TABLES

Table-C.1 General Properties of The Observation Wells in the Kucuk Menderes River Basin

	Well No.	District	Village	Coordinate	Construction Date (Month /Year)	Ground Altitude (m)	Depth of Well (m)	Lithology of ground surface	Lithology of Aquifer	Thickness of Aquifer (m)	Depth of The Aquifer Section (G.L. - m)	Diameter of Screen	Pumping Test					Jacob's Method		Recovery Method		Theis's Method		Average	
													Pumping Ratio (Lt/sec.)	Static Water Level (G.L. - m)	Lowest Groundwater Depth (G.L. - m)	Maximum Drawdown (G.L. - m)	Specific Yield (Lt/sec/m)	Transmissivity (m²/day/m)	Coefficient of Permeability (cm/sec)	Transmissivity (m²/day/m)	Coefficient of Permeability (cm/sec)	Transmissivity (m²/day/m)	Coefficient of Permeability (cm/sec)	Coefficient of Permeability (cm/sec)	Storage Coefficient
1	18(22)	KIRAZ	Hamitpaşa	L20c1-09500D,30000K	11/1958	259.6	124.00	Sandy soil	Gravelly Sand, Sand	50	11.0 - 58.0	6"	10.00	5.00	8.00	3.00	3.3	-	-	-	-	-	-	7.99E-03	-
2	10065/A	-do-	Yeğiler	L20d2-06875D,27250K	6/1968	231.0	87.25	Silt to Gravel	Gravel, Clayey Sand	42	5.0 - 81.0	8" - 6"	6.87	3.20	39.33	36.13	0.2	8	2.28E-04	10	2.68E-04	7	1.86E-04	2.77E-04	0.03
3	27665	ÖDEMİŞ	Kayınağıç	L20d3-09000D,24700K	7/1980	161.0	85.00	Sandy Silt	Gravel, Gravelly Clay	42	0.0 - 84.0	8"5/8 - 6"5/8	29.27	26.95	42.07	15.12	1.9	80	2.20E-03	445	1.23E-02	425	1.15E-02	8.85E-03	0.03
4	(18643)-35611	-do-	K.Arıtürcek	L20d1-00740D,32800K	3/1987	182.0	145.00	Rubbles	Silt, Sand, Gravel	77	40.0 - 143.0	12"3/4 - 8"5/8	17.00	47.46	66.06	18.60	0.9	77	1.16E-03	90	1.35E-03	84	1.27E-03	1.26E-03	0.05
5	(20325)-43562	-do-	B.Arıtürcek	L20d1-99800D,31720K	6/1992	157.0	89.00	Clay, Rubble	Clayey Gravel	27	54.0 - 84.0	14"	17.00	50.69	57.23	6.54	2.6	224	9.69E-03	244	1.06E-02	354	1.53E-02	1.19E-02	0.35
6	27927	-do-	Yeniköy	L20d1-99075D,30500K	9/1980	136.0	120.00	Silt	Mainly Gravel	91	0.0 - 120.0	10"3/4 - 6"5/8	60.24	23.06	29.46	6.40	9.4	2072	2.65E-02	1642	2.10E-02	1721	2.20E-02	2.32E-02	0.21
7	25526	-do-	-do-	L20d1-89125D,27850K	5/1979	117.0	104.00	Clayey Silt	Gravel mix Silty Clay	70	44.0 - 104.0	8"5/8	37.00	13.06	33.86	22.80	1.6	443	7.32E-03	344	5.68E-03	312	5.15E-03	6.05E-03	0.01
8	13426/B	-do-	Adagüzel	L20d1-89650D,21215K	10/1969	121.5	42.00	Clayey Gravel	Gravel, Clayey Gravel	18	6.0 - 38.0	10"	26.00	10.27	19.88	9.61	2.7	-	-	-	-	-	-	2.60E-02	-
9	25527	-do-	Yenieskoy	L19c2-85345D,32700K	5/1979	127.0	104.85	Gravel	Gravel, Sand, Clay	49	43.0 - 92.0	8"5/8	6.00	19.50	37.01	17.51	0.3	198	4.67E-03	51	1.20E-03	80	1.89E-03	2.59E-03	0.02
10	(10577)-39073	-do-	Demirli	L19c2-81000D,31900K	5/1989	123.0	130.00	Gravel	Gravel, Clayey Gravel	90	0.0 - 122.0	12"3/4 - 10"3/4	30.00	29.30	38.18	2.88	10.4	2157	2.78E-02	1329	1.46E-02	1474	1.90E-02	2.04E-02	0.36
11	21920	-do-	Yeniköy	L19d2-76900D,28625K	4/1978	104.0	104.00	Silt to Sand	Gravel, Gravelly Clay	69	44.0 - 103.0	8"5/8	50.46	10.86	33.90	23.04	2.2	258	4.31E-03	307	5.14E-03	285	4.77E-03	4.74E-03	0.02
12	10(12)	-do-	-do-	L19c2-77500D,29750K	5/1959	94.7	160.00	?	Sand, Gravel	137	2.0 - 148.0	?	12.50	2.40	11.00	8.60	1.6	-	-	-	-	-	-	1.51E-03	-
13	10066	TİRE	Kahve	L19d1-76025D,21275K	4/1968	95.0	181.60	Fine Sand & Gravel	Gravel	146	13.0 - 160.0	10" - 8"	34.00	13.25	17.74	0.49	69.4	17931	1.42E-01	10752	8.51E-02	17348	1.36E-01	1.21E-01	0.54
14	30296	-do-	Gökçen	L19c2-77250D,29075K	12/1982	126.6	100.00	Sandy Rubble	Rubble	80	0.0 - 100.0	12"3/4 - 6"5/8	6.00	31.55	39.44	7.89	0.8	59	8.58E-04	68	9.80E-04	63	9.07E-04	8.11E-04	0.06
15	34355	-do-	-do-	L20c1-76000D,20000K	4/1972	95.0	110.00	Fine Sand, Rubble	Rubble	90	0.0 - 110.0	8"	50.48	8.71	19.94	11.23	4.5	1736	2.23E-02	1663	2.14E-02	1042	1.34E-02	1.90E-02	0.04
16	30301	-do-	-do-	L19c4-78950D,19850K	12/1982	115.0	102.00	Coarse Sand, Rubble	Sand, Rubble	52	0.0 - 99.0	12"3/4 - 6"5/8	30.00	29.31	46.71	17.40	1.7	399	7.50E-03	296	6.56E-03	243	5.37E-03	6.48E-03	0.03
17	30483	BAYINDIR	Zeytinova	L19d2-63400D,27550K	7/1990	75.0	88.00	Rubble	Rubble, Gravelly Clay	40	0.0 - 74.0	12"3/4 - 10"3/4	30.00	30.85	33.77	2.92	10.3	608	2.01E-02	2790	8.02E-02	1375	3.95E-02	4.66E-02	0.33
18	30305	-do-	Yalçık	L19d2-61450D,27300K	5/1983	63.0	95.00	Rubble	Rubble, Gravel	78	0.0 - 89.0	10"3/4 - 8"5/8	60.24	8.90	11.06	2.16	27.9	5295	7.86E-02	4536	6.74E-02	6026	8.95E-02	7.85E-02	0.51
19	27362	-do-	Yüzüllü	L19d2-60100D,29075K	9/1980	82.0	110.00	Rubble	Rubble	82	0.0 - 110.0	10"3/4 - 6"5/8	60.24	26.25	28.19	1.94	31.1	-	-	-	-	-	-	6.45E-02	-
20	23425	-do-	Turan	L19d2-59900D,30600K	4/1981	93.0	77.00	Rubble	Rubble, Gravel	30	0.0 - 72.0	10"3/4 - 8"5/8	60.24	30.55	42.01	11.46	5.3	529	2.04E-02	3810	1.47E-01	567	2.19E-02	6.31E-02	0.04
21	30665	-do-	Fındı	L19d1-51105D,26750K	3/1984	32.0	70.00	Silty Gravelly Clay	Silt, Clay to Sand, Gravel	68	0.0 - 70.0	10"3/4	11.67	+2.00	2.50	4.50	2.6	62	1.06E-03	12	2.14E-04	35	5.96E-04	4.22E-04	0.02
22	30665	-do-	-do-	L19d1-51025D,26400K	2/1984	30.0	67.00	Silty Clay	Sandy Gravel, Gravelly Clay	47	17.0 - 64.0	10"3/4	38.00	+2.80	1.45	4.28	8.9	2889	7.12E-02	-	-	2024	4.98E-02	4.03E-02	0.30
23	39994	-do-	Elvin	L19d1-50050D,27500K	1/1990	36.0	104.00	Rubble	Gravelly Clay	90	0.0 - 96.0	12"3/4 - 10"3/4	30.00	20.80	37.06	16.26	1.8	158	3.11E-03	339	6.65E-03	124	2.43E-03	4.06E-03	0.09
24	7765(3)	-do-	Çeşmeköy	L19d1-48500D,24800K	2/1966	24.0	104.00	?	Sand, Gravel	58	22.0 - 80.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	21917	-do-	Yeşilpınar	L19d1-47750D,27550K	2/1978	50.0	80.00	Rubble	Rubble	41	0.0 - 76.0	8"5/8	27.12	16.40	34.61	18.21	1.5	306	8.57E-03	238	6.66E-03	163	4.56E-03	6.60E-03	0.04
26	19145	-do-	Kızılçavın	L19d1-45750D,27000K	6/1975	38.5	60.00	Fine Sand	Rubble	33	0.0 - 30.0	12" - 8"	60.24	10.35	16.95	6.60	9.1	1906	6.68E-02	4536	1.59E-01	1357	4.75E-02	9.10E-02	0.15
27	24962	-do-	Çiftlikaltı	L19d1-44575D,26325K	9/1978	35.0	82.00	Sandy Clay	Rubble	48	6.0 - 76.0	12"3/4 - 8"5/8	45.10	8.45	28.72	19.77	2.3	155	3.76E-03	396	9.60E-03	258	6.26E-03	6.54E-03	0.03
28	(14493)-43333	-do-	Ankaralı	L19d1-44025D,26150K	2/1992	38.0	106.00	Sandy Rubble	Gravel, Clayney or Sandy Gravel	75	0.0 - 96.0	12"3/4 - 8"5/8	40.00	22.07	35.90	13.83	2.9	352	5.44E-03	545	8.43E-03	330	5.10E-03	6.32E-03	0.06
29	24879	-do-	Cepi	L19d1-44600D,24200K	8/1978	22.0	84.00	Silty Clay	Gravel, Clayey Gravel	49	40.0 - 82.0	8"5/8	35.32	+1.25	32.92	34.17	1.0	399	9.61E-03	-	-	265	6.25E-03	4.67E-03	0.01
30	24868	-do-	Hasköy	L19d1-45450D,21925K	5/1978	20.5	86.50	Silty Clay	Gravel, Clayey Gravel	45	39.0 - 84.0	8"	20.69	1.40	31.97	30.57	0.7	96	2.68E-03	100	2.57E-03	95	2.44E-03	2.49E-03	0.01
31	24957	TİRE	Yeşilhüyük	L19d1-43800D,20400K	7/1978	20.0	80.00	Silty Clay	Silt or Clayey Gravel	59	4.0 - 78.0	8"5/8	60.62	10.26	19.16	8.80	6.9	55	1.08E-02	63	1.25E-03	80	1.57E-03	1.30E-03	0.20
32	26402	TORBALI	Atalan	L19c3-40875D,19500K	6/1979	17.0	121.15	Silty Clay	Mainly Gravel	47	72.0 - 119.0	8"5/8	50.00	5.85	12.93	7.08	7.1	659	1.62E-02	659	1.62E-02	894	2.20E-02	1.82E-02	0.30
33	29907	-do-	Aslanlar	L18c2-35650D,25100K	10/1979	40.0	69.60	Rubble	Conglomerate	61	0.0 - 70.0	12"3/4 - 6"5/8	50.00	4.38	8.51	4.13	12.1	6592	1.24E-01	6081	1.14E-01	4458	8.39E-02	1.07E-01	0.10
34	33270	-do-	Sütüler	L18c2-33875D,27900K	6/1987	27.5	100.00	Sand, Clay	Gravel, Clay	83	11.0 -100.0	12"3/4 - 8"5/8	40.00	3.27	16.91	13.64	2.9	527	7.35E-03	652	9.08E-03	550	7.66E-03	8.03E-03	0.04
35	30307	-do-	Pamukyazı	L18c3-36400D,19150K	9/1983	13.0	100.15	Silt, Gravel	Gravel	28	62.0 - 90.0	8"5/8	60.00	2.00	12.21	10.21	3.9	722	2.98E-02	794	3.28E-02	829	3.43E-02	3.23E-02	0.11
36	(22331)-46051	-do-	Çaybağı	L18c1-32375D,20450K	7/1993	21.0	138.00	Sand, Clayey Sand	Gravelly Silty Clay	99	0.0 - 136.0	10"3/4 - 8"5/8	20.00	12.28	37.44	25.16	0.8	45	5.31E-04	60	7.03E-04	55	6.46E-04	6.27E-04	0.04
37	10064/A	-do-	Yeniköy	L18c1-29450D,21625K	3/1968	20.0	84.00	Clay	Gravel	39	18.0 - 44.0	10" - 8"	8.48	0.90	25.30	24.40	0.3	20	1.22E-03	25	2.17E-03	15	9.33E-04	1.44E-03	0.04
38	10063	-do-	Mandıra	L18c1-32500D,27250K	3/1968	57.0	54.00	?	Gravel	25	21.0 - 46.0	?	36.83	15.83	17.37	1.54	23.9	4482	2.08E-01	4479	2.07E-01	3897	1.80E-01	1.98E-01	-
39	27614	-do-	Merkez I	L18c1-30900D,26500K	5/1990	52.5	120.00	Gravel	Clayey Gravel, Conglomerate	71	0.0 - 94.0	12"3/4 - 8"5/8	50.46	13.24	23.36	10.12	5.0	-	-	-	-	-	-	1.03E-02	-
40	29863	-do-	Merkez II	L18d1-27700D,26725K	6/1992	39.0	61.00	Silt, Coarse Sand	Marble	10	31.0 - 41.0	8"5/8	60.62	+0.2	2.85	2.65	22.9	3307	3.83E-01	3550	4.11E-01	3343	3.87E-01	3.94E-01	0.50
41	31482	-do-	Pancar	L18d2-21750D,28100K	6/1984	54.0	224.00	Sand, Clay	Clayey Gravel, Conglomerate	133	91.0 - 224.0	10"3/4	2.00	2.00	57.00	55.00	0.0	-	-	-	-	-	-	6.21E-05	-
42	39495	-do-	-do-	L18d2-21150D,24375K	10/1991	44.0	113.00	Clay	Marble	67	30.0 - 113.0	8"5/8	20.00	28.35	34.53	6.18	3.2	105	1.82E-03	132	2.28E-03	150	2.59E-03	2.23E-03	0.51
43	18495	SELÇUK	Merkez II	M18a2-33250D,01300K	8/1975	25.0	79.00	Rubble	Marble	25	0.0 - 79.0	8"	63.00	19.28	19.87	0.59	106.8	27688	1.28E+00	-	-	25275	1.17E+00	1.23E+00	0.40
44	21381	-do-	-do-	M18b1-30550D,00325K	10/1976	10.0	74.60	Gravel	Marble	30	7.0 - 74.6	Non Casing(9"5/8)	52.00	5.40	6.93	0.92	56.5	12740	6.55E-01	25693	9.78E-01	13005	4.95E-01	7.09E-01	0.40

Table-C.2 Number of Wells and Amount of Water Allocation
Pumped from Wells registrated at DSİ

As of 15 March 1995

	ÖDEMİŞ				BEYDAĞ				Total	
Registered Number of Wells	680				9				689	
Total Privatal Water Allocation (MCM/year)	16.84				2.16				19.00	
Total Cooperative Water Allocation (MCM/year)	11.35				-				11.35	
Details of Number & Amount of Water Allocation of Privatal Use in Respective Köy	Köy	No. of Wells	Irrigation Area	Amount of Water Allocation	Köy	No. of Wells	Irrigation Area	Amount of Water Allocation		
		nos.	ha	m3		nos.	ha	m3		
	Adagüme	84		1,217,000	Halıköy	1		1,000		
	Bademli	38		498,100	MERKEZ	5		2,158,460		
	Balabanlı	38		798,126	Tosunlar	2		2,500		
	Birgi	2		242,030	Yağcılar	1		1,000		
	B.Avlucak	3		124,992						
	Bozceyaka	8		29,000						
	Canyayla	2		4,000						
	Çayli	2		11,000						
	Demirçili	1		2,000						
	Dolaylı	1		6,000						
	Emirli	4		38,500						
	Ertuğrul	1		10,000						
	Eselli	3		1,640						
	Gereli	7		150,000						
	Gercekli	5		91,000						
	Gölcük	6		124,000						
	Gunluce	9		292,540						
	Karadoğan	10		101,000						
	Karahayıt	4		69,000						
	Kayaköy	1		25,000						
	Kaymakçı	37		2,930,422						
	Kazanlı	5		151,000						
	Kurucaova	2		156,000						
	K.Avlucak	2		190,120						
	Kofundere	3		258,000						
	Işık	1		8,000						
	Likkursun	4		95,440						
	Kecilliler	3		30,000						
	MERKEZ	102		5,289,193						
	Mescitli	25		156,000						
	Mursallı	2		42,000						
	Ocaklı	26		737,094						
	Ovakent	138		2,007,800						
	Sekiköy	11		134,000						
	Seyrekli	5		18,000						
	Türkmen	1		8,100						
	Türkönü	5		77,300						
	Yeniceköy	17		263,880						
	Yeniköy	7		57,100						
	Yölüstü	8		108,940						
	Yusufdere	1		5,000					Total	
	Zeytinlik	11		280,380						
				MCM				MCM	nos.	MCM
Total		645		16.839		9		2.163	654	19.002
	Kaymakçı	1	50	300,000						
Details of Number & Amount of Water Allocation of Respective Cooperative	B.Avlucak	5	200	1,650,000						
	K.Avlucak	7	230	3,000,000						
	Yölüstü	12	400	3,900,000						
	Demirçili	4	150	1,200,000					Total	
	Yeniköy	6	170	1,300,000						
				MCM					nos. ha	MCM
Total		35	1,200	11.350					35 1,200	11.350

Table-C.3 Recharge Water from Wtershed (1 of 4)

Rechaege parameter: 0.2
Total available soil moisture: 100.0 mm

		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1974	Rainfall	26.5	174.2	88.5	36.6	35.3	6.0	0.0	2.6	37.3	34.4	105.8	108.3	655.5
	Surface runoff	3.1	35.3	53.8	10.2	3.7	2.2	1.7	1.5	1.5	1.7	11.4	72.6	198.8
	Excess Rainfall	23.4	138.9	34.7	26.4	31.6	3.8	0.0	1.1	35.8	32.7	94.4	35.7	458.4
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	25.4	34.7	26.4	31.6	3.8	0.0	1.1	35.8	32.7	57.4	28.7	
	Et2(from soil)	0.0	0.0	7.0	23.7	40.4	28.2	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.4	41.6	50.1	72.0	32.0	0.0	1.1	35.8	32.7	57.4	28.7	393.6
	Soil moisture	100.0	193.5	147.9	94.6	35.2	0.0	0.0	0.0	0.0	0.0	37.0	36.6	
	Recharge (mm)	20.0	20.0	38.7	29.6	18.9	7.0	0.0	0.0	0.0	0.0	0.0	7.4	141.6
1975	Rainfall	102.4	44.0	62.5	27.1	48.0	38.4	0.0	4.3	7.3	7.4	163.8	132.5	687.7
	Surface runoff	91.31	65.76	27.77	12.95	8.52	11.93	2.56	1.70	1.53	1.70	10.90	28.45	265.1
	Excess Rainfall	11.1	0.0	34.7	64.2	39.5	26.5	0.0	2.6	5.8	5.7	152.9	104.1	446.9
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	11.1	0.0	34.7	64.2	39.5	26.5	0.0	2.6	5.8	5.7	57.4	28.7	
	Et2(from soil)	2.9	12.7	6.9	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	12.7	41.7	66.2	39.5	26.5	0.0	2.6	5.8	5.7	57.4	28.7	303.6
	Soil moisture	30.8	11.9	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	95.5	151.7	
	Recharge (mm)	7.3	6.2	2.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.1	35.5
1976	Rainfall	51.1	29.7	18.8	131.2	25.7	29.8	21.7	2.8	0.9	124.7	32.2	79.5	548.1
	Surface runoff	11.41	22.15	10.90	28.28	8.86	3.75	1.70	1.70	1.53	16.70	21.98	65.25	194.2
	Excess Rainfall	39.7	7.6	7.9	102.9	16.8	26.1	20.0	1.1	0.0	108.0	10.2	14.3	354.5
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	7.6	7.9	73.8	16.8	26.1	20.0	1.1	0.0	89.4	10.2	14.3	
	Et2(from soil)	0.0	8.9	20.4	0.0	46.7	0.0	0.0	0.0	0.0	0.0	14.9	0.0	
	Actual Et.	16.9	16.5	28.2	73.8	63.5	26.1	20.0	1.1	0.0	89.4	25.1	14.3	374.8
	Soil moisture	100.0	71.1	36.5	58.3	0.0	0.0	0.0	0.0	0.0	18.6	0.0	0.0	
	Recharge (mm)	30.3	20.0	14.2	7.3	11.7	0.0	0.0	0.0	0.0	0.0	3.7	0.0	87.3
1977	Rainfall	74.4	87.8	41.3	54.2	0.0	34.7	0.2	0.0	44.3	38.3	49.5	70.6	495.3
	Surface runoff	62.52	34.41	20.78	9.88	4.43	2.21	1.19	1.02	1.19	8.01	3.58	17.38	166.6
	Excess Rainfall	11.9	53.4	20.5	44.3	0.0	32.5	0.0	0.0	43.1	30.3	45.9	53.2	335.1
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	11.9	25.4	20.5	44.3	0.0	32.5	0.0	0.0	43.1	30.3	45.9	28.7	
	Et2(from soil)	0.0	0.0	14.0	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	11.9	25.4	34.6	51.0	0.0	32.5	0.0	0.0	43.1	30.3	45.9	28.7	303.3
	Soil moisture	0.0	28.0	8.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.5	
	Recharge (mm)	0.0	0.0	5.6	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.3
1978	Rainfall	203.0	225.5	87.1	80.0	14.1	10.4	0.0	0.0	63.0	89.6	30.6	72.6	875.9
	Surface runoff	124.87	71.72	83.48	61.84	15.33	4.43	1.36	1.02	1.70	3.41	3.75	5.11	378.0
	Excess Rainfall	78.1	153.8	3.6	18.2	0.0	6.0	0.0	0.0	61.3	86.2	26.9	67.5	501.5
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	25.4	3.6	18.2	0.0	6.0	0.0	0.0	61.3	86.2	26.9	28.7	
	Et2(from soil)	0.0	0.0	22.5	27.8	56.2	6.4	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.4	26.1	46.0	56.2	12.4	0.0	0.0	61.3	86.2	26.9	28.7	386.0
	Soil moisture	85.8	197.0	135.1	80.3	8.0	0.0	0.0	0.0	0.0	0.0	0.0	38.8	
	Recharge (mm)	4.9	17.2	39.4	27.0	16.1	1.6	0.0	0.0	0.0	0.0	0.0	0.0	106.1
1979	Rainfall	180.9	67.1	52.7	38.4	42.3	11.3	0.7	0.0	0.1	37.3	94.9	127.6	653.3
	Surface runoff	86.88	43.27	8.18	8.01	5.79	2.56	1.02	1.02	1.02	1.02	7.33	33.39	199.5
	Excess Rainfall	94.0	23.8	44.5	30.4	36.5	8.7	0.0	0.0	0.0	36.3	87.6	94.2	456.1
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	23.8	44.5	30.4	36.5	8.7	0.0	0.0	0.0	36.3	57.4	28.7	
	Et2(from soil)	0.0	0.8	2.0	21.7	21.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	24.6	46.6	52.1	58.4	8.7	0.0	0.0	0.0	36.3	57.4	28.7	329.7
	Soil moisture	100.0	79.2	61.3	27.4	0.0	0.0	0.0	0.0	0.0	0.0	30.2	89.6	
	Recharge (mm)	7.8	20.0	15.8	12.3	5.5	0.0	0.0	0.0	0.0	0.0	0.0	6.0	67.4

Table-C.3 Recharge Water from Wtershed (2 of 4)

		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1980	Rainfall	132.5	23.4	104.7	54.2	39.7	21.0	0.3	0.0	0.0	19.1	126.8	203.0	724.7
	Surface runoff	90.12	25.55	40.55	15.67	11.41	4.77	1.53	1.02	1.02	1.19	6.13	34.92	233.9
	Excess Rainfall	42.4	0.0	64.2	38.5	28.3	16.2	0.0	0.0	0.0	17.9	120.7	168.1	496.2
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	0.0	48.6	38.5	28.3	16.2	0.0	0.0	0.0	17.9	57.4	28.7	
	Et2(from soil)	0.0	12.7	0.0	17.6	30.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	12.7	48.6	56.2	58.6	16.2	0.0	0.0	0.0	17.9	57.4	28.7	313.2
	Soil moisture	100.0	67.3	69.4	37.9	0.0	0.0	0.0	0.0	0.0	0.0	63.3	190.0	
	Recharge (mm)	17.9	20.0	13.5	13.9	7.6	0.0	0.0	0.0	0.0	0.0	0.0	12.7	85.5
1981	Rainfall	232.0	72.2	64.9	12.2	32.8	3.6	0.0	1.3	5.7	2.5	113.3	333.7	874.2
	Surface runoff	205.79	56.56	36.97	15.50	11.24	4.09	1.53	1.19	1.36	0.00	27.09	258.94	620.3
	Excess Rainfall	26.2	15.6	27.9	0.0	21.6	0.0	0.0	0.1	4.3	2.5	86.2	74.8	259.3
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	15.6	27.9	0.0	21.6	0.0	0.0	0.1	4.3	2.5	57.4	28.7	
	Et2(from soil)	0.0	4.9	10.3	36.9	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	20.5	38.3	36.9	23.9	0.0	0.0	0.1	4.3	2.5	57.4	28.7	229.5
	Soil moisture	100.0	75.1	49.8	2.9	0.0	0.0	0.0	0.0	0.0	0.0	28.8	69.1	
	Recharge (mm)	38.0	20.0	15.0	10.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	5.8	89.3
1982	Rainfall	40.6	47.1	81.4	71.4	30.5	8.4	22.8	0.0	0.0	79.2	26.2	84.4	492.0
	Surface runoff	50.26	29.47	68.99	41.06	27.09	10.56	10.39	0.34	0.34	1.53	1.87	15.84	257.8
	Excess Rainfall	0.0	17.6	12.4	30.3	3.4	0.0	12.4	0.0	0.0	77.7	24.3	68.6	246.7
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	0.0	17.6	12.4	30.3	3.4	0.0	12.4	0.0	0.0	77.7	24.3	28.7	
	Et2(from soil)	8.5	3.9	18.1	9.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	21.5	30.5	40.1	3.4	0.0	12.4	0.0	0.0	77.7	24.3	28.7	255.5
	Soil moisture	52.2	37.9	12.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.9	
	Recharge (mm)	13.8	10.4	7.6	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.3
1983	Rainfall	80.0	81.1	14.9	47.8	16.7	55.4	10.5	0.0	3.7	16.6	199.6	90.9	617.2
	Surface runoff	27.26	33.05	20.78	20.10	3.92	2.56	0.51	2.21	0.51	1.87	16.18	70.70	199.7
	Excess Rainfall	52.7	48.1	0.0	27.7	12.8	52.8	10.0	0.0	3.2	14.7	183.4	20.2	425.6
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	25.4	0.0	27.7	12.8	52.8	10.0	0.0	3.2	14.7	57.4	20.2	
	Et2(from soil)	0.0	0.0	24.3	23.1	8.6	0.0	0.0	0.0	0.0	0.0	0.0	4.2	
	Actual Et.	16.9	25.4	24.3	50.7	21.4	52.8	10.0	0.0	3.2	14.7	57.4	24.5	301.3
	Soil moisture	75.7	83.2	42.3	10.8	0.0	0.0	0.0	0.0	0.0	0.0	126.0	96.6	
	Recharge (mm)	8.0	15.1	16.6	8.5	2.2	0.0	0.0	0.0	0.0	0.0	0.0	25.2	75.6
1984	Rainfall	148.2	122.5	108.4	69.2	2.4	0.0	9.5	0.2	0.0	0.0	58.8	19.7	538.9
	Surface runoff	136.12	72.23	59.63	26.24	11.24	3.92	3.07	0.00	1.70	1.02	3.07	2.56	320.8
	Excess Rainfall	12.1	50.3	48.8	43.0	0.0	0.0	6.4	0.2	0.0	0.0	55.7	17.1	233.6
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	12.1	25.4	48.6	43.0	0.0	0.0	6.4	0.2	0.0	0.0	55.7	17.1	
	Et2(from soil)	2.4	0.0	0.0	15.4	38.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.4	48.6	58.4	38.1	0.0	6.4	0.2	0.0	0.0	55.7	17.1	266.9
	Soil moisture	91.7	98.3	78.8	47.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Recharge (mm)	19.3	18.3	19.7	15.8	9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	82.6
1985	Rainfall	165.8	51.5	64.2	25.9	29.7	0.0	2.6	0.1	1.5	30.5	94.1	37.6	503.5
	Surface runoff	32.88	37.14	33.73	21.47	5.96	0.51	0.00	0.00	0.00	0.00	5.11	1.87	138.7
	Excess Rainfall	132.9	14.4	30.5	4.4	23.7	0.0	2.6	0.1	1.5	30.5	89.0	35.7	365.3
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	14.4	30.5	4.4	23.7	0.0	2.6	0.1	1.5	30.5	57.4	28.7	
	Et2(from soil)	0.0	5.5	9.1	34.7	4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	19.9	39.5	39.1	28.3	0.0	2.6	0.1	1.5	30.5	57.4	28.7	264.6
	Soil moisture	100.0	74.5	50.5	5.7	0.0	0.0	0.0	0.0	0.0	0.0	31.6	32.3	
	Recharge (mm)	0.0	20.0	14.9	10.1	1.1	0.0	0.0	0.0	0.0	0.0	0.0	6.3	52.5
1986	Rainfall	132.9	116.4	26.8	35.4	40.4	13.1	0.0	5.5	2.7	16.4	12.5	108.4	510.5
	Surface runoff	65.08	38.84	16.70	5.96	3.41	1.02	0.00	0.00	0.17	0.68	1.36	19.25	152.5
	Excess Rainfall	67.8	77.6	10.1	29.4	37.0	12.1	0.0	5.5	2.5	15.7	11.1	89.1	358.0
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	25.4	10.1	29.4	37.0	12.1	0.0	5.5	2.5	15.7	11.1	28.7	
	Et2(from soil)	0.0	0.0	19.2	22.2	30.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.4	29.4	51.6	67.7	12.1	0.0	5.5	2.5	15.7	11.1	28.7	266.7
	Soil moisture	83.2	118.7	75.7	38.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	60.4	
	Recharge (mm)	6.5	16.6	23.7	15.1	7.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	69.7

Table-C.3 Recharge Water from Wtershed (3 of 4)

		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1987	Rainfall	175.6	64.2	51.6	54.3	7.5	8.8	0.0	0.0	0.0	15.0	88.8	94.3	560.1
	Surface runoff	36.80	13.97	10.22	14.65	3.92	1.02	0.17	0.00	0.00	2,90	5.11	13.12	101.9
	Excess Rainfall	138.8	50.2	41.4	39.6	3.6	7.8	0.0	0.0	0.0	12.1	83.7	81.2	458.4
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	25.4	41.4	39.6	3.6	7.8	0.0	0.0	0.0	12.1	57.4	28.7	
	Et2(from soil)	0.0	0.0	3.6	17.1	37.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.4	45.0	56.7	41.3	7.8	0.0	0.0	0.0	12.1	57.4	28.7	291.3
	Soil moisture	100.0	104.8	80.3	47.1	0.0	0.0	0.0	0.0	0.0	0.0	26.3	73.5	
	Recharge (mm)	**12.1**	**20.0**	**21.0**	**16.1**	**9.4**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**5.3**	**83.8**
1988	Rainfall	9.6	86.3	130.9	23.1	21.8	0.0	0.0	11.8	0.2	14.6	125.0	108.5	531.8
	Surface runoff	7.84	11.93	54.00	20.78	9.54	3.24	0.00	0.00	0.00	1.87	8.52	29.81	147.5
	Excess Rainfall	1.8	74.4	76.9	2.3	12.3	0.0	0.0	11.8	0.2	12.7	116.5	78.7	387.5
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	1.8	25.4	48.6	2.3	12.3	0.0	0.0	11.8	0.2	12.7	57.4	28.7	
	Et2(from soil)	7.6	0.0	0.0	35.7	38.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.4	48.6	38.1	50.8	0.0	0.0	11.8	0.2	12.7	57.4	28.7	290.5
	Soil moisture	58.4	95.7	104.8	48.1	0.0	0.0	0.0	0.0	0.0	0.0	59.1	97.3	
	Recharge (mm)	**14.7**	**11.7**	**19.1**	**21.0**	**9.6**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**11.8**	**87.9**
1989	Rainfall	11.8	3.5	64.8	9.9	38.2	2.8	2.0	0.0	5.3	32.2	151.2	97.8	419.5
	Surface runoff	9.71	7.16	13.12	5.96	6.30	1.19	0.00	0.00	0.00	2.39	30.32	12.78	88.9
	Excess Rainfall	2.1	0.0	51.7	3.9	31.9	1.6	2.0	0.0	5.3	29.8	120.9	85.0	334.2
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	2.1	0.0	48.6	3.9	31.9	1.6	2.0	0.0	5.3	29.8	57.4	28.7	
	Et2(from soil)	7.4	12.7	0.0	34.9	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	12.7	48.6	38.9	33.2	1.6	2.0	0.0	5.3	29.8	57.4	28.7	275.1
	Soil moisture	82.4	53.3	45.7	1.6	0.0	0.0	0.0	0.0	0.0	0.0	63.5	107.1	
	Recharge (mm)	**19.5**	**16.5**	**10.7**	**9.1**	**0.3**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**12.7**	**68.7**
1990	Rainfall	1.3	51.2	38.1	110.9	0.6	2.6	0.0	5.6	33.1	13.8	36.2	190.7	484.1
	Surface runoff	10.56	18.06	24.87	22.15	13.97	2.39	0.00	0.00	0.00	0.34	9.37	28.62	130.3
	Excess Rainfall	0.0	33.1	13.2	88.8	0.0	0.2	0.0	5.6	33.1	13.5	26.8	162.1	376.4
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	0.0	25.4	13.2	73.8	0.0	0.2	0.0	5.6	33.1	13.5	26.8	28.7	
	Et2(from soil)	8.5	0.0	17.7	0.0	41.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.4	30.9	73.8	41.6	0.2	0.0	5.6	33.1	13.5	26.8	28.7	296.5
	Soil moisture	90.2	79.9	46.2	51.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	133.4	
	Recharge (mm)	**21.4**	**18.0**	**16.0**	**9.2**	**10.4**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**75.1**
1991	Rainfall	40.9	38.0	38.1	44.8	68.0	7.9	7.3	1.7	0.0	22.2	21.6	80.0	370.5
	Surface runoff	12.10	14.99	11.93	13.29	12.10	3.41	0.00	0.00	0.00	0.51	3.75	7.50	79.6
	Excess Rainfall	28.8	23.0	26.2	31.5	55.9	4.5	7.3	1.7	0.0	21.7	17.9	72.5	290.9
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	23.0	26.2	31.5	55.9	4.5	7.3	1.7	0.0	21.7	17.9	28.7	
	Et2(from soil)	0.0	1.2	11.2	21.1	16.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	24.2	37.4	52.7	72.2	4.5	7.3	1.7	0.0	21.7	17.9	28.7	285.0
	Soil moisture	100.0	78.8	51.8	20.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	43.8	
	Recharge (mm)	**26.7**	**20.0**	**15.8**	**10.4**	**4.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**76.9**
1992	Rainfall	121.0	82.0	65.2	41.5	10.5	0.0	0.0	0.0	20.0	49.0	41.1	103.0	533.3
	Surface runoff	6.47	4.60	8.35	14.14	3.58	0.51	0.00	0.00	0.00	1.36	15.33	14.65	69.0
	Excess Rainfall	114.5	77.4	56.9	27.4	6.9	0.0	0.0	0.0	20.0	47.6	25.8	88.3	464.8
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	25.4	48.6	27.4	6.9	0.0	0.0	0.0	20.0	47.6	25.8	28.7	
	Et2(from soil)	0.0	0.0	0.0	23.2	52.7	1.2	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.4	48.6	50.6	59.7	1.2	0.0	0.0	20.0	47.6	25.8	28.7	324.5
	Soil moisture	100.0	132.0	113.9	67.9	1.6	0.0	0.0	0.0	0.0	0.0	0.0	59.6	
	Recharge (mm)	**8.8**	**20.0**	**26.4**	**22.8**	**13.6**	**0.3**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**91.8**
1993	Rainfall	96.0	141.8	57.2	23.2	56.0	0.0	0.5	0.2	120.0	162.0	17.5	141.5	815.9
	Surface runoff	9.03	27.60	29.98	14.99	11.75	3.07	0.00	0.00	0.00	4.43	6.47	71.72	179.0
	Excess Rainfall	87.0	114.2	27.2	8.2	44.2	0.0	0.5	0.2	120.0	157.6	11.0	69.8	639.9
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	25.4	27.2	8.2	44.2	0.0	0.5	0.2	120.0	89.4	11.0	28.7	
	Et2(from soil)	0.0	0.0	10.7	32.8	34.1	15.4	0.0	0.0	0.0	0.0	23.2	0.0	
	Actual Et.	16.9	25.4	37.9	41.0	78.3	15.4	0.5	0.2	120.0	89.4	34.2	28.7	488.0
	Soil moisture	100.0	168.8	124.4	66.7	19.3	0.0	0.0	0.0	0.0	68.2	31.3	66.2	
	Recharge (mm)	**11.9**	**20.0**	**33.8**	**24.9**	**13.3**	**3.9**	**0.0**	**0.0**	**0.0**	**0.0**	**13.6**	**6.3**	**127.7**

Table-C.3 Recharge Water from Wtershed (4 of 4)

- Summary Table of Recharge Water -

(unit:mm)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1974	20.0	20.0	38.7	29.6	18.9	7.0	0.0	0.0	0.0	0.0	0.0	7.4	141.6
1975	7.3	6.2	2.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.1	35.5
1976	30.3	20.0	14.2	7.3	11.7	0.0	0.0	0.0	0.0	0.0	3.7	0.0	87.3
1977	0.0	0.0	5.6	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.3
1978	4.9	17.2	39.4	27.0	16.1	1.6	0.0	0.0	0.0	0.0	0.0	0.0	106.1
1979	7.8	20.0	15.8	12.3	5.5	0.0	0.0	0.0	0.0	0.0	0.0	6.0	67.4
1980	17.9	20.0	13.5	13.9	7.6	0.0	0.0	0.0	0.0	0.0	0.0	12.7	85.5
1981	38.0	20.0	15.0	10.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	5.8	89.3
1982	13.8	10.4	7.6	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.3
1983	8.0	15.1	16.6	8.5	2.2	0.0	0.0	0.0	0.0	0.0	0.0	25.2	75.6
1984	19.3	18.3	19.7	15.8	9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	82.6
1985	0.0	20.0	14.9	10.1	1.1	0.0	0.0	0.0	0.0	0.0	0.0	6.3	52.5
1986	6.5	16.6	23.7	15.1	7.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	69.7
1987	12.1	20.0	21.0	16.1	9.4	0.0	0.0	0.0	0.0	0.0	0.0	5.3	83.8
1988	14.7	11.7	19.1	21.0	9.6	0.0	0.0	0.0	0.0	0.0	0.0	11.8	87.9
1989	19.5	16.5	10.7	9.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	12.7	68.7
1990	21.4	18.0	16.0	9.2	10.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	75.1
1991	26.7	20.0	15.8	10.4	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	76.9
1992	8.8	20.0	26.4	22.8	13.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	91.8
1993	11.9	20.0	33.8	24.9	13.3	3.9	0.0	0.0	0.0	0.0	13.6	6.3	127.7
Average	14.4	16.5	18.5	13.4	7.1	0.6	0.0	0.0	0.0	0.0	0.9	5.9	77.3

Table-C.4 Recharge Water from Plain Area (1 of 5)

Coeff. of Et from Soil: 0.8 Recharging parameter: 0.2
Total available soil moisture: 100.0 mm

		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1974	Rainfall	26.5	174.2	88.5	36.6	35.3	6.0	0.0	2.6	37.3	34.4	105.8	108.3	655.5
	effetive rainfall	26.3	103.9	76.2	34.7	33.7	6.0	0.0	2.6	35.3	32.9	86.8	88.0	
	Surface runoff	0.2	70.3	12.3	1.9	1.6	0.0	0.0	0.0	2.0	1.5	19.0	20.3	129.1
	Excess Rainfall	26.3	103.9	76.2	34.7	33.7	6.0	0.0	2.6	35.3	32.9	86.8	88.0	526.4
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	25.4	48.6	34.7	33.7	6.0	0.0	2.6	35.3	32.9	57.4	28.7	
	Et2(from soil)	0.0	0.0	0.0	31.2	63.0	8.7	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.4	48.6	66.0	96.7	14.7	0.0	2.6	35.3	32.9	57.4	28.7	425.1
	Soil moisture	100.0	158.5	154.4	92.3	10.8	0.0	0.0	0.0	0.0	0.0	29.4	82.8	
	Recharge (mm)	**20.0**	**20.0**	**31.7**	**30.9**	**18.5**	**2.2**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**5.9**	**129.1**
1975	Rainfall	102.4	44.0	62.5	77.1	48.0	38.4	0.0	4.3	7.3	7.4	163.8	132.5	687.7
	effetive rainfall	85.2	41.0	56.5	68.4	44.3	36.3	0.0	4.3	7.3	7.4	103.1	97.8	
	Surface runoff	17.25	3.04	6.00	8.67	3.68	2.14	0.00	0.00	0.00	0.00	60.70	34.70	136.2
	Excess Rainfall	85.2	41.0	56.5	68.4	44.3	36.3	0.0	4.3	7.3	7.4	103.1	97.8	551.5
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	25.4	48.6	68.4	44.3	36.3	0.0	4.3	7.3	7.4	57.4	28.7	
	Et2(from soil)	0.0	0.0	0.0	4.3	50.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.4	48.6	72.7	94.9	36.3	0.0	4.3	7.3	7.4	57.4	28.7	399.8
	Soil moisture	100.0	95.6	84.3	63.2	0.0	0.0	0.0	0.0	0.0	0.0	45.7	105.7	
	Recharge (mm)	**16.6**	**20.0**	**19.1**	**16.9**	**12.6**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**9.1**	**94.3**
1976	Rainfall	51.1	29.7	18.8	131.2	25.7	29.8	21.7	2.8	0.9	124.7	32.2	79.5	548.1
	effetive rainfall	46.9	28.9	18.8	97.5	25.6	29.0	21.7	2.8	0.9	95.9	31.0	70.1	
	Surface runoff	4.18	0.75	0.00	33.71	0.11	0.77	0.00	0.00	0.00	28.84	1.15	9.44	79.0
	Excess Rainfall	46.9	28.9	18.8	97.5	25.6	29.0	21.7	2.8	0.9	95.9	31.0	70.1	469.1
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	25.4	18.8	73.8	25.6	29.0	21.7	2.8	0.9	89.4	31.0	28.7	
	Et2(from soil)	0.0	0.0	23.8	0.0	46.5	0.0	0.0	0.0	0.0	0.0	5.2	0.0	
	Actual Et.	16.9	25.4	42.6	73.8	72.1	29.0	21.7	2.8	0.9	89.4	36.2	28.7	439.5
	Soil moisture	100.0	83.5	43.0	58.1	0.0	0.0	0.0	0.0	0.0	6.5	0.0	41.4	
	Recharge (mm)	**21.1**	**20.0**	**16.7**	**8.6**	**11.6**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**1.3**	**0.0**	**79.4**
1977	Rainfall	74.4	87.8	41.3	54.2	0.0	34.7	0.2	0.0	44.3	38.3	49.5	70.6	495.3
	effetive rainfall	66.5	75.7	38.7	49.5	0.0	33.1	0.2	0.0	41.2	36.2	45.6	63.3	
	Surface runoff	7.90	12.10	2.61	4.67	0.00	1.55	0.00	0.00	3.09	2.13	3.92	7.30	45.3
	Excess Rainfall	66.5	75.7	38.7	49.5	0.0	33.1	0.2	0.0	41.2	36.2	45.6	63.3	450.0
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	25.4	38.7	49.5	0.0	33.1	0.2	0.0	41.2	36.2	45.6	28.7	
	Et2(from soil)	0.0	0.0	7.9	19.4	42.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.4	46.6	68.9	42.4	33.1	0.2	0.0	41.2	36.2	45.6	28.7	385.3
	Soil moisture	91.0	123.1	90.5	53.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.6	
	Recharge (mm)	**8.3**	**18.2**	**24.6**	**18.1**	**10.6**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**79.8**
1978	Rainfall	203.0	225.5	87.1	80.0	14.1	10.4	0.0	0.0	63.0	89.6	30.6	72.6	875.9
	effetive rainfall	104.0	104.0	75.2	70.4	14.1	10.4	0.0	0.0	56.9	76.9	29.7	65.0	
	Surface runoff	99.00	121.50	11.87	9.60	0.00	0.00	0.00	0.00	6.08	12.67	0.90	7.62	269.2
	Excess Rainfall	104.0	104.0	75.2	70.4	14.1	10.4	0.0	0.0	56.9	76.9	29.7	65.0	606.7
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	25.4	48.6	70.4	14.1	10.4	0.0	0.0	56.9	76.9	29.7	28.7	
	Et2(from soil)	0.0	0.0	0.0	2.7	78.6	13.9	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.4	48.6	73.1	92.7	24.3	0.0	0.0	56.9	76.9	29.7	28.7	473.4
	Soil moisture	100.0	158.6	153.5	120.1	17.4	0.0	0.0	0.0	0.0	0.0	0.0	36.3	
	Recharge (mm)	**6.9**	**20.0**	**31.7**	**30.7**	**24.0**	**3.5**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**116.8**
1979	Rainfall	180.9	67.1	52.7	38.4	42.3	11.3	0.7	0.0	0.1	37.3	94.9	127.6	653.3
	effetive rainfall	104.0	60.4	48.3	36.3	39.5	11.3	0.7	0.0	0.1	35.3	80.5	96.6	
	Surface runoff	76.90	6.74	4.43	2.14	2.77	0.00	0.00	0.00	0.00	1.97	14.37	30.98	140.3
	Excess Rainfall	104.0	60.4	48.3	36.3	39.5	11.3	0.7	0.0	0.1	35.3	80.5	96.6	513.0
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	25.4	48.3	36.3	39.5	11.3	0.7	0.0	0.1	35.3	57.4	28.7	
	Et2(from soil)	0.0	0.0	0.3	30.0	34.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.4	48.5	66.3	74.2	11.3	0.7	0.0	0.1	35.3	57.4	28.7	364.9
	Soil moisture	100.0	115.0	91.7	43.3	0.0	0.0	0.0	0.0	0.0	0.0	23.1	86.4	
	Recharge (mm)	**7.3**	**20.0**	**23.0**	**18.3**	**8.7**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**4.6**	**81.9**

Table-C.4 Recharge Water from Plain Area (2 of 5)

		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1980	Rainfall	132.5	23.4	104.7	54.2	39.7	21.0	0.3	0.0	0.0	19.1	126.8	203.0	724.7
	effetive rainfall	97.8	23.4	86.3	49.5	37.3	21.0	0.3	0.0	0.0	19.1	96.4	104.0	
	Surface runoff	34.70	0.00	18.44	4.67	2.35	0.00	0.00	0.00	0.00	0.00	30.37	99.00	189.5
	Excess Rainfall	97.8	23.4	86.3	49.5	37.3	21.0	0.3	0.0	0.0	19.1	96.4	104.0	535.2
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	23.4	48.6	49.5	37.3	21.0	0.3	0.0	0.0	19.1	57.4	28.7	
	Et2(from soil)	0.0	1.6	0.0	19.4	48.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.0	48.6	68.9	86.1	21.0	0.3	0.0	0.0	19.1	57.4	28.7	372.0
	Soil moisture	100.0	78.4	100.4	60.9	0.0	0.0	0.0	0.0	0.0	0.0	39.0	106.5	
	Recharge (mm)	17.3	20.0	15.7	20.1	12.2	0.0	0.0	0.0	0.0	0.0	0.0	7.8	93.0
1981	Rainfall	232.0	72.2	64.9	12.2	32.8	3.6	0.0	1.3	5.7	2.5	113.3	333.7	874.2
	effetive rainfall	104.0	64.6	58.5	12.2	31.6	3.6	0.0	1.3	5.7	2.5	90.4	104.0	
	Surface runoff	128.00	7.55	6.38	0.00	1.25	0.00	0.00	0.00	0.00	0.00	22.92	229.70	395.8
	Excess Rainfall	104.0	64.6	58.5	12.2	31.6	3.6	0.0	1.3	5.7	2.5	90.4	104.0	478.4
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	25.4	48.6	12.2	31.6	3.6	0.0	1.3	5.7	2.5	57.4	28.7	
	Et2(from soil)	0.0	0.0	0.0	49.3	28.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.4	48.6	61.5	59.5	3.6	0.0	1.3	5.7	2.5	57.4	28.7	311.1
	Soil moisture	100.0	119.2	105.3	35.0	0.0	0.0	0.0	0.0	0.0	0.0	33.0	101.7	
	Recharge (mm)	21.3	20.0	23.8	21.1	7.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6	99.8
1982	Rainfall	40.6	47.1	81.4	71.4	30.5	8.4	22.8	0.0	0.0	79.2	26.2	84.4	492.0
	effetive rainfall	38.1	43.6	71.4	64.0	29.6	8.4	22.8	0.0	0.0	69.9	26.0	73.4	
	Surface runoff	2.50	3.54	10.05	7.42	0.88	0.00	0.00	0.00	0.00	9.34	0.19	11.01	44.9
	Excess Rainfall	38.1	43.6	71.4	64.0	29.6	8.4	22.8	0.0	0.0	69.9	26.0	73.4	447.1
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	25.4	48.6	64.0	29.6	8.4	22.8	0.0	0.0	69.9	26.0	28.7	
	Et2(from soil)	0.0	0.0	0.0	7.9	58.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.4	48.6	71.8	88.2	8.4	22.8	0.0	0.0	69.9	26.0	28.7	406.7
	Soil moisture	100.0	98.2	101.3	73.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.7	
	Recharge (mm)	20.3	20.0	19.6	20.3	14.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	94.9
1983	Rainfall	80.0	81.1	14.9	47.8	16.7	55.4	10.5	0.0	3.7	16.6	199.6	90.9	617.2
	effetive rainfall	70.4	71.1	14.9	44.2	16.7	50.5	10.5	0.0	3.7	16.6	104.0	77.8	
	Surface runoff	9.60	9.95	0.00	3.65	0.00	4.86	0.00	0.00	0.00	0.00	95.60	13.09	136.8
	Excess Rainfall	70.4	71.1	14.9	44.2	16.7	50.5	10.5	0.0	3.7	16.6	104.0	77.8	480.4
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	25.4	14.9	44.2	16.7	50.5	10.5	0.0	3.7	16.6	57.4	28.7	
	Et2(from soil)	0.0	0.0	27.0	23.7	27.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.4	41.9	67.9	44.1	50.5	10.5	0.0	3.7	16.6	57.4	28.7	363.6
	Soil moisture	98.2	124.3	72.5	34.3	0.0	0.0	0.0	0.0	0.0	0.0	46.6	86.4	
	Recharge (mm)	8.9	19.6	24.9	14.5	6.9	0.0	0.0	0.0	0.0	0.0	0.0	9.3	84.1
1984	Rainfall	148.2	122.5	108.4	69.2	2.4	0.0	9.5	0.2	0.0	0.0	58.8	19.7	538.9
	effetive rainfall	101.6	94.8	88.0	62.1	2.4	0.0	9.5	0.2	0.0	0.0	53.4	19.7	
	Surface runoff	46.63	27.70	20.37	7.07	0.00	0.00	0.00	0.00	0.00	0.00	5.41	0.00	107.2
	Excess Rainfall	101.6	94.8	88.0	62.1	2.4	0.0	9.5	0.2	0.0	0.0	53.4	19.7	431.7
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	25.4	48.6	62.1	2.4	0.0	9.5	0.2	0.0	0.0	53.4	19.7	
	Et2(from soil)	0.0	0.0	0.0	9.3	88.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.4	48.6	71.5	90.4	5.0	9.5	0.2	0.0	0.0	53.4	19.7	340.6
	Soil moisture	100.0	149.4	159.0	117.8	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Recharge (mm)	17.3	20.0	29.9	31.8	23.6	1.3	0.0	0.0	0.0	0.0	0.0	0.0	123.8
1985	Rainfall	165.8	51.5	64.2	25.9	29.7	0.0	2.6	0.1	1.5	30.5	94.1	37.6	503.5
	effetive rainfall	103.3	47.3	57.9	25.8	28.9	0.0	2.6	0.1	1.5	29.6	80.0	35.6	
	Surface runoff	62.54	4.24	6.27	0.14	0.75	0.00	0.00	0.00	0.00	0.88	14.11	2.02	91.0
	Excess Rainfall	103.3	47.3	57.9	25.8	28.9	0.0	2.6	0.1	1.5	29.6	80.0	35.6	412.5
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	25.4	48.6	25.8	28.9	0.0	2.6	0.1	1.5	29.6	57.4	28.7	
	Et2(from soil)	0.0	0.0	0.0	38.4	21.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.4	48.6	64.2	50.7	0.0	2.6	0.1	1.5	29.6	57.4	28.7	325.7
	Soil moisture	86.4	91.0	82.1	27.2	0.0	0.0	0.0	0.0	0.0	0.0	22.6	25.0	
	Recharge (mm)	0.0	17.3	18.2	16.4	5.4	0.0	0.0	0.0	0.0	0.0	0.0	4.5	61.8

Table-C.4 Recharge Water from Plain Area (3 of 5)

		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1986	Rainfall	132.9	116.4	26.8	35.4	40.4	13.1	0.0	5.5	2.7	16.4	12.5	108.4	510.5
	effetive rainfall	97.9	91.9	26.5	33.7	37.9	13.1	0.0	5.5	2.7	16.4	12.5	88.0	
	Surface runoff	35.00	24.53	0.29	1.66	2.46	0.00	0.00	0.00	0.00	0.00	0.00	20.37	84.3
	Excess Rainfall	97.9	91.9	26.5	33.7	37.9	13.1	0.0	5.5	2.7	16.4	12.5	88.0	426.2
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	25.4	26.5	33.7	37.9	13.1	0.0	5.5	2.7	16.4	12.5	28.7	
	Et2(from soil)	0.0	0.0	17.7	32.1	38.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.4	44.2	65.8	76.0	13.1	0.0	5.5	2.7	16.4	12.5	28.7	307.1
	Soil moisture	100.0	146.5	99.5	47.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	59.3	
	Recharge (mm)	5.0	20.0	29.3	19.9	9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	83.7
1987	Rainfall	175.6	64.2	51.6	54.3	7.5	8.8	0.0	0.0	0.0	15.0	88.8	94.3	560.1
	effetive rainfall	104.0	57.9	47.3	49.6	7.5	8.8	0.0	0.0	0.0	15.0	76.4	80.1	
	Surface runoff	71.60	6.27	4.26	4.69	0.00	0.00	0.00	0.00	0.00	0.00	12.42	14.18	113.4
	Excess Rainfall	104.0	57.9	47.3	49.6	7.5	8.8	0.0	0.0	0.0	15.0	76.4	80.1	446.7
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	25.4	47.3	49.6	7.5	8.8	0.0	0.0	0.0	15.0	57.4	28.7	
	Et2(from soil)	0.0	0.0	1.0	19.4	41.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.4	48.3	69.0	49.0	8.8	0.0	0.0	0.0	15.0	57.4	28.7	318.5
	Soil moisture	100.0	112.5	89.0	51.9	0.0	0.0	0.0	0.0	0.0	0.0	19.0	66.6	
	Recharge (mm)	11.9	20.0	22.5	17.8	10.4	0.0	0.0	0.0	0.0	0.0	0.0	3.8	86.3
1988	Rainfall	9.6	86.3	130.9	23.1	21.8	0.0	0.0	11.8	0.2	14.6	125.0	108.5	531.8
	effetive rainfall	9.6	74.7	97.4	23.1	21.8	0.0	0.0	11.8	0.2	14.6	96.0	88.1	
	Surface runoff	0.00	11.62	33.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29.00	20.42	94.5
	Excess Rainfall	9.6	74.7	97.4	23.1	21.8	0.0	0.0	11.8	0.2	14.6	96.0	88.1	437.3
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	9.6	25.4	48.6	23.1	21.8	0.0	0.0	11.8	0.2	14.6	57.4	28.7	
	Et2(from soil)	5.8	0.0	0.0	40.6	48.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.4	48.6	63.7	70.1	0.0	0.0	11.8	0.2	14.6	57.4	28.7	337.4
	Soil moisture	59.3	96.7	126.2	60.4	0.0	0.0	0.0	0.0	0.0	0.0	38.6	90.3	
	Recharge (mm)	13.3	11.9	19.3	25.2	12.1	0.0	0.0	0.0	0.0	0.0	0.0	7.7	89.6
1989	Rainfall	11.8	3.5	64.8	9.9	38.2	2.8	2.0	0.0	5.3	32.2	151.2	97.8	419.5
	effetive rainfall	11.8	3.5	58.4	9.9	36.1	2.8	2.0	0.0	5.3	31.0	102.1	82.5	
	Surface runoff	0.00	0.00	6.37	0.00	2.11	0.00	0.00	0.00	0.00	1.15	49.10	15.30	74.0
	Excess Rainfall	11.8	3.5	58.4	9.9	36.1	2.8	2.0	0.0	5.3	31.0	102.1	82.5	345.5
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	11.8	3.5	48.6	9.9	36.1	2.8	2.0	0.0	5.3	31.0	57.4	28.7	
	Et2(from soil)	4.1	17.5	0.0	40.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	21.0	48.6	50.2	36.1	2.8	2.0	0.0	5.3	31.0	57.4	28.7	300.0
	Soil moisture	85.2	50.6	50.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.7	89.6	
	Recharge (mm)	18.1	17.0	10.1	10.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9	64.2
1990	Rainfall	1.3	51.2	38.1	110.9	0.6	2.6	0.0	5.6	33.1	13.8	36.2	190.7	484.1
	effetive rainfall	1.3	47.0	36.0	89.2	0.6	2.6	0.0	5.6	31.8	13.8	34.4	104.0	
	Surface runoff	0.00	4.19	2.10	21.67	0.00	0.00	0.00	0.00	1.30	0.00	1.79	86.70	117.7
	Excess Rainfall	1.3	47.0	36.0	89.2	0.6	2.6	0.0	5.6	31.8	13.8	34.4	104.0	366.4
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	1.3	25.4	36.0	73.8	0.6	2.6	0.0	5.6	31.8	13.8	34.4	28.7	
	Et2(from soil)	12.5	0.0	10.1	0.0	47.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.4	46.1	73.8	47.9	2.6	0.0	5.6	31.8	13.8	34.4	28.7	326.9
	Soil moisture	74.0	80.8	54.5	59.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	75.3	
	Recharge (mm)	17.9	14.8	16.2	10.9	11.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	71.6
1991	Rainfall	40.9	38.0	38.1	44.8	68.0	7.9	7.3	1.7	0.0	22.2	21.6	80.0	370.5
	effetive rainfall	38.4	35.9	36.0	41.6	61.1	7.9	7.3	1.7	0.0	22.2	21.6	70.4	
	Surface runoff	2.54	2.08	2.10	3.17	6.88	0.00	0.00	0.00	0.00	0.00	0.00	9.60	26.4
	Excess Rainfall	38.4	35.9	36.0	41.6	61.1	7.9	7.3	1.7	0.0	22.2	21.6	70.4	344.1
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	25.4	36.0	41.6	61.1	7.9	7.3	1.7	0.0	22.2	21.6	28.7	
	Et2(from soil)	0.0	0.0	10.1	25.7	18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.4	46.1	67.4	79.1	7.9	7.3	1.7	0.0	22.2	21.6	28.7	324.2
	Soil moisture	96.8	87.9	60.3	22.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.7	
	Recharge (mm)	15.1	19.4	17.6	12.1	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	68.5

Table-C.4 Recharge Water from Plain Area (4 of 5)

		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1992	Rainfall	121.0	82.0	65.2	41.5	10.5	0.0	0.0	0.0	20.0	49.0	41.1	103.0	533.3
	effetive rainfall	94.1	71.8	58.8	38.9	10.5	0.0	0.0	0.0	20.0	45.2	38.5	85.4	
	Surface runoff	26.92	10.24	6.43	2.64	0.00	0.00	0.00	0.00	0.00	3.84	2.58	17.56	70.2
	Excess Rainfall	94.1	71.8	58.8	38.9	10.5	0.0	0.0	0.0	20.0	45.2	38.5	85.4	463.1
	Evapotranspiration	46.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	25.4	48.6	38.9	10.5	0.0	0.0	0.0	20.0	45.2	38.5	28.7	
	Et2(from soil)	0.0	0.0	0.0	28.0	48.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Actual Et.	16.9	25.4	48.6	66.8	59.3	0.0	0.0	0.0	20.0	45.2	38.5	28.7	349.4
	Soil moisture	100.0	126.4	111.3	61.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.7	
	Recharge (mm)	8.3	20.0	25.3	22.3	12.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	88.1
1993	Rainfall	96.0	141.8	57.2	23.2	56.0	0.0	0.5	0.2	120.0	162.0	17.5	141.5	815.9
	effetive rainfall	81.3	100.0	52.0	23.2	51.0	0.0	0.5	0.2	93.6	103.0	17.5	100.0	
	Surface runoff	14.72	41.77	5.15	0.00	4.96	0.00	0.00	0.00	26.40	59.04	0.00	41.54	193.6
	Excess Rainfall	81.3	100.0	52.0	23.2	51.0	0.0	0.5	0.2	93.6	103.0	17.5	100.0	622.3
	Evapotranspiration	16.9	25.4	48.6	73.8	112.4	150.1	170.7	163.5	131.6	89.4	57.4	28.7	1068.5
	Et1(from rain)	16.9	25.4	48.6	23.2	51.0	0.0	0.5	0.2	93.6	89.4	17.5	28.7	
	Et2(from soil)	0.0	0.0	0.0	40.5	49.0	0.0	0.0	0.0	0.0	0.0	10.8	0.0	
	Actual Et.	16.9	25.4	48.6	63.7	100.0	0.0	0.5	0.2	93.6	89.4	28.3	28.7	495.4
	Soil moisture	100.0	154.6	127.2	61.2	0.0	0.0	0.0	0.0	0.0	13.6	0.0	71.3	
	Recharge (mm)	11.3	20.0	30.9	25.4	12.2	0.0	0.0	0.0	0.0	0.0	2.7	0.0	102.7

Table-C.4 Recharge Water from Plain Area (5 of 5)

- Summary Table of Recharge Water -

(unit:mm)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1974	20.0	20.0	31.7	30.9	18.5	2.2	0.0	0.0	0.0	0.0	0.0	5.9	129.1
1975	16.6	20.0	19.1	16.9	12.6	0.0	0.0	0.0	0.0	0.0	0.0	9.1	94.3
1976	21.1	20.0	16.7	8.6	11.6	0.0	0.0	0.0	0.0	0.0	1.3	0.0	79.4
1977	8.3	18.2	24.6	18.1	10.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	79.8
1978	6.9	20.0	31.7	30.7	24.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	116.8
1979	7.3	20.0	23.0	18.3	8.7	0.0	0.0	0.0	0.0	0.0	0.0	4.6	81.9
1980	17.3	20.0	15.7	20.1	12.2	0.0	0.0	0.0	0.0	0.0	0.0	7.8	93.0
1981	21.3	20.0	23.8	21.1	7.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6	99.8
1982	20.3	20.0	19.6	20.3	14.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	94.9
1983	8.9	19.6	24.9	14.5	6.9	0.0	0.0	0.0	0.0	0.0	0.0	9.3	84.1
1984	17.3	20.0	29.9	31.8	23.6	1.3	0.0	0.0	0.0	0.0	0.0	0.0	123.8
1985	0.0	17.3	18.2	16.4	5.4	0.0	0.0	0.0	0.0	0.0	0.0	4.5	61.8
1986	5.0	20.0	29.3	19.9	9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	83.7
1987	11.9	20.0	22.5	17.8	10.4	0.0	0.0	0.0	0.0	0.0	0.0	3.8	86.3
1988	13.3	11.9	19.3	25.2	12.1	0.0	0.0	0.0	0.0	0.0	0.0	7.7	89.6
1989	18.1	17.0	10.1	10.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9	64.2
1990	17.9	14.8	16.2	10.9	11.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	71.6
1991	15.1	19.4	17.6	12.1	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	68.5
1992	8.3	20.0	25.3	22.3	12.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	88.1
1993	11.3	20.0	30.9	25.4	12.2	0.0	0.0	0.0	0.0	0.0	2.7	0.0	102.7
Average	13.3	18.9	22.5	19.6	11.4	0.3	0.0	0.0	0.0	0.0	0.2	3.4	89.7

Table-C.5 Water Economy of Groundwater Basin since 1974

(Unit:MCM)

	Recharge Water to Groundwater Basin				Pumped Yield	Reserv.****	Defc.
	G.W.Basin*	S.W.Basin**	K.M.River***	Total			
1974	122.6	74.2	5.0	201.9	105.0	100.0	0.0
1975	89.6	18.6	5.0	113.2	107.5	100.0	0.0
1976	75.4	45.7	5.0	126.1	110.0	100.0	0.0
1977	75.8	3.8	5.0	84.6	112.5	100.0	0.0
1978	111.0	55.6	5.0	171.6	115.0	72.1	0.0
1979	77.8	35.3	5.0	118.1	117.5	100.0	0.0
1980	88.4	44.8	5.0	138.2	120.0	100.0	0.0
1981	94.8	46.8	5.0	146.6	130.0	100.0	0.0
1982	90.1	18.0	5.0	113.1	140.0	100.0	0.0
1983	79.9	39.6	5.0	124.5	150.0	73.1	0.0
1984	117.6	43.3	5.0	165.9	160.0	47.6	0.0
1985	58.8	27.5	5.0	91.2	170.0	53.4	-31.2
1986	79.5	36.5	5.0	121.0	180.0	0.0	-5.5
1987	82.0	43.9	5.0	130.9	190.0	0.0	-59.1
1988	85.1	46.1	5.0	136.2	200.0	0.0	-63.8
1989	61.0	36.0	5.0	102.0	210.0	0.0	-108.0
1990	68.0	39.3	5.0	112.3	220.0	0.0	-107.7
1991	65.1	40.3	5.0	110.4	230.0	0.0	-119.6
1992	83.7	48.1	5.0	136.8	240.0	0.0	-103.2
1993	97.5	66.9	5.0	169.4	250.0	0.0	-80.6
Average	85.2	40.5	5.0	130.7			

*: Recharge over the groungwater basin
**: Recharge from watershed basin
***: Recharge from Küçük Menderes river
****:Reserved excess recharge into aquifer

Table-C.6 Watershed Area Flowing into the Groundwater Basin

(Unit: km²)

Related Node	Area	Related Node	Area	Related Node	Area
1 - 2	3.91	172 - 181	8.01	174 - 165	4.61
2 - 6	2.80	181 - 180	5.11	165 - 157	1.60
6 - 10	2.80	180 - 189	12.42	157 - 149	0.40
10 - 11	3.81	189 - 197	8.01	149 - 148	9.31
11 - 15	3.20	197 - 205	21.43	148 - 141	98.84
15 - 18	3.61	205 - 204	14.12	141 - 135	8.11
18 - 19	5.61	204 - 203	10.01	135 - 129	11.02
19 - 24	2.80	203 - 195	0.70	129 - 125	14.12
24 - 31	10.41	195 - 194	4.51	125 - 124	8.61
31 - 30	24.64	194 - 202	2.10	124 - 119	3.51
30 - 38	2.30	202 - 210	4.61	119 - 114	9.51
38 - 37	69.20	210 - 215	11.42	114 - 107	6.41
37 - 44	105.75	215 - 214	1.10	107 - 100	14.62
44 - 43	29.04	214 - 219	19.33	100 - 101	0.80
43 - 50	8.71	219 - 218	4.51	101 - 102	2.80
50 - 56	10.62	218 - 217	5.11	102 - 95	4.61
56 - 61	8.26	217 - 225	2.15	95 - 90	1.50
61 - 61	4.01	225 - 226	0.40	90 - 89	6.21
61 - 62	7.31	226 - 227	2.90	89 - 83	5.61
62 - 68	14.32	227 - 228	2.80	83 - 77	3.81
68 - 69	6.11	228 - 229	2.40	77 - 71	1.90
69 - 76	5.91	229 - 220	0.40	71 - 70	2.50
76 - 82	74.61	220 - 221	3.40	70 63	3.61
82 - 81	2.10	221 - 222	62.49	63 - 57	1.80
81 - 87	5.61	222 - 231	38.56	57 - 52	0.00
87 - 88	1.70	231 - 240	7.11	52 - 51	2.00
88 - 94	11.32	240 - 244	26.44	51 - 45	0
94 - 99	5.21	244 - 243	6.81	45 - 46	4.31
99 - 106	14.52	243 - 247	7.61	46 - 39	6.31
106 - 113	107.45	247 - 246	88.63	39 - 32	11.72
113 - 112	68.60	246 - 245	36.35	32 - 33	14.02
112 - 111	37.35	245 - 241	17.63	33 - 25	9.41
111 - 110	4.81	241 - 237	0.40	25 - 26	7.51
110 - 117	3.91	237 - 236	6.01	26 - 27	5.71
117 - 118	1.20	236 - 235	6.91	27 - 20	5.51
118 - 123	10.52	235 - 234	32.35	20 - 21	9.91
123 - 128	13.02	234 - 233	10.82	21 - 16	4.31
128 - 132	5.86	233 - 232	52.58	16 - 13	3.61
132 - 138	4.01	232 - 223	10.21	13 - 12	10.92
138 - 139	3.00	223 - 224	4.51	12 - 8	5.11
139 - 133	1.40	224 - 216	7.61	8 - 7	10.41
133 - 134	12.22	216 - 211	11.12	7 - 3	33.15
134 - 140	81.52	211 - 212	3.91	3 - 4	3.51
140 - 146	12.42	212 - 207	7.01	4 - 1	3.00
146 - 147	3.30	207 - 206	0.00		
147 - 154	2.80	206 - 198	2.00		
154 - 155	4.81	198 - 190	3.40		
155 - 156	2.40	190 - 182	63.29		
156 - 164	52.48	182 - 173	7.61		
164 - 172	9.61	173 - 174	4.11		

Note: Nodes are illustlated in Figure C-10

Table-C.7 Transition of Annual Pumping Yield in the Study Groundwater Basin

Item					Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
Irrigation Water Requirement (mm)					0.2	0.9	6.7	36.6	114.1	124.9	118.2	99.2	45.9	11.3	2.1	0.3	560.5
					Total Pumped Water Volume in the Basin												
Year	No. of wells	Area(ha)															(MCM)
		Coop.	Priv.	Total													
1974		3,190	15,500	18,690	0.0	0.2	1.3	6.8	21.3	23.3	22.1	18.5	8.6	2.1	0.4	0.1	104.8
1975	1,700	3,270	15,900	19,170	0.0	0.2	1.3	7.0	21.9	23.9	22.7	19.0	8.8	2.2	0.4	0.1	107.5
1976		3,340	16,300	19,640	0.0	0.2	1.3	7.2	22.4	24.5	23.2	19.5	9.0	2.2	0.4	0.1	110.1
1977		3,420	16,700	20,120	0.0	0.2	1.4	7.4	23.0	25.1	23.8	20.0	9.2	2.3	0.4	0.1	112.8
1978		3,500	17,000	20,500	0.0	0.2	1.4	7.5	23.4	25.6	24.2	20.3	9.4	2.3	0.4	0.1	114.9
1979		3,570	17,400	20,970	0.0	0.2	1.4	7.7	23.9	26.2	24.8	20.8	9.6	2.4	0.4	0.1	117.5
1980		3,650	17,800	21,450	0.0	0.2	1.4	7.9	24.5	26.8	25.4	21.3	9.8	2.4	0.5	0.1	120.2
1981		3,950	19,200	23,150	0.0	0.2	1.6	8.5	26.4	28.9	27.4	23.0	10.6	2.6	0.5	0.1	129.8
1982		4,260	20,700	24,960	0.1	0.2	1.7	9.1	28.5	31.2	29.5	24.8	11.5	2.8	0.5	0.1	139.9
1983		4,560	22,200	26,760	0.1	0.2	1.8	9.8	30.5	33.4	31.6	26.5	12.3	3.0	0.6	0.1	150.0
1984	2,600	4,860	23,700	28,560	0.1	0.3	1.9	10.5	32.6	35.7	33.8	28.3	13.1	3.2	0.6	0.1	160.1
1985		5,170	25,200	30,370	0.1	0.3	2.0	11.1	34.7	37.9	35.9	30.1	13.9	3.4	0.6	0.1	170.2
1986		5,470	26,600	32,070	0.1	0.3	2.2	11.7	36.6	40.1	37.9	31.8	14.7	3.6	0.7	0.1	179.8
1987		5,780	28,100	33,880	0.1	0.3	2.3	12.4	38.7	42.3	40.0	33.6	15.6	3.8	0.7	0.1	189.9
1988		6,080	29,600	35,680	0.1	0.3	2.4	13.1	40.7	44.6	42.2	35.4	16.4	4.0	0.8	0.1	200.0
1989		6,380	31,100	37,480	0.1	0.3	2.5	13.7	42.8	46.8	44.3	37.2	17.2	4.2	0.8	0.1	210.1
1990		6,690	32,600	39,290	0.1	0.4	2.6	14.4	44.8	49.1	46.4	39.0	18.0	4.4	0.8	0.1	220.2
1991		6,990	34,000	40,990	0.1	0.4	2.8	15.0	46.8	51.2	48.5	40.7	18.8	4.6	0.9	0.1	229.8
1992		7,300	35,500	42,800	0.1	0.4	2.9	15.7	48.8	53.5	50.6	42.5	19.6	4.8	0.9	0.1	239.9
1993		7,600	37,000	44,600	0.1	0.4	3.0	16.3	50.9	55.7	52.7	44.2	20.5	5.0	0.9	0.1	250.0
	3,900			(44,600)													

Table-C.8 Pumping Yeild in Each Modeled Element

(observed in June, 1993)

(Unit: MCM)

Node No.	Volume	Node No.	Volume	Node No.	Volume	Node No.	Volume
1	0.57	51	0.12	101	0.12	151	0.35
2	0.04	52	0.90	102	0.49	152	0.23
3	0.00	53	0.49	103	0.51	153	0.21
4	0.06	54	0.74	104	0.51	154	0.23
5	0.16	55	0.06	105	0.35	155	0.16
6	0.08	56	0.53	106	0.25	156	0.23
7	0.10	57	0.80	107	0.10	157	0.43
8	0.04	58	0.64	108	0.31	158	0.33
9	0.04	59	0.53	109	0.35	159	0.10
10	0.08	60	0.57	110	0.29	160	0.21
11	0.04	61	0.49	111	0.16	161	0.27
12	0.04	62	0.96	112	0.57	162	0.23
13	0.23	63	0.47	113	0.16	163	0.39
14	0.25	64	0.21	114	0.14	164	0.33
15	0.16	65	0.18	115	0.14	165	0.23
16	0.06	66	0.45	116	0.29	166	0.27
17	0.16	67	0.59	117	0.20	167	0.29
18	0.64	68	0.53	118	0.31	168	0.33
19	0.47	69	0.23	119	0.14	169	0.25
20	0.35	70	0.64	120	0.16	170	0.18
21	0.35	71	1.02	121	0.25	171	0.25
22	0.04	72	0.23	122	0.35	172	0.31
23	0.33	73	0.82	123	0.18	173	0.00
24	0.51	74	0.41	124	0.18	174	0.00
25	0.92	75	0.23	125	0.43		
26	0.10	76	0.45	126	0.25		
27	0.00	77	1.33	127	0.10		
28	0.08	78	0.12	128	0.08		
29	0.92	79	0.31	129	0.18		
30	0.57	80	0.59	130	0.23		
31	0.06	81	0.27	131	0.20		
32	0.00	82	0.12	132	0.27		
33	0.10	83	0.33	133	0.29		
34	0.35	84	0.23	134	0.39		
35	0.23	85	0.66	135	0.16		
36	0.31	86	0.10	136	0.10		
37	0.37	87	0.88	137	0.27		
38	0.18	88	0.70	138	0.18		
39	0.49	89	0.82	139	0.23		
40	0.06	90	0.72	140	0.29		
41	0.47	91	0.61	141	0.20		
42	0.21	92	0.21	142	0.04		
43	0.31	93	0.31	143	0.39		
44	0.14	94	0.66	144	0.27		
45	0.14	95	0.62	145	0.18		
46	0.66	96	0.27	146	0.31		
47	0.72	97	0.18	147	0.20		
48	0.39	98	0.49	148	0.08		
49	0.70	99	0.31	149	0.06		
50	0.08	100	0.39	150	0.10		
					Total		55.70

Note: Nodes are illustlated in Figure C-11

Pumped water volume tabulated above is maximum monthly volume amongest 14 years (1980-1994)

Table-C.9 Boron Test Result

Data of DSİ, June 1995

Sample No.	Coordinate			Sampling Location	Sampling Depth (m)	Aquifer	Water Temperature (°C)	Boron Including Ratio (ppm)
F- 1	L20 d2	7200 D	29300 K	Kiraz Bel. i.s.k.	97	Al	15.4	0.53
F- 2	L20 c1	13550 D	26700 K	Haliller Köyü . i.s.k.	12	Al	-	0.20
F- 3	L20 a3	1800 D	36600 K	Ceridet Köyü . i.s.k.	12	Al	-	0.32
F- 4	L20 c1	11550 D	29750 K	Karabura Köyü . i.s.k.	55	Al	14.4	0.04
F- 5	L20 c2	22700 D	32700 K			Al	15.3	0.00
F- 6	L20 d2	7600 D	24650 K	Yenişehir K. i.s.k.	48	Al	-	0.06
F- 7	L20 d3	6650 D	18450 K	Beydağ i.s.k.	38	Al	17.4	0.00
F- 8	L20 d3	3100 D	19400 K	Sarıkaya KH	32	Al	-	0.16
F- 9	L20 d2	99050 D	24700 K	Kaymakçı Koop	100	Al	20.6	0.56
F- 10	L20 d1	93500 D	24050 K	Kurucaova		Al	-	0.00
F- 11	L20 d1	89200 D	27600 K	Yolüstü 39107		Al	20.9	0.29
F- 12	L20 d1	90150 D	32800 K	K. Arıucak 32514 - 32517		Al	-	0.72
F- 13	L19 c2	86250 D	33400 K	Ödemiş iB	100	Al	-	0.69
F- 14	L19 b3	84900 D	35250 K	Mehmet Badakçı	128	Al	-	0.00
F- 15	L19 c2	81100 D	31950 K	Demirçalı 39073		Al	15.4	0.00
F- 16	L19 c2	77600 D	28600 K	Yeniköy 21923		Al	-	0.00
F- 17	L19 c2	82550 D	25800 K	Karakova Kahvesi	20	Al	18.0	0.18
F- 18	L19 c1	75150 D	23300 K	Kahrat 30304		Al	14.8	0.23
F- 19	L20 d1	97400 D	20600 K	Emirli KH. i.s.k.	50	Al	20.2	0.18
F- 20	L20 d1	94400 D	21050 K	Mescitli KH. i.s.k.	120	Al	-	0.19
F- 21	L20 d1	92950 D	15300 K	Bademli DSİ/B		St	-	0.86
F- 22	L20 d1	90275 D	21800 K	Adagide iB	100	Al	-	0.10
F- 23	L19 c2	87200 D	21600 K	Konaklı JICA		Al	-	0.35
F- 24	L19 c2	82175 D	22450 K	Kızılcaaulu KH.	102	Al	20.4	0.11
F- 25	L19 c2	77400 D	22750 K	Kızılcaaulu KH.	75	Al	-	0.05
F- 26	L19 c4	76050 D	19350 K	Gökçen Koop 30301		Al	-	0.22
F- 27	L19 c4	70600 D	18400 K	Çiniyeri KH	60	Al	-	0.25
F- 28	L19 c4	66900 D	17550 K	Tire iB	106	Al	-	0.48
F- 29	L19 d3	62600 D	16300 K	Tire iB	90	Al	18.7	0.20
F- 30	L19 d2	62800 D	22700 K	Tire iB	100	Al	17.9	0.20
F- 31	L19 c1	73650 D	29200 K	Kayakom iB	80	Al	-	0.42
F- 32	L19 c1	68300 D	22500 K	Derebaşı KH	40	Al,St	-	0.61
F- 33	L19 d2	63450 D	27450 K	Zeytinova 39083		Al	17.6	0.22
F- 34	L19 d2	59850 D	28850 K	Yusuflu 27361(27362)		Al	18.3	0.20
F- 35	L19 d2	57800 D	25850 K	Yanık Kavak Kah	88	Al	18.8	0.10
F- 36	L19 d2	56700 D	29400 K	Bayındır iB		Al	-	0.48
F- 37	L19 d1	54100 D	23700 K	Tokatbaşı KH	90	Al	-	0.47
F- 38	L19 d1	49500 D	27800 K	Elifli(1) 39398		Al	19.3	0.48
F- 39	L19 d1	43900 D	26060 K	Arıkbaşı 14192		Al	-	0.35
F- 40	L19 d1	45450 D	21950 K	Hasköy		Al	-	0.11
F- 41	L18 c2	40900 D	24350 K	Havuzbaşı KH	40	Al	-	0.33
F- 42	L18 c2	35850 D	25100 K	Aslanlar 45748			-	0.64
F- 43	L18 c2	36600 D	22100 K	Sehirler			-	0.67
F- 44	L18 c1	25700 D	31900 K	Gözimsen	83	Ng	-	0.25
F- 45	L18 c1	28900 D	29800 K	Kuscuburn KH	64	Ng	-	0.66
F- 46	L18 c1	30900 D	26400 K	Torbalı I 27414		Al	19.2	0.55
F- 47	L18 c1	32600 D	31300 K	Ege Maden		Al,Ng	-	0.29
F- 48	L18 c1	32500 D	20200 K	Kavaklık(Çaybaşı)	100	Al	19.0	0.16
F- 49	L18 c3	36350 D	19050 K	Pazmukyazı (30307)	120	Al	19.6	0.74
F- 50	L18 c3	40650 D	18300 K	Atalan	100	Al	21.6	0.70
F- 51	L19 d1	50000 D	20000 K	Mustafa Yılmağsu (Çiftlik)	68	Al	19.0	0.32
F- 52	L19 d2	58600 D	21600 K	Karateke KH	75	Al	-	0.52
F- 53	L19 d3	58075 D	14500 K	Çayırlı Çavuş Çş.Ku	95	Al,St	-	0.89
F- 54	L19 d4	53700 D	12600 K	Akyurt	85	Al	-	0.13
F- 55	L19 d4	50150 D	13200 K	Kurşak Köy Ku	40	Mb	20.2	0.67
F- 56	L19 d4	45400 D	9600 K	Mehmet Çelik	78	Al	-	0.68
F- 57	L18 c3	37200 D	7500 K	Belevi KH (1981)	81	Al	17.9	0.87
F- 58	L18 c3	38600 D	16700 K	Tulumköy KH	45	Al	-	0.16
F- 59	L18 c4	30100 D	19100 K	Torbalı Yeniköy			-	0.47
F- 60	L18 c3	39700 D	12950 K	Urfalı Çif		Al	-	0.18
F- 67	L18 d3	16650 D	5900 K	Ahmetbaşı şahil Sevan Market	58	Al	-	0.72
F- 68	L18 d3	17000 D	11200 K	Çile(Dilzgün Market)	67		-	0.49
F- 69	L18 d3	17150 D	19100 K	Çamönü			-	0.29
F- 70	L18 d3	19600 D	16250 K	Palamutaraşı	70		-	0.16
F- 71	L18 d2	21100 D	20900 K	Karakuyu	65	K	-	0.66
F- 72	L18 d2	20250 D	26700 K	Pancar Köy	20	Al	-	0.43
F- 73	L18 d2	19900 D	30400 K	Yeni Bul Gurca DSİ		Ng	-	0.40
F- 74	L18 d3	21400 D	35250 K	Oğlananabı Güzi	60		-	0.49

Note: The Meaning of Symbol of Aquifer

Al; Alluvium Mb; Marble

Ng; Neogene K; Limestone

St; Schist

FIGURES

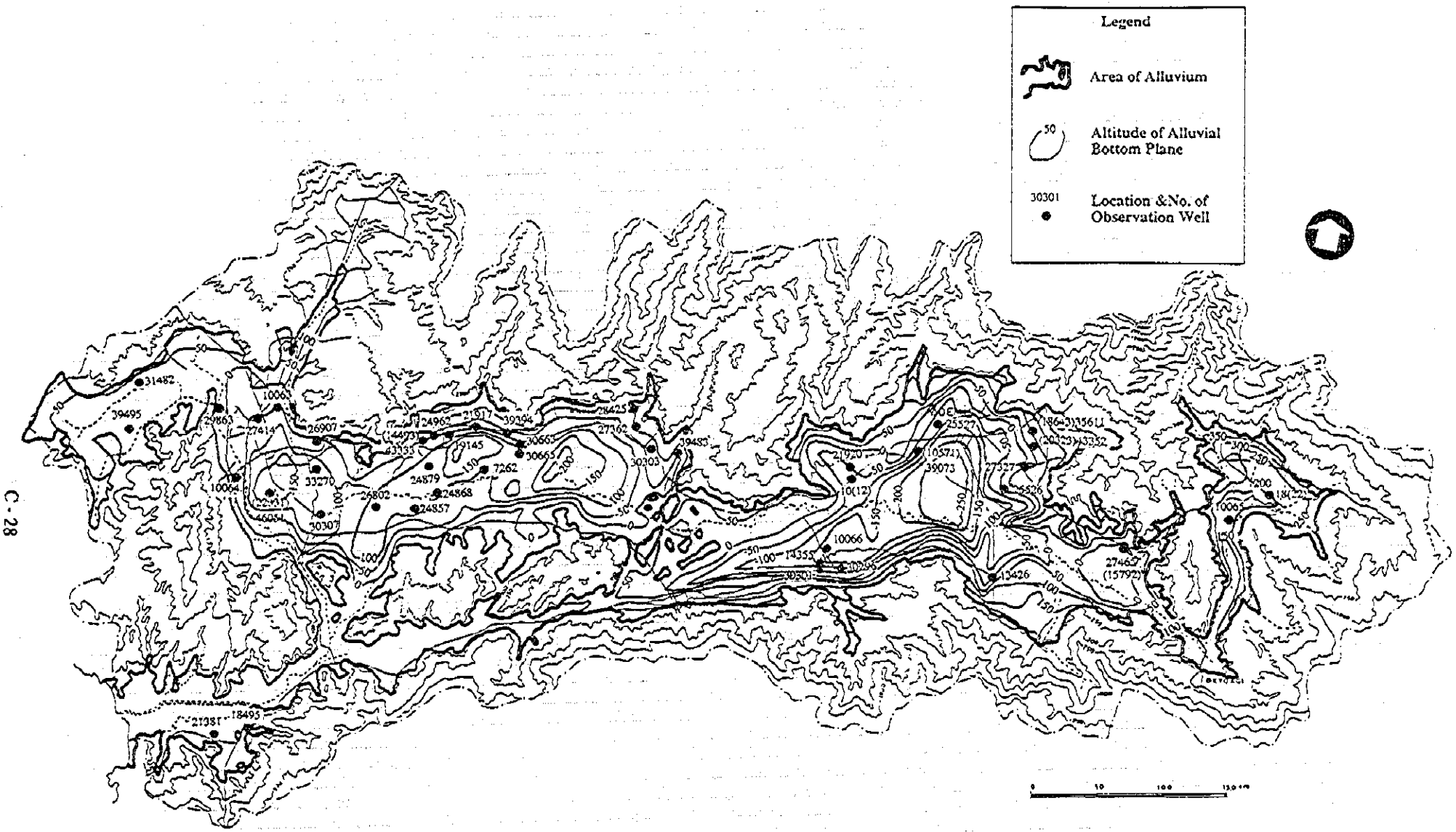


Figure-C.1 Map on Location of Observation Wells & Altitude of Alluvial Bottom Plane

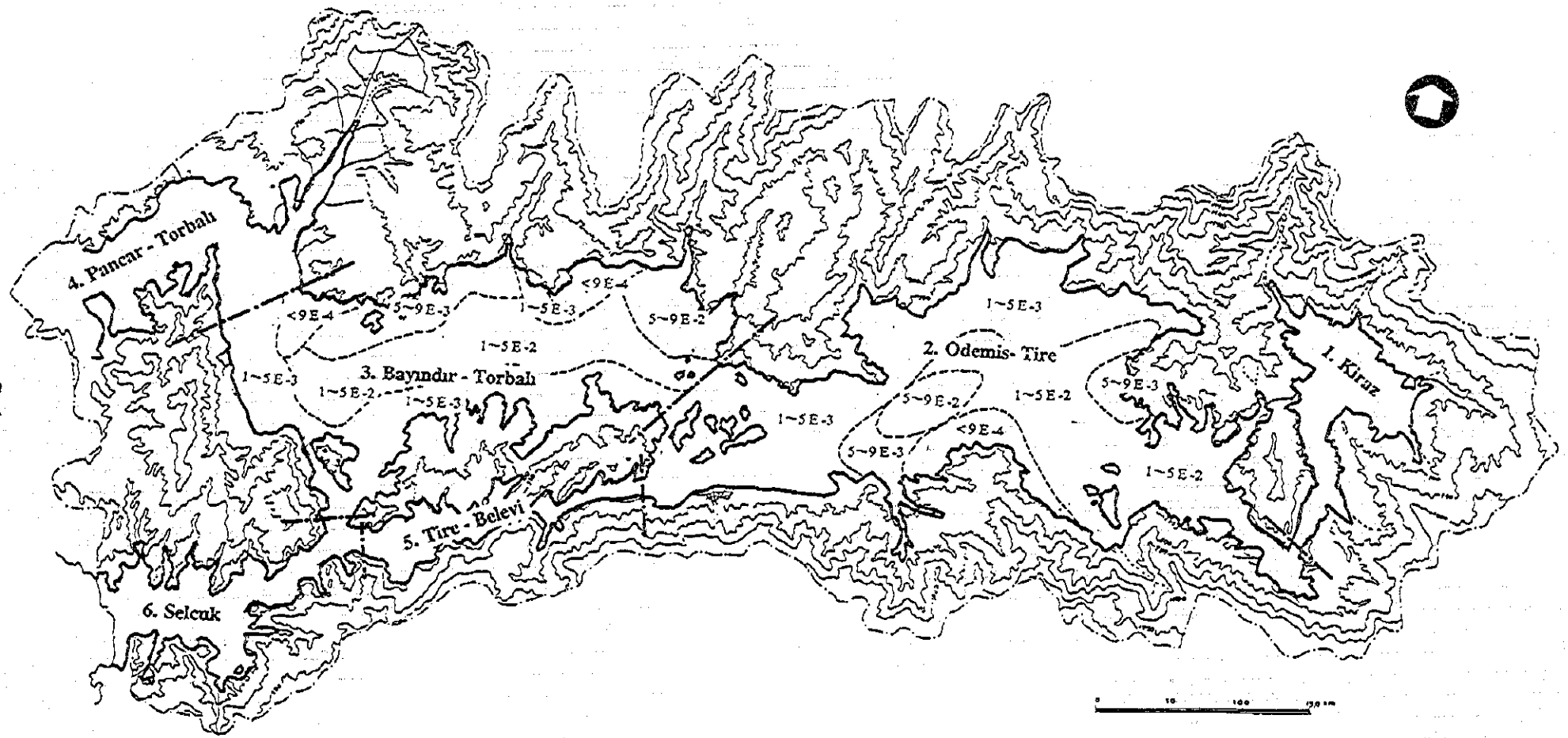


Figure-C.2 Divided Regions of Groundwater Basin of Küçük Menderes River Basin and Permeability Distribution of Ödemiş-Tire & Bayındır-Torbalı Plains

Unit : cm/sec

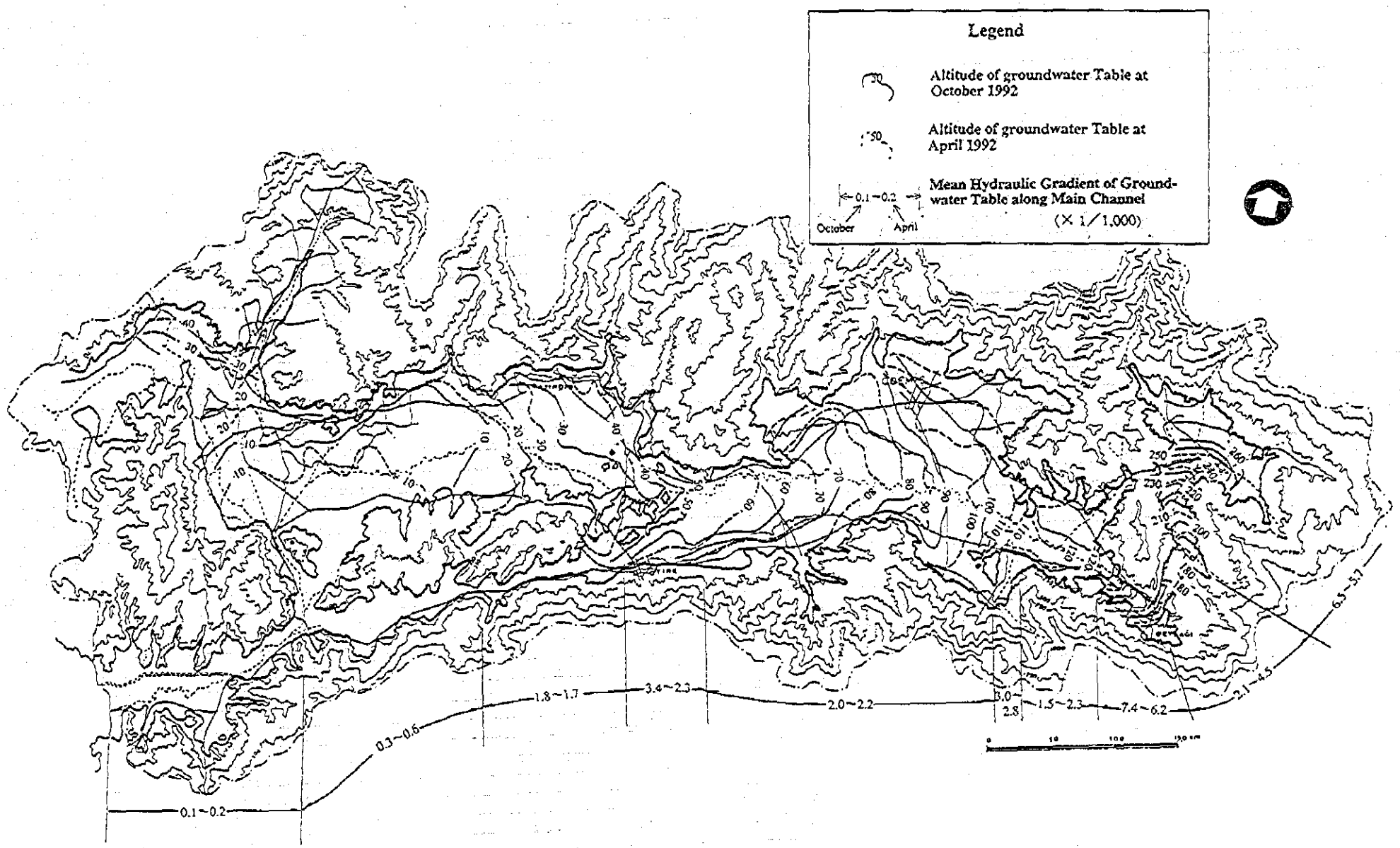


Figure-C.3 Altitude & Mean Hydraulic Gradient of Groundwater Table

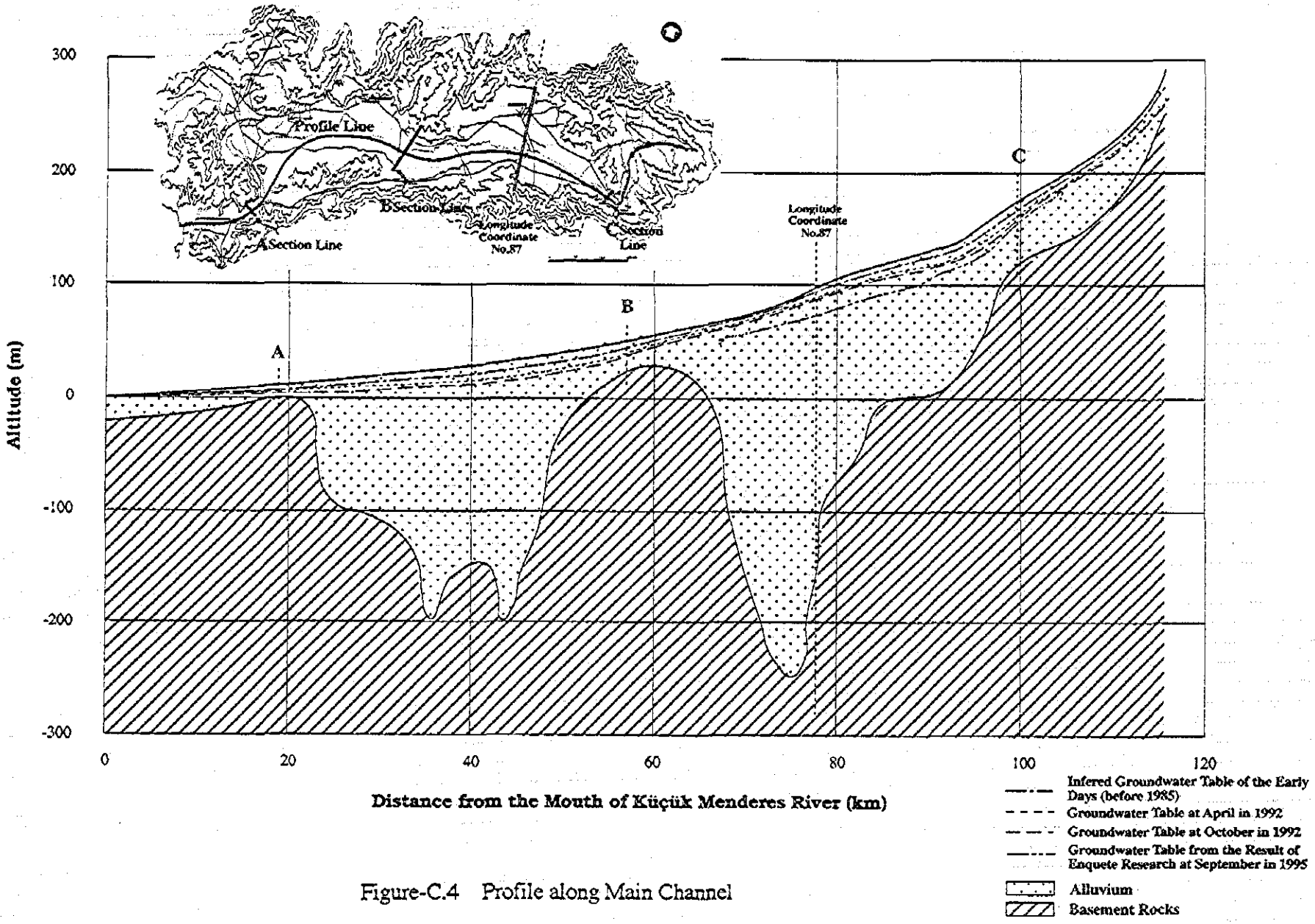
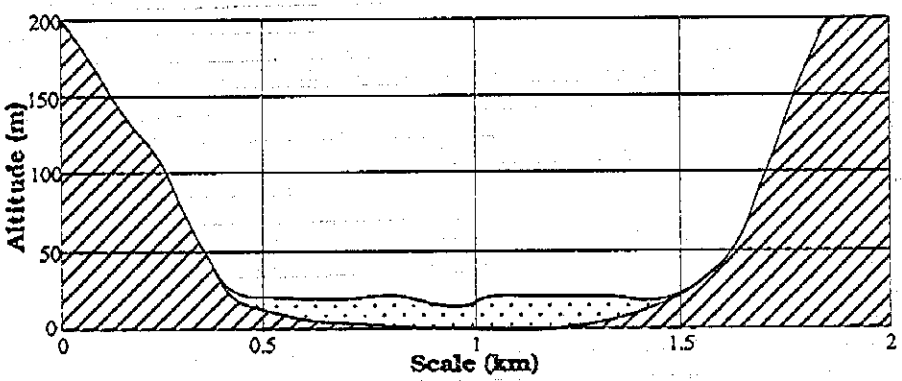
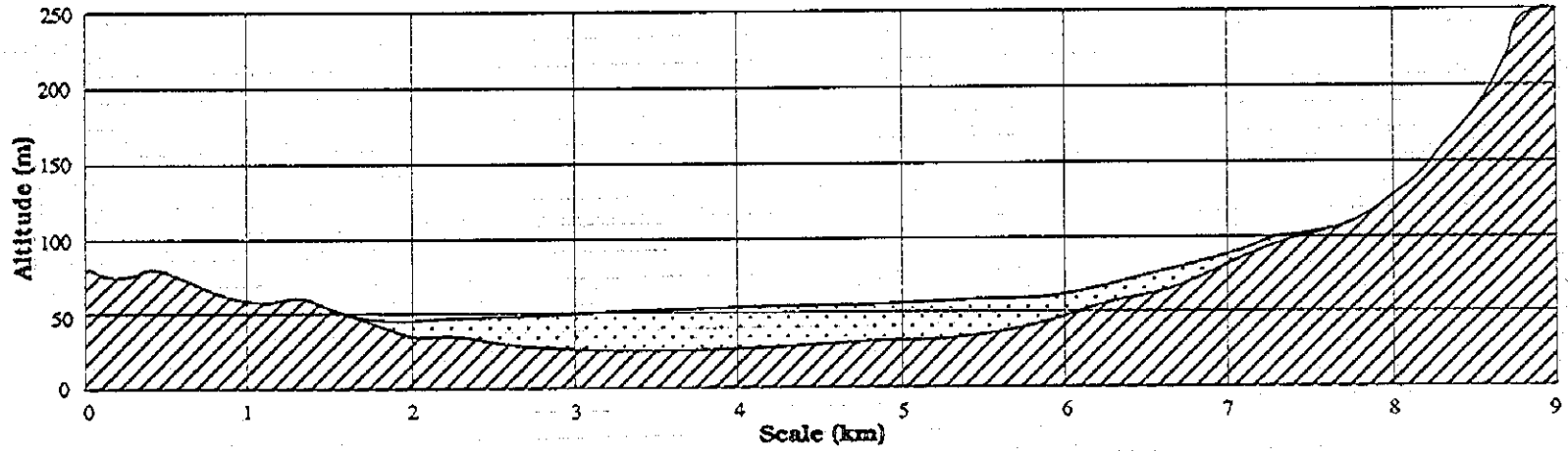


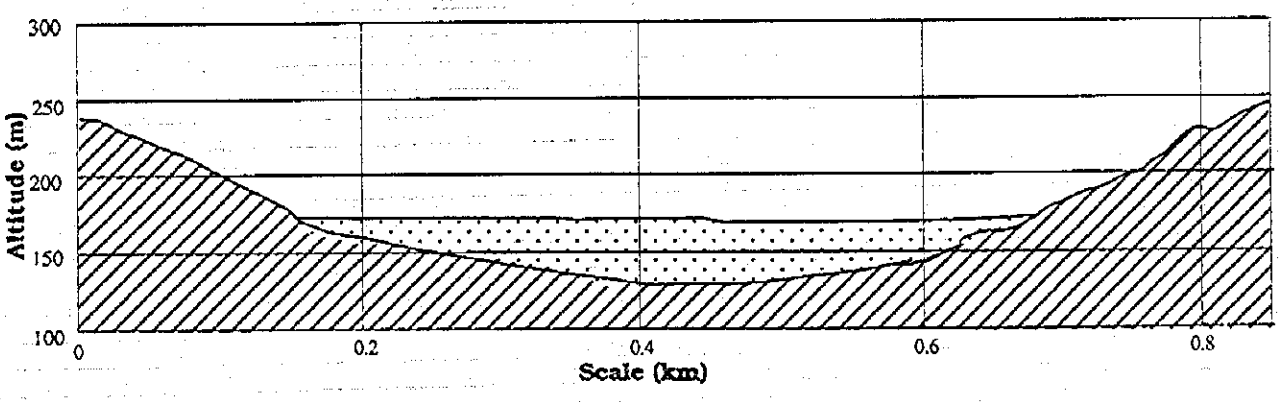
Figure-C.4 Profile along Main Channel



A section



B section



C section

Figure-C.5 (1) Geological Section of the Groundwater Basin
(20, 60, 100 km from the Mouth of Küçük Menderes River)

Alluvium

Basement Rocks

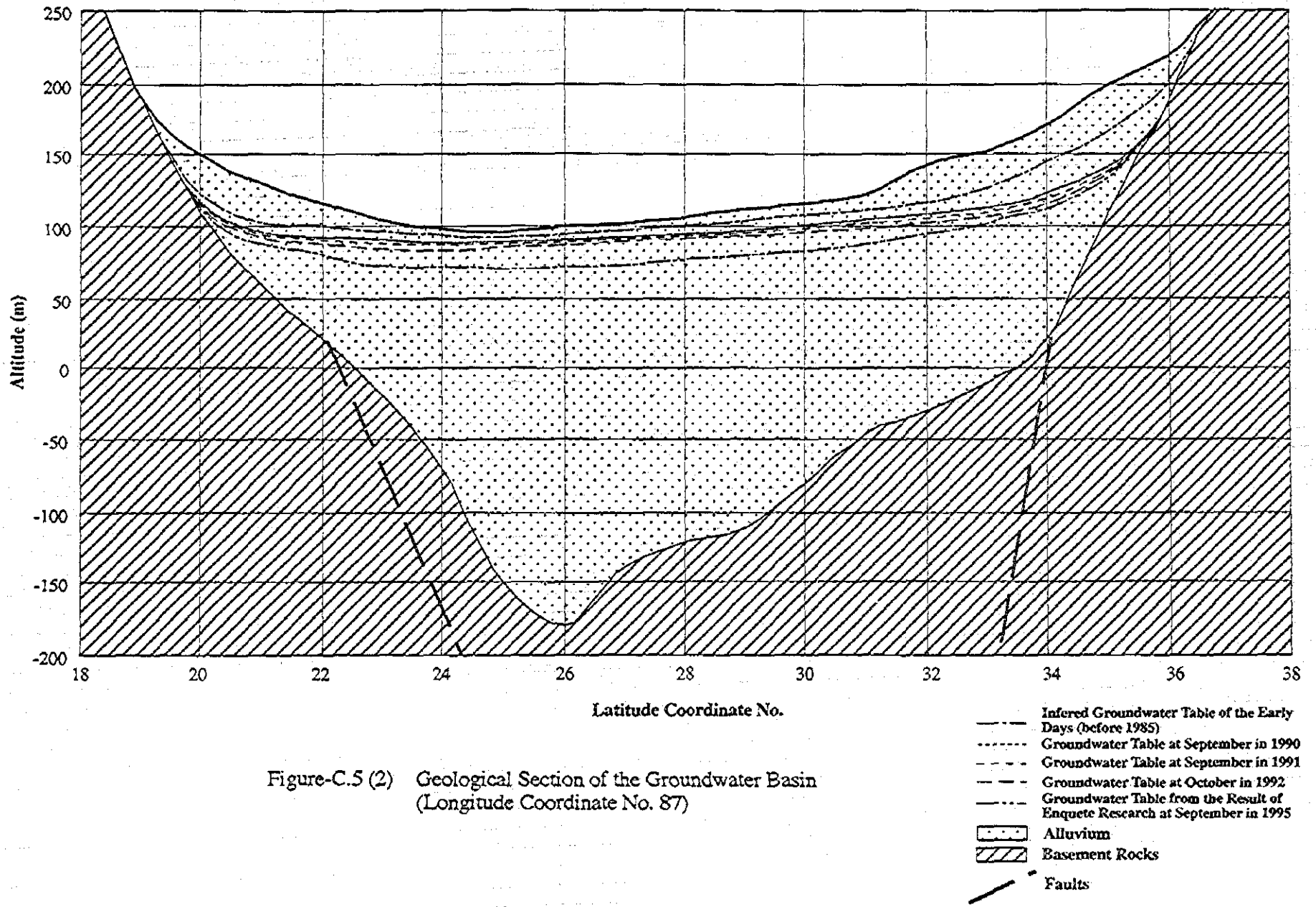


Figure-C.5 (2) Geological Section of the Groundwater Basin (Longitude Coordinate No. 87)

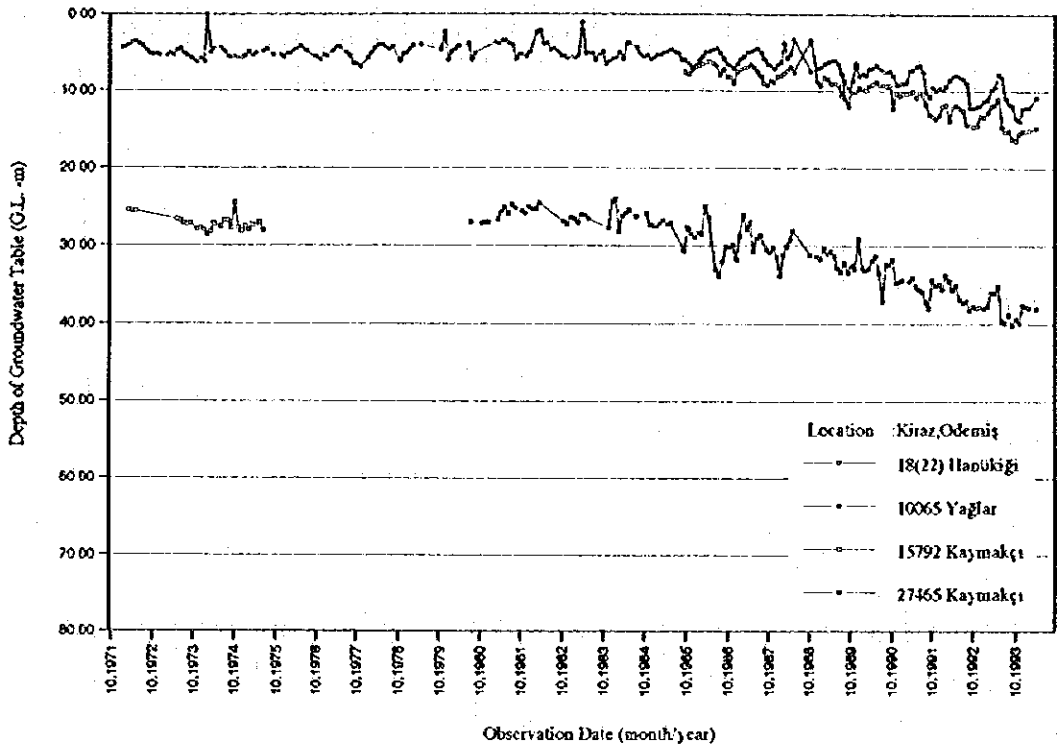


Figure-C.6 (1) Diagram of Groundwater Fluctuation at Respective Observation Wells

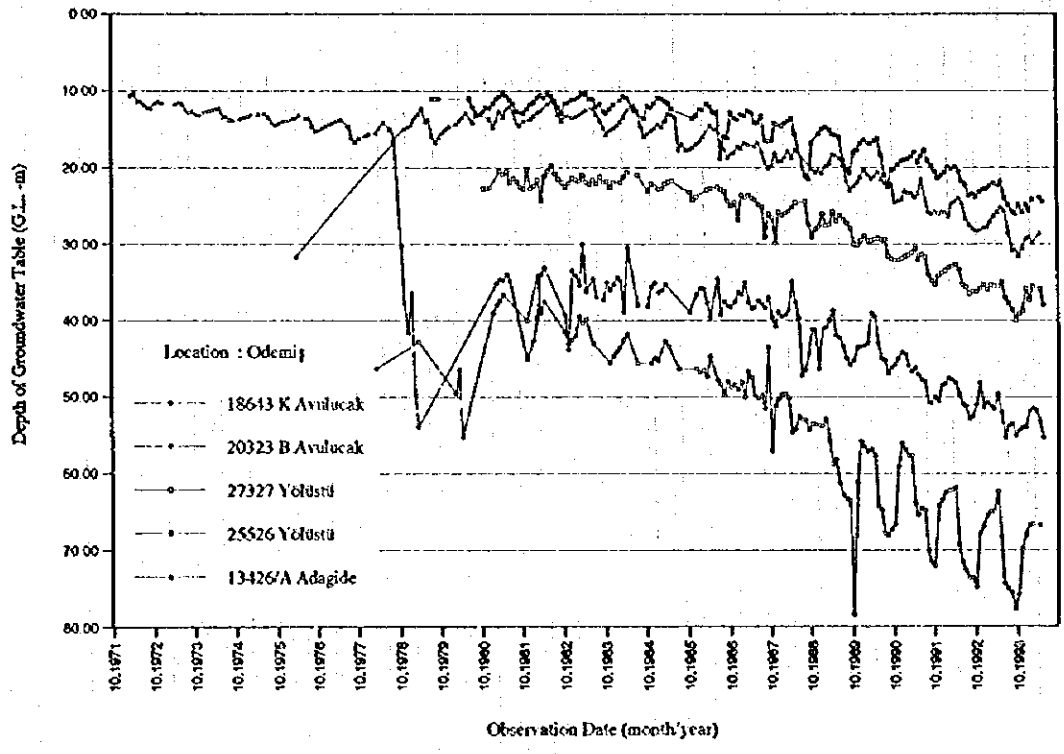


Figure-C.6 (2) Diagram of Groundwater Fluctuation at Respective Observation Wells

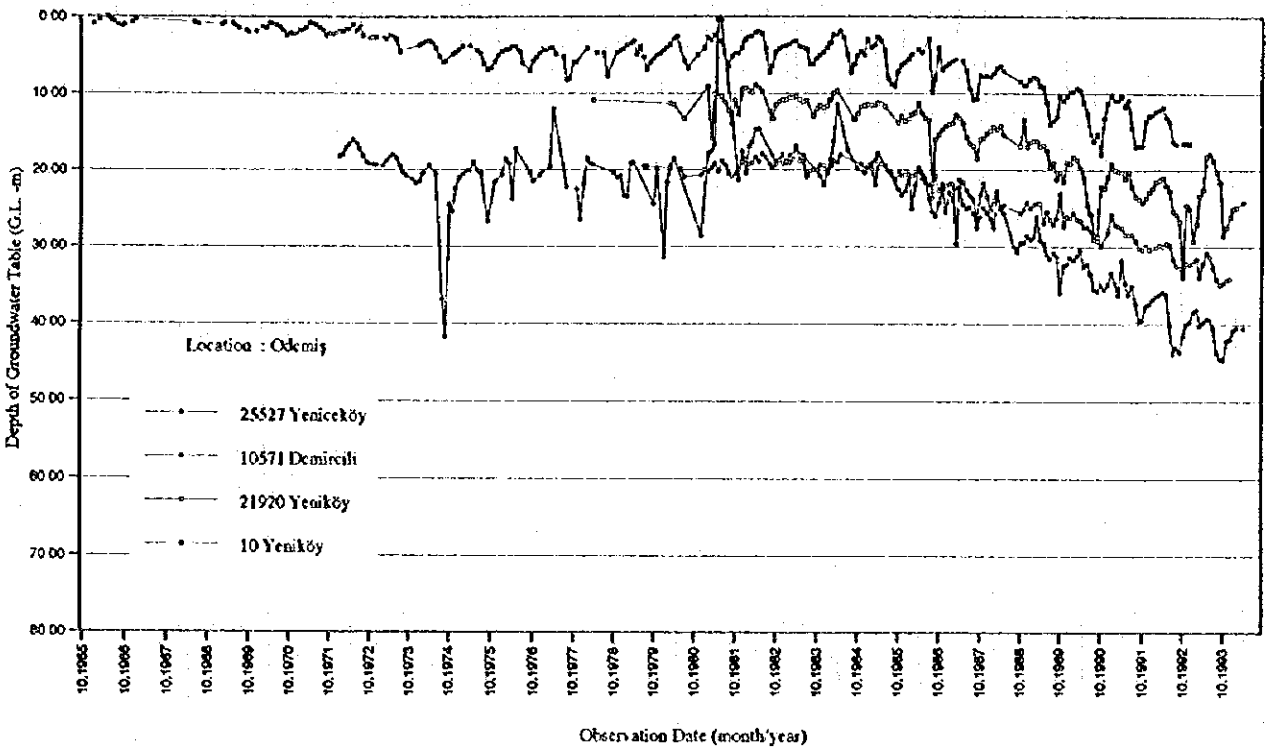


Figure-C.6 (3) Diagram of Groundwater Fluctuation at Respective Observation Wells

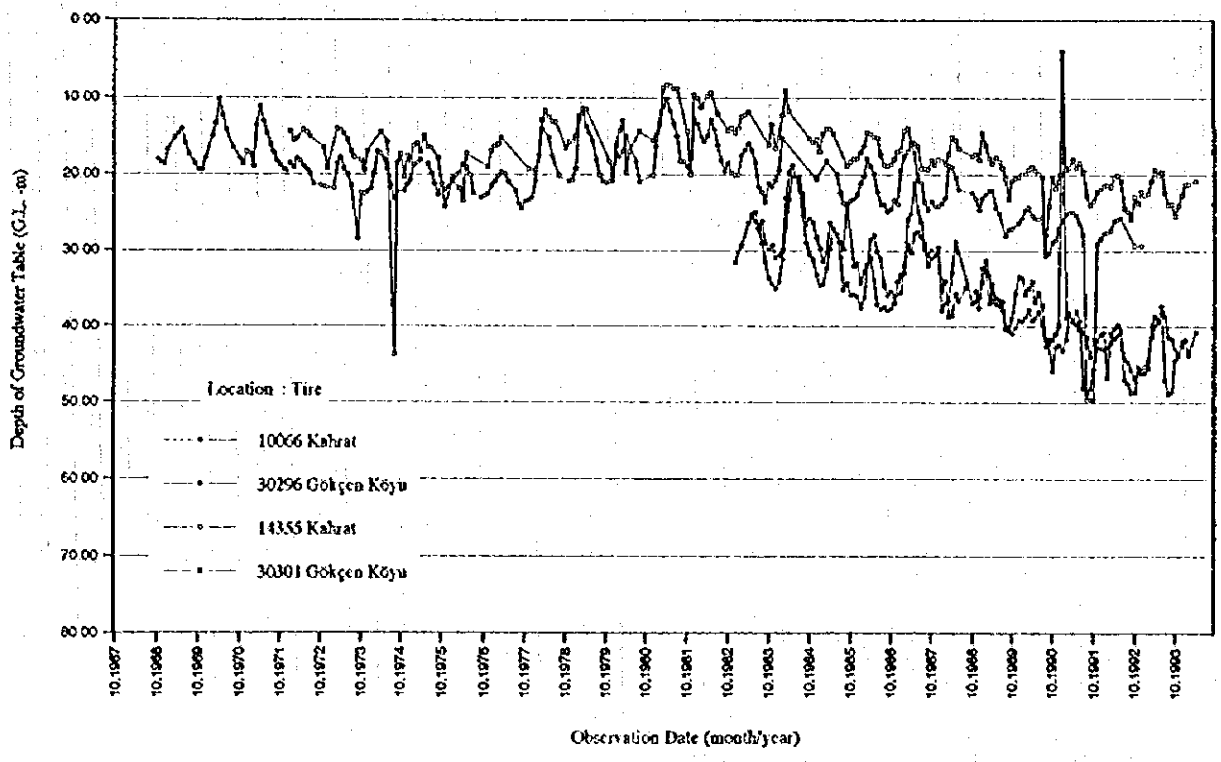


Figure-C.6 (4) Diagram of Groundwater Fluctuation at Respective Observation Wells

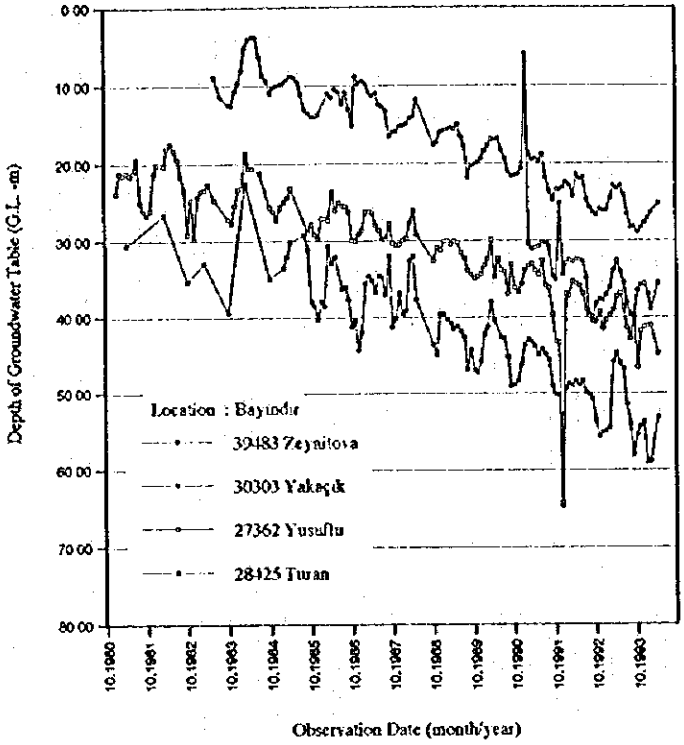


Figure-C.6 (5) Diagram of Groundwater Fluctuation at Respective Observation Wells

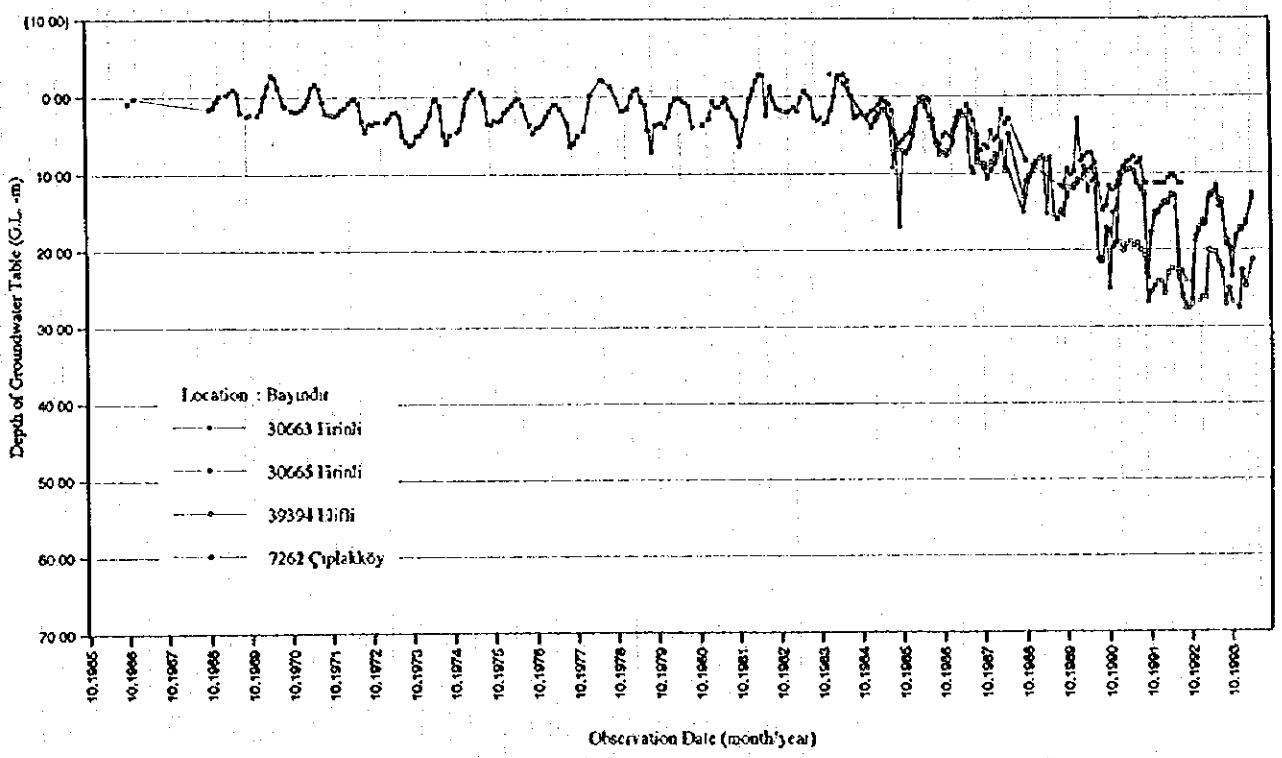


Figure-C.6 (6) Diagram of Groundwater Fluctuation at Respective Observation Wells

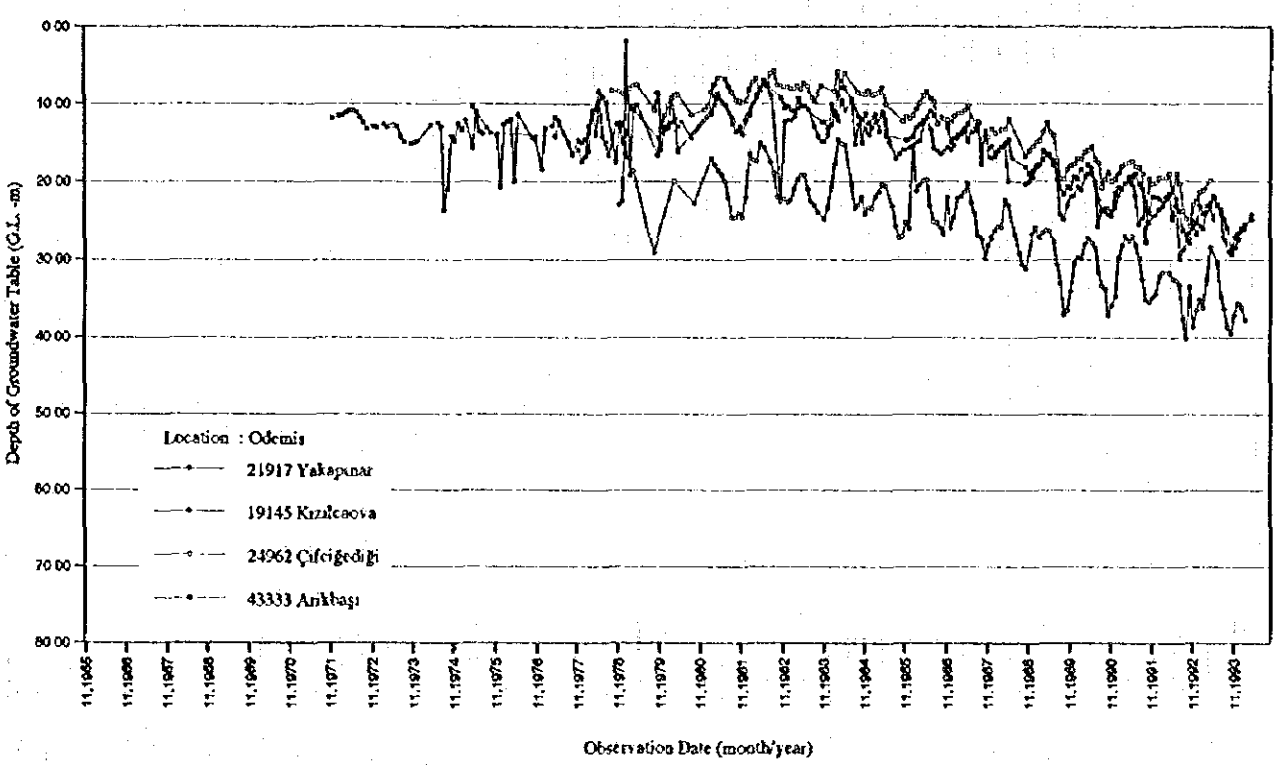


Figure-C.6 (7) Diagram of Groundwater Fluctuation at Respective Observation Wells

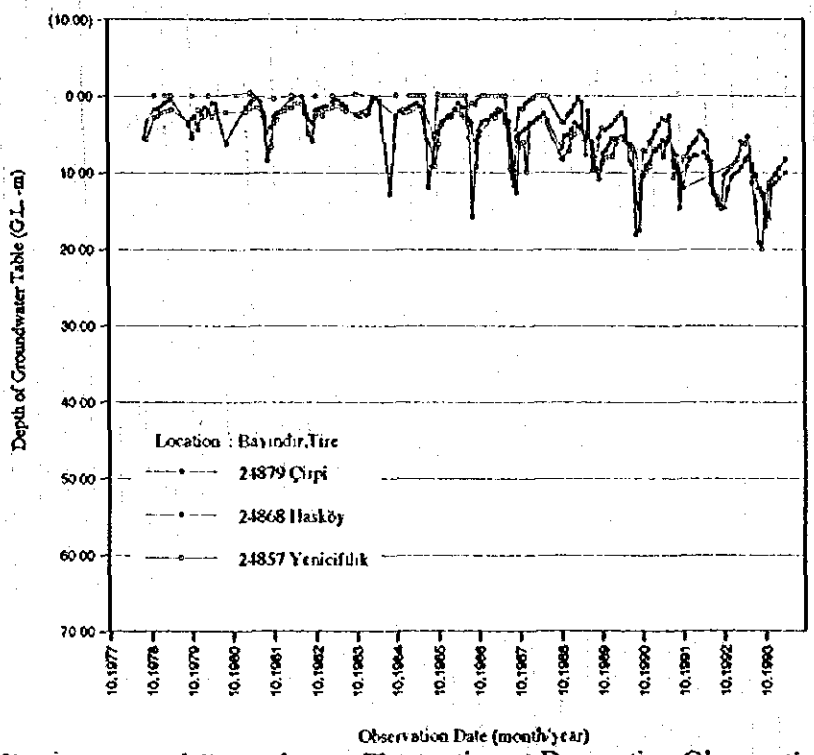


Figure-C.6 (8) Diagram of Groundwater Fluctuation at Respective Observation Wells

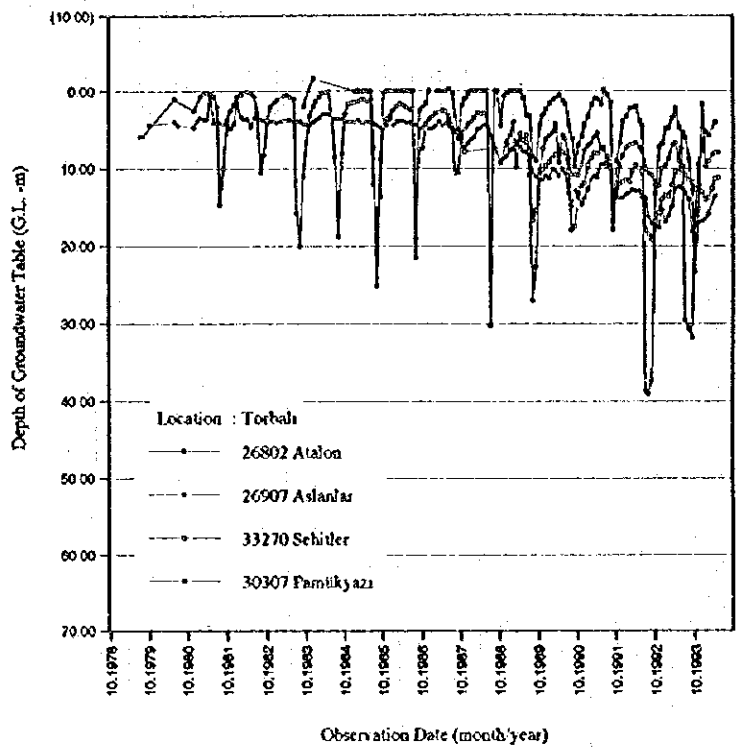


Figure-C.6 (9) Diagram of Groundwater Fluctuation at Respective Observation Wells

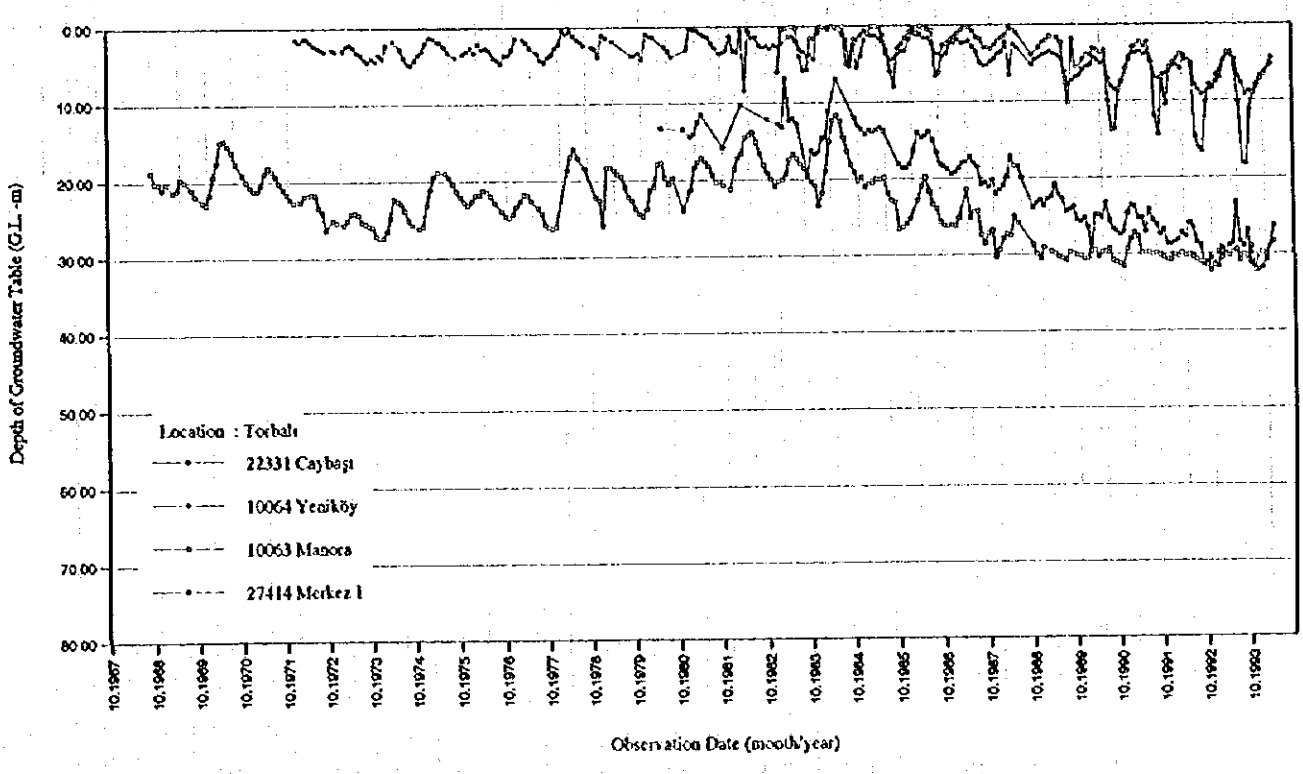


Figure-C.6 (10) Diagram of Groundwater Fluctuation at Respective Observation Wells

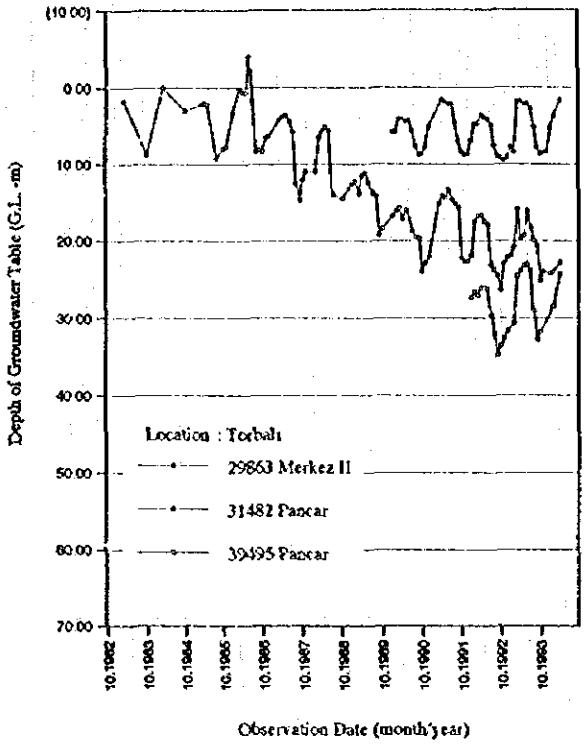


Figure-C.6 (11) Diagram of Groundwater Fluctuation at Respective Observation Wells

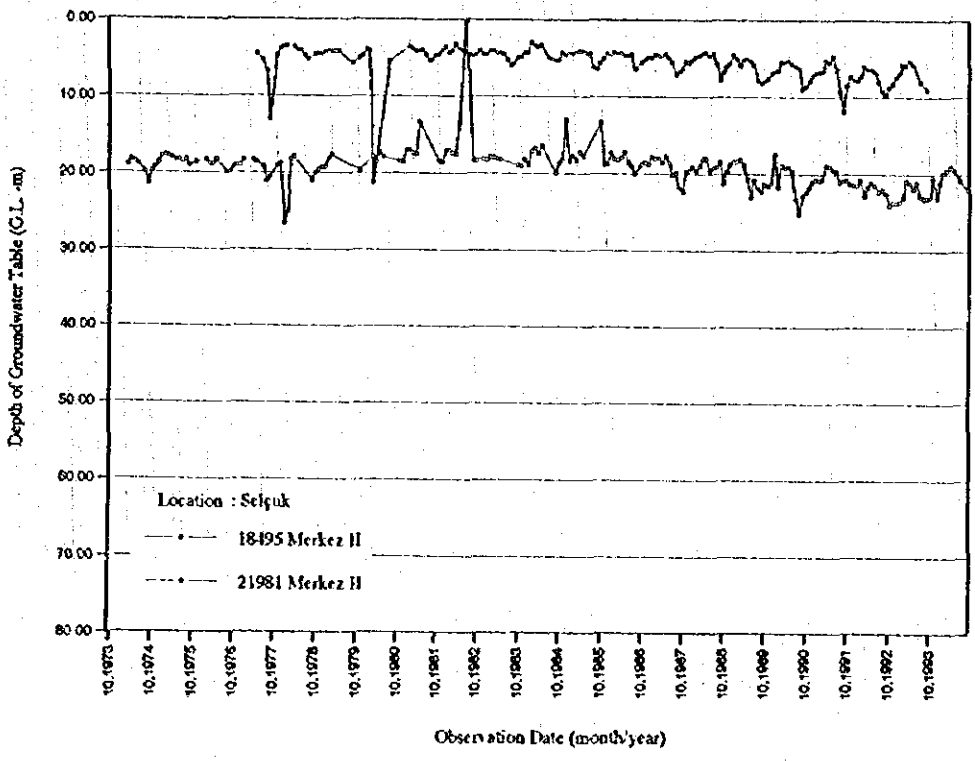


Figure-C.6 (12) Diagram of Groundwater Fluctuation at Respective Observation Wells

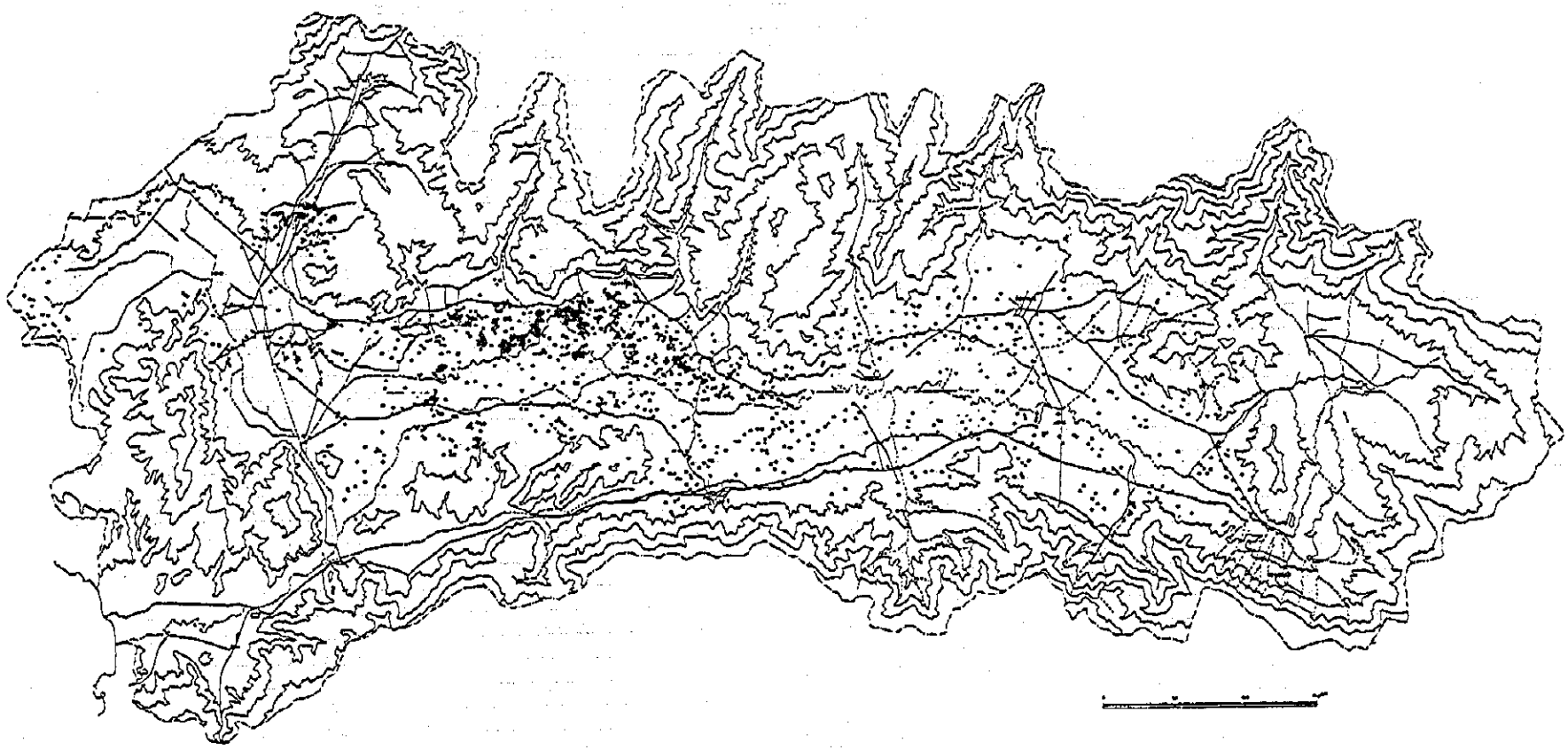


Figure-C.7 Location of Existing Wells in the Küçük Menderes Plain
(based on the topo-map published in 1960 ~ 1964)

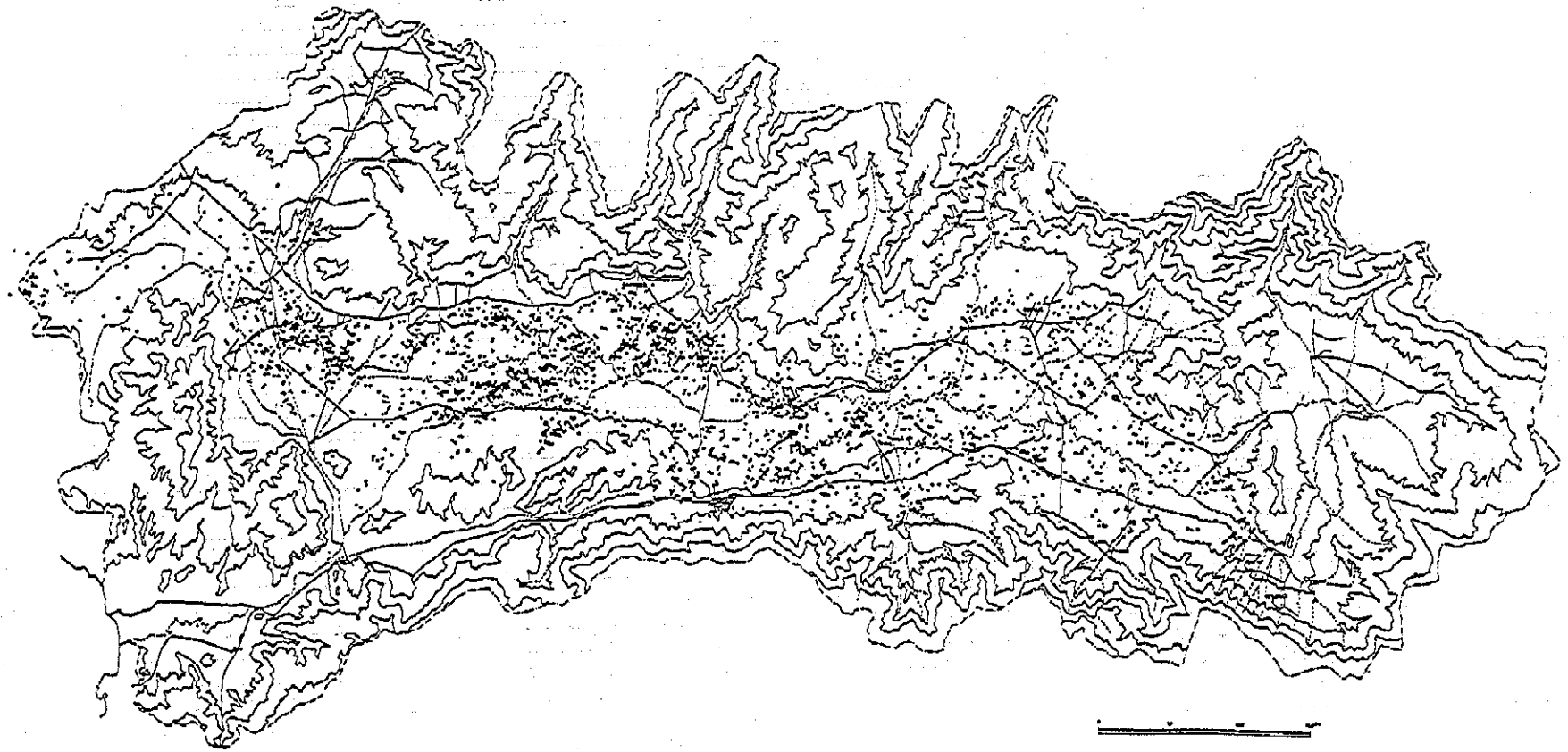


Figure-C.8 Location of Existing Wells in the Küçük Menderes Plain
(based on the topo-map published in 1979 ~ 1980)

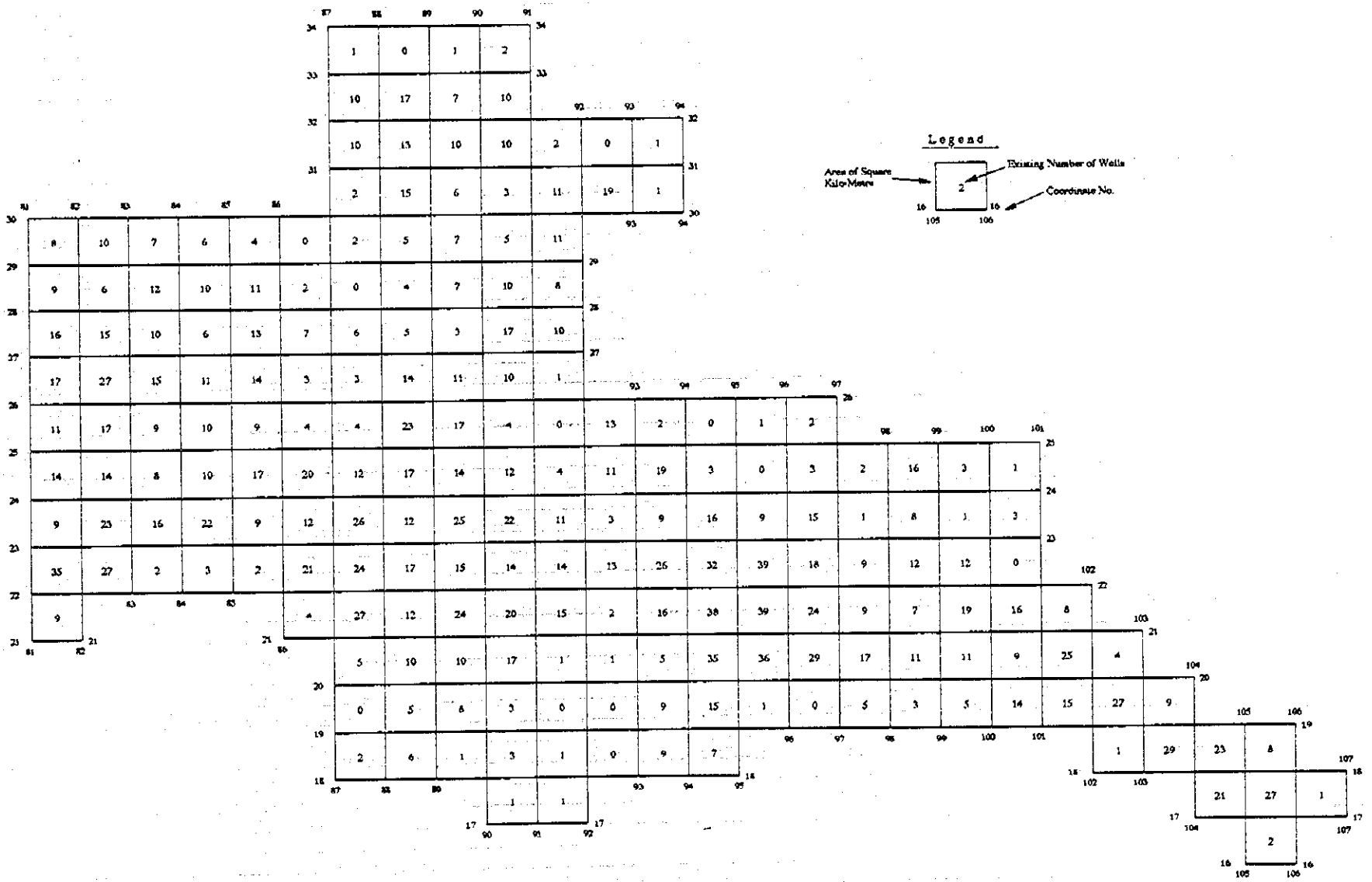


Figure-C.9 Existing Number of Wells at Respective Square Kilometer in the Ödemiş-Beydağ Study Area

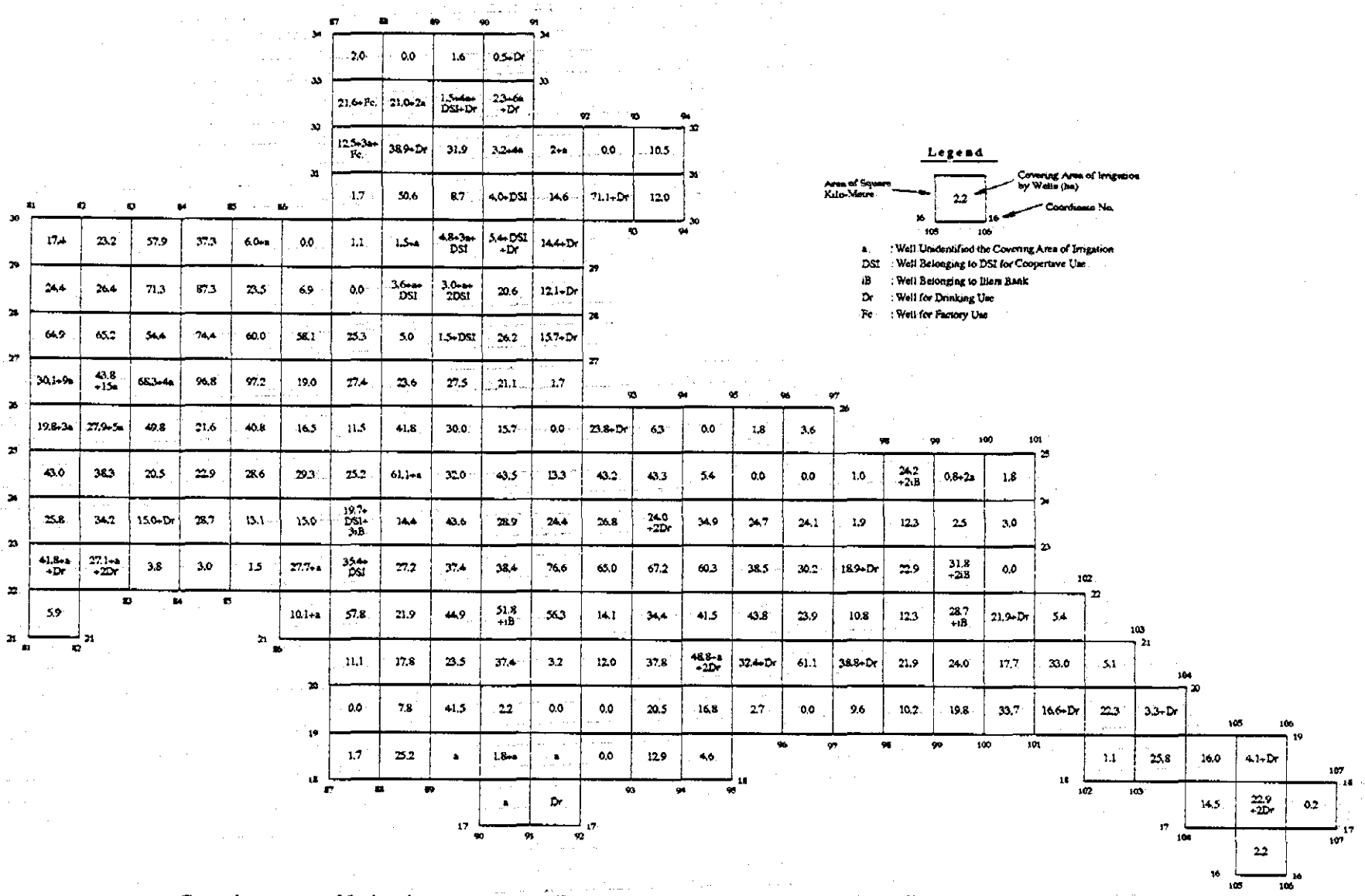


Figure-C.10 Covering Area of Irrigation by Wells at Respective Square Kilometer in the Ödemiş-Beydağ Study Area

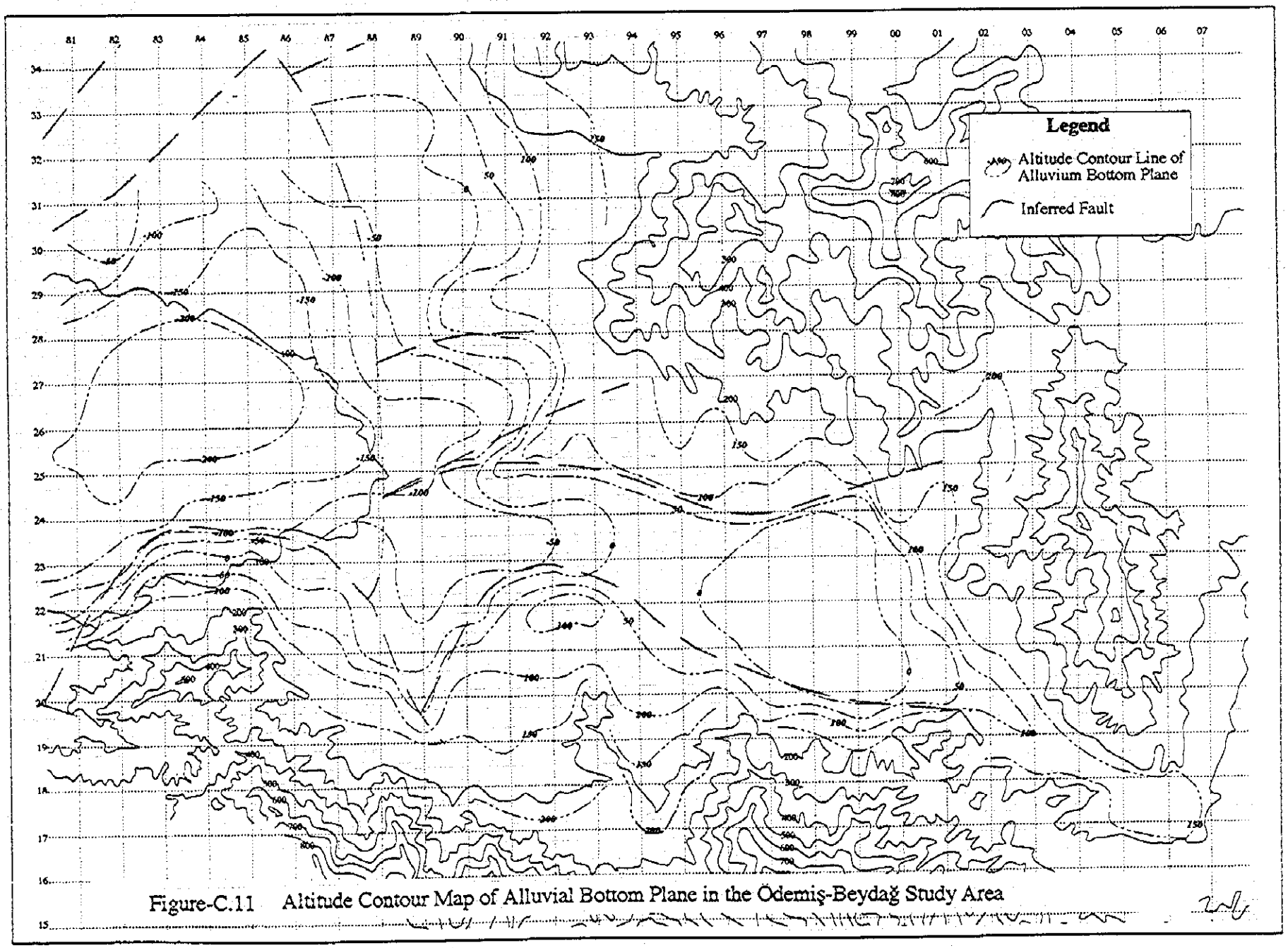


Figure-C.11 Altitude Contour Map of Alluvial Bottom Plane in the Ödemiş-Beydağ Study Area

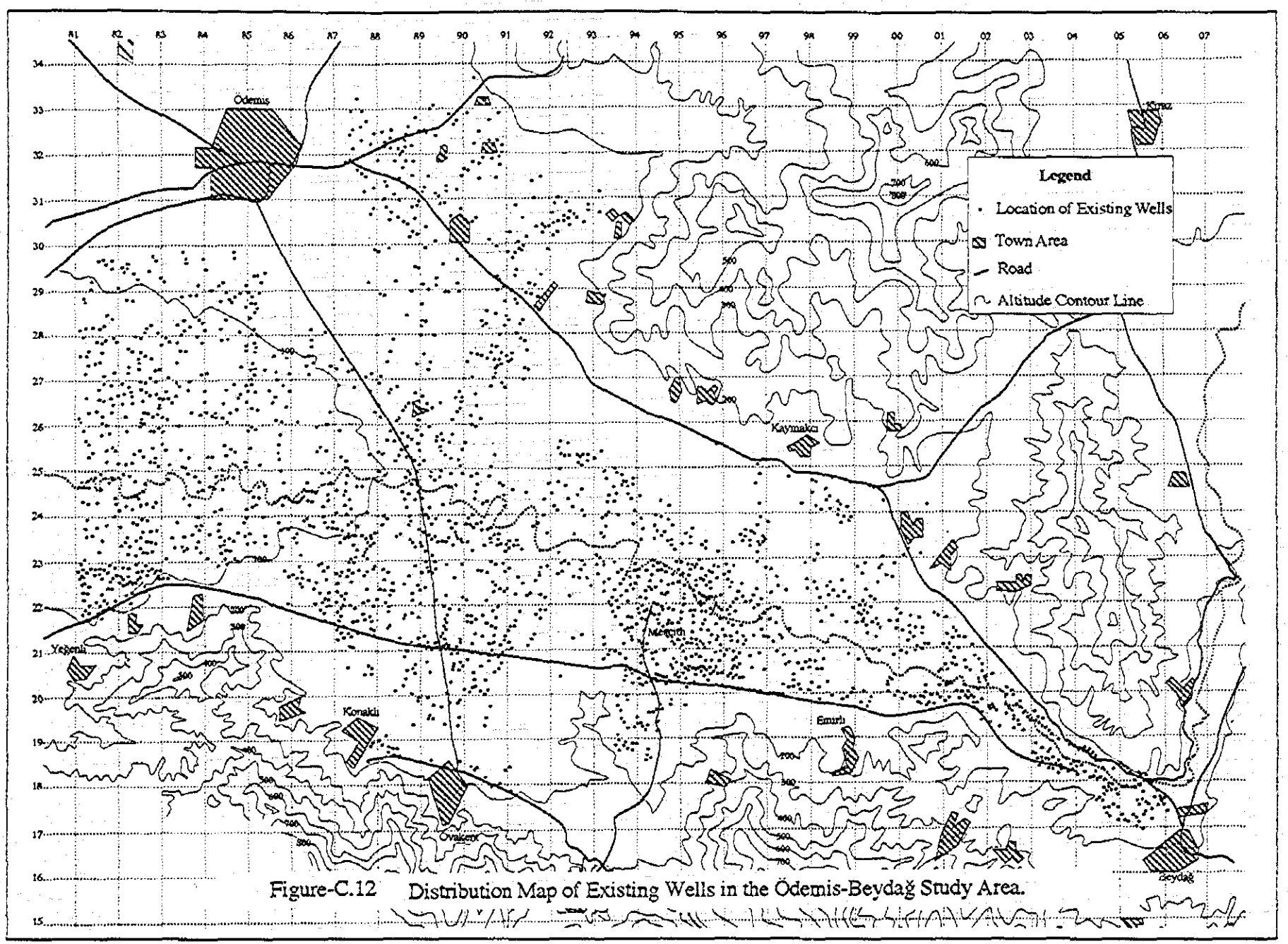


Figure-C.12 Distribution Map of Existing Wells in the Ödemis-Beydağ Study Area.

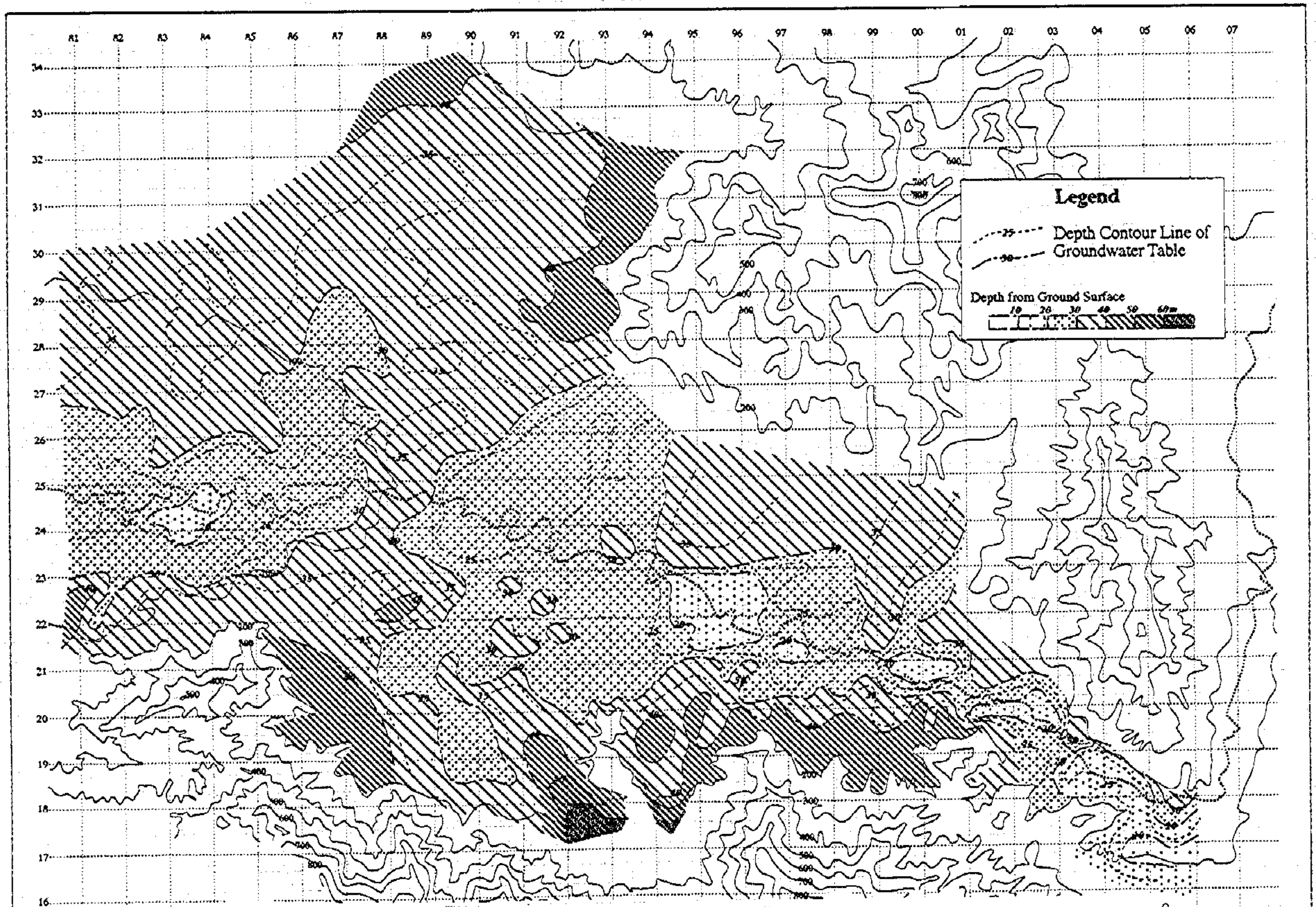


Figure-C.13 Depth of Groundwater Table in the Ödemiş-Beydağ Study Area

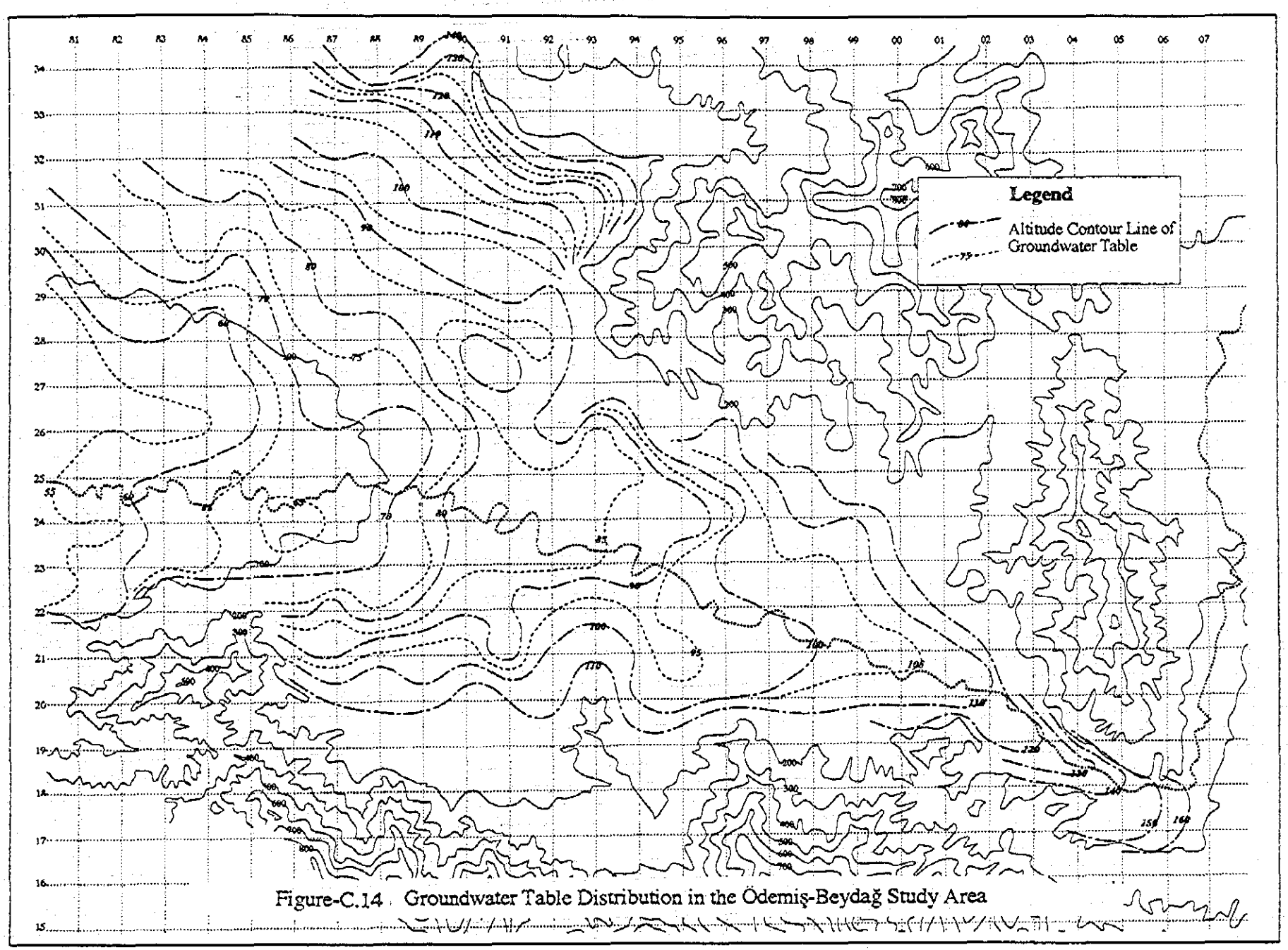


Figure-C.14 Groundwater Table Distribution in the Ödemiş-Beydağ Study Area

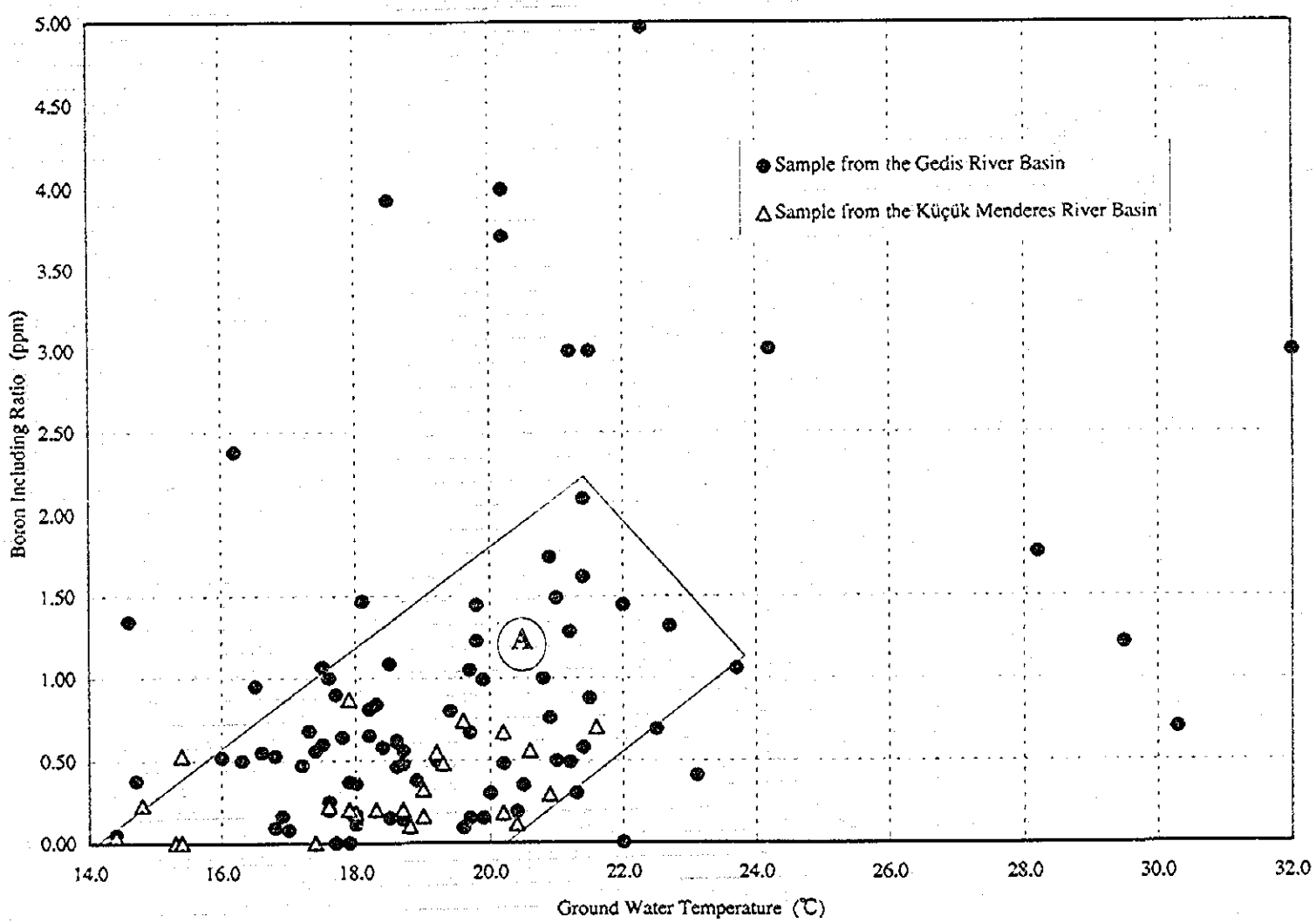


Figure-C.15 Relationship between Water Temperature and Boron Including Ratio

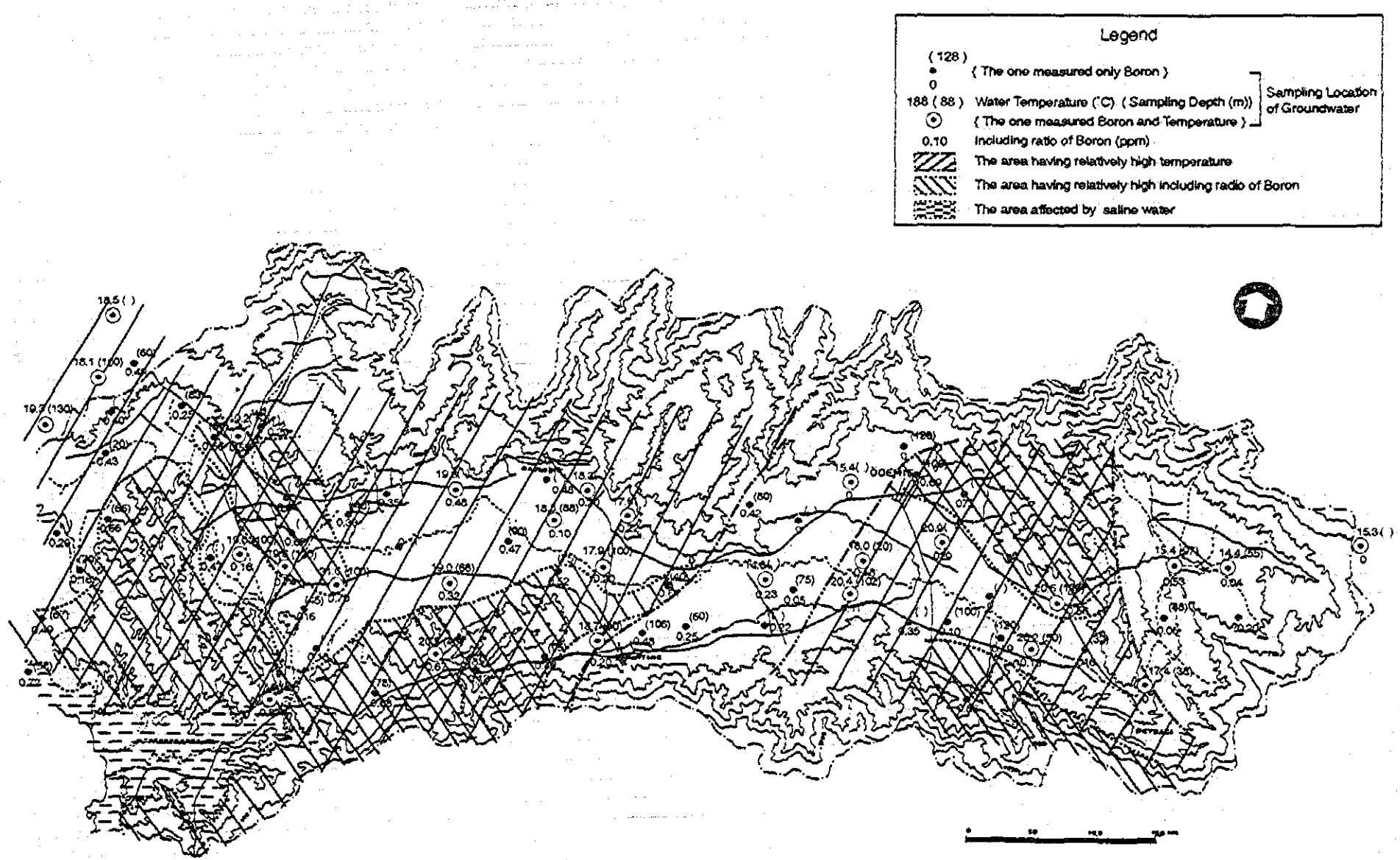


Figure-C.16 Boron Including Ratio & Temperature of Groundwater in the Küçük Menderes River Basin

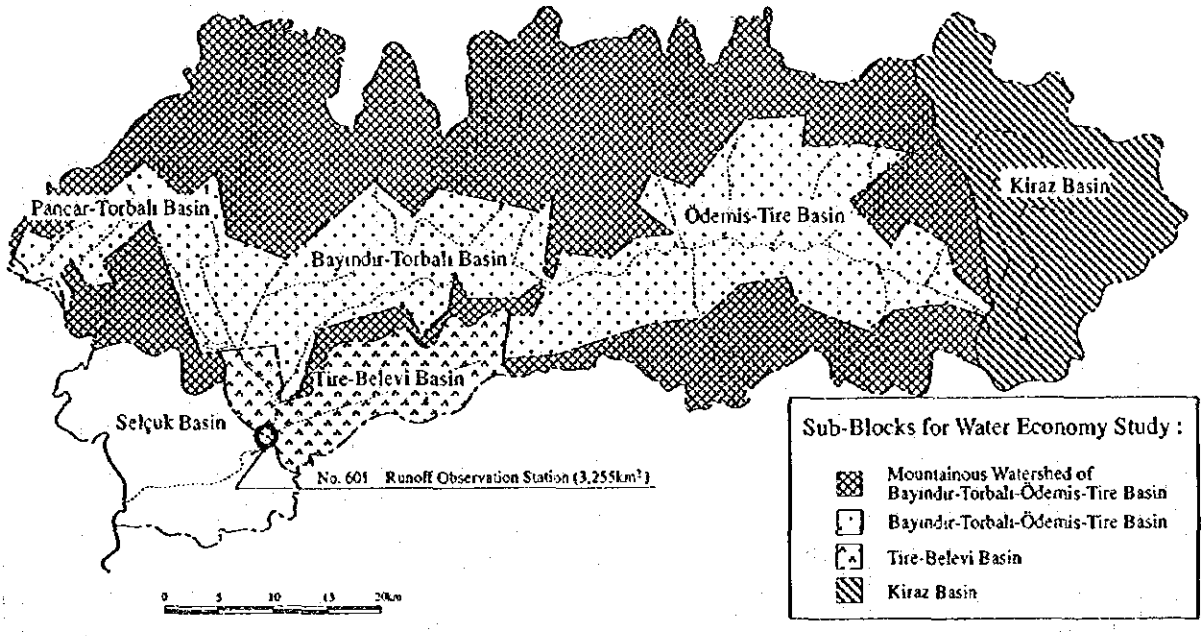
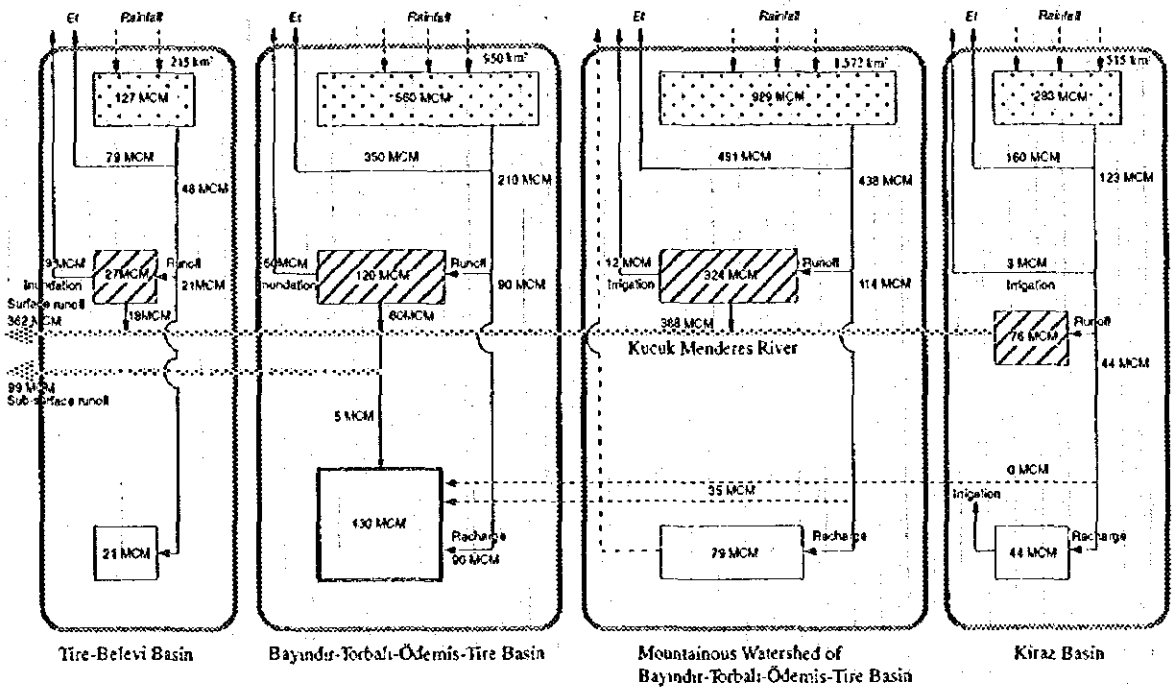


Figure-C.17 Zoning of Groundwater Basin in the Study Basin



*: Above figures of water volume are mean values estimated through water economy study during 20 years from 1974 to1993.

Figure-C.18 Water Economy of the Küçük Menderes River Basin

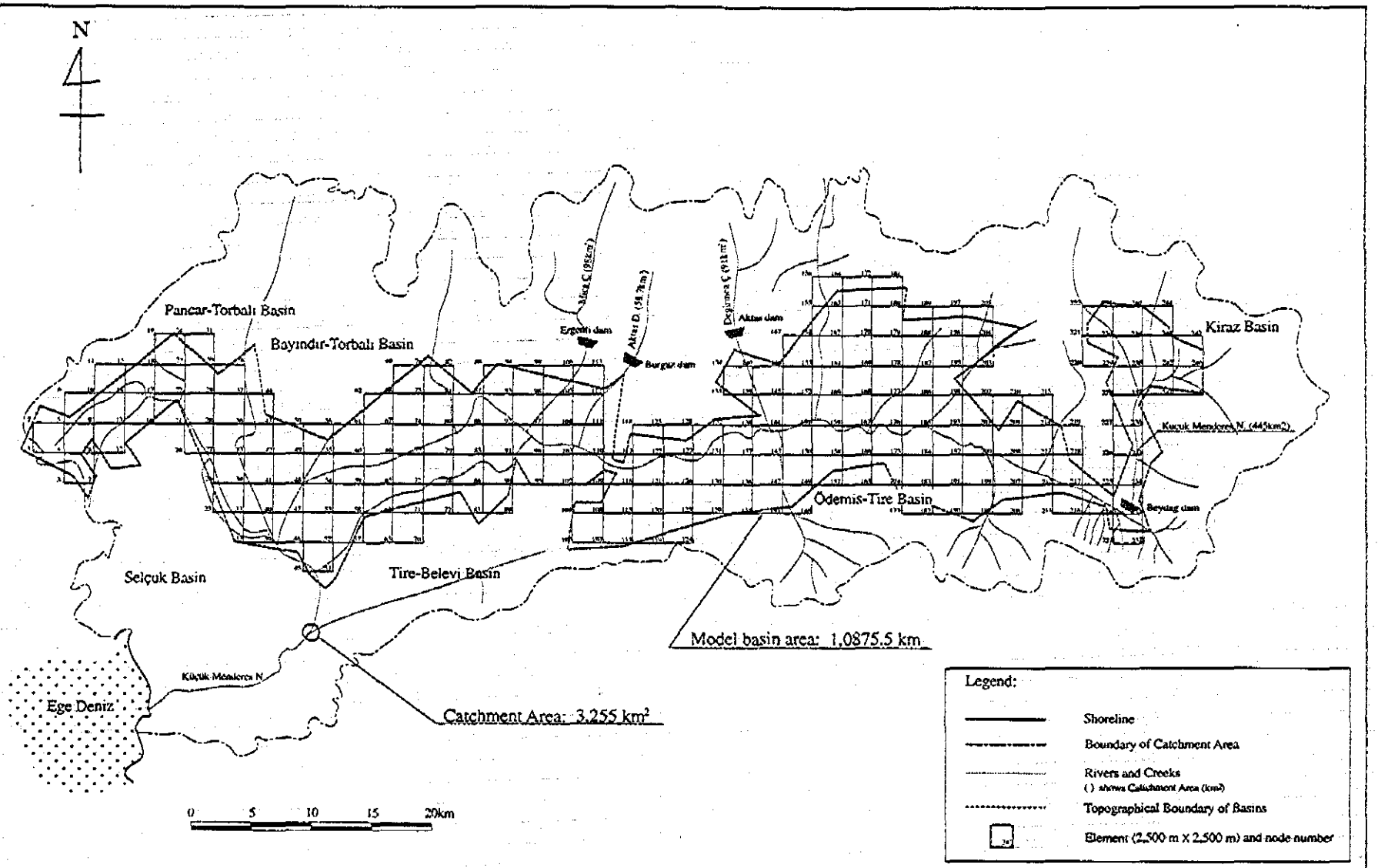


Figure-C.19 Model for Groundwater Analysis

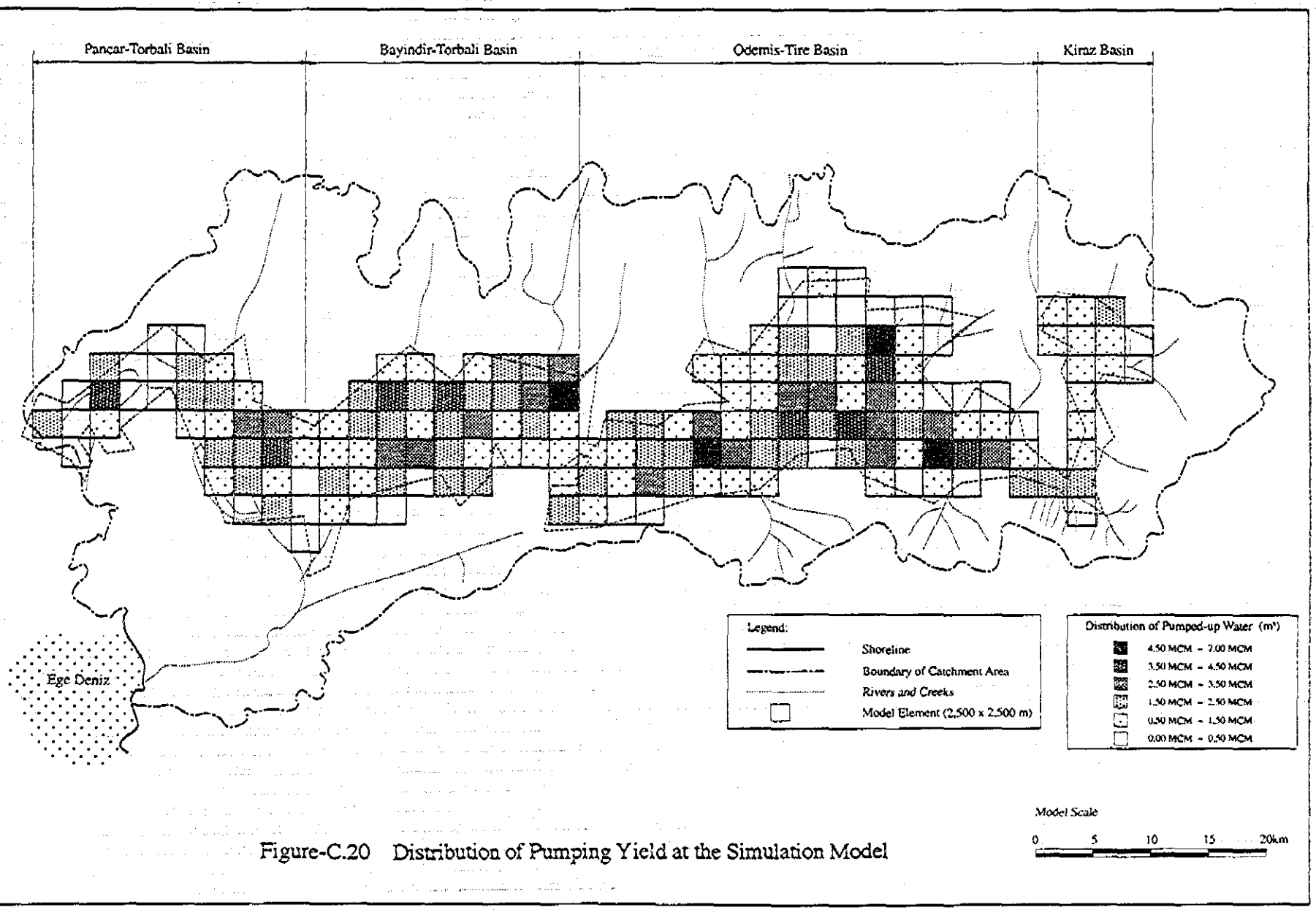
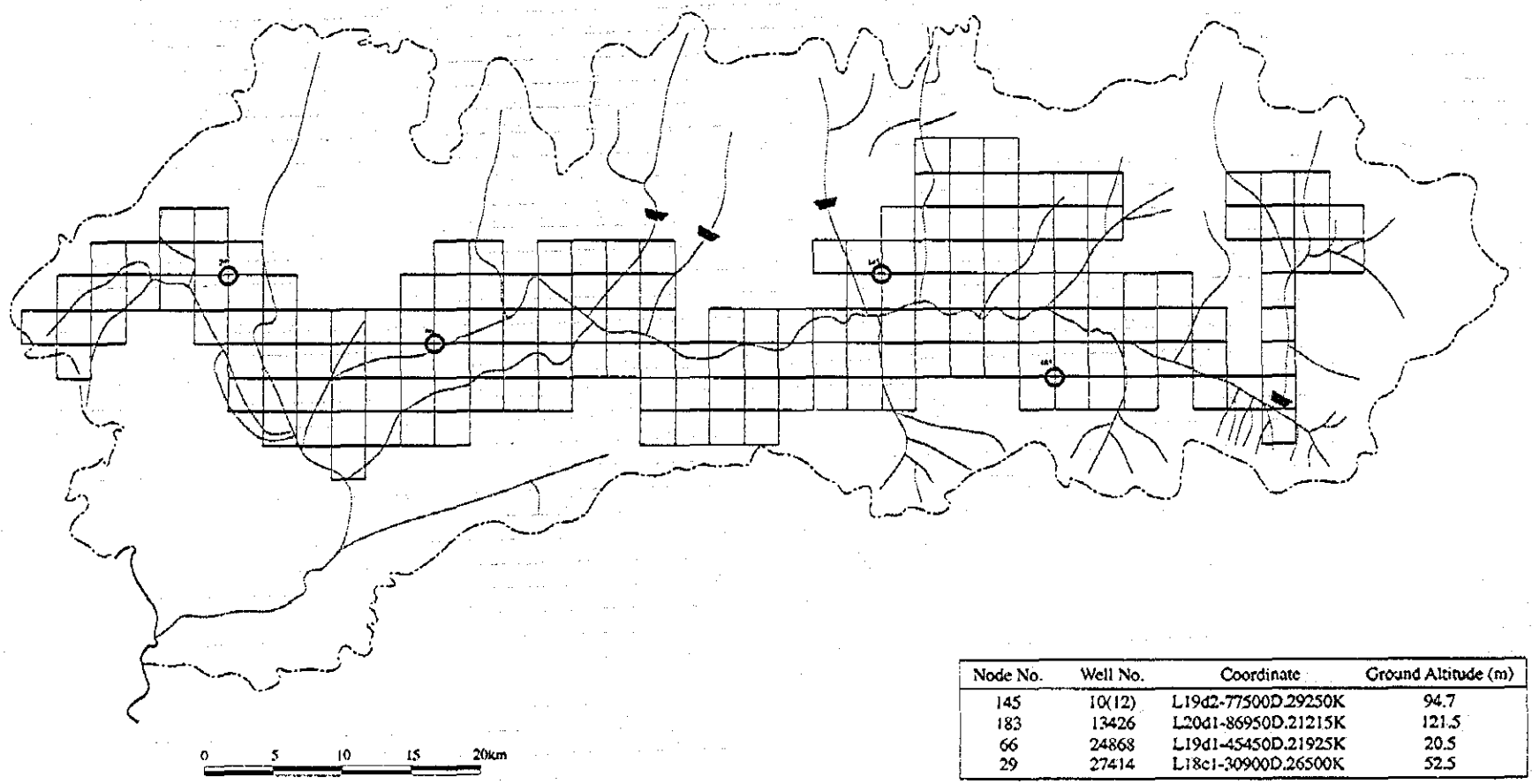


Figure-C.20 Distribution of Pumping Yield at the Simulation Model



Node No.	Well No.	Coordinate	Ground Altitude (m)
145	10(12)	L19d2-77500D.29250K	94.7
183	13426	L20d1-86950D.21215K	121.5
66	24868	L19d1-45450D.21925K	20.5
29	27414	L18c1-30900D.26500K	52.5

Figure-C.21 Location Map of Existing Wells to be checked the simulated Results

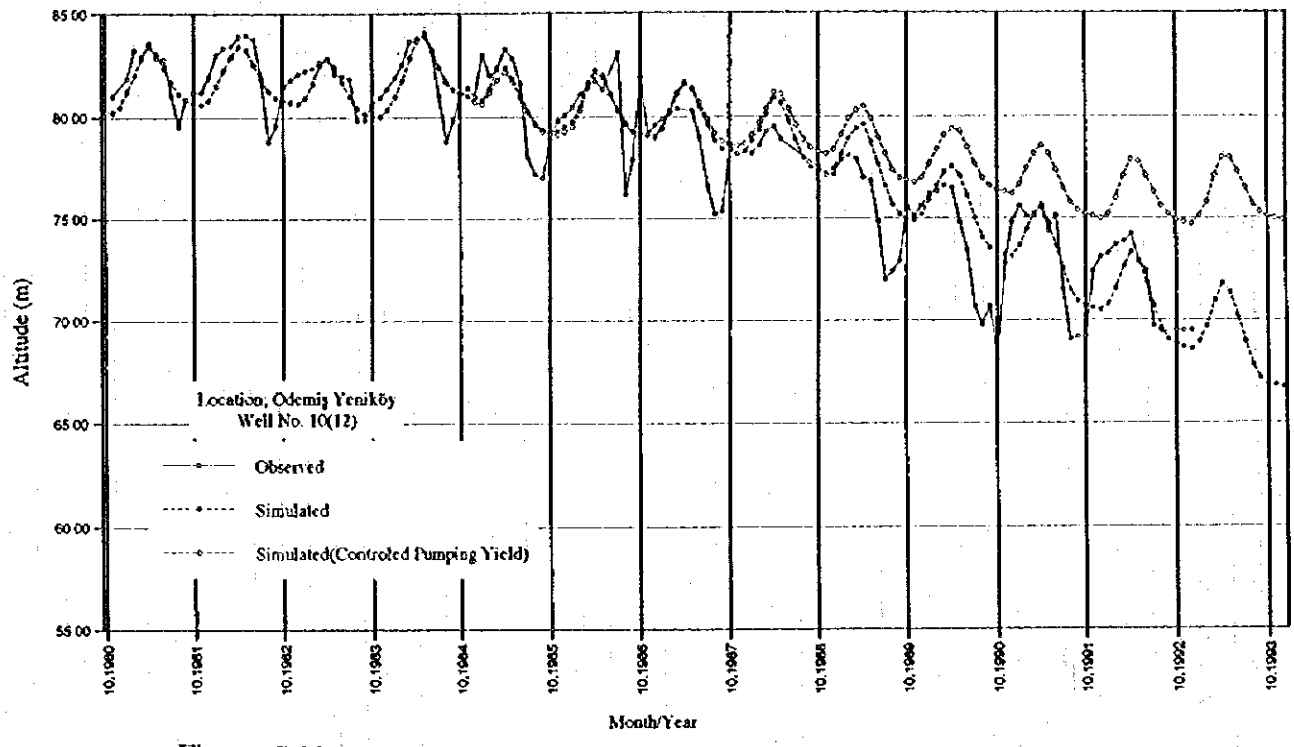


Figure-C.22 (1) Comparative Graph between Observed and Simulated Groundwater Levels

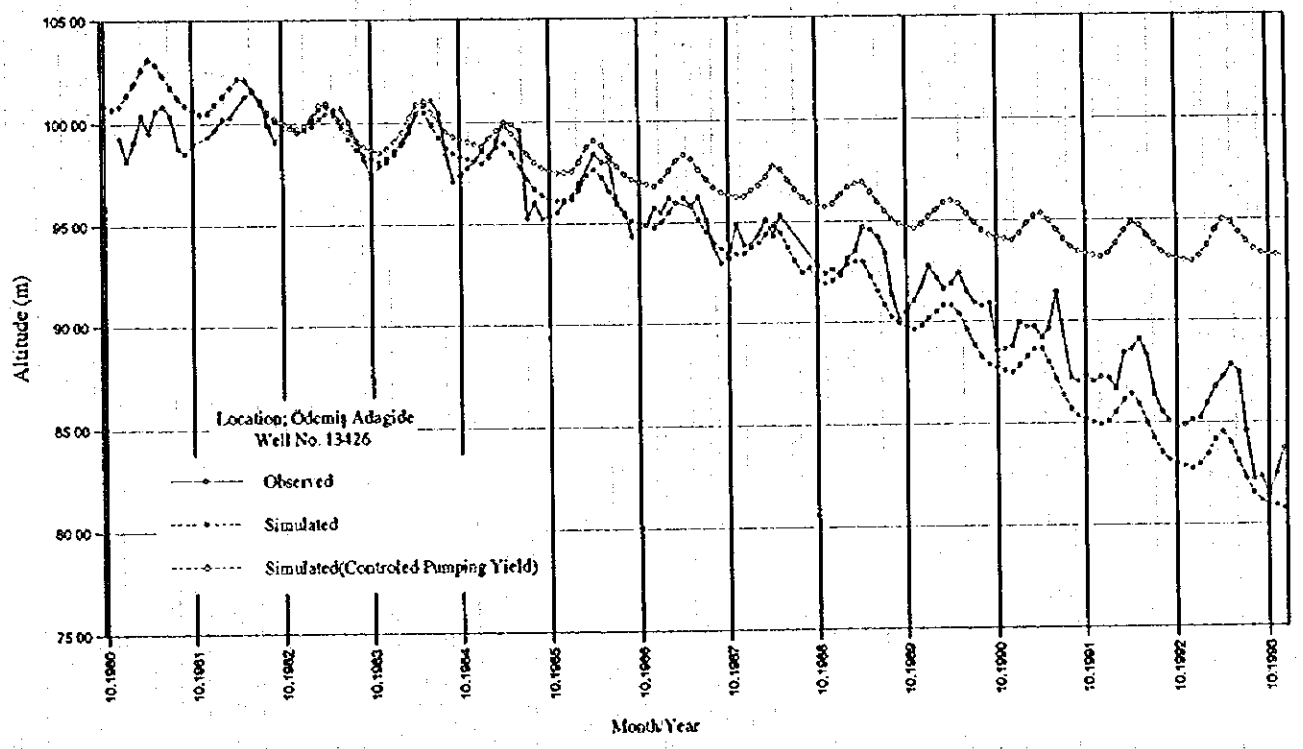


Figure-C.22 (2) Comparative Graph between Observed and Simulated Groundwater Levels

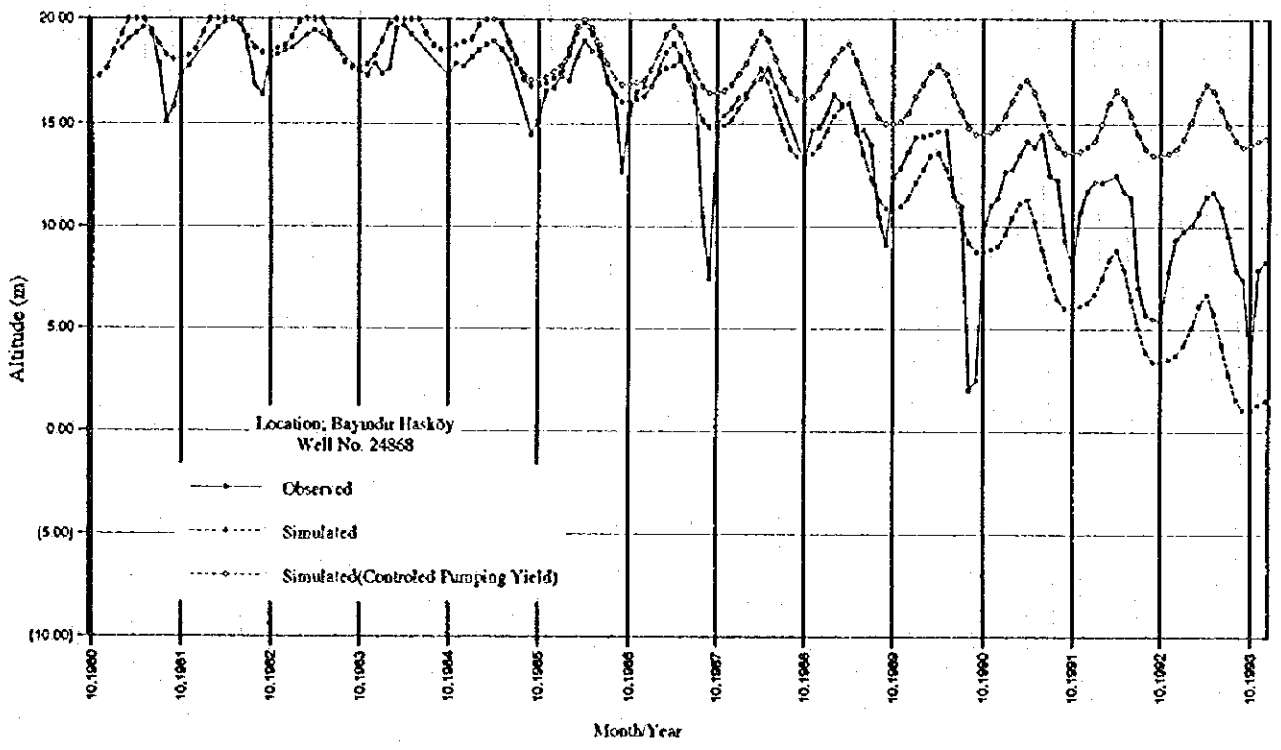


Figure-C.22 (3) Comparative Graph between Observed and Simulated Groundwater Levels

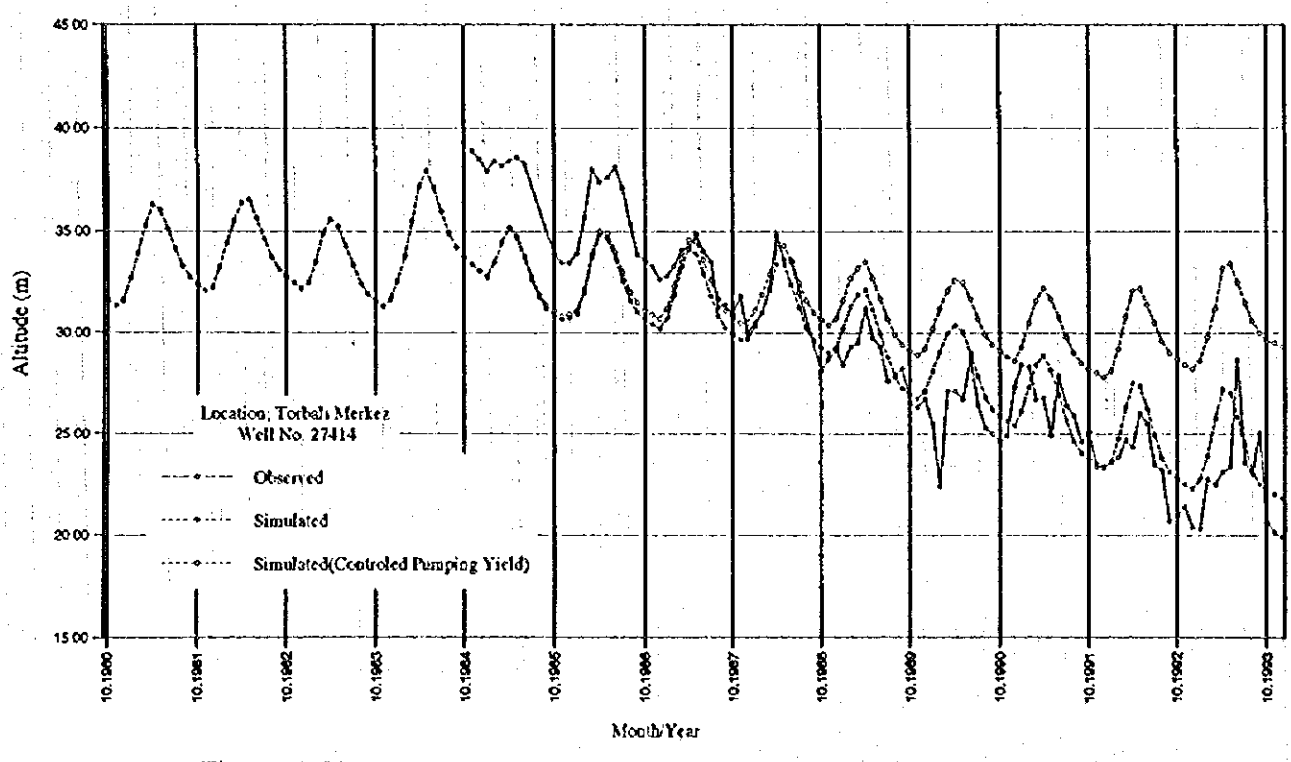


Figure-C.22 (4) Comparative Graph between Observed and Simulated Groundwater Levels

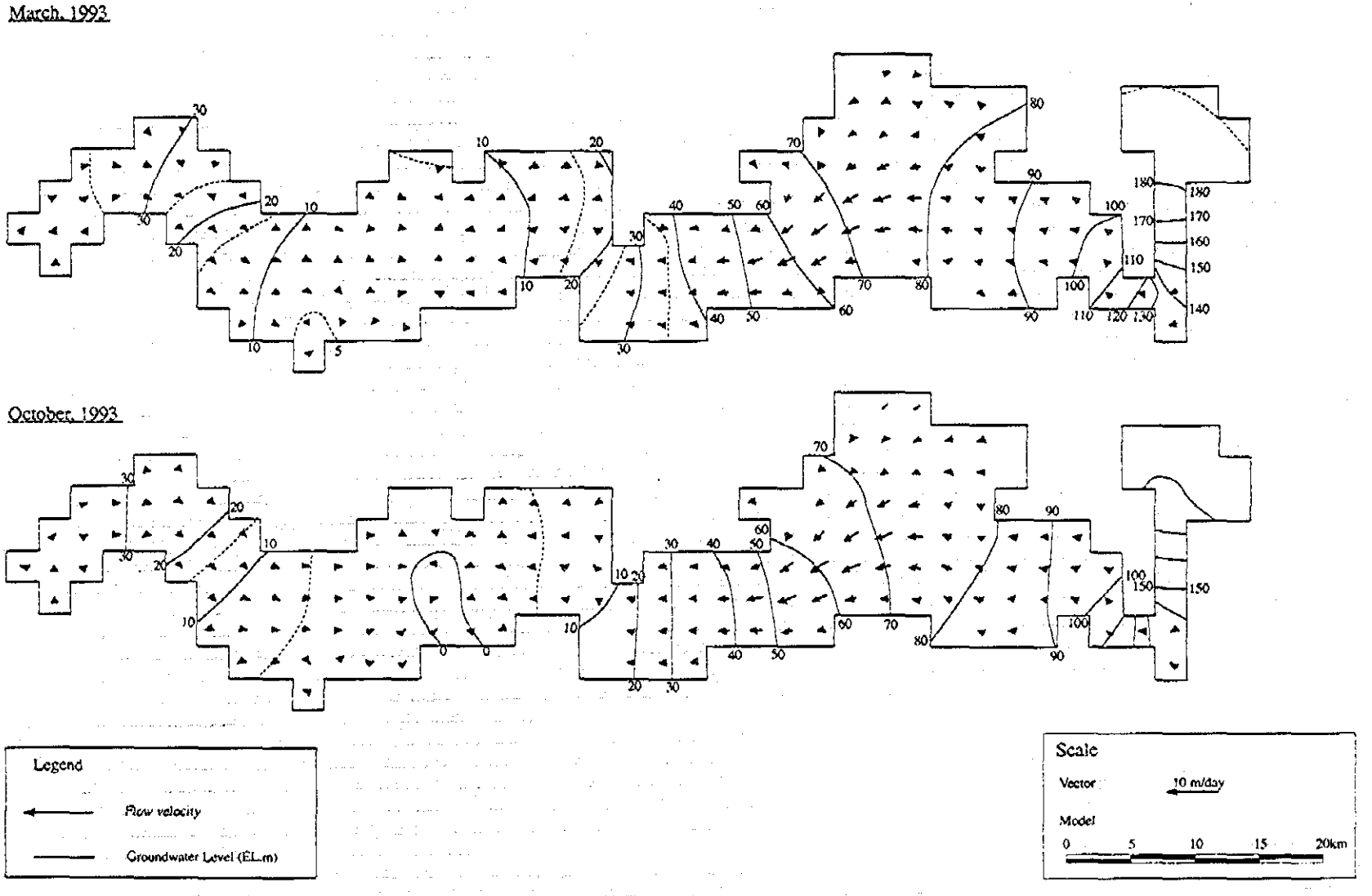


Figure-C.23 Distribution Map of Simulated Flow Vector

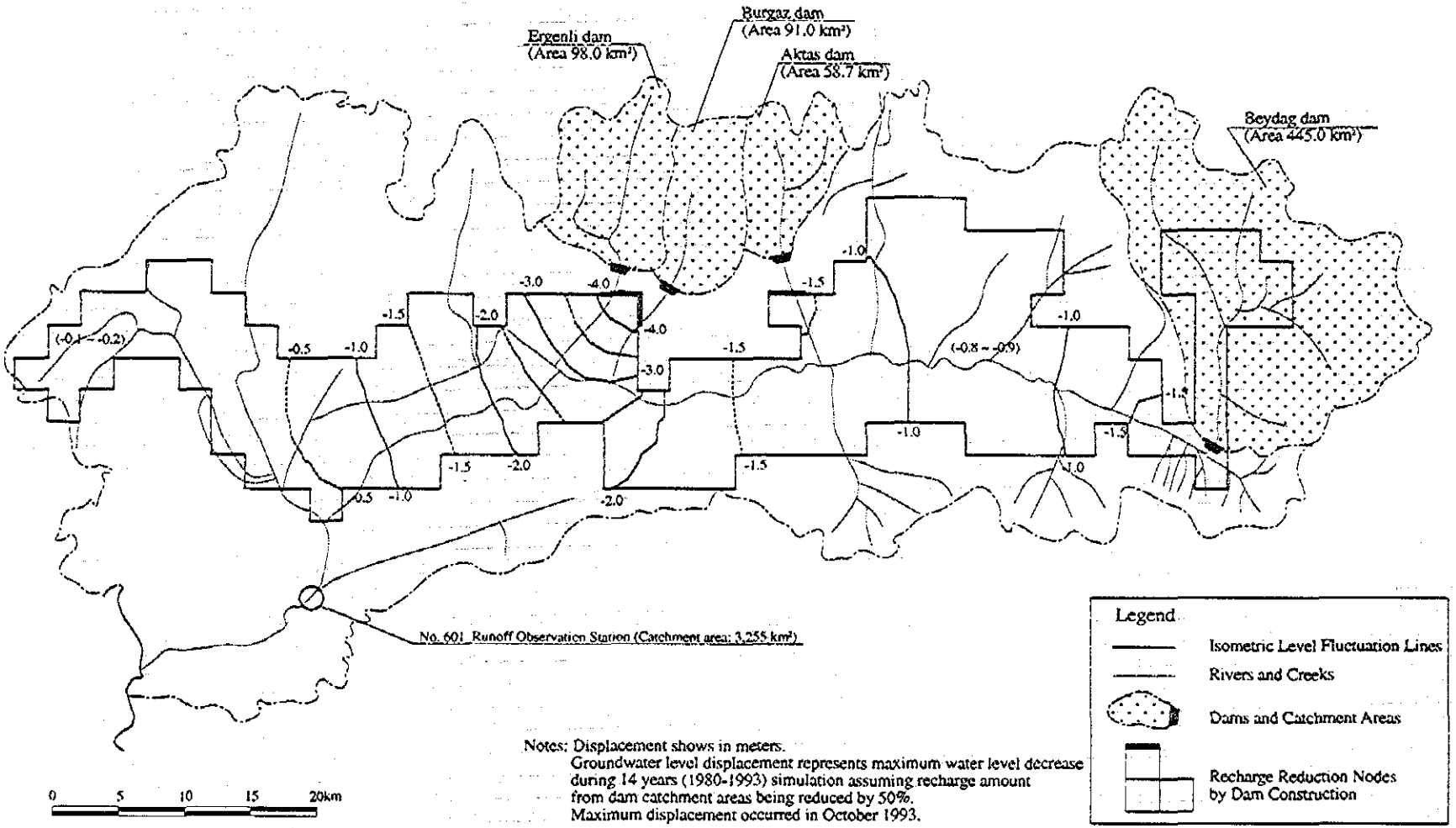


Figure-C.24 Lowing of Groundwater Level by Dams Construction

ANNEX D

SOIL AND LAND CLASSIFICATION

ANNEX D

SOIL AND LAND CLASSIFICATION

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TABLES

Table - D.1 Detailed Information of Soil Units in the Basin Area (1/8)

1) US - Steep rocky shallow medium-textured soils developed on schist	This unit, covers around 145,500 ha or 41.4% of the Basin Area, is classified into the paralithic or lithic Xerothent by USDA Soil Taxonomy. These soils develop on hills and mountains with rounded summits; slopes usually range from 25 to 45%.. They are very shallow non-calcareous somewhat excessively drained, coarse to medium textured soils with rapid run-off, on convex summits and on steep slopes. They are dark olive to brownish coloured very gravely sandy loam soils which are characterized by shallow soil depth (less than 50 cm). These soils are commonly covered with forest, shrubs and olive trees.
2) UG - Steep very rocky shallow coarse-textured soils developed on gneiss and granite	This unit, covers around 13,600 ha or 3.9% of the Basin Area, is classified into the lithic Xerothent by USDA Soil Taxonomy. These soils develop on hills and mountains with usually sharp summits; slopes usually range from 25 to 50%. They are very shallow non-calcareous excessively drained coarse-textured soils with very rapid run-off which are characterized by 5-15 cm brown loose coarse and overlying hard rock. These soils are commonly covered with poor shrubs.
3) UL - Steep extremely rocky very shallow fine textured soils developed on limestone	This unit, covers around 48,200 ha or 13.7% of the Basin Area, is classified into the lithic Rhodoxeralf or lithic Xerothent by USDA Soil Taxonomy. A part of the unit, slopes from 30 to 90%, covers with only hard rock without soil. These soils develop on steep sloping from 20 to 45% in the mountain and hilly area except for hard rocky part. They are dark brown to brown or red coloured subaugular-blocky clay loam to clay soils which are characterized by shallow soil depth (less than 50 cm). These soils are commonly covered with shrubs and pine trees.
4) Hhb - Hilly medium to fine textured calcareous well drained soils	This unit, covers around 4,300 ha or 1.2% of the Basin Area, is classified into the typic Xerothent by USDA Soil Taxonomy. These soils develop on NE-SW running ridges. The interridge valleys have strong slopes, but the convex summits of the ridges as well as the concave valley bottoms are gently sloping.. They are very shallow calcareous well drained medium-textured soils with rapid run-off on convex summits and moderate to strong slopes of ridges. They are characterized by 10-20 cm pale-yellow (5Y 7/3) subaugular-blocky loamy sand overlying tilted pale yellow, greenish and violet layers with textures of very fine sand to loam and 20 to 50% lime. These soils are commonly covered with tree crops or agricultural lands.

Table - D.1 Detailed Information of Soil Units in the Basin Area (2/8)

5) HrA - Rolling fine-textured calcareous well drained soils	This unit, covers around 1,000 ha or 0.3% of the Basin Area, is classified into the vertic and typic Haploxeralf by USDA Soil Taxonomy. These soils develop on NE-SW running ridges are gently sloping to sloping. At the base of the ridges gently sloping colluvium occurs. They are deep well-drained clayey soils with medium run-off occurring on gentle slopes. Soils in colluvial positions are more clayey. They are characterized by 15 cm dark brown (7.5YR 4/4) subaugular-blocky non-calcareous clay-loam to clay overlying yellowish red (5YR 4/6) to strong brown angular-blocky non-calcareous clay with sometimes slickensides. At 60 to 100 cm depth pink (7.5YR 7/4) massive strongly calcareous silt-loam occurs with 50% white lime pockets. These soils are commonly covered with agricultural lands.
6) CsL - Sloping fine-textured calcareous well drained soils developed on colluvium from limestone	This unit, covers around 1,800 ha or 0.5% of the Basin Area, is classified into the typic Rhodexeralf by USDA Soil Taxonomy. These soils develop on gently sloping to sloping colluvium at the foot of limestone hills with a somewhat gravely and stony surface. They are deep non-calcareous well drained clayey red soils with medium to rapid run-off on gentle to moderate slopes. They are characterized by 10-30 cm dark brown (7.5YR 4/4) subaugular-blocky clay loam overlying dark reddish brown to red (2.5YR 3/6) angular-blocky somewhat gravely clay. At 50 to 100 cm depth gradually more stones occur. These soils are commonly covered with agricultural lands.
7) EsS - Sloping fine-textured non-calcareous well drained soils	This unit, covers around 1,200 ha or 0.3% of the Basin Area, is classified into the typic Rhodoxeralf and typic Palexeralf by USDA Soil Taxonomy. These soils develop on sloping pediment with smooth, rarely dissected surface. Common quartz cobbles occur at the surface. They are moderately deep non-calcareous well drained clayey soils with rapid run-off on middle and lower parts of moderately sloping pediment. They are characterized by 110-15 cm dark brown to reddish brown (2.5YR 3/4) subaugular-blocky gravely clay-loam overlying dark red (12.5YR 3/6) to brown prismatic to coarse angular-blocky gravely clay with a few slickensides. Schist-rock exists at 50-150 cm. These soils are commonly covered with a dense shrub vegetation.

Table - D.1 Detailed Information of Soil Units in the Basin Area (3/8)

8) EmW - Gently sloping fine-textured calcareous well drained soils	This unit, covers around 1,000 ha or 0.3% of the Basin Area, is classified into the typic Rendoll and typic Xerochrept by USDA Soil Taxonomy. These soils develop on gently sloping, sometimes dissected pediment at foot of 200-400 m high limestone hills. They are moderately deep calcareous well drained loamy soils with medium run-off, developed in soft lime at the food of limestone hills. They are characterized by 30-60 cm dark brown to brown (10YR 3/3) granular to subaugular blocky silt-loam overlying light yellowish brown (10YR 6/4) to pale yellow fine angular-blocky silt-loam (mainly consisting of lime), containing various amounts of limestone gravel. These soils are commonly covered with a dense shrub vegetation or cultivated land.
9) TlB - Level medium - textured calcareous at depth well drained soils	This unit, covers around 1,500 ha or 0.4% of the Basin Area, is classified into the typic Xerofluventt by USDA Soil Taxonomy. These soils develop on extensive flat river terrace. They are deep somewhat excessively drained very gravely loamy soils with slow run-off, on a flat river terrace. They are characterized by 20 cm brown (7.5YR 4/4) subaugular-blocky very gravely non-calcareous loam overlying somewhat heavier textured horizon; at 70-100 cm depth massive very gravely (50-80% gravel) loam starts, which shows lime beards at depths of over 100 cm. These soils are commonly covered with cultivated land.
10) TbB - Level medium-textured calcareous well drained soils	This unit, covers around 500 ha or 0.1% of the Basin Area, is classified into the typic Xerofluventt by USDA Soil Taxonomy. These soils develop on flat lowest river terrace along present river courses. They are deep well-drained calcareous loamy soils with slow run-off and abundant biopores, on flat young river terrace. They are characterized by 20 cm dark yellowish brown (10YR 4/4) subangular-blocky sandy loam overlying yellowish brown stratified subangular-blocky loam with 3/5% carbonates. These soils are commonly covered with cultivated land.
12) DsS - Medium-textured non-calcareous well drained soils developed on alluvium from schists	This unit, covers around 7,600 ha or 2.2% of the Basin Area, is classified into the typic Xerochrept by USDA Soil Taxonomy. These soils develop on dissected part of alluvial fans from schists. They are deep well-drained non-calcareous gravely loamy soils with medium-run-off on the gently sloping lower part of broad intergully-divides. They are characterized by 20-60 cm dark brown subangular-blocky gravely sandy loam to loam overlying dark brown to brown angular-blocky somewhat gravely loam. At 70-100 cm, they are dark yellowish brown weakly structured gravely sand. Their clay mineral association is: smectite, 12.1 Å-mineral, mica, kaolinite, goethite and quartz. These soils are commonly covered with cultivated land.

Table - D.1 Detailed Information of Soil Units in the Basin Area (4/8)

13) DsG - Medium to coarse textured non-calcareous well drained soils developed on alluvium from gneiss and granite	This unit, covers around 4,000 ha or 1.1% of the Basin Area, is classified into the typic Haploxeralf or typic Xerochrept by USDA Soil Taxonomy. These soils develop on dissected part of alluvial fans from schists. They are deep well-drained non-calcareous stony and gravely medium-textured soils with rapid run-off on the sloping upper part of intergully-divides. They are characterized by 20 cm reddish-brown (5YR 4/4) subangular-blocky gravely sandy loam overlying yellowish red (5YR 4/8) angular-blocky very gravely and stony sandy clay-loam to clay-loam, which continues to a depth of more than 100 cm. Their clay mineral association is: mica, kaolinite, quartz and goethite. These soils are commonly covered with a poor shrub and grass vegetation.
14) DsM - Medium to fine textured here and there calcareous well drained soils on a substratum on marl	This unit, covers around 3,900 ha or 1.1% of the Basin Area, is classified into the typic Haploxeralf by USDA Soil Taxonomy. These soils develop on dissected piedmont alluvial plain with a centripetal drainage pattern. They are deep well-drained non-calcareous reddish brown gravely and stony clayey soils with medium to rapid run-off on sloping intergully-divides. They are characterized by 15 cm strong brown (7.5YR 4/6) subangular-blocky gravely loam overlying reddish brown (5YR 4/4) angular-blocky gravely clay which becomes more gravely with depth. From a depth of 75 cm downwards the clay contains 60% weathering stones and gravel. These soils are commonly covered with a poor shrub and grass vegetation.
15) PsS - Coarse-textured non-calcareous excessively drained soils developed on alluvium from schists	This unit, covers around 3,900 ha or 1.1% of the Basin Area, is classified into the typic Xeropsamment by USDA Soil Taxonomy. These soils develop on steepest part of alluvial fans from schists with slopes range from 5 to 20%. They are deep excessively drained non-calcareous very gravely and stony coarse-textured soils with rapid run-off occurring on the steepest sloping part of fans and near stream These soils are commonly covered with a poor shrub and grass vegetation.
16) PsG - Coarse-textured non-calcareous excessively drained soils developed on alluvium from gneiss and granite	This unit, covers around 900 ha or 0.3% of the Basin Area, is classified into the typic Xeropsamment by USDA Soil Taxonomy. These soils develop on steepest part of alluvial fans from gneiss and granite with slopes range from 5 to 20%. They are deep excessively drained non-calcareous gravely and stony coarse sandy soils with medium run-off. These soils are commonly covered with a poor shrub and grass vegetation.

Table - D.1 Detailed Information of Soil Units in the Basin Area (5/8)

17) PsL - Medium-textured calcareous well drained soils developed on alluvium from limestone with calcareous at shallow depth	This unit, covers around 1,800 ha or 0.5% of the Basin Area, is classified into the lithic Xerothent by USDA Soil Taxonomy. These soils develop on steepest part of alluvial fans from limestone with slopes range from 5 to 30%. They are shallow well-drained slightly calcareous medium-textured soils over calcareous, with rapid run-off. They are characterized by 5-30 cm dark brown to brown (10YR 4/3) subangular-blocky fine sandy loam overlying calcrete. Their calcrete consists of over 90% limestone gravbel and cobbles cemented by secondary lime.. These soils are commonly covered with a poor shrub and grass vegetation.
18) PmS - Coarse to medium textured non-calcareous somewhat excessively drained soils developed on alluvium from shists	This unit, covers around 26,900 ha or 7.7% of the Basin Area, is classified into the typic Xeropsamment, typic Xerofluvent or typic Xerochrept by USDA Soil Taxonomy. These soils develop on gentle sloping from 3 to 10% in the alluvial fans from shists. They are dark yellowish brown to yellowish brown coloured gravely or cobby sandy loam to sandy soils without discernible structure which are characterized by deep soil depth. These soils are commonly used for agriculture.
19) PmG - Coarse textured non-calcareous excessively drained soils developed on alluvium from gneiss and granite	This unit, covers around 4,000 ha or 1.1% of the Basin Area, is classified into the typic Xeropsamment by USDA Soil Taxonomy. These soils develop on gently sloping part of mostly coalescing alluvial fans from gneiss and granite with slopes range from 3 to 10%. They are deep excessively drained non-calcareous gravely and cobbly sandy soils with medium run-off. They are characterized by layers of dark yellowish brown (10YR 4/4) gravely and cobbly sand and loamy sand. These soils are commonly used for agriculture.
20) PmL - Medium to coarse textured usually calcareous well drained soils developed on alluvium from limestone	This unit, covers around 3,000 ha or 0.9% of the Basin Area, is classified into the calcic Xerochrept by USDA Soil Taxonomy. These soils develop on gently sloping part of alluvial fans from limestone with slopes from 2 to 6%. They are deep well-drained calcareous gravely and cobbly medium-textured soils with medium run-off on the upper gently sloping parts of this mapping unit near streams where tow fans coalesce. They are characterized by dark brown (7.5YR 3/2) subangular-blocky non-calcareous gravely sandy loam to loam, below 15 cm calcareous and gradually more gravely. Below 80 cm gravel and cobbles in some places are cemented by secondary lime. These soils are commonly used for agriculture.

Table - D.1 Detailed Information of Soil Units in the Basin Area (6/8)

21) PlS - Medium textured slightly calcareous well drained soils developed on alluvium from shists	This unit, covers around 21,100 ha or 6.0% of the Basin Area, is classified into the typic Xerofluvent or typic Xerochrept by USDA Soil Taxonomy. These soils develop on very gentle sloping from 1 to 5% in the alluvial fans from shists. They are yellowish brown or grayish brown coloured weakly structured sandy loam to silty loam soils which are characterized by deep soil depth. These soils are commonly used for irrigated agriculture if the irrigation water is available.
22) PlG - Coarse-textured non-calcareous somewhat excessively drained soils developed on alluvium from gneiss and granite	This unit, covers around 1,900 ha or 0.5% of the Basin Area, is classified into the Typic Xerosamment by USDA Soil Taxonomy. These soils develop on very gently sloping part of coalescing alluvial fans from gneiss and granite with slopes range between 1 and 5%. They are deep excessively drained non-calcareous sandy soils with medium to low run-off occurring all over the mapping unit except in the lowest part far from stream. They are characterized by dark yellowish brown (10YR 4/4) weekly structured layers of sand and loamy sand to over 20 cm. These soils are commonly used for agriculture.
23) PlL - Medium-textured calcareous well drained soils developed on alluvium from limestone	This unit, covers around 700 ha or 0.2% of the Basin Area, is classified into the calcic or typic Xerochrept by USDA Soil Taxonomy. These soils develop on very gently sloping part of coalescing alluvial fans from limestone with slopes range from 1 to 3%. They are deep well drained loamy soils with medium run-off. They are characterized by 25 cm dark brown (7.5YR 3/2) slightly calcareous subangular-blocky sandy loam, which at 60 cm becomes moderately to strongly calcareous to a depth of 100 cm. These soils are commonly used for agriculture.
24) PlM - Medium-textured calcareous well drained soils developed on alluvium from marl	This unit, covers around 5,700 ha or 1.6% of the Basin Area, is classified into the typic Xerofluvent by USDA Soil Taxonomy. These soils develop on very gentle sloping part of coalescing alluvial fans from marl with slopes range from 1 to 3%. They are deep well drained calcareous loamy soils with medium to slow run-off. They are characterized by 30 cm brown (10YR 4/3) subangular - blocky slightly gravely sandy loam overlying layers of pale brown (10YR 6/3) subangular-blocky slightly gravely sandy loam and loamy sand to a depth of more than 100 cm. These soils are commonly used for agriculture.

Table - D.1 Detailed Information of Soil Units in the Basin Area (7/8)

25) PbM - Medium to fine textured calcareous moderately well to well drained soils developed on alluvium from marl	This unit, covers around 3,700 ha or 1.1% of the Basin Area, is classified into the typic Xerochrept by USDA Soil Taxonomy. These soils develop on almost level part of coalescing alluvial fans from marl with slopes range from 0.5 to 2%. They are deep well drained clay-loam soils with medium to slow run-off. They are characterized by 30 cm dark brown (10YR 3/3) subangular - blocky loam to clay-loam overlying brown (10YR 5/3) calcareous angular-blocky clay-loam, which is weakly mottled below 50 cm. These soils are commonly used for agriculture.
26) PbH - Fine-textured calcareous moderately well drained soils developed on alluvium from chalk	This unit, covers around 600 ha or 0.2% of the Basin Area, is classified into the entic Chromoxerert by USDA Soil Taxonomy. These soils develop on almost flat part of alluvial fans from chalk with slopes range from 0.5 to 2%. They are deep well drained calcareous heavily cracking soils with medium to slow run-off. The surface shows cracks. They are characterized by dark brown compound angular-blocky clay with prominent slickensides and faint iron mottling below 140 cm. These soils are commonly used for agriculture or covered over grassland.
27) BfN - Fine-textured calcareous imperfectly drained soils	This unit, covers around 1,400 ha or 0.4% of the Basin Area, is classified into the fluventic Eutrochrept by USDA Soil Taxonomy. These soils develop on extensive backswamp of alluvial fans from marl with smooth and almost flat surface. They are deep imperfectly drained calcareous medium to fine textured soils with slow run-off. They are characterized by 50 cm very dark grayish brown (10YR 3/2) subangular-blocky silty clay-loam to silty clay overlaying yellowish brown (2.5YR 6/4) strongly calcareous angular-blocky silt clay to a depth of more than 150 cm. These soils are used for agriculture or covered over grassland.
28) BfV - Very fine-textured calcareous imperfectly drained soils self-mulching	This unit, covers around 5,800 ha or 1.7% of the Basin Area, is classified into the entic Pelloxerert by USDA Soil Taxonomy. These soils develop on flat smooth bottom of a former shallow lake, forming an extensive backswamp of alluvial fans from marl. They are deep imperfectly drained calcareous very fine textured heavily cracking and self-mulching soils with very slow run-off. They are characterized by dark gray (10YR 4/1) compound subangular-blocky clay with few fine lime concretions below 17 cm depth becoming coarse angular-blocky. At deeper than 60 cm, many slickensides occur. These soils are used for agriculture or covered over grassland.

Table - D.1 Detailed Information of Soil Units in the Basin Area (8/8)

29) BwI - Medium to fine textured calcareous imperfectly drained soils	This unit, covers around 1,600 ha or 0.5% of the Basin Area, is classified into the typic Haplaquoll by USDA Soil Taxonomy. These soils develop on very gently sloping backswamps of alluvial fans from limestone. They are deep imperfectly drained very calcareous dark coloured medium-textured soils with slow run-off. They are characterized by 20-40 cm black to very dark grayish brown (10YR 3/2) subaugular-blocky loam overlying dark olive gray (5Y 3/2) to olive subangular-blocky yellowish mottled loam. At below 60 cm olive massive yellowish mottled loam with manganese and lime concretions. These soils are used for agriculture or covered over grassland.
30) AyC - Coarse-textured calcareous usually excessively but saline imperfectly drained soils	This unit, covers around 6,200 ha or 1.8% of the Basin Area, is classified into the typic Xeropsamment by USDA Soil Taxonomy. These soils develop to the east of the line Selçuk-Pamukyazi sandy deposits occur in former and present river-courses of the Küçük Menderes. They are deep excessively to imperfectly drained calcareous stratified sandy soils with slow run-off. They are characterized by layers of yellowish brown (10YR 5/4) loamy sand and sand with single grain structure. At 60 cm depth, faint iron mottling exists. The soil is commonly used for irrigated agriculture if the irrigation water source is available.
31) AyB - Medium textured usually calcareous well drained soils	This unit, covers around 24,400 ha or 7.0% of the Basin Area, is classified into the typic Xerofluvent by USDA Soil Taxonomy. The soil develop on flat in the flood plain of the Küçük Menderes River. It is dark brown coloured subaugular-blocky sandy loam to loam soils which are characterized by deep soil depth of over 150 cm. They are characterized by 30 cm dark brown (10YR 4/3) subangular-blocky loam overlaying layers of yellowish brown (10YR 4/3) single grain sandy loam and silt loam to a depth of over 150 cm. The soil is commonly used for irrigated agriculture if the irrigation water source is available.
32) AyA - Medium to fine textured calcareous, saline imperfectly drained soils	This unit, covers around 1,400 ha or 0.4% of the Basin Area, is classified into the aquic Xerochrept by USDA Soil Taxonomy. These soils develop on slight depression within the flood plain of the Küçük Menderes corresponding with backswamps. Backswamps mainly at the base of alluvial fans originating in mountains, consisting of schist and gneiss. They are deep imperfectly drained calcareous clay soils with slow run-off mainly occurring in backswamps. They are characterized by olive brown to dark grayish brown (2.5Y 4/2) subangular-blocky clay with distinct brownish yellow iron mottles which continue to a depth of 150 cm. The soil is commonly used for agriculture.
33) R - Stream beds	This unit covers around 5,000 ha or 01.4% of the Basin Area. This is miscellaneous lands.

Table-D.2 Summary Table of Soil Units in the Basin Area

Physiography		Slope	Texture	Soil Depth	Drainage	Parent Material	Others	USDA Soil Taxonomy
Upland								
	US	Steep	M	Shallow	-	Schists	Rocky	Paralithic Xerorthent, Lithic Xerothent
	UG	Steep	C	Shallow	-	Gneiss & granite	Rocky	Lithic Xerothent
	UL	Steep	F	V. shallow	-	Limestone	Rocky	Lithic Rhodoxeralf, Typic Rhodoxeralf
Marl Hills								
	HrA	Rolling	F	Deep	Well	-	Calcareous	Vertic Haploxeralf, Typic Haploxeralf, Calcic Aquic Palexeralf,Typic Xerother
Colluvial slopes								
	CsL	Sloping	F	Deep	Well	Limestone	Calcareous	Typic Rhodoxeralf, Calcic Xerochrept, Typic Xerothent
Pediment								
	EsS	Sloping	F	M. Deep to shallow	Well	Schists	Non-calcareous	Typic Rhodoxeralf, Lithic Mollic Haploxeralf
	EmW	Gently sloping	F	Deep to m. deep	Well	Limestone	Calcareous	Typic Rendoll, Typic Xerochrept, Entic Chromoxerert
Terraces								
	TlB	Level	M	Deep	Well	-	Calcareous	Typic Xerochrept
	TbB	Level	M	Deep	Well	-	Calcareous	Typic Xerofluvent
Old dissetected alluvial fans								
	DsS	Sloping to gently sloping	M	Deep	Well	Schists	Stony & gravelly, non-calcareous	Typic Xerochrept, Typic Rhodoxeralf
	DsG	Sloping to gently sloping	M to C	Deep	Well	Gneiss & granite	Stony & gravelly, non-calcareous	Typic Haploxeralf, Typic Xerochrept
	DsM	Sloping to gently sloping	M to F	Deep	Well	Marl	Stony & gravelly, calcareous	Typic Haploxeralf, Typic Rhodoxeralf, Typic Xerochrept
Young dissetected alluvial fans								
	PsS	Sloping to gently sloping	C	Deep	Excessively	Schists	Stony & gravelly, non-calcareous	Typic Xeropsamment, Typic Xerofluvent
	PsG	Sloping to gently sloping	C	Deep	Excessively	Gneiss & granite	Stony & gravelly, non-calcareous	Typic Xeropsamment
	PsL	Sloping to gently sloping	M	Shallow	Well	Limestone	Stony & gravelly, calcareous	Lithic Xerorthent, Calcic Xerochrept
	PmS	Gently sloping	C to M	Deep	Excessively	Schists	Cobby & gravelly, non-calcareous	Typic Xeropsamment, Typic Xerofluvent, Typic Xerochrept
	PmG	Gently sloping	C	Deep	Excessively	Gneiss & granite	Cobby & gravelly, non-calcareous	Typic Xeropsamment
	PmL	Gently sloping	M to C	Deep	Excessively	Limestone	Cobby & gravelly, calcareous	Calcic Xerochrept, Typic Xerochrept
	PlS	Very gently sloping	M	Deep	Well	Schists	Non-gravelly, non-calcareous	Typic Xerofluvent, Typic Xerochrept
	PlG	Very gently sloping	C	Deep	Excessively	Gneiss & granite	Non-gravelly, non-calcareous	Typic Xeropsamment, Typic Xerofluvent
	PlL	Very gently sloping	M	Deep	Well	Limestone	Non-gravelly, calcareous	Calcic Xerochrept, Typic Xerochrept
	PlM	Very gently sloping	M	Deep	Well	Marl	Non-gravelly, calcareous	Typic Xerofluvent, Typic Xerochrept
	PbM	Level	M to F	Deep	Moderately	Marl	Non-gravelly, calcareous	Typic Xerochrept, Vertic Xerochrept, Aquic Xerfluvent, Typic Xerofluvent
	PbH	Level	F	Deep	Moderately	Chalk	Non-gravelly, calcareous	Entic Chromoxerert, Entic Pelloxerert
Basins								
	BfN	Level	F	Deep	Imperfectly	Marl	Calcareous	Fluventic Eutrochrept
	BfV	Level	V.F	Deep	Imperfectly	Marl	Calcareous	Entic Pelloxerert
	Bwl	Level	M to F	Deep	Imperfectly	Limestone	Calcareous	Typic Haplaquoll, Thapto Histic Haplaquoll, Cumulic Vertic Haplaquoll
Young alluvial plains								
	AvC	Flat	C	Deep	Excessively	-	Calcareous	Typic Xeropsamment
	AvB	Flat	M	Deep	Well	-	Calcareous	Typic Xerofluvent
	AvA	Flat	M to F	Deep	Imperfectly	-	Calcareous	Aquic Xerochrept, Aeric Haplaquent
Marin Beach								
	SeC	Undulating	C to M	-	Excessively	-	Calcareous	Typic Xeropsamment, Psammentic Haplaquoll
Streambeds								
	R	-	-	-	-	-	-	-

Table-D.3 Definition of Irrigation Suitability

Irrigation Suitability		Definition
Class I:	Irrigable	Lands are highly suitable for irrigation farming, being capable of producing sustained and relatively high yields in a wide range of climatically suited crops at reasonable cost.
Class II:	Irrigable	Lands are moderately suitable for irrigation farming, being measurably lower than Class I in productive capacity, adapted to a somewhat narrower range of crops, more expensive to prepare the land for irrigation or more costly to farm.
Class III:	Irrigable	Lands are marginally suitable for irrigation farming, being of distinctly restricted suitability because of more extreme deficiencies in the soil, topographic or drainage characteristics than described for Class II.
Class IV:	Irrigable for Special Crops	Lands are suitable for irrigation farming to only a very limited range of crops such as rice or fodder crops. The irrigation suitability is evaluated for various crops in this Study. This class is, therefore, not included in this Study.
Class V	Provisionally non-irrigable	Land are temporarily not suitable for irrigation farming due to specific limitations in soils, topography or drainage condition. The lands in this class is necessary to be improved for the use of irrigated agriculture.
Class VI:	Non-irrigable	Lands are not suitable for irrigation farming due to excessive severe limitations in soils, topography or drainage condition. The class is non-arable under the existing or projected economic condition.

Table-D.4 Specifications for Irrigation Suitability

Land Characteristics	Class I	Class II	Class III	Class IV	Class V	Class VI
Soil Texture	Medium to Fine	Medium	Coarse	-	-	-
Drainage	Well to moderately	Imperfectly	Excessively	-	-	-
Slope	Flat or Level	Very gently sloping	Gently sloping	-	Slopping	Steep Slopping
Soil Depth	Deep	Middle deep	-	-	Somewhat Shallow	Shallow
Erosion Hazard	Severely eroded soils will be reduced one class.					
Soil Fertility	High	Moderate	Imperfect	-	Poor	-
Water Holding Capacity	High	Medium	Low	-	-	-
Rock Content	No stones	0-2% stones	2-10% stones	-	>10% stones	-

Table-D.5 Result of Irrigation Suitability Classification

Physiography		Suit. Class	Area (ha)	Remarks
Upland				
	US	VI	144,900	Steep slope, Shallow Soil Depth, High rock content
	UG	VI	13,400	Steep slope, Shallow Soil Depth, High rock content
	UL	VI	47,500	Steep slope, Shallow Soil Depth, High rock content
Marl Hills				
	Hhb	VI	4,300	Hilly, shallow soil depth
	HrA	V	1,000	Rolling, High carbonate content
Colluvial slopes				
	CsL	V	1,800	Sloping
Pediment				
	EsS	V	1,200	Sloping
	EmW	V	1,000	Gently sloping, High carbonate content
Terraces				
	TlB	III	1,500	Rolling
	TbB	I	500	
Old dissetected alluvial fans				
	DsS	V	7,500	Sloping, Rock content
	DsG	V	3,900	Sloping, Rock content
	DsM	V	3,800	Sloping, Rock content
Young dissetected alluvial fans				
	PsS	VI	3,900	Sloping, High rock content, Coarse texture
	PsG	VI	900	Sloping, High rock content, Coarse texture
	PsL	VI	1,800	Sloping, High rock content, Coarse texture
	PmS	III	26,200	Coarse texture, low water holding capacity
	PmG	III	3,900	Coarse texture, low water holding capacity
	PmL	III	2,800	Coarse texture, low water holding capacity
	PlS	II	20,600	Gently sloping
	PlG	III	1,900	Coarse texture, low water holding capacity
	PlL	II	700	Gently sloping
	PlM	II	5,500	Gently sloping
	PbM	I	3,600	
	PbH	III	600	Flood
Basins				
	BfN	II	1,400	Imperfect drain
	BfV	III	5,700	Imperfect drain, Low fertility
	BwI	III	1,600	Imperfect drain, Low fertility
Young alluvial plains				
	AyC	III	6,100	Coarse texture, low water holding capacity
	AyB	I	24,000	
	AyA	III	1,400	Imperfect drain, Low fertility
Streambeds				
	R	VI	1,900	-
Built-up Area		-	5,000	-
Total			351,800	

Table - D.6 Summary Table of Irrigation Suitability Classification in the Basin Area

Suitability Class	Area (ha)	Proportion(%)
Class I	28,100	8
Class II	28,200	8
Class III	51,700	15
Class IV	-	-
Class V-VI	238,000	68
Built-up Area	5,000	1
Total	351,000	100

Table - D.7 Definition of Land Use Category in the Basin Area

Land Use Category	Definition	Remarks
Annual crops	Area cultivated with field crops and vegetables	The area includes fallow land.
Tree crop yard	Area cultivated with tree crops under irrigation or rainfed condition	-
Pasture and grassland	Area covered with grasses for grazing livestock	-
Bushes	Area covered with scrubs	-
Forest	Area covered with forest	-
Urban and village yards	-	Small isolated houses are not included
Others	Rivers, seasonal streams, major road, etc.	-

Table - D.8 Present Land Use in the Basin Area

Land Use Category	Area (ha)	Proportion (%)
Agricultural land		
- Annual crops	129,600	37
- Tree crops	57,400	16
Pasture and grassland	23,400	7
Bushes	82,200	23
Forest	48,300	14
Urban and village yards	5,000	1
Others	5,100	1
Total	351,000	100

Table - D.9 Potential of Land Resource in the Basin Area

Suitability	Area (ha)	Proportion
Potential Area		
- Class I (highly suitable)	27,500	8
- Class II (moderately suitable)	27,700	8
- Class III (marginally suitable)	47,900	14
Sub-total	103,100	30
Excluded Area from Class I to III	4,900	1
Class IV (not suitable)	238,000	68
Built-up Area	5,000	1
Total	351,000	100

Table - D.10 Representative Soil Profile (1/6)

Typic Xerochrept

Physiographic position : flat river terrace
Relief : normal
Slope : level
Parent material : gravelly calcareous clay-loam
Stoniness : no stones
Erosion : none

Drainage : moderately well drained,
Moistness : dry surface soil, moist subsoil
Root development : few fine roots down to 1.70 m
Landuse and vegetation : arable, fallow

Ap	0 – 20 cm	brown (10YR 5/3) when moist, yellowish brown (10YR 5/4) when dry; sandy loam; moderate medium subangular-blocky; many large, abundant fine biopores; slightly hard, friable, slightly sticky and non-plastic; abrupt and smooth boundary.
B21	20 – 70 cm	yellowish brown (10YR 5/4) when moist; yellowish brown (10YR 5/6) when dry; silty clay-loam; moderate coarse compound prismatic breaking into moderate fine angular-blocky; many large, abundant fine biopores; hard, friable, sticky and plastic; common faint fine yellowish red (5YR 5/8) Fe mottles; Mn concretions; 50% cutans; clear and wavy boundary.
B22	50 – 125 cm	yellowish brown (10YR 5/4) when moist; clay-loam; moderate coarse angular-blocky; few large, common fine biopores; friable, sticky and plastic; common distinct fine yellowish red (5YR 5/8) Fe mottles; Mn concretions; 60% cutans; calcareous with lime concretions; clear and wavy boundary.
IIC	125 – 150 cm+	Yellowish brown (10YR 5/4) moist silty clay; no macrostructure (massive); few large and fine biopores; friable, sticky and plastic; many distinct medium yellowish brown (5YR 5/8) Fe mottles; Mn concretions; very calcareous, much fine gravel.

Table - D.10 Representative Soil Profile (2/6)

Typic Xerochrept (1/2)

Physiographic position : alluvial fan
Relief : normal
Slope : sloping (9%)
Parent material : sandy alluvium derived from schist
Stoniness : no stones
Erosion : few to many deep gullies

Drainage : somewhat excessively drained
Moistness : dry
Salinity : saltfree
Root development : common large roots throughout profile
Landuse and vegetation : not irrigated, olive trees with intercropped wheat

Ap 0 - 18 cm dark yellowish grown (10YR 4/4) when moist, yellowish brown (10YR 5/4) when dry; gravelly sandy loam; moderate medium and fine subangular-blocky; few very fine and moderate fine biopores; slightly hard, slightly sticky and slightly plastic; abrupt and smooth boundary.

B2 18-42 cm brown to dark brown (7.5YR 4/4) when moist, dark yellowish brown (10YR 4/4) when dry; gravelly sandy loam; strong medium and coarse subangular-blocky; few moderate fine and moderate large biopores; hard, slightly sticky and slightly plastic; few clay-cutans; clear and smooth boundary.

B3 42-71 cm dark yellowish brown (10YR 3.5/4) when moist, yellowish brown (10YR 5/8) when dry; gravelly sandy loam; moderate medium and coarse subangular-blocky; common very fine, few moderate fine and common moderate large biopores; hard, slightly sticky and non-plastic; few clay-cutans; clear and smooth boundary.

C 71-150 cm dark yellowish brown (10YR 4/4) when moist, yellowish brown (10YR 5/6) when dry; gravelly sand; very weak medium subangular-blocky; few very fine and moderate fine biopores; soft, non-sticky and non-plastic; few clay-cutans.

Particle-size distribution, organic C, and pH values.

	Depth (cm)	Particle-size in µm					Org. C (%)	pH	
		>2000	2000-500	500-50	50-2	<2		H_2O	$CaCl_2$
Ap	0-18	16.2	28.5	46.7	15.6	9.6	0.9	6.0	5.6
B2	18-42	10.2	53.3	24.7	14.8	17.3	0.5	6.3	5.7
B3	42-71	19.3	16.9	56.5	14.4	12.2	0.5	6.4	5.7
C	71-120	25.8	22.2	60.5	10.1	7.2	0.2	6.3	5.6

Table - D.10 Representative Soil Profile (3/6)

Typic Xerochrept (2/2)

Exchangeable bases and CEC values.

	Depth (cm)	Exchangeable bases				CEC soil
		Ca	Mg	Na	K	
Ap	0-18	5.5	3.9	0.7	1.4	5.9
B2	18-42	10.0	4.2	0.3	0.4	11.5
B3	42-71	7.4	4.0	0.3	0.3	9.2
C	71-120	3.9	1.5	0.1	0.1	4.6

Chemical composition of fractions <2 mm and <2 μm (weight %)

	Depth (cm)	SiO_2	Al_2O_3	Fe_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	TiO_2	P_2O_5	H_2O	Li_2O
Ap	0-18	65.0	15.0	6.0	0.5	0.1	1.9	1.6	3.3	2.2	1.2	0.2	3.6	-
		41.4	23.6	15.0	0.4	0.1	3.5	0.1	0.2	3.5	0.8	0.5	9.7	-
B2	18-42	64.2	16.1	7.2	0.7	0.1	1.9	1.6	2.4	1.8	1.2	0.2	3.8	-
		41.6	24.0	15.2	0.3	0.1	3.1	-	0.2	2.9	0.8	0.5	9.8	-
B3	42-71	65.1	15.3	6.3	1.0	0.1	1.9	1.7	2.8	1.9	1.3	0.2	3.3	-
		42.2	24.2	15.0	0.3	0.1	3.0	0.1	0.2	2.9	0.8	0.4	10.0	-
C	71-120	68.2	15.4	5.4	1.2	0.1	1.4	1.7	3.3	1.7	1.0	0.2	2.4	-
		41.6	23.5	14.9	0.3	0.1	3.0	0.1	0.2	2.9	0.7	0.4	10.5	-

Table - D.10 Representative Soil Profile (4/6)

Typic Xeropsamment

Physiographic position : alluvial plain
Relief : flat
Slope : nearly level
Parent material : sand/loam sediments of micaschist origin
Stoniness : no stones
Erosion : none

Drainage : well drained
Moistness : moist
Salinity : saltfree
Root development : few fine roots down to 70 cm, large few roots down to 1.25 m
Landuse and vegetation : not irrigated, maize

Ap	0 – 16 cm	yellowish brown (10YR 5/4) moist sandy loam; single grain; loose, non-sticky and non-plastic; abrupt and smooth boundary.
C1	16 – 25 cm	yellowish brown (10YR 5/5) moist fine sand; single grain; loose, non-sticky and non-plastic; abrupt and smooth boundary.
C2	25 – 39 cm	light yellowish brown to yellowish brown (10YR 5.5/4) moist sandy loam; single grain; loose, non-sticky and non-plastic;abrupt and smooth boundary.
C3	39 – 41 cm	yellowish brown (10YR 5/5) moist fine sand; single grain; loose, non-sticky and non-plastic; abrupt and smooth boundary.
C4	41 - 50 cm	yellowish brown to brownish yellow (10YR 5.5/6) moist sandy loam; single grain; loose, non-sticky and non-plastic; abrupt and smooth boundary.
C5	50 – 56 cm	yellowish brown (10YR 5/5) moist fine sand; single grain; loose, non-sticky and non-plastic; abrupt and smooth boundary.
C6	56 – 62 cm	yellowish brown to brownish yellow (10YR 5.5/6) moist medium sand; single grain; loose, non-sticky and non-plastic; abrupt and smooth boundary.
C7	62 - 77 cm	dark brown to brown (10YR 4/3) miost loam; massive; loose, non-sticky and non-plastic; few distinct medium and fine irregular yellowish-red (5YR 5/8) Fe mottles; abrupt and smooth boundary.
C8	77 - 100 cm+	dark yellowish brown (10YR 4/4) moist coist coatse sand; single grain; loose, non-sticky and non-plastic; few very thin lamellae of loam (1cm).

Table - D.10 Representative Soil Profile (5/6)

Typic Xerofluvent

Physiographic position : river plain

Relief : flat

Slope : level

Parent material : loamy deposits of Kucuk Menderes River

Stoniness : no stones

Erosion : none

Drainage : well drained

Moistness : dry surface soil, moist subsoil

Salinity : saltfree

Root development : few fine roots down to 20 cm, few krotovinas

Landuse and vegetation : irrigated, cotton

Ap	0 – 20 cm	dark brown (10YR 4/3) when moist, yellowish brown (10YR 5/4) when dry; loam; weak fine subangular-blocky; few large, few very fine biopores; very friable, slightly sticky and slightly plastic; clear andsmooth boundary.
C1	20 – 30 cm	dark brown (10YR 4/3) moist loam; moderate medium subangular-blocky; few large and very fine biopores; friable, slightly sticky and slightly plastic; clear and smooth boundary.
C2	30– 42 cm	yellowish brown (10YR 5/4) moist sandy loam; single grain; few large, common fine biopores; loose, slightly sticky and slightly plastic; at 42 cm sand-layer of 1 cm; abrupt and smooth boundary.
C3	42 – 62 cm	dark brown (10YR 4/3) moist silt loam; moderate coarse subangular-blocky; common large, many fine, and very fine biopores; friable, sticky and plastic; few faint fine irregular strong brown (7.5YR 5/6) Fe mottles; gradual and smooth boundary.
C4	62 – 120 cm	yellowish brown (10YR 5/6) moist sandy loam; weak medium subangular-blocky; many large, abundant fine and very fine biopores; very friable, sticky and plastic; common faint fine mainly strong-brown (7.5YR 5/6) Fe mottles abrupt and smooth boundary.
C5	120 – 130 cm	yellowish brown (10YR 5/4) moist loamy sand; single grain; few large and very fine biopores; loose, non-sticky and non-plastic; common faint fine mainly very dark grayisch brown (10YR 3/2) Fe mottles; abrupt and smooth boundary.
C6	130 – 160 cm+	dark yellowish brown (10YR 4/3) moist silt loam; moderate medium subangular-blocky; many large and fine, abundant very fine biopores; friable, slightly sticky and slightly plastic; few soft fine white CaCO3 concrcions; many distine tfine mainly strong brown (7.5YR 5/6) Fe mottles.

Particle-size distribution, organic C, $CaCO_3$ and pH values.

	Depth (cm)	Particle-size in µm					Org. C (%)	$CaCo_3$ (%)	pH	
		>2000	2000-500	500-50	50-2	<2			H_2O	$CaCl_2$
Ap	0-20	-	47.1		39.9	9.5	0.6	-	7.1	7.0
C1	20-30		49.2		38.1	7.9	0.5	-	7.3	7.2
C3	40-62	-	27.2		83.3	12.1	0.5	3.5	8.0	7.2
C5	120-150	-	82.8		14.6	2.9	0.2	-	7.8	7.7

Table - D.10 Representative Soil Profile (6/6)

Aquic Xerochrept

Physiographic position : backswamp of river plain
Relief : subnormal
Slope : level
Parent material : clayey deposits of Kucuk Menderes River
Stoniness : no stones
Erosion : none

Drainage : imperfectly drained
Moistness : dry surface soil, moist subsoil
Salinity : slightly affected
Root development : few fine roots troughout profile, mainly at 30 cm depth
Landuse and vegetation :used by tile factory

A1	0 – 9 cm	dark grayish brown (2.5Y 4/2) when moist, grayish brown (2.5Y 5/2) when dry; silt-loam; moderate medium subangular-blocky; common fine biopores; hard, slightly sticky and slightly plastic; calcareous; abrupt and wavy boundary.
B1	9 – 47 cm	dark grayish brown (2.5Y 4/2) moist silty clay-loam; moderate medium subangular-blocky; few large, common fine biopores; friable, slightly sticky and slightly plastic; calcareous; gradual and smooth boundary.
B2	47 – 72 cm	olive brown (2.5Y 4/4) moist silty clay-loam; moderate coarse to medium subangular-blocky; many large and fine biopores; friable, sticky and plastic; common faint fine brownish yellow (10YR 6/6) Fe mottles; clear and smooth boundary.
C1	72 – 96 cm	dark grayish brown (2.5Y 4/2) moist clay-loam; weak medium subangular-blocky; common large, many fine biopores; friable, sticky and plastic; common very faint fine brownish yellow (10YR 5/6) Fe mottles; clear and smooth boundary.
C2	96 – 150 cm+	olive brown (2.5Y 4/4) moist silt-loam; massive; common large, many fine biopores; very friable, slightly sticky and slightly plastic; common faint fine browish yellow (10YR 5/6) and faint fine grayish brown (10YR 5/2) Fe mottles.

Particle-size distribution, organic C, $CaCo_3$ and pH values.

	Depth (cm)	Particle-size in µm					Org. C (%)	$CaCo_3$ (%)	pH	
		>2000	2000-500	500-50	50-2	<2			H_2O	$CaCl_2$
A1	0-9	0.5	2.3	24.9	46.0	26.8	2.4	3.6	7.1	6.7
B1	9-47	0.3	2.0	22.1	45.1	30.8	0.7	5.4	8.4	7.3
B2	47-72	0.3	2.4	39.6	38.3	19.7	0.2	5.4	8.2	7.4
C1	72-96	0.7	3.9	30.9	41.9	23.3	0.2	6.2	8.3	7.5
C2	96-150	2.0	3.6	24.5	49.3	22.6	0.2	10.4	8.3	7.5

Table - D.11 Soil Classification based on US Soil Taxonomy in the Project Area

Soil Classification by US Soil Taxonomy	Slope	Texture of Top Soil	Soil Color of Top Soil	Soil Depth	Drainage	Salinity	Parent Material	Others
Entisols								
Typic Xeropsamment	Flat	Loamy Sand to Sandy	Yellowish brown	Deep	Excessively	Saltfree	-	Calcareous, flooding
Typic Xerofluvent	Flat	Loamy	Dark brown	Deep	Well	Saltfree	-	Calcareous
Lithic Xerorthent	Steep	Sandy	Brown	Very Shallow	Excessively	Saltfree	Gneiss & granite	Rocky
Inceptisols								
Aquic Xerochrept	Flat	Siltloam to Silty	Dark grayish brown	Deep	Imperfectly	Slightly Affected	-	Calcareous
Typic Xerochrept	Gently Sloping	Loamy Sand	Dark yellowish brown	Deep	Excessively	Saltfree	Schists	Gravelly, non-calcareous
Typic Xerochrept	Nearly level	Sandy Loam	Yellowish brown	Deep	Moderately well	Saltfree	Schists	Gravelly, non-calcareous

Table-D.12 Soil Classification in the Project Area

Soil Classification	Area (ha)	Proportion(%)
Aquic Xerochrept	1,400	7
Typic Xerofluvent	12,100	63
Typic Xeropsamment	1,500	7
Typic Xerochrept	3,000	15
Lithic Xerorthent	600	3
Village yards and Road	600	3
Riverbed	400	2
Total	19,600	100

Table-D.13 Irrigation Suitability Classification under the Present Condition

Suitability Class	Area (ha)	Proportion(%)
Class I	12,100	62
Class II	2,600	13
Class III	400	2
Class IV	-	-
Class V	2,900	15
Class VI	600	3
Village yards and Road	600	3
Riverbed	400	2
Total	19,600	100

Table-D.14 Irrigation Suitability Classification under the "With Project" Condition

Suitability Class	Area (ha)	Proportion(%)
Class I	13,400	68
Class II	4,000	20
Class III	600	3
Class IV	-	-
Class V	-	-
Class VI	600	3
Village yards and Road	600	3
Riverbed	400	2
Total	19,600	100

Table - D.15 Definition of Land Use Category in the Project Area

Land Use Category	Definition	Remarks
Annual crops	Area cultivated with field crops and vegetables	The area includes fallow land.
Tree crop yards	Area cultivated with tree crops under irrigation or rainfed condition	-
Pasture and grasslands	Area covered with grasses for grazing livestock	-
Urban and village yards	-	Small isolated houses are not included
Roads	All roads including the right of way	Footpath in the field is not included
Riverbeds	Riverbeds and seasonal streams	-

Table - D.16 Present Land Use in the Project Area

Land Use Category	Area (ha)	Proportion (%)
Agricultural land		
- Annual crops	14,900	75
- Tree crops	3,100	16
Pasture and grasslands	600	3
Village yards	300	2
Roads	300	2
Riverbeds	400	2
Total	19,600	100