

4.3 Agriculture and Agro-economy

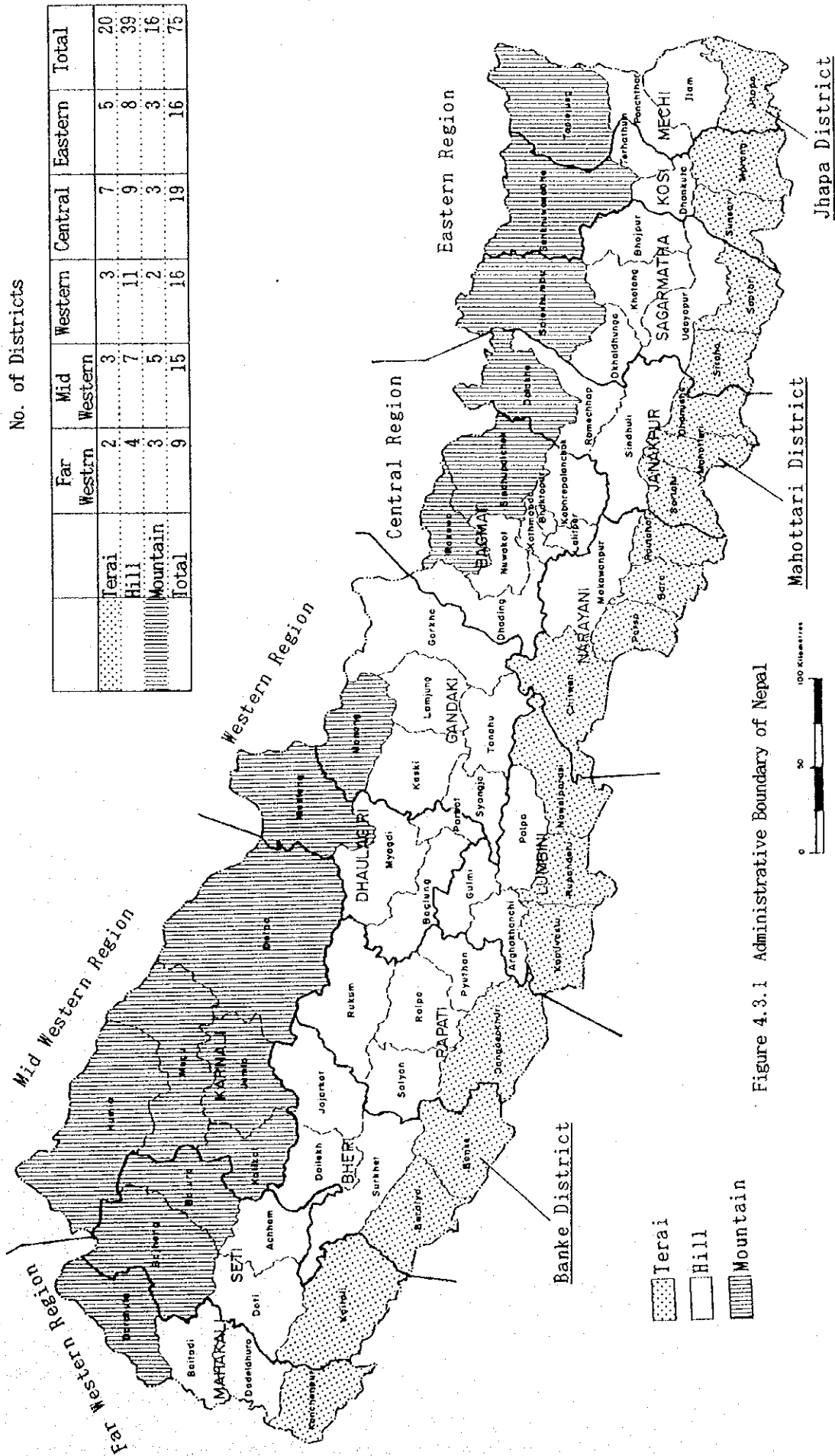


Figure 4.3.1 Administrative Boundary of Nepal

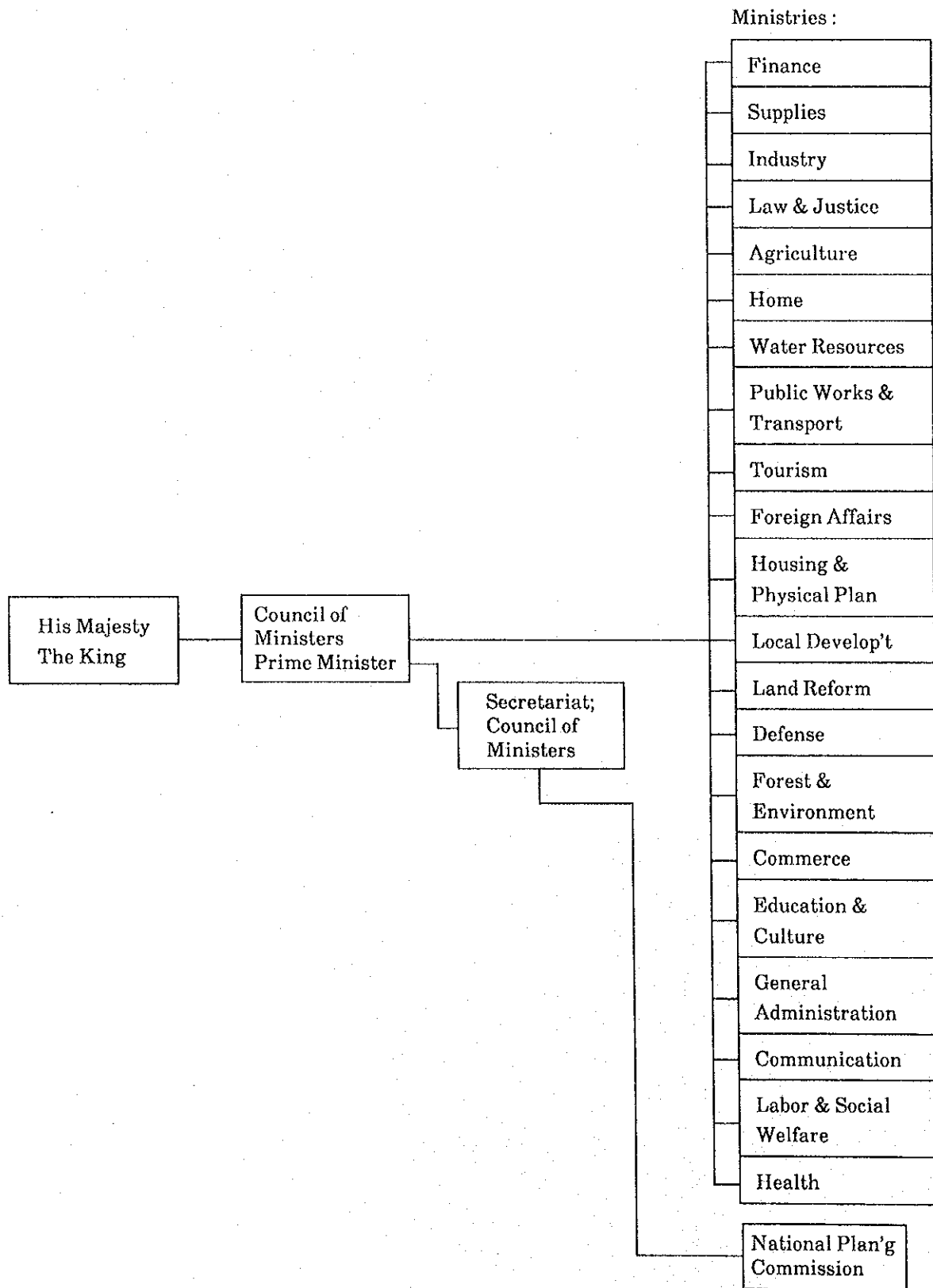
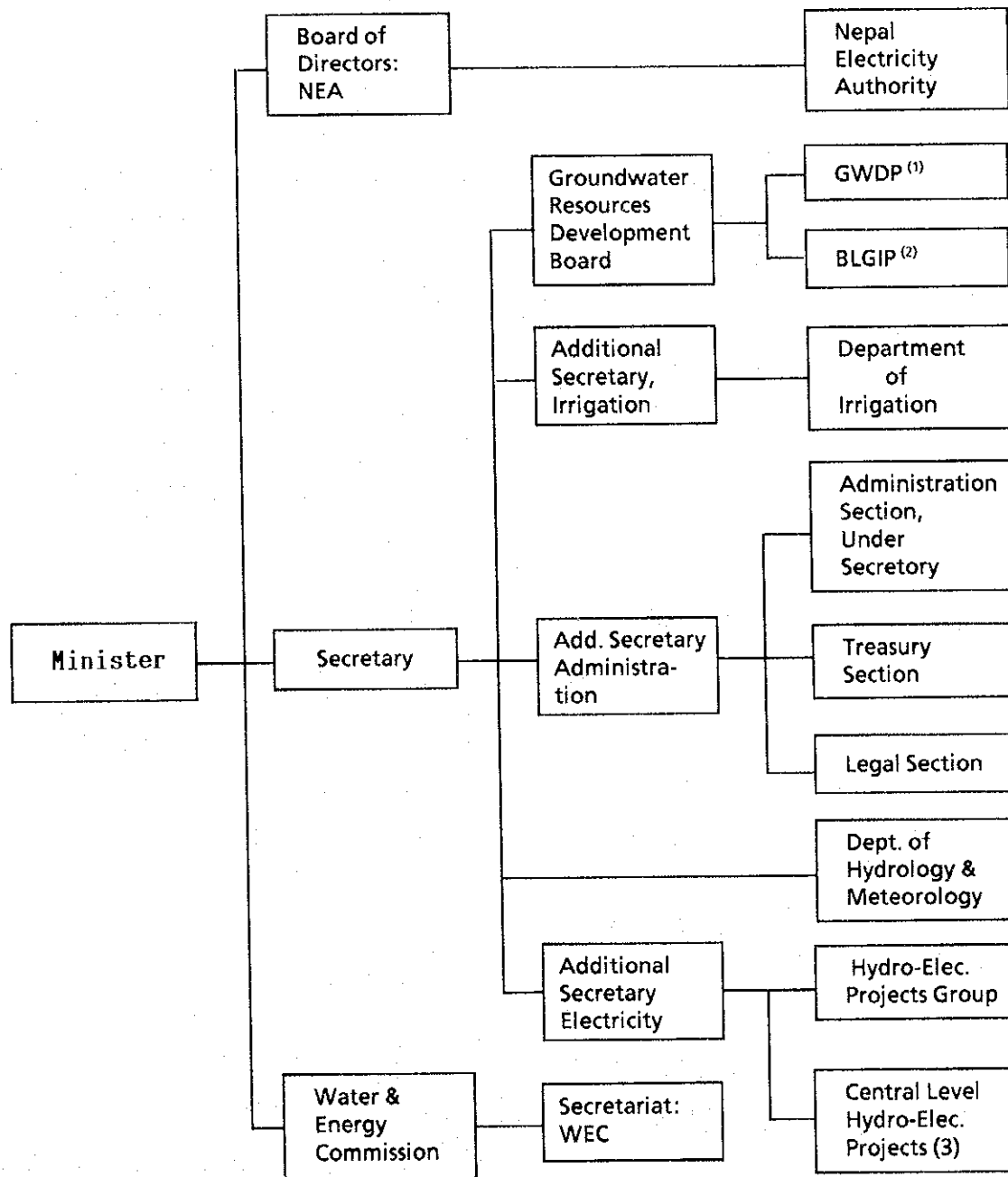
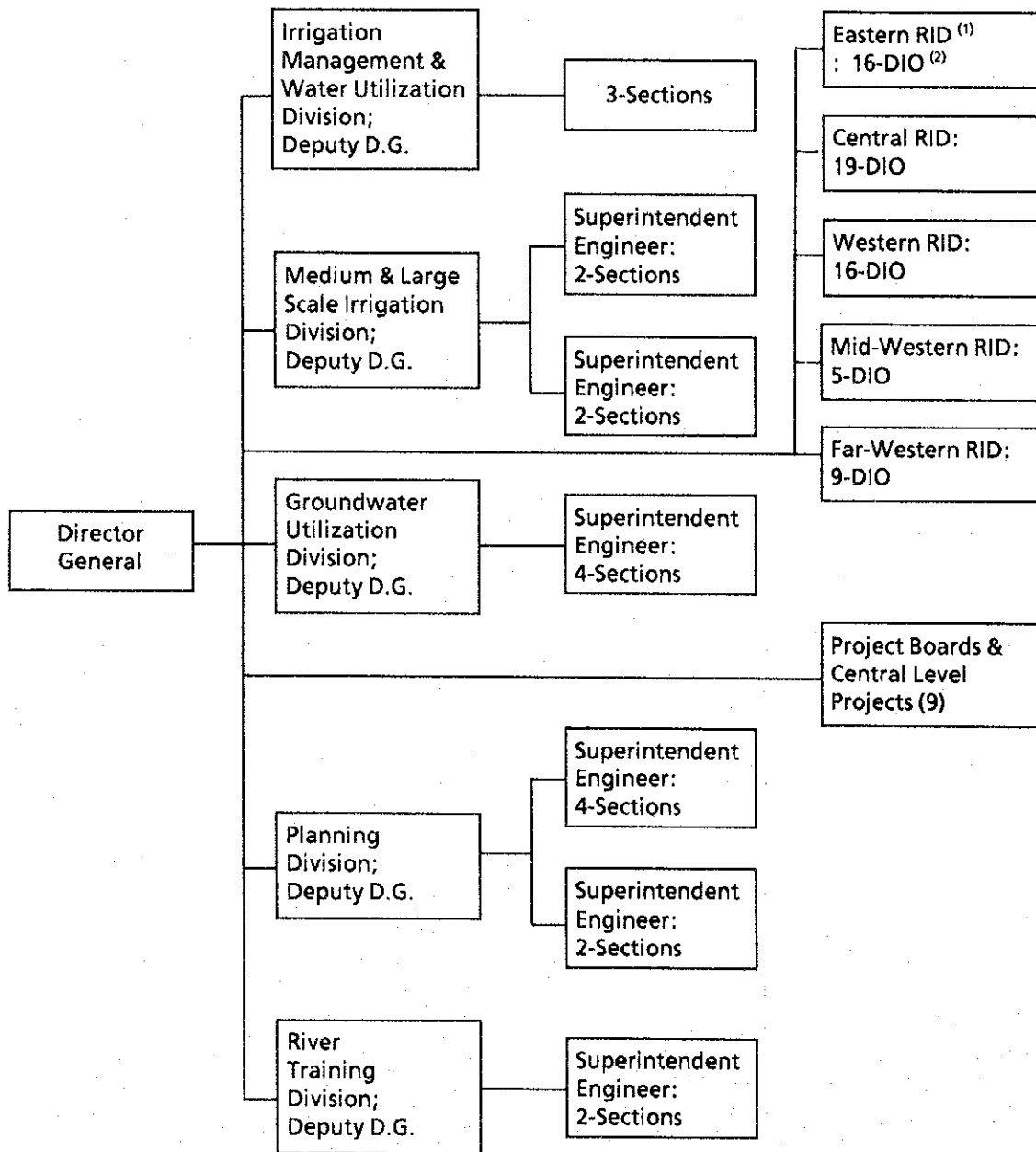


Figure 4.3.2 Organizational Chart of the Government (1991)



Notes: (1) Groundwater Development Project
 (2) Bhairawa Lumbini Groundwater Irrigation Project

Figure 4.3.3 Organizational Chart of the Ministry of Water Resources



Notes: (1) Regional Irrigation Directorate
 (2) District Irrigation Office

Figure 4.3.4 Organizational Chart of the Department of Irrigation

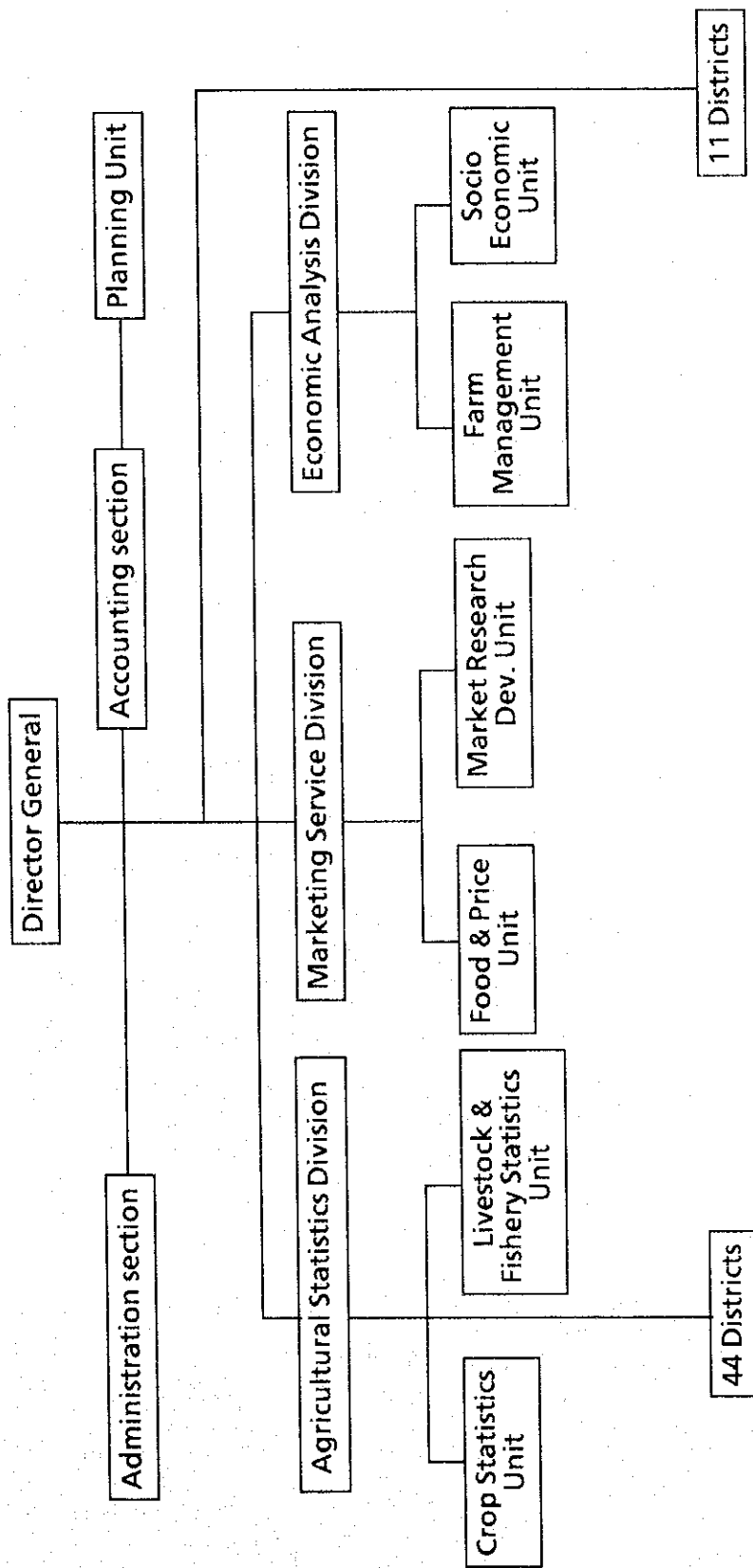


Figure 4.3.5 Organization Chart of DRAMS

Table 4.3.1 Population & Households Distribution

Region	Households	1981			Households	1991*		
		Total	Male	Female		Total	Male	Female
Nepal	2,585,194	15,022,839	7,695,336	7,329,503	3,345,052	18,462,081	9,220,914	9,241,167
Mountain Region	236,294	1,302,896	666,432	636,464	276,064	1,444,481	717,153	727,328
Hill Region	1,240,434	7,163,115	3,619,439	3,543,676	1,567,120	8,411,309	4,109,169	4,302,140
Terai Region	1,108,426	6,556,828	3,409,465	3,147,363	1,501,868	8,606,291	4,394,592	4,211,699

* Preliminary Results of Population Census 1991.

Source: Central Bureau of Statistics

Table 4.3.2 Distribution of Population by Ecological Zones

Content	Unit	Mountain	Hill	Mountain & Hill	Terai	Total
Population 1952/54	No.	-	-	(64.8) 5,349,988	(35.2) 2,906,637	8,256,625
1961	No.	-	-	(63.6) 5,991,297	(36.4) 3,421,699	9,412,996
1971	No.	(9.9) 1,138,616	(52.5) 6,071,407	(62.4) 7,210,017	(37.6) 4,345,966	11,555,983
1981	No.	(8.7) 1,302,896	(47.7) 7,163,115	(56.4) 8,466,011	(43.6) 6,556,828	15,022,839
1991	No.	(7.8) 1,444,481	(45.6) 8,411,309	(53.4) 9,855,790	(46.6) 8,606,291	18,462,081

Note: The figure in the parenthesis indicates the percentage.

Source: Central Bureau of Statistics.

Table 4.3.3 Economically Active Population 10 years of Age and Over Major Occupation (1991)

	Total	Prof/Tech. Workers	Administrative Workers	Clerical Workers	Sales Workers	Service Workers	Farm Fish Workers	Produ. Labour Workers	Others	Occupation not Stated
Nepal	7339586	130653	21942	77697	218496	453739	5952047	310414	153728	20870
	100.0	1.8	0.3	1.1	3.0	6.2	81.1	4.2	2.1	0.3
Jhapa	196009	4310	381	1809	12842	30516	129397	11044	5054	656
	100.0	2.2	0.2	0.9	6.6	15.6	66.0	5.6	2.6	0.3
Mahottari	126802	2691	177	1377	3751	11362	100440	4315	2483	206
	100.0	2.1	0.1	1.1	3.0	9.0	79.2	3.4	2.0	0.2
Banke	93052	1722	507	1785	5815	12016	62813	6599	1460	335
	100.0	1.9	0.5	1.9	6.2	12.9	67.5	7.1	1.6	0.4

Source: Statistical Yearbook of Nepal, 1993

Table 4.3.4(1) Trade Balance

Items	(in Million Rupees)									
	1982/83	1983/84	1984/85	1985/86R	1986/87R	1987/88R	1988/89R	1989/90R	1990/91R	1991/92P
Export. f.o.b.	1,132.0	1,703.9	2,740.6	3,078.0	2,991.4	4,114.6	4,195.3	5,156.2	7,387.5	13,939.4
(a) India	843.3	1,160.7	1,601.7	1,241.1	1,302.5	1,567.8	1,034.9	602.5	1,552.2	1,568.9
(b) Other countries	288.7	543.2	1,138.9	1,836.9	1,688.9	2,546.8	3,160.4	4,553.7	5,835.3	12,370.5
Imports. c.i.f.	6,314.0	6,514.3	7,742.1	9,341.2	10,905.4	13,869.6	16,263.7	18,324.9	23,226.5	32,951.3
(a) India	2,499.0	3,058.0	3,895.8	3,970.9	4,262.1	4,595.8	4,238.7	4,674.5	7,323.1	11,815.9
(b) Other countries	3,814.0	3,456.3	3,846.3	5,370.3	6,643.3	9,273.8	12,025.0	13,650.4	15,903.4	21,135.4
Trade Balance	-5,181.9	-4,810.4	-5,001.5	-6,263.2	-7,914.0	-9,755.0	-12,068.4	-13,168.7	-15,839.0	-19,011.9
(a) India	-1,656.4	-1,897.3	-2,294.1	-2,729.8	-2,959.6	-3,028.0	-3,203.8	-4,072.0	-5,770.9	-10,247.0
(b) Other countries	-3,525.5	-2,913.1	-2,707.4	-3,533.4	-4,954.4	-6,727.0	-8,864.6	-9,096.7	-10,068.1	-8,764.9

* customs based data (at basic exchange rate).

R: Revised.

P: Provisional

Source: Nepal Rastra Bank.

Table 4.3.4(2) Total Exports by Major Commodities

	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92
	Thousand Rupees						Million Rupees			
Food and Live Animals	327712	584138	992055	835625	703707	804433	577566	616	987	2096
Tobacco and Beverage	13316	5292	4988	246	3510	10110	6584	4	11	4
Crude Materials, Inedibles Except Fuels	336377	372697	486836	412870	491085	513692	249907	239	312	478
Mineral Fuels and Lubricants	698	3277	998	187	227	838	-	-	-	-
Animal and Vegetable Oils and Fats	42165	67607	57094	61263	117079	171364	100391	20	202	120
Chemicals and Drugs	1755	6301	1193	2470	2029	12617	25964	11	18	31
Manufactured Goods Classified Chiefly by Materials	357323	581620	609073	899941	1009561	1601635	1982622	2693	4312	7628
Machinery and Transport and Equipments	7886	24412	33694	38625	2573	487	5744	0	0	0
Miscellaneous Manufactured Articles	44639	57710	513445	826524	661470	996843	1246504	1573	1546	3582
Commodities and Transport not Classified According to Kind	148	839	1226	337	174	2478	15	-	-	-
Total	1132019	1703893	2700602	3078088	2991415	4114497	4195297	5156	7388	13939

Source: Nepal Rastra Bank

Table 4.3.4(3) Total Imports by Major Commodities

	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92
	Thousand Rupees					Million Rupees				
Food and Live Animals	924679	728419	782878	971079	1028917	1523673	1332595	1608	1821	3670
Tobacco and Beverage	62524	71744	79427	112919	143963	172207	197039	227	257	152
Crude Materials, Inedibles Except Fuels	206274	266171	424497	392950	657215	1036857	1182678	1571	2013	3751
Mineral Fuels and Lubricants	701875	749191	918799	1053995	929477	1049899	1116600	1516	2278	3685
Animal and Vegetable Oils and Fats	66326	78529	122725	101936	175868	352646	342729	476	742	801
Chemicals and Drugs	645983	698421	907960	1170246	1287590	1495352	1532585	2824	3051	4437
Manufactured Goods Classified Chiefly by Materials	936765	1801881	2376908	2759470	3226849	3359515	4671058	5065	5951	8751
Machinery and Transport and Equipments	1180956	1651227	1671436	2134654	2784078	4143737	4847059	3790	5991	5873
Miscellaneous Manufactured Articles	584257	466340	450631	637213	663951	729082	1036645	1248	1121	1657
Commodities and Transport not Classified According to Kind	4297	2428	6847	6703	7314	6959	726	1	2	175
Total	5313936	5514351	7742108	9341165	10905222	13869927	16259714	18325	23227	32952

Source: Nepal Rastra Bank

Table 4.3.4(4) Export of major Foods to India

(ton)

Year	Rice	Maize	Wheat Flour	Pulses	Dried Ginger	Ginger	Ghee
1981/1982	36503	15988			1067		624
1982/1983	2509	214			808		877
1983/1984	16670	2043			879		1085
1984/1985	55327	7810			1068		805
1985/1986	15130		2620	5591	1516	5549	960
1986/1987	2020		354	6359	1515	8082	888
1987/1988	8		51	18113	1122	8608	765
1988/1989	1	796	17	7383	1161	6501	690

Source: Marketing Services Division

Table 4.3.5 Projected Growth Rate by Sector (Eighth Plan)

(in millions of rupees at 1991/92 prices)

	1991/92		1996/97		Growth Rate 1992-97 (%)
	Amount (Rs.)	Share (%)	Amount (Rs.)	Share (%)	
Total Value Added	113,024	100.0	142,992	100.0	4.8
Agriculture, Irrigation & Forestry	62,712	55.5	75,364	52.7	3.7
Mon-agriculture	50,312	44.5	67,628	47.3	6.1
Industry and Mining	7,283	6.4	12,169	8.5	10.8
Electricity, Gas & Water	1,054	0.9	1,617	1.1	8.9
Construction	9,408	8.3	11,604	8.1	4.3
Trade, Hotel & Restaurant	5,995	5.3	8,685	6.1	7.7
Transport & Communication	6,878	6.1	8,548	6.0	4.4
Finance & Real Estate	9,321	8.3	11,735	8.2	4.7
Social Services	10,372	9.2	13,270	9.3	5.0
Indirect Tax	8,038		12,168		8.6
GDP (At Market Price)	121,062		155,160		5.1

Table 4.3.6 Agricultural Production Target for the Eighth Plan

Crop	Output			Targetted output increase rate per year (%)	Productivity (MT/Ha)	
	Unit	Base Year	1996/97		Base Year	1996/97
Food Grains	000 MT			5.4		
Paddy	-	3,392.0	4,452.0	5.5	2.350	2.850
Maize	-	1,168.0	1,476.0	4.7	1.570	1.930
Wheat	-	840.0	1,258.0	8.4	1.400	2.040
Millet	-	213.0	236.0	2.1	1.110	1.130
Buckwheat	-	23.0	32.0	6.8	0.540	0.640
Barley	-	27.0	32.0	3.4	0.930	1.140
Pulse Crops	-	124.0	186.0	8.4	0.600	0.820
Cash Crops				9.1		
Oilseeds (including peanut)	-	108.0	174.0	10.0	0.647	0.906
Sugarcane	-	1,106.0	1,530.0	6.7	33.560	38.250
Tobacco	-	6.3	9.5	8.8	0.854	0.990
Jute Fibre	-	16.4	25.0	8.8	1.215	1.400
Horticulture				5.4		
Citrus	-	86.0	128.0	8.3	9.520	9.820
Other Fruits	-	416.0	507.0	4.0	9.940	10.290
Vegetable	-	1,075.0	1,278.0	3.5	7.090	9.100
Potato	-	738.0	1,033.0	7.0	8.680	10.760
Livestock Development				3.8		
Milk	-	865.0	1,028.0	3.5		
Eggs	000 Nos	369,519.0	479,791.0	5.4		
Meat	000 MT	147.0	173.0	3.3		
Wool	MT	767.0	814.0	1.2		
Fish	MT	12,656.0	22,311.0	12.0		
Miscellaneous						
Tea	000 MT	1.5	2.5	10.7	0.545	0.645
Cotton	000 MT	1.7	7.1			
Silk(cocoon)	MT	30.0	400.0			
Mushroom	MT	56.0	300.0			
Ginger	000 MT	19.5	32.5			
Cardamom	MT	3,002.0	3,540.0			
Coffee	MT		153.0			

Table 4.3.7 Irrigation Policies for the Eighth Plan(1992)

- Government agencies will be actively involved in the implementation of multi-purposes, large and medium scale projects;
- Small irrigation projects will be implemented with the participation of user's groups;
- Arrangement will be made to jointly manage and where appropriate turn-over government constructed irrigation projects to user's group
- User's group will be involved in every stage, from appraisal to implementation of irrigation projects;
- The dependency on lift irrigation and imported fuel will be reduced; substantial expansion will be made to sprinkler method of irrigation in hilly areas;
- Completed project feasibility study reports will be forwarded to district irrigation offices for execution, and list of reports will be provided to the district development committee and user's groups;
- Additional investment for uncompleted and high cost projects will be made only after reappraisal.

Table 4.3.8 Land Use by Ecological Belt

Category	Mountain		Hills		Terai		Total	
	(000 ha.)	Percent	(000 ha.)	Percent	(000 ha.)	Percent	(000 ha.)	Percent
Cultivated	252.2	4	1,481.3	23.4	1,234.6	58.5	2,986.1	20.1
Grazing	1,394.1	22.1	313.3	4.9	49.7	2.4	1,757.1	11.9
Forest	1,786.7	28.3	3,238.8	51.2	591.3	28	5,156.9	38.1
Shrub	247.9	3.9	440.6	7	1.4	0.1	609.9	4.7
Non-cultivated inclusions	149.1	2.4	720.7	11.4	117.1	5.6	986.9	6.7
Others	2,478.6	39.3	134.9	2.1	116.1	5.5	2,729.6	18.5
Total	6,308.6	100	6,329.6	100	2,110.2	100.1	14,748.4	100

Source: Land Resources Mapping Projects, LRMP.

Figure 4.3.9 Present Irrigation Status of Nepal

Region	(unit:ha)			Total Irrigated	100.0
	Monsoon Irrigated	Year Round Irrigated	Total Irrigated		
E. Mountain	9,913	4,023	13,936		
E. Hills	40,001	22,315	62,317		
E. Terai	129,349	45,223	174,572		
E. Region	179,263	71,561	250,826		
C. Mountain	10,928	6,641	17,569		
C. Hills	39,921	36,965	76,885		
C. Terai	119,719	106,908	226,626		
C. Region	170,568	150,514	321,080		
W. Mountain	0	0	0		
W. Hills	41,197	27,350	68,546		
W. Terai	70,100	39,285	109,385		
W. Region	111,297	66,635	177,931		
MW. Mountain	4,083	3,623	7,705		
MW. Hills	18,655	16,444	35,098		
MW. Terai	35,880	10,088	45,968		
MW. Region	58,618	30,155	88,771		
FW. Mountain	6,382	7,072	13,453		
FW. Hills	16,298	20,614	36,913		
FW. Terai	34,701	17,624	52,325		
FW. Region	57,381	45,310	102,691		
Nepal	577,127	364,175	941,299	100.0	
Terai	389,749	219,128	608,876	64.7	
Mountain	31,306	21,359	52,663	5.6	
Hills	156,072	123,688	279,759	29.7	
E. Region	179,263	71,561	250,825	26.6	
C. Region	170,568	150,514	321,080	34.2	
W. Region	111,297	66,635	177,931	18.9	
MW. Region	58,618	30,155	88,771	9.4	
FW. Region	57,381	45,310	102,691	10.9	

Source: Agricultural Statistics of Nepal, 1990

Table 4.3.10 Food Balance of Nepal

		(ton)				
Crops		1986/87	1987/88	1988/89	1989/90	1990/91
Rice	Production	1256383	1606965	1771671	1831713	1892105
	Requirement	1402380	1435892	1426697		
	Balance	-145997	171073	344974		
Maize	Production	664595	689576	835600	857846	877075
	Requirement	663840	663381	789229		
	Balance	755	26195	46371		
Wheat	Production	548744	580184	653038	667972	651956
	Requirement	467150	497727	548028		
	Balance	81594	82457	105010		
Millet	Production	112356	122592	149851	184546	190177
	Requirement	112356	122592	149851		
	Balance	0	0	0		
Barley	Production	6742	6622	7409	7510	7642
	Requirement	6742	6622	7409		
	Balance	0	0	0		
Total	Production	2588820	3005939	3417569	3549587	3618955
	Requirement	2652468	2726214	2921214	3559011	3486776
	Balance	-63648	279725	496355	-9424	132179

Source: Statistical Yearbook of Nepal, 1993

Table 4.3.11(1)
 AREA, PRODUCTION AND YIELD OF PADDY BY ECOLOGICAL BELT
 (Area in Hectare, Production in Metric Ton and Yield in Kg. per Hectare)

YEAR	MOUNTAIN			HILLS			TERAI			NEPAL		
	AREA	PROD.	YIELD	AREA	PROD.	YIELD	AREA	PROD.	YIELD	AREA	PROD.	YIELD
1984/85	31,010	53,310	1.719	295,720	594,460	2.010	1,050,130	2,061,660	1.963	1,376,860	2,709,430	1.968
1985/86	34,540	61,150	1.770	310,220	587,850	1.895	1,046,280	2,155,490	2.060	1,391,040	2,804,490	2.016
1986/87	35,420	59,770	1.687	313,910	581,170	1.851	984,030	1,731,080	1.759	1,333,360	2,372,020	1.779
1987/88	35,500	65,300	1.839	337,890	667,390	1.975	1,049,900	2,249,090	2.142	1,423,290	2,981,780	2.095
1988/89	38,200	73,940	1.936	345,890	764,630	2.211	1,066,380	2,444,640	2.292	1,450,470	3,283,210	2.264
1989/90	41,350	82,510	1.995	335,410	771,690	2.301	1,056,090	2,535,470	2.401	1,432,850	3,389,670	2.366
1990/91	39,900	84,160	2.109	346,110	823,200	2.378	1,069,160	2,594,800	2.427	1,455,170	3,502,160	2.407
1991/92	40,430	79,940	1.977	341,380	764,840	2.240	1,030,000	2,377,760	2.309	1,411,810	3,222,540	2.283
1992/93	39,970	72,780	1.821	337,320	671,500	1.991	884,820	1,840,620	2.080	1,262,110	2,584,900	2.048

Table 4.3.11(2)
 AREA, PRODUCTION AND YIELD OF MAIZE BY ECOLOGICAL BELT
 (Area in Hectare, Production in Metric Ton and Yield in Kg. per Hectare)

YEAR	MOUNTAIN			HILLS			TERAI			NEPAL		
	AREA	PROD.	YIELD	AREA	PROD.	YIELD	AREA	PROD.	YIELD	AREA	PROD.	YIELD
1984/85	47,350	74,910	1.582	402,180	541,140	1.346	129,190	203,800	1.578	578,720	819,850	1.417
1985/86	47,780	70,170	1.469	432,650	591,940	1.368	134,250	211,640	1.576	614,680	873,750	1.421
1986/87	49,170	73,770	1.500	439,200	579,430	1.319	138,340	215,150	1.555	626,710	868,350	1.386
1987/88	53,380	72,310	1.355	482,940	621,480	1.287	137,490	207,710	1.511	673,810	901,500	1.338
1988/89	52,190	73,400	1.406	522,030	749,180	1.435	147,650	249,030	1.687	721,870	1,071,610	1.484
1989/90	59,740	83,970	1.406	532,790	827,380	1.553	158,640	289,640	1.826	751,170	1,200,990	1.599
1990/91	58,550	88,300	1.508	537,320	846,290	1.575	161,840	296,360	1.831	757,710	1,230,950	1.625
1991/92	57,700	86,690	1.502	535,800	826,000	1.542	160,590	292,020	1.818	754,090	1,204,710	1.598
1992/93	59,950	90,370	1.507	546,870	874,690	1.599	168,400	325,440	1.933	775,220	1,290,500	1.665

Table 4.3.11 (3)
 AREA, PRODUCTION AND YIELD OF MILLET BY ECOLOGICAL BELT
 (Area in Hectare, Production in Metric Ton and Yield in Kg. per Hectare)

YEAR	MOUNTAIN			HILLS			TERAI			NEPAL		
	AREA	PROD.	YIELD	AREA	PROD.	YIELD	AREA	PROD.	YIELD	AREA	PROD.	YIELD
1984/85	21,710	20,510	945	101,930	93,470	917	10,730	10,450	974	134,370	124,430	926
1985/86	22,570	21,230	941	116,930	106,240	909	11,550	10,470	906	151,050	137,940	913
1986/87	21,930	20,740	946	117,670	106,700	907	11,180	10,150	908	150,780	137,590	913
1987/88	23,510	21,840	929	127,920	115,890	906	13,340	12,400	930	164,770	150,130	911
1988/89	22,310	21,620	969	148,520	149,500	1,007	11,730	11,970	1,020	182,560	183,090	1,003
1989/90	24,480	26,920	1,100	156,790	184,670	1,178	12,220	13,190	1,079	193,490	224,780	1,162
1990/91	25,080	27,750	1,106	160,780	189,950	1,181	12,710	13,930	1,096	198,570	231,630	1,166
1991/92	25,120	27,470	1,094	160,100	187,450	1,171	13,020	13,740	1,055	198,240	228,660	1,153
1992/93	25,740	28,090	1,091	162,370	194,320	1,197	13,660	14,340	1,050	201,770	236,750	1,173

Table 4.3.11 (4)
 AREA, PRODUCTION AND YIELD OF WHEAT BY ECOLOGICAL BELT
 (Area in Hectare, Production in Metric Ton and Yield in Kg. per Hectare)

YEAR	MOUNTAIN			HILLS			TERAI			NEPAL		
	AREA	PROD.	YIELD	AREA	PROD.	YIELD	AREA	PROD.	YIELD	AREA	PROD.	YIELD
1984/85	23,120	21,950	949	163,260	176,060	1,078	265,510	335,710	1,264	451,890	533,720	1,181
1985/86	34,930	29,260	838	189,060	206,450	1,092	258,830	362,290	1,400	482,820	598,000	1,239
1986/87	35,760	31,820	890	207,010	238,860	1,154	292,760	430,360	1,470	535,530	701,040	1,309
1987/88	40,610	38,740	954	242,860	272,110	1,120	313,280	433,750	1,385	596,750	744,600	1,248
1988/89	42,020	43,140	1,027	243,010	293,060	1,206	314,260	493,850	1,571	599,290	830,050	1,385
1989/90	42,340	44,360	1,048	244,990	303,480	1,239	316,910	507,120	1,600	604,240	854,960	1,415
1990/91	42,210	44,870	1,063	242,270	301,080	1,242	308,260	490,020	1,589	592,740	835,970	1,410
1991/92	42,100	44,550	1,058	239,980	272,120	1,134	289,180	445,290	1,540	571,260	761,960	1,334
1992/93	39,200	42,010	1,072	241,140	290,270	1,204	333,640	432,720	1,297	613,980	765,000	1,246

Table 4.3.11(5)
 AREA, PRODUCTION AND YIELD OF BARLEY BY ECOLOGICAL BELT
 (Area in Hectare, Production in Metric Ton and Yield in Kg. per Hectare)

YEAR	MOUNTAIN			HILLS			TERAI			NEPAL		
	AREA	PROD.	YIELD	AREA	PROD.	YIELD	AREA	PROD.	YIELD	AREA	PROD.	YIELD
1984/85	9,980	8,590	861	13,170	11,070	841	4,240	3,800	896	27,390	23,460	857
1985/86	10,760	8,680	807	15,120	11,730	776	3,440	3,020	878	29,320	23,430	799
1986/87	10,650	9,000	845	14,350	12,390	863	3,560	3,280	921	28,550	24,670	864
1987/88	11,130	9,380	843	14,500	11,860	818	3,480	3,050	876	29,110	24,290	834
1988/89	10,810	10,060	931	15,290	13,790	902	3,350	3,170	946	29,450	27,020	917
1989/90	10,850	10,120	933	15,310	14,030	916	3,380	3,240	959	29,540	27,390	927
1990/91	10,830	10,150	937	15,390	14,410	936	3,390	3,280	968	29,610	27,840	940
1991/92	10,910	10,190	934	15,410	14,250	925	3,340	3,200	958	29,660	27,640	932
1992/93	11,090	10,390	937	15,430	14,360	931	3,160	2,860	905	29,680	27,610	930

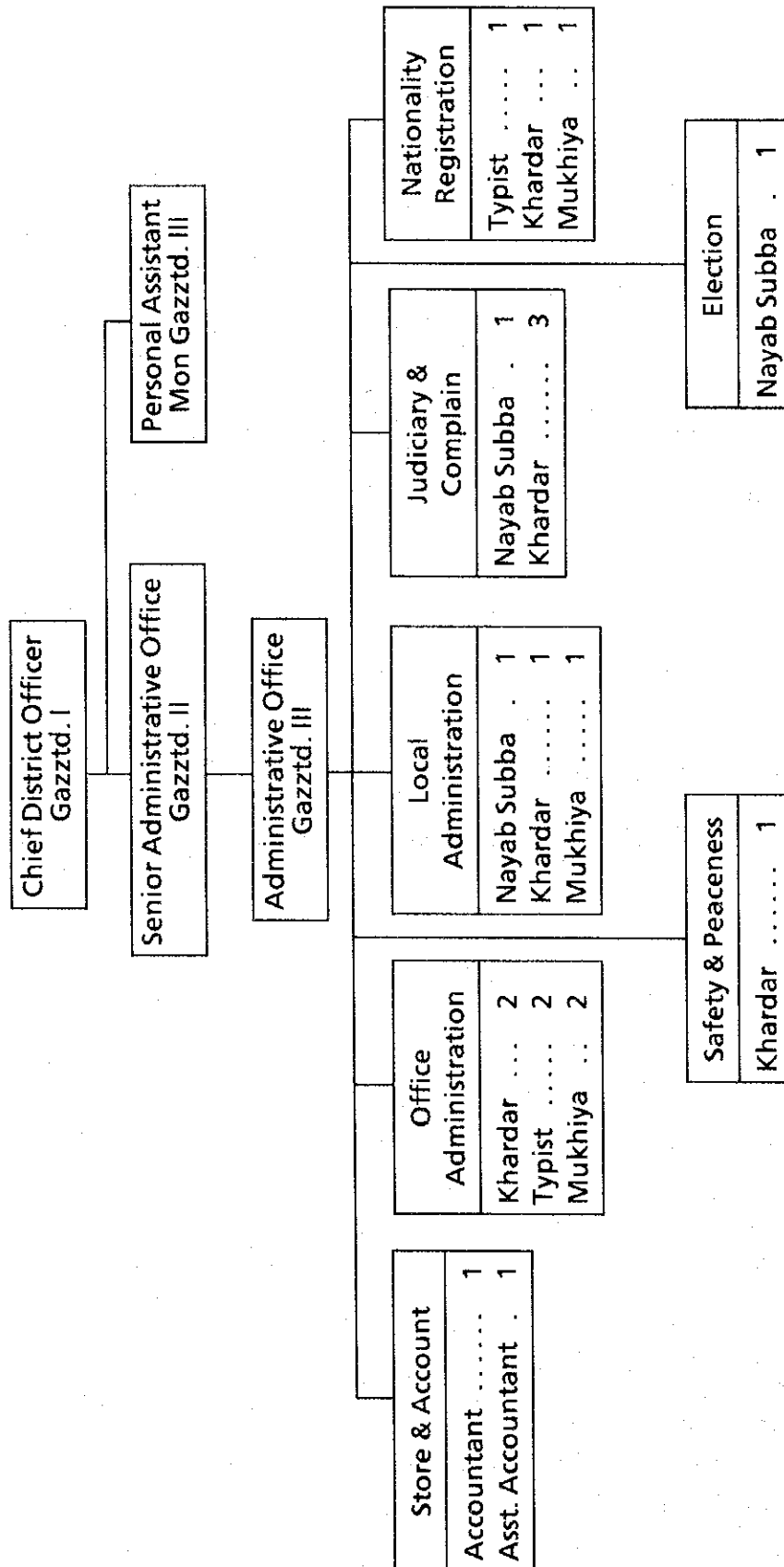


Figure 4.3.6 Organizational Chart of District Administration Office, Jhapa

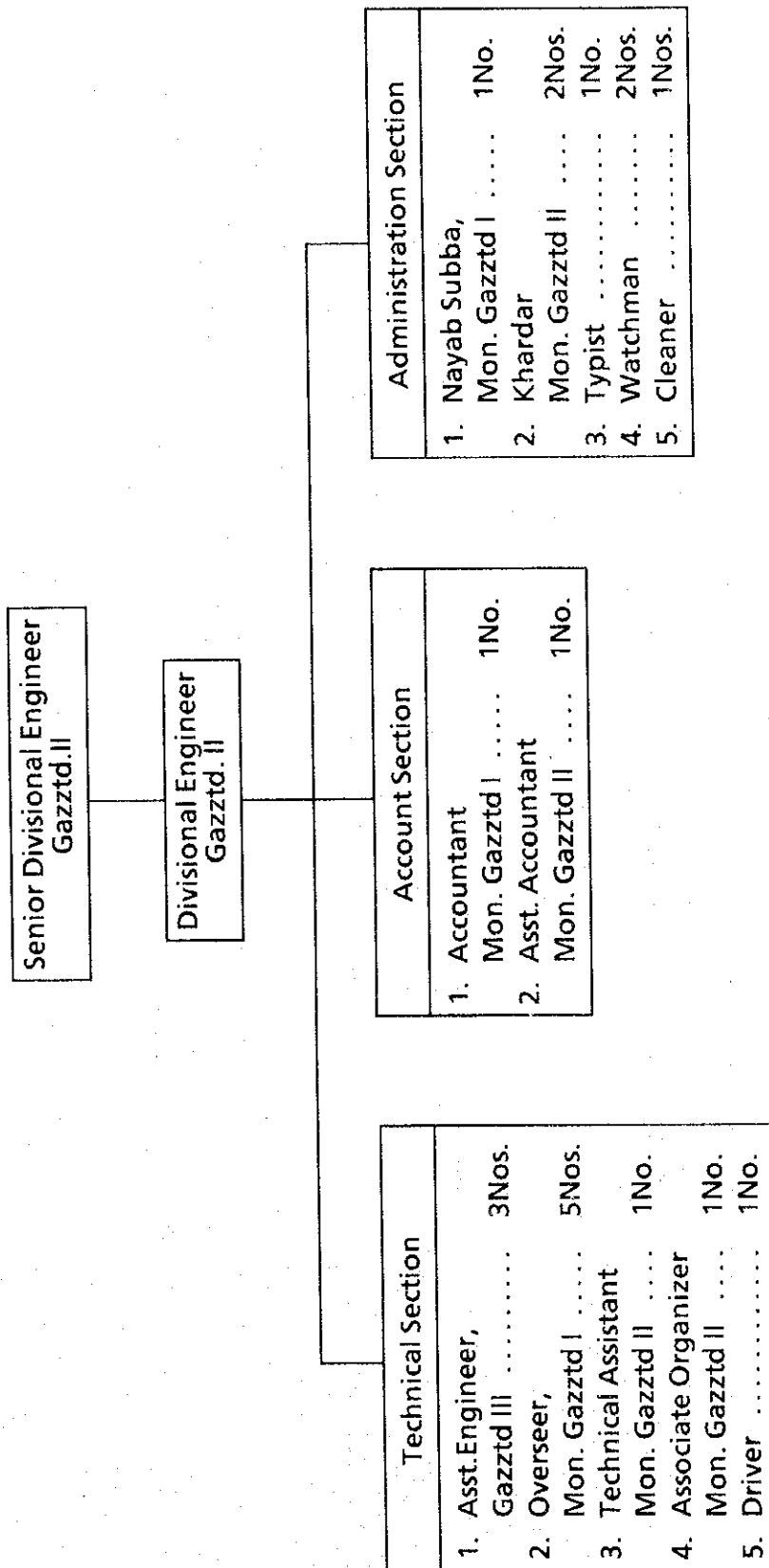
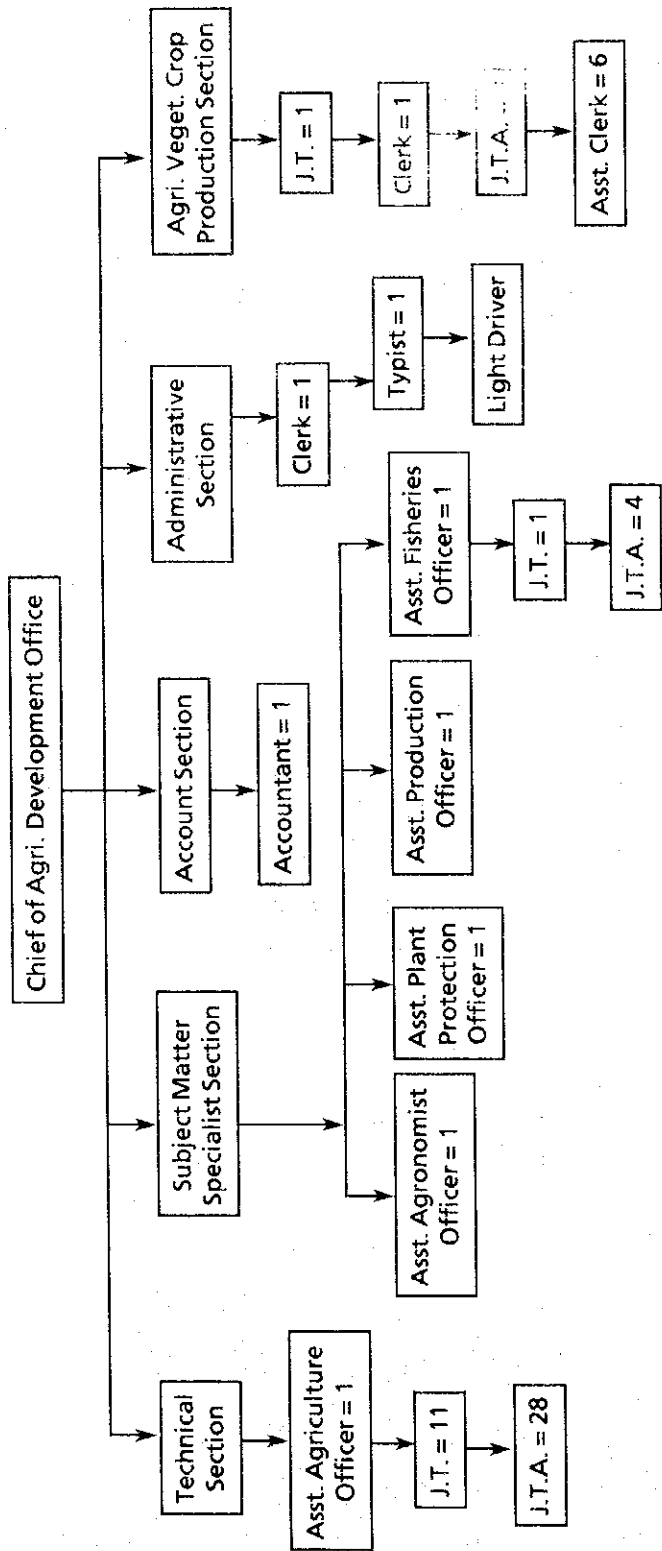


Figure 4.3.7 Organization Chart of District Irrigation Office, Jhapa



JT : Junior Technician
 JTA : Assistant Junior Tech.

Figure 4.3.8 Agricultural Development Office, Mahottari

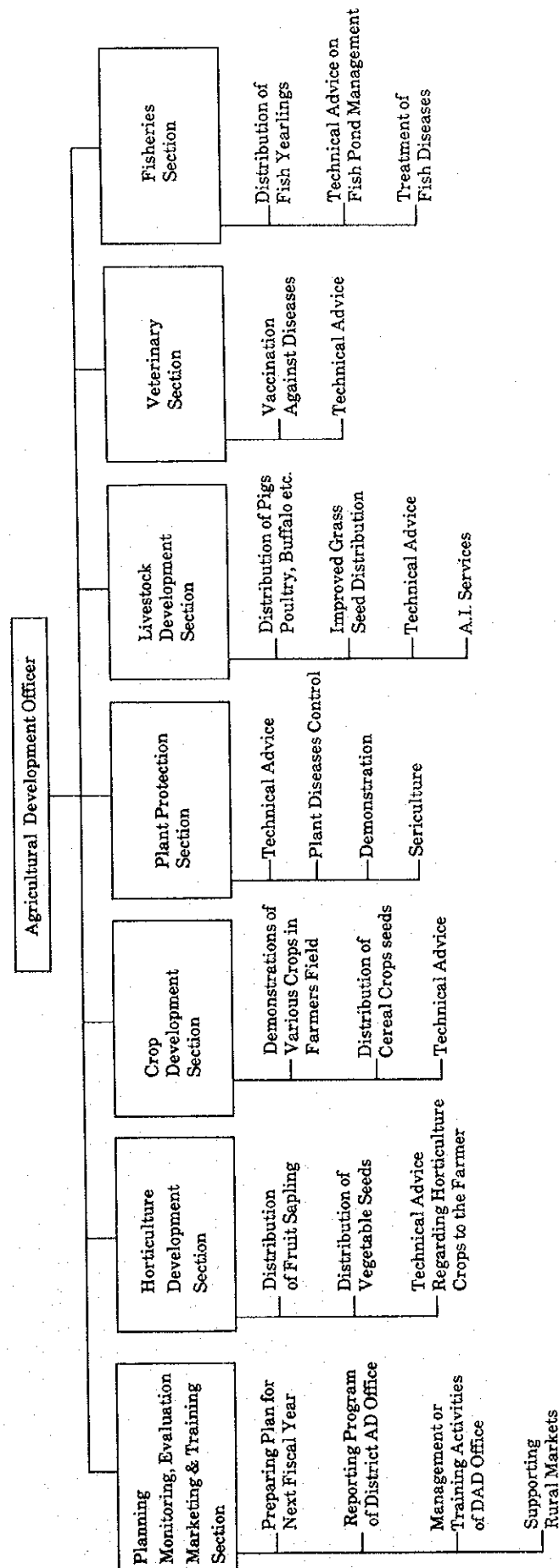


Figure 4.3.9 Agricultural Development Office, Banke

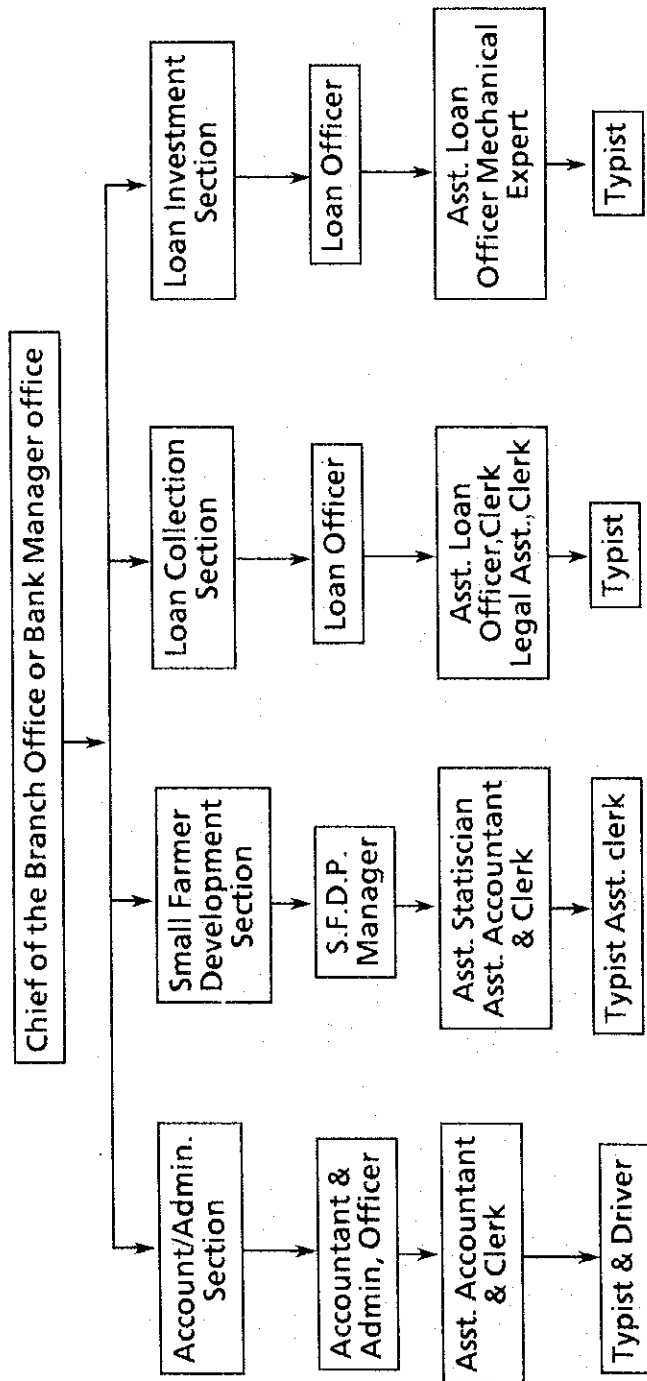


Figure 4.3.10 ADBN Branch Office, Jhapa

Table 4.3.12 Agricultural Production in Jhapa District

Crop	1987/88			1988/89			1989/90			1990/91			1991/92			1992/93			
	Area (ha)	Production (ton)	Yield (ton/ha)	Area (ha)	Production (ton)	Yield (ton/ha)	Area (ha)	Production (ton)	Yield (ton/ha)	Area (ha)	Production (ton)	Yield (ton/ha)	Area (ha)	Production (ton)	Yield (ton/ha)	Area (ha)	Production (ton)	Yield (ton/ha)	
Paddy	85240	157800	1.97	86890	216770	2.49	91870	234550	2.55	89550	206900	2.34	88710	252290	2.84	80730	202630	2.51	2.45
Maize	7620	8790	1.15	10820	16000	1.48	10500	12830	1.22	10500	13330	1.27	10500	13590	1.29	13310	18630	1.40	1.31
Wheat	10200	15810	1.55	9180	14230	1.55	9200	14720	1.60	8250	13590	1.65	8110	13390	1.65	8500	13090	1.54	1.59
Millet	2350	1880	0.80	1260	1260	1.00	1200	1290	1.08	2000	2150	1.08	2000	2160	1.08	2010	2190	1.09	1.01
Barley	20	20	1.00	10	10	1.00	10	10	1.00	20	20	1.00	20	20	0.67	20	20	1.00	0.91
Oilseed	2640	1590	0.60	2770	1700	0.61	2750	1690	0.61	2800	1720	0.61	2950	1750	0.59	2990	1790	0.60	0.61
Potato	1100	9350	8.50	1050	9450	9.00	1100	9560	8.69	1100	9560	8.69	1120	9730	8.69	1200	12960	10.80	9.09
Tobacco	530	380	0.72	830	570	0.69	840	680	0.81	840	710	0.85	800	700	0.88	830	730	0.88	0.81
Sugarcane	150	3600	24.00	120	2880	24.00	200	5000	25.00	200	5000	25.00	210	5040	24.00	220	5500	25.00	24.56
Lentil				50	50	1.00	30	30	1.00	150	150	1.00	150	170	0.61	390	210	0.54	0.60
Chick Pea				50	40	0.80	80	60	0.75	120	70	0.58	130	80	0.62	120	70	0.58	0.64
Pigeon Pea				100	140	1.40	40	40	1.00	90	60	0.67	100	70	0.70	240	180	0.75	0.86
Black Gram				250	300	1.20	470	270	0.57	410	240	0.59	400	200	0.50	380	220	0.58	0.54
Grass Pea				100	150	1.50	100	70	0.70	140	80	0.57	130	60	0.46	130	70	0.54	0.72
Horse Gram				30	20	0.67	50	40	0.80	20	10	0.50	20	10	0.50	30	10	0.33	0.60
Soyabean				50	50	1.00	110	70	0.64	60	30	0.50	40	20	0.50	70	40	0.57	0.64
Other Pulses				250	150	0.60	160	90	0.56	200	120	0.60	170	90	0.53	160	90	0.56	0.57
Total Pulses				880	900	1.02	1040	670	0.64	1200	700	0.58	1270	700	0.55	1520	890	0.59	0.65
Jute	5810	6954	1.20	5093	5653	1.11	3580	3508	0.98	1000	910	0.91	1100	990	0.90				1.09
Vegetables	1700	11200	6.59	1900	12670	6.67	2100	14649	6.98	2185	7880	3.61	3000	20820	6.94				6.18
Mango	174	NA	NA	176	NA	NA	180	NA	NA	190	NA	NA	200	NA	NA				
Lichi	85	NA	NA	75	NA	NA	50	NA	NA	40	NA	NA	20	NA	NA				
Banana	153	NA	NA	125	NA	NA	70	NA	NA	70	NA	NA	50	NA	NA				
Lemon	4	NA	NA	5	NA	NA	5	NA	NA	5	NA	NA	6	NA	NA				
Coconut	10	NA	NA	22	NA	NA	63	NA	NA	100	NA	NA	125	NA	NA				
Nut	84	NA	NA	85	NA	NA	87	NA	NA	89	NA	NA	94	NA	NA				
Papaya	4	NA	NA	6	NA	NA	6	NA	NA	7	NA	NA	9	NA	NA				
Pineapple	6	NA	NA	6	NA	NA	5	NA	NA	3	NA	NA	1	NA	NA				

Source: Agricultural Statistics of Nepal
 Statistical Yearbook of Nepal, 1993
 ADO, Jhapa

Table 4.3.13 Agricultural Production in Mahottari District

Crop	1987/88			1988/89			1989/90			1990/91			1991/92			1992/93			Average Yield (ton/ha)
	Area (ha)	Production (ton)	Yield (ton/ha)	Area (ha)	Production (ton)	Yield (ton/ha)	Area (ha)	Production (ton)	Yield (ton/ha)	Area (ha)	Production (ton)	Yield (ton/ha)	Area (ha)	Production (ton)	Yield (ton/ha)	Area (ha)	Production (ton)	Yield (ton/ha)	
Paddy	46550	96030	2.06	50330	111350	2.21	48910	105200	2.24	48490	111220	2.29	46550	98990	2.13	32590	52140	1.60	2.12
Maize	2670	4430	1.66	2700	5220	1.93	3070	6090	1.98	3080	5460	2.10	3280	6460	1.97	4100	8200	2.00	1.95
Wheat	16380	21290	1.30	17050	27260	1.60	17090	29060	1.70	16870	28680	1.70	16280	27190	1.67	24090	26510	1.10	1.48
Millet	1150	1000	0.87	1200	1190	0.99	1460	1570	1.08	1830	1960	1.07	1800	1940	1.08	1830	1960	1.07	1.04
Barley	290	200	0.69	200	190	0.95	260	250	0.96	270	250	0.93	280	250	0.89	270	220	0.81	0.87
Dillseed	1400	780	0.56	1540	920	0.60	1400	850	0.61	1010	570	0.56	1120	560	0.50	4630	2360	0.51	0.54
Potato	630	4410	7.00	830	5670	9.00	720	6740	9.36	660	7750	11.74	650	7910	12.17	740	8140	11.00	10.08
Tobacco	1450	1020	0.70	1550	1240	0.80	1570	1540	0.98	1400	1370	0.98	1400	1250	0.89	1400	1200	0.86	0.87
Sugarcane	700	17500	25.00	1210	39930	33.00	1240	40920	33.00	1400	46200	33.00	1400	49000	35.00	1210	43610	36.04	33.12
Lentil				3400	1750	0.51	5080	3330	0.66	4800	2870	0.60	5180	3180	0.61	6780	4130	0.61	0.60
Chick Pea				1160	680	0.59	990	600	0.61	880	480	0.55	940	650	0.69	920	510	0.55	0.60
Pigeon Pea				1720	1190	0.69	1440	960	0.67	1350	810	0.60	1330	780	0.59	3070	2150	0.70	0.66
Black Gram				150	80	0.53	70	40	0.57	50	20	0.40	40	20	0.50	50	20	0.40	0.50
Brass Pea				3000	1500	0.50	5650	3350	0.59	4850	2430	0.50	4670	2220	0.48	4760	2270	0.48	0.51
Horse Gram				500	250	0.50	810	330	0.41	650	330	0.51	630	300	0.48	600	310	0.52	0.48
Soyabean				30	10	0.33	30	20	0.67	40	20	0.50	30	20	0.67	50	30	0.60	0.56
Other Pulses				220	120	0.55	350	230	0.66	280	150	0.54	240	120	0.50	220	120	0.55	0.61
Total Pulses				10180	5580	0.55	14420	8920	0.62	12900	7110	0.55	13060	7230	0.56	16450	9540	0.58	0.57
Mute																			
Cabbage	60	600	10.00	65	650	10.00	70	700	10.00	75	750	10.00	80	800	10.00				10.00
Cauliflower	120	1200	10.00	125	1250	10.00	130	1300	10.00	135	1350	10.00	140	1400	10.00				10.00
Ginger																			
Tomato	60	1200	20.00	65	1300	20.00	68	1360	20.00	70	1400	20.00	75	1500	20.00				20.00
Radish	90	1800	20.00	92	1840	20.00	95	1900	20.00	98	1960	20.00	100	2000	20.00				20.00
Onion	50	500	10.00	52	520	10.00	55	550	10.00	58	580	10.00	60	600	10.00				10.00
Eggplant	150	3000	20.00	153	3060	20.00	155	3100	20.00	158	3160	20.00	160	3200	20.00				20.00
Chilly	50	400	8.00	52	416	8.00	55	440	8.00	57	456	8.00	58	464	8.00				8.00
Okra	20	200	10.00	22	220	10.00	24	240	10.00	26	260	10.00	28	280	10.00				10.00
Mustard	20	300	15.00	22	330	15.00	25	375	15.00	28	420	15.00	30	450	15.00				15.00
Mango	1300			1330			1360			1400			1430						
Banana	250			255			260			265			270						
Chick	200			205			208			210			215						

Table 4.3.14 Agricultural Production in Banke District

Crop	1987/88			1988/89			1989/90			1990/91			1991/92			1992/93			Average Yield (ton/ha)	
	Area (ha)	Production (ton)	Yield (ton/ha)	Area (ha)	Production (ton)	Yield (ton/ha)	Area (ha)	Production (ton)	Yield (ton/ha)	Area (ha)	Production (ton)	Yield (ton/ha)	Area (ha)	Production (ton)	Yield (ton/ha)	Area (ha)	Production (ton)	Yield (ton/ha)		
Paddy	28540	57080	2.00	32200	70840	2.20	32250	74180	2.30	32250	81400	2.52	23540	18380	0.80	25800	36120	1.40	1.94	
Maize	4860	3610	0.74	9550	11070	1.16	10000	17390	1.74	10090	17410	1.74	10200	17340	1.70	9860	20710	2.10	1.61	
Wheat	14000	20300	1.45	16090	20280	1.26	13900	20850	1.50	13510	20260	1.50	8780	12150	1.38	8000	10400	1.30	1.40	
Millet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barley	50	50	1.00	40	40	1.00	50	50	1.00	60	60	1.00	40	40	1.00	20	20	1.00	1.00	
Mustard	4840	2660	0.55	4910	2950	0.60	4900	2950	0.60	4740	2410	0.51	4700	2370	0.50	4900	2430	0.51	0.55	
Potato	500	5000	10.00	550	6600	12.00	420	5350	12.74	390	5520	14.15	390	4680	12.00	400	4600	11.50	11.98	
Tobacco	70	50	0.71	50	30	0.60	60	40	0.67	60	50	0.83	50	40	0.80	50	40	0.80	0.74	
Sugarcane	150	3150	21.00	130	3250	25.00	130	2700	20.77	140	2910	20.79	140	3910	27.93	150	4270	28.47	24.04	
Lentil	-	-	-	4090	2330	0.57	3850	2330	0.61	3950	3160	0.80	4020	3050	0.76	5590	3710	0.66	0.68	
Chick Pea	-	-	-	1450	890	0.61	1480	920	0.62	1550	1090	0.70	1510	1070	0.71	1620	1060	0.65	0.66	
Pigeon Pea	-	-	-	2050	1400	0.68	2090	1460	0.70	2150	1510	0.70	2080	1370	0.66	4900	3590	0.73	0.70	
Black Gram	-	-	-	80	40	0.50	100	60	0.60	70	50	0.71	60	30	0.50	70	30	0.43	0.55	
Brass Pea	-	-	-	180	100	0.56	210	120	0.57	160	90	0.56	150	80	0.53	140	60	0.43	0.54	
Horse Gram	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Soyabean	-	-	-	40	20	0.50	50	30	0.60	40	20	0.50	40	20	0.50	40	20	0.50	0.52	
Other Pulses	-	-	-	160	90	0.56	180	100	0.56	220	150	0.68	180	120	0.67	190	110	0.58	0.61	
Total Pulses	-	-	-	8050	4870	0.60	7960	5020	0.63	8140	6070	0.75	8040	5740	0.71	12550	8580	0.68	0.68	
Jute	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Vegetables	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Onion	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chilly	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mango	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Banana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lemon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	-	-	-	-	-	-	-	-	-	-	-	-	801	7100	8.86	-	-	-	8.86	
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	-	-	-	-	-	-	-	-	-	-	-	-	50	-	-	-	-	-	0.00	
	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	0.00	

Table 4.3.15 Irrigation Impact in BLGIP

Yield in Bhailawa Lumbini GroundWater Project		(Unit: ton/ha)											
	Before Project	After Project											
		1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93
Summer													
Paddy Local	1.10	1.50	1.80	2.00	2.10	1.70	1.90	2.95	2.26	2.65	2.60	2.60	2.10
Paddy HYV	1.80	2.60	2.80	3.50	4.20	4.00	4.23	4.63	4.40	4.46	3.50	4.50	4.18
Sugarcane	25.00		30.00	30.00			32.00	50.00	56.00		36.00	25.16	35.40
Maize		2.50	3.00	3.00	2.80	3.00	2.50	3.69			3.20		
Pulse	0.50	0.70	0.80	0.87	0.85	0.90	0.90	1.34	1.20	1.15	0.70	1.30	1.20
Vegetables										22.17	17.60	15.00	12.90
Groundnut												1.60	2.41
Winter													
Wheat	0.80	2.20	2.50	2.17	2.50	3.00	2.00	2.87	2.60	2.70	2.85	3.03	3.07
Oilseed	0.40	0.50	0.60	0.60	0.77	0.80	0.70	0.70	0.72	0.75	0.69	0.68	0.39
Pulse	0.50	0.60	0.80	0.90	0.87	0.90	1.20	1.10	1.20	1.12	1.33	1.45	0.90
Maize		2.50	3.00	3.00	3.00	3.20	2.80	3.74	3.80	4.00	3.23	4.46	4.03
Potato			17.00	17.50	18.00	15.00	23.00	18.00	27.00	25.00	19.73	25.06	22.50
Vegetable					10.00		13.00	13.00	21.00	20.00	22.08	17.89	22.40
Spring													
Spring Paddy			2.50	2.90	3.00	3.50	4.00	4.00	2.85	2.83	3.15	3.50	2.40
Maize								3.50	3.82	3.23	2.92	4.39	3.10
Pulses								0.99	1.30	1.13	1.00	0.93	1.10
Oilseeds								1.40					
Onion								20.50	27.00	18.90	18.20	31.33	24.84
Vegetables								13.60	16.00	19.33	21.97	17.10	18.70
Potato								12.00	12.35				
Stringbean										12.03	18.50	19.25	22.00

Source: B. L. G. W. P

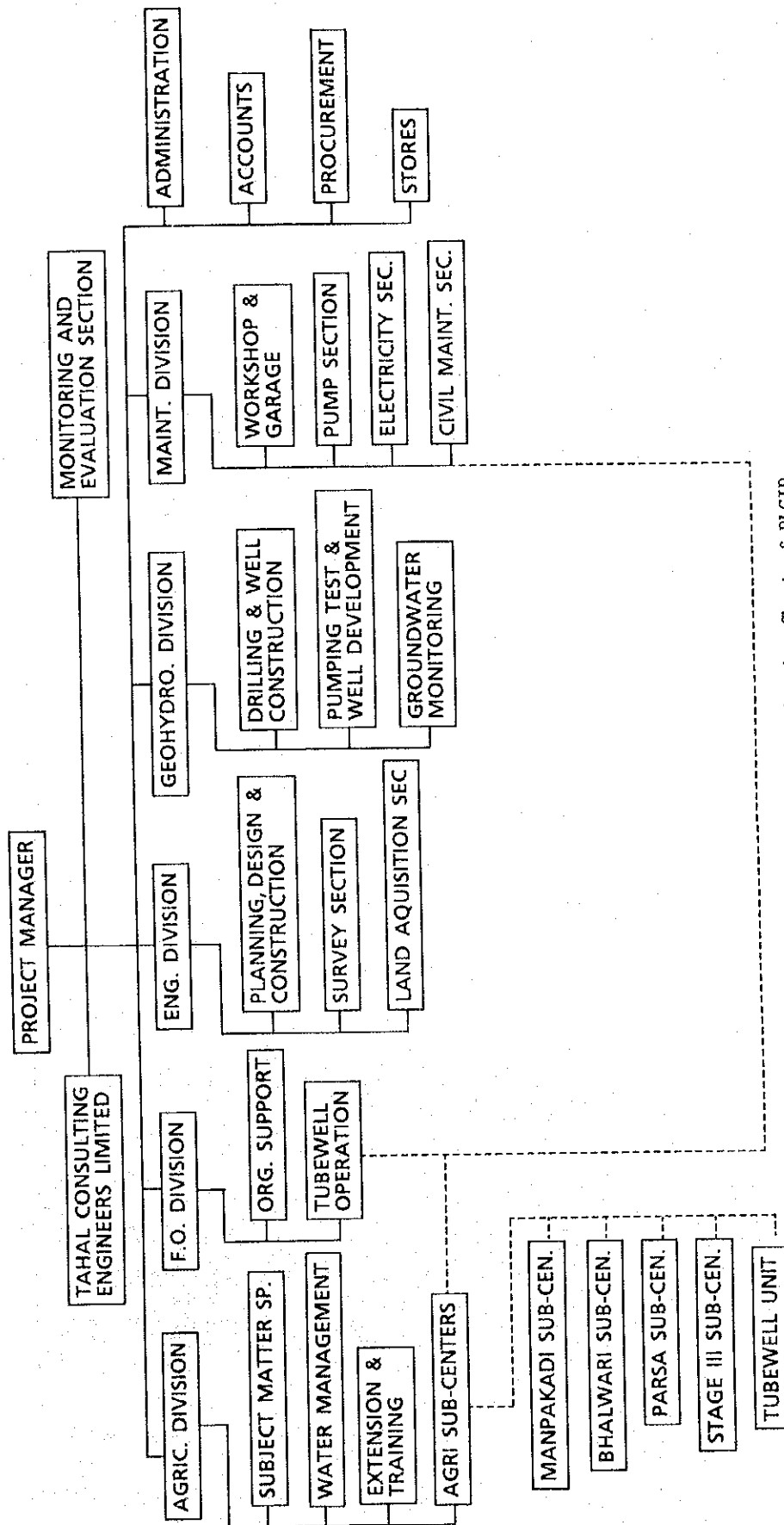
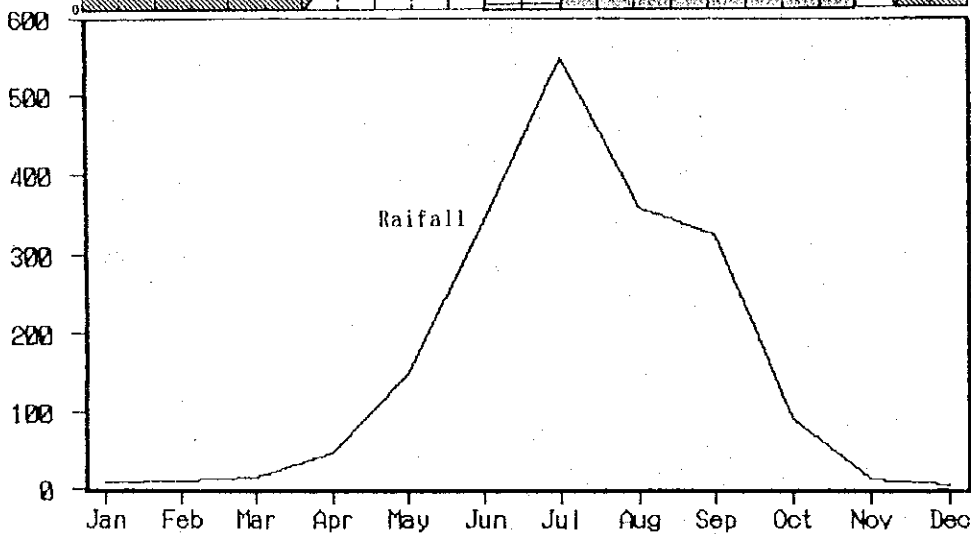
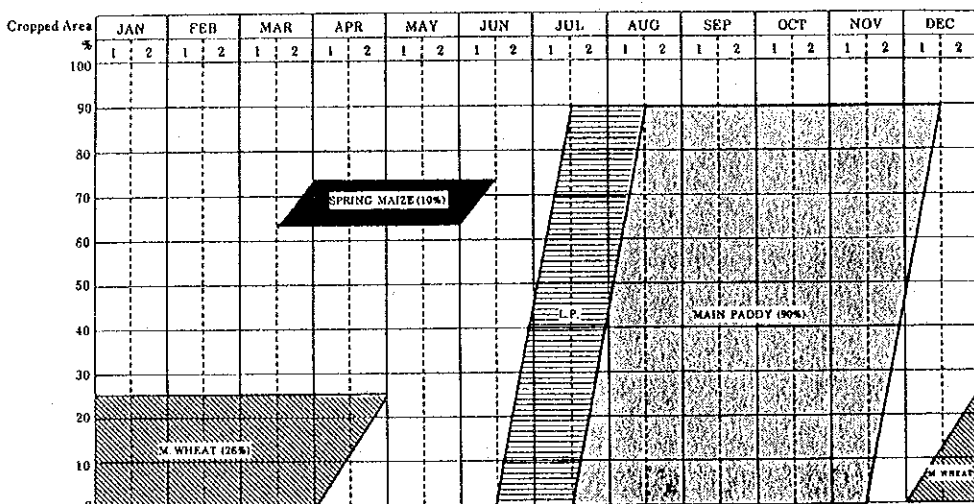


Figure 4.3.6 Organization Chart of BLGIP

PRESENT CROPPING PATTERN

Cropping Intensity = 126 %

(JHAPA DISTRICT)



PROPOSED CROPPING PATTERN

Cropping Intensity = 200 %

(JHAPA DISTRICT)

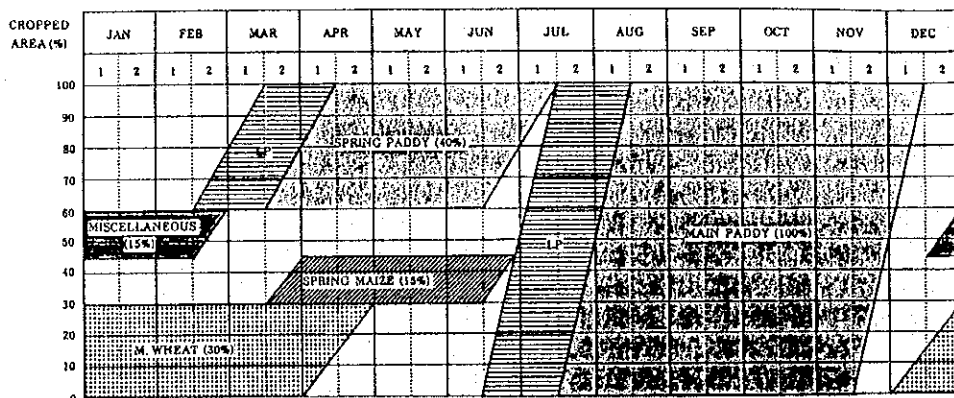


Figure 4.3.7 Present and Proposed Cropping Pattrens in Jhapa District

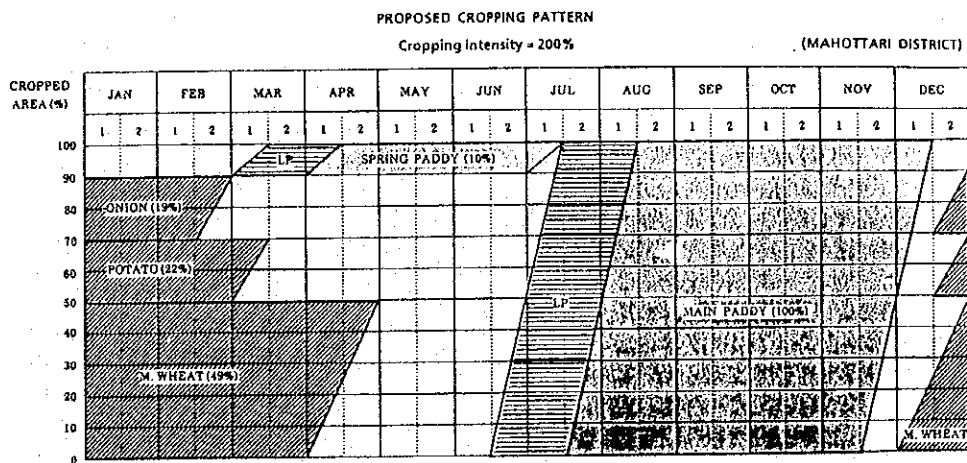
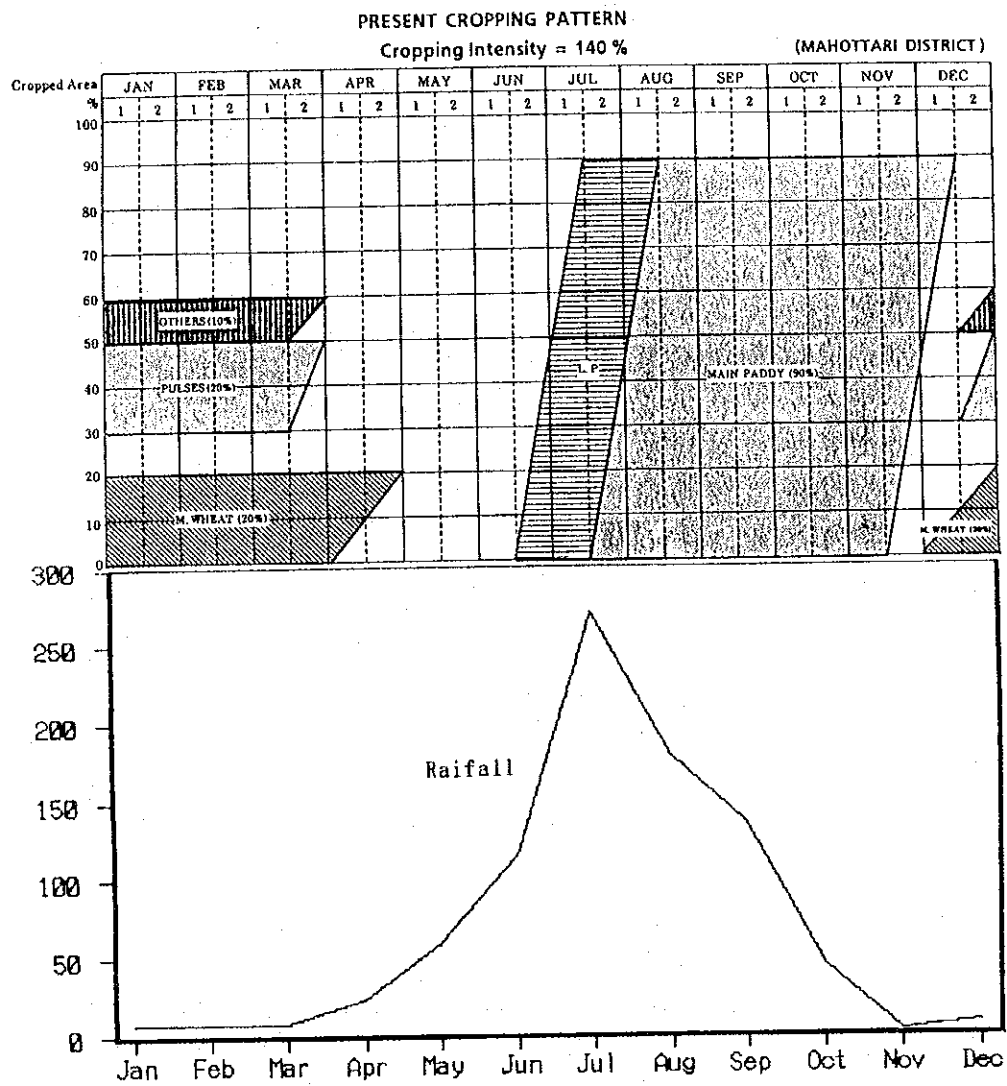


Figure 4.3.8 Present and Proposed Cropping Patterns in Mahottari District

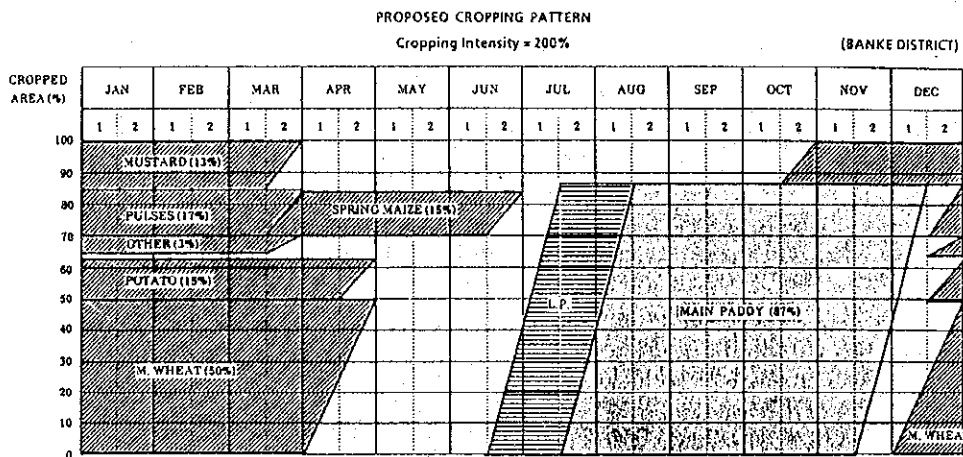
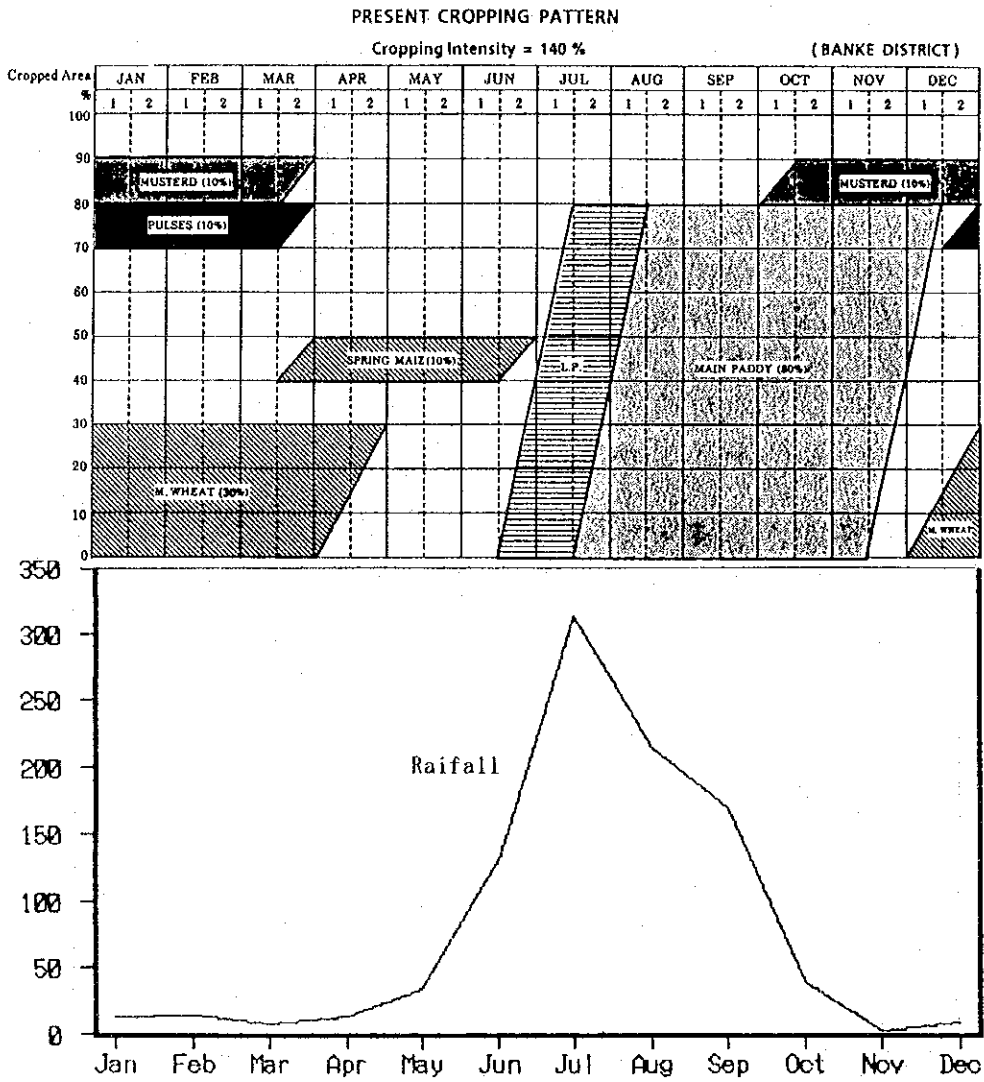


Figure 4.3.9 Present and Proposed Cropping Patterns in Banke District

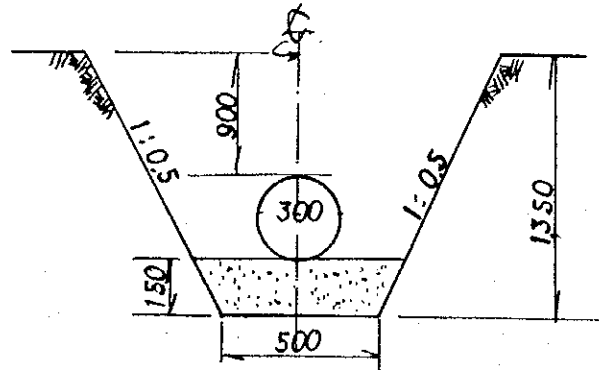
Table 4.3.16 Projected Crop Production

1. Jhapa			
	Planted Area (ha)	Yield (ton/ha)	Production (ton)
Without Project			
M. Paddy, Rainfed	15,300	2.33	35,649
Maize	1,700	1.31	2,227
Wheat	4,420	1.59	7,028
Total	21,420		
With Project			
M. Paddy, Irrigated	17,000	4.00	68,000
S. Paddy, Irrigated	6,800	3.80	25,840
Maize	2,550	2.70	6,885
Wheat	5,100	2.70	13,770
Miscellaneous	2,550	0.80	2,040
Total	34,000		
2. Mahottari			
	Planted Area (ha)	Yield (ton/ha)	Production (ton)
Without Project			
M. Paddy, Rainfed	6,300	2.29	14,427
Wheat	1,400	1.48	2,072
Pulses	1,400	0.60	840
Others	700	0.54	378
Total	9,800		
With Project			
M. Paddy, Irrigated	7,000	3.40	23,800
S. Paddy, Irrigated	700	3.60	2,520
Wheat	3,430	2.60	8,918
Onion	1,330	13.00	17,290
Potato	1,540	12.00	18,480
Total	14,000		
3. Banke			
	Planted Area (ha)	Yield (ton/ha)	Production (ton)
Without Project			
M. Paddy, Rainfed	6,400	1.95	12,480
Maize	800	1.61	1,288
Mustard	800	0.55	440
Wheat	2,400	1.40	3,360
Pulses	800	0.68	544
Total	11,200		
With Project			
M. Paddy, Irrigated	6,960	3.50	24,360
Maize	1,200	2.60	3,120
Mustard	1,040	0.80	832
Wheat	4,000	2.10	8,400
Pulses	1,360	1.00	1,360
Potato	1,200	14.00	16,800
Others	240	11.00	2,640
Total	16,000		

4.4 Irrigation

4.4.1. Typical Standard Design

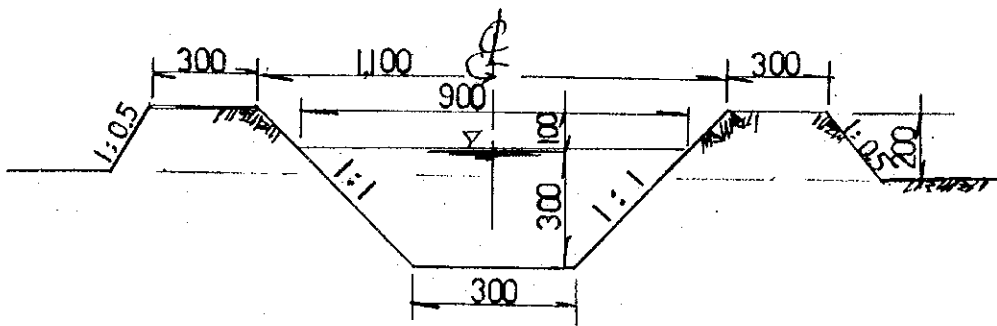
Figure 4.4.1 TYPICAL SECTION



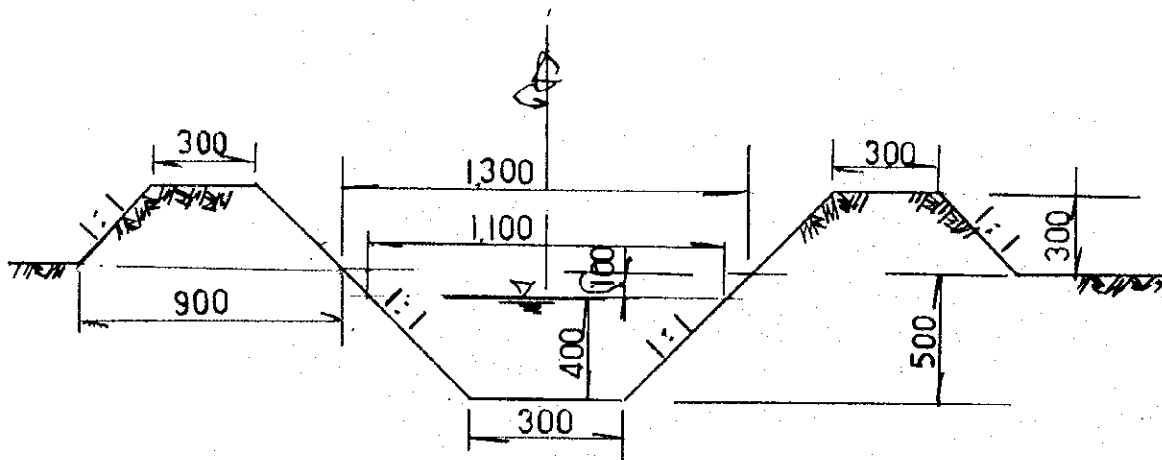
Unit; mm

No Scale

TYPICAL SECTION OF PIPELINE



TYPICAL SECTION OF TERMINAL IRRIGATION CANAL



TYPICAL SECTION OF DRAINAGE CANAL FOR IRRIGATION BLOCK

TYPICAL SECTIONS OF VILLAGE ROADS

Figure 4.4.2

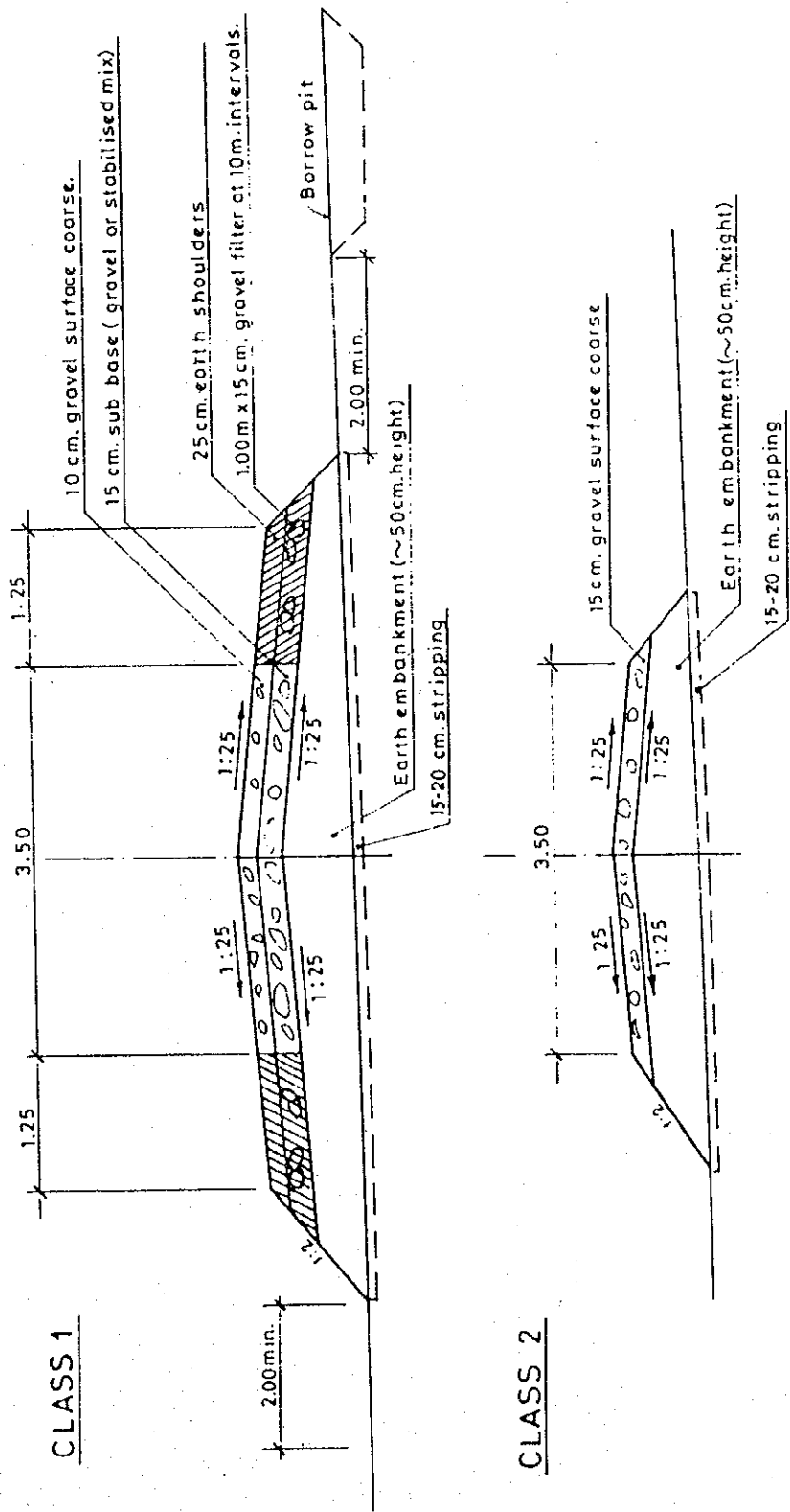
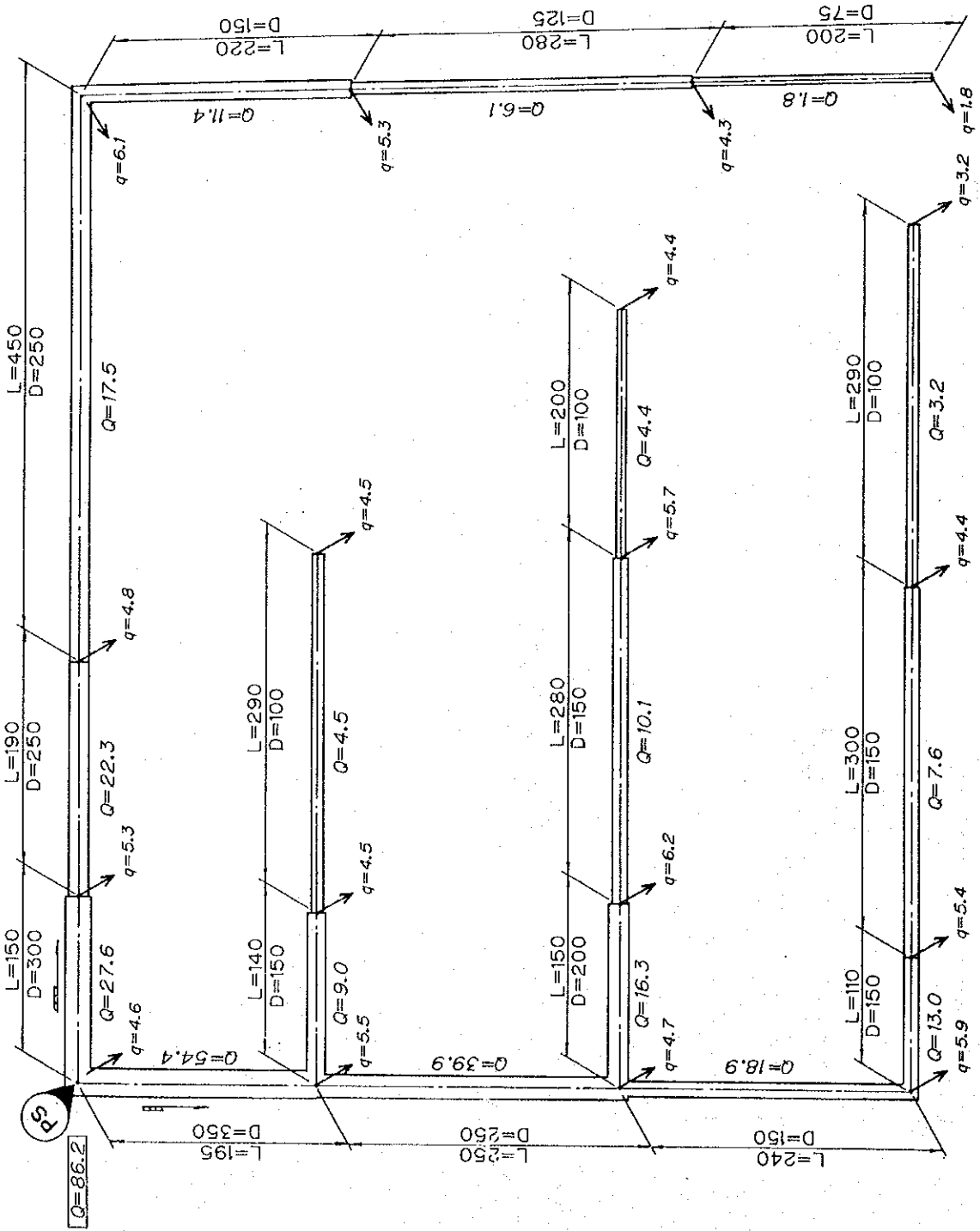


FIGURE 4.4.3(1) CASE STUDY I (PIPE LINE SYSTEM)



TOTAL IRRIGATION AREA: 96.2
 PROPOSED PUMP CAPACITY

PS = 90L/sec
 Q, q = l/s
 L = (m)
 D = (mm)

FIGURE 4.4.3(2) CASE STUDY II (PIPE LINE SYSTEM)

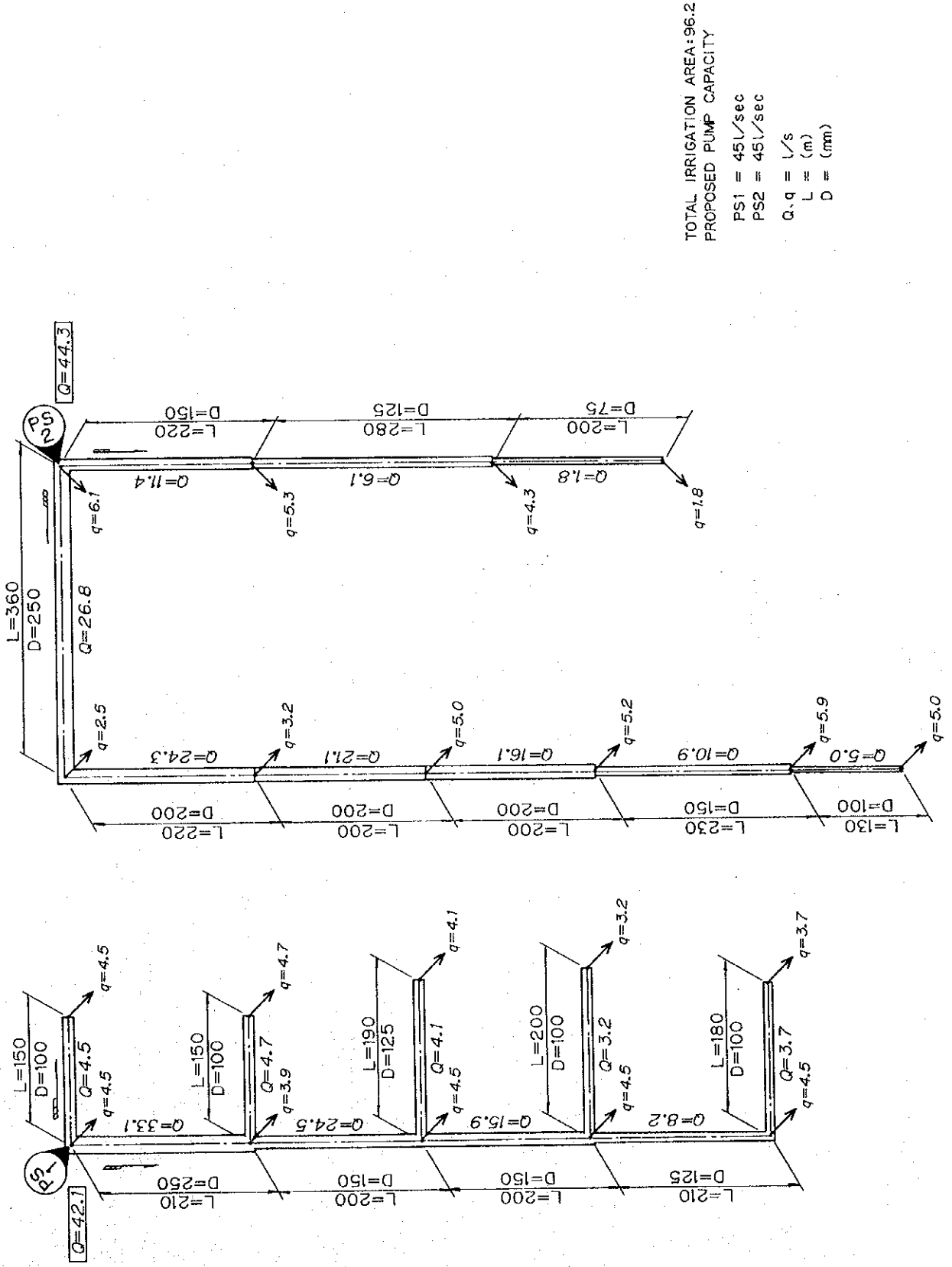
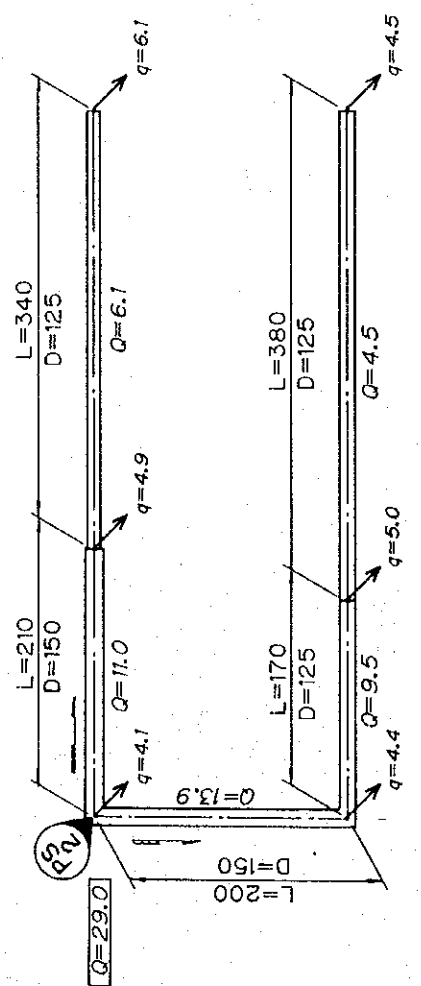
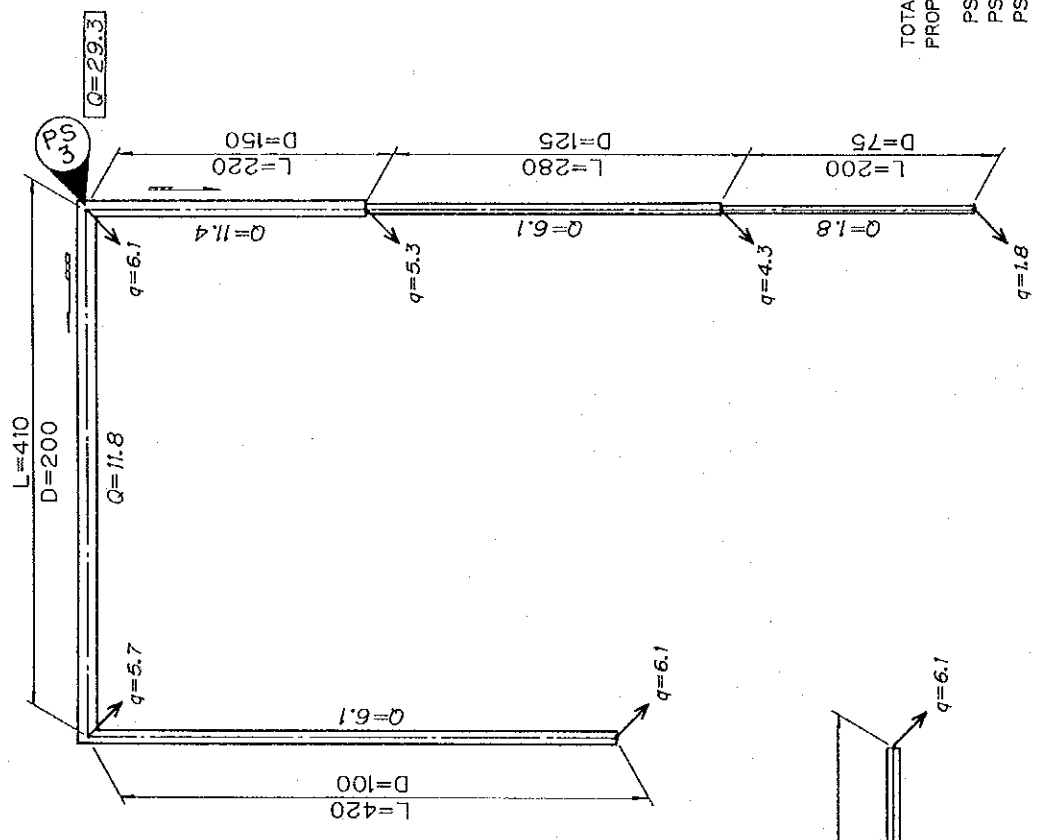
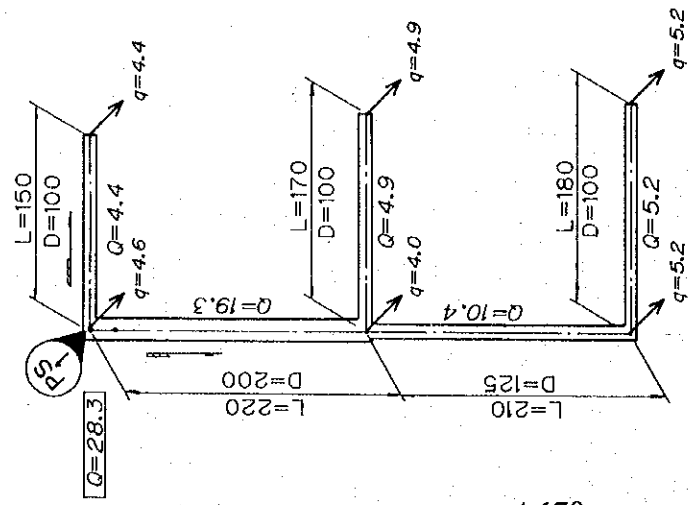


FIGURE 4.4.3(3) CASE STUDY III (PIPE LINE SYSTEM)



TOTAL IRRIGATION AREA: 96.2
 PROPOSED PUMP CAPACITY

PS1 = 30l/sec
 PS2 = 30l/sec
 PS3 = 30l/sec

Q, q = l/s
 L = (m)
 D = (mm)

4.4.2. Water Requirement

TABLE 4.4.1(1) WATER REQUIREMENT OF MAIN PADDY (JHAPA DISTRICT)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC				
CROPPING PATTERN																
(mm)																
Total W.R (f)							108.1	140.0	103.5	88.5	87.5	86.0	89.6	57.7	32.7	6.7
(mm)																
E.R							186.7	121.8	121.8	110.3	110.3	31.0	31.0	4.4	4.4	2.1
(mm)																
Total W.R (n)							-	18.2	-	-	-	55.0	58.6	53.3	28.3	4.6
(mm)																
T.W.R (IE=0.7)							-	26.0	-	-	-	78.6	83.7	76.1	40.4	6.6
m ³ /(ha)																
ℓ/s/(ha)								260	-	-	-	786	837	761	404	66
T.W.R for B.A (10 ³ m ³)																
								4,420	-	-	-	13,362	14,229	12,937	6,868	1,122

Total W.R (f) = Total Water Requirement of Field Total W.R (n) = Total Net Requirement

IE = Irrigation Efficiency ER; Effective Rainfall T.W.R for B.A; 52,938 10³m³/year

B.A (ha); Beneficial Area → 17,000

TABLE 4.4.1(2) WATER REQUIREMENT OF SPRING PADDY (JHAPA DISTRICT)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CROPPING PATTERN												
(mm)												
Total W.R.(f)			110.7	156.0	120.0	116.5	123.2	74.3	41.3	9.3		
(mm)												
E.R			5.4	15.4	15.4	50.2	50.2	116.3	116.3	186.7		
(mm)												
Total W.R.(n)			105.3	140.6	104.6	66.3	73.0	-	-	-		
(mm)												
T.W.R (IE=0.70)			150.4	200.9	149.4	94.7	104.3	-	-	-		
m ³ (ha)			1,504	2,009	1,494	947	1,043	-	-	-		
ℓ/s(ha)			1.1	1.6	1.2	0.7	0.8	-	-	-		
T.W.R for B.A (10 ³ m ³)			30,227	13,661	30,159	6,440	7,092	-	-	-		

Total W.R(f) = Total Water Requirement of Field
 IE = Irrigation Efficiency
 B.A (ha) ; Beneficial Area → 6,800
 ER ; Effective Rainfall
 T.W.R for B.A ; 47,579 10³m³/year
 Total W.R(n) = Total Net Requirement

TABLE 4.4.1(3) WATER REQUIREMENT OF MAIN WHEAT (JHAPA DISTRICT)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CROPPING PATTERN												
(mm)												
Total W.R (f)	20.0	27.2	41.0	39.0	50.5	35.7	14.0	7.0				5.0
(mm)												13.9
E.R	2.7	2.7	3.5	3.5	5.4	5.4	15.4	15.4				2.1
(mm)												2.1
Total W.R (n)	17.3	24.5	37.5	35.5	45.1	30.3	-	-				2.9
(mm)												11.8
T.W.R (IE = 0.60)	28.8	40.8	62.5	59.2	75.2	50.5	-	-				4.8
m ³ /(ha)	288	408	625	592	752	505	-	-				48
ℓ/s/(ha)	0.2	0.3	0.5	0.5	0.6	0.4	-	-				0.1
T.W.R for B.A (10 ³ m ³)	1,469	2,081	3,188	3,019	3,835	2,576	-	-				225
												1,005

Total W.R (f) = Total Water Requirement of Field
 Total W.R (n) = Total Net Requirement
 IE = Irrigation Efficiency
 T.W.R for B.A; 17,398 10³m³/year
 B.A (ha); Beneficial Area → 5,100

TABLE 4.4.1(4) WATER REQUIREMENT OF SPRING MAIZE (JHAPA DISTRICT)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CROPPING PATTERN												
(mm)												
Total W.R (f)			94.4	82.5	85.5	64.0	32.0					
(mm)												
E.R			5.4	15.4	15.4	116.3	116.3					
(mm)												
Total W.R (n)			89.0	67.1	70.1	-	-					
(mm)												
T.W.R (IE = 0.6)			148.3	111.8	116.8	-	-					
m ³ (ha)			3,483	1,118	3,168	-	-					
ℓ/s(ha)			1.1	0.9	0.9	-	-					
T.W.R for B.A (10 ³ m ³)			3,782	2,851	2,979	-	-					

Total W.R (f) = Total Water Requirement of Field ER; Effective Rainfall Total W.R (n) = Total Net Requirement

IE = Irrigation Efficiency T.W.R for B.A; 12,853 10³m³/year

B.A (ha); Beneficial Area → 2,550

TABLE 4.4.2(1) WATER REQUIREMENT OF MAIN PADDY (MAHOTTARI DISTRICT)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CROPPING PATTERN												
(mm)							116.6	153.0	99.0	90.5	54.2	30.7
Total W.R (f)								62.9	47.9	15.6	0.7	2.7
(mm)							95.7	90.1	51.1	74.9	53.5	30.0
E.R							20.9	80.9	73.0	107.0	76.4	42.9
Total W.R (n)							29.9	128.7	71.6	112.6	42.9	6.1
(mm)												
T.W.R (IE=0.7)							299	1,287	730	1,070	764	61
m ³ /(ha)							0.2	1.0	0.6	0.8	0.6	0.3
ℓ/s/(ha)							2,093	9,009	5,110	7,490	5,348	3,003
T.W.R for B.A (10 ³ m ³)												

Total W.R (f) = Total Water Requirement of Field Total W.R (n) = Total Net Requirement

IE = Irrigation Efficiency ER; Effective Rainfall T.W.R for B.A; 51,037 10³m³/year

B.A (ha); Beneficial Area → 7,000

TABLE 4.4.2(2) WATER REQUIREMENT OF SPRING PADDY (MAHOTTARI DISTRICT)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CROPPING PATTERN												
(mm)												
Total W.R (f)				148.6	219.0	144.0	152.0	114.0	81.4	11.7		
(mm)												
E.R				8.2	8.2	20.6	20.6	40.8	40.8	95.7		
(mm)												
Total W.R (n)				140.4	210.8	123.4	131.4	73.2	40.6	-		
(mm)												
T.W.R (IE=0.70)				200.6	301.1	176.3	187.7	104.6	58.0	-		
m ³ (ha)				2,006	3,011	1,763	1,877	1,046	580	-		
ℓ/s/(ha)				1.5	2.3	1.4	1.4	0.8	0.4	-		
T.W.R for B.A (10 ³ m ³)				1,404	2,108	1,234	1,314	732	406			

Total W.R (f) = Total Water Requirement of Field
 IE = Irrigation Efficiency
 B.A (ha) ; Beneficial Area → 700
 ER ; Effective Rainfall
 T.W.R for B.A ; 7,198 10³m³/year
 Total W.R (n) = Total Net Requirement

TABLE 4.4.2(3) WATER REQUIREMENT OF MAIN WHEAT (MAHOTTARI DISTRICT)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CROPPING PATTERN												
(mm)	21.0	28.8	45.1	57.0	40.0	17.0	8.5					
Total W.R (f)		48.0	45.1	57.0	40.0	17.0	8.5					
(mm)	2.9	2.9	3.0	2.9	2.9	8.2	8.2					
E.R		3.0	3.0	2.9	2.9	8.2	8.2					5.5
(mm)	18.1	25.9	45.0	42.1	54.1	37.1	8.8	0.3				2.7
Total W.R (n)		43.2	70.2	90.2	61.8	14.7	0.5					2.8
(mm)	30.2	43.2	75.0	90.2	61.8	14.7	0.5					4.7
T.W.R (IE=0.60)		432	702	902	618	147	5					213
m ³ /ha	302	432	702	902	618	147	5					47
ℓ/s/ha	0.2	0.3	0.6	0.7	0.4	0.1	-					-
T.W.R for B.A (10 ³ m ³)	1,086	1,482	2,573	2,408	3,094	2,110	504	17				161
												731

Total W.R (f) = Total Water Requirement of Field ER; Effective Rainfall Total W.R (n) = Total Net Requirement

IE = Irrigation Efficiency T.W.R for B.A; 14,116 10³m³/year

B.A (ha); Beneficial Area → 3,430

TABLE 4.4.3(1) WATER REQUIREMENT OF MAIN PADDY (BANKE DISTRICT)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC				
CROPPING PATTERN																
(mm) Total W.R (f)							113.9	146.0	113.1	96.0	95.0	89.0	92.8	53.0	30.0	6.2
(mm) E.R							111.9	76.7	76.7	60.7	60.7	14.0	14.0	1.2	1.2	3.3
(mm) Total W.R (n)							2.0	69.3	36.4	35.3	34.3	75.0	78.8	51.8	28.8	2.9
(mm) T.W.R (IE=0.70)							2.9	99.0	52.0	50.4	49.0	107.1	112.6	74.0	41.1	4.1
m ³ /ha							29	990	520	504	490	1,071	1,126	740	411	41
ℓ/s/ha							-	0.8	0.4	0.4	0.4	0.8	0.8	0.6	0.3	-
T.W.R for B.A (10 ⁶ m ³)							202	6,890	3,619	3,508	3,410	7,454	7,837	5,150	2,861	285

Total W.R (f) = Total Water Requirement of Field
 IE = Irrigation Efficiency
 B.A (ha) ; Beneficial Area → 6,960
 ER ; Effective Rainfall
 T.W.R for B.A ; 41,216 10⁶m³/year
 Total W.R (n) = Total Net Requirement

TABLE 4.4.3(2) WATER REQUIREMENT OF MAIN WHEAT (BANKE DISTRICT)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CROPPING PATTERN												
(mm)												
Total W.R (f)	18.5	25.1	38.5	36.4	50.5	35.7	16.0	8.0				4.5
(mm)												12.3
E.R	4.6	4.6	5.1	5.1	2.8	2.8	4.4	4.4				3.3
(mm)												3.3
Total W.R (m)	13.9	20.5	33.4	31.3	47.7	32.9	11.6	3.6				1.2
(mm)												9.0
T.W.R (IE = 0.60)	23.2	34.2	55.7	52.2	79.5	54.8	19.3	6.0				2.0
m ² /(ha)	232	342	557	522	795	548	193	60				20
ℓ/s/(ha)	0.2	0.2	0.4	0.5	0.6	0.4	0.1	0.1				-
T.W.R for B.A (10 ³ m ³)	928	1,368	2,228	2,088	3,180	2,192	772	240				80
												600

Total W.R (f) = Total Water Requirement of Field
 ER; Effective Rainfall
 T.W.R for B.A; 13,676 10³m³/year
 Total W.R (n) = Total Net Requirement
 IE = Irrigation Efficiency
 B.A (ha); Beneficial Area → 4,000

TABLE 4.4.3(3) WATER REQUIREMENT OF SPRING MAIZE (BANKE DISTRICT)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CROPPING PATTERN												
(mm) Total W.R (f)			94.4	96.0	99.0	115.5	123.2	93.0	45.8			
(mm) E.R			2.8	4.4	4.4	12.0	12.0	46.7	46.7			
(mm) Total W.R (n)			91.6	91.6	94.6	103.5	111.2	46.3	0.1			
(mm) T.W.R (IE=0.60)			152.7	152.7	157.7	172.5	185.3	77.2	0.2			
m ³ /(ha)			1,527	1,527	1,577	1,725	1,853	772	2			
ℓ/s/(ha)			1.1	1.2	1.2	1.3	1.3	0.6	-			
T.W.R for B.A (10 ⁶ m ³)			1,832	1,832	1,892	2,070	2,224	926	-			

Total W.R (f) = Total Water Requirement of Field
 IE = Irrigation Efficiency
 B.A (ha) ; Beneficial Area → 1,200
 ER ; Effective Rainfall
 T.W.R for B.A ; 10,776 10³m³/year
 Total W.R (n) = Total Net Requirement

Table 4.4.4(1) ESTIMATION OF EFFECTIVE PRECIPITATION FOR PRIORITY SUB-AREA

Summary of Monthly Probable Effective Precipitation at Jhapa averaged by Thiessen Method, mm

R.period	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Yearly	Remarks
5	5.9	7.8	11.9	34.0	110.8	256.8	412.3	268.9	243.6	68.4	9.7	4.6	1,434	
*10	5.3	7.0	10.8	30.8	100.3	232.6	373.4	243.5	220.6	61.9	8.8	4.2	1,299	
15	5.1	6.7	10.2	29.4	95.5	221.4	355.5	231.8	210.0	59.0	8.4	4.0	1,236	
20	4.9	6.5	9.9	28.4	92.5	214.4	344.3	224.5	203.4	57.1	8.1	3.9	1,197	
30	4.7	6.2	9.5	27.3	88.8	205.9	330.6	215.6	195.3	54.8	7.8	3.7	1,150	
50	4.5	6.0	9.1	26.1	84.8	196.7	315.8	205.9	186.5	52.4	7.4	3.5	1,098	

Note; *Adopted value for the evaluation of water demands

Summary of Monthly Probable Effective Precipitation at Janakpur Airport Station (1111), mm

R.period	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Yearly	Remarks
5	6.7	6.7	6.7	18.7	47.3	93.8	220.1	144.6	110.0	35.8	1.7	6.1	698	
*10	5.8	5.9	5.8	16.3	41.2	81.5	191.3	125.7	95.7	31.2	1.4	5.3	607	
15	5.4	5.5	5.5	15.2	38.6	76.4	179.3	117.8	89.6	29.2	1.3	5.0	569	
20	5.2	5.3	5.3	14.7	37.1	73.6	172.6	113.4	86.3	28.1	1.3	4.8	548	
30	5.0	5.0	5.0	14.0	35.4	70.1	164.5	108.1	82.3	26.8	1.2	4.6	522	
50	4.7	4.8	4.8	13.3	33.7	66.8	156.7	103.0	78.4	25.5	1.2	4.3	497	

Summary of Monthly Probable Effective Precipitation at Khajura Station (0409), mm

R.period	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Yearly	Remarks
5	10.3	11.5	6.2	10.0	27.3	106.1	254.1	174.2	137.9	31.7	2.6	7.4	779	
*10	9.1	10.1	5.5	8.8	24.0	93.4	223.7	153.4	121.4	27.9	2.3	6.5	686	
15	8.5	9.5	5.1	8.3	22.6	87.8	210.3	144.3	114.2	26.2	2.2	6.2	645	
20	8.2	9.1	4.9	8.0	21.7	84.5	202.4	138.8	109.8	25.3	2.1	5.9	621	
30	7.8	8.7	4.7	7.6	20.7	80.6	193.1	132.4	104.8	24.1	2.0	5.6	592	
50	7.4	8.3	4.5	7.2	19.7	76.6	183.5	125.8	99.6	22.9	1.9	5.4	563	

TABLE 4.4.4(2) ESTIMATION OF EFFECTIVE PRECIPITATION FOR PRIORITY SUB-AREA (JHAPA)

Summary of Monthly Probable Precipitation at Jhapa averaged by Thiessen Method, mm

R.period	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Yearly	Remarks
5	8.7	11.5	17.5	50.1	163.0	377.9	606.8	395.7	358.4	100.6	14.3	6.8	2,110	
10	7.8	10.4	15.8	45.4	147.7	342.3	549.6	358.4	324.6	91.1	12.9	6.2	1,911	
15	7.5	9.9	15.1	43.2	140.6	325.8	523.1	341.1	309.0	86.8	12.3	5.9	1,819	
20	7.2	9.6	14.6	41.8	136.2	315.6	506.7	330.4	299.3	84.0	11.9	5.7	1,762	
30	6.9	9.2	14.0	40.2	130.7	303.1	486.6	317.3	287.4	80.7	11.4	5.5	1,692	
50	6.6	8.8	13.4	38.4	124.9	289.4	464.7	303.0	274.5	77.1	10.9	5.2	1,616	

Summary of Monthly Probable Effective Precipitation at Jhapa averaged by Thiessen Method, mm

R.period	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Yearly	Remarks
5	5.9	7.8	11.9	34.0	110.8	256.8	412.3	268.9	243.6	68.4	9.7	4.6	1,434	
*10	5.3	7.0	10.8	30.8	100.3	232.6	373.4	243.5	220.6	61.9	8.8	4.2	1,299	
15	5.1	6.7	10.2	29.4	95.5	221.4	355.5	231.8	210.0	59.0	8.4	4.0	1,236	
20	4.9	6.5	9.9	28.4	92.5	214.4	344.3	224.5	203.4	57.1	8.1	3.9	1,197	
30	4.7	6.2	9.5	27.3	88.8	205.9	330.6	215.6	195.3	54.8	7.8	3.7	1,150	
50	4.5	6.0	9.1	26.1	84.8	196.7	315.8	205.9	186.5	52.4	7.4	3.5	1,098	

Note; *Adopted value for the evaluation of water demands

TABLE 4.4.4(3) ESTIMATION OF EFFECTIVE PRECIPITATION FOR PRIORITY SUB-AREA (MAHOTTARI)

Summary of Monthly Probable Precipitation at Janakpur Airport Station (1111), mm

R.period	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Yearly	Remarks
5	9.4	9.5	9.5	26.4	66.9	132.6	311.0	204.4	155.5	50.7	2.3	8.6	987	
10	8.2	8.3	8.3	23.0	58.2	115.3	270.4	177.7	135.2	44.0	2.0	7.5	858	
15	7.7	7.8	7.7	21.5	54.5	108.0	253.4	166.5	126.7	41.3	1.9	7.0	804	
20	7.4	7.5	7.5	20.7	52.5	104.0	243.9	160.3	122.0	39.7	1.8	6.8	774	
30	7.0	7.1	7.1	19.8	50.0	99.1	232.6	152.9	116.3	37.9	1.8	6.4	738	
50	6.7	6.8	6.8	18.8	47.7	94.4	221.5	145.6	110.8	36.1	1.7	6.1	703	

Summary of Monthly Probable Effective Precipitation at Janakpur Airport Station (1111), mm

R.period	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Yearly	Remarks
5	6.7	6.7	6.7	18.7	47.3	93.8	220.1	144.6	110.0	35.8	1.7	6.1	698	
*10	5.8	5.9	5.8	16.3	41.2	81.5	191.3	125.7	95.7	31.2	1.4	5.3	607	
15	5.4	5.5	5.5	15.2	38.6	76.4	179.3	117.8	89.6	29.2	1.3	5.0	569	
20	5.2	5.3	5.3	14.7	37.1	73.6	172.6	113.4	86.3	28.1	1.3	4.8	548	
30	5.0	5.0	5.0	14.0	35.4	70.1	164.5	108.1	82.3	26.8	1.2	4.6	522	
50	4.7	4.8	4.8	13.3	33.7	66.8	156.7	103.0	78.4	25.5	1.2	4.3	497	

Note; *Adopted value for the evaluation of water demands

TABLE 4.4.4(4) ESTIMATION OF EFFECTIVE PRECIPITATION FOR PRIORITY SUB-AREA (BANKE-BARDIYA)

Summary of Monthly Probable Precipitation at Khajura Station (0409), mm

R.period	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Yearly	Remarks
5	14.3	16.0	8.6	14.0	38.0	148.0	354.4	243.1	192.3	44.2	3.6	10.4	1,087	
10	12.6	14.1	7.6	12.3	33.5	130.3	312.0	214.0	169.3	38.9	3.2	9.1	957	
15	11.9	13.2	7.2	11.6	31.5	122.5	293.5	201.2	159.3	36.6	3.0	8.6	900	
20	11.4	12.7	6.9	11.2	30.3	117.9	282.4	193.6	153.2	35.2	2.9	8.3	866	
30	10.9	12.1	6.6	10.6	28.9	112.4	269.3	184.7	146.2	33.6	2.8	7.9	826	
50	10.4	11.5	6.2	10.1	27.5	106.9	256.0	175.5	138.9	31.9	2.6	7.5	785	

Summary of Monthly Probable Effective Precipitation at Khajura Station (0409), mm

R.period	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Yearly	Remarks
5	10.3	11.5	6.2	10.0	27.3	106.1	254.1	174.2	137.9	31.7	2.6	7.4	779	
*10	9.1	10.1	5.5	8.8	24.0	93.4	223.7	153.4	121.4	27.9	2.3	6.5	686	
15	8.5	9.5	5.1	8.3	22.6	87.8	210.3	144.3	114.2	26.2	2.2	6.2	645	
20	8.2	9.1	4.9	8.0	21.7	84.5	202.4	138.8	109.8	25.3	2.1	5.9	621	
30	7.8	8.7	4.7	7.6	20.7	80.6	193.1	132.4	104.8	24.1	2.0	5.6	592	
50	7.4	8.3	4.5	7.2	19.7	76.6	183.5	125.8	99.6	22.9	1.9	5.4	563	

Note; *Adopted value for the evaluation of water demands

TABLE 4.4.5(1)

WATER REQUIREMENT OF MAIN PADDY (JHAPA)

MONTH	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	REMARKS
CROPPING PATTERN	Seedling								
	(1) ET (m.m)	3.8	4.1	4.1	3.6	3.6	3.0	3.0	2.1
	Kc	1.10	1.10	1.08	1.05	1.00	0.95		
	ETc = ET * Kc	4.2	4.5	4.4	3.8	3.6	3.4	2.9	
	P (m.m)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
	C = ETc + P	6.2	6.5	6.4	5.8	5.6	5.4	4.9	
	Days	16	15	16	15	16	5		
	S t = C.Days	99.2	97.5	102.4	87.0	84.0	86.4	24.5	
	(2) ET (m.m)		4.1	4.1	3.6	3.6	3.0	3.0	
	Kc		1.10	1.10	1.08	1.05	1.00	0.95	
ETc = ET * Kc		4.5	4.5	3.9	3.8	3.6	2.9		
P (m.m)		2.0	2.0	2.0	2.0	2.0	2.0		
C = ETc + P		6.5	6.5	5.9	5.8	5.6	4.9		
Days		15	16	15	16	15	5		
S t = C.Days		97.5	104.0	88.5	87.0	89.6	73.5	24.5	
(3) ET (m.m)			4.1	3.6	3.6	3.0	3.0		
Kc			1.10	1.10	1.08	1.05	1.00	0.95	
ETc = ET * Kc			4.5	4.0	3.9	3.8	3.0	2.9	
P (m.m)			2.0	2.0	2.0	2.0	2.0	2.0	
C = ETc + P			6.5	6.0	5.9	5.8	5.0	4.9	
Days			16	15	15	16	15	5	
S t = C.Days			104.0	90.0	88.5	87.0	75.0	73.5	20.0
(4) Avr = (1) + (2) + (3) / 3			65.0	88.5	87.5	86.0	89.6	57.7	6.7
(5) Land Preparation			75.0						
Total W R (f)		108.1	140.0	103.5	88.5	87.5	86.0	57.7	32.7
									650.3
									150.0
									800.3

NOTE:- T.P = Transplanting
 E.I = End of Irrigation
 H.V = Harvesting

TABLE 4.4.5(2)

WATER REQUIREMENT OF SPRING PADDY (JHAPA)

MONTH	FEB.	MAR.	APR.	MAY	JUN.	JUL.	TOTAL	REMARKS
CROPPING PATTERN	Seeding	T.P			E.I	H.V		
(1) ET (m.m)		4.3	5.5	5.5	5.4	4.4		
Kc		1.10	1.10	1.05	0.95	0.95		
ETc = ET * Kc		4.7	6.1	5.8	5.7	4.2		
P (m.m)		2.0	2.0	2.0	2.0	2.0		
C = ETc + P		6.7	8.1	7.8	7.7	6.2		
Days		16	15	15	16	5		
St = C * Days		107.2	121.5	117.0	115.5	31.0		
(2) ET (m.m)			5.5	5.5	5.4	4.4		
Kc			1.10	1.10	1.05	0.95		
ETc = ET * Kc			6.1	6.1	5.7	4.2		
P (m.m)			2.0	2.0	2.0	2.0		
C = ETc + P			8.1	8.1	7.7	6.2		
Days			15	15	16	5		
St = C * Days			121.5	121.5	115.5	31.0		
(3) ET (m.m)				5.5	5.4	4.4		
Kc				1.10	1.05	0.95		
ETc = ET * Kc				6.1	5.7	4.2		
P (m.m)				2.0	2.0	2.0		
C = ETc + P				8.1	7.7	6.2		
Days				15	15	5		
St = C * Days				121.5	118.5	28.0		
(4) Avr = (1) + (2) + (3) / 3		35.7	81.0	120.0	116.5	74.3	601.3	
(5) Land Preparation		75.0	75.0				150.0	
Total W.R (f)		110.7	156.0	120.0	116.5	74.3	751.3	

NOTE:- T.P = Transplanting P = Percolation Total W.R(f) = Total Water Requirement of Field
 E.I = End of Irrigation ST = Sub-Total
 H.V = Harvesting Avr = Average

TABLE 4.4.5(3) WATER REQUIREMENT OF MAIN WHEAT (JHAPA)

MONTH	DEC.	JAN.	FEB.	MAR.	APR.	TOTAL	REMARKS
CROPPING PATTERN							
(1) ET (m.m)	2.1	2.0	2.9	4.3	5.5		
Kc	0.49	0.77	1.05	0.25	0.25		
ETc = ET * Kc	1.0	1.5	3.0	1.1	1.1		
P (m.m)	-	-	-	-	-		
C = ETc + P	1.0	1.5	3.0	1.1	1.1		
Days	15	16	13	15	16		
St = C.Days	15.0	22.5	45.0	16.5	17.6		
ET (m.m)	2.1	2.0	2.9	4.3	5.5		
Kc	0.49	0.77	1.05	1.05	0.25		
ETc = ET * Kc	1.0	1.5	3.0	4.5	1.4		
P (m.m)	-	-	-	-	-		
C = ETc + P	1.0	1.5	3.0	4.5	1.4		
Days	16	16	13	15	15		
St = C.Days	16.0	22.5	45.0	67.5	21.0		
(3) ET (m.m)		2.0	2.9	4.3	5.5		
Kc		0.49	0.77	1.05	0.25		
ETc = ET * Kc		1.0	2.2	4.5	1.4		
P (m.m)		-	-	-	-		
C = ETc + P		1.0	2.2	4.5	1.4		
Days		15	13	15	15		
St = C.Days		15.0	33.0	67.5	21.0		
(4) Avr = (1)+(2)+(3)/3	5.0	20.0	41.0	50.5	14.0	7.0	253.3 mm
(5) Land Preparation							
Total W.R(f)							

Total W.R(f) = Total Water Requirement of Field

NOTE:- T.P = Transplanting
 E.I = End of Irrigation
 H.V = Harvesting
 P = Percolation
 ST = Sub-Total
 Avr = Average

TABLE 4.4.5(4) WATER REQUIREMENT OF SPRING MAIZE (JHAPA)

MONTH	FEB.	MAR.	APR.	MAY	JUN.	JUL.	TOTAL	REMARKS
CROPPING PATTERN								
(1)								
ET (m.m)		4.3	5.5	5.5	5.4	5.4	4.4	
Kc		1.0	1.0	1.05	1.05	1.05	0.95	
ETc = ET * Kc		4.3	5.5	5.8	5.7	5.7	4.2	
P (m.m)		-	-	-	-	-	-	
C = ETc + P		4.3	5.5	5.8	5.7	5.7	4.2	
Days		16	15	15	16	15	15	
St = C.Days		68.8	82.5	87.0	85.5	91.2	63.0	
ET (m.m)		4.3	5.5	5.5	5.4	5.4	4.4	
Kc		1.0	1.0	1.05	1.05	1.05	0.95	
ETc = ET * Kc		4.3	5.5	5.8	5.7	5.7	4.2	
P (m.m)		-	-	-	-	-	-	
C = ETc + P		4.3	5.5	5.8	5.7	5.7	4.2	
Days		8	15	15	16	15	8	
St = C.Days		34.4	82.5	87.0	85.5	91.2	63.0	
ET (m.m)			5.5	5.5	5.4	5.4	4.4	
Kc			1.0	1.0	1.05	1.05	1.0	
ETc = ET * Kc			5.5	5.5	5.7	5.7	4.4	
P (m.m)			-	-	-	-	-	
C = ETc + P			5.5	5.5	5.7	5.7	4.4	
Days			15	15	16	15	15	
St = C.Days			82.5	82.5	85.5	91.2	66.0	
(4)								
Avr = (1)+(2)+(3)/3		34.4	82.5	85.5	85.5	91.2	64.0	32.2
Land Preparation		60.0						475.3
Total W.R(f)		94.4	82.5	85.5	85.5	91.2	64.0	535.3

NOTE:- T.P = Transplanting P = Percolation Total W.R(f) = Total Water Requirement of Field
 E.I = End of Irrigation ST = Sub-Total
 H.V = Harvesting Avr = Average

TABLE 4.4.6(1) WATER REQUIREMENT OF MAIN PADDY (MAHOTTARI)

MONTH	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	REMARKS
CROPPING PATTERN	Seedling								
(1) ET (m.m)	5.3	5.0	5.0	4.3	3.9	3.9	2.7	2.7	
Kc	1.10	1.10	1.08	1.05	1.00	0.95	0.95		
ETc = ET * Kc	5.8	5.5	5.4	4.5	3.9	3.7	2.6		
P (m.m)	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
C = ETc + P	7.8	7.5	7.4	6.5	5.9	5.7	4.6		
Days	16	15	16	15	16	15	5		
S t = C * Days	124.8	112.5	118.4	97.5	97.5	88.5	23.0		
(2) ET (m.m)		5.5	5.0	4.3	3.9	3.9	2.7		
Kc		1.10	1.10	1.08	1.05	1.00	0.95		
ETc = ET * Kc		6.1	5.5	4.6	4.5	4.1	3.9		
P (m.m)		2.0	2.0	2.0	2.0	2.0	2.0		
C = ETc + P		8.1	7.5	6.6	6.5	6.1	5.9		
Days		15	16	15	15	16	5		
S t = C * Days		121.5	120.0	99.0	97.5	94.4	23.0		
(3) ET (m.m)			5.0	4.3	3.9	3.9	2.7		
Kc			1.10	1.10	1.08	1.05	1.00		
ETc = ET * Kc			5.5	4.7	4.6	4.1	3.9		
P (m.m)			2.0	2.0	2.0	2.0	2.0		
C = ETc + P			7.5	6.7	6.6	6.1	5.9		
Days			16	15	15	16	5		
S t = C * Days			120.0	100.5	99.0	97.6	21.0		
(4) Avr = (1) + (2) + (3) / 3		41.6	78.0	119.5	99.0	98.0	30.7	712.9	
(5) Land Preparation		75.0	75.0					150.0	
Total W.R (f)		116.6	153.0	119.5	99.0	98.0	30.7	862.9	

NOTE:- T.P = Transplanting
 E.I = End of Irrigation
 H.V = Harvesting

TABLE 4.4.6(2)

WATER REQUIREMENT OF SPRING PADDY (MAHOTTARI)

MONTH	APR.	MAY	JUN.	JUL.	TOTAL	REMARKS
CROPPING PATTERN	Seedling					
	T.P.					
	E.I.					
	H.V.					
	ET (m.m)	6.9	7.1	5.7	5.7	
	Kc	1.10	1.05	0.95	0.95	
	ETc = ET * Kc	7.6	7.5	5.4	5.4	
	P (m.m)	2.0	2.0	2.0	2.0	
	C = ETc + P	9.6	9.5	7.4	7.4	
	Days	15	15	15	5	
St = C.Days	144.0	142.5	111.0	37.0		
(2)	ET (m.m)	6.9	7.1	5.7	5.7	
	Kc	1.10	1.05	0.95	0.95	
	ETc = ET * Kc	7.6	7.5	5.4	5.4	
	P (m.m)	2.0	2.0	2.0	2.0	
	C = ETc + P	9.6	9.5	7.4	7.4	
	Days	8	15	15	13	
	St = C.Days	76.8	144.0	111.0	96.2	
	ET (m.m)	6.9	7.1	5.7	5.7	
	Kc	1.10	1.05	0.95	0.95	
	ETc = ET * Kc	7.6	7.5	5.4	5.4	
(3)	P (m.m)	2.0	2.0	2.0	2.0	
	C = ETc + P	9.6	9.5	7.4	7.4	
	Days	8	15	15	13	
	St = C.Days	76.8	144.0	111.0	96.2	
	ET (m.m)	6.9	7.1	5.7	5.7	
	Kc	1.10	1.05	0.95	0.95	
	ETc = ET * Kc	7.6	7.5	5.4	5.4	
	P (m.m)	2.0	2.0	2.0	2.0	
	C = ETc + P	9.6	9.5	7.4	7.4	
	Days	15	15	15	5	
(4)	St = C.Days	144.0	147.0	120.0	111.0	35.0
	Avr = (1) + (2) + (3) / 3	73.6	144.0	114.0	81.4	11.7
	Land Preparation	75.0	75.0			150.0
	Total W.R (f)	148.6	219.0	144.0	81.4	870.7

NOTE:- T.P = Transplanting
 E.I = End of Irrigation
 H.V = Harvesting
 P = Percolation
 ST = Sub-Total
 Avr = Average
 Total W.R(f) = Total Water Requirement of Field

WATER REQUIREMENT OF MAIN WHEAT (MAHOTTARI)

TABLE 4.4.6(3)

MONTH	DEC.	JAN.	FEB.	MAR.	APR.	TOTAL	REMARKS
CROPPING PATTERN	2.3	2.1	2.9	4.9	6.9		
	0.49	0.77	1.05	0.25			
	1.1	1.6	3.0	1.2			
	-	-	-	-			
	1.1	1.6	3.0	1.2			
	15	15	13	15			
	16.5	24.0	39.0	18.0			
	2.3	2.1	2.9	4.9	6.9		
	0.49	0.77	1.05	0.25			
	1.1	1.6	4.4	5.1	1.7		
-	-	-	-				
1.1	1.6	4.4	5.1	1.7			
16	15	13	15	15			
17.6	24.0	66.0	76.5	25.5			
(3)	2.1	2.1	2.9	4.9	6.9		
	0.49	0.77	1.05	1.05	0.25		
	1.0	1.6	2.2	5.1	1.7		
	-	-	-	-			
	1.0	1.6	2.2	5.1	1.7		
	15	16	13	15	15		
	15.0	25.6	33.0	76.5	25.5		
	5.5	15.5	48.0	57.0	17.0	286.4 mm	
	21.0	28.8	45.1	40.0	8.5		
(4)	5.5	21.0	48.0	57.0	17.0	286.4 mm	
(5)							
Total W.R(f)							

NOTE:- T.P = Transplanting
E.I = End of Irrigation
H.V = Harvesting

P = Percolation
ST = Sub-Total
Avr = Average

Total W.R(f) = Total Water Requirement of Field

TABLE 4.4.7(1)

WATER REQUIREMENT OF MAIN PADDY (BANKE)

MONTH	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	REMARKS				
CROPPING PATTERN	Seedling												
	(1) ET (m.m)	4.8	4.6	4.6	4.1	4.1	3.8	3.8	2.6	2.6	1.8		
	Kc	1.10	1.10	1.08	1.05	1.05	1.00	0.95	0.95				
	ETc = ET * Kc	5.3	5.1	5.0	4.3	4.3	3.8	3.6	2.5				
	P (m.m)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
	C = ETc + P	7.3	7.1	7.0	6.3	6.3	5.8	5.6	4.5				
	Days	16	15	16	15	15	16	16	5				
	S t = C * Days	116.8	106.5	112.0	94.5	94.5	87.0	89.6	22.5				
	(2) ET (m.m)		4.6	4.6	4.1	4.1	3.8	3.8	2.6	2.6			
	Kc		1.10	1.10	1.08	1.05	1.05	1.00	0.95	0.95			
ETc = ET * Kc		5.1	5.1	4.4	4.3	4.0	3.8	2.5	2.5				
P (m.m)		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
C = ETc + P		7.1	7.1	6.4	6.3	6.0	5.8	4.5	4.5				
Days		15	16	15	15	16	16	5					
S t = C * Days		106.5	113.6	96.0	94.5	90.0	92.8	67.5	22.5				
(3) ET (m.m)			4.6	4.1	4.1	3.8	3.8	2.6	2.6	1.8			
Kc			1.10	1.10	1.08	1.05	1.05	1.00	0.95	0.95			
ETc = ET * Kc			5.1	4.5	4.4	4.0	4.0	2.6	2.5	1.7			
P (m.m)			2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			
C = ETc + P			7.1	6.5	6.4	6.0	6.0	4.6	4.5	3.7			
Days			16	15	15	16	16	5					
S t = C * Days			113.6	97.5	96.0	90.0	96.0	69.0	67.5	18.5			
(4) Avr = (1) + (2) + (3) / 3		38.9	71.0	113.1	96.0	95.0	89.0	92.8	53.0	30.0	6.2	685.0	
(5) Land Preparation		75.0	75.0									150.0	
Total W.R (f)		113.9	146.0	113.1	96.0	95.0	89.0	92.8	53.0	30.0	6.2	835.0	

NOTE:- T.P = Transplanting
 E.I = End of Irrigation
 H.V = Harvesting

WATER REQUIREMENT OF MAIN WHEAT (BANKE)

TABLE 4.4.7(2)

MONTH	DEC.	JAN.	FEB.	MAR.	APR.	TOTAL	REMARKS
CROPPING PATTERN							
(1) ET (m.m)	1.8	1.8	2.7	4.3	6.4	6.4	
Kc	0.49	0.77	1.05	0.25	0.25		
ETc = ET * Kc	0.9	1.4	2.8	1.1	1.1		
P (m.m)	-	-	-	-	-		
C = ETc + P	0.9	1.4	2.8	1.1	1.1		
Days	15	15	13	15	16		
St = C.Days	13.5	21.0	42.0	16.5	17.6		
ET (m.m)	1.8	1.8	2.7	4.3	6.4		
Kc	0.49	0.77	1.05	1.05	0.25		
ETc = ET * Kc	0.9	1.4	2.8	4.5	1.6		
P (m.m)	-	-	-	-	-		
C = ETc + P	0.9	1.4	2.8	4.5	1.6		
Days	16	15	13	15	15		
St = C.Days	14.4	21.0	42.0	67.5	24.0		
ET (m.m)		1.8	2.7	4.3	6.4		
Kc		0.49	0.77	1.05	0.25		
ETc = ET * Kc		0.9	2.1	4.5	1.6		
P (m.m)		-	-	-	-		
C = ETc + P		0.9	2.1	4.5	1.6		
Days		15	13	15	15		
St = C.Days		13.5	31.5	67.5	24.0		
(4) Avr = (1)+(2)+(3)/3	4.5	18.5	38.5	50.5	16.0	245.5 mm	
(5) Land Preparation							
Total W.R(f)							

Total W.R(f) = Total Water Requirement of Field

P = Percolation
ST = Sub-Total
Avr = Average

NOTE:- T.P = Transplanting
E.I = End of Irrigation
H.V = Harvesting

TABLE 4.4.7(3) WATER REQUIREMENT OF SPRING MAIZE (BANKE)

MONTH	FEB.	MAR.	APR.	MAY	JUN.	JUL.	TOTAL	REMARKS
CROPPING PATTERN								
(1) ET (m.m)		4.3	6.4	7.3	7.3	6.4	6.4	
Kc		1.0	1.05	1.05	1.05	0.95		
ETc = ET * Kc		4.3	6.4	7.7	7.7	6.1		
P (m.m)		-	-	-	-	-		
C = ETc + P		4.3	6.4	7.7	7.7	6.1		
Days		16	15	15	16	15		
St = C.Days		68.8	100.5	115.5	123.2	91.5		
(2) ET (m.m)		4.3	6.4	7.3	7.3	6.4	6.4	
Kc		1.0	1.05	1.05	1.05	0.95	0.95	
ETc = ET * Kc		4.3	6.4	7.7	7.7	6.1	6.1	
P (m.m)		-	-	-	-	-		
C = ETc + P		4.3	6.4	7.7	7.7	6.1	6.1	
Days		8	15	15	16	15	8	
St = C.Days		34.4	96.0	115.5	123.2	91.5	48.8	
(3) ET (m.m)			6.4	6.4	7.3	6.4	6.4	
Kc			1.0	1.05	1.05	1.0	0.95	
ETc = ET * Kc			6.4	6.4	7.7	6.4	6.1	
P (m.m)			-	-	-	-		
C = ETc + P			6.4	6.4	7.7	6.4	6.1	
Days			15	15	16	15	15	
St = C.Days			96.0	96.0	115.5	123.2	96.0	91.5
(4) Avr = (1)+(2)+(3)/3		34.4	96.0	99.0	115.5	123.2	93.0	46.8
(5) Land Preparation		60.0						60.0
Total W.R(f)		94.4	96.0	99.0	115.5	123.2	93.0	667.9

NOTE:- Total W.R(f) = Total Water Requirement of Field

P = Percolation

ST = Sub-Total

Avr = Average

T.P = Transplanting

E.I = End of Irrigation

H.V = Harvesting

TABLE 4.4.8(1) **CALCULATION OF WATER REQUIREMENT BY MODIFIED PENMAN METHOD**
 (Station; Name; Kankai No. 1421) Name of Project; JHAPA

No.	Items	Month												Remarks
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
1	W.Rn ①	1.6	2.2	3.0	4.0	4.3	3.8	3.3	3.5	3.1	2.9	2.2	1.6	
2	(1-w) · f(u) · (ed-ed) ②	0.4	0.7	1.3	1.5	1.1	0.6	0.5	0.6	0.5	0.7	0.8	0.5	
3	ET _o = ① + ②	2.0	2.9	4.3	5.5	5.4	4.4	3.8	4.1	3.6	3.6	3.0	2.1	
4														
5														
6														
7														
8														
9														
10														

TABLE 4.4.8(2) CALCULATION OF WATER REQUIREMENT BY MODIFIED PENMAN METHOD
 (Station; Name; Kankai No. 1421) Name of Project; JHAPA

No.	Month Items	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Remarks
1	Monthly Mean Temperature	15.4	18.2	22.9	26.6	27.1	28.1	27.3	27.9	27.1	25.8	22.1	17.6	
2	f(t)	13.7	14.2	15.2	16.0	16.1	16.3	16.1	16.3	16.1	15.9	15.0	14.2	
3	(ed) f(ed)	14.5 0.17	16.1 0.16	18.4 0.15	23.0 0.13	26.9 0.11	31.9 0.09	32.0 0.09	31.6 0.09	30.5 0.10	25.6 0.12	18.9 0.15	15.5 0.17	
4	n/N f(n/N)	0.67 0.71	0.62 0.65	0.65 0.69	0.65 0.69	0.61 0.64	0.39 0.46	0.27 0.33	0.42 0.48	0.40 0.46	0.58 0.62	0.69 0.73	0.61 0.64	
5	$Rnl = f(t)f(ed) \cdot f(n/N)$ $5 = 2 \times 3 \times 4$	1.8	1.5	1.7	1.5	1.2	0.7	0.5	0.8	0.7	1.2	1.6	1.5	
6	Rns	4.4	4.8	5.9	6.7	6.9	5.6	4.9	5.4	4.8	5.0	4.7	3.9	
7	$Rn = Rns - Rnl$ $7 = 6 - 5$	2.6	3.3	4.2	5.2	5.7	4.9	4.4	4.6	4.1	3.8	3.1	2.4	
8	W	0.62	0.66	0.72	0.76	0.76	0.77	0.76	0.77	0.76	0.75	0.71	0.66	
9	W · Rn	1.6	2.2	3.0	4.0	4.3	3.8	3.3	3.5	3.1	2.9	2.2	1.6	
10														

TABLE 4.4.8(3) CALCULATION OF WATER REQUIREMENT BY MODIFIED PENMAN METHOD

(Station; Name; Kankai No.1421) Name of Project; JHAPA

No.	Items	Month												Remarks				
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC					
1	Monthly Temperature	15.4	18.2	22.9	26.6	27.1	28.1	27.3	27.9	27.1	28.1	27.3	27.9	27.1	25.8	22.1	17.6	(°C)
2	Monthly Relative Humidity	83	77	66	66	75	84	88	84	85	84	88	84	85	77	71	77	(%)
3	ea (mbar)	17.5	20.8	27.9	34.9	35.9	38.0	36.3	37.6	35.9	38.0	36.3	37.6	35.9	33.2	26.6	20.1	
4	ed (mbar)	14.5	16.1	18.4	23.0	26.9	31.9	32.0	31.6	30.5	31.9	32.0	31.6	30.5	25.6	18.9	15.5	ea × R.H
5	(ea-ed) (mber)	3.0	4.7	9.5	11.9	9.0	6.1	4.3	6.0	5.4	6.1	4.3	6.0	5.4	7.6	7.7	4.6	
6	W.V	(km/hr)	1.8	2.5	3.4	4.2	3.0	3.2	2.6	2.3	3.0	3.2	2.6	2.3	1.6	1.3	1.4	
		(km/24)	43.2	60.0	82.0	101.0	79.2	72.0	77.0	62.0	55.0	72.0	77.0	62.0	55.0	38.0	31.0	34.0
7	f(u)	0.38	0.43	0.49	0.54	0.49	0.46	0.45	0.43	0.42	0.46	0.45	0.43	0.42	0.37	0.35	0.34	
8	W	0.62	0.66	0.72	0.76	0.76	0.77	0.76	0.77	0.76	0.77	0.76	0.77	0.76	0.75	0.71	0.66	
9	(1-W)	0.38	0.34	0.28	0.24	0.24	0.23	0.24	0.23	0.24	0.23	0.24	0.23	0.24	0.26	0.29	0.34	
10	$\frac{(1-W) \cdot f(u) \cdot (ea-ed)}{10 = 5 \times 7 \times 9}$	0.4	0.7	1.3	1.5	1.1	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.7	0.8	0.5	

Basic Formular; $E_{To} = C \cdot [W.Rn + (1-W) \cdot f(u) \cdot (ea-ed)]$ C=1.0

TABLE 4.4.8(4) CALCULATION OF WATER REQUIREMENT BY MODIFIED PENMAN METHOD
 (Station; Name; Kankai No. 1421) Name of Project; JHAPA

No.	Month Items	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Remarks
		1	Ra(mm/day)	9.8	11.5	13.7	15.3	16.4	16.7	16.6	15.7	14.3	12.3	
2	Sunshin hrs (n)	6.5	7.0	7.8	8.2	8.1	5.4	3.7	5.5	4.9	6.7	7.5	6.5	Measurement data
3	N	9.7	11.3	12.0	12.7	13.3	13.7	13.5	13.0	12.3	11.6	10.9	10.6	
4	n/N	0.67	0.62	0.65	0.65	0.61	0.39	0.27	0.42	0.40	0.58	0.69	0.61	
5	$(0.25 + 0.5n/N)$	0.59	0.56	0.58	0.58	0.56	0.45	0.39	0.46	0.45	0.54	0.60	0.56	
6	$R_s = Ra(0.25 + 0.5n/N)$	5.8	6.4	7.9	8.9	9.2	7.5	6.5	7.2	6.4	6.6	6.2	5.2	m.m/day
7	$R_{ns} = R_s \times 0.75$	4.4	4.8	5.9	6.7	6.9	5.6	4.9	5.4	4.8	5.0	4.7	3.9	
8														
9														
10														

TABLE 4.4.9(1)

CALCULATION OF WATER REQUIREMENT BY MODIFIED PENMAN METHOD

Name of Project; MAHOTTARI

(Station; Name; JA No.1111)

No.	Items	Month												Remarks
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
1	W.Rn ①	1.7	2.3	3.4	4.4	5.0	4.1	4.4	4.1	3.6	3.3	2.2	1.8	
2	(1-W)f(u) · (ea-ed) ②	0.4	0.6	1.5	2.5	2.1	1.6	0.9	0.9	0.7	0.6	0.5	0.5	
3														
4	ET _o = ① + ② (mm/day)	2.1	2.9	4.9	6.9	7.1	5.7	5.3	5.0	4.3	3.9	2.7	2.3	
5														
6														
7														
8														
9														
10														

J · A = Janakpure

JA = Janakpur Airport

TABLE 4.4.9(2)

CALCULATION OF WATER REQUIREMENT BY MODIFIED PENMAN METHOD

Name of Project; MAHOTTARI

(Station; JA No.1111)

No.	Month Items	Name of Project; MAHOTTARI												Remarks
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
1	Monthly Mean Temperatur	15.4	17.4	22.7	27.6	28.8	29.7	28.5	28.9	27.7	26.7	21.3	17.5	
2	f(T)	13.6	14.0	15.2	16.0	16.5	16.7	16.5	16.5	16.2	16.1	14.8	14.1	
3	ed	15.1	16.4	18.8	23.9	29.6	34.8	34.3	34.9	32.4	29.5	20.8	17.0	
	f(ed)	0.17	0.16	0.14	0.12	0.10	0.08	0.08	0.08	0.09	0.11	0.14	0.15	
4	(n)/N	0.72	0.77	0.75	0.75	0.74	0.46	0.50	0.54	0.55	0.73	0.77	0.80	
	f(n/N)	0.73	0.79	0.78	0.78	0.78	0.51	0.55	0.60	0.60	0.73	0.79	0.82	
5	Rnl = f(t)·f(ed)·f(n/N)	1.7	1.8	1.7	1.5	1.3	0.7	0.7	0.8	0.9	1.3	1.4	1.7	
6	Rns	4.4	5.4	6.4	7.2	7.7	6.0	6.3	6.1	5.6	5.7	4.8	4.4	
7	Rn = Rns - Rnl	2.7	3.6	4.7	5.7	6.4	5.3	5.6	5.3	4.7	4.4	3.2	2.7	
8	W	0.62	0.65	0.72	0.77	0.78	0.78	0.78	0.78	0.77	0.76	0.69	0.65	
9	W · Rn	1.7	2.3	3.4	4.4	5.0	4.1	4.4	4.1	3.6	3.3	2.2	1.8	
10														

JA ; Janakpur Airport

TABLE 4.4.9(3) **CALCULATION OF WATER REQUIREMENT BY MODIFIED PENMAN METHOD**
 (Station; Name; JA No.1111) Name of Project; MAHOTTARI

No.	Items	Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Remarks
1	Monthly Temperature		15.4	17.4	22.7	27.6	28.8	29.7	28.5	28.9	27.7	26.7	21.3	17.5	(°C)
2	Monthly Relative Humidity		86	82	69	65	74	82	88	87	88	85	83	85	(%)
3	ea(mber)		17.6	20.0	27.3	36.8	40.0	42.4	39.0	40.1	36.8	34.7	25.0	20.0	
4	ed (mbar)		15.1	16.4	18.8	23.9	29.6	34.8	34.3	34.9	32.4	29.5	20.8	17.0	eaXR.H
5	(ea-ed) (mbar)		2.5	3.6	8.5	12.9	10.4	7.6	4.7	5.2	4.4	5.2	4.2	3.0	
6	W.V (km/hr)		2.8	3.7	5.4	8.9	9.8	10.2	9.8	8.2	6.4	3.4	2.8	2.5	
		(km/24)	67.2	88.8	129.6	213.6	235.2	244.8	235.2	196.8	153.6	81.6	67.2	60.0	
7	f(u)		0.45	0.51	0.62	0.85	0.91	0.93	0.91	0.80	0.68	0.49	0.45	0.43	
8	W		0.62	0.65	0.72	0.77	0.78	0.78	0.78	0.78	0.77	0.76	0.69	0.65	
9	(1-W)		0.38	0.35	0.28	0.23	0.22	0.22	0.22	0.22	0.23	0.24	0.31	0.35	
10	$(1-W) \cdot f(u) \cdot (ea-ed)$ $10 = 5 \times 7 \times 9$		0.4	0.6	1.5	2.5	2.1	1.6	0.9	0.9	0.7	0.6	0.5	0.5	

Basic Formular; $E_{To} = C [W \cdot R_n + (1-W) \cdot f(u) \cdot (ea-ed)]$ C=1.0 JA; Janakpur Airport

TABLE 4.4.9(4)

CALCULATION OF WATER REQUIREMENT BY MODIFIED PENMAN METHOD

Name of Project; MAHOTTARI

(Station; Name; JA No.1111)

No.	Month Items	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Remarks
		1	Ra	9.6	11.3	13.6	15.3	16.5	16.8	16.7	15.7	14.2	12.2	
2	Sunshine Hrs Data (n)	7.6	8.6	9.0	9.6	10.0	6.4	6.9	7.1	6.8	8.5	8.3	8.3	
3	N	10.6	11.2	12.0	12.8	13.5	13.9	13.7	13.1	12.4	11.6	10.8	10.4	(N = 27°)
4	(n)/N	0.72	0.77	0.75	0.75	0.74	0.46	0.50	0.54	0.55	0.73	0.77	0.80	
5	$0.25 + 0.5(n)/N$	0.61	0.64	0.63	0.63	0.62	0.48	0.50	0.52	0.53	0.62	0.64	0.65	
6	$R_s = Ra(0.25 + 0.5(n)/N)$	5.8	7.2	8.6	9.6	10.2	8.1	8.4	8.2	7.5	7.6	6.5	5.9	
7	$R_{ns} = R_s \times 0.75$	4.4	5.4	6.4	7.2	7.7	6.0	6.3	6.1	5.6	5.7	4.8	4.4	
8														
9														
10														

JA; Janakpur Airport

CALCULATION OF WATER REQUIREMENT BY MODIFIED PENMAN METHOD

TABLE 4.4.10(1)

(Station: Name; Khajura No. 0409) Name of Project; BANKE

No.	Month Items	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Remarks
		1	W · Rn ①	1.5	2.2	3.0	3.9	4.6	4.6	3.9	3.9	3.5	3.2	
2	(1-W) · f(u) · (ea-ed) ②	0.3	0.5	1.3	2.5	2.7	1.8	0.9	0.7	0.6	0.6	0.5	0.4	
3														
4	$E_{To} = ① + ②$ (m · m/day)	1.8	2.7	4.3	6.4	7.3	6.4	4.8	4.6	4.1	3.8	2.6	1.8	
5														
6														
7														
8														
9														
10														

TABLE 4.4.10(2) CALCULATION OF WATER REQUIREMENT BY MODIFIED PENMAN METHOD

(Station; Name; Khajura No. 0409) Name of Project; **BANKE**

No.	Month Items	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Remarks
1	Monthly Mean Temperature	14.3	16.5	21.3	27.4	30.1	30.6	29.3	29.2	27.9	25.2	20.3	16.0	(°C)
2	f(T)	13.5	13.9	14.9	16.2	16.8	16.9	16.6	16.5	16.3	15.7	14.7	13.8	
3	ed	14.4	15.6	17.3	19.3	24.8	31.6	34.3	34.5	32.3	26.6	19.4	15.7	
	f(ed)	0.17	0.17	0.16	0.15	0.12	0.09	0.08	0.08	0.09	0.11	0.15	0.17	
4	n/N	0.69	0.74	0.72	0.70	0.71	0.56	0.39	0.46	0.52	0.73	0.79	0.68	
	f(n/N)	0.72	0.77	0.75	0.73	0.74	0.60	0.45	0.51	0.57	0.76	0.81	0.71	
5	Rn _l = f(T) · f(ed) · f(n/N)	1.7	1.8	1.8	1.8	1.5	0.9	0.6	0.7	0.8	1.3	1.8	1.7	
6	Rns	4.2	5.2	6.1	6.9	7.4	6.7	5.6	5.7	5.4	5.6	4.8	3.9	
7	Rn = Rns - Rn _l	2.5	3.4	4.3	5.1	5.9	5.8	5.0	5.0	4.6	4.3	3.0	2.2	
8	W	0.61	0.64	0.70	0.76	0.78	0.79	0.78	0.78	0.77	0.74	0.69	0.64	
9	W × Rn	1.5	2.2	3.0	3.9	4.6	4.6	3.9	3.9	3.5	3.2	2.1	1.4	
10														

TABLE 4.4.10(3)

CALCULATION OF WATER REQUIREMENT BY MODIFIED PENMAN METHOD

Name of Project; BANKE

(Station; Name; Khajura No. 0409)

No.	Month Items	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Remarks
1	Monthly Temperature	14.3	16.5	21.3	27.4	30.1	30.6	29.3	29.2	27.9	25.2	20.3	16.0	(°C)
2	Monthly Relative Humidity	88	83	68	53	58	72	84	85	86	83	81	86	(%)
3	ea (mbar)	16.4	18.8	25.4	36.5	42.7	43.9	40.8	40.6	37.6	32.1	23.9	18.2	
4	ed (mbar)	14.4	15.6	17.3	19.3	24.8	31.6	34.3	34.5	32.3	26.6	19.4	15.7	ea × R.H
5	(ea - ed) (mbar)	2.0	3.2	8.1	17.2	17.9	12.3	6.5	6.1	5.3	5.5	4.5	2.5	
6	(km/hr)	1.8	3.1	3.9	5.3	6.5	6.6	5.3	4.2	3.2	2.0	1.6	1.9	
	W·V (km/24)	43.2	74.4	93.6	127.2	156.0	158.4	127.2	100.8	76.8	48.0	38.4	45.6	
7	f(u)	0.39	0.47	0.52	0.61	0.69	0.70	0.61	0.54	0.48	0.40	0.38	0.40	
8	W	0.61	0.64	0.70	0.76	0.78	0.79	0.78	0.78	0.77	0.74	0.69	0.64	
9	(1-W)	0.39	0.36	0.30	0.24	0.22	0.21	0.22	0.22	0.23	0.26	0.31	0.36	
10	$\frac{(1-W) \cdot f(u) \cdot (ea-ed)}{10=5 \times 7 \times 9}$	0.3	0.5	1.3	2.5	2.7	1.8	0.9	0.7	0.6	0.6	0.5	0.4	

Basic Formular; $ETo = C [W \cdot Ru + (1 - W) \cdot f(u) \cdot (ea - ed)]$ C = 1.0

TABLE 4.4.10(4) CALCULATION OF WATER REQUIREMENT BY MODIFIED PENMAN METHOD

(Station; Name; Khajure No. 0409) Name of Project; BANKE

No.	Items	Month												Remarks
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
1	Ra	9.3	11.1	13.4	15.3	16.5	16.8	16.7	15.7	14.1	12.0	9.9	8.8	(N=28°)
2	Sunshine Hrs. Data (n)	7.3	8.3	8.4	8.9	9.4	9.8	5.4	5.9	6.7	8.6	8.4	7.2	
3	N	10.6	11.2	12.0	12.8	13.5	13.9	13.7	13.1	12.4	11.6	10.8	10.4	(N=28°)
4	(n)/N	0.69	0.74	0.70	0.70	0.70	0.56	0.39	0.45	0.54	0.74	0.78	0.69	
5	$0.25 + 0.5(n)/N$	0.60	0.62	0.60	0.60	0.60	0.53	0.45	0.48	0.52	0.62	0.64	0.60	
6	$R_s = Ra(0.25 + 0.5(n)/N)$	5.58	6.88	8.04	9.18	9.90	8.90	7.52	7.54	7.33	7.44	6.34	5.28	
7	$R_{ns} = R_s \times 0.75$	4.19	5.16	6.03	6.89	7.43	6.68	5.64	5.66	5.50	5.58	4.76	3.96	
8														
9														
10														

4.4.3. Disbursement schedule

JHAPA DISTRICT PRIORITY SUB-AREA
Proposed Disbursement Schedule

No. of D. T. W.; 113
Project Area; 1,700 (ha)
Unit: 1,000 NRS

TABLE 4.4.11(1)

Description	Amount		1 Year		2 Year		3 Year		4 Year		5 Year		6 Year		7 Year		8 Year		9 Year		10 Year		
	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	
A Well Development	24,747	146,561	171,308																				
B Pump Station	121,588	326,118	447,706																				
C Irrigation Canal System	146,335	107,124	253,459																				
D Drainage system	42,940	9,831	52,771																				
E Farm Road System	173,455	115,599	289,054																				
F Land Acquisition	237,300	-	237,300		47,460	-	47,460																
G Building for O & M	7,527	3,980	11,507	3,764	1,990	3,763	1,990																
H Procurement of O & M and Office Equipment	2,940	52,170	55,110		1,176	20,868	882	15,651															
I Technical Support	109,030	304,530	412,560	21,606	91,359	21,606	91,359	16,205	6,091	5,401	6,091	5,401	6,091	5,401	6,091	5,401	6,089	5,403					
J Project Administration	107,730	-	107,730	9,696	-	9,696	-	9,696	-	9,696	-	11,853	-	11,850	-	11,849	-	11,848	-				
Total Investment Cost	972,592	1,065,913	2,038,505	35,066	93,344	83,701	114,217	79,644	107,010	108,934	44,862	154,232	129,448	156,389	129,448	108,926	129,448	108,926	129,445	74,236	100,237	62,538	88,449
Physical Contingencies	97,259	106,591	203,850	3,507	9,335	8,370	11,422	7,964	10,701	10,893	4,486	15,423	12,945	15,639	12,945	10,892	12,945	10,893	12,944	7,424	10,024	6,254	8,844
Price Escalation	486,296	159,887	646,183	17,533	14,002	41,851	17,133	39,822	16,052	54,467	6,729	77,116	19,417	78,194	19,417	54,463	19,417	54,463	19,417	37,118	15,036	31,269	13,267
Total Project Cos	1,556,147	1,332,391	2,888,538	56,106	116,686	133,922	142,772	127,430	133,763	174,294	56,077	246,771	161,810	250,222	161,810	174,281	161,810	174,282	161,806	118,778	125,297	100,061	110,560

**MAHOTTARI DISTRICT PRIORITY SUB-AREA
Proposed Disbursement Schedule**

No. of D. T. W. : 92
Project Area : 7,000 (ha)
Unit : 1,000 NRs

TABLE 4.4.11(2)

Description	Amount		1 Year		2 Year		3 Year		4 Year		5 Year		6 Year		7 Year		8 Year		9 Year		10 Year	
	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C
A Well Development	20,148	119,324	139,472																			
B Pump Station	69,301	188,875	238,176																			
C Irrigation Canal System	62,791	45,965	108,756																			
D Drainage System	18,392	4,237	22,629																			
E Farm Road System	74,428	49,619	124,047																			
F Land Acquisition	103,170	-	103,170		25,793	-	25,793															
G Building for O & M	5,018	2,653	7,671	2,509	1,827	2,059	1,326															
H Procurement of O & M and Office Equipment	1,960	34,780	36,740	980	17,390	980	17,390	980	17,390													
I Technical Support	72,020	203,020	275,040	14,404	60,906	14,404	60,906	14,404	60,906	14,404	8,122	3,601	4,060	3,601	4,060	3,601	4,060	3,601				
J Project Administration	71,820	-	71,820	7,253	-	7,253	-	7,253	-	7,253	-	8,561	-	8,561	-	8,561	-	8,561	-	8,564	-	-
Total Investment Cost	499,048	628,473	1,127,521	24,166	62,233	50,939	79,622	48,430	78,296	66,056	20,527	90,690	84,146	64,896	84,146	64,895	84,144	46,287	67,680	42,689	87,679	
Physical Contingencies	49,505	62,947	112,452	2,417	6,223	5,094	7,962	4,843	7,830	6,606	2,053	9,069	8,415	6,490	8,415	6,490	8,414	4,628	6,768	4,628	6,767	
Price Escalation	249,524	94,271	343,795	12,083	9,335	25,470	11,943	24,215	11,744	33,028	3,079	45,345	12,622	32,448	12,622	32,448	23,143	10,152	21,344	10,152	21,344	10,152
Total Project Cost	798,477	785,591	1,584,068	38,666	77,791	81,503	99,527	77,488	97,870	105,690	25,659	145,104	105,183	103,834	105,183	103,833	105,180	74,058	84,600	68,301	84,598	

BANKE-BARDIYA DISTRICT PRIORITY SUB-AREA
Proposed Disbursement Schedule

No. of D. T. W. : 51
Project Area : 8,000 (ha)
Unit : 1,000 NRS

TABLE 4.4.11(3)

Description	Amount		1 Year		2 Year		3 Year		4 Year		5 Year		6 Year		7 Year		8 Year		9 Year		10 Year	
	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C
A Well Development	11,169	66,147	77,316																			
B Pump Station	54,672	141,876	196,248																			
C Irrigation Canal System	70,431	51,561	121,992																			
D Drainage system	20,655	4,743	25,398																			
E Farm Road System	83,487	55,641	139,128																			
F Land Acquisition	114,750	-	114,750		28,688	-	28,688	-	28,687	-	28,687	-	28,687	-	28,687	-	28,687	-	28,687	-	28,687	-
G Building for O & M	5,018	2,553	7,671	2,509	1,327	2,509	1,326															
H Procurement of O & M and Office Equipment	1,960	34,780	36,740		980	17,390	980	17,390														
I Technical Support	72,020	203,020	275,040	14,404	50,906	14,404	60,906	14,404	60,906	7,202	5,076	7,202	5,076	7,202	5,076	7,202	5,075	7,202	5,075	7,202	5,075	7,202
J Project Administration	71,820	-	71,820	8,160	-	8,160	-	8,160	-	9,468	-	9,468	-	9,468	-	9,468	-	9,468	-	9,468	-	9,468
Total Investment Cost	505,982	560,121	1,066,103	25,073	62,233	54,741	79,622	52,232	48,296	66,229	18,987	105,452	84,994	76,774	84,992	76,773	84,992	48,698	48,698	66,005	66,005	66,005
Physical Contingencies	50,598	56,012	106,610	2,507	6,223	5,474	7,962	5,223	7,830	6,623	1,999	10,546	8,499	7,677	8,499	7,677	8,499	4,871	4,871	6,801	6,801	6,801
Price Escalation	252,991	84,018	337,009	12,537	9,335	27,371	11,943	26,116	11,744	33,115	2,849	52,731	12,749	38,387	12,749	38,387	12,749	24,347	24,347	9,900	9,900	9,900
Total Project Cost	809,571	700,151	1,509,722	40,117	77,791	87,586	99,527	83,571	97,870	105,967	23,735	168,739	106,242	122,838	106,240	122,837	106,240	77,916	77,916	82,506	82,506	82,506

COST ESTIMATE OF CASE STUDY (I - III)

TABLE 4.4.12

No.	Work Items	Case Study I			Case Study II			Case Study III			Remarks
		L/C	F/C	T/C	L/C	F/C	T/C	L/C	F/C	T/C	
1	Well Development										Unit 10 ³ NRs A = 100 (ha)
	(1) Construction	185	655	840	296	1,048	1,344	444	1,572	2,016	
	(2) Material Supply Sub - T	34	642	676	54	1,028	1,082	81	1,541	1,622	
		219	1,297	1,516	350	2,076	2,426	525	3,113	3,638	
2	Pump Station										Including electric motor
	(1) Pump Sets	212	1,097	1,309	216	1,116	1,332	216	1,116	1,332	
	(2) Pump House	198	116	314	396	232	628	594	348	942	
	(3) Control Chamber	116	140	256	232	280	512	348	420	768	
	(4) Power Supply Sub - T	180	930	1,110	360	1,860	2,220	540	2,790	3,330	
		706	2,283	2,989	1,204	3,488	4,692	1,698	4,674	6,372	
3	Irrigation Canal System										
	(1) Pipe line System	696	552	1,248	584	439	1,023	514	352	866	
	(2) Alfalfa Valve	83	80	163	69	67	136	66	64	130	
	(3) Terminal Irrigation Sub - T	84	-	84	103	-	103	101	-	101	
		863	632	1,495	756	506	1,262	681	416	1,097	
4	Drainage System										
	(1) Dearth Works	104	-	104	122	-	122	131	-	131	
	(2) Structures Sub - T	149	58	207	176	68	244	189	73	262	
		253	58	311	298	68	366	320	73	393	
5	Farm Road System	1,023	682	1,705	1,023	682	1,705	1,023	682	1,705	
6	Procurement of O & M and Office Equipment	26	460	486	26	460	486	26	460	486	
7	Technical Supports	950	2,680	3,630	950	2,680	3,630	950	2,680	3,630	
8	Project Administration	950	-	950	950	-	950	950	-	950	
9	Land Acquisition	1,410	-	1,410	1,740	-	1,740	1,890	-	1,890	
	TOTAL INVESTMENT COST	6,400	8,092	14,492	7,297	9,960	17,257	8,063	12,098	20,161	
	us\$ Equivalent (×1,000)	128	162	290	146	199	345	161	242	403	
	Per ha (×1,000)	1.28	1.62	2.90	1.46	1.99	3.45	1.61	2.42	4.03	
10	Physical Contingence(10%)	640	809	1,449	730	996	1,726	806	1,210	2,016	
11	Price Escalation	640	162	802	730	199	929	806	242	1,048	L/C 10% for T.I.C F/C 2% for T.I.C
12	TOTAL PROJECT COST	7,680	9,063	16,743	8,757	11,155	19,912	9,675	13,550	23,225	
	us\$ Equivalent (×1,000)	154	181	335	175	223	398	194	271	465	

4.5 Evaluation of Groundwater Resources

4.5.1. Detail of Basin Structure

 HYDROLOGIC CIRCULATION BY SYNTHETIC STORAGE MODEL *****

 JHAPA DISTRICT BASIN *****

NUMBER OF SUB-BASIN = 37
 POTENTIAL MONTHLY EVAPOTRANSPIRATION (MM/DAY)
 1 2 3 4 5 6 7 8 9 10 11 12
 1.5 3.0 4.0 6.0 6.0 5.5 4.5 5.0 5.0 4.0 3.0 2.0
 YEARLY DATA BASIN/LAYERS ARE 0 0 0 0 0 0
 YEARLY DATA BASIN/LAYERS ARE 0 1 1 1 1 0
 YEARLY DATA BASIN/LAYERS ARE 0 17

***** SUB-BASIN NO. 1 (CASE 1) *****

AREA = 1181.542 SQ.KM
 RAINFALL RATE = 1.20
 CONNECT TO D/S BASIN = 8
 NUMBER OF TANKS = 3
 RATE OF DRAFR = .00
 ADDITIONAL DRAFT = .00 CUM/DAY

TANK DIMENSIONS

TANK NO.	COEFFICIENTS	HEIGHTS	NOUT	INITIAL W.L.	RATE OF ET
TANK NO. 1	.0300	.0000	0	.0000	.700
	.0180	20.000	8	50.000	.550
	.0800	110.000	8	.0010	.0020
	.3500	200.000	8	.0050	.0000
TANK NO. 2	.0180	.0000	0	.0000	.700
	.0450	50.000	8	210.000	.550
	.0000	8.000	8	.0010	.0020
	.0000	160.000	8	.0050	.0000
TANK NO. 3	.0300	.0000	0	.0000	.700
	.0180	20.000	8	50.000	.550
	.0800	110.000	8	.0010	.0020
	.3500	200.000	8	.0050	.0000

GW TANK INTERCONNECTION 0 0 0 0

***** SUB-BASIN NO. 2 (CASE 1) *****

AREA = 5.225 SQ.KM
 RAINFALL RATE = 1.00
 CONNECT TO D/S BASIN = 9
 NUMBER OF TANKS = 2
 RATE OF DRAFR = .00
 ADDITIONAL DRAFT = .00 CUM/DAY

TANK DIMENSIONS

TANK NO.	COEFFICIENTS	HEIGHTS	NOUT	INITIAL W.L.	RATE OF ET
TANK NO. 1	.0300	.0000	0	.0000	.700
	.1500	10.000	9	.0000	.550
	.4500	23.000	9	.0030	.1000
	.0000	9.000	9	.0000	.1000
TANK NO. 2	.0300	.0000	0	.0000	.700
	.1500	10.000	9	.0000	.550
	.4500	23.000	9	.0030	.1000
	.0000	9.000	9	.0000	.1000

GW TANK INTERCONNECTION 0 0 0 0

***** SUB-BASIN NO. 3 (CASE 1) *****

AREA = 160.385 SQ.KM
 RAINFALL RATE = 1.10
 CONNECT TO D/S BASIN = 5
 NUMBER OF TANKS = 3
 RATE OF DRAFR = .00
 ADDITIONAL DRAFT = .00 CUM/DAY

TANK DIMENSIONS

TANK NO.	COEFFICIENTS	HEIGHTS	NOUT	INITIAL W.L.	RATE OF ET
TANK NO. 1	.0350	.0000	0	.0000	.700
	.1000	15.000	5	.0000	.550
	.4500	30.000	5	.0250	.0800
	.0000	5.000	5	.0000	.0800
TANK NO. 2	.0350	.0000	0	.0000	.700
	.1000	15.000	5	.0000	.550
	.4500	30.000	5	.0250	.0800
	.0000	5.000	5	.0000	.0800
TANK NO. 3	.0350	.0000	0	.0000	.700
	.1000	15.000	5	.0000	.550
	.4500	30.000	5	.0250	.0800
	.0000	5.000	5	.0000	.0800

GW TANK INTERCONNECTION 0 0 0 0

***** SUB-BASIN NO. 4 (CASE 1) *****

AREA = 66.535 SQ.KM
 RAINFALL RATE = 1.10
 CONNECT TO D/S BASIN = 7
 NUMBER OF TANKS = 3
 RATE OF DRAFR = .00
 ADDITIONAL DRAFT = .00 CUM/DAY

TANK DIMENSIONS

TANK NO.	COEFFICIENTS	HEIGHTS	NOUT	INITIAL W.L.	RATE OF ET
TANK NO. 1	.0350	.0000	0	.0000	.700
	.1000	15.000	7	.0000	.550
	.4500	30.000	7	.0280	.0800
	.0000	7.000	7	.0000	.0800
TANK NO. 2	.0350	.0000	0	.0000	.700
	.1000	15.000	7	.0000	.550
	.4500	30.000	7	.0280	.0800
	.0000	7.000	7	.0000	.0800
TANK NO. 3	.0350	.0000	0	.0000	.700
	.1000	15.000	7	.0000	.550
	.4500	30.000	7	.0280	.0800
	.0000	7.000	7	.0000	.0800

GW TANK INTERCONNECTION 0 0 0 0

***** SUB-BASIN NO. 5 (CASE 1) *****

AREA = 58.984 SQ.KM
 RAINFALL RATE = 1.00
 CONNECT TO D/S BASIN = 9
 NUMBER OF TANKS = 2
 RATE OF DRAFR = .00
 ADDITIONAL DRAFT = .00 CUM/DAY

TANK DIMENSIONS
 TANK NO. 1 COEFFICIENTS .0300 .0100 .3000 .0000
 HEIGHTS .000 15.000 100.000 .000
 NOUT 0 9 9 9
 INITIAL W.L. .000
 RATE OF ET .700
 TANK NO. 2 COEFFICIENTS .0600 .0050 .0000 .6000
 HEIGHTS .000 .000 30.000 13.000
 NOUT 0 9 0 9
 INITIAL W.L. 20.000
 RATE OF ET .550
 GW TANK INTERCONNECTION 0 9 6 0
 ***** AQUIFER NO. 1 *****
 COEFFICIENTS .000 5.000 1.500 .000
 G-HEIGHT .000 100.000 136.000 .000
 AQUIFER THICK 27.00
 AQUIFER HEIGHT 130.00
 AQUICL. THICK .50
 ACL. LEAKANCE 5.00E-01
 SPEC. YIELD .05000
 INITIAL W.L. 150.100
 GROUND LEVEL 152.00
 MAX. STORAGE 64882400.0
 ***** AQUIFER NO. 2 *****
 COEFFICIENTS .000 .500 1.000 .000
 AQUIFER THICK 1.00
 AQUIFER HEIGHT 128.50
 AQUICL. THICK 5.00
 ACL. LEAKANCE 2.00E-04
 SPEC. YIELD .00050
 INITIAL W.L. 150.400
 ***** AQUIFER NO. 3 *****
 COEFFICIENTS .000 .200 1.000 .000
 AQUIFER THICK 23.50
 AQUIFER HEIGHT 100.00
 AQUICL. THICK 50.00
 ACL. LEAKANCE 1.30E-05
 SPEC. YIELD .00050
 INITIAL W.L. 150.500
 ***** AQUIFER NO. 4 *****
 COEFFICIENTS .000 .100 .300 .000
 AQUIFER THICK 70.00
 AQUIFER HEIGHT -20.00
 SPEC. YIELD .00100
 INITIAL W.L. 151.000

***** SUB-BASIN NO. 6 (CASE 1) *****

AREA = 20.142 SQ.KM
 RAINFALL RATE = 1.00
 CONNECT TO D/S BASIN = 11
 NUMBER OF TANKS = 2
 RATE OF DRAFR = .00
 ADDITIONAL DRAFT = .00 CUM/DAY

TANK DIMENSIONS
 TANK NO. 1 COEFFICIENTS .0400 .0100 .3500 .0000
 HEIGHTS .000 15.000 100.000 .000
 NOUT 0 11 11 11
 INITIAL W.L. .000
 RATE OF ET .700
 TANK NO. 2 COEFFICIENTS .0500 .0050 .1000 .6000
 HEIGHTS .000 .000 30.000 50.000
 NOUT 0 11 0 11
 INITIAL W.L. 10.000
 RATE OF ET .550
 GW TANK INTERCONNECTION 0 11 7 5
 ***** AQUIFER NO. 1 *****
 COEFFICIENTS .000 8.000 1.500 1.500
 G-HEIGHT .000 110.000 136.000 136.000
 AQUIFER THICK 27.00
 AQUIFER HEIGHT 138.00
 AQUICL. THICK 1.00
 ACL. LEAKANCE 4.00E-01
 SPEC. YIELD .04000
 INITIAL W.L. 152.200
 GROUND LEVEL 165.00
 MAX. STORAGE 21753360.0
 ***** AQUIFER NO. 2 *****
 COEFFICIENTS .000 .200 .300 1.000
 AQUIFER THICK 1.00
 AQUIFER HEIGHT 136.50
 AQUICL. THICK 2.00
 ACL. LEAKANCE 1.15E-03
 SPEC. YIELD .00100
 INITIAL W.L. 155.100
 ***** AQUIFER NO. 3 *****
 COEFFICIENTS .000 1.000 .300 1.000
 AQUIFER THICK 19.50
 AQUIFER HEIGHT 115.00
 AQUICL. THICK 50.00
 ACL. LEAKANCE 8.00E-06
 SPEC. YIELD .00050
 INITIAL W.L. 154.700
 ***** AQUIFER NO. 4 *****
 COEFFICIENTS .000 .020 .100 .300
 AQUIFER THICK 65.00
 AQUIFER HEIGHT .00
 SPEC. YIELD .00100
 INITIAL W.L. 154.500

***** SUB-BASIN NO. 7 (CASE 1) *****

AREA = 111.100 SQ.KM
 RAINFALL RATE = 1.00
 CONNECT TO D/S BASIN = 12
 NUMBER OF TANKS = 2
 RATE OF DRAFR = .00
 ADDITIONAL DRAFT = .00 CUM/DAY

TANK DIMENSIONS
 TANK NO. 1 COEFFICIENTS .0400 .0100 .3500 .0000
 HEIGHTS .000 15.000 100.000 .000
 NOUT 0 12 12 12
 INITIAL W.L. .000
 RATE OF ET .700
 TANK NO. 2 COEFFICIENTS .0400 .0050 .0000 .6000
 HEIGHTS .000 .000 20.000 55.000
 NOUT 0 12 0 12
 INITIAL W.L. 30.000
 RATE OF ET .550
 GW TANK INTERCONNECTION 0 12 28 6
 ***** AQUIFER NO. 1 *****
 COEFFICIENTS .000 5.000 1.500 1.500
 G-HEIGHT .000 120.000 156.000 136.000
 AQUIFER THICK 27.00
 AQUIFER HEIGHT 156.00
 AQUICL. THICK 1.50
 ACL. LEAKANCE 4.67E-03
 SPEC. YIELD .03500
 INITIAL W.L. 180.000
 GROUND LEVEL 183.00
 MAX. STORAGE 104989500.0
 ***** AQUIFER NO. 2 *****
 COEFFICIENTS .000 .300 .500 .300
 AQUIFER THICK 19.50
 AQUIFER HEIGHT 135.00
 AQUICL. THICK 5.50
 ACL. LEAKANCE 2.18E-05
 SPEC. YIELD .00010
 INITIAL W.L. 179.600
 ***** AQUIFER NO. 3 *****
 COEFFICIENTS .000 .200 1.000 .300
 AQUIFER THICK 29.50
 AQUIFER HEIGHT 100.00
 AQUICL. THICK 50.00
 ACL. LEAKANCE 1.00E-05
 SPEC. YIELD .00050
 INITIAL W.L. 179.400
 ***** AQUIFER NO. 4 *****
 COEFFICIENTS .000 .100 1.500 .100
 AQUIFER THICK 50.00
 AQUIFER HEIGHT .00
 SPEC. YIELD .00250
 INITIAL W.L. 179.000

***** SUB-BASIN NO. 8 (CASE 1) *****

AREA = 48.365 SQ.KM
 RAINFALL RATE = 1.00
 CONNECT TO D/S BASIN = 13
 NUMBER OF TANKS = 2
 RATE OF DRAFR = .00
 ADDITIONAL DRAFT = .00 CUM/DAY

TANK DIMENSIONS
 TANK NO. 1 COEFFICIENTS .0400 .0100 .3500 .0000
 HEIGHTS .000 15.000 60.000 .000
 NOUT 0 13 13 13
 INITIAL W.L. .000
 RATE OF ET .700
 TANK NO. 2 COEFFICIENTS .0001 .0050 .0220 .8000
 HEIGHTS .000 .000 205.000 215.000
 NOUT 0 13 0 13
 INITIAL W.L. 150.000
 RATE OF ET .550
 GW TANK INTERCONNECTION 0 13 9 33
 ***** AQUIFER NO. 1 *****
 COEFFICIENTS 5.000 10.000 5.000 5.000
 G-HEIGHT .000 80.000 90.000 85.000
 AQUIFER THICK 30.00
 AQUIFER HEIGHT 85.00
 AQUICL. THICK 1.00
 ACL. LEAKANCE 3.00E-01
 SPEC. YIELD .03000
 INITIAL W.L. 113.300
 GROUND LEVEL 115.00
 MAX. STORAGE 43528500.0
 ***** AQUIFER NO. 2 *****
 COEFFICIENTS .500 .100 .100 .100
 AQUIFER THICK 1.00
 AQUIFER HEIGHT 83.00
 AQUICL. THICK 1.90
 ACL. LEAKANCE 1.58E-04
 SPEC. YIELD .00100
 INITIAL W.L. 112.700
 ***** AQUIFER NO. 3 *****
 COEFFICIENTS .500 .100 .100 .100
 AQUIFER THICK 29.00
 AQUIFER HEIGHT 52.10
 AQUICL. THICK 38.00
 ACL. LEAKANCE 5.26E-06
 SPEC. YIELD .00020
 INITIAL W.L. 112.500
 ***** AQUIFER NO. 4 *****
 COEFFICIENTS 1.000 .100 .100 .100
 AQUIFER THICK 15.00
 AQUIFER HEIGHT .90
 SPEC. YIELD .00150
 INITIAL W.L. 112.000

***** SUB-BASIN NO. 9 (CASE 1) *****

AREA = 56.512 SQ.KM
 RAINFALL RATE = 1.00
 CONNECT TO D/S BASIN = 14
 NUMBER OF TANKS = 2
 RATE OF DRAFR = .00
 ADDITIONAL DRAFT = .00 CUM/DAY

TANK DIMENSIONS
 TANK NO. 1 COEFFICIENTS .0400 .0100 .3000 .0000
 HEIGHTS .000 15.000 60.000 .000
 NOUT 0 14 14 14
 INITIAL W.L. .000
 RATE OF ET .700
 TANK NO. 2 COEFFICIENTS .0100 .0050 .0000 .8000
 HEIGHTS .000 .000 100.000 20.000
 NOUT 0 14 0 14
 INITIAL W.L. .000
 RATE OF ET .550

GW TANK INTERCONNECTION 5 14 10 8

***** AQUIFER NO. 1 *****
 COEFFICIENTS 5.000 20.000 1.500 5.000
 G-HEIGHT 100.000 70.000 95.000 90.000
 AQUIFER THICK 22.00
 AQUIFR HEIGHT 92.00
 AQUICL. THICK 3.00
 ACL. LEAKANCE 9.33E-04
 SPEC. YIELD .03500
 INITIAL W.L. 113.500
 GROUND LEVEL 115.00
 MAX. STORAGE 45492160.0

***** AQUIFER NO. 2 *****
 COEFFICIENTS .100 2.000 .500 .100
 AQUIFER THICK 30.00
 AQUIFR HEIGHT 60.00
 AQUICL. THICK 15.00
 ACL. LEAKANCE 1.33E-05
 SPEC. YIELD .00010
 INITIAL W.L. 113.700

***** AQUIFER NO. 3 *****
 COEFFICIENTS .200 1.000 1.000 .100
 AQUIFER THICK 25.00
 AQUIFR HEIGHT 20.00
 AQUICL. THICK 80.00
 ACL. LEAKANCE 9.38E-06
 SPEC. YIELD .00050
 INITIAL W.L. 113.800

***** AQUIFER NO. 4 *****
 COEFFICIENTS .100 .100 .500 .300
 AQUIFER THICK 90.00
 AQUIFR HEIGHT -150.00
 SPEC. YIELD .00150
 INITIAL W.L. 114.700

***** SUB-BASIN NO.11 (CASE 1) *****

AREA = 28.757 SQ.KM
 RAINFALL RATE = 1.00
 CONNECT TO D/S BASIN = 16
 NUMBER OF TANKS = 2
 RATE OF DRAFR = .00
 ADDITIONAL DRAFT = .00 CUM/DAY

TANK DIMENSIONS
 TANK NO. 1 COEFFICIENTS .0400 .0100 .2000 .0000
 HEIGHTS .000 15.000 60.000 .000
 NOUT 0 16 16 16
 INITIAL W.L. .000
 RATE OF ET .700
 TANK NO. 2 COEFFICIENTS .0500 .0050 .0000 .6000
 HEIGHTS .000 .000 10.000 20.000
 NOUT 0 16 0 16
 INITIAL W.L. .000
 RATE OF ET .550

GW TANK INTERCONNECTION 6 16 12 10

***** AQUIFER NO. 1 *****
 COEFFICIENTS 5.000 5.000 1.500 1.500
 G-HEIGHT 110.000 86.000 96.000 100.000
 AQUIFER THICK 29.00
 AQUIFR HEIGHT 98.00
 AQUICL. THICK 6.00
 ACL. LEAKANCE 2.00E-02
 SPEC. YIELD .03000
 INITIAL W.L. 123.800
 GROUND LEVEL 127.00
 MAX. STORAGE 25018590.0

***** AQUIFER NO. 2 *****
 COEFFICIENTS .500 .500 .400 1.000
 AQUIFER THICK 19.00
 AQUIFR HEIGHT 73.00
 AQUICL. THICK 23.00
 ACL. LEAKANCE 7.83E-05
 SPEC. YIELD .00030
 INITIAL W.L. 123.500

***** AQUIFER NO. 3 *****
 COEFFICIENTS 1.000 .500 .400 2.500
 AQUIFER THICK 14.00
 AQUIFR HEIGHT 36.00
 AQUICL. THICK 54.00
 ACL. LEAKANCE 5.93E-05
 SPEC. YIELD .00080
 INITIAL W.L. 123.100

***** AQUIFER NO. 4 *****
 COEFFICIENTS .020 .300 .500 .300
 AQUIFER THICK 140.00
 AQUIFR HEIGHT -158.00
 SPEC. YIELD .00200
 INITIAL W.L. 123.600

***** SUB-BASIN NO.10 (CASE 1) *****

AREA = 41.319 SQ.KM
 RAINFALL RATE = 1.00
 CONNECT TO D/S BASIN = 15
 NUMBER OF TANKS = 2
 RATE OF DRAFR = .00
 ADDITIONAL DRAFT = .00 CUM/DAY

TANK DIMENSIONS
 TANK NO. 1 COEFFICIENTS .0220 .0100 .4000 .0000
 HEIGHTS .000 15.000 60.000 .000
 NOUT 0 15 15 15
 INITIAL W.L. .000
 RATE OF ET .700
 TANK NO. 2 COEFFICIENTS .0500 .0050 .1000 .8000
 HEIGHTS .000 .000 10.000 30.000
 NOUT 0 15 0 15
 INITIAL W.L. .000
 RATE OF ET .550

GW TANK INTERCONNECTION 0 15 11 9

***** AQUIFER NO. 1 *****
 COEFFICIENTS .000 10.000 1.500 .500
 G-HEIGHT .000 74.000 98.000 96.000
 AQUIFER THICK 27.00
 AQUIFR HEIGHT 98.00
 AQUICL. THICK 6.00
 ACL. LEAKANCE 5.83E-03
 SPEC. YIELD .03500
 INITIAL W.L. 121.800
 GROUND LEVEL 125.00
 MAX. STORAGE 39046460.0

***** AQUIFER NO. 2 *****
 COEFFICIENTS .000 .500 1.000 .500
 AQUIFER THICK 19.00
 AQUIFR HEIGHT 73.00
 AQUICL. THICK 31.00
 ACL. LEAKANCE 3.23E-05
 SPEC. YIELD .00010
 INITIAL W.L. 122.500

***** AQUIFER NO. 3 *****
 COEFFICIENTS .000 .300 2.500 1.000
 AQUIFER THICK 17.00
 AQUIFR HEIGHT 41.00
 AQUICL. THICK 52.00
 ACL. LEAKANCE 1.23E-04
 SPEC. YIELD .00080
 INITIAL W.L. 122.800

***** AQUIFER NO. 4 *****
 COEFFICIENTS .000 .300 .300 .500
 AQUIFER THICK 143.00
 AQUIFR HEIGHT -170.00
 SPEC. YIELD .00200
 INITIAL W.L. 121.700

***** SUB-BASIN NO.12 (CASE 1) *****

AREA = 48.814 SQ.KM
 RAINFALL RATE = 1.00
 CONNECT TO D/S BASIN = 17
 NUMBER OF TANKS = 2
 RATE OF DRAFR = 1.00
 ADDITIONAL DRAFT = .00 CUM/DAY

TANK DIMENSIONS
 TANK NO. 1 COEFFICIENTS .0200 .0100 .3500 .0000
 HEIGHTS .000 15.000 100.000 .000
 NOUT 0 17 17 17
 INITIAL W.L. .000
 RATE OF ET .700
 TANK NO. 2 COEFFICIENTS .0100 .0050 .0000 .6000
 HEIGHTS .000 .000 20.000 15.000
 NOUT 0 17 0 17
 INITIAL W.L. .000
 RATE OF ET .550

GW TANK INTERCONNECTION 7 17 29 11

***** AQUIFER NO. 1 *****
 COEFFICIENTS 5.000 20.000 20.000 1.500
 G-HEIGHT 120.000 93.000 106.000 96.000
 AQUIFER THICK 30.00
 AQUIFR HEIGHT 100.00
 AQUICL. THICK 5.00
 ACL. LEAKANCE 1.00E-02
 SPEC. YIELD .02500
 INITIAL W.L. 126.200
 GROUND LEVEL 130.00
 MAX. STORAGE 36610500.0

***** AQUIFER NO. 2 *****
 COEFFICIENTS .300 1.500 1.500 .400
 AQUIFER THICK 17.00
 AQUIFR HEIGHT 78.00
 AQUICL. THICK 20.00
 ACL. LEAKANCE 3.00E-05
 SPEC. YIELD .00020
 INITIAL W.L. 126.000

***** AQUIFER NO. 3 *****
 COEFFICIENTS .200 1.000 1.500 .400
 AQUIFER THICK 17.00
 AQUIFR HEIGHT 41.00
 AQUICL. THICK 57.00
 ACL. LEAKANCE 2.81E-05
 SPEC. YIELD .00080
 INITIAL W.L. 125.500

***** AQUIFER NO. 4 *****
 COEFFICIENTS .100 .200 1.500 .500
 AQUIFER THICK 134.00
 AQUIFR HEIGHT -150.00
 SPEC. YIELD .00200
 INITIAL W.L. 125.100

***** SUB-BASIN NO.13 (CASE 1) *****

AREA = 41.297 SQ.KM
 RAINFALL RATE = 1.00
 CONNECT TO D/S BASIN = 18
 NUMBER OF TANKS = 2
 RATE OF DRAFR = .00
 ADDITIONAL DRAFT = .00 CUM/DAY

TANK DIMENSIONS
 TANK NO. 1 COEFFICIENTS .0400 .1000 .3500 .0000
 HEIGHTS .000 15.000 60.000 .000
 NOUT 0 18 18 18
 INITIAL W.L. 170.000
 RATE OF ET .700
 TANK NO. 2 COEFFICIENTS .0001 .0050 .0150 .8000
 HEIGHTS .000 .000 295.000 310.000
 NOUT 0 18 0 18
 INITIAL W.L. 210.000
 RATE OF ET .550

GW TANK INTERCONNECTION 8 18 14 34

***** AQUIFER NO. 1 *****
 COEFFICIENTS 10.000 17.000 1.000 5.000
 G-HEIGHT 80.000 60.000 66.000 70.000
 AQUIFER THICK 30.00
 AQUIFER HEIGHT 68.00
 AQUICL. THICK 6.00
 ACL. LEAKANCE 3.00E-02
 SPEC. YIELD .03000
 INITIAL W.L. 96.300
 GROUND LEVEL 98.00
 MAX. STORAGE 37167300.0

***** AQUIFER NO. 2 *****
 COEFFICIENTS .100 3.000 1.000 1.500
 AQUIFER THICK 32.00
 AQUIFER HEIGHT 30.00
 AQUICL. THICK 18.00
 ACL. LEAKANCE 5.56E-05
 SPEC. YIELD .00020
 INITIAL W.L. 96.300

***** AQUIFER NO. 3 *****
 COEFFICIENTS .050 1.500 1.000 1.500
 AQUIFER THICK 37.00
 AQUIFER HEIGHT -25.00
 AQUICL. THICK 75.00
 ACL. LEAKANCE 2.67E-05
 SPEC. YIELD .00080
 INITIAL W.L. 96.400

***** AQUIFER NO. 4 *****
 COEFFICIENTS .050 .200 1.000 1.500
 AQUIFER THICK 100.00
 AQUIFER HEIGHT -200.00
 SPEC. YIELD .00200
 INITIAL W.L. 96.300

***** SUB-BASIN NO.14 (CASE 1) *****

AREA = 37.800 SQ.KM
 RAINFALL RATE = 1.00
 CONNECT TO D/S BASIN = 19
 NUMBER OF TANKS = 2
 RATE OF DRAFR = .00
 ADDITIONAL DRAFT = .00 CUM/DAY

TANK DIMENSIONS
 TANK NO. 1 COEFFICIENTS .0400 .0100 .3500 .0000
 HEIGHTS .000 15.000 100.000 .000
 NOUT 0 19 19 19
 INITIAL W.L. .000
 RATE OF ET .700
 TANK NO. 2 COEFFICIENTS .0400 .0050 .0000 .6000
 HEIGHTS .000 .000 110.000 20.000
 NOUT 0 19 0 19
 INITIAL W.L. 10.000
 RATE OF ET .550

GW TANK INTERCONNECTION 9 19 15 13

***** AQUIFER NO. 1 *****
 COEFFICIENTS 15.000 20.000 5.000 1.000
 G-HEIGHT 70.000 46.000 59.000 70.000
 AQUIFER THICK 41.00
 AQUIFER HEIGHT 59.00
 AQUICL. THICK 7.00
 ACL. LEAKANCE 8.57E-03
 SPEC. YIELD .03000
 INITIAL W.L. 97.800
 GROUND LEVEL 100.00
 MAX. STORAGE 46494000.0

***** AQUIFER NO. 2 *****
 COEFFICIENTS .500 2.000 2.000 1.000
 AQUIFER THICK 27.00
 AQUIFER HEIGHT 25.00
 AQUICL. THICK 24.00
 ACL. LEAKANCE 8.33E-05
 SPEC. YIELD .00010
 INITIAL W.L. 98.200

***** AQUIFER NO. 3 *****
 COEFFICIENTS 1.500 3.000 2.000 1.000
 AQUIFER THICK 31.00
 AQUIFER HEIGHT -30.00
 AQUICL. THICK 75.00
 ACL. LEAKANCE 5.33E-06
 SPEC. YIELD .00080
 INITIAL W.L. 97.000

***** AQUIFER NO. 4 *****
 COEFFICIENTS .100 5.000 1.000 1.000
 AQUIFER THICK 143.00
 AQUIFER HEIGHT -248.00
 SPEC. YIELD .00200
 INITIAL W.L. 92.400

***** SUB-BASIN NO.15 (CASE 1) *****

AREA = 37.410 SQ.KM
 RAINFALL RATE = 1.00
 CONNECT TO D/S BASIN = 20
 NUMBER OF TANKS = 2
 RATE OF DRAFR = 1.00
 ADDITIONAL DRAFT = 1.00 CUM/DAY

TANK DIMENSIONS
 TANK NO. 1 COEFFICIENTS .0200 .0100 .5000 .0000
 HEIGHTS .000 15.000 60.000 .000
 NOUT 0 20 20 20
 INITIAL W.L. .000
 RATE OF ET .700
 TANK NO. 2 COEFFICIENTS .0600 .0050 .0000 .6000
 HEIGHTS .000 .000 10.000 15.000
 NOUT 0 20 0 30
 INITIAL W.L. .000
 RATE OF ET .550

GW TANK INTERCONNECTION 10 20 16 14

***** AQUIFER NO. 1 *****
 COEFFICIENTS 5.000 20.000 5.000 5.000
 G-HEIGHT 74.000 59.000 66.000 52.000
 AQUIFER THICK 43.00
 AQUIFER HEIGHT 59.00
 AQUICL. THICK 8.00
 ACL. LEAKANCE 3.75E-02
 SPEC. YIELD .03000
 INITIAL W.L. 100.000
 GROUND LEVEL 102.00
 MAX. STORAGE 48258900.0

***** AQUIFER NO. 2 *****
 COEFFICIENTS .500 .500 1.000 2.000
 AQUIFER THICK 21.00
 AQUIFER HEIGHT 30.00
 AQUICL. THICK 27.00
 ACL. LEAKANCE 3.33E-04
 SPEC. YIELD .00030
 INITIAL W.L. 99.800

***** AQUIFER NO. 3 *****
 COEFFICIENTS .500 1.500 1.000 2.000
 AQUIFER THICK 26.00
 AQUIFER HEIGHT -23.00
 AQUICL. THICK 70.00
 ACL. LEAKANCE 8.57E-05
 SPEC. YIELD .00060
 INITIAL W.L. 99.300

***** AQUIFER NO. 4 *****
 COEFFICIENTS .500 .100 .100 1.000
 AQUIFER THICK 167.00
 AQUIFER HEIGHT -260.00
 SPEC. YIELD .00200
 INITIAL W.L. 99.200

***** SUB-BASIN NO.16 (CASE 1) *****

AREA = 66.742 SQ.KM
 RAINFALL RATE = 1.00
 CONNECT TO D/S BASIN = 21
 NUMBER OF TANKS = 3
 RATE OF DRAFR = 1.00
 ADDITIONAL DRAFT = 1.00 CUM/DAY

TANK DIMENSIONS
 TANK NO. 1 COEFFICIENTS .0400 .0100 .0300 .3000
 HEIGHTS .000 15.000 70.000 150.000
 NOUT 0 21 21 21
 INITIAL W.L. .000
 RATE OF ET .700
 TANK NO. 2 COEFFICIENTS .0150 .0300 .0000 .0000
 HEIGHTS .000 50.000 .000 .000
 NOUT 0 21 21 21
 INITIAL W.L. .000
 RATE OF ET .550
 TANK NO. 3 COEFFICIENTS .0020 .0020 .1000 .9000
 HEIGHTS .000 .000 10.000 15.000
 NOUT 0 21 0 21
 INITIAL W.L. .000
 RATE OF ET .000

GW TANK INTERCONNECTION 11 21 17 15

***** AQUIFER NO. 1 *****
 COEFFICIENTS 10.000 25.000 25.000 5.000
 G-HEIGHT 86.000 52.000 76.000 66.000
 AQUIFER THICK 29.00
 AQUIFER HEIGHT 71.00
 AQUICL. THICK 11.00
 ACL. LEAKANCE 3.18E-02
 SPEC. YIELD .03500
 INITIAL W.L. 98.000
 GROUND LEVEL 100.00
 MAX. STORAGE 67743120.0

***** AQUIFER NO. 2 *****
 COEFFICIENTS .300 1.000 1.000 1.000
 AQUIFER THICK 10.00
 AQUIFER HEIGHT 50.00
 AQUICL. THICK 22.00
 ACL. LEAKANCE 2.27E-04
 SPEC. YIELD .00050
 INITIAL W.L. 97.400

***** AQUIFER NO. 3 *****
 COEFFICIENTS .300 .100 .100 1.000
 AQUIFER THICK 26.00
 AQUIFER HEIGHT 2.00
 AQUICL. THICK 68.00
 ACL. LEAKANCE 2.35E-04
 SPEC. YIELD .00080
 INITIAL W.L. 98.400

***** AQUIFER NO. 4 *****
 COEFFICIENTS .100 .100 .100 .200
 AQUIFER THICK 177.00
 AQUIFER HEIGHT -243.00
 SPEC. YIELD .00300
 INITIAL W.L. 98.300

***** SUB-BASIN NO.17 (CASE 1) *****

AREA = 51.765 SQ.KM
 RAINFALL RATE = 1.00
 CONNECT TO D/S BASIN = 30
 NUMBER OF TANKS = 2
 RATE OF DRAFR = .00
 ADDITIONAL DRAFT = .00 CUM/DAY

TANK DIMENSIONS
 TANK NO. 1 COEFFICIENTS .0300 .0150 .4000 .0000
 HEIGHTS .000 15.000 60.000 .000
 NOUT 0 30 30 30
 INITIAL W.L. .000
 RATE OF ET .700
 TANK NO. 2 COEFFICIENTS .1500 .0020 .0000 .6000
 HEIGHTS .000 .000 20.000 40.000
 NOUT 0 30 0 30
 INITIAL W.L. .000
 RATE OF ET .550

GW TANK INTERCONNECTION 12 0 30 16

***** AQUIFER NO. 1 *****
 COEFFICIENTS 15.000 .000 30.000 5.000
 G-HEIGHT 93.000 62.000 78.000 76.000
 AQUIFER THICK 29.00
 AQUIFER HEIGHT 77.00
 AQUICL. THICK 8.00
 ACL. LEAKANCE 1.56E-01
 SPEC. YIELD .02500
 INITIAL W.L. 105.500
 GROUND LEVEL 107.60
 MAX. STORAGE 39600220.0

***** AQUIFER NO. 2 *****
 COEFFICIENTS 1.500 .000 2.000 1.000
 AQUIFER THICK 9.00
 AQUIFER HEIGHT 60.00
 AQUICL. THICK 18.00
 ACL. LEAKANCE 5.56E-05
 SPEC. YIELD .00020
 INITIAL W.L. 104.900

***** AQUIFER NO. 3 *****
 COEFFICIENTS 1.000 .000 2.000 1.000
 AQUIFER THICK 27.00
 AQUIFER HEIGHT 15.00
 AQUICL. THICK 79.00
 ACL. LEAKANCE 1.01E-05
 SPEC. YIELD .00010
 INITIAL W.L. 104.800

***** AQUIFER NO. 4 *****
 COEFFICIENTS .200 .000 2.000 1.000
 AQUIFER THICK 164.00
 AQUIFER HEIGHT -228.00
 SPEC. YIELD .00020
 INITIAL W.L. 103.500

***** SUB-BASIN NO.19 (CASE 1) *****

AREA = 28.019 SQ.KM
 RAINFALL RATE = 1.00
 CONNECT TO D/S BASIN = 25
 NUMBER OF TANKS = 2
 RATE OF DRAFR = 1.00
 ADDITIONAL DRAFT = .00 CUM/DAY

TANK DIMENSIONS
 TANK NO. 1 COEFFICIENTS .0400 .0150 .3500 .0000
 HEIGHTS .000 15.000 100.000 .000
 NOUT 0 25 25 25
 INITIAL W.L. .000
 RATE OF ET .700
 TANK NO. 2 COEFFICIENTS .0200 .0050 .0000 .6000
 HEIGHTS .000 .000 250.000 20.000
 NOUT 0 25 0 25
 INITIAL W.L. .000
 RATE OF ET .550

GW TANK INTERCONNECTION 14 25 20 18

***** AQUIFER NO. 1 *****
 COEFFICIENTS 20.000 50.000 1.000 1.000
 G-HEIGHT 46.000 38.000 38.000 50.000
 AQUIFER THICK 41.00
 AQUIFER HEIGHT 44.00
 AQUICL. THICK 8.00
 ACL. LEAKANCE 3.75E-04
 SPEC. YIELD .02000
 INITIAL W.L. 83.000
 GROUND LEVEL 85.00
 MAX. STORAGE 22975580.0

***** AQUIFER NO. 2 *****
 COEFFICIENTS 2.000 5.000 1.000 1.000
 AQUIFER THICK 47.00
 AQUIFER HEIGHT -11.00
 AQUICL. THICK 27.00
 ACL. LEAKANCE 3.70E-05
 SPEC. YIELD .00020
 INITIAL W.L. 83.000

***** AQUIFER NO. 3 *****
 COEFFICIENTS 3.000 3.000 .500 .100
 AQUIFER THICK 30.00
 AQUIFER HEIGHT -68.00
 AQUICL. THICK 72.00
 ACL. LEAKANCE 1.39E-05
 SPEC. YIELD .00050
 INITIAL W.L. 84.700

***** AQUIFER NO. 4 *****
 COEFFICIENTS 2.000 3.000 .500 .100
 AQUIFER THICK 160.00
 AQUIFER HEIGHT -300.00
 SPEC. YIELD .00100
 INITIAL W.L. 86.000

***** SUB-BASIN NO.18 (CASE 1) *****

AREA = 44.648 SQ.KM
 RAINFALL RATE = 1.00
 CONNECT TO D/S BASIN = 24
 NUMBER OF TANKS = 2
 RATE OF DRAFR = .00
 ADDITIONAL DRAFT = .00 CUM/DAY

TANK DIMENSIONS
 TANK NO. 1 COEFFICIENTS .0300 .1000 .3500 .0000
 HEIGHTS .000 15.000 60.000 .000
 NOUT 0 24 24 24
 INITIAL W.L. 180.000
 RATE OF ET .700
 TANK NO. 2 COEFFICIENTS .0001 .0020 .0200 .6000
 HEIGHTS .000 .000 300.000 320.000
 NOUT 0 24 0 24
 INITIAL W.L. 170.000
 RATE OF ET .550

GW TANK INTERCONNECTION 13 24 19 35

***** AQUIFER NO. 1 *****
 COEFFICIENTS 10.000 40.000 1.000 1.000
 G-HEIGHT 60.000 46.000 50.000 56.000
 AQUIFER THICK 32.00
 AQUIFER HEIGHT 59.00
 AQUICL. THICK 7.00
 ACL. LEAKANCE 7.14E-03
 SPEC. YIELD .02000
 INITIAL W.L. 83.500
 GROUND LEVEL 85.00
 MAX. STORAGE 28574720.0

***** AQUIFER NO. 2 *****
 COEFFICIENTS 1.500 5.000 1.000 1.000
 AQUIFER THICK 53.00
 AQUIFER HEIGHT -7.00
 AQUICL. THICK 21.00
 ACL. LEAKANCE 1.43E-06
 SPEC. YIELD .00010
 INITIAL W.L. 83.700

***** AQUIFER NO. 3 *****
 COEFFICIENTS 1.500 .500 .100 .100
 AQUIFER THICK 37.00
 AQUIFER HEIGHT -65.00
 AQUICL. THICK 85.00
 ACL. LEAKANCE 2.12E-06
 SPEC. YIELD .00010
 INITIAL W.L. 85.900

***** AQUIFER NO. 4 *****
 COEFFICIENTS .200 .200 .100 .100
 AQUIFER THICK 150.00
 AQUIFER HEIGHT -300.00
 SPEC. YIELD .00100
 INITIAL W.L. 85.100

***** SUB-BASIN NO.20 (CASE 1) *****

AREA = 38.750 SQ.KM
 RAINFALL RATE = 1.00
 CONNECT TO D/S BASIN = 26
 NUMBER OF TANKS = 2
 RATE OF DRAFR = 1.00
 ADDITIONAL DRAFT = 1.00 CUM/DAY

TANK DIMENSIONS
 TANK NO. 1 COEFFICIENTS .0400 .0150 .0800 .3500
 HEIGHTS .000 15.000 70.000 200.000
 NOUT 0 26 26 26
 INITIAL W.L. .000
 RATE OF ET .700
 TANK NO. 2 COEFFICIENTS .0200 .0020 .0000 .8000
 HEIGHTS .000 .000 15.000 30.000
 NOUT 0 26 0 26
 INITIAL W.L. .000
 RATE OF ET .550

GW TANK INTERCONNECTION 15 26 21 19

***** AQUIFER NO. 1 *****
 COEFFICIENTS 15.000 65.000 1.500 1.000
 G-HEIGHT 60.000 45.000 56.000 38.000
 AQUIFER THICK 38.00
 AQUIFER HEIGHT 47.00
 AQUICL. THICK 12.00
 ACL. LEAKANCE 6.25E-03
 SPEC. YIELD .02500
 INITIAL W.L. 83.500
 GROUND LEVEL 85.00
 MAX. STORAGE 36812500.0

***** AQUIFER NO. 2 *****
 COEFFICIENTS 1.500 2.000 1.000 1.000
 AQUIFER THICK 19.00
 AQUIFER HEIGHT 16.00
 AQUICL. THICK 21.00
 ACL. LEAKANCE 4.95E-04
 SPEC. YIELD .00080
 INITIAL W.L. 83.000

***** AQUIFER NO. 3 *****
 COEFFICIENTS 1.500 .500 1.000 .500
 AQUIFER THICK 29.00
 AQUIFER HEIGHT -34.00
 AQUICL. THICK 66.00
 ACL. LEAKANCE 1.82E-04
 SPEC. YIELD .00080
 INITIAL W.L. 83.200

***** AQUIFER NO. 4 *****
 COEFFICIENTS .100 .200 .200 .500
 AQUIFER THICK 200.00
 AQUIFER HEIGHT -300.00
 SPEC. YIELD .00150
 INITIAL W.L. 83.400

***** SUB-BASIN NO.21 (CASE 1) *****

AREA = 59.647 SQ.KM
 RAINFALL RATE = 1.00
 CONNECT TO D/S BASIN = 31
 NUMBER OF TANKS = 3
 RATE OF DRAFR = 1.00
 ADDITIONAL DRAFT = 1.00 CUM/DAY

TANK DIMENSIONS
 TANK NO. 1 COEFFICIENTS .0450 .0170 .0800 .3800
 HEIGHTS .000 15.000 70.000 200.000
 NOUT 0 31 31 31
 INITIAL W.L. .000
 RATE OF ET .700
 TANK NO. 2 COEFFICIENTS .0200 .0250 .0000 .0000
 HEIGHTS .000 150.000 31 .000 31
 NOUT 0
 INITIAL W.L. 30.000
 RATE OF ET .550
 TANK NO. 3 COEFFICIENTS .0010 .0030 .0000 .8000
 HEIGHTS .000 31 .000 220.000 280.000
 NOUT 0 31 0 31
 INITIAL W.L. 220.000
 RATE OF ET .000

GW TANK INTERCONNECTION 16 23 31 20

***** AQUIFER NO. 1 *****
 COEFFICIENTS 20.000 5.000 65.000 1.500
 G-HEIGHT 52.000 64.000 60.000 56.000
 AQUIFER THICK 30.00
 AQUIFER HEIGHT 56.00
 AQICL. THICK 8.00
 ACL. LEAKANCE 1.56E-02
 SPEC. YIELD .02500
 INITIAL W.L. 84.500
 GROUND LEVEL 86.00
 MAX. STORAGE 44735250.0

***** AQUIFER NO. 2 *****
 COEFFICIENTS 2.000 5.000 5.000 1.000
 AQUIFER THICK 13.00
 AQUIFER HEIGHT 25.00
 AQICL. THICK 18.00
 ACL. LEAKANCE 1.39E-04
 SPEC. YIELD .00050
 INITIAL W.L. 87.000

***** AQUIFER NO. 3 *****
 COEFFICIENTS 1.000 5.000 15.000 2.000
 AQUIFER THICK 61.00
 AQUIFER HEIGHT -44.00
 AQICL. THICK 64.00
 ACL. LEAKANCE 4.69E-05
 SPEC. YIELD .00050
 INITIAL W.L. 89.000

***** AQUIFER NO. 4 *****
 COEFFICIENTS 1.000 5.000 15.000 .500
 AQUIFER THICK 192.00
 AQUIFER HEIGHT -300.00
 SPEC. YIELD .00250
 INITIAL W.L. 91.100

***** SUB-BASIN NO.22 (CASE 1) *****

AREA = 16.937 SQ.KM
 RAINFALL RATE = 1.00
 CONNECT TO D/S BASIN = 26
 NUMBER OF TANKS = 2
 RATE OF DRAFR = .00
 ADDITIONAL DRAFT = .00 CUM/DAY

TANK DIMENSIONS
 TANK NO. 1 COEFFICIENTS .0350 .1500 .4500 .0000
 HEIGHTS .000 15.000 30.000 .000
 NOUT 0 26 26 26
 INITIAL W.L. .000
 RATE OF ET .700
 TANK NO. 2 COEFFICIENTS .0500 .0030 .0000 .6000
 HEIGHTS .000 .000 15.000 50.000
 NOUT 0 26 0 26
 INITIAL W.L. .000
 RATE OF ET .550

GW TANK INTERCONNECTION 20 26 23 0

***** AQUIFER NO. 1 *****
 COEFFICIENTS .000 .003 1.000 50.000
 G-HEIGHT 65.000 60.000 65.000 67.000
 AQUIFER THICK 33.00
 AQUIFER HEIGHT 67.00
 AQICL. THICK 7.00
 ACL. LEAKANCE 4.64E-04
 SPEC. YIELD .02500
 INITIAL W.L. 92.200
 GROUND LEVEL 100.00
 MAX. STORAGE 13973030.0

***** AQUIFER NO. 2 *****
 COEFFICIENTS .000 .003 .200 10.000
 AQUIFER THICK 18.00
 AQUIFER HEIGHT 42.00
 AQICL. THICK 32.00
 ACL. LEAKANCE 4.69E-05
 SPEC. YIELD .00030
 INITIAL W.L. 92.200

***** AQUIFER NO. 3 *****
 COEFFICIENTS .000 .003 .020 10.000
 AQUIFER THICK 16.00
 AQUIFER HEIGHT -6.00
 AQICL. THICK 24.00
 ACL. LEAKANCE 2.67E-05
 SPEC. YIELD .00080
 INITIAL W.L. 92.300

***** AQUIFER NO. 4 *****
 COEFFICIENTS .000 .003 .020 15.000
 AQUIFER THICK 270.00
 AQUIFER HEIGHT -300.00
 SPEC. YIELD .00150
 INITIAL W.L. 92.100

***** SUB-BASIN NO.23 (CASE 1) *****

AREA = 40.312 SQ.KM
 RAINFALL RATE = 1.00
 CONNECT TO D/S BASIN = 27
 NUMBER OF TANKS = 2
 RATE OF DRAFR = 1.00
 ADDITIONAL DRAFT = 1.00 CUM/DAY

TANK DIMENSIONS
 TANK NO. 1 COEFFICIENTS .0400 .0800 .3500 .0000
 HEIGHTS .000 15.000 35.000 .000
 NOUT 0 27 27 27
 INITIAL W.L. .000
 RATE OF ET .700
 TANK NO. 2 COEFFICIENTS .5000 .0050 .0000 .4000
 HEIGHTS .000 27 .000 10.000 80.000
 NOUT 0 27 0 27
 INITIAL W.L. .000
 RATE OF ET .550

GW TANK INTERCONNECTION 21 27 0 22

***** AQUIFER NO. 1 *****
 COEFFICIENTS .000 2.000 .000 50.000
 G-HEIGHT 65.000 60.000 65.000 67.000
 AQUIFER THICK 34.00
 AQUIFER HEIGHT 66.00
 AQICL. THICK 14.00
 ACL. LEAKANCE 2.68E-03
 SPEC. YIELD .02500
 INITIAL W.L. 93.400
 GROUND LEVEL 100.00
 MAX. STORAGE 34265200.0

***** AQUIFER NO. 2 *****
 COEFFICIENTS .000 .300 .000 20.000
 AQUIFER THICK 22.00
 AQUIFER HEIGHT 30.00
 AQICL. THICK 40.00
 ACL. LEAKANCE 1.88E-04
 SPEC. YIELD .00050
 INITIAL W.L. 93.200

***** AQUIFER NO. 3 *****
 COEFFICIENTS .000 .100 .000 .020
 AQUIFER THICK 20.00
 AQUIFER HEIGHT -30.00
 AQICL. THICK 22.00
 ACL. LEAKANCE 1.09E-05
 SPEC. YIELD .00080
 INITIAL W.L. 93.200

***** AQUIFER NO. 4 *****
 COEFFICIENTS .000 1.000 .000 .020
 AQUIFER THICK 248.00
 AQUIFER HEIGHT -300.00
 SPEC. YIELD .00300
 INITIAL W.L. 89.000

***** SUB-BASIN NO.24 (CASE 1) *****

AREA = 55.303 SQ.KM
 RAINFALL RATE = 1.00
 CONNECT TO D/S BASIN = 37
 NUMBER OF TANKS = 2
 RATE OF DRAFR = .00
 ADDITIONAL DRAFT = .00 CUM/DAY

TANK DIMENSIONS
 TANK NO. 1 COEFFICIENTS .0300 .1000 .3500 .0000
 HEIGHTS .000 15.000 60.000 .000
 NOUT 0 37 37 37
 INITIAL W.L. 100.000
 RATE OF ET .700
 TANK NO. 2 COEFFICIENTS .0001 .0020 .0200 .6000
 HEIGHTS .000 .000 350.000 355.000
 NOUT 0 37 0 37
 INITIAL W.L. 150.000
 RATE OF ET .550

GW TANK INTERCONNECTION 18 37 25 36

***** AQUIFER NO. 1 *****
 COEFFICIENTS 20.000 90.000 90.000 50.000
 G-HEIGHT 46.000 40.000 40.000 48.000
 AQUIFER THICK 31.00
 AQUIFER HEIGHT 44.00
 AQICL. THICK 18.00
 ACL. LEAKANCE 1.67E-04
 SPEC. YIELD .02500
 INITIAL W.L. 75.500
 GROUND LEVEL 77.00
 MAX. STORAGE 45624980.0

***** AQUIFER NO. 2 *****
 COEFFICIENTS 5.000 3.000 3.000 3.000
 AQUIFER THICK 50.00
 AQUIFER HEIGHT -24.00
 AQICL. THICK 21.00
 ACL. LEAKANCE 4.76E-05
 SPEC. YIELD .00050
 INITIAL W.L. 75.600

***** AQUIFER NO. 3 *****
 COEFFICIENTS 5.000 3.000 3.000 5.000
 AQUIFER THICK 47.00
 AQUIFER HEIGHT -92.00
 AQICL. THICK 78.00
 ACL. LEAKANCE 5.13E-06
 SPEC. YIELD .00080
 INITIAL W.L. 75.300

***** AQUIFER NO. 4 *****
 COEFFICIENTS .500 1.000 1.000
 AQUIFER THICK 130.00
 AQUIFER HEIGHT -300.00
 SPEC. YIELD .00150
 INITIAL W.L. 75.000

***** SUB-BASIN NO.25 (CASE 1) *****

AREA = 39.298 SQ.KM
 RAINFALL RATE = 1.00
 CONNECT TO D/S BASIN = 37
 NUMBER OF TANKS = 2
 RATE OF DRAFR = .00
 ADDITIONAL DRAFT = .00 CUM/DAY

TANK DIMENSIONS
 TANK NO. 1 COEFFICIENTS .0300 .0100 .3000 .0000
 HEIGHTS .000 15.000 60.000 .000
 NOUT 0 37 37 37
 INITIAL W.L. .700
 RATE OF ET .700
 TANK NO. 2 COEFFICIENTS .0250 .0050 .0000 .6000
 HEIGHTS .000 .000 20.000 30.000
 NOUT 0 37 0 37
 INITIAL W.L. 30.000
 RATE OF ET .550

GW TANK INTERCONNECTION 19 37 26 24

***** AQUIFER NO. 1 *****
 COEFFICIENTS 50.000 100.000 100.000 50.000
 G-HEIGHT 38.000 20.000 30.000 40.000
 AQUIFER THICK 41.00
 AQUIFER HEIGHT 34.00
 AQUICL. THICK 16.00
 ACL. LEAKANCE 6.25E-04
 SPEC. YIELD .02000
 INITIAL W.L. 73.400
 GROUND LEVEL 75.00
 MAX. STORAGE 32224360.0

***** AQUIFER NO. 2 *****
 COEFFICIENTS 10.000 15.000 20.000 3.000
 AQUIFER THICK 41.00
 AQUIFER HEIGHT -23.00
 AQUICL. THICK 21.00
 ACL. LEAKANCE 1.71E-04
 SPEC. YIELD .00030
 INITIAL W.L. 73.600

***** AQUIFER NO. 3 *****
 COEFFICIENTS 5.000 2.000 2.000 5.000
 AQUIFER THICK 34.00
 AQUIFER HEIGHT -78.00
 AQUICL. THICK 77.00
 ACL. LEAKANCE 9.35E-05
 SPEC. YIELD .00060
 INITIAL W.L. 74.400

***** AQUIFER NO. 4 *****
 COEFFICIENTS 5.000 2.000 2.000 1.000
 AQUIFER THICK 145.00
 AQUIFER HEIGHT -300.00
 SPEC. YIELD .00200
 INITIAL W.L. 75.000

***** SUB-BASIN NO.26 (CASE 1) *****

AREA = 71.152 SQ.KM
 RAINFALL RATE = 1.00
 CONNECT TO D/S BASIN = 37
 NUMBER OF TANKS = 2
 RATE OF DRAFR = 1.00
 ADDITIONAL DRAFT = 1.00 CUM/DAY

TANK DIMENSIONS
 TANK NO. 1 COEFFICIENTS .0450 .0100 .0800 .3000
 HEIGHTS .000 15.000 70.000 200.000
 NOUT 0 37 37 37
 INITIAL W.L. 10.000
 RATE OF ET .700
 TANK NO. 2 COEFFICIENTS .1000 .0030 .0000 .6000
 HEIGHTS .000 .000 170.000 60.000
 NOUT 0 37 0 37
 INITIAL W.L. 10.000
 RATE OF ET .550

GW TANK INTERCONNECTION 20 37 27 25

***** AQUIFER NO. 1 *****
 COEFFICIENTS 30.000 90.000 90.000 50.000
 G-HEIGHT 45.000 5.000 18.000 30.000
 AQUIFER THICK 50.00
 AQUIFER HEIGHT 23.00
 AQUICL. THICK 13.00
 ACL. LEAKANCE 2.88E-03
 SPEC. YIELD .02500
 INITIAL W.L. 71.000
 GROUND LEVEL 73.00
 MAX. STORAGE 90190000.0

***** AQUIFER NO. 2 *****
 COEFFICIENTS 10.000 10.000 10.000 20.000
 AQUIFER THICK 31.00
 AQUIFER HEIGHT -21.00
 AQUICL. THICK 15.00
 ACL. LEAKANCE 6.67E-05
 SPEC. YIELD .00050
 INITIAL W.L. 71.000

***** AQUIFER NO. 3 *****
 COEFFICIENTS 3.000 5.000 5.000 5.000
 AQUIFER THICK 24.00
 AQUIFER HEIGHT -60.00
 AQUICL. THICK 82.00
 ACL. LEAKANCE 1.95E-05
 SPEC. YIELD .00080
 INITIAL W.L. 71.200

***** AQUIFER NO. 4 *****
 COEFFICIENTS 1.000 6.000 6.000 3.000
 AQUIFER THICK 158.00
 AQUIFER HEIGHT -300.00
 SPEC. YIELD .00300
 INITIAL W.L. 71.000

***** SUB-BASIN NO.27 (CASE 1) *****

AREA = 54.652 SQ.KM
 RAINFALL RATE = 1.00
 CONNECT TO D/S BASIN = 37
 NUMBER OF TANKS = 3
 RATE OF DRAFR = 1.00
 ADDITIONAL DRAFT = 1.00 CUM/DAY

TANK DIMENSIONS
 TANK NO. 1 COEFFICIENTS .0400 .0100 .0800 .3500
 HEIGHTS .000 8.000 60.000 70.000
 NOUT 0 37 37 37
 INITIAL W.L. .000
 RATE OF ET .700
 TANK NO. 2 COEFFICIENTS .0200 .3000 .0000 .0000
 HEIGHTS .000 40.000 .000 .000
 NOUT 0 37 37 37
 INITIAL W.L. .000
 RATE OF ET .550
 TANK NO. 3 COEFFICIENTS .6000 .0020 .0000 .6000
 HEIGHTS .000 .000 .000 60.000
 NOUT 0 37 0 37
 INITIAL W.L. 5.000
 RATE OF ET .000

GW TANK INTERCONNECTION 23 37 32 26

***** AQUIFER NO. 1 *****
 COEFFICIENTS 3.000 60.000 60.000 50.000
 G-HEIGHT 16.000 .000 -8.000 18.000
 AQUIFER THICK 64.00
 AQUIFER HEIGHT 5.00
 AQUICL. THICK 13.00
 ACL. LEAKANCE 3.85E-03
 SPEC. YIELD .02500
 INITIAL W.L. 66.800
 GROUND LEVEL 69.00
 MAX. STORAGE 87443200.0

***** AQUIFER NO. 2 *****
 COEFFICIENTS .300 15.000 15.000 20.000
 AQUIFER THICK 22.00
 AQUIFER HEIGHT -30.00
 AQUICL. THICK 6.00
 ACL. LEAKANCE 3.33E-04
 SPEC. YIELD .00050
 INITIAL W.L. 67.000

***** AQUIFER NO. 3 *****
 COEFFICIENTS .100 30.000 30.000 20.000
 AQUIFER THICK 34.00
 AQUIFER HEIGHT -70.00
 AQUICL. THICK 64.00
 ACL. LEAKANCE 7.50E-05
 SPEC. YIELD .00080
 INITIAL W.L. 67.800

***** AQUIFER NO. 4 *****
 COEFFICIENTS .100 30.000 30.000 20.000
 AQUIFER THICK 166.00
 AQUIFER HEIGHT -300.00
 SPEC. YIELD .00300
 INITIAL W.L. 69.100

***** SUB-BASIN NO.28 (CASE 1) *****

GW TANK INTERCONNECTION 0 0 0 7

***** AQUIFER NO. 1 *****
 COEFFICIENTS .000 5.000 1.500 1.500
 COEFFICIENTS .000 .300
 G-HEIGHT 490.000 110.000 156.000 156.000
 AQUIFER THICK 27.00
 INITIAL W.L. 175.000
 GROUND LEVEL 183.00

***** AQUIFER NO. 2 *****
 COEFFICIENTS .000 .300 .500 .300
 COEFFICIENTS .000 .200
 AQUIFER THICK 20.00
 INITIAL W.L. 175.000

***** AQUIFER NO. 3 *****
 COEFFICIENTS .000 .200 1.000 .300
 COEFFICIENTS .000 .100
 AQUIFER THICK 25.00
 INITIAL W.L. 175.000

***** AQUIFER NO. 4 *****
 COEFFICIENTS .000 .100 1.500 .100
 COEFFICIENTS 5.000 10.000
 AQUIFER THICK 70.00
 INITIAL W.L. 170.000

***** SUB-BASIN NO.29 (CASE 1) *****

GW TANK INTERCONNECTION 0 0 0 12

***** AQUIFER NO. 1 *****
 COEFFICIENTS 5.000 20.000 20.000 1.500
 COEFFICIENTS .300 1.500
 G-HEIGHT 156.000 96.000 106.000 106.000
 AQUIFER THICK 23.00
 INITIAL W.L. 125.000
 GROUND LEVEL 129.00

***** AQUIFER NO. 2 *****
 COEFFICIENTS .300 1.500 1.500 .400
 COEFFICIENTS .200 1.000
 AQUIFER THICK 16.00
 INITIAL W.L. 125.000

***** AQUIFER NO. 3 *****
 COEFFICIENTS .200 1.000 1.500 .400
 COEFFICIENTS .100 .200
 AQUIFER THICK 22.00
 INITIAL W.L. 120.000

***** AQUIFER NO. 4 *****
 COEFFICIENTS .100 .200 1.500 .500
 COEFFICIENTS 10.000 17.000
 AQUIFER THICK 134.00
 INITIAL W.L. 120.000

***** SUB-BASIN NO.30 (CASE 1) *****

GW TANK INTERCONNECTION	0	0	0	17
***** AQUIFER NO. 1 *****				
COEFFICIENTS	15.000	.000	30.000	5.000
COEFFICIENTS	1.500	.000		
G-HEIGHT	95.000	62.000	78.000	78.000
AQUIFER THICK	25.00			
INITIAL W.L.	80.000			
GROUND LEVEL	103.00			
***** AQUIFER NO. 2 *****				
COEFFICIENTS	1.500	.000	2.000	1.000
COEFFICIENTS	1.000	.000		
AQUIFER THICK	16.00			
INITIAL W.L.	90.000			
***** AQUIFER NO. 3 *****				
COEFFICIENTS	1.000	.000	2.000	1.000
COEFFICIENTS	.200	.000		
AQUIFER THICK	28.00			
INITIAL W.L.	100.000			
***** AQUIFER NO. 4 *****				
COEFFICIENTS	.200	.000	2.000	1.000
COEFFICIENTS	10.000	40.000		
AQUIFER THICK	156.00			
INITIAL W.L.	100.000			

***** SUB-BASIN NO.31 (CASE 1) *****

GW TANK INTERCONNECTION	0	0	0	21
***** AQUIFER NO. 1 *****				
COEFFICIENTS	20.000	5.000	65.000	1.500
COEFFICIENTS	2.000	5.000		
G-HEIGHT	62.000	2.000	60.000	60.000
AQUIFER THICK	22.00			
INITIAL W.L.	50.000			
GROUND LEVEL	82.00			
***** AQUIFER NO. 2 *****				
COEFFICIENTS	2.000	5.000	5.000	1.000
COEFFICIENTS	1.000	5.000		
AQUIFER THICK	18.00			
INITIAL W.L.	63.000			
***** AQUIFER NO. 3 *****				
COEFFICIENTS	1.000	5.000	15.000	2.000
COEFFICIENTS	1.000	5.000		
AQUIFER THICK	60.00			
INITIAL W.L.	95.000			
***** AQUIFER NO. 4 *****				
COEFFICIENTS	1.000	5.000	15.000	.500
COEFFICIENTS	.000	.003		
AQUIFER THICK	180.00			
INITIAL W.L.	95.000			

***** SUB-BASIN NO.32 (CASE 1) *****

GW TANK INTERCONNECTION	0	0	0	27
***** AQUIFER NO. 1 *****				
COEFFICIENTS	3.000	60.000	60.000	50.000
COEFFICIENTS	.300	15.000		
G-HEIGHT	2.000	-20.000	-8.000	-8.000
AQUIFER THICK	73.00			
INITIAL W.L.	63.000			
GROUND LEVEL	65.00			
***** AQUIFER NO. 2 *****				
COEFFICIENTS	.300	15.000	15.000	20.000
COEFFICIENTS	.100	30.000		
AQUIFER THICK	24.00			
INITIAL W.L.	65.000			
***** AQUIFER NO. 3 *****				
COEFFICIENTS	.100	30.000	30.000	20.000
COEFFICIENTS	.100	30.000		
AQUIFER THICK	59.00			
INITIAL W.L.	70.000			
***** AQUIFER NO. 4 *****				
COEFFICIENTS	.100	30.000	30.000	20.000
COEFFICIENTS	.000	.000		
AQUIFER THICK	150.00			
INITIAL W.L.	73.000			

***** SUB-BASIN NO.33 (CASE 1) *****

GW TANK INTERCONNECTION	0	34	8	0
***** AQUIFER NO. 1 *****				
COEFFICIENTS	5.000	20.000	1.500	5.000
COEFFICIENTS	.100	2.000		
G-HEIGHT	130.000	70.000	98.000	90.000
AQUIFER THICK	22.00			
INITIAL W.L.	112.000			
GROUND LEVEL	115.00			
***** AQUIFER NO. 2 *****				
COEFFICIENTS	.100	2.000	.500	.100
COEFFICIENTS	.200	1.000		
AQUIFER THICK	30.00			
INITIAL W.L.	93.000			
***** AQUIFER NO. 3 *****				
COEFFICIENTS	.200	1.000	1.000	.100
COEFFICIENTS	.100	.100		
AQUIFER THICK	25.00			
INITIAL W.L.	92.000			
***** AQUIFER NO. 4 *****				
COEFFICIENTS	.100	.100	.500	.300
COEFFICIENTS	.000	10.000		
AQUIFER THICK	90.00			
INITIAL W.L.	90.000			

***** SUB-BASIN NO.34 (CASE 1) *****

GW TANK INTERCONNECTION	33	35	13	0
***** AQUIFER NO. 1 *****				
COEFFICIENTS	15.000	20.000	5.000	1.000
COEFFICIENTS	.500	2.000		
G-HEIGHT	70.000	46.000	59.000	68.000
AQUIFER THICK	41.00			
INITIAL W.L.	95.000			
GROUND LEVEL	100.00			
***** AQUIFER NO. 2 *****				
COEFFICIENTS	.500	2.000	2.000	1.000
COEFFICIENTS	1.500	3.000		
AQUIFER THICK	27.00			
INITIAL W.L.	90.000			
***** AQUIFER NO. 3 *****				
COEFFICIENTS	1.500	3.000	2.000	1.000
COEFFICIENTS	.100	5.000		
AQUIFER THICK	31.00			
INITIAL W.L.	93.000			
***** AQUIFER NO. 4 *****				
COEFFICIENTS	.100	5.000	1.000	1.000
COEFFICIENTS	5.000	20.000		
AQUIFER THICK	143.00			
INITIAL W.L.	95.000			

***** SUB-BASIN NO.35 (CASE 1) *****

GW TANK INTERCONNECTION	34	36	18	0
***** AQUIFER NO. 1 *****				
COEFFICIENTS	20.000	60.000	1.000	1.000
COEFFICIENTS	2.000	5.000		
G-HEIGHT	46.000	38.000	47.000	50.000
AQUIFER THICK	41.00			
INITIAL W.L.	82.000			
GROUND LEVEL	85.00			
***** AQUIFER NO. 2 *****				
COEFFICIENTS	2.000	5.000	1.000	1.000
COEFFICIENTS	3.000	3.000		
AQUIFER THICK	47.00			
INITIAL W.L.	80.000			
***** AQUIFER NO. 3 *****				
COEFFICIENTS	3.000	3.000	.500	.100
COEFFICIENTS	2.000	3.000		
AQUIFER THICK	30.00			
INITIAL W.L.	80.000			
***** AQUIFER NO. 4 *****				
COEFFICIENTS	2.000	3.000	.500	.100
COEFFICIENTS	15.000	65.000		
AQUIFER THICK	160.00			
INITIAL W.L.	80.000			

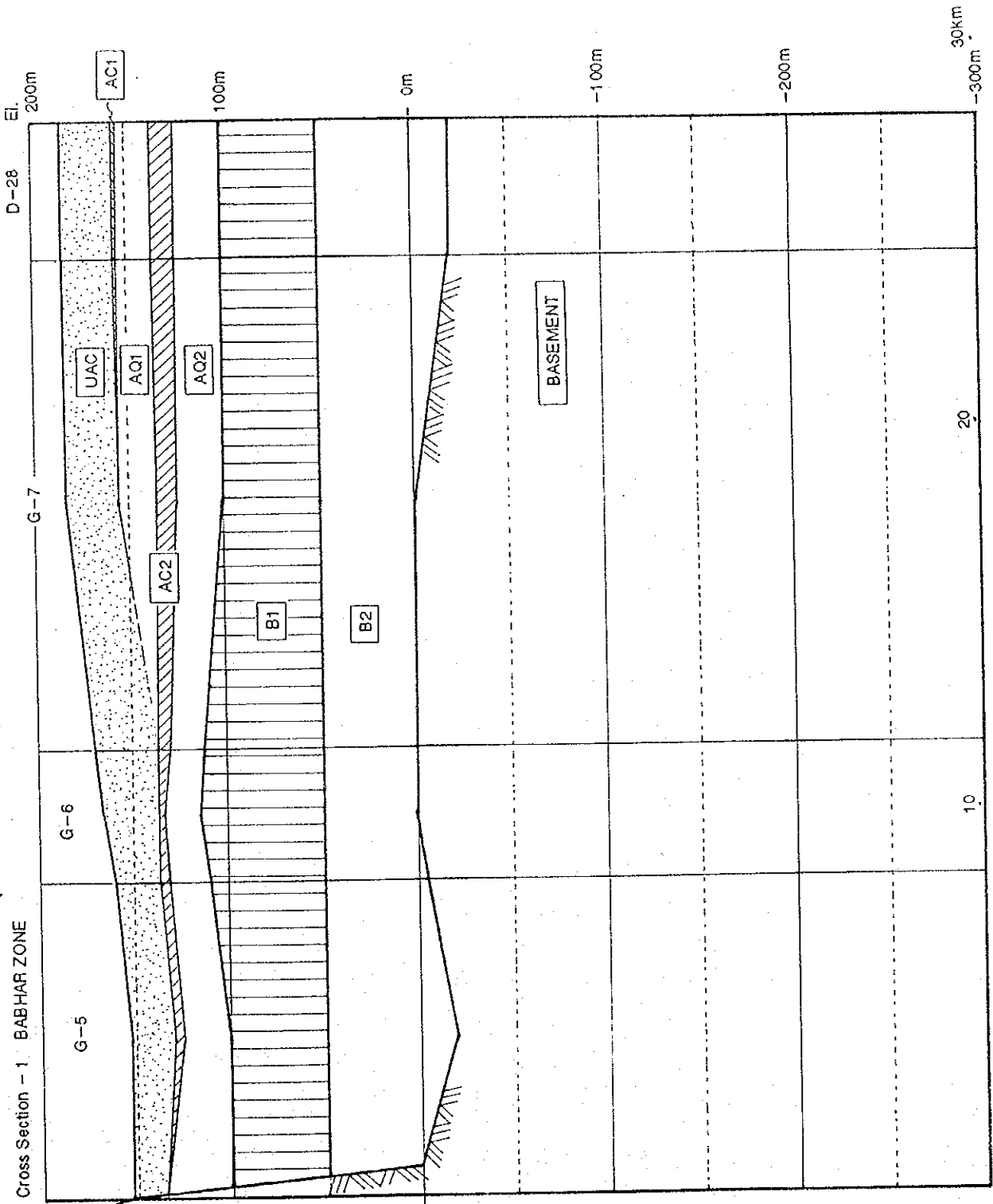
***** SUB-BASIN NO.36 (CASE 1) *****

GW TANK INTERCONNECTION	35	37	24	0
***** AQUIFER NO. 1 *****				
COEFFICIENTS	50.000	100.000	100.000	50.000
COEFFICIENTS	10.000	15.000		
G-HEIGHT	38.000	30.000	30.000	40.000
AQUIFER THICK	41.00			
INITIAL W.L.	72.000			
GROUND LEVEL	75.00			
***** AQUIFER NO. 2 *****				
COEFFICIENTS	10.000	15.000	20.000	3.000
COEFFICIENTS	5.000	2.000		
AQUIFER THICK	41.00			
INITIAL W.L.	72.000			
***** AQUIFER NO. 3 *****				
COEFFICIENTS	5.000	2.000	2.000	5.000
COEFFICIENTS	5.000	2.000		
AQUIFER THICK	34.00			
INITIAL W.L.	75.000			
***** AQUIFER NO. 4 *****				
COEFFICIENTS	5.000	2.000	2.000	1.000
COEFFICIENTS	30.000	90.000		
AQUIFER THICK	145.00			
INITIAL W.L.	80.000			

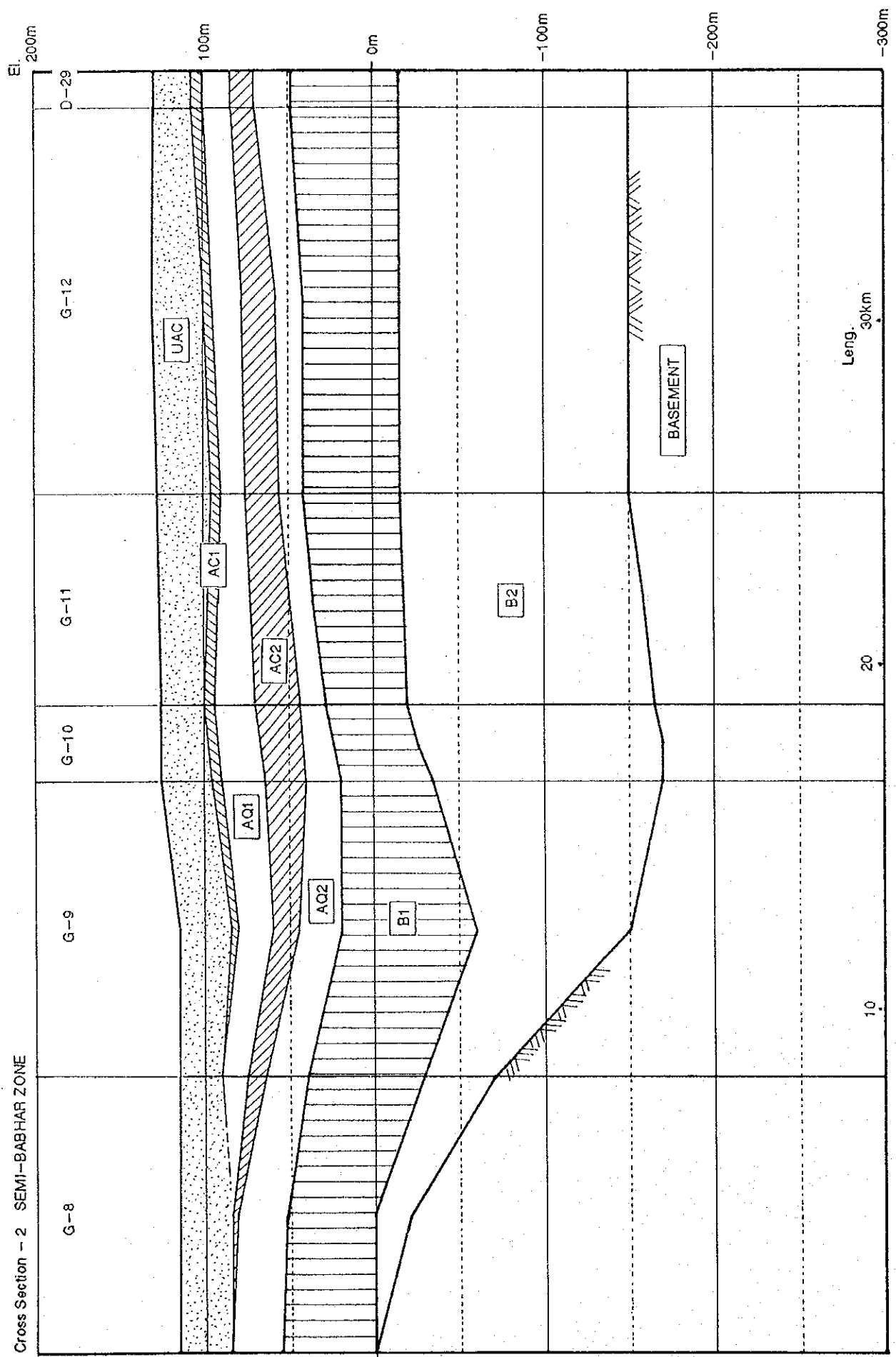
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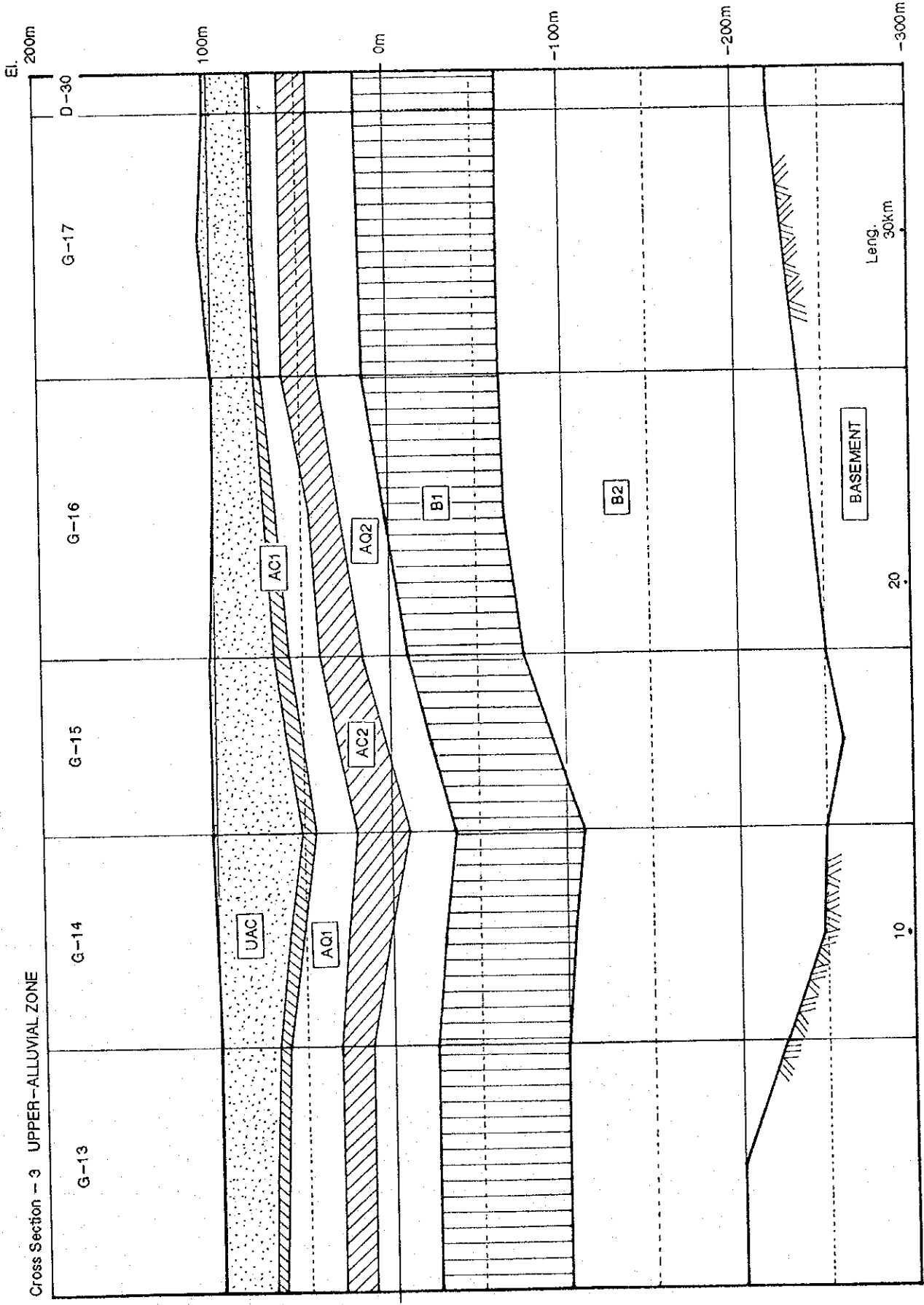
GW TANK INTERCONNECTION	37	37	37	37
***** AQUIFER NO. 1 *****				
COEFFICIENTS	50.000	100.000	100.000	50.000
COEFFICIENTS	10.000	15.000		
G-HEIGHT	.000	.000	.000	.000
AQUIFER THICK	64.00			
INITIAL W.L.	58.000			
GROUND LEVEL	60.00			
***** AQUIFER NO. 2 *****				
COEFFICIENTS	10.000	15.000	20.000	3.000
COEFFICIENTS	5.000	2.000		
AQUIFER THICK	34.00			
INITIAL W.L.	60.000			
***** AQUIFER NO. 3 *****				
COEFFICIENTS	5.000	2.000	2.000	5.000
COEFFICIENTS	5.000	2.000		
AQUIFER THICK	33.00			
INITIAL W.L.	60.000			
***** AQUIFER NO. 4 *****				
COEFFICIENTS	5.000	2.000	2.000	1.000
COEFFICIENTS	30.000	90.000		
AQUIFER THICK	150.00			
INITIAL W.L.	62.000			

4.5.2: Detail of Aquifer Structure (Note: As per the location of section line, refer to Figure 3.3.6. Vol II)

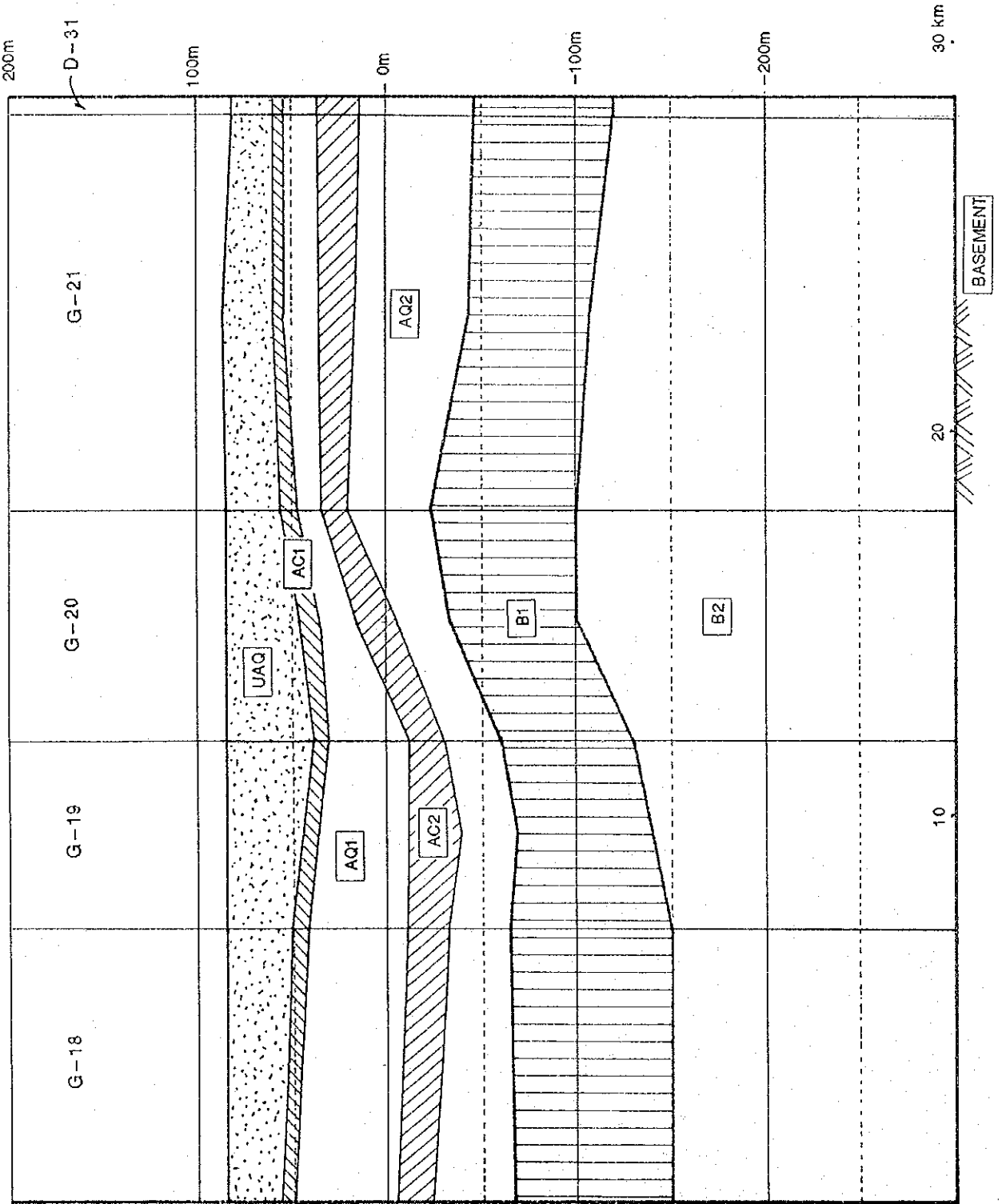


Cross Section - 2 SEMI-BABHAR ZONE

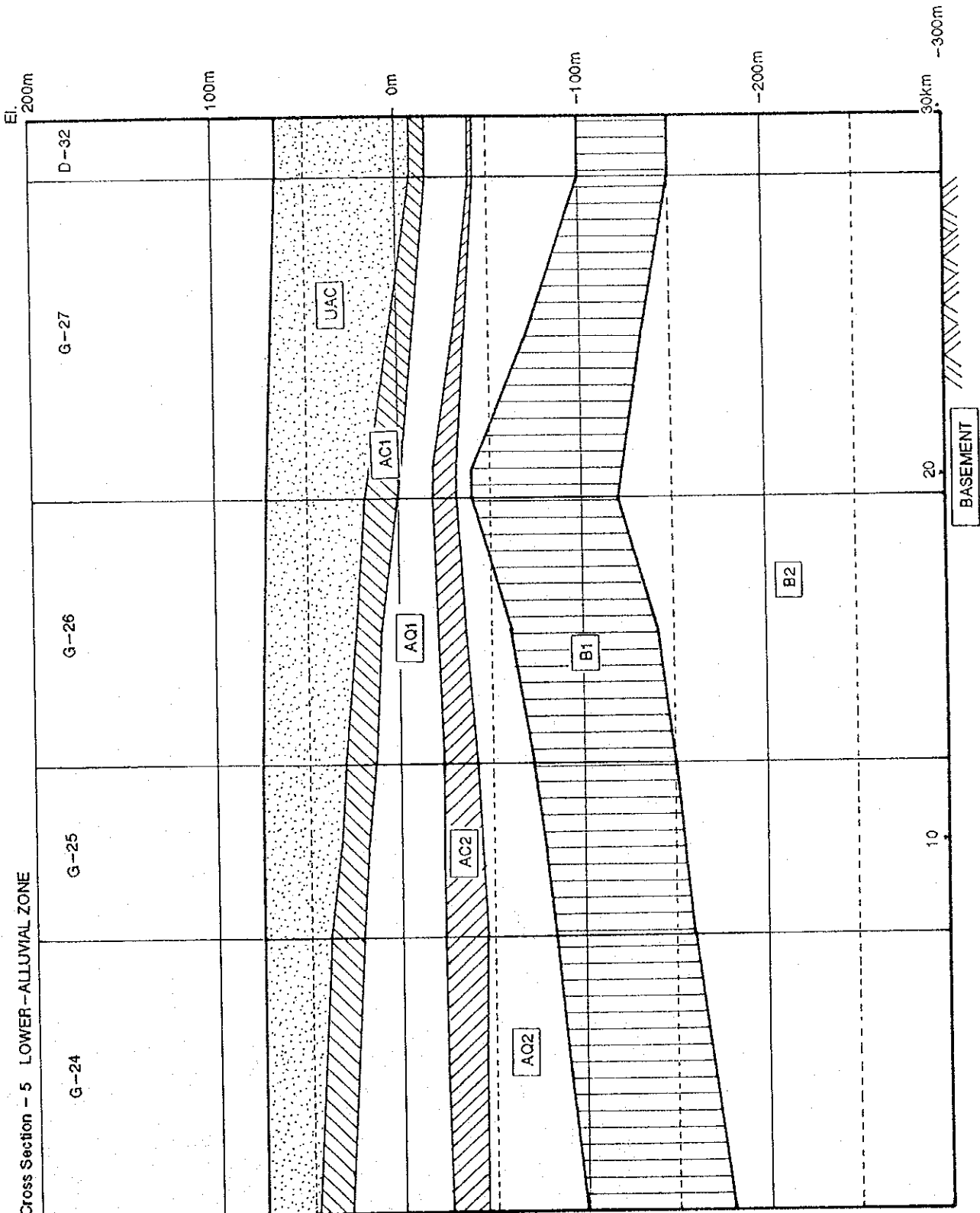




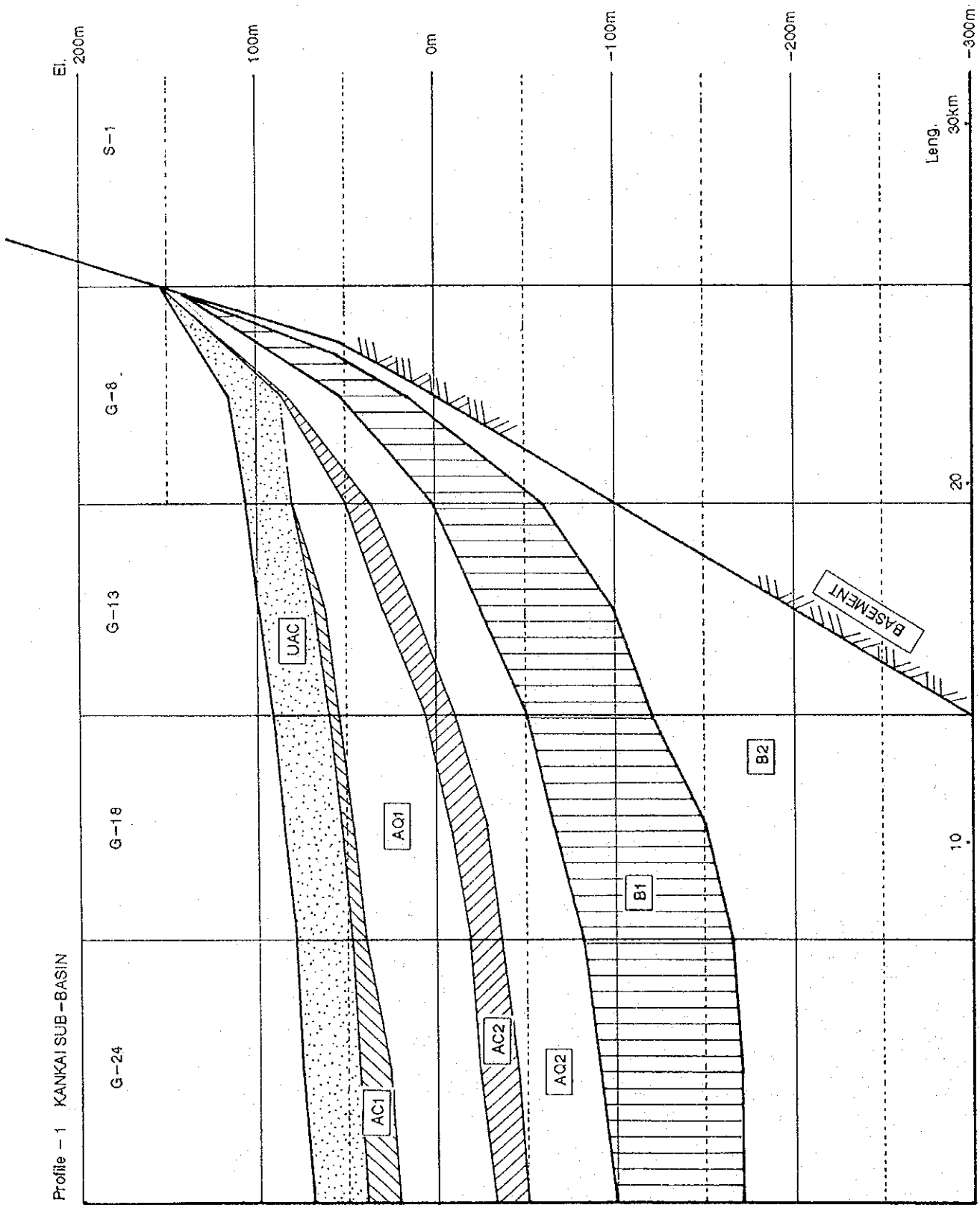
Cross Section - 4 MID-ALLUVIAL ZONE

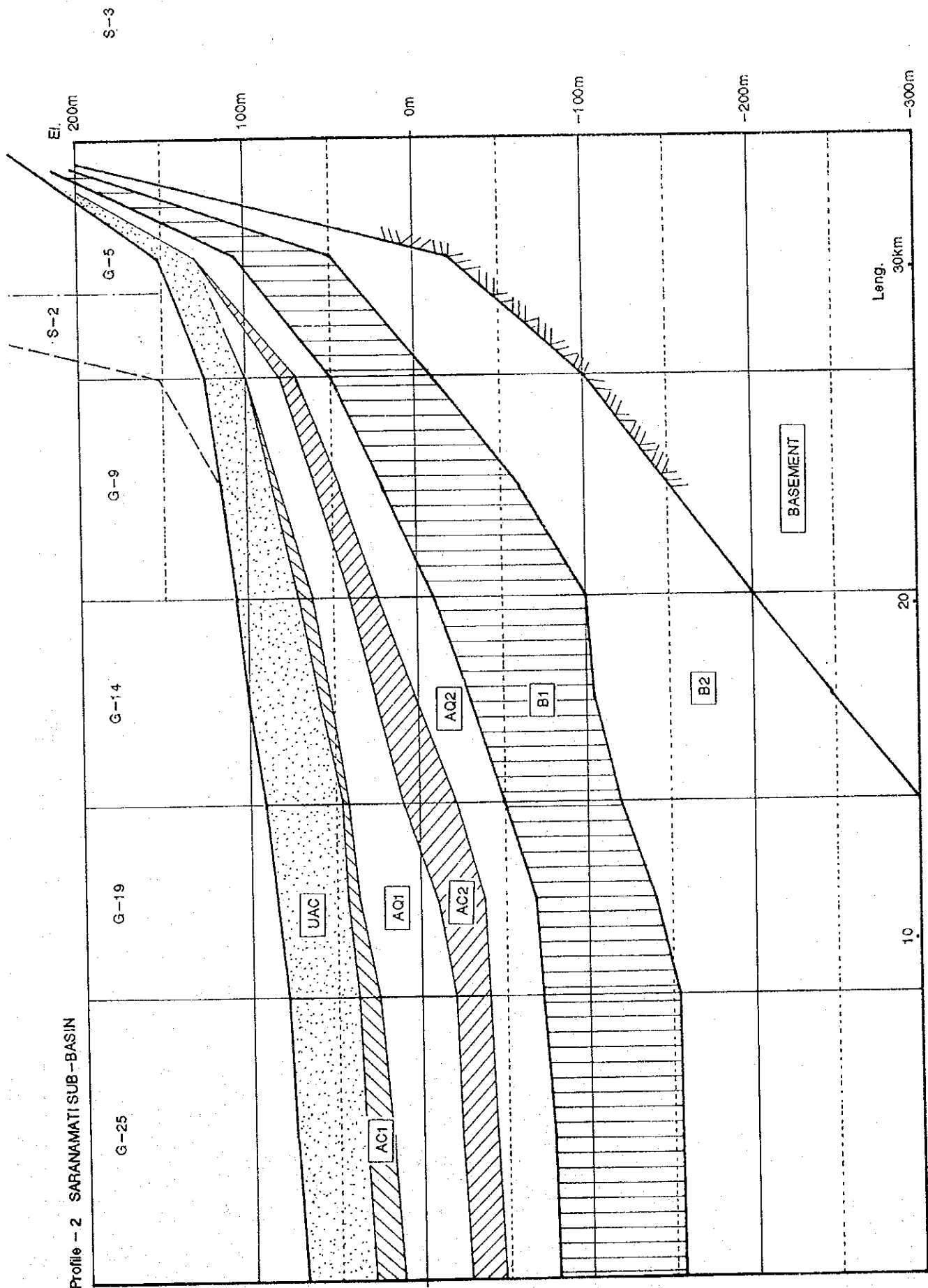


Cross Section - 5 LOWER-ALLUVIAL ZONE

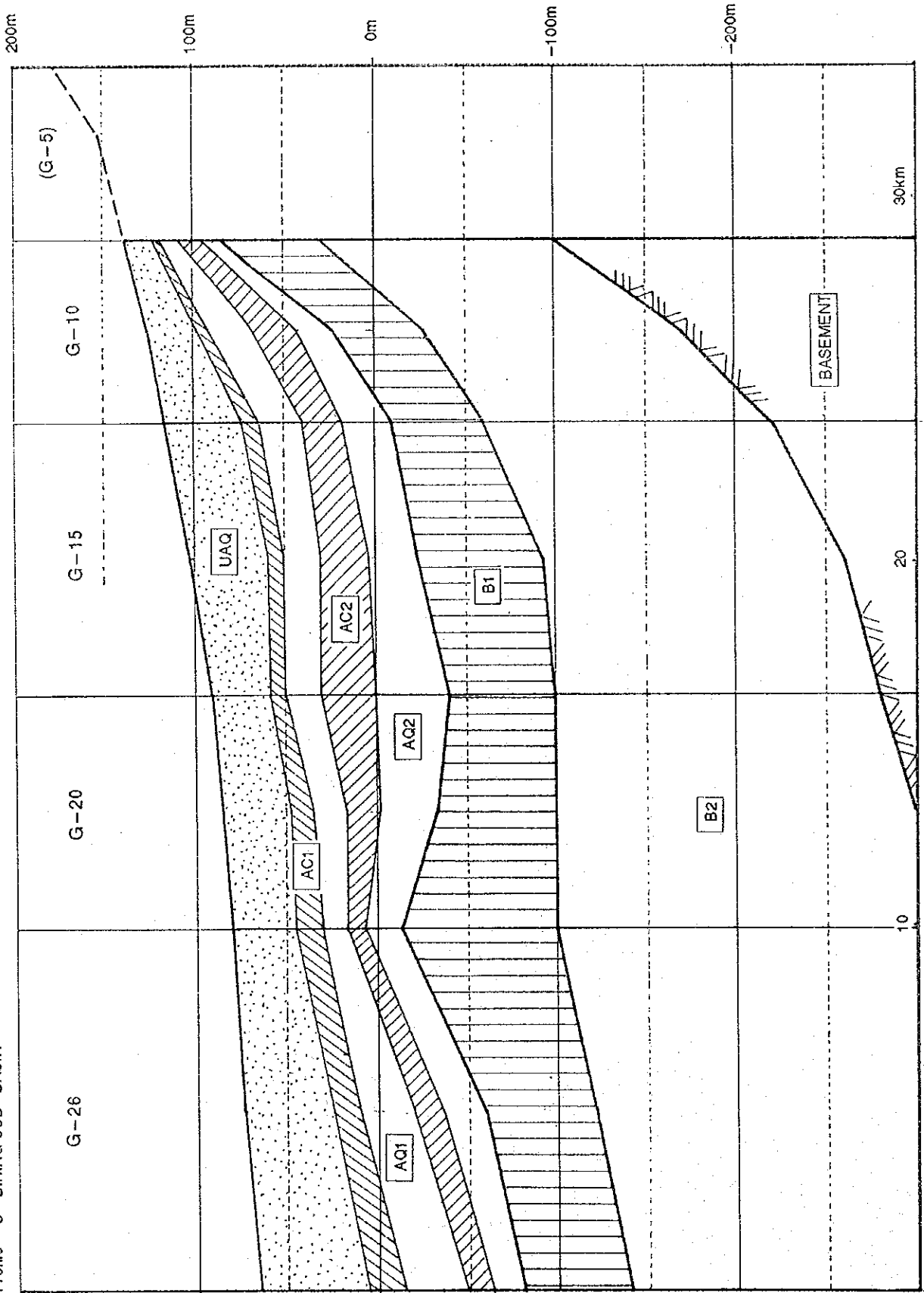


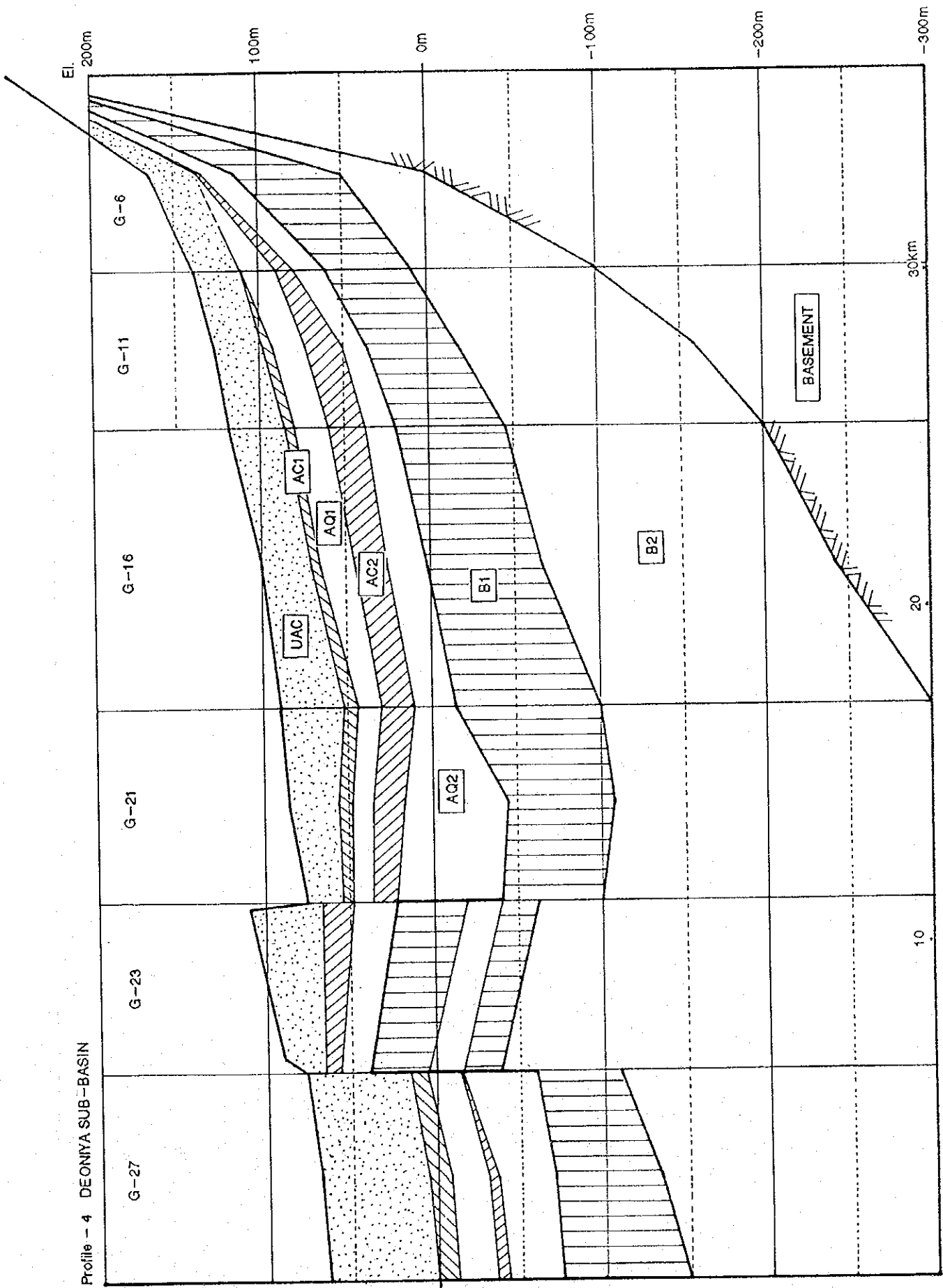
Profile - 1 KANKAI SUB-BASIN



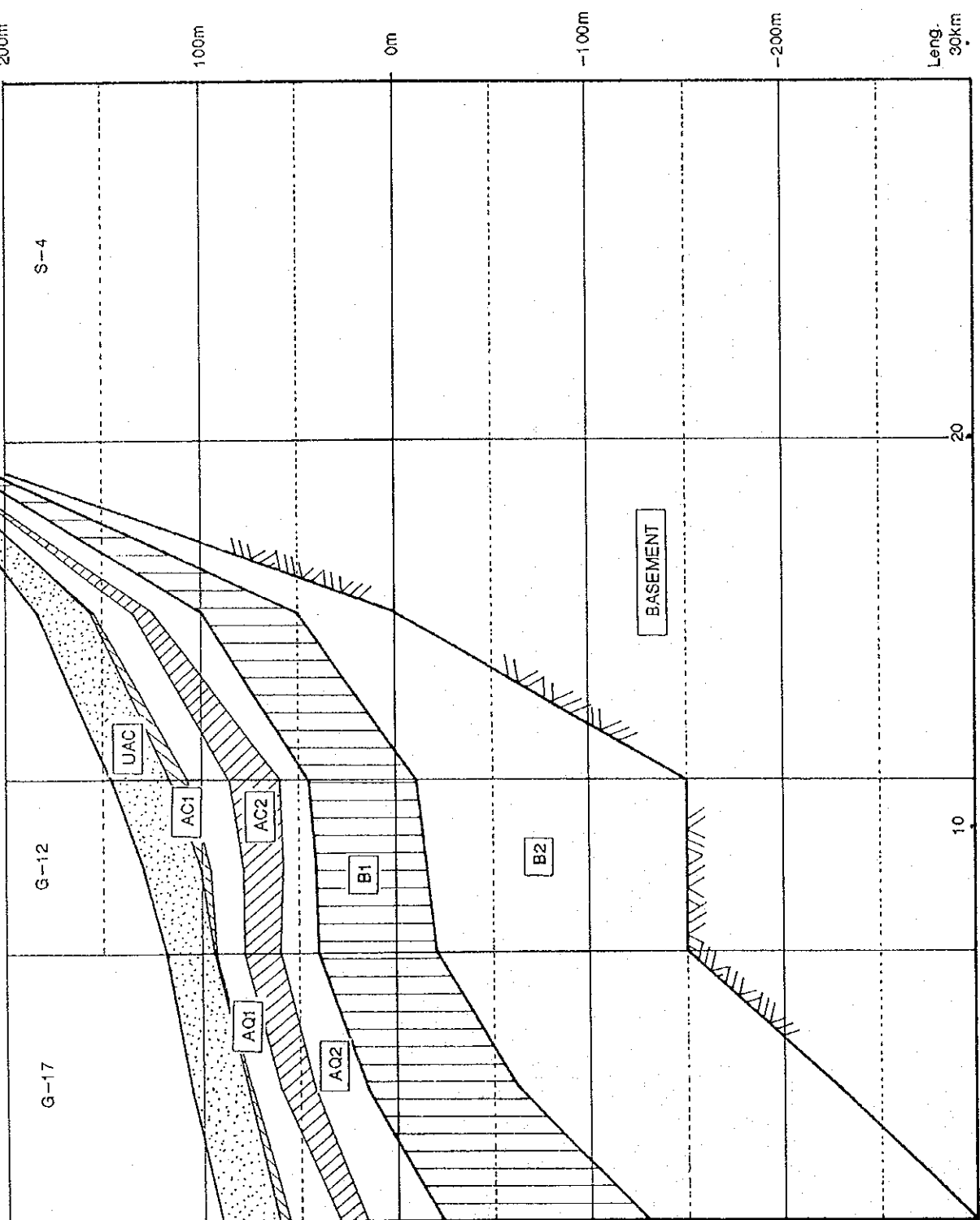


Profile - 3 BIRING SUB-BASIN





Profile - 5 HANDIYA/NINDITYA SUB-BASIN



Cross/Profile TERRACE ZONE

