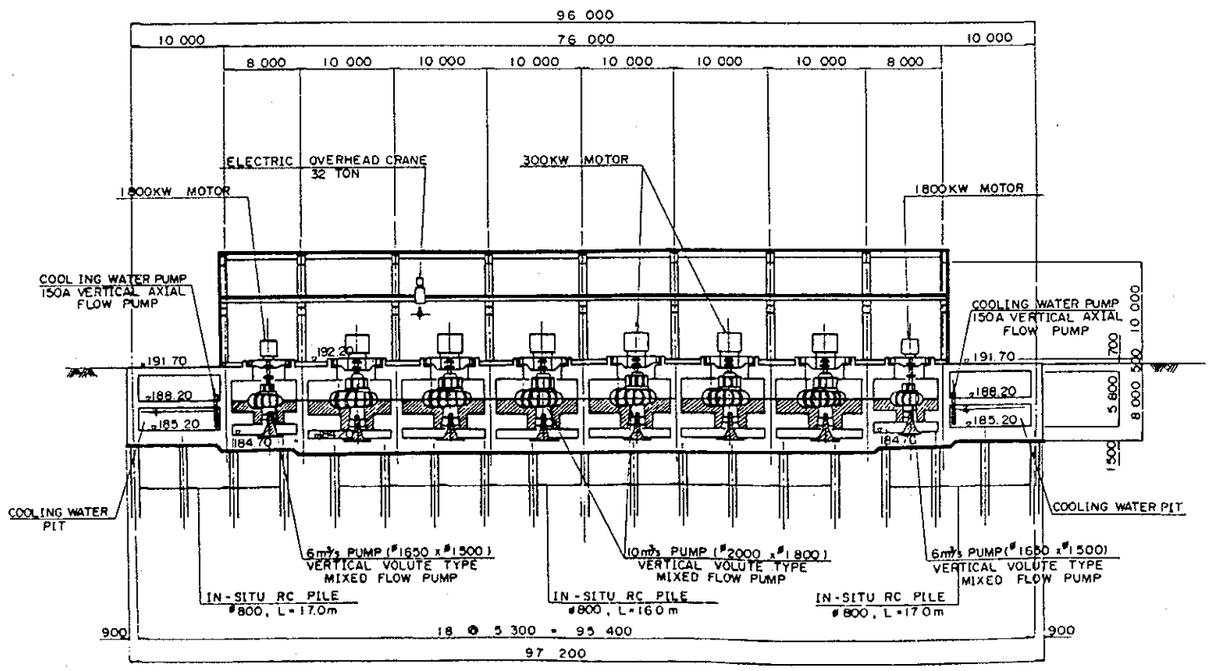
PUMP STATION (2/3)

JAPAN INTERNATIONAL COOPERATION AGENCY | D.W. NO.

PLATE 5



C — C S = 1 : 300



D — D S = 1 : 300

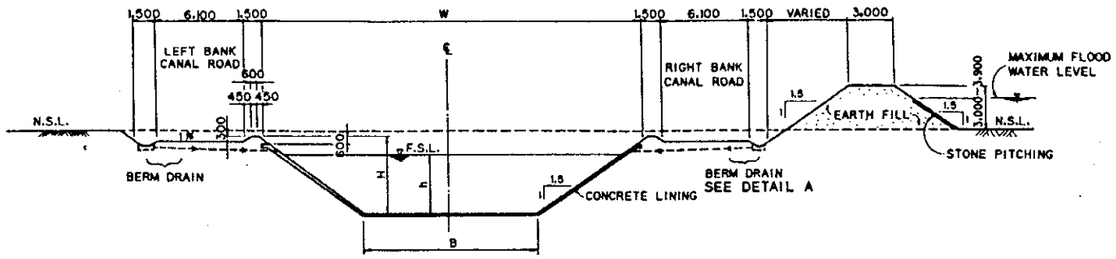
ISLAMIC REPUBLIC OF PAKISTAN
GOVERNMENT OF NORTH WEST FRONTIER PROVINCE

CHASHMA RIGHT BANK 1ST LIFT IRRIGATION PROJECT

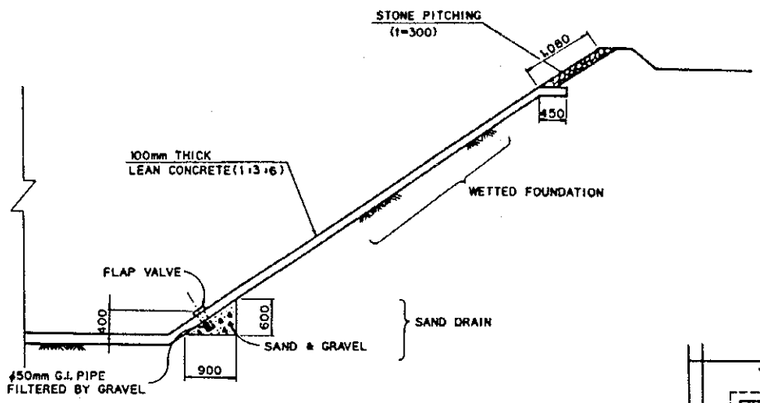
PUMP STATION (3/3)

JAPAN INTERNATIONAL COOPERATION AGENCY | D.W. NO.

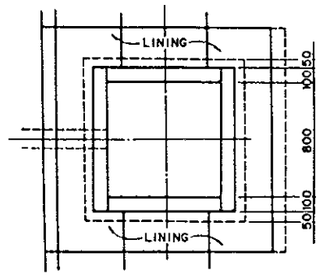
PLATE 6



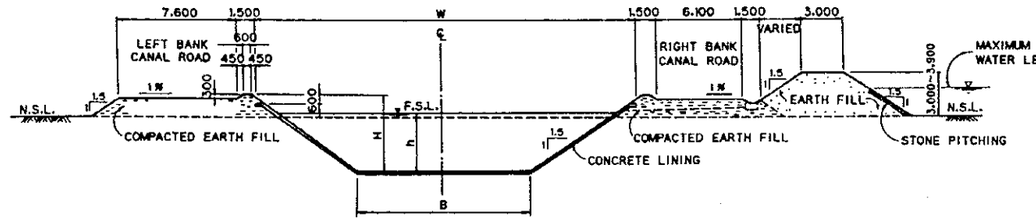
TYPICAL SECTION FULL CUT WITH FLOOD PROTECTION DIKE
SCALE A



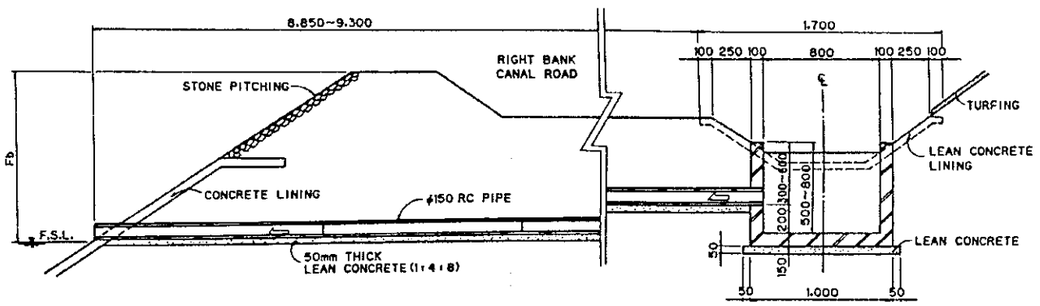
LINING DETAILS
SCALE C



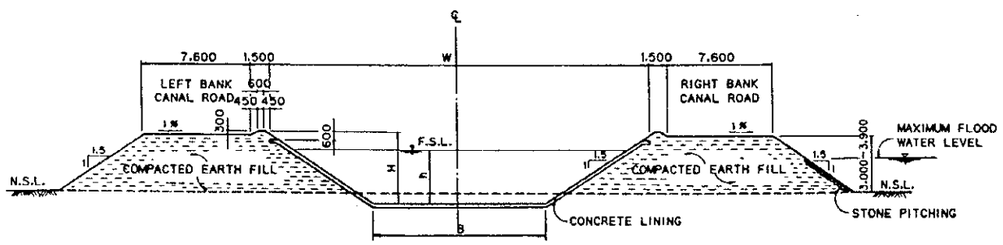
PLAN



TYPICAL SECTION CUT & FILL WITH FLOOD PROTECTION DIKE
SCALE A



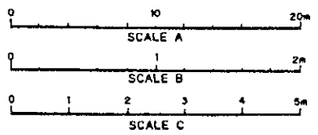
DETAIL-A
SCALE B(BERM DRAIN)



TYPICAL SECTION CUT & FILL OR FULL CUT WITHOUT FLOOD PROTECTION DIKE
SCALE A

DIMENSION TABLE

No. OF SECTION	STATION No. OF BP ~ EP	DISCHARGE (m³/s)	BOTTOM WIDTH B (m)	CANAL HIGHT H (m)	WATER DEPTH h (m)	FREE BOARD F.B (m)	W (m)
1	0+000 ~ 32+800 (32.80km)	72	12.0	5.15	3.94	1.21	27.45
2	32+800 ~ 56+550 (23.75km)	53	10.5	4.75	3.53	1.22	24.75
3	56+550 ~ 75+000 (18.45km)	30	8.0	3.80	2.60	1.20	19.40
4	75+000 ~ 94+300 (19.30km)	20	6.5	3.20	2.14	1.06	16.10
5	94+300 ~ 113+250 (18.95km)	10	4.5	2.40	1.49	0.91	11.70



ISLAMIC REPUBLIC OF PAKISTAN
GOVERNMENT OF NORTH WEST FRONTIER PROVINCE

CHASHMA RIGHT BANK 1ST LIFT IRRIGATION PROJECT

TYPICAL CROSS SECTION OF MAIN CANAL

JAPAN INTERNATIONAL COOPERATION AGENCY | D.W. NO.