Table 2.2 DAILY MEAN, MEAN MINIMUM AND MEAN MAXIMUM TEMPERATURE (1/3)

Unit : Degree Centigrade

Station No.	Station Name	Temp.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
0104	Dadeldhura	mean	7.80	9.40	12.80	17.60	20.70	26.60	20.00	19.90	19.20	16.40	12.70	10.00
		min.	3.90	4.60	8.30	12.70	15.50	17.20	16.90	16.80	15.60	12.20	8.30	5.90
		max.	11.40	13.20	17.40	22.60	26.20	26.20	23.20	23.10	22.70	20.60	16.80	14.00
0303	Jumla	mean	3.80	4.70	8.40	12.60	15.60	19.00	19.70	19.80	17.50	12.90	8.10	5.00
		min.	-4.80	-3.80	-3.80	-0.60	3.40	7.00	12.80	15.10	15.40	11.40	4.40	-1.90
		max.	12.50	13.20	17.40	21.70	24.20	25.20	24.40	24.20	23.50	21.30	18.10	14.90
0406	Surkhet (Mahendra Nagar)	mean	11.50	14.10	18.80	24.50	27.40	27.70	26.50	26.60	25.20	21.90	16.60	12.30
		min.	3.60	6.70	10.10	15.80	20.00	22.60	22.70	22.60	20.90	15.60	8.60	4.00
		max.	19.50	22.00	27.40	33.30	34.90	32.70	30.20	30.60	29.60	29.30	24.70	20.50
0409	Khajura (Nepalgunj)	mean	14.40	16.70	21.60	27.10	30.10	30.60	29.00	28.80	27.90	25.30	20.00	15.90
		min.	6.40	8.10	12.00	17.50	22.90	25.00	25.30	25.10	24.10	19.60	12.20	7.70
		max.	22.40	25.40	31.30	36.60	37.40	36.00	32.70	32.30	31.70	31.00	27.70	24.10
0601	Jomsom	mean	4.50	5.80	8.80	12.00	15.10	18.60	19.40	18.90	17.10	11.90	8.20	5.50
		min.	-2.60	-1.20	1.50	4.30	7.20	12.50	13.80	13.40	11.10	4.70	1.10	7.70
		max.	11.50	12.70	16.00	19.70	23.00	24.70	25.00	24.40	23.10	19.00	15.50	15.00
0703	Butwal	mean	17.74	19.50	24.27	29.10	30.78	29.94	28.42	28.43	27.73	25.76	22.00	18.24
		min.	12.37	13.45	17.90	22.66	24.92	25.40	25.04	25.03	23.96	21.12	16.77	12.94
		max.	23.13	25.55	30.58	35.51	36.39	34.31	31.83	31.82	31.49	30.41	27.23	23.61
0705	Bhairahawa	mean	14.84	16.40	22.36	27.80	29.82	29.40	28.74	28.74	27.62	2.59	20.98	15.86
		min.	7.52	9.55	13.62	19.80	23.38	23.98	24.97	25.10	23.77	20.65	13.32	8.07
		max.	22.20	24.70	31.17	36.15	36.55	34.55	32.42	32.47	31.57	31.02	28.20	23.42

Table 2.2 DAILY MEAN, MEAN MINIMUM AND MEAN MAXIMUM TEMPERATURE (2/3)

Unit : Degree Centigrade

Station No.	Station Name	Temp.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
0804	Pokhara Airport	mean	13.04	15.14	19.91	23.23	24.34	25.16	25.34	25.42	24.30	21.46	17.33	13.92
		min.	7.35	8.99	12.76	16.32	18.54	20.68	21.53	21.68	20.53	16.69	11.47	7.94
		max.	18.72	21.29	26.03	30.15	30.17	29.64	29.16	29.16	28.38	26.23	23.19	19.89
0809	Gorakha	mean	12.62	14.86	19.48	23.26	24.23	24.41	23.72	23.51	22.76	20.06	16.84	13.59
		min.	7.56	9.26	13.75	17.61	18.97	20.03	20.14	19.81	18.91	15.90	11.64	8.45
		max.	17.68	20.46	25.20	28.91	29.54	28.84	27.30	27.22	26.77	25.37	22.20	8.73
0902	Rampur	mean	15.54	17.54	22.16	26.83	29.00	28.71	28.38	28.33	27.21	24.98	19.01	15.86
		min.	8.80	9.86	12.77	18.34	21.95	25.30	24.57	24.19	23.03	18.56	11.24	8.08
		max.	22.27	25.21	31.34	35.33	36.05	33.83	32.13	32.39	31.55	29.14	26.78	23.65
0911	Parwanipur	mean	16.05	18.18	23.24	27.69	30.33	29.68	29.35	28.81	28.42	26.14	21.41	17.13
		min.	8.73	10.50	15.10	19.21	23.49	24.76	25.40	24.66	24.17	20.36	13.98	9.12
		max.	23.49	25.81	31.53	36.29	37.13	34.59	33.30	33.96	32.33	31.93	28.84	25.14
1030	Kathmandu Airport	mean	9.44	11.16	15.53	19.16	21.55	22.95	23.38	23.29	21.95	18.96	14.04	10.22
		min.	2.24	3.28	7.43	11.60	15.46	18.74	19.83	19.56	18.00	13.31	6.88	2.15
		max.	16.64	19.04	23.63	26.71	27.64	27.16	26.93	27.03	25.96	24.61	21.21	18.29
1103	Jiri	mean	6.07	7.96	11.53	15.60	17.21	19.44	19.71	19.63	18.49	15.05	10.23	7.21
		min.	-0.51	0.79	4.34	8.43	12.08	16.09	16.89	16.58	15.03	9.99	4.06	0.49
		max.	13.36	15.19	18.99	21.84	22.42	22.79	22.60	22.69	21.91	20.00	16.36	14.29
1111	Janakpur Airport	mean	15.31	17.49	22.97	28.12	29.62	29.39	28.64	27.99	27.21	25.76	21.46	16.40
		min.	7.93	9.84	14.46	21.44	24.36	25.30	24.93	24.00	22.83	20.69	14.67	8.66
		max.	22.68	25.14	31.49	34.80	34.99	33.49	32.36	31.97	31.59	30.54	28.24	24.12

Table 2.2 DAILY MEAN, MEAN MINIMUM AND MEAN MAXIMUM TEMPERATURE (3/3)

Unit : Degree Centigrade

Station No.	Station Name	Temp.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1201	Namche Bazaar	mean	1.13	0.36	3.20	6.11	8.39	10.63	11.77	11.86	10.43	6.56	2.96	1.13
		min.	-7.24	-5.59	-2.50	0.40	2.91	5.94	7.69	7.60	6.00	1.44	-2.65	-5.08
		max.	6.99	6.30	8.90	11.81	13.73	15.20	15.90	16.24	14.91	11.83	8.80	7.34
1206	Okhaldhunga	mean	9.26	10.99	14.93	18.09	19.33	20.61	20.39	20.59	19.40	17.52	13.85	11.04
		min.	4.58	6.13	9.93	13.44	14.86	16.85	17.19	16.86	15.82	13.17	9.09	6.07
		max.	13.95	15.85	19.93	22.83	23.81	24.47	23.59	24.33	22.98	21.87	18.60	16.01
1303	Chainpur (East)	mean	13.14	15.05	19.46	22.06	22.70	23.90	23.71	23.60	22.37	18.97	17.58	13.98
		min.	8.70	10.10	13.13	16.15	17.70	19.59	19.98	19.99	18.77	16.39	12.80	9.83
		max.	17.55	19.84	23.96	25.75	28.35	28.16	27.63	27.18	26.35	25.26	22.25	18.49
1307	Dhankuta	mean	11.39	13.72	17.39	21.16	21.81	22.43	27.77	23.10	21.54	20.35	16.28	13.21
		min.	7.25	9.60	13.18	16.80	17.98	19.46	20.02	19.74	18.36	16.55	11.93	9.28
		max.	15.53	17.84	22.00	25.52	25.64	25.52	25.64	26.46	24.72	24.15	20.63	17.15
1319	Biratnagar	mean	16.07	16.02	23.13	22.16	27.76	28.64	27.75	27.93	26.98	25.61	20.66	16.32
		min.	8.85	10.23	14.92	20.52	22.62	24.92	23.95	23.97	22.95	20.13	12.70	7.72
		max.	23.28	25.80	31.35	33.80	32.90	32.37	31.55	31.90	31.00	31.08	28.62	24.87
1401	Olangchung Gola	mean	0.53	0.78	3.50	6.72	8.72	11.66	12.61	12.38	11.21	8.04	4.64	3.26
		min.	-4.75	-4.31	-1.51	1.76	4.25	7.86	8.90	8.74	7.38	2.89	-0.06	-1.56
		max.	5.80	5.88	8.51	11.68	13.31	15.53	16.43	16.11	15.24	13.13	9.35	8.08
1411	Soktim Tea Estate	mean	17.23	18.07	21.68	29.32	25.59	26.25	25.18	26.35	25.33	23.60	21.30	17.44
		min.	12.42	12.97	16.72	20.23	21.13	22.45	22.94	22.94	21.76	19.34	16.03	12.15
		max.	27.03	23.17	26.63	28.51	30.04	29.56	27.48	29.63	28.77	27.76	26.64	22.73

Table 2.3 MEAN DAILY TEMPERATURE RANGE AT SELECTED ELEVATIONS

Unit: Degree Centigrade

MONTH		ELAVATION (M, AMSL)				
		200	1000	2000	3000	4000
JANUARY	max	22.4	18.3	13.0	7.8	2.6
	min	9.5	6.1	1.8	-4.5	-12.3
FEBRUARY	max	25.2	20.4	14.5	8.6	2.7
	min	11.2	7.5	3.1	-2.2	-10.0
MARCH	max	30.8	25.2	18.2	11.2	4.3
	min	15.3	11.4	6.6	1.8	-5.0
APRIL	max	34.2	28.7	21.8	14.9	8.0
	min	20.9	16.1	10.1	4.1	-2.4
MAY	max	35.1	29.8	23.2	16.6	9.9
	min	23.3	18.5	12.4	6.4	0.3
JUNE	max	33.5	29.1	23.6	18.1	12.6
	min	24.6	20.3	15.1	9.8	4.5
JULY	max	36.1	27.8	23.1	18.3	13.6
	min	24.7	20.7	15.8	10.9	5.9
AUGUST	max	31.9	28.1	23.3	18.5	13.8
	min	24.4	20.5	15.5	10.5	5.6
SEPTEMBER	max	31.7	27.8	22.9	18.1	13.3
	min	23.3	19.3	14.2	9.2	4.1
OCTOBER	max	30.6	26.1	20.6	15.1	9.5
	min	20.3	15.9	10.3	4.7	-1.6
NOVEMBER	max	27.7	23.0	17.2	11.4	5.6
	min	14.3	10.6	6.0	1.4	-5.3
DECEMBER	max	23.6	19.5	14.3	9.1	4.0
	min	9.8	6.8	3.0	-1.6	-9.4

Table 2.4 RELATIVE HUMIDITY AT DIFFERENT STATIONS

UNIT : %

STA. NO.	NAME OF STATION	TIME	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0402	DAILEKH	8:40	80	76	64	54	65	80	89	93	92	82	80	78
		17:40	81	72	60	48	58	70	86	87	86	81	77	80
0406	SURKHET	8:40	95	89	79	71	75	80	89	91	88	90	89	89
	(MAHENDRA NAGAR)	17:40	70	56	39	27	32	56	77	80	79	74	72	76
0601	JOMSOM	8:40	78	62	52	49	52	67	76	80	74	66	66	72
		17:40	58	59	57	55	66	70	70	67	70	67	65	58
0703	BUTWAL	8:40	66	60	45	39	47	70	79	82	78	66	58	62
		17:40	65	51	33	30	35	61	77	78	77	73	66	69
0803	POKHARA HOSPITAL	8:40	75	67	57	54	64	82	87	87	84	73	71	73
		17:40	60	49	43	48	59	75	79	78	80	76	70	65
0809	GORKHA	8:40	74	65	55	54	69	87	93	94	92	84	75	75
		17:40	66	55	45	44	57	75	82	83	83	76	62	69
0902	RAMPUR	8:40	93	89	71	56	62	80	83	86	87	86	90	95
		17:40	69	59	49	40	50	72	83	82	79	78	68	69
0911	PARWANIPUR	8:40	83	78	65	60	63	79	84	85	84	80	76	81
		17:40	67	60	54	47	52	70	79	81	77	74	60	59
1030	KATHMANDU AIRPORT	8:40	94	88	78	67	70	80	84	85	87	89	90	94
		17:40	64	51	43	44	55	72	80	81	80	75	72	65
1103	JIRI	8:40	78	72	66	60	69	77	84	83	85	79	80	76
		17:40	74	69	61	61	73	80	87	86	88	81	77	72
1206	OKHALDHUNGA	8:40	74	67	58	59	74	89	93	92	92	80	73	72
		17:40	75	62	52	55	70	87	91	93	92	86	80	78
1303	CHAINPUR (EAST)	8:40	76	69	65	63	73	85	88	88	88	78	73	73
		17:40	74	67	62	64	72	82	86	86	85	79	72	71
1319	BIRATNAGAR	8:40	88	82	64	66	77	83	87	85	85	83	81	85
		17:40	62	51	48	46	63	74	77	78	79	76	66	62
1401	OLANGCHUNG GOLA	8:40	69	66	66	59	68	85	86	82	82	62	56	49
		17:40	76	74	88	78	84	93	94	94	92	80	82	73
1407	ILAM TEA ESTATE	8:40	76	68	61	65	80	88	91	89	87	81	70	68
		17:40	76	68	61	65	80	88	91	89	87	81	70	68

Table 3.1 MONTHLY MEAN RUNOFF

Unit: cu.m/s

Station No.	Drainage Area (km2)	Record	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual Mean
						FAR WESTERN REGION									
240	19,260	1962-85	132	117	130	200	375	723	1170	1410	935	438	238	164	505
280	42,890	1962-87	369	335	347	442	701	1520	3310	4320	2990	1300	628	445	1400
250	21,240	1963-85	155	139	152	228	415	791	1470	1820	1240	554	292	203	624
260	7,460	1963-85	71.7	67.1	75.3	92.2	131	300	736	974	677	258	128	88.4	302
262	896	1966-86	7.68	7.54	6.88	6.33	7.16	28.7	83.3	101	78.4	44.3	13.1	9.68	31.6
						MID WESTERN REGION									
270	12,290	1963-85	97.1	84.8	82.9	102	152	370	1070	1470	1070	386	178	120	435
286	816	1972-76	5.25	4.67	3.65	2.59	2.03	11.2	27.8	40.9	32.7	21.2	8.83	5.4	14
330	1,980	1964-85	17.8	14.8	12.4	10.8	11.5	36	120	199	169	75.3	32.5	22.2	60.4
340	-	1965-70	5.8	4.75	4.58	3.27	1.97	15.2	41.9	63.8	51.9	29	12.4	8.07	20.3
350	3,380	1976-85	31.7	26.3	21.4	18.2	22.8	60.3	192	259	268	117	58.6	39.8	93.4
360	-	1964-85	27.9	22.7	18.2	13.8	15.1	92.9	298	388	355	147	57.2	33.4	123
						WESTERN REGION									
390	554	1964-69	4.36	3.03	2.45	2.16	2.35	15.1	58.3	108	46.7	24.7	7.61	4.94	23.5
410	6,630	1964-85	49	40.5	40.5	57.1	91.5	273	752	835	593	261	117	69.3	267
415	476	1964-85	4.91	4.09	3.35	3.31	6.79	36.4	99.4	99.8	99.7	28.5	10.2	6.22	31.3
430	582	1964-84	13	11.6	11.5	13.4	19.7	52	139	158	108	55	25.2	16.9	52.3
439.8	-	1974-85	49.1	41.6	40.7	54.9	95.6	229	571	607	463	210	104	65.8	212
440	308	1964-85	5.38	4.38	3.93	4.25	5.6	19.1	63.3	71.1	58.7	28.1	12.9	7.77	23.9
445	4,270	1964-85	37.4	31.6	37	64.2	105	220	394	408	300	169	89.5	54.2	160
						CENTRAL REGION									
420	11,400	1964-85	113	89.7	77.3	90.6	142	406	1220	1450	1120	537	250	154	473
446.8	162	1971-85	2.26	1.89	1.6	1.76	2.4	12.3	37.6	45	32.4	12.4	5.18	3.15	13.2
447	4,110	1967-85	44	38.4	39.6	49.3	83	227	499	548	368	165	85.9	57.8	185
448	653	1969-85	9.14	7.04	5.33	5.82	8.41	33.8	101	132	97.3	43.2	22.2	13.1	40.1
450	31,100	1963-87	353	288	266	349	558	1620	4280	4950	3450	1590	795	498	1590
460	579	1963-85	9.02	7.41	6.46	6.58	8.36	23.3	68.6	81.6	68.8	33.4	16.9	11.5	28.6
465	427	1963-85	5.42	4.4	4.08	4.14	4.86	13.3	40.7	55.7	48.8	21.4	11	7.15	18.5
470	169	1964-85	2.04	1.79	1.56	1.54	2.02	6.25	23.9	32.7	27.2	9.53	3.69	2.46	9.61
505	17	1963-85	0.29	0.23	0.2	0.2	0.29	0.82	2.33	3.51	2.89	1.13	0.55	0.38	1.07
536.2	4	1969-85	0.085	0.082	0.083	0.086	0.11	0.25	0.71	0.92	0.8	0.39	0.17	0.13	0.3
550	-	1963-80	2.51	1.85	1.55	1.78	2.47	14.5	45.4	53.4	35.4	16.4	6.98	3.9	15.6
590	-	1965-79	18.8	16.9	15.4	16.7	31.6	214	539	513	338	137	51	26.9	161
589	2,700	1979-85	17.6	14.4	11.2	11.9	22.7	98	398	364	370	90.4	30.2	21.6	122
610	2,410	1965-85	21.3	17.6	16.5	21.6	32.7	91.3	203	228	168	80.3	40.6	26.5	79.3
620	629	1964-85	11.7	10.0	9.58	10.8	14.2	44.9	130	157	116	48.5	22.9	15.1	49.6
640	87	1964-85	1.24	1.05	0.93	0.83	0.93	1.93	5.78	7.62	6.06	3.48	2.13	1.55	2.85
630	4,920	1964-85	57.4	47.3	44.3	52.2	73.9	226	678	824	554	239	124	77.5	252
647	2,753	1971-85	30.3	25.2	24.1	29.7	56.9	173	402	436	306	141	66.4	41.7	145
652	10,000	1968-83	109	89.6	82.4	95.9	150	501	1370	1660	1070	496	230	146	503
660	823	1964-85	14.6	11.8	10.4	11.9	17.7	52.3	145	166	130	66.1	32.9	20.8	57
						EASTERN REGION									
604.5	28,200	1976-86	116	116	135	174	266	615	1020	1010	830	408	215	145	423
670	4,100	1964-85	48.3	39.9	38	45.2	75.5	265	644	665	459	219	100	63.7	223
680	17,600	1966-85	188	162	149	160	220	681	2060	2420	1730	781	353	238	768
690	5,640	1965-86	67.1	54.7	51.6	80.1	176	482	921	895	704	338	149	92.6	336
695	54,100	1977-87	355	306	305	405	657	1610	3970	4220	3340	1450	769	495	1500
728	377	1983-86	5.74	4.69	3.8	4.6	7.95	19.8	66.7	42.1	57.9	24.7	12	7.53	21.6
730	107	1965-68	1.4	1.16	0.77	0.97	2.23	5.95	21.6	25.7	18	7.87	2.42	1.62	7.12
795	125	1972-84	11.5	9.32	7.98	11.2	20.8	71.8	198	145	106	51.3	23.1	15.3	56.3

Table 4.1 RIVER BASIN AND PRECIPITATION STATION DENSITY

NAME OF RIVER BASIN	BASIN AREA (sq.km)	NO. OF. STATIONS (no.)	DENSITY OF STATIONS (sq.km./no.)
I MAHAKALI RIVER	5,317	6	886
II SOUTHERN BORDER RIVER GROUP NO.1	3,811	8	476
III KARNALI RIVER	(43,227)	(39)	(1,108)
1 HUMLA KARNALI	5,527	2	2,764
2 MUGU KARNALI	6,155	1	6,155
3 SINJA TILA	3,252	4	813
4 SETI WEST	7,103	8	888
5 BHERI	13,867	9	1,541
6 KARNALI MAIN (OTHERS)	7,323	15	488
IV BABAI RIVER	3,252	8	407
V SOUTHERN BORDER RIVER GROUP NO.2	948	3	316
VI RAPTI(WEST)RIVER	6,215	5	1,243
VII SOUTHERN BORDER RIVER GROUP NO.3	4,849	11	441
VIII NARAYANI/GANDAKI RIVER	(31,726)	(63)	(504)
1 TRISULI	3,622	9	402
2 BUDHI GANDAKI	3,621	3	1,207
3 MARSYANGDI	4,819	6	803
4 SETI GANDAKI	2,843	7	406
5 KALI GANDAKI	11,573	29	399
6 RAPTI(EAST)	2,993	6	499
7 NARAYANI/GANDAKI MAIN(OTHERS)	2,255	3	752
IX SOUTHERN BORDER RIVER GROUP NO.4	3,502	6	584
X BAGMATI RIVER	3,681	18	205
XI SOUTHERN BORDER RIVER GROUP NO.5	3,013	6	502
XII KAMALA RIVER SYSTEM	1,786	3	595
XIII SOUTHERN BORDER RIVER GROUP NO.6	1,896	2	948
XIV SUN KOSHI/SAPTA KOSHI RIVER	(27,863)	(60)	(464)
1 BHOTE KOSHI	240	2	120
2 TAMA KOSHI	2,714	4	679
3 DUDH KOSHI	4,030	8	504
4 ARUN	5,248	10	525
5 TAMAR/TAMUR	6,125	10	613
6 SUN KOSHI MAIN(OTHERS)	9,506	26	366
XV SOUTHERN BORDER RIVER GROUP NO.7	3,462	6	577
XVI KANKAI RIVER	1,317	3	439
XVII SOUTHERN BORDER RIVER GROUP NO.8	1,316	5	263
TOTAL	147,181	252	584

Table 4.2 ELEVATION AND MEAN ANNUAL RAINFALL (1/6)

STN. NO.	NAME OF STATION	ELEVATION (m)	RAINFALL (mm)
	MAHAKALI ZONE		
0101	KAKERPAKHA	842	1,758
0102	BAITADI	1,635	1,449
0103	PATAN (WEST)	1,266	1,430
0104	DANDELDHURA	1,865	1,409
0105	MAHENDRA NAGAR	176	1,660
0106	BELAURI SANTIPUR	159	1,216
0107	DARCHULA	1,097	2,273
0108	SATBANJH	2,370	1,566
	SETI ZONE		
0201	PIPALKOT	1,456	2,141
0202	CHAINPUR (WEST)	1,304	1,517
0203	SILGADHI DOTI	1,360	1,360
0204	BAJURA	1,400	2,146
0205	KATAI	1,388	1,487
0206	ASARA GHAT	650	1,216
0207	TIKAPUR	140	1,749
0208	SANDEPANI	195	1,928
0209	DHANGADHI	170	1,659
0210	BANGGA CAMP	340	1,572
0211	KHAPTAD	3,430	2,942
0212	SITAPUR	152	1,633
0214	KOLA GAUN	1,304	1,860
0215	GODAVARI (WEST)	288	2,174
0216	TEGHARI	190	1,561
0217	MANGALSEN	1,345	1,488
0218	DIPAYAL (DOTI)	617	1,307
	KARNALI ZONE		
0301	MUGU	3,803	608
0302	THIBRU	1,006	690
0303	JUMLA	2,300	899
0304	GUTHI CHAUR	3,080	1,078
0305	SHERI GHAT	1,210	1,503
0306	GAM SHREE NAGAR	2,133	887
0307	RARA	3,048	917
0308	NAGMA	1,905	787
0309	BIJAYAPUR (RASKOT)	1,814	1,194
0310	DIPAL GAUN	2,310	988
0311	SIMIKOT	2,800	988
0312	DUNAI	2,058	446
0313	DARMA	1,950	1,359
	BHERI ZONE		
0401	PUSMA CAMP	950	1,621
0402	DAILEKH	1,402	1,765
0403	JAMU (TIKUWA KUNA)	260	1,682
0404	JAJARKOT	1,231	2,014
0405	CHISAPANI (KARNALI)	225	2,228
0406	SURKHET (BIRENDRA NAGAR)	720	1,613
0407	KUSUM	235	1,037
0408	GULARIYA	215	1,453
0409	KHAJURA (NEPALGANJ)	190	1,446
0410	BALE BUDHA	610	1,014
0411	RAJAPUR	129	1,550
0412	NAUBASTA	135	1,410

Table 4.2 ELEVATION AND MEAN ANNUAL RAINFALL (2/6)

STN. NO.	NAME OF STATION	ELEVATION (m)	RAINFALL (mm)
0413	SHYANO SHREE	302	1,941
0414	BAIJAPUR	226	1,118
0415	BARGADAHA	200	1,275
0416	NEPALGUNJ (REG.OFF.)	144	1,452
0417	RANI JARUWA NURSERY	200	1,295
0418	MAINA GAUN (D.BAS)	2,000	1,561
0419	SIKTA	195	1,532
	RAPTI ZONE		
0501	RUKUMKOT	1,560	1,986
0502	SHERA GAUN	2,150	1,489
0504	LIBANG GAUN	1,270	1,825
0505	BIJUWAR TAR	823	1,328
0507	NAYABASTI (DANG)	698	1,529
0508	TULSIPUR	725	1,757
0509	GHORAHI (MASINA)	725	1,952
0510	LOILABAS	320	1,579
0511	SALYAN BAZAR	1,457	1,093
0512	LUWAMJULA BAZAR	885	1,257
0513	CHAUR JHARI TAR	910	1,333
0514	MUSIKOT (RUKUMKOT)	2,100	1,949
	DHAULAGIRI ZONE		
0601	JOMSOM	2,744	259
0603	DHORPATAN	2,820	-
0604	THAKMARPHA	2,566	387
0605	BAGLUNG	984	1,800
0606	TATOPANI	1,243	1,469
0607	LETE	2,384	1,170
0608	RANIPAUWA (M.NATH)	3,609	397
0609	BENI BAZAR	835	1,455
0610	GHAMI (MUSTANG)	3,465	220
0612	MUSTANG (LOMANGTANG)	3,705	177
0613	KARKI NETA	1,720	2,275
0614	KUSHMA	891	2,306
0615	BOBANG	2,273	2,643
0616	GURJA KHANI	2,530	1,994
0619	GHORAPANI	2,742	2,664
	LUMBINI ZONE		
0701	RIDI BAZAR	442	1,545
0702	TANSEN	1,067	1,470
0703	BUTWAL	205	2,363
0704	BELUWA (GIRWARI)	150	2,582
0705	BHAIRHAWA AIRPORT	109	1,651
0706	DUMKAULI	154	2,235
0707	BHAIRHAWA (AGRIC)	120	1,694
0708	PARASI	125	1,924
0710	DUMKIBAS	164	2,050
0711	TAMASPUR	150	-
0712	TRIBHUVAN TAR	174	1,789
0713	RAMBAS	423	2,658
0714	KRITIPUR CHULI	842	3,372
0715	KHANCHIKOT	1,760	1,840
0716	TAULIHAWA	94	1,664
0719	KOLUWA	134	1,539
0720	KOILAPANI	258	1,749

Table 4.2 ELEVATION AND MEAN ANNUAL RAINFALL (3/6)

STN. NO.	NAME OF STATION	ELEVATION (m)	RAINFALL (mm)
0721	PATTHARKOT (WEST)	200	2,394
0722	MUSIKOT	1,280	2,158
0723	BHAGWANPUR	80	1,833
0724	PAKLIHAWA	100	1,889
0725	TAMGHAS	1,530	2,310
0726	GARAKOT	500	1,871
0727	LUMBINI	95	1,938
0728	SIMARI	154	2,071
	GANDAKI ZONE		
0801	JAGAT (SETIBAS)	1,334	1,318
0802	KHUDI BAZAR	823	3,298
0804	POKHARA AIRPORT	827	3,789
0805	SYANGJA	868	2,901
0806	LARKE SAMDO	3,650	1,108
0807	KUNCHHA	855	2,709
0808	BANDIPUR	965	1,914
0809	GORKHA	1,097	1,898
0810	CHAPKOT	460	1,892
0811	MALEPATAN (POKHARA)	856	3,531
0813	BHADAURE DEURALI	1,600	4,298
0814	LUMLE	1,740	5,010
0815	KHAIRINI TAR	500	2,249
0816	CHAME	2,680	953
0817	DAMAULI	358	1,765
0818	LAMACHAUR	1,070	4,476
0820	MANANG BHOT	3,420	471
0821	GHANDRUK	1,960	3,309
0823	GHAREDHUNGA	1,120	2,812
0824	SIKLESH	1,820	3,761
	NARAYANI ZONE		
0902	RAMPUR	256	1,939
0903	JHAWANI	270	1,958
0904	CHISAPANI GADHI	1,706	2,268
0905	DAMAN	2,314	1,905
0906	HETAUNDA N.F.I.	474	2,248
0907	AMLEKHGANJ	396	2,157
0909	SIMARA AIRPORT	130	1,796
0910	NIJGADH	244	1,962
0911	PARWANIPUR	115	1,464
0912	RAMOLI BAIRIYA	152	1,742
0914	BHARATPUR	223	2,995
0915	KARKHU GAUN	1,530	1,540
0916	TIGER TOP	190	2,065
0917	HETAUNDA (IND.DIS)	466	2,138
0918	BIRGANJ	91	1,423
0919	MAKWANPUR GADHI	1,030	1,722
0920	BELUWA	274	2,086
0921	KALAIYA	140	1,720
0922	GAUR	90	1,656
	BAGMATI ZONE		
1001	TIMURE	1,900	720
1002	ARU GHAT D. BAZAR	518	2,805
1003	TRISULI	595	1,769
1004	NUWAKOT	1,003	1,984

Table 4.2 ELEVATION AND MEAN ANNUAL RAINFALL (4/6)

STN. NO.	NAME OF STATION	ELEVATION (m)	RAINFALL (mm)
1005	DHADING	1,420	2,315
1006	GUMTHANG	2,000	3,805
1007	KAKANI	2,064	2,751
1008	NAWALPUR	1,592	2,455
1009	CHAUTARA	1,660	2,163
1012	SUNDARIJAL (PWR.HOUSE)	1,380	2,124
1013	SUNDARIJAL (WATER RES.)	1,600	2,242
1015	THANKOT	1,630	2,020
1016	SARMATHANG	2,625	4,005
1017	DUBACHAUR	1,550	2,391
1018	BAUNEPATI	845	1,815
1019	RANIPAUWA	1,828	2,684
1020	MANDAN	1,365	1,048
1022	GODAVARI	1,400	1,889
1023	DOLAL GHAT	710	1,308
1024	DHULIKHEL	1,552	1,622
1025	DHAP	1,240	2,781
1027	BAHRABISE	1,220	2,739
1028	PACHUWAR GHAT	633	977
1029	KHUMALTAR	1,350	1,244
1030	KATHMANDU AIRPORT	1,336	1,410
1034	GATLANG	2,350	1,488
1035	SANKHU	1,449	2,013
1036	PANCHKHAL	865	1,201
1038	DHUNIBESI	1,085	1,571
1039	PANIPOKHARI (KATHMANDU)	1,335	1,549
1040	TIKA BHAIRAB	1,524	-
1041	GOKARNA	1,400	-
1042	KHUDKHU KHOLA	1,450	-
1043	NAGARKOT	2,163	1,865
1044	BIRDHARA	-	-
1046	PHUTUNG	1,390	-
1047	PHARPING	1,500	1,271
1048	PANCHMANE	1,712	-
1049	KHOPASI (PANAUTI)	1,517	1,420
1050	MAHADEV KHOLA	1,420	1,256
1051	BUDHANILAKANTHA	1,350	2,322
1052	BHAKTAPUR	1,330	1,613
1054	THAMACHIT	1,847	1,415
1055	DHUNCHE	1,982	1,844
1056	TOKHA	1,790	2,738
1057	PANSAYAKHOLA	1,240	3,093
1058	TARKE GHYANG	2,480	3,360
1059	CHANGU NARAYAN	1,543	1,669
1060	CHAPA GAUN	1,448	1,447
1061	LUBHU	1,341	1,363
1062	SANGACHOK	1,327	1,527
	JANAKPUR ZONE		
1101	NAGDAHA	850	1,658
1102	CHARIKOT	1,940	2,080
1103	JIRI	2,003	2,251
1104	MELUNG	1,536	1,805
1106	RAMECHHAP	1,395	936
1107	SINDHULI GADHI	1,463	3,008

Table 4.2 ELEVATION AND MEAN ANNUAL RAINFALL (5/6)

STN. NO.	NAME OF STATION	ELEVATION (m)	RAINFALL (mm)
1108	BAHUN TILPUNG	1,417	1,885
1109	PATTHARKOT (EAST)	275	2,026
1110	TULSI	457	1,580
1111	JANAKPUR AIRPORT	90	1,246
1112	CHISAPANI BAZAR	165	1,606
1114	HARDINATH	93	1,274
1115	NEPALTHOK	1,098	960
1116	HARIHARPUR GADHI	880	2,781
1117	HARIHARPUR GADHI VALLEY	250	2,448
1118	MANUSMARA	100	1,360
1119	GAUSALA	200	1,190
1120	MALANGWA	150	1,555
1121	KARMAIYA	131	1,318
	SAGARMATHA ZONE		
1201	NAMCHE BAZAR	3,450	1,048
1202	CHAURIKHARK	2,619	2,018
1203	PAKARNAS	1,982	1,765
1204	AISEALUKHARK	2,143	2,193
1206	OKHALDHUNGA	1,720	1,719
1207	NAME BHANJYANG	1,576	1,098
1210	KURULE GHAT	497	928
1211	KHOTANG BAZAR	1,295	1,150
1212	PHATEPUR	100	1,295
1213	UDAYAPUR GADHI	1,175	2,021
1215	LAHAN	138	1,501
1216	SIRAHA	102	1,397
1217	KHUMJUNG	3,750	776
1218	TENGBOCHE	3,857	1,003
1219	SALLERI	2,378	1,758
1220	CHIALSA	2,770	1,912
1222	DIKTEL	1,623	1,506
1223	RAJBIRAJ	91	1,360
1224	SIRWA	1,662	1,967
1225	SYANGBOCHE	3,700	936
1226	BARMAJHIYA	85	1,571
	KOSI ZONE		
1301	NUM	1,497	4,251
1303	CHAINPUR (EAST)	1,329	1,402
1304	PAKHRIBVAS	1,680	1,553
1305	LEGUWA GHAT	410	1,171
1306	MUNGA	1,317	1,199
1307	DHANKUTA	1,445	983
1308	MUL GHAT	365	1,105
1309	TRIBENI	143	1,726
1311	DHARAN BAZAR	444	2,352
1312	HARAINCHA	152	2,022
1313	BIRATNAGAR (CITY)	67	1,775
1314	TERHATHUM	1,633	932
1315	KHARE LALANTAR	541	1,474
1316	CHATARA	183	2,161
1317	CHEPUWA	2,590	2,627
1318	PARIPATLE (HORTI.)	1,364	1,117
1319	BIRATNAGAR AIRPORT	72	1,772
1320	TARAHARA	200	1,735

Table 4.2 ELEVATION AND MEAN ANNUAL RAINFALL (6/6)

STN. NO.	NAME OF STATION	ELEVATION (m)	RAINFALL (mm)
1321	TUMLINGTAR	303	1,319
1322	MACHUWA GHAT	158	1,473
1323	DHARAN BRITISH CAMP	400	2,311
1324	BHOJPUR	1,595	1,315
1325	DINGLA	1,190	1,856
	MECHI ZONE		
1401	OLANGCHUNG GOLA	3,119	1,200
1403	LUNGTHUNG	1,780	2,101
1404	TAPLETHOK	1,383	2,659
1405	TAPLEJUNG	1,732	1,992
1406	MEMENG JAGAT	1,830	2,089
1407	ILAM TEA ESTATE	1,300	1,577
1408	DAMAK	163	2,312
1409	ANARMANI BIRTA	122	2,363
1410	HIMALI GAUN	1,654	2,210
1411	SOKTIM TEA ESTATE	530	2,472
1412	CHANDRA GADHI	120	2,306
1415	SANISCHARE	168	2,672
1416	KANYAM TEA ESTATE	1,678	3,062
1417	JAUBARI	3,050	3,113
1419	PHIDIM (PANCHTHER)	1,205	1,248
1420	DOVAN	763	1,592
1421	GAIDA (KANKAI)	143	2,569

Table 5.1 RIVER BASIN AND HYDROLOGICAL STATION DENSITY

NAME OF RIVER BASIN	BASIN AREA (sq.km)	NO. OF. STATIONS (no.)	DENSITY OF STATIONS (sq.km./no.)
I MAHAKALI RIVER	5,317	3	1,772
II SOUTHERN BORDER RIVER GROUP NO.1	3,811	3	1,270
III KARNALI RIVER	(43,227)	(24)	(1,801)
1 HUMLA KARNALI	5,527	1	5,527
2 MUGU KARNALI	6,155	1	6,155
3 SINJA TILA	3,252	3	1,084
4 SETI WEST	7,103	4	1,776
5 BHERI	13,867	4	3,467
6 KARNALI MAIN (OTHERS)	7,323	11	666
IV BABAI RIVER	3,252	6	542
V SOUTHERN BORDER RIVER GROUP NO.2	948	0	-
VI RAPTI(WEST)RIVER	6,215	8	777
VII SOUTHERN BORDER RIVER GROUP NO.3	4,849	4	1,212
VIII NARAYANI/GANDAKI RIVER	(31,726)	(35)	(906)
1 TRISULI	3,622	7	517
2 BUDHI GANDAKI	3,621	2	1,811
3 MARSYANGDI	4,819	5	964
4 SETI GANDAKI	2,843	3	948
5 KALI GANDAKI	11,573	12	964
6 RAPTI(EAST)	2,993	3	998
7 NARAYANI/GANDAKI MAIN(OTHERS)	2,255	3	752
IX SOUTHERN BORDER RIVER GROUP NO.4	3,502	0	-
X BAGMATI RIVER	3,681	12	307
XI SOUTHERN BORDER RIVER GROUP NO.5	3,013	0	-
XII KAMALA RIVER SYSTEM	1,786	2	893
XIII SOUTHERN BORDER RIVER GROUP NO.6	1,896	0	-
XIV SUN KOSHI/SAPTA KOSHI RIVER	(27,863)	(34)	(820)
1 BHOTE KOSHI	240	2	120
2 TAMA KOSHI	2,714	2	1,357
3 DUDH KOSHI	4,030	3	1,343
4 ARUN	5,248	13	404
5 TAMAR/TAMUR	6,125	1	6,125
6 SUN KOSHI MAIN(OTHERS)	9,506	13	731
XV SOUTHERN BORDER RIVER GROUP NO.7	3,462	0	-
XVI KANKAI RIVER	1,317	5	263
XVII SOUTHERN BORDER RIVER GROUP NO.8	1,316	0	-
TOTAL	147,181	136	1,082

FIGURES

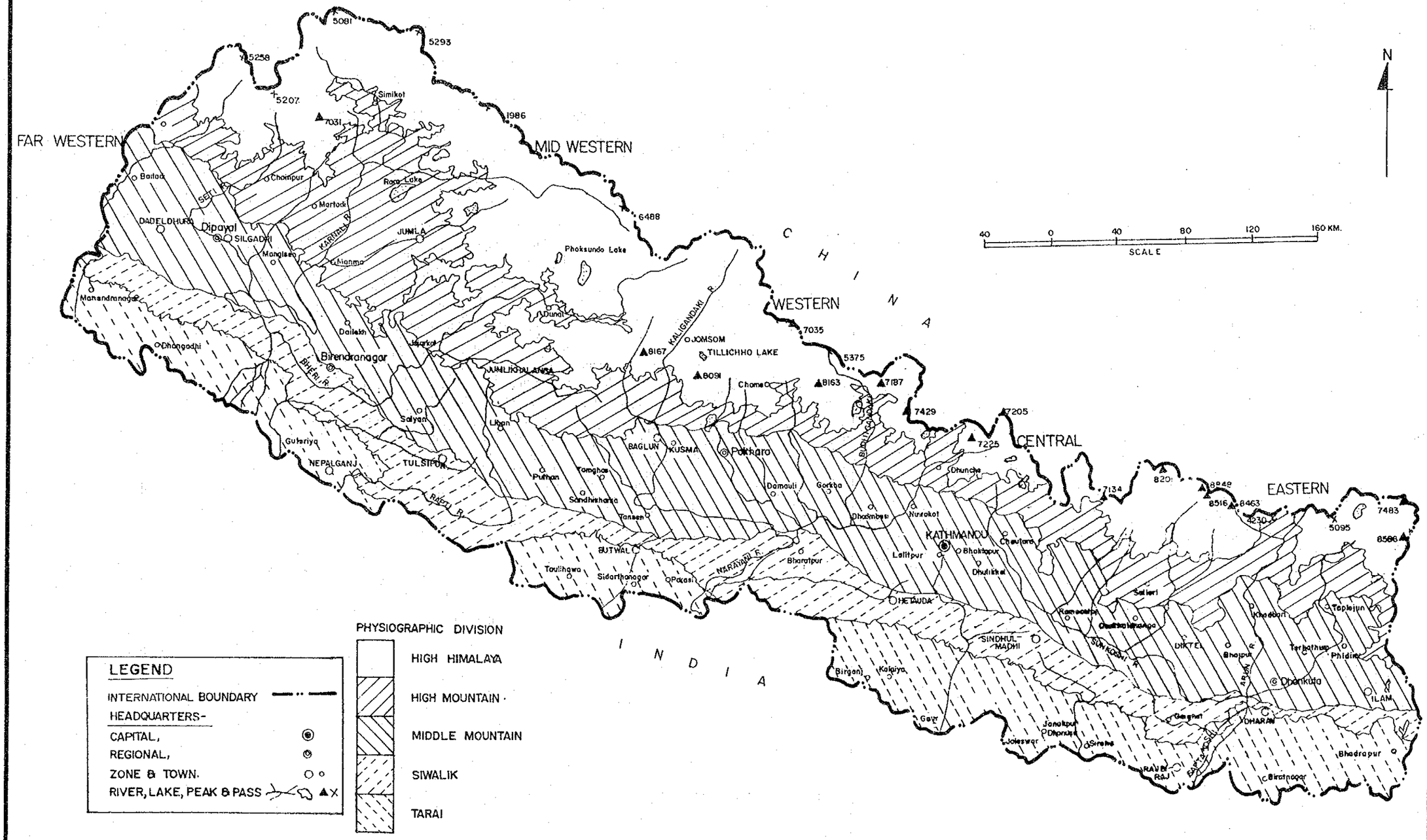
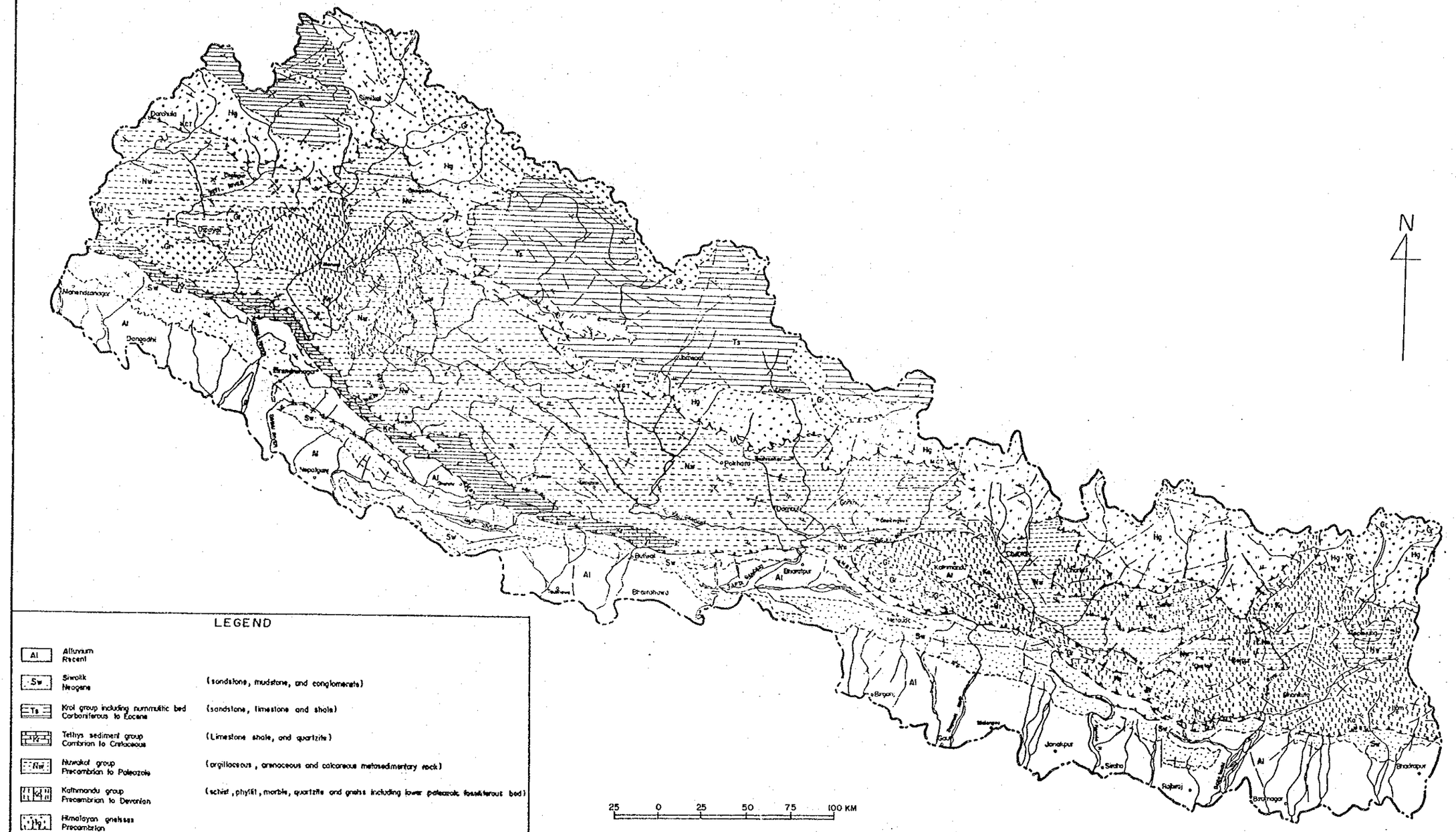


Fig. 1.1 PHYSIOGRAPHIC REGIONS

SOURCE : - Land resource mapping project, 1986.



LEGEND

Al	Alluvium Recent	
Sw	Siwalik Neogene	(sandstone, mudstone, and conglomerate)
Ts	Krol group including nummulitic bed Carboniferous to Eocene	(sandstone, limestone and shale)
Tg	Tethys sediment group Cambrian to Cretaceous	(Limestone shale, and quartzite)
Nw	Nawakot group Precambrian to Paleozoic	(argillaceous, arenaceous and calcareous metasedimentary rock)
Gc	Kathmandu group Precambrian to Devonian	(schist, phyllit, marble, quartzite and gneiss including lower paleozoic fossiliferous bed)
Hg	Himalayan gneisses Precambrian	
Gr	Granite Tertiary	

Attitude of stratification

- < 30°
- 30°–60°
- > 60°
- Vertical
- Thrust
- Fault
- Geologic contact
- Anticline
- Syncline

M.C.T. Main Central Thrust
M.B.T. Main Boundary Thrust

International Boundary
Capital
Main town
River

SOURCE : - Land resources mapping Project 1986

Fig. 1.2 GEOLOGY OF NEPAL

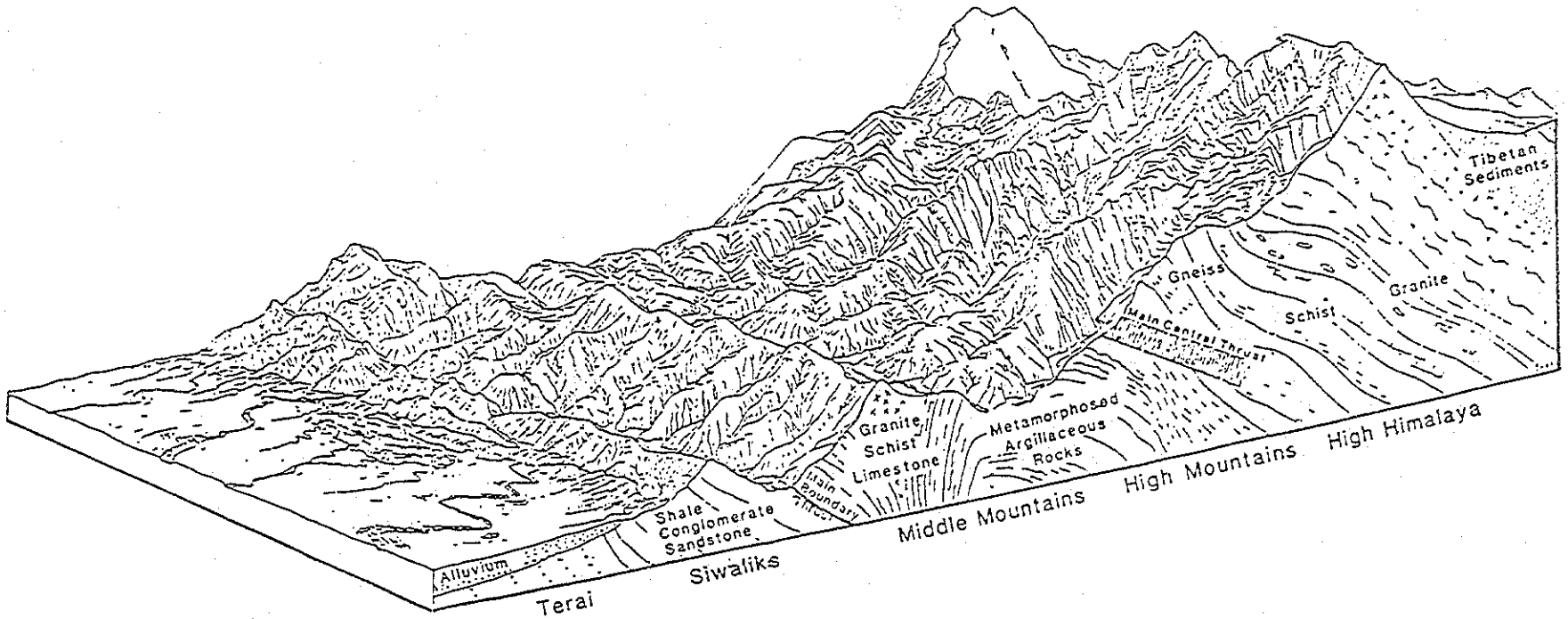


Fig. 1.3 TYPICAL NORTH SOUTH GEOLOGICAL SECTION

SOURCE : Modified from Nelson, et at 1980, and Ramsay, 1986

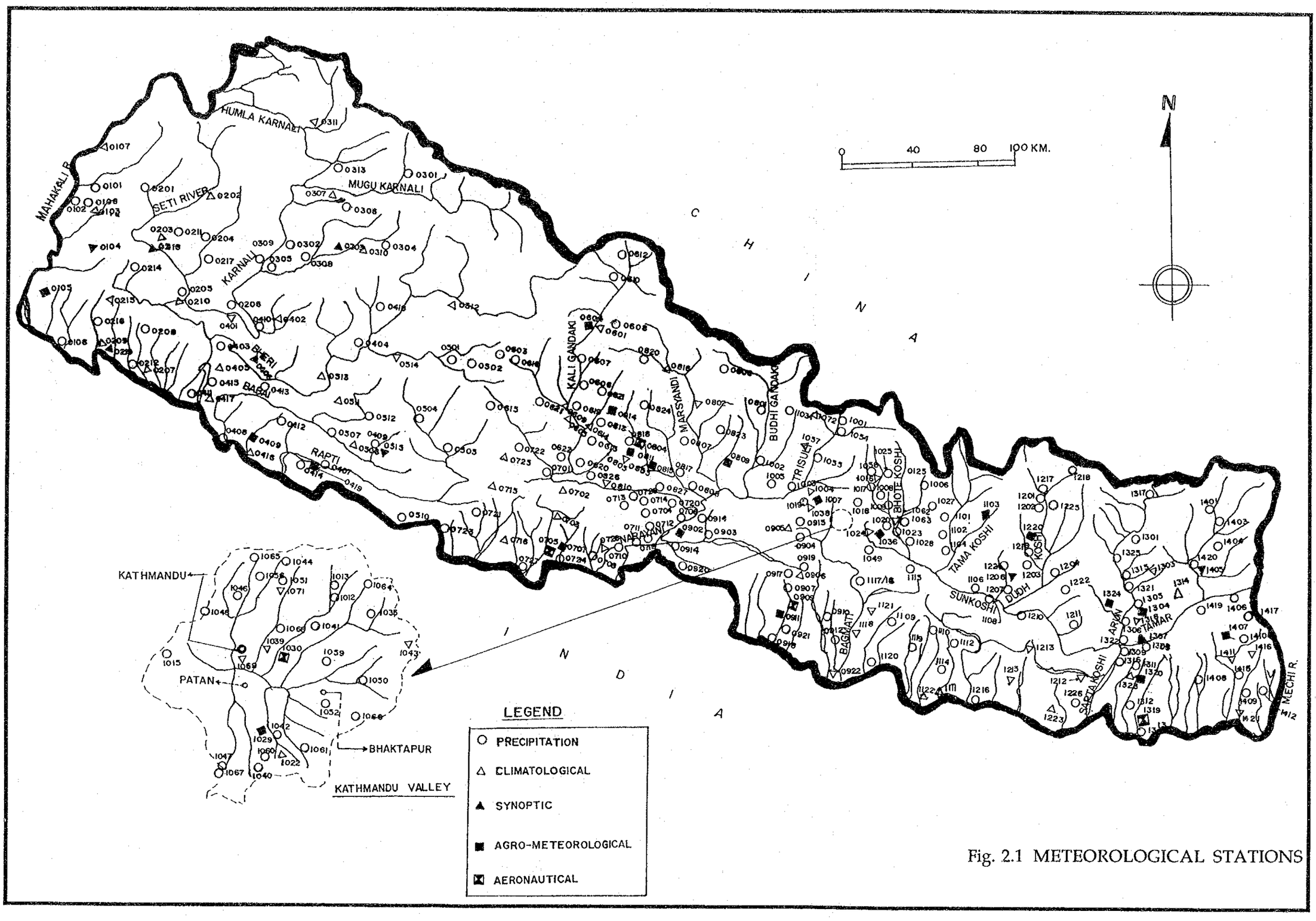
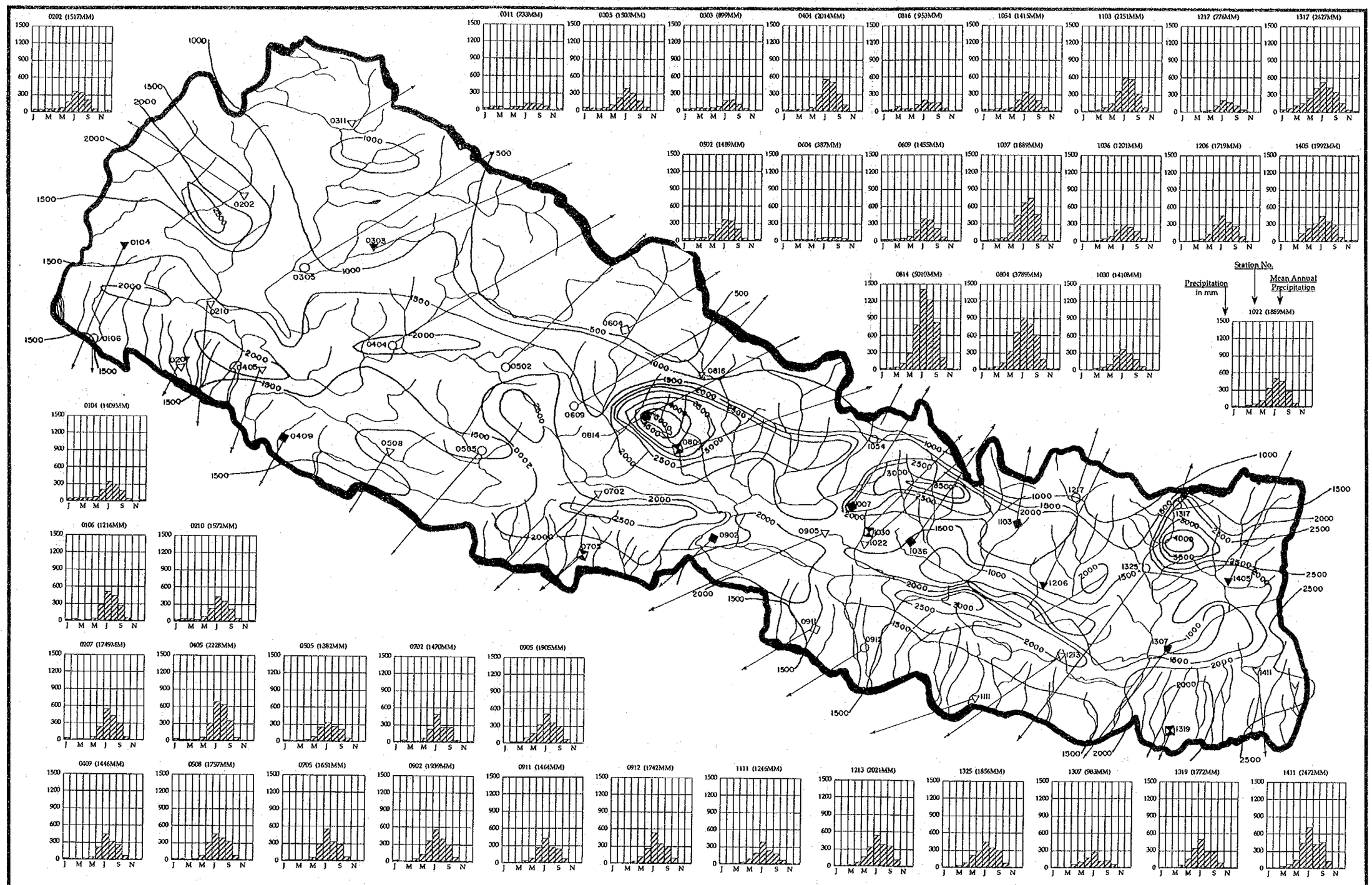


Fig. 2.1 METEOROLOGICAL STATIONS



NOTE : This Isohyetal Map is Derived from the Data in Table 2.1.

Fig. 2.2 MEAN ANNUAL PRECIPITATION DISTRIBUTION

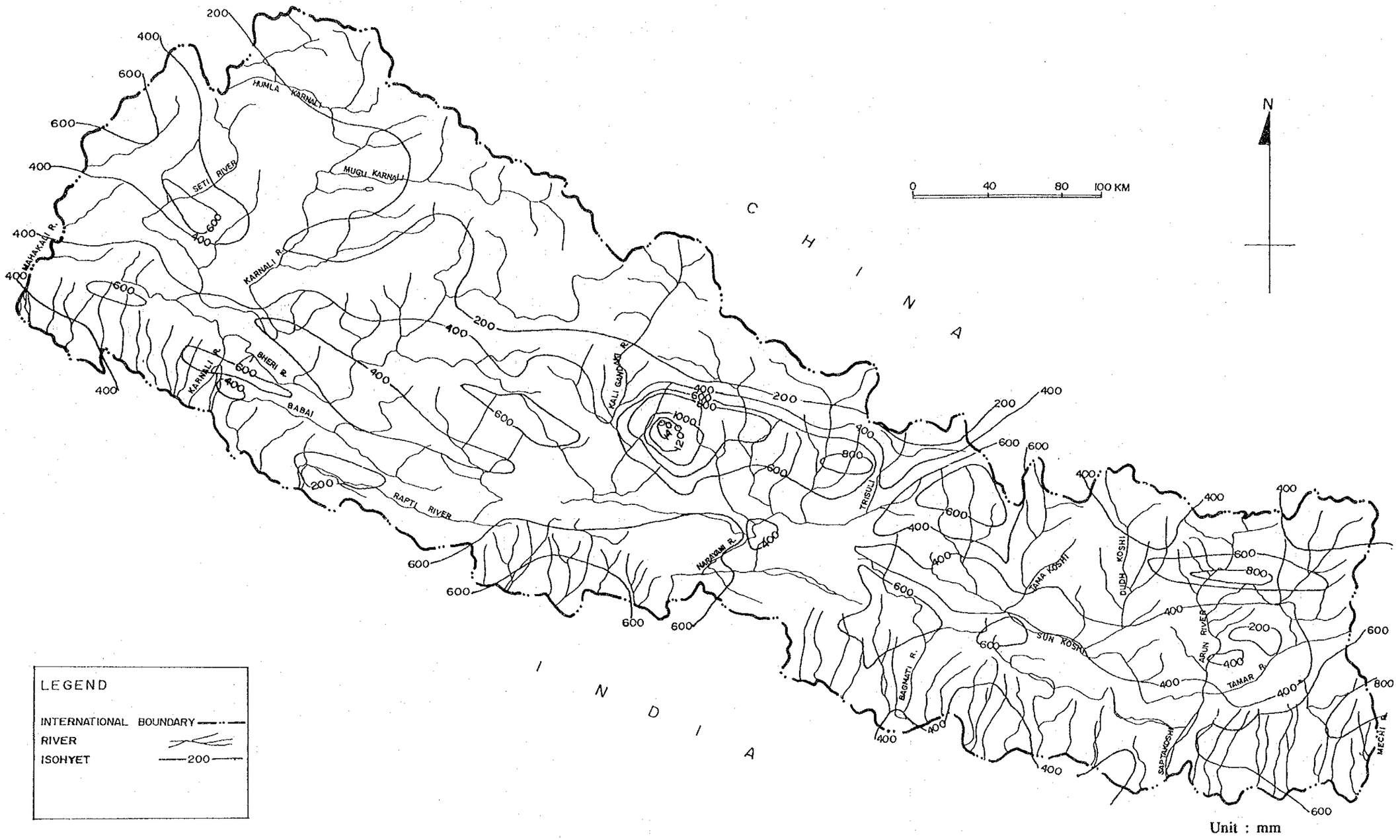
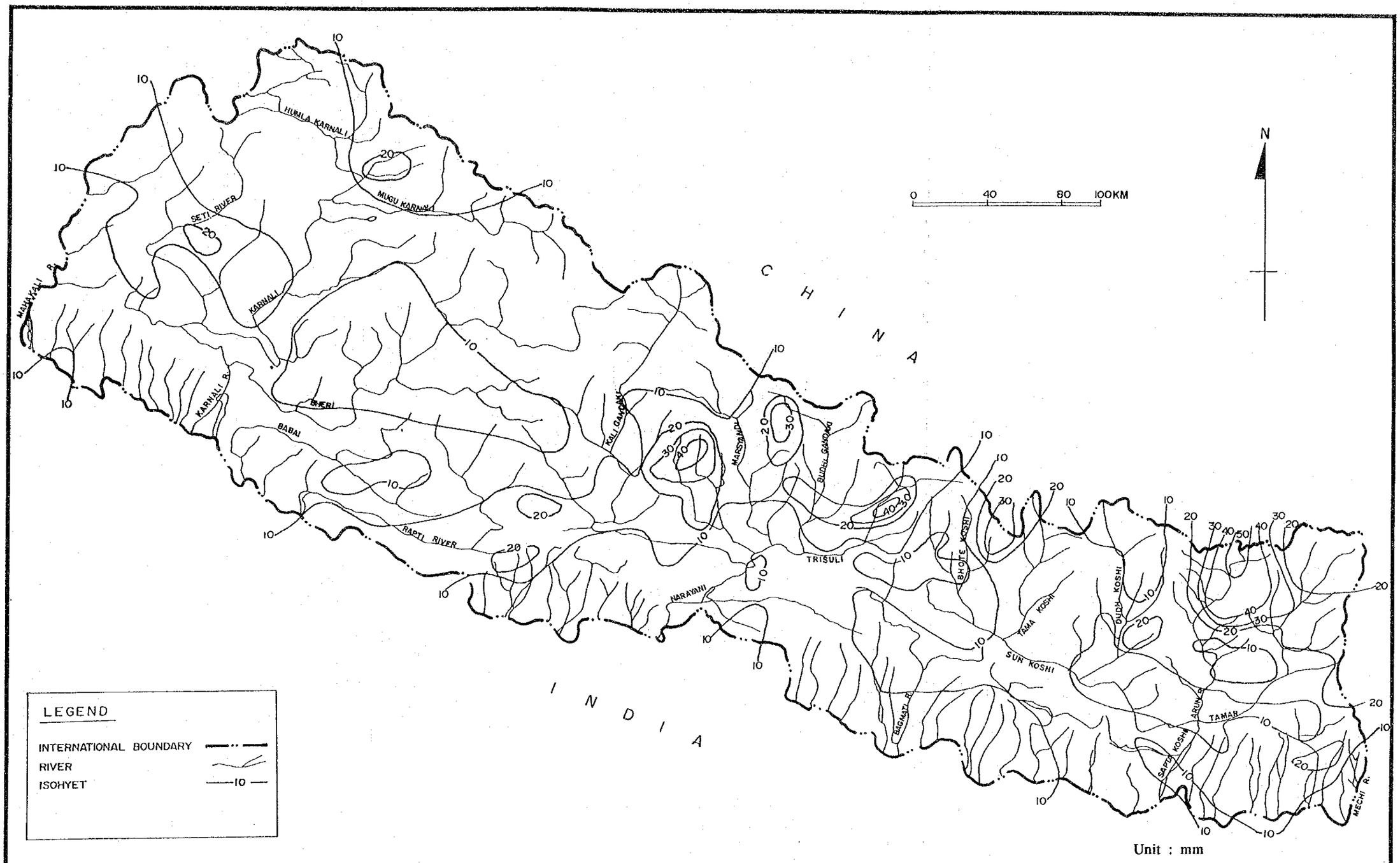


Fig. 2.3 MEAN PRECIPITATION DISTRIBUTION FOR JULY (1/2)



Unit : mm

Fig. 2.3 MEAN PRECIPITATION DISTRIBUTION FOR NOVEMBER (2/2)

Rainfall Intensity for Different Duration at Kathmandu Airport (1030)

Unit : mm/hour

Date	5 min	10 min	15 min	30 min	60 min	2 hour	6 hour	12 hour	24 hour
July 14, 1973	60.00	42.00	32.00	32.00	25.20	15.30	5.10	3.19	1.60
July 13, 1974	120.00	68.40	51.20	33.60	18.30	9.40	3.32	1.95	1.09
June 18, 1977	120.00	120.00	96.00	80.00	41.40	20.70	6.90	3.45	1.73
August 13, 1978	96.00	72.00	64.00	50.40	31.60	16.20	5.43	3.22	1.61
June 14, 1979	66.00	45.00	34.00	20.00	17.60	11.55	6.60	3.34	1.69

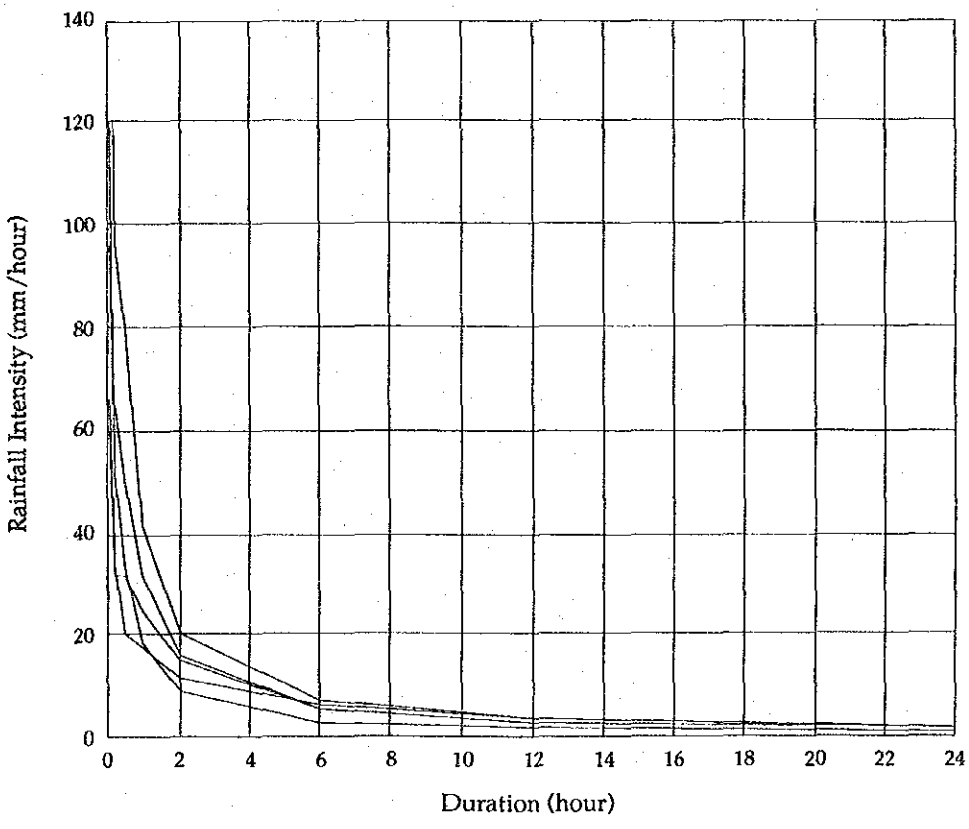
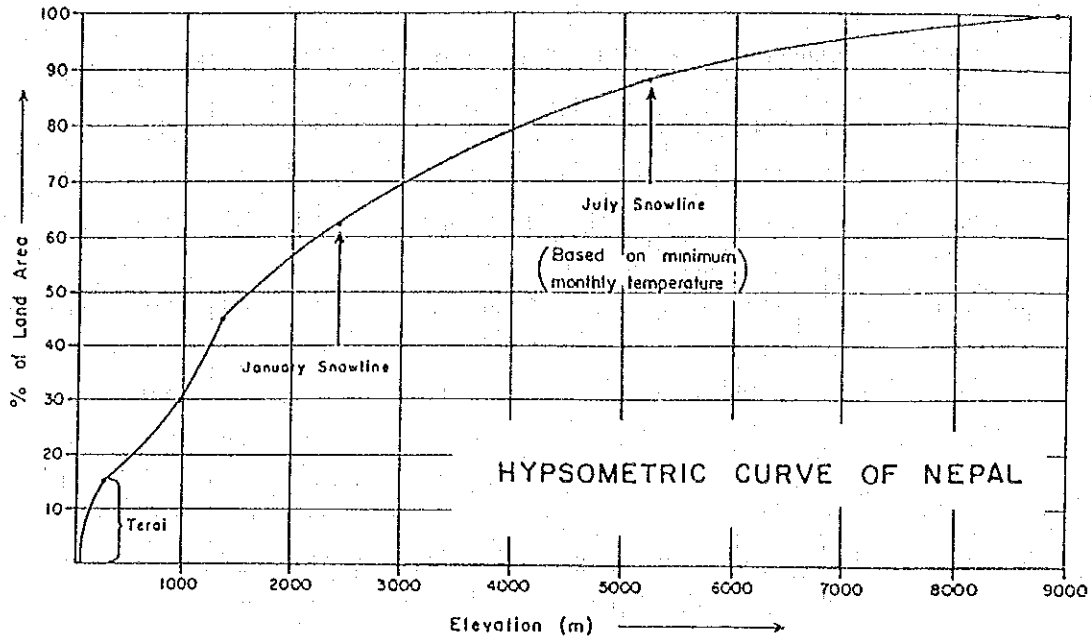


Fig 2.4 RAINFALL INTENSITY AND DURATION AT KATHMANDU AIRPORT (1030)



HONTHLY AND ANNUAL SNOWFALL IN NEPAL

Month	Mean Precipitation (mm)	Snowline Elevation (Based on mean monthly temperature)	Area ($km.^2$)	Snow Accumulation ($m^3 \times 10^{-3}$)
February	22	3,590	35,250	775.5
March	61	3,990	31,020	1,892.2
April	69	4,425	26,790	1,848.5
May	80	4,780	21,150	1,692.0
June	182	5,390	14,805	2,694.5
July	281	6,035	11,280	3,169.7
August	260	6,000	11,280	2,938.7
September	173	5,770	14,100	2,439.3
October	75	4,785	21,250	1,586.3
November	14	4,125	28,905	404.7
December	11	3,785	33,840	372.2
January	33	3,460	38,775	1,279.6

TOTAL ANNUAL ..... 21,092.5 x $10^3 m^3$

Note: all snow accumulation in water equivalent.

Fig. 2.5 SNOWFALL IN NEPAL

SOURCE : - Land resource mapping project, 1986.

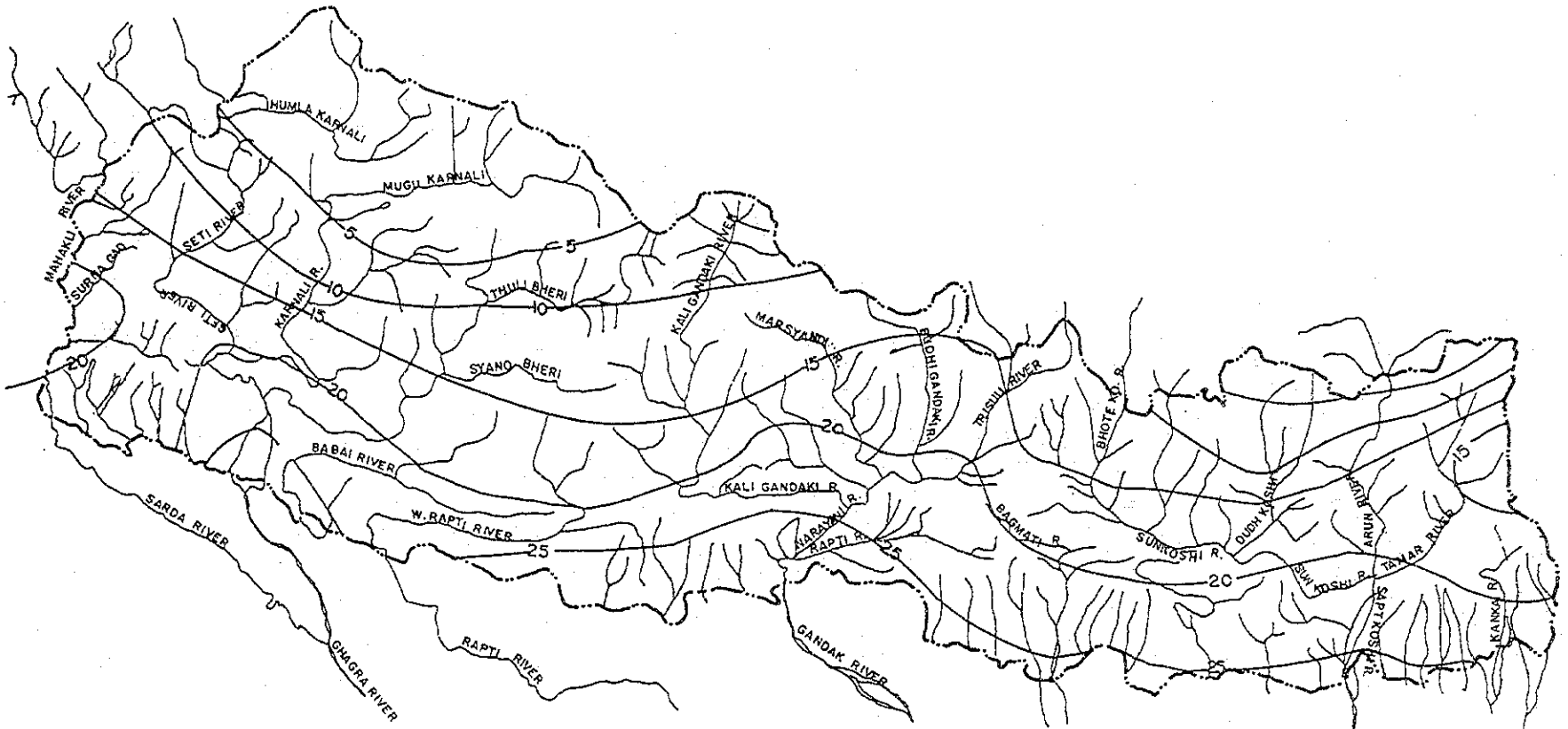


Fig. 2.6 MEAN ANNUAL TEMPERATURE (°C)

SOURCE : Hydrological Studies of Nepal, Water and Energy Commission, March 1982.

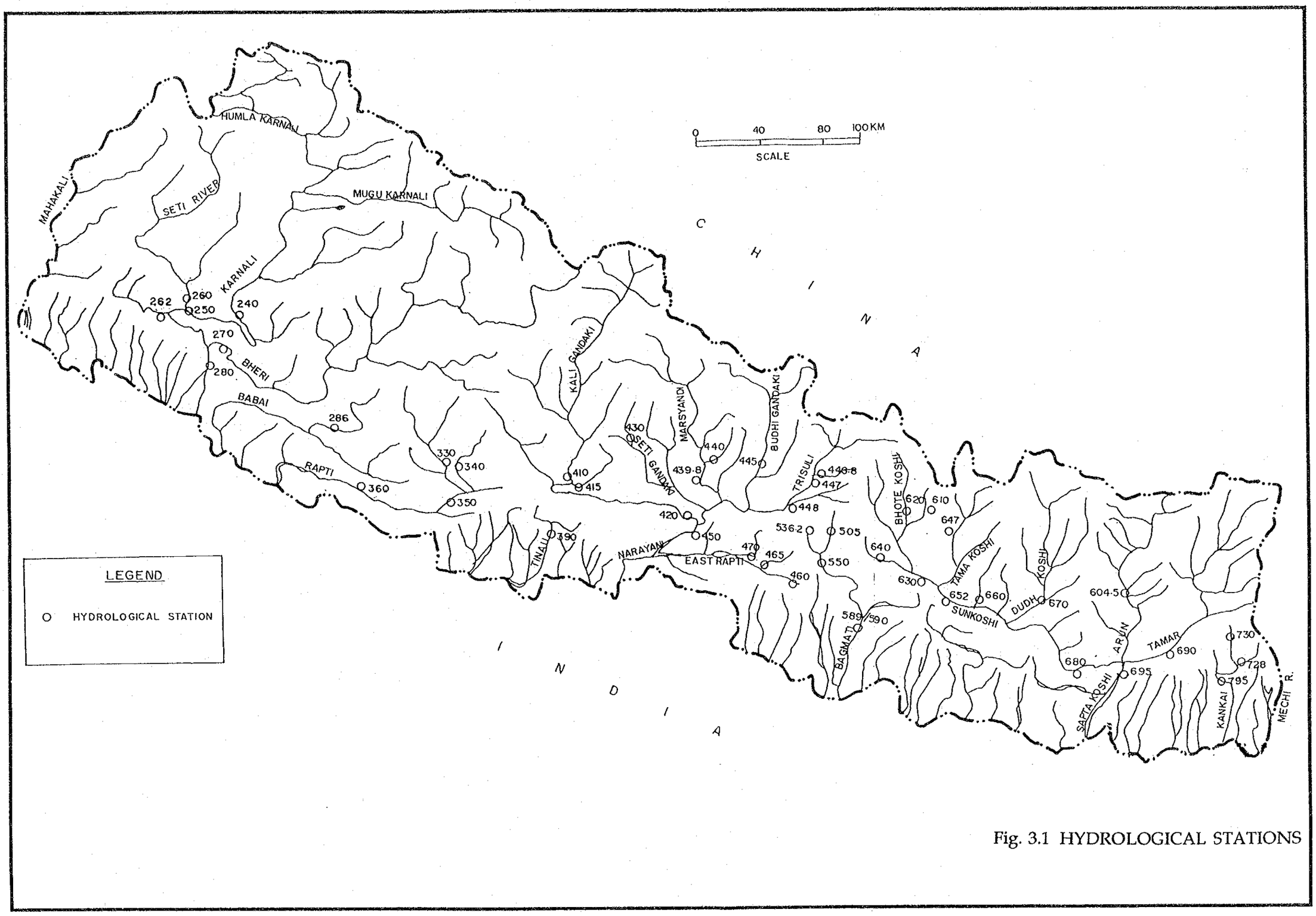


Fig. 3.1 HYDROLOGICAL STATIONS

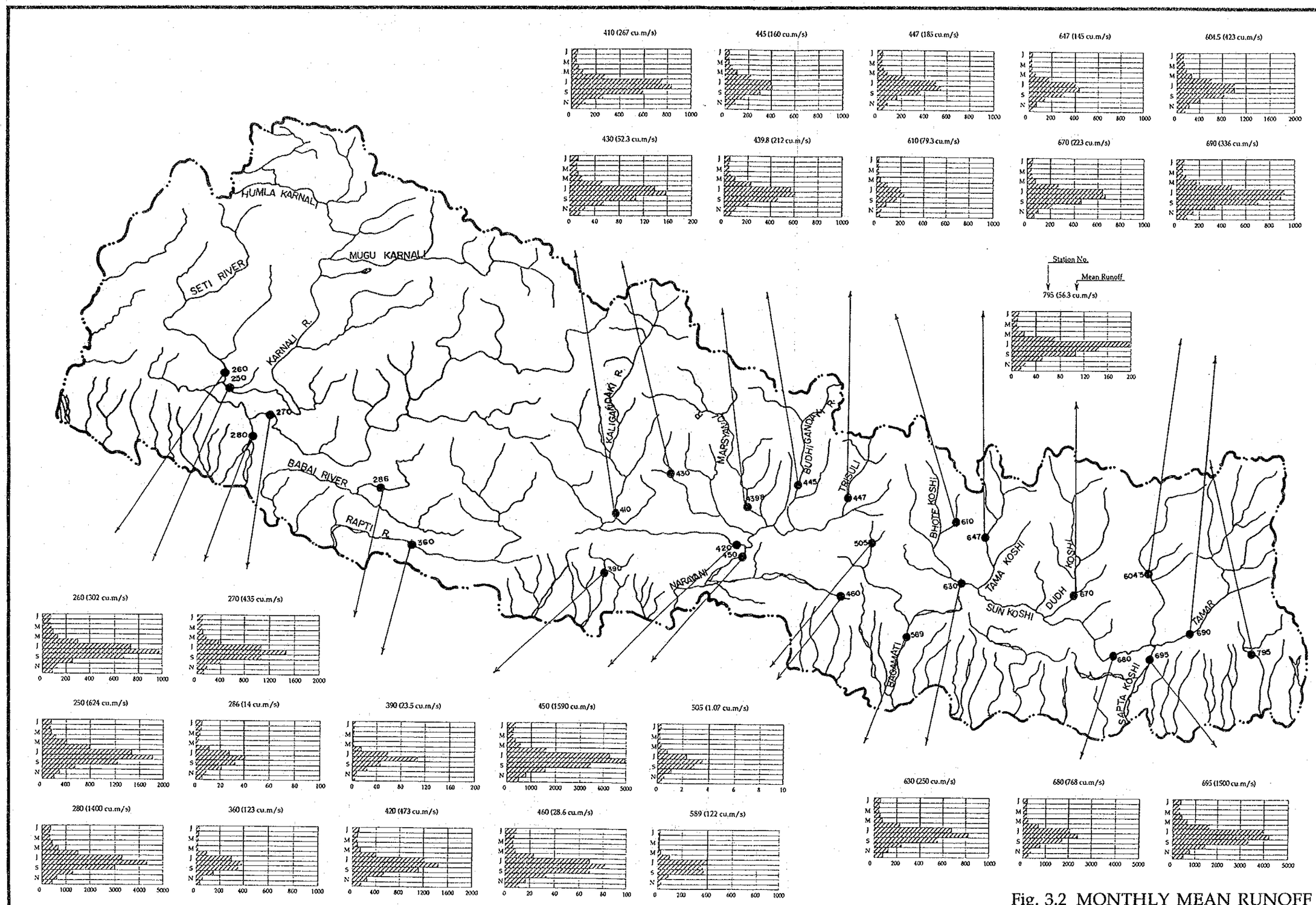


Fig. 3.2 MONTHLY MEAN RUNOFF

Basin	ln Q30 = a + b ln A	
	a	b
Karnali River Basin	− 6.583	1.162
Gandaki River Basin	− 3.462	0.844
Koshi River Basin	− 3.484	0.855
Southern River Basin	− 3.840	0.737

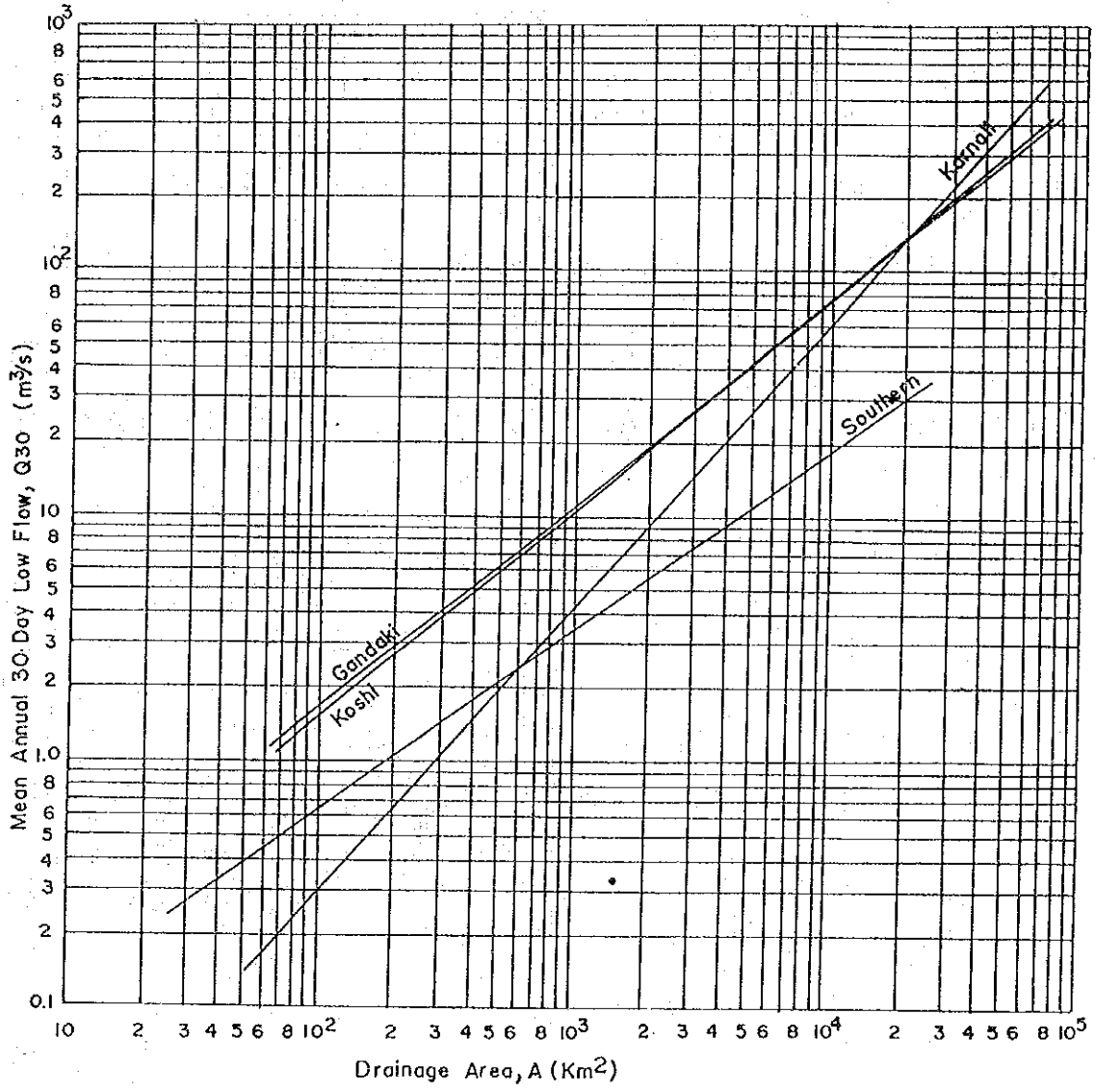


Fig. 3.3 MEAN ANNUAL 30-DAY LOW FLOW AND DRAINAGE AREA

SOURCE : Hydrological Studies of Nepal, Water and Energy Commission.

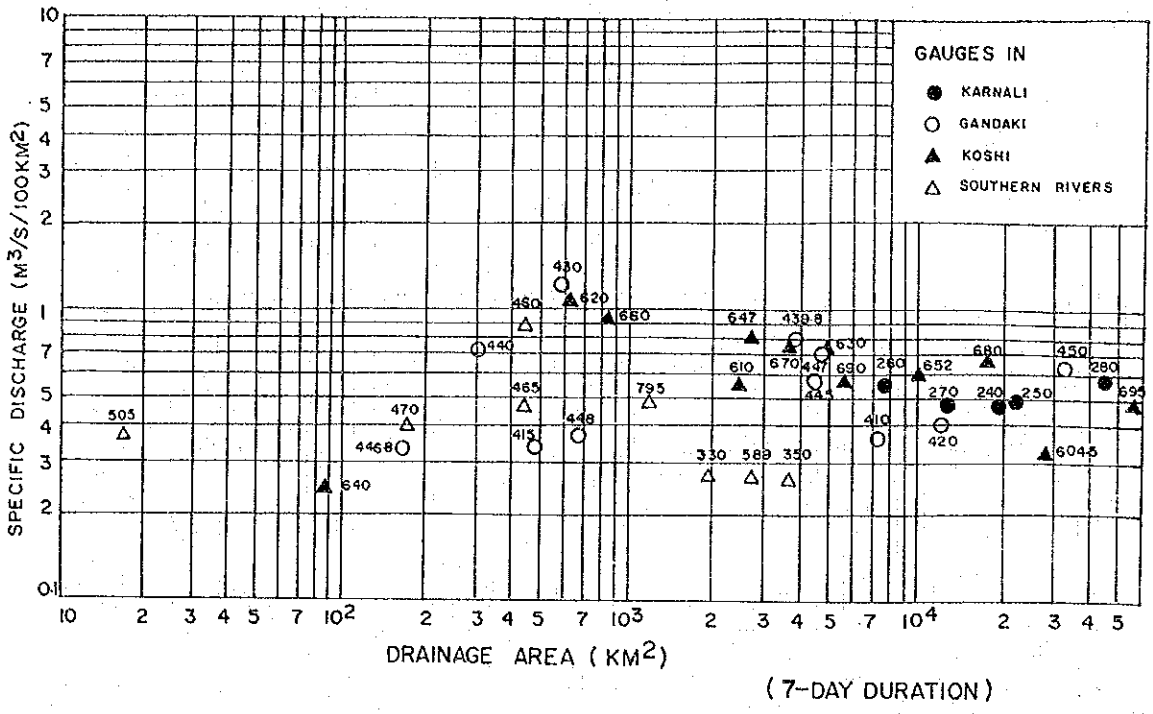


Fig. 3.4 10-YEAR PROBABLE LOW FLOW AND DRAINAGE AREA (1/2)

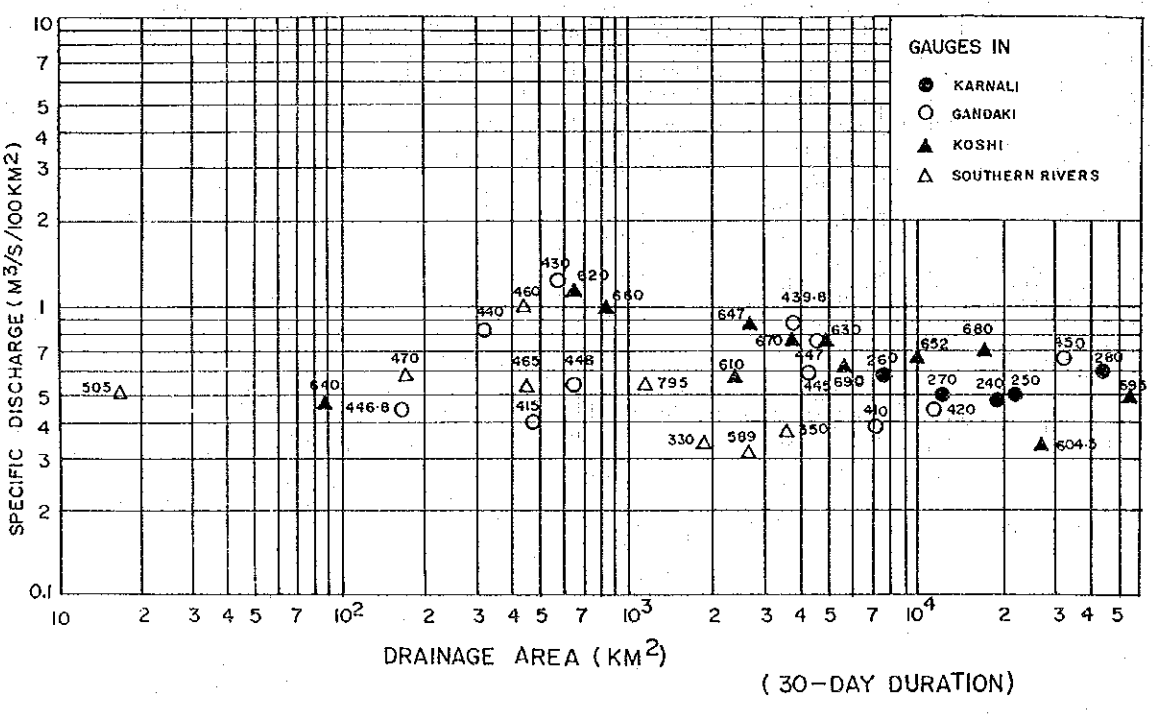


Fig. 3.4 10-YEAR PROBABLE LOW FLOW AND DRAINAGE AREA (2/2)

DATA SOURCE : Methodologies for Estimating Hydrologic Characteristics of Ungauged Location in Nepal, July 1990, WECS and DHM

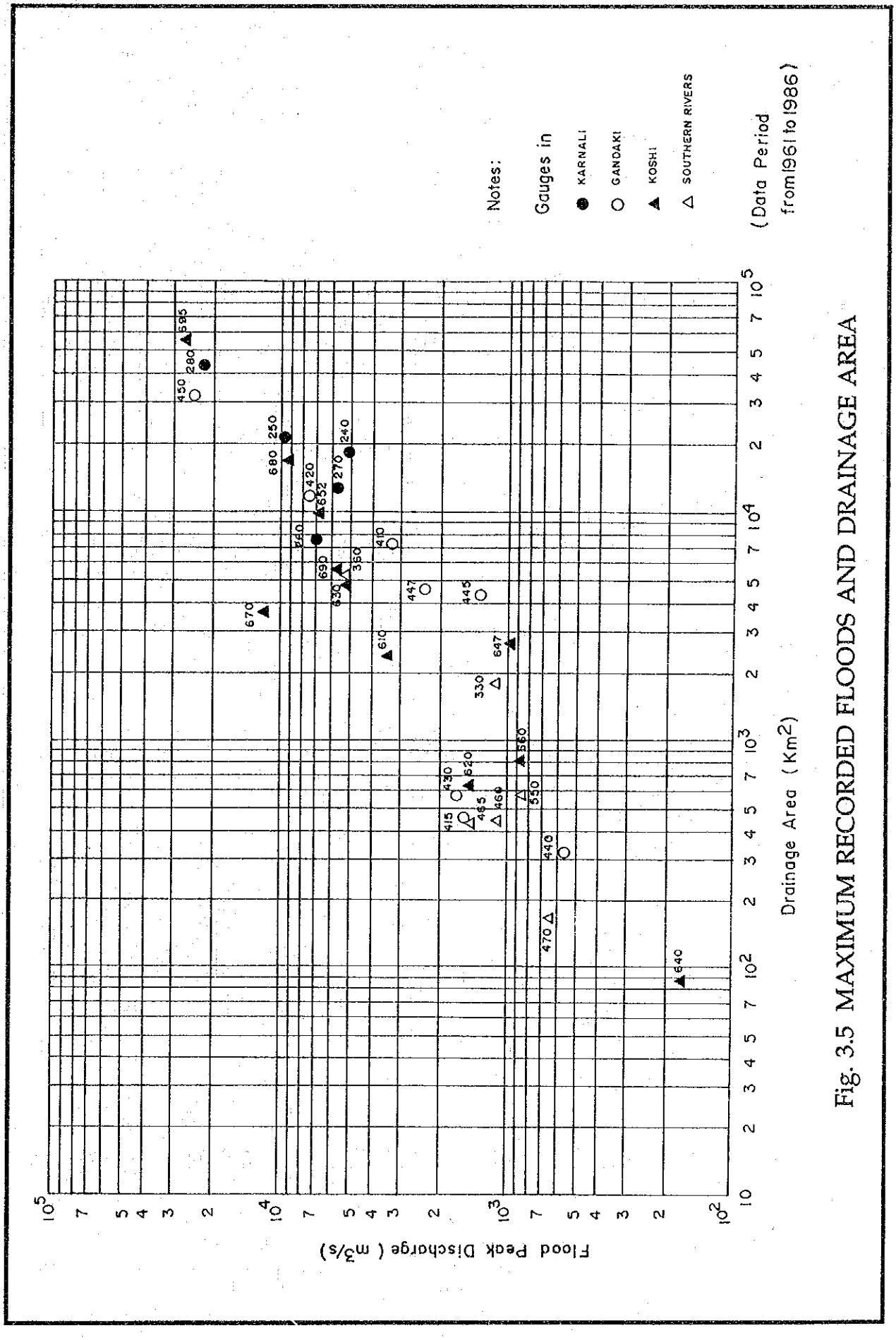


Fig. 3.5 MAXIMUM RECORDED FLOODS AND DRAINAGE AREA

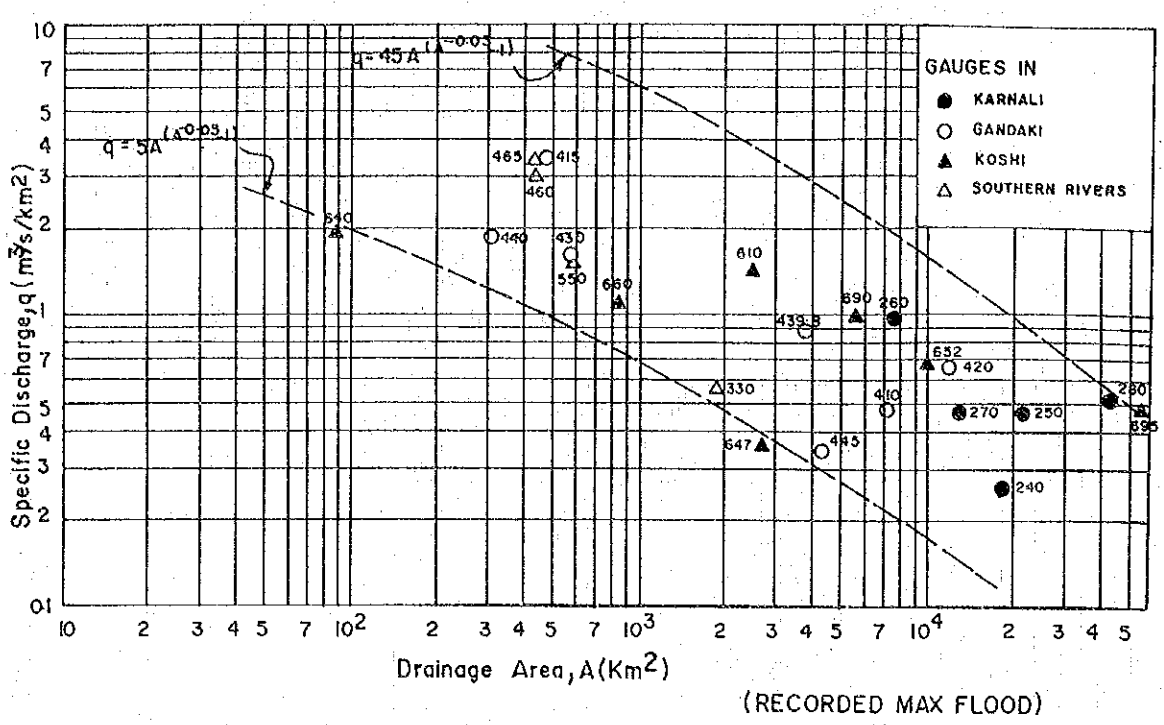


Fig. 3.6 SPECIFIC FLOOD PEAK AND DRAINAGE AREA (1/2)

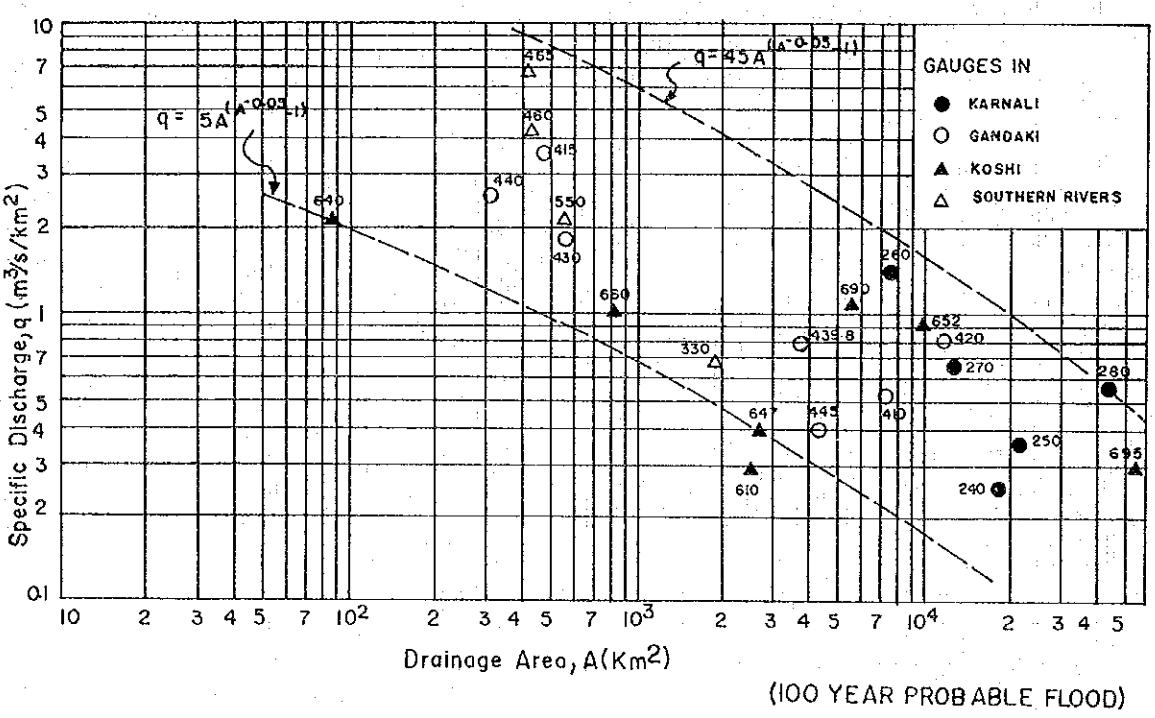
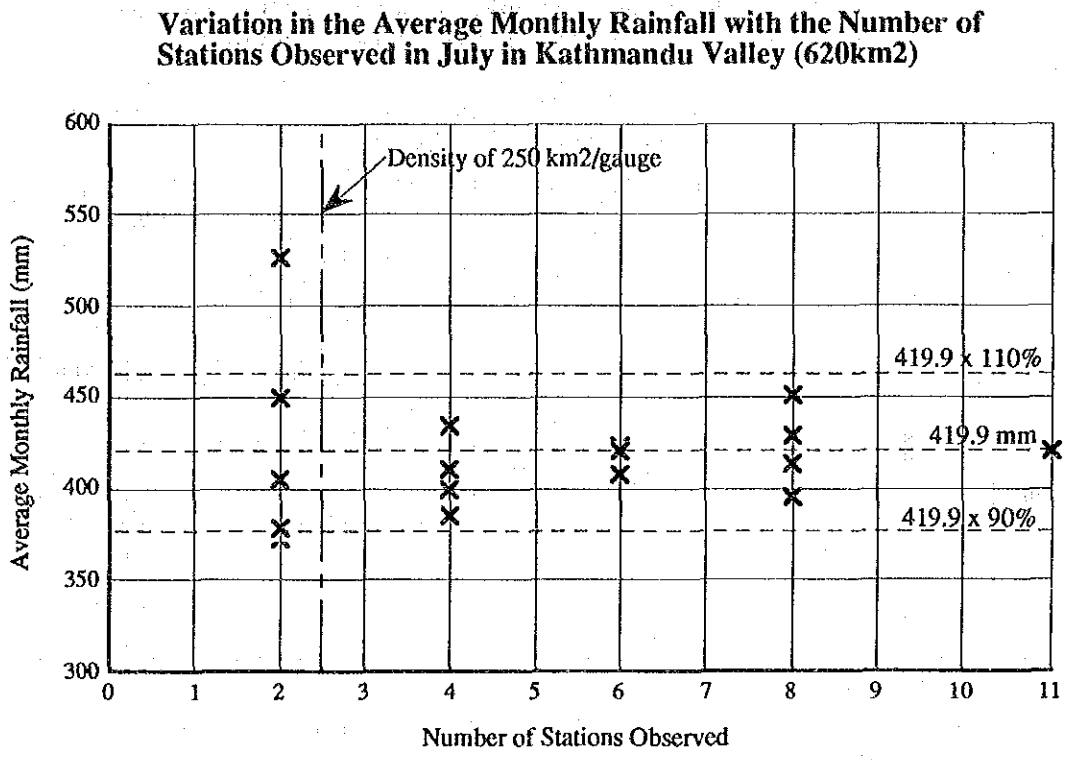


Fig. 3.6 SPECIFIC FLOOD PEAK AND DRAINAGE AREA (2/2)

DATA SOURCE : 1) Hydrological Studies of Nepal, March 1982, WEC
2) Methodologies for Estimating Hydrologic Characteristics of Ungauged Locations in Nepal, July 1990, WECS and DHM



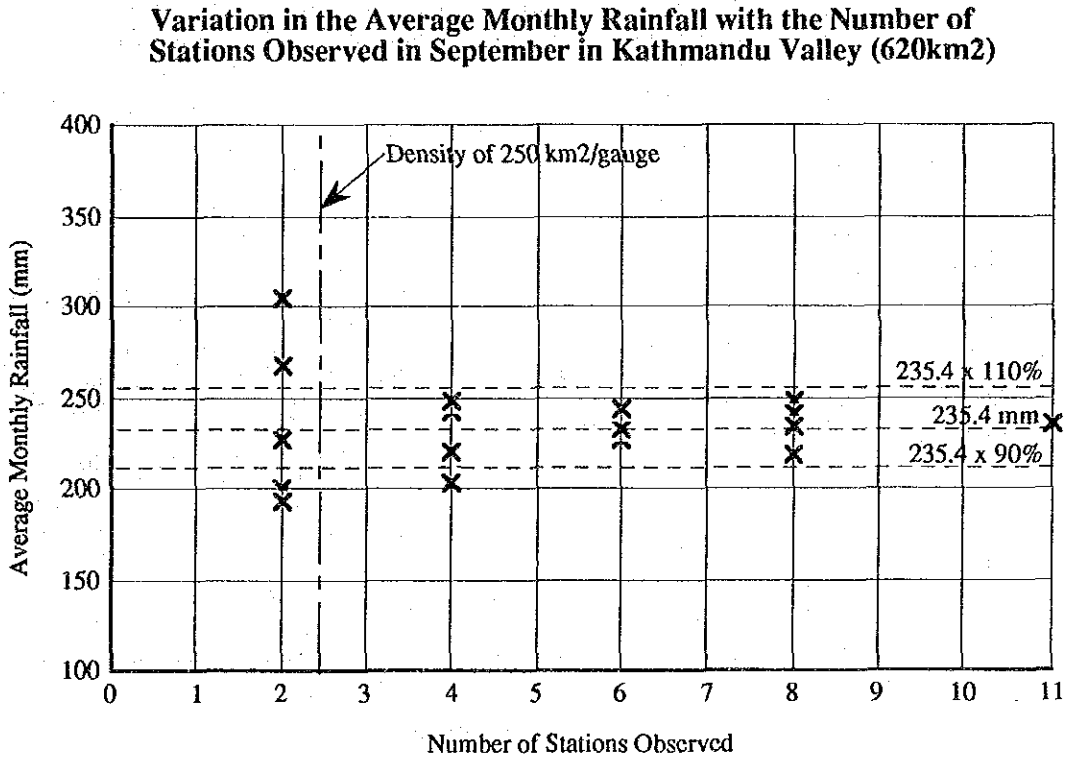
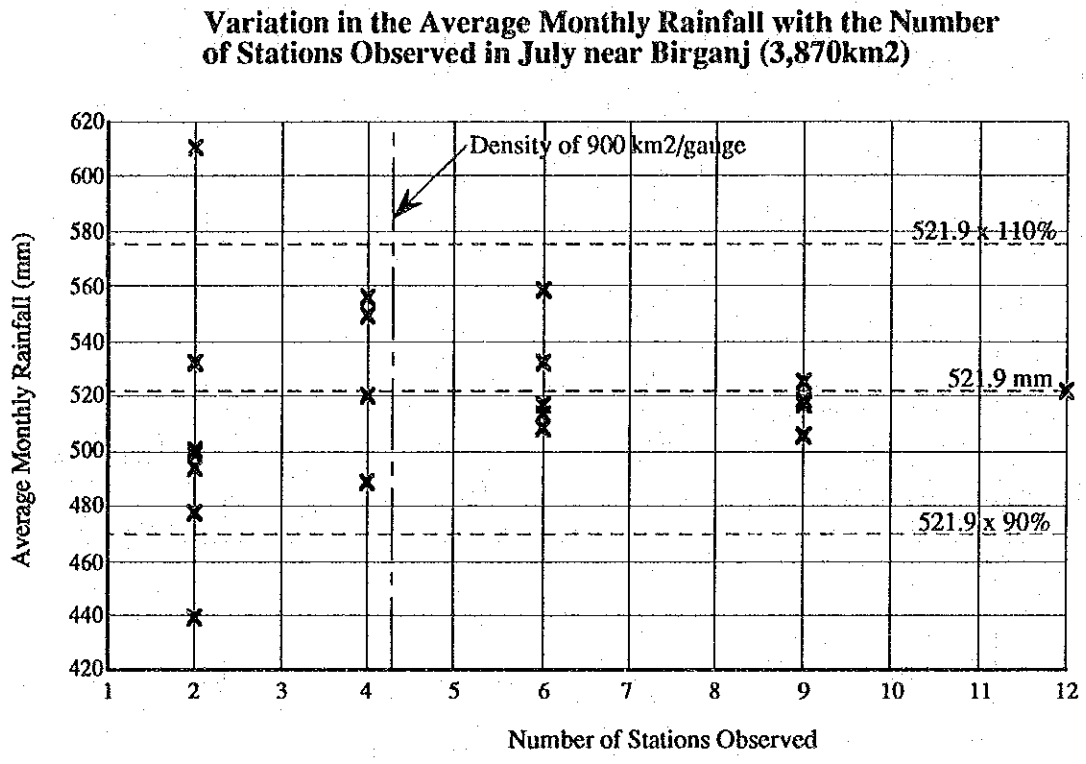


Fig. 4.1 VARIATION IN THE AVERAGE RAINFALL WITH THE NUMBER OF STATIONS IN MOUNTAINOUS AREA (KATHMANDU VALLEY)



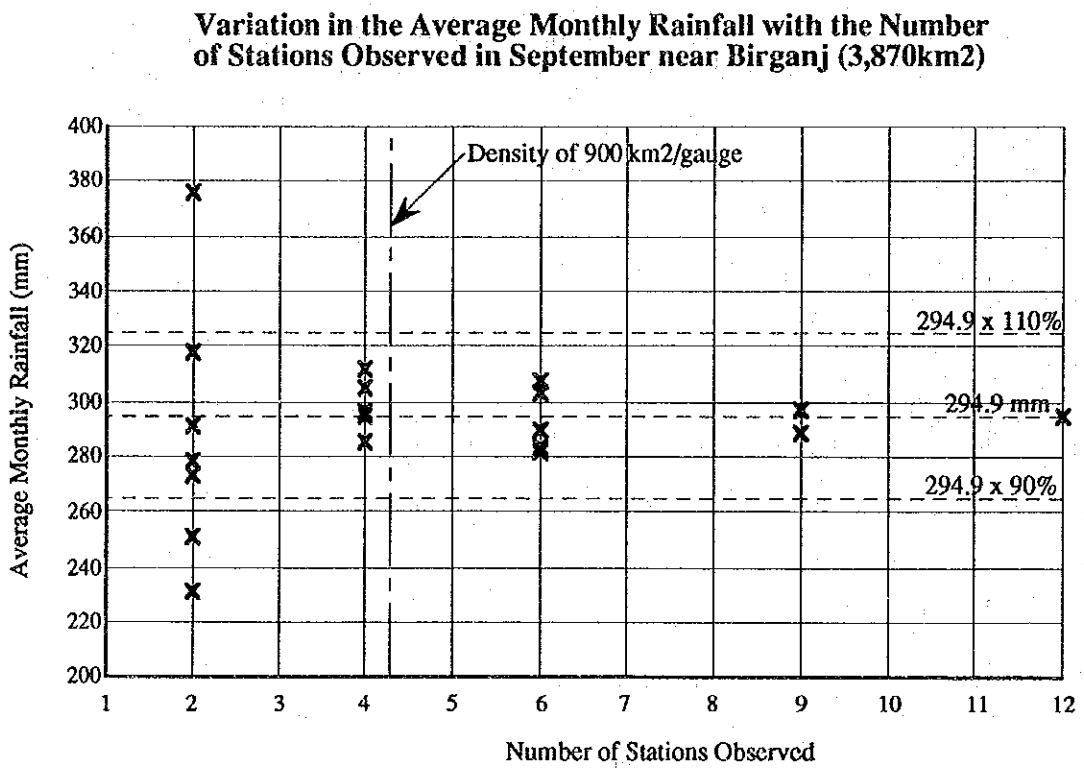


Fig. 4.2 VARIATION IN THE AVERAGE RAINFALL WITH THE NUMBER OF STATIONS IN TERAI AREA (BIRGANJ)

Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (1/33)

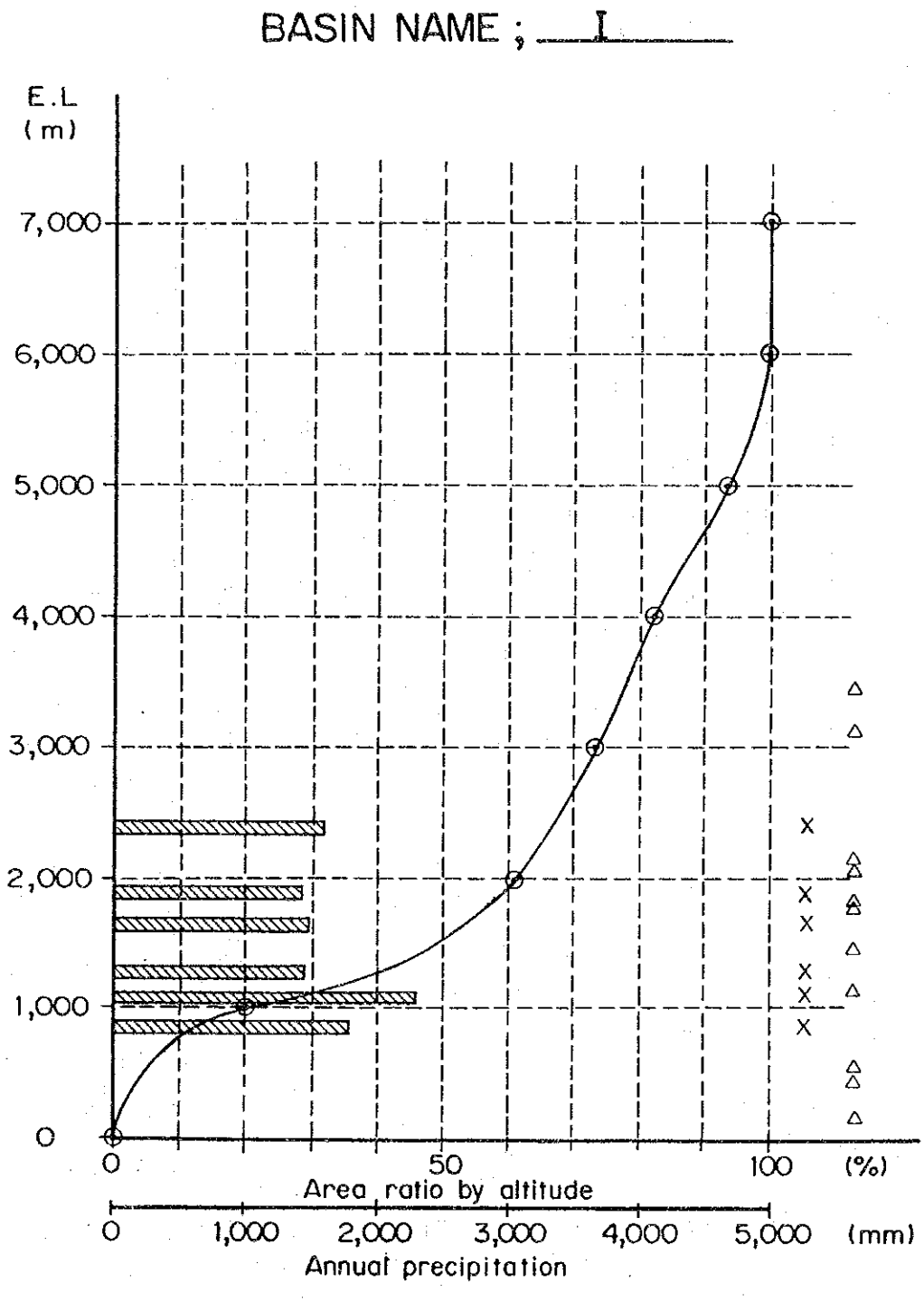


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (2/33)

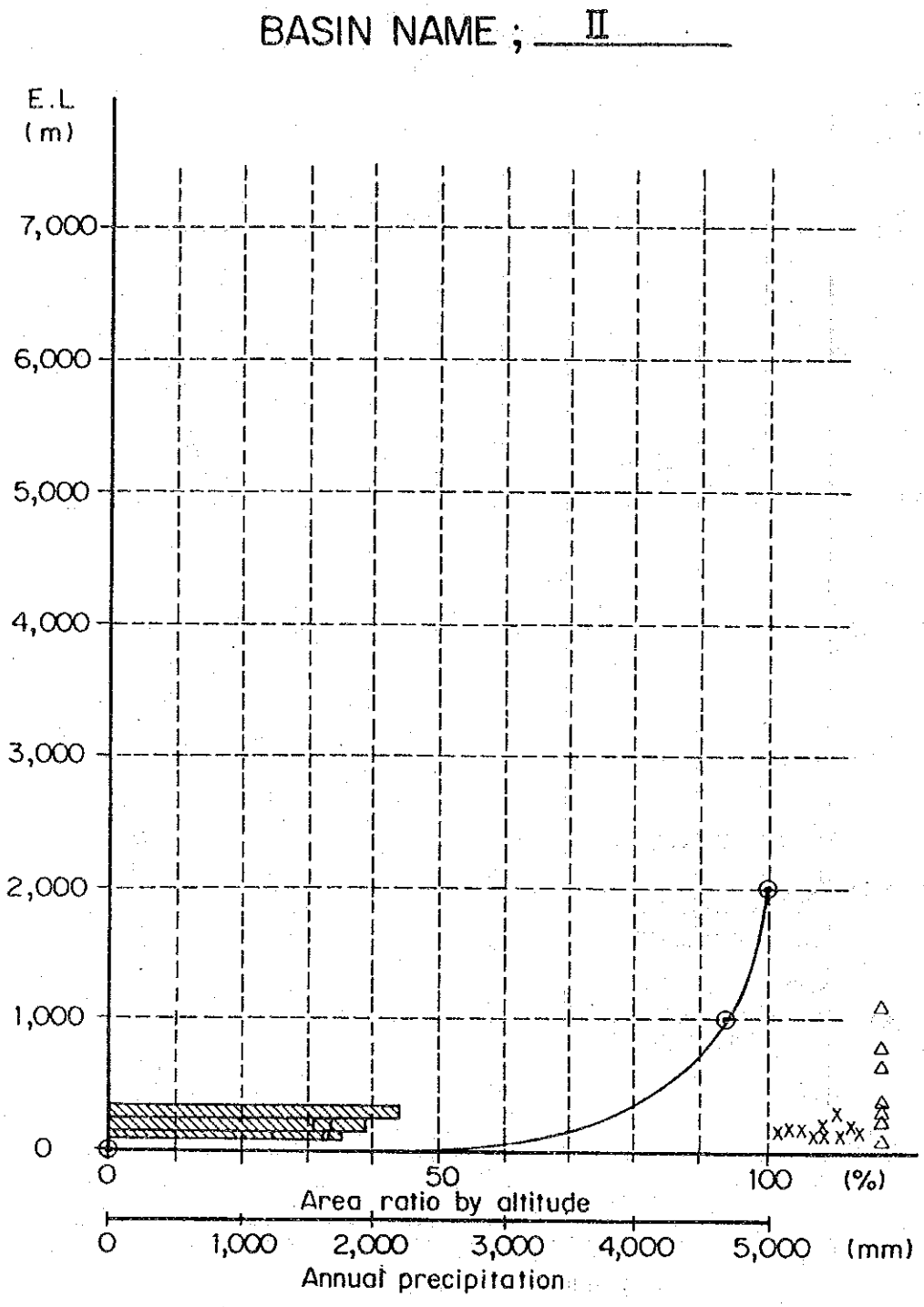


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (3/33)

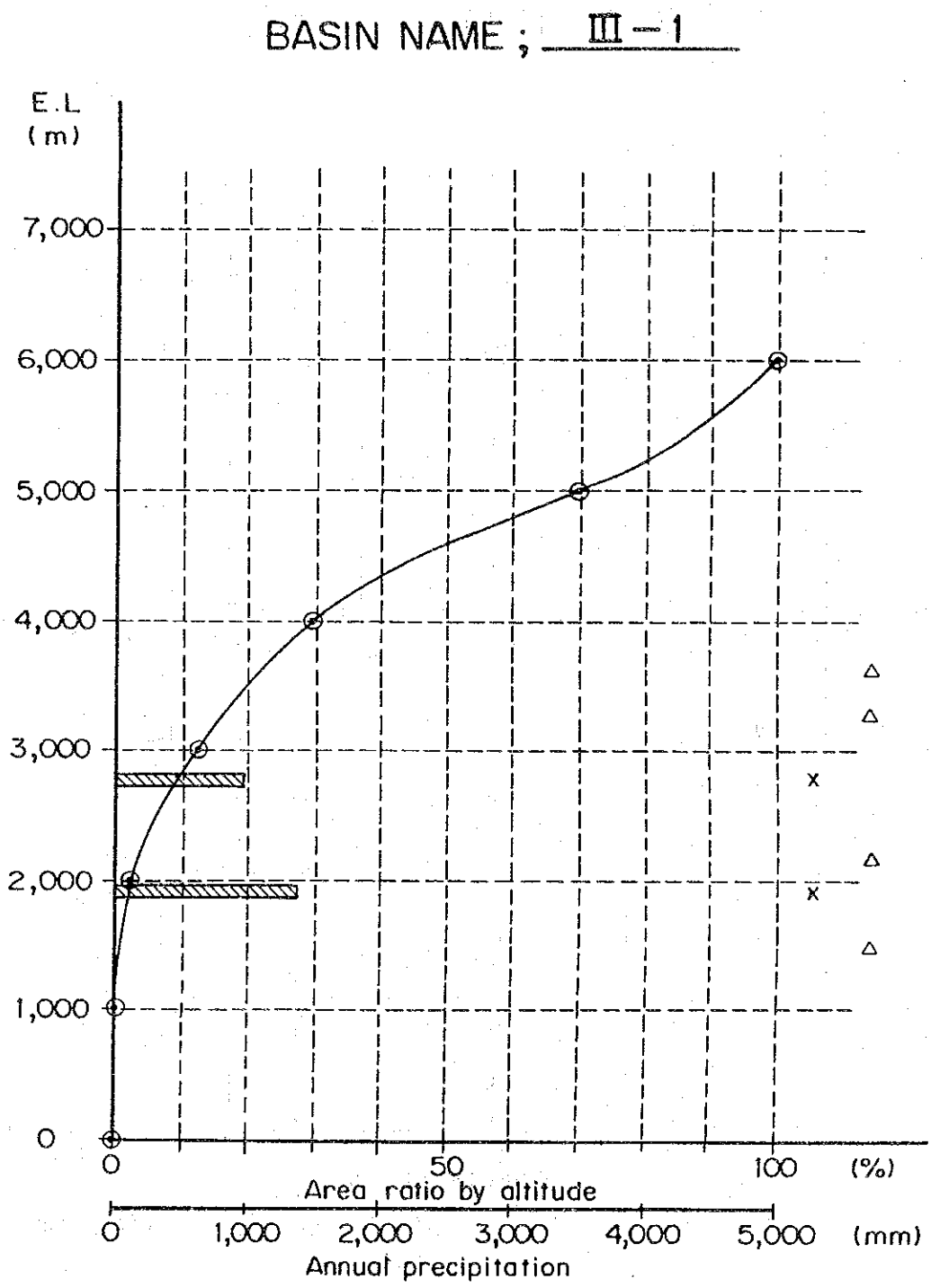


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (4/33)

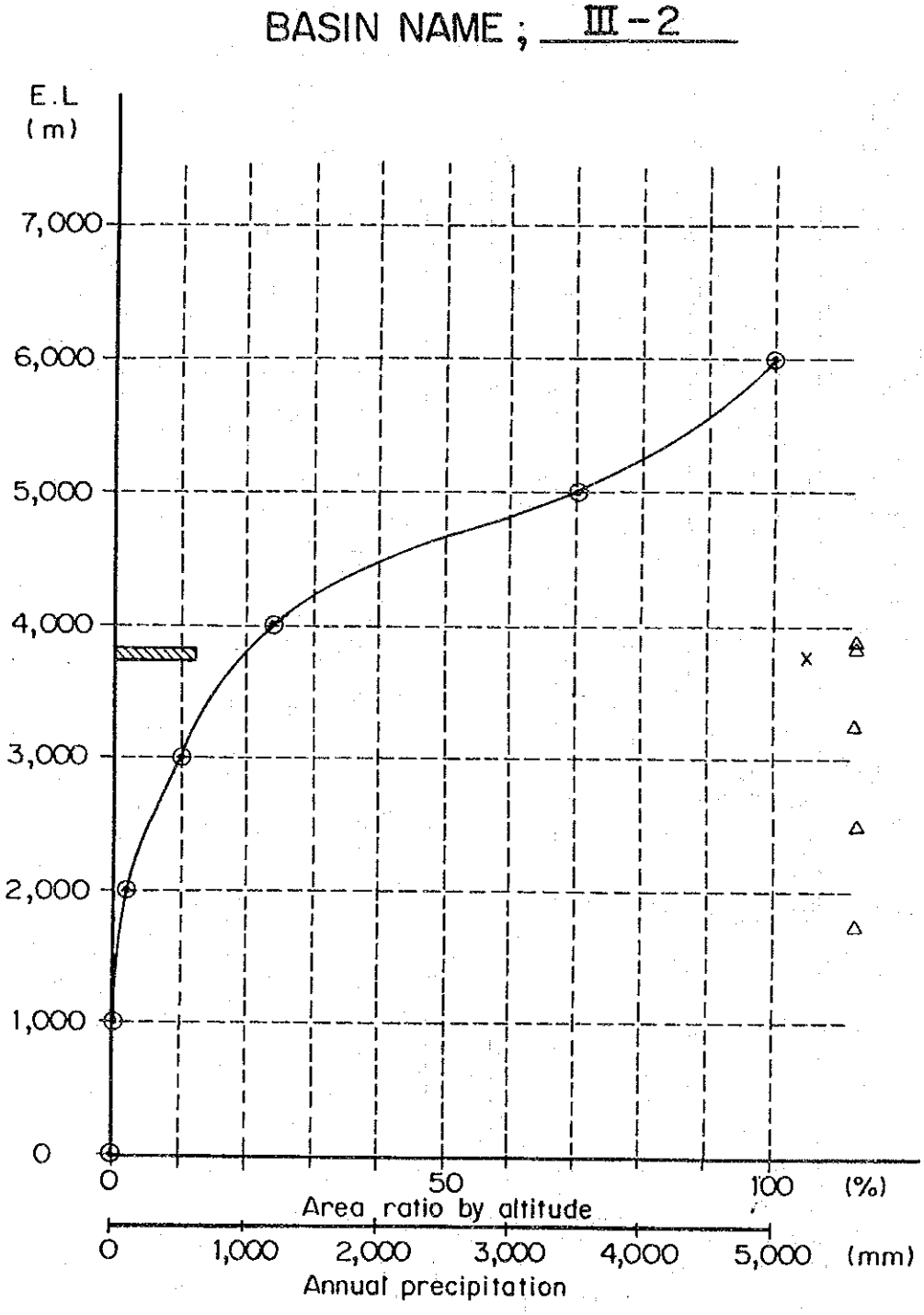


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (5/33)

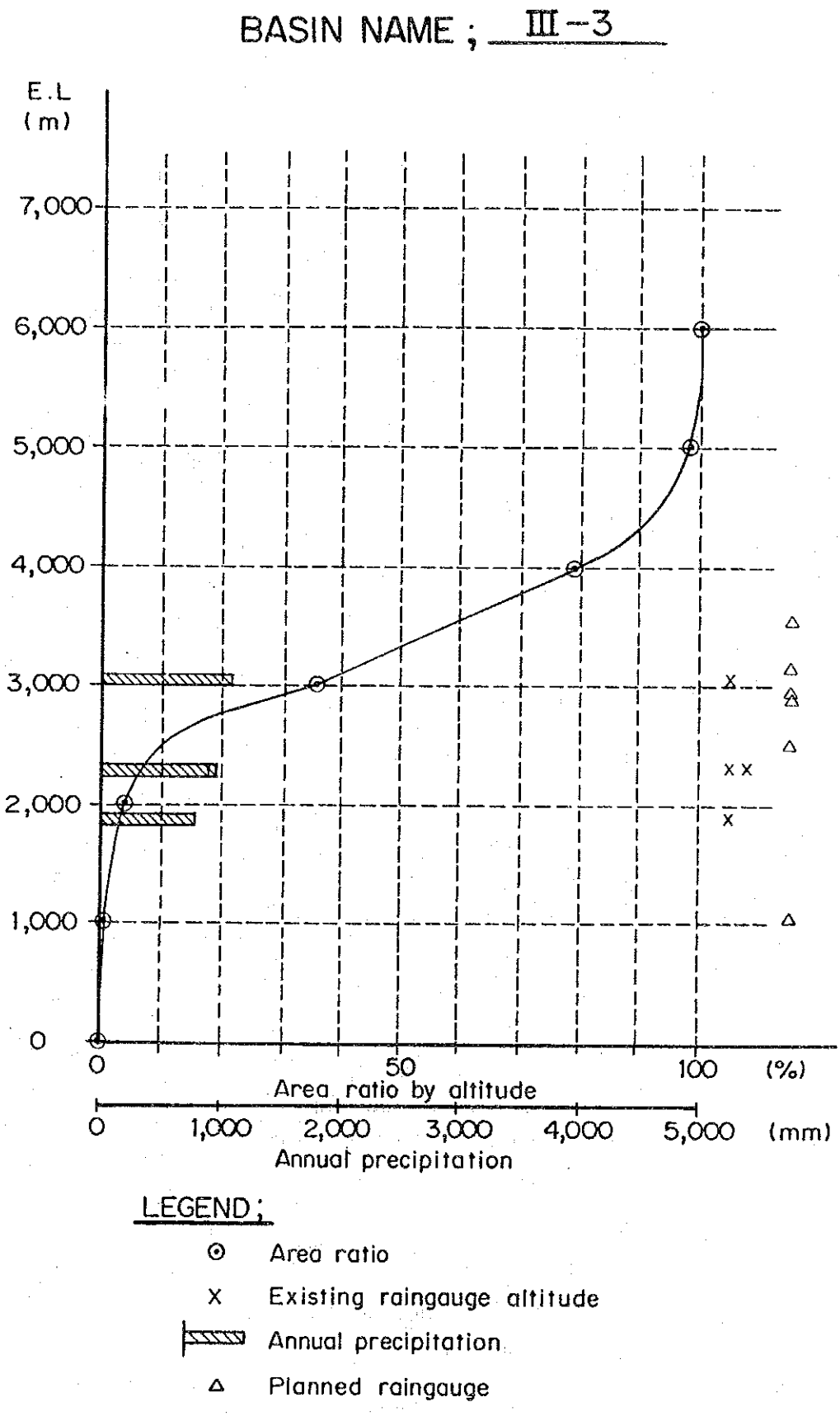


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (6/33)

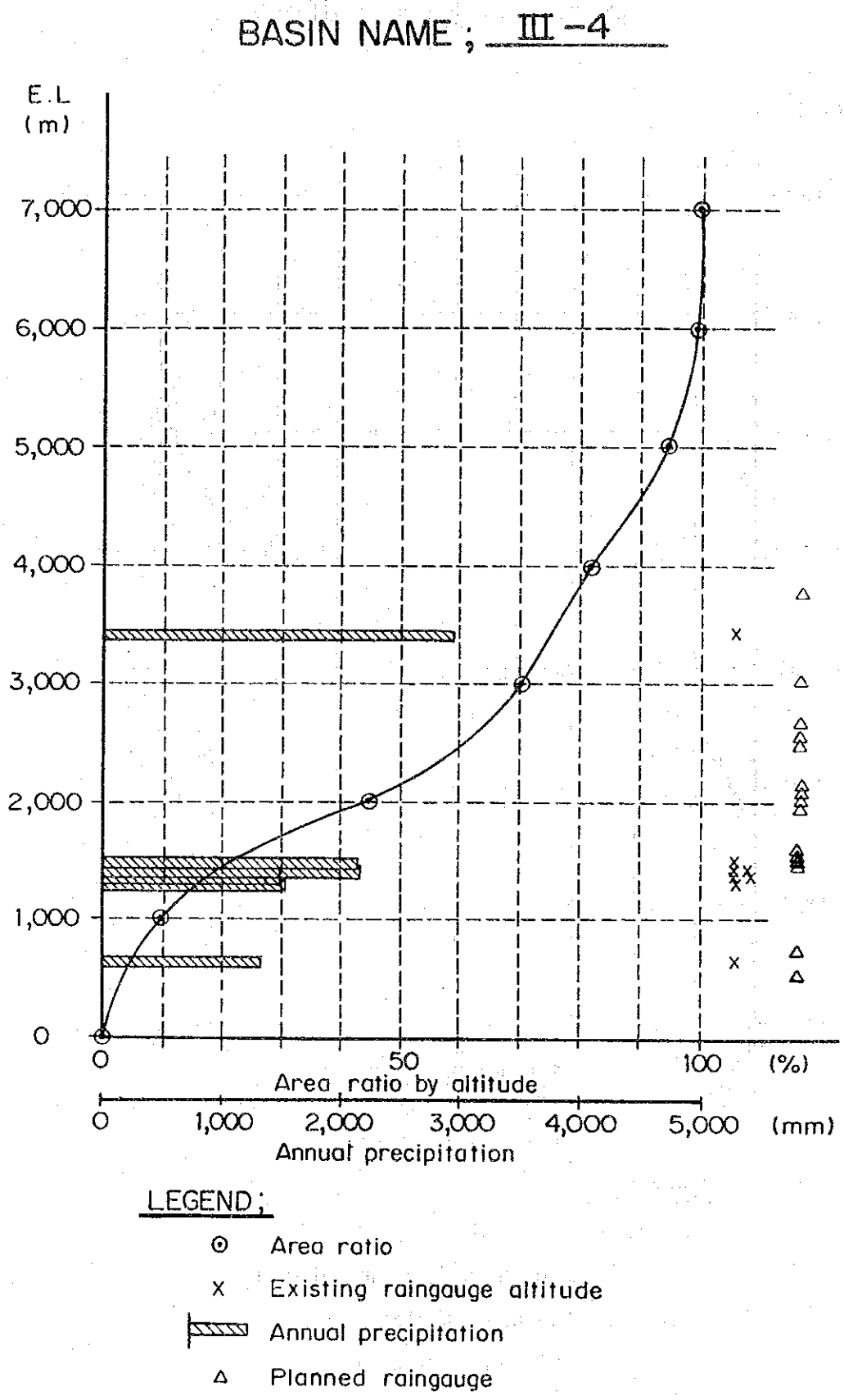


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (7/33)

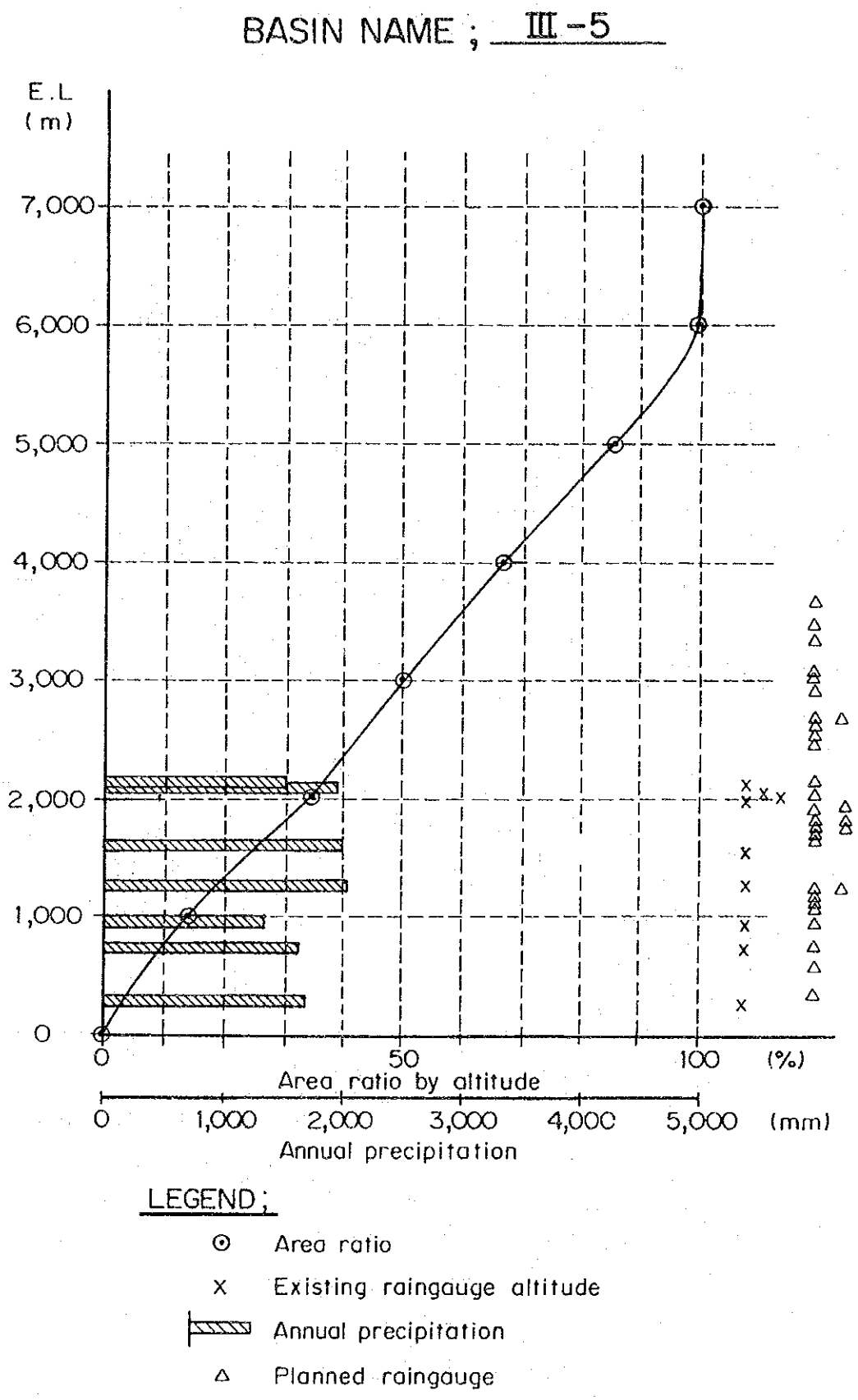


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (8/33)

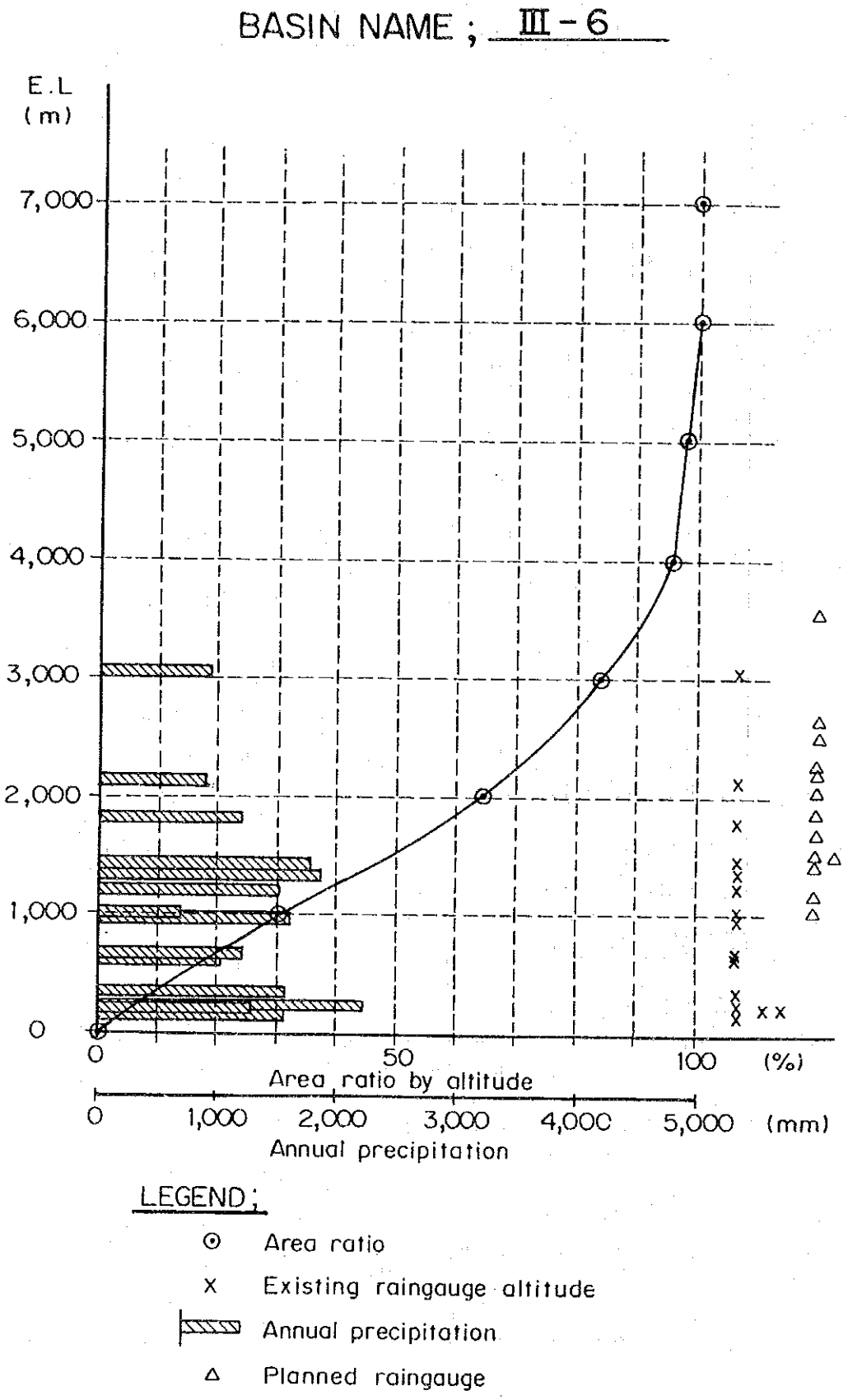


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (9/33)

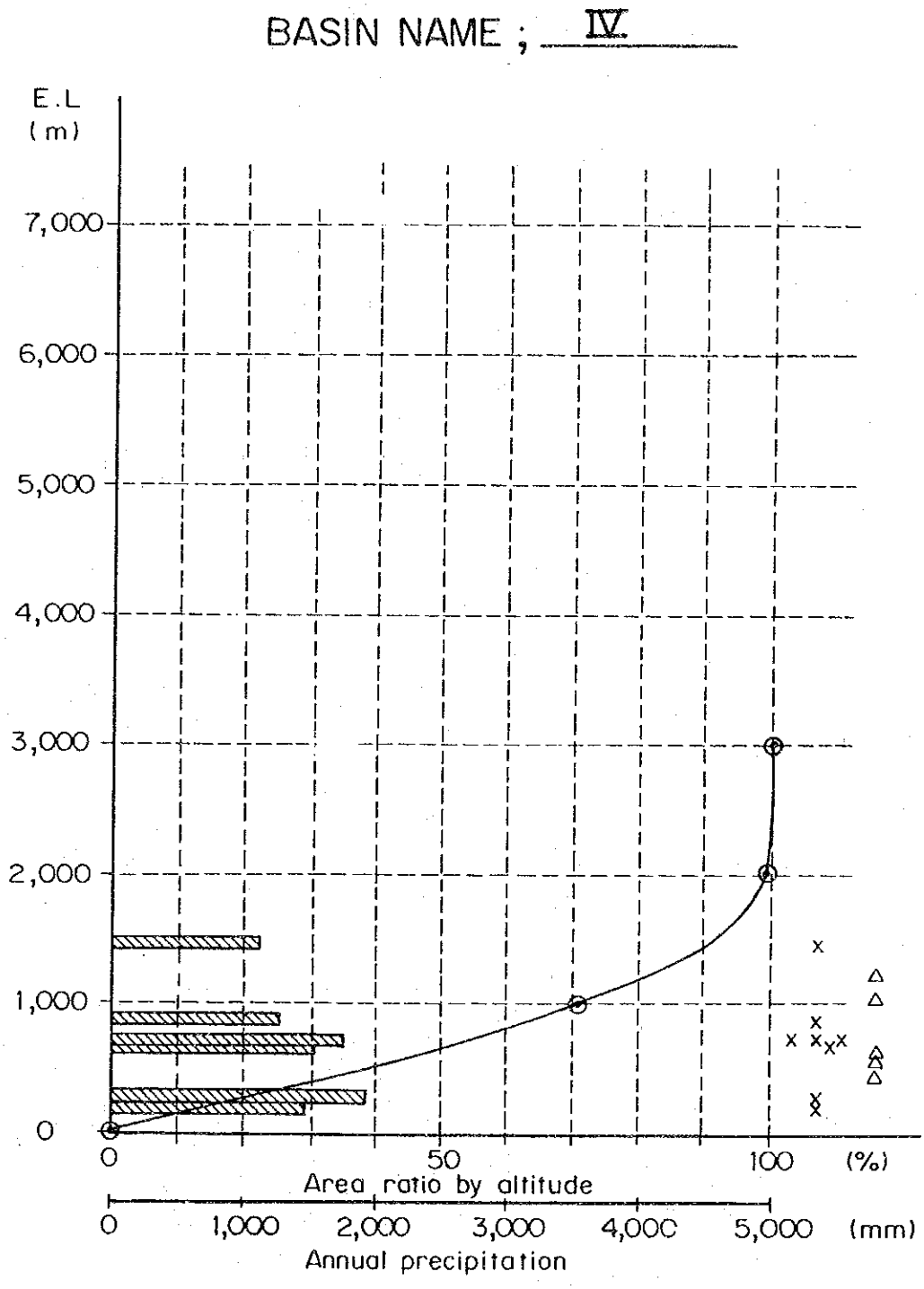


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (10/33)

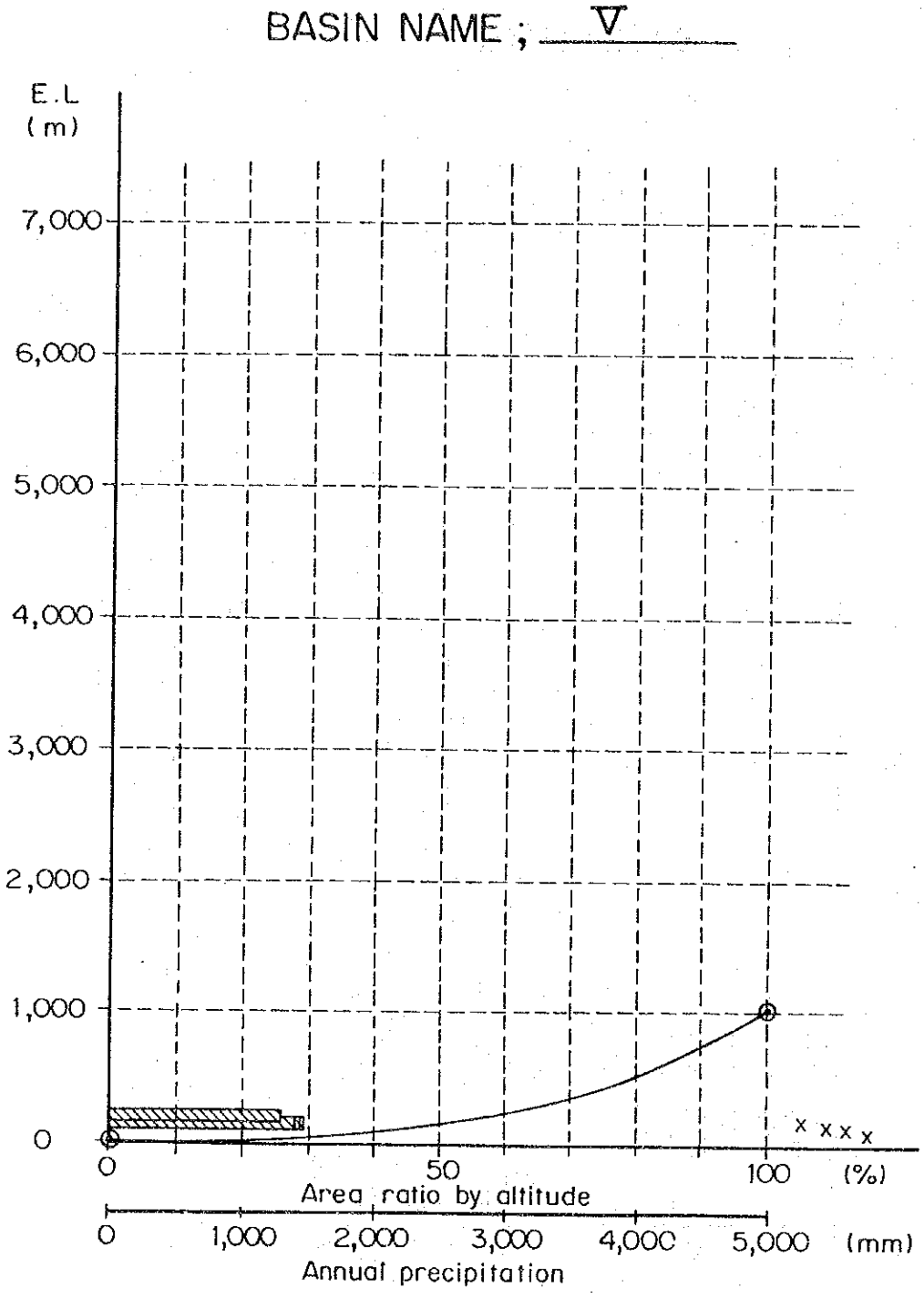


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (11/33)

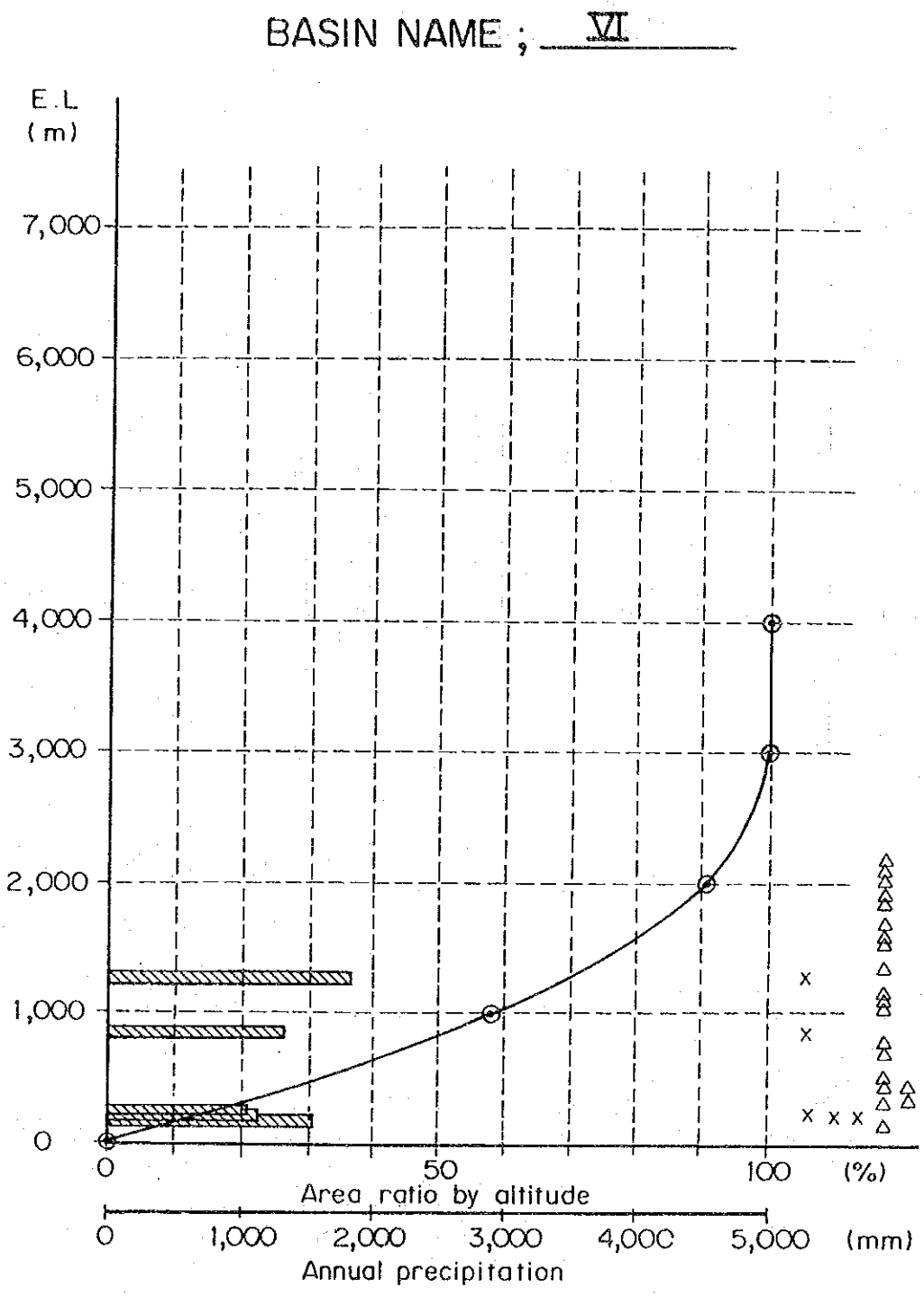


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (12/33)

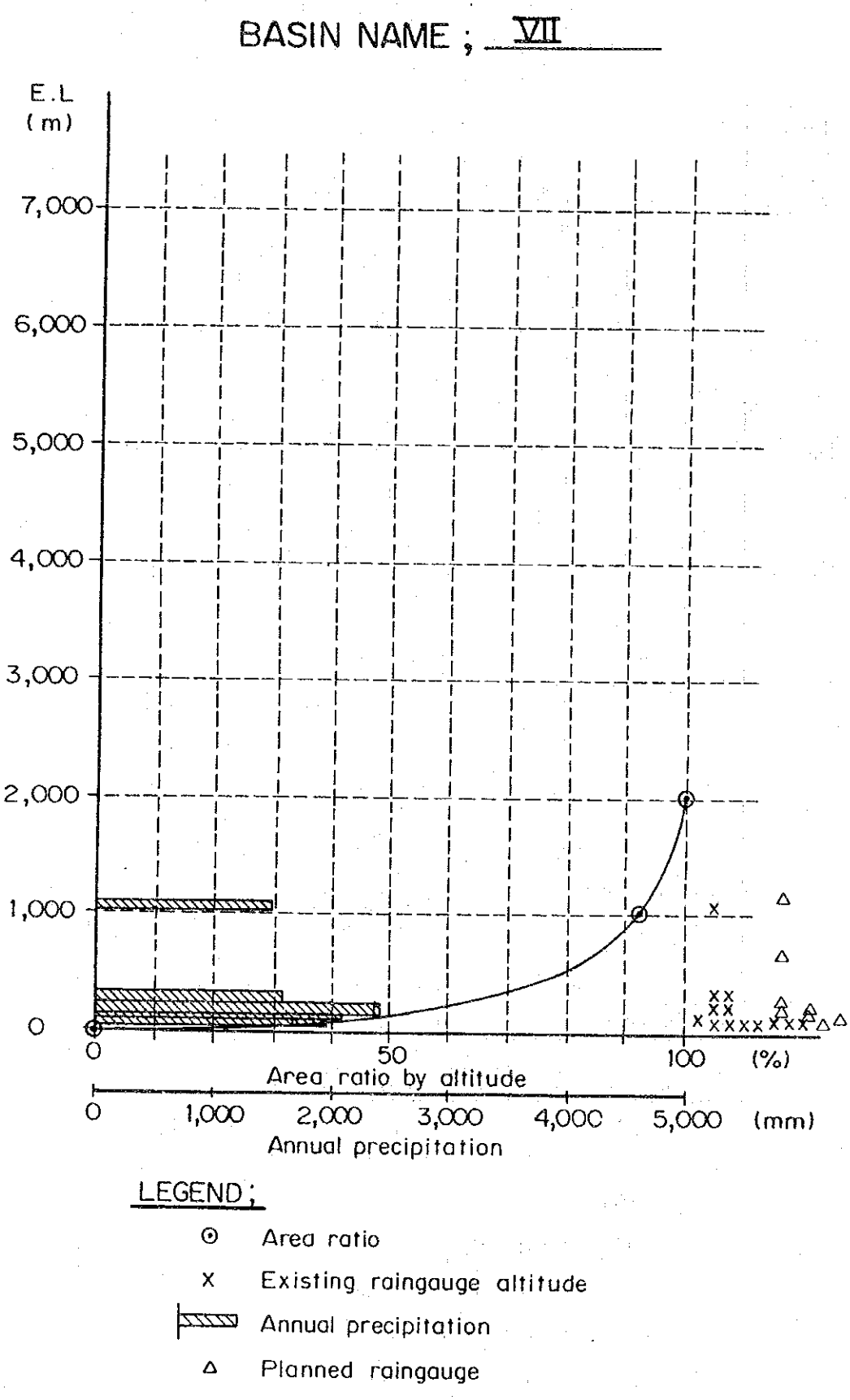


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (13/33)

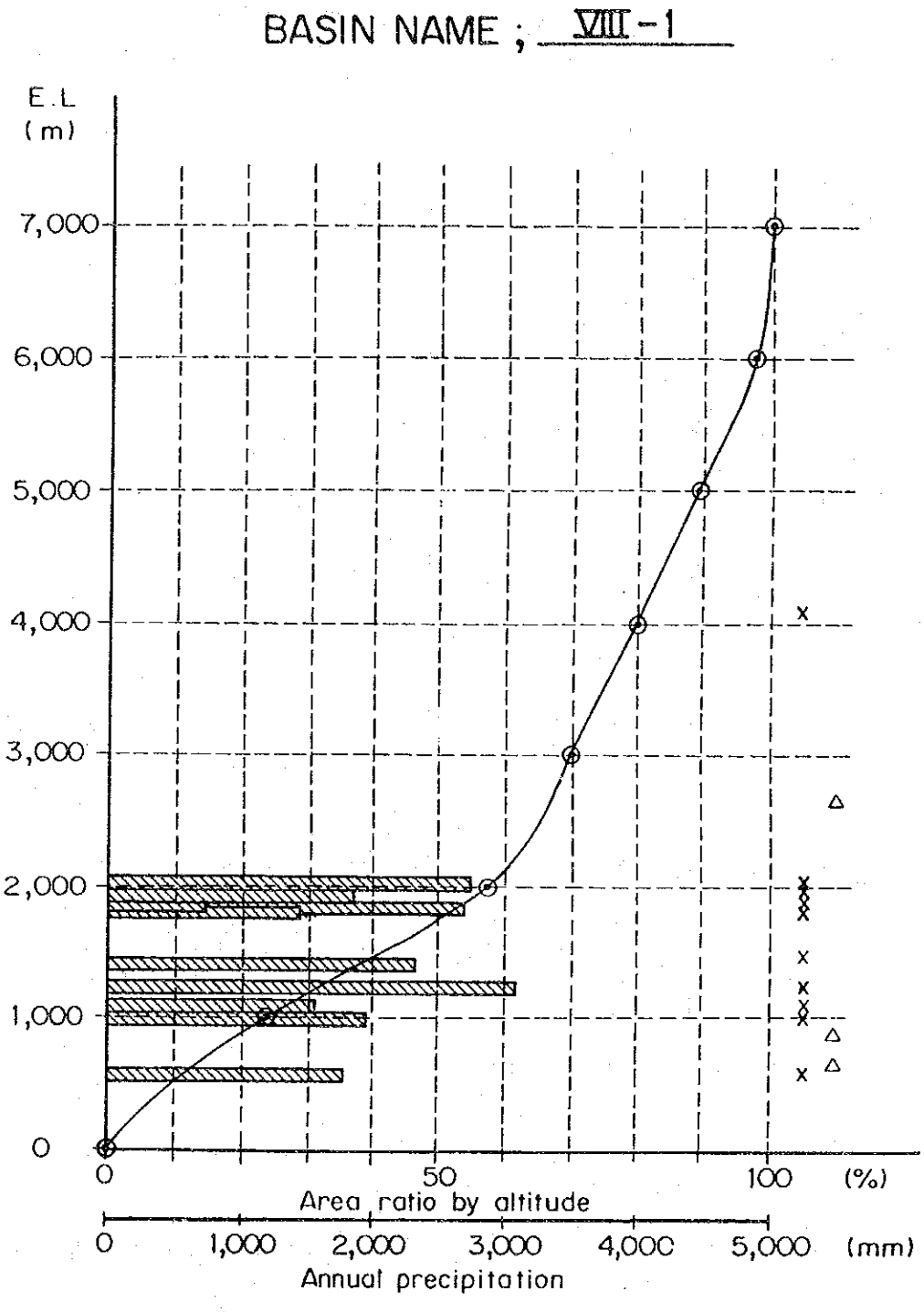


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (14/33)

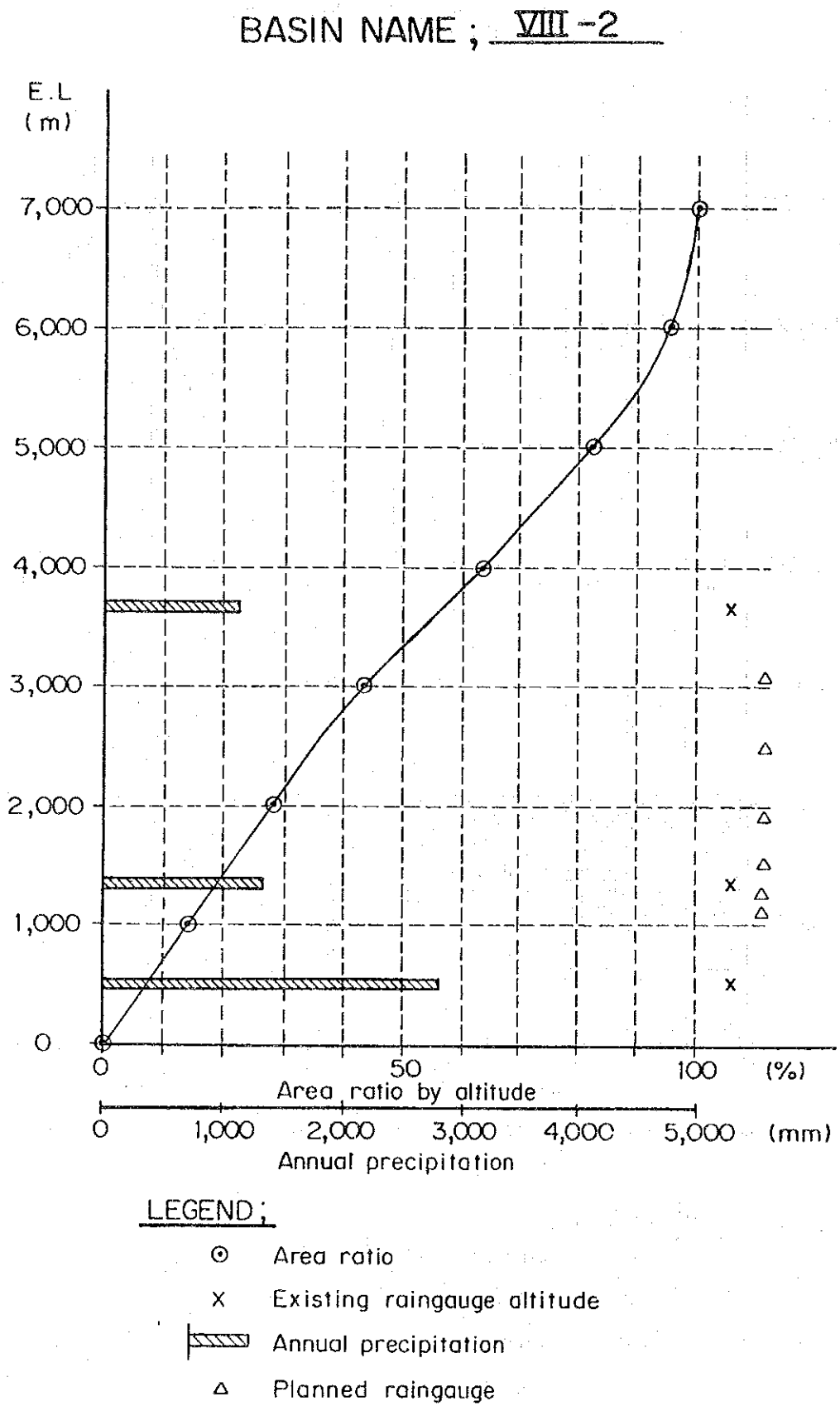


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (15/33)

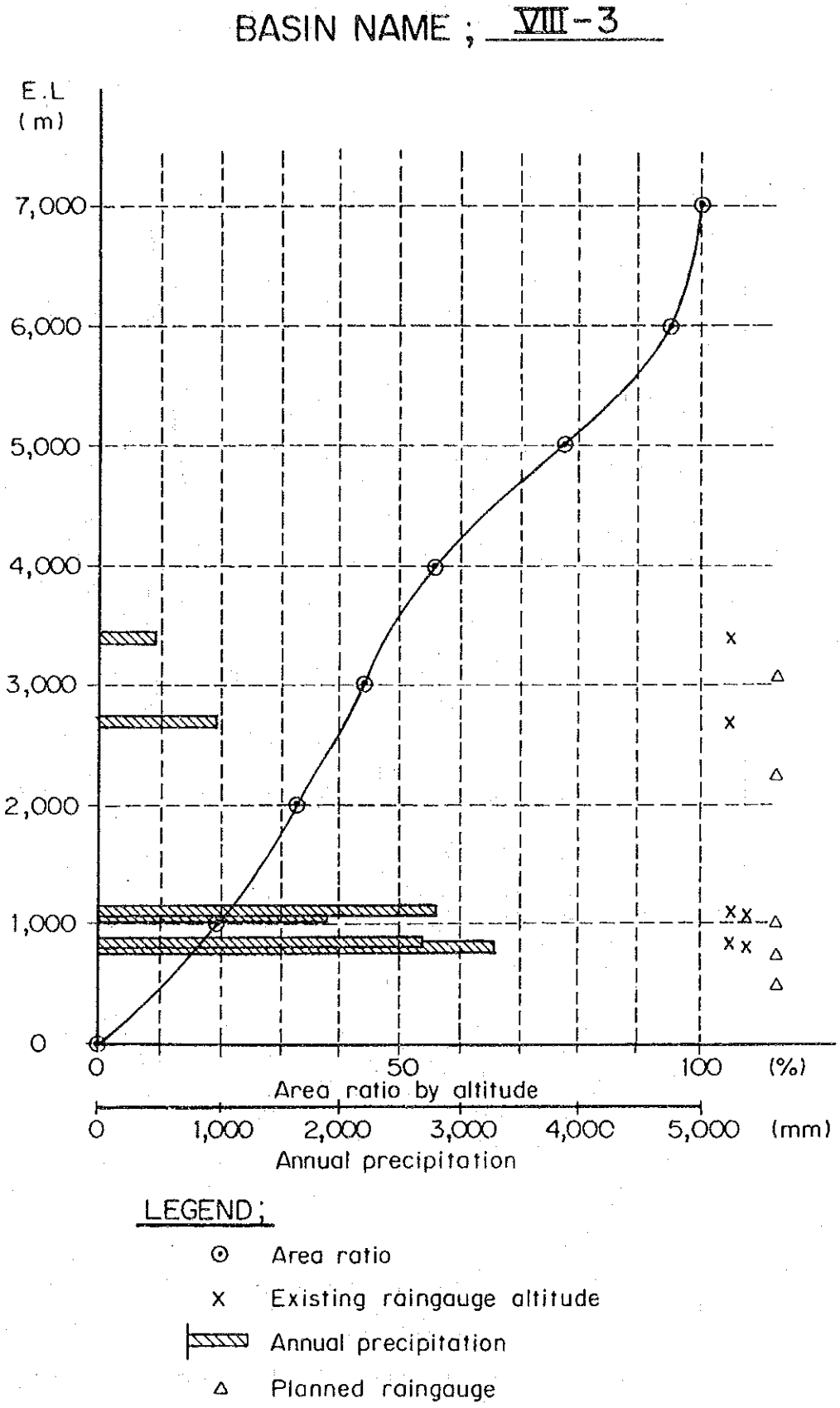


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (16/33)

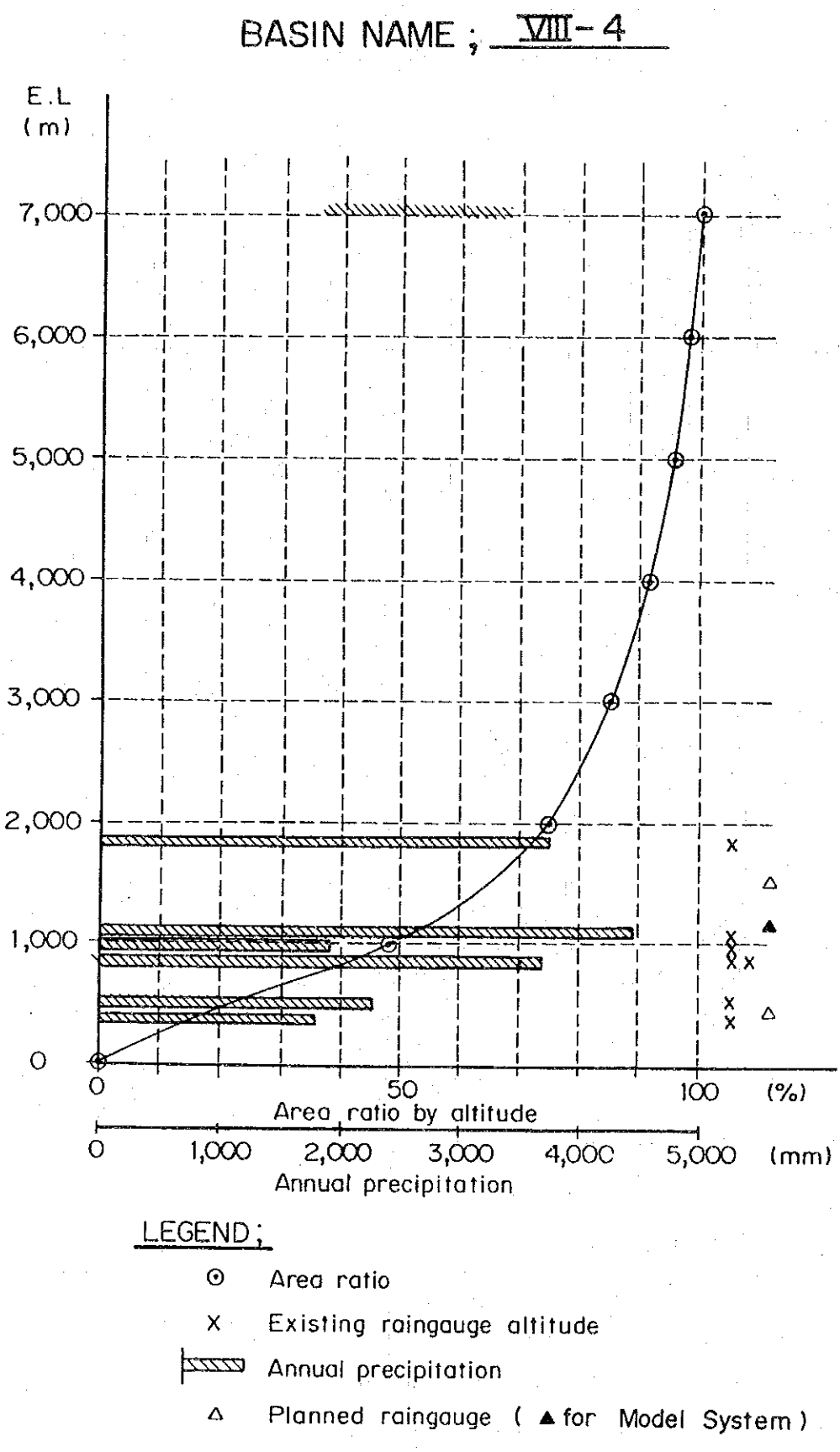


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (17/33)

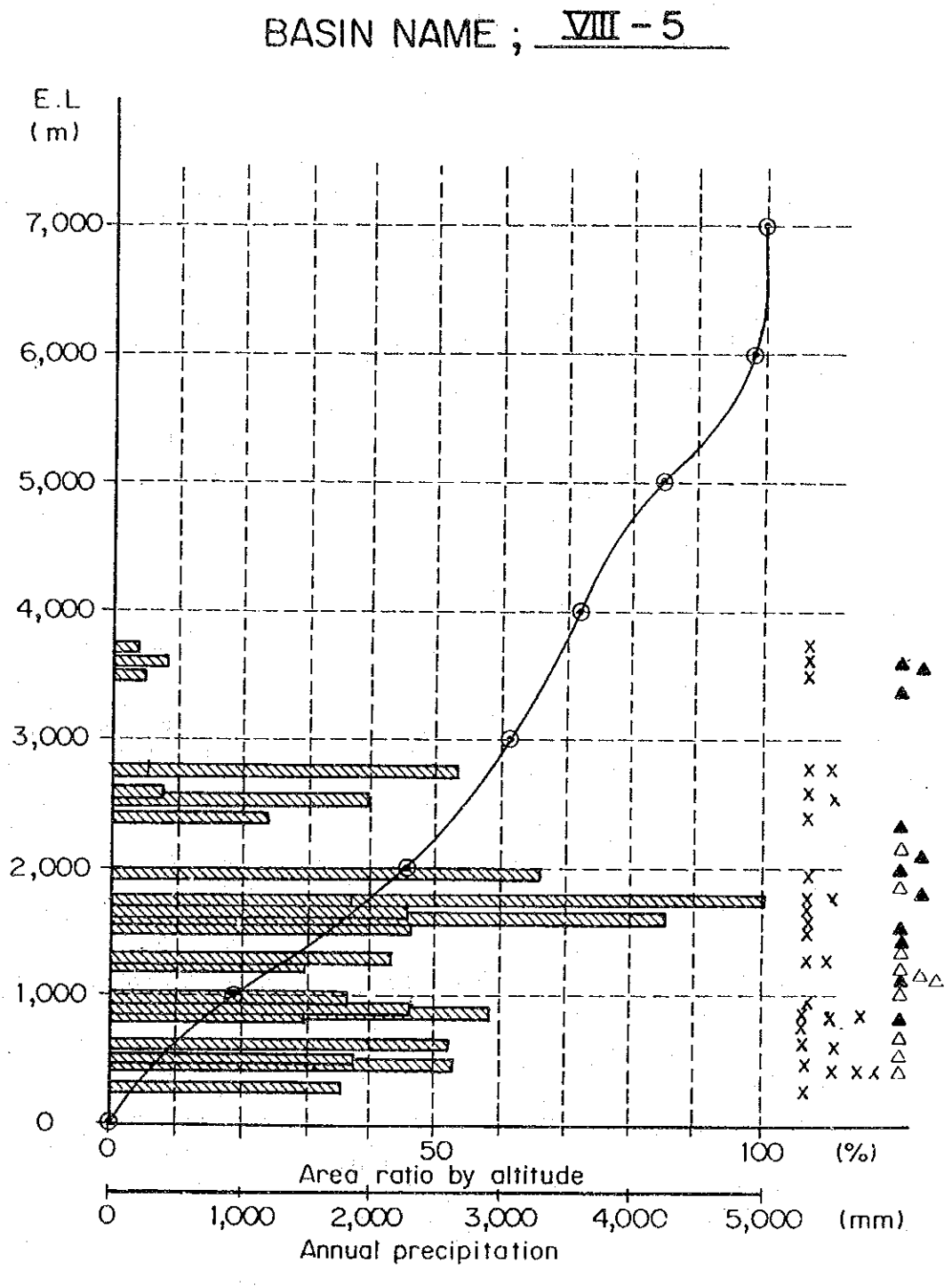


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (18/33)

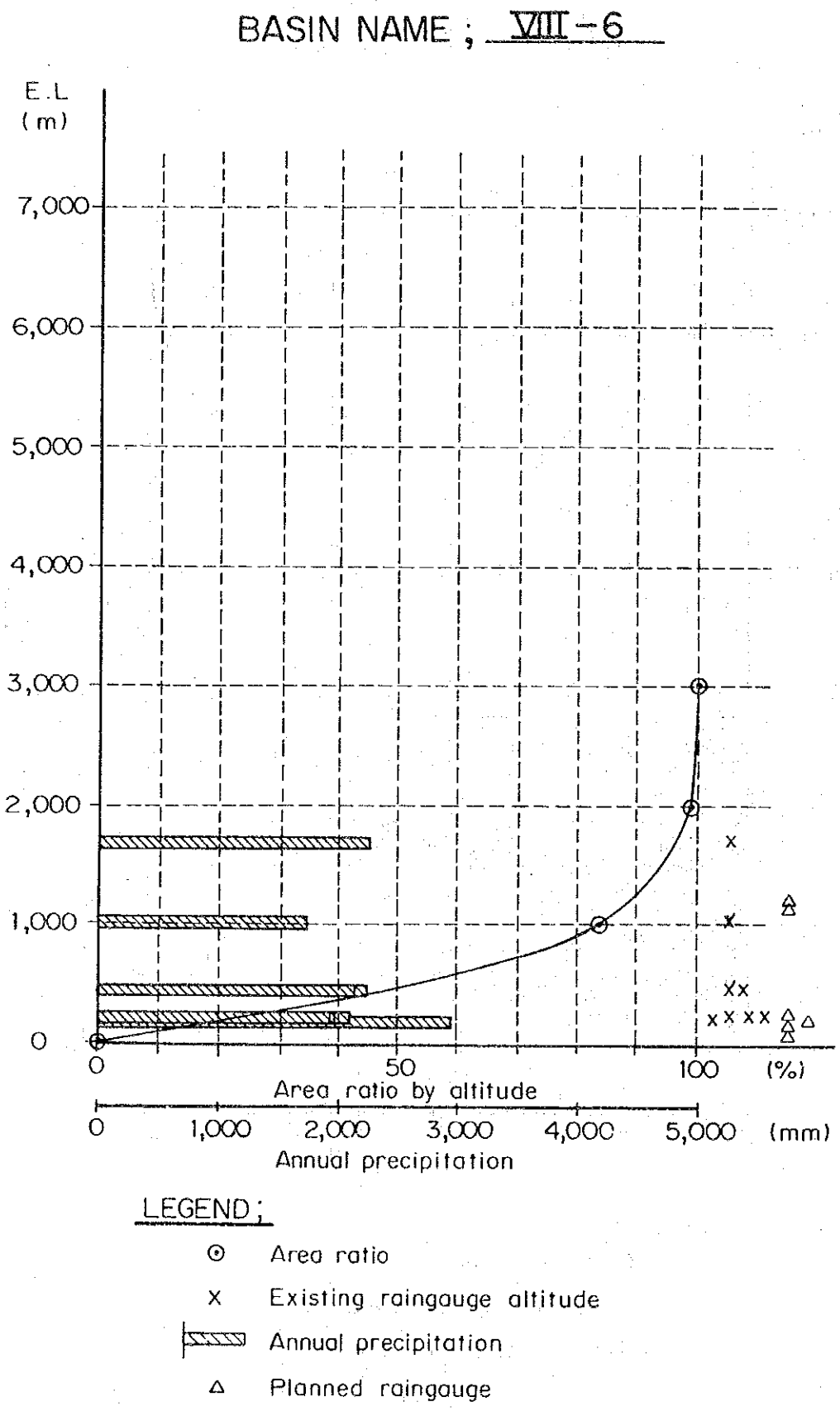


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (19/33)

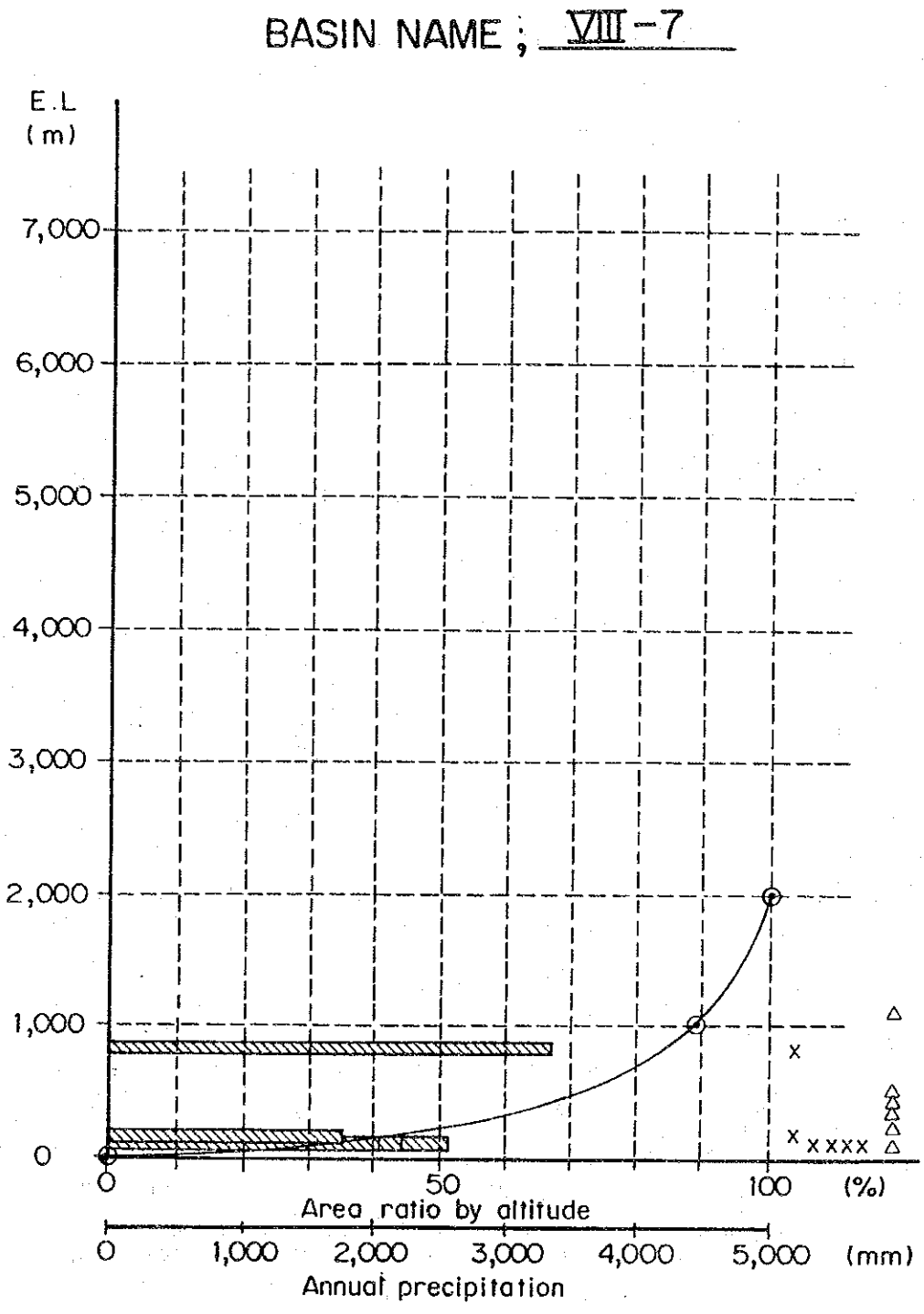


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (20/33)

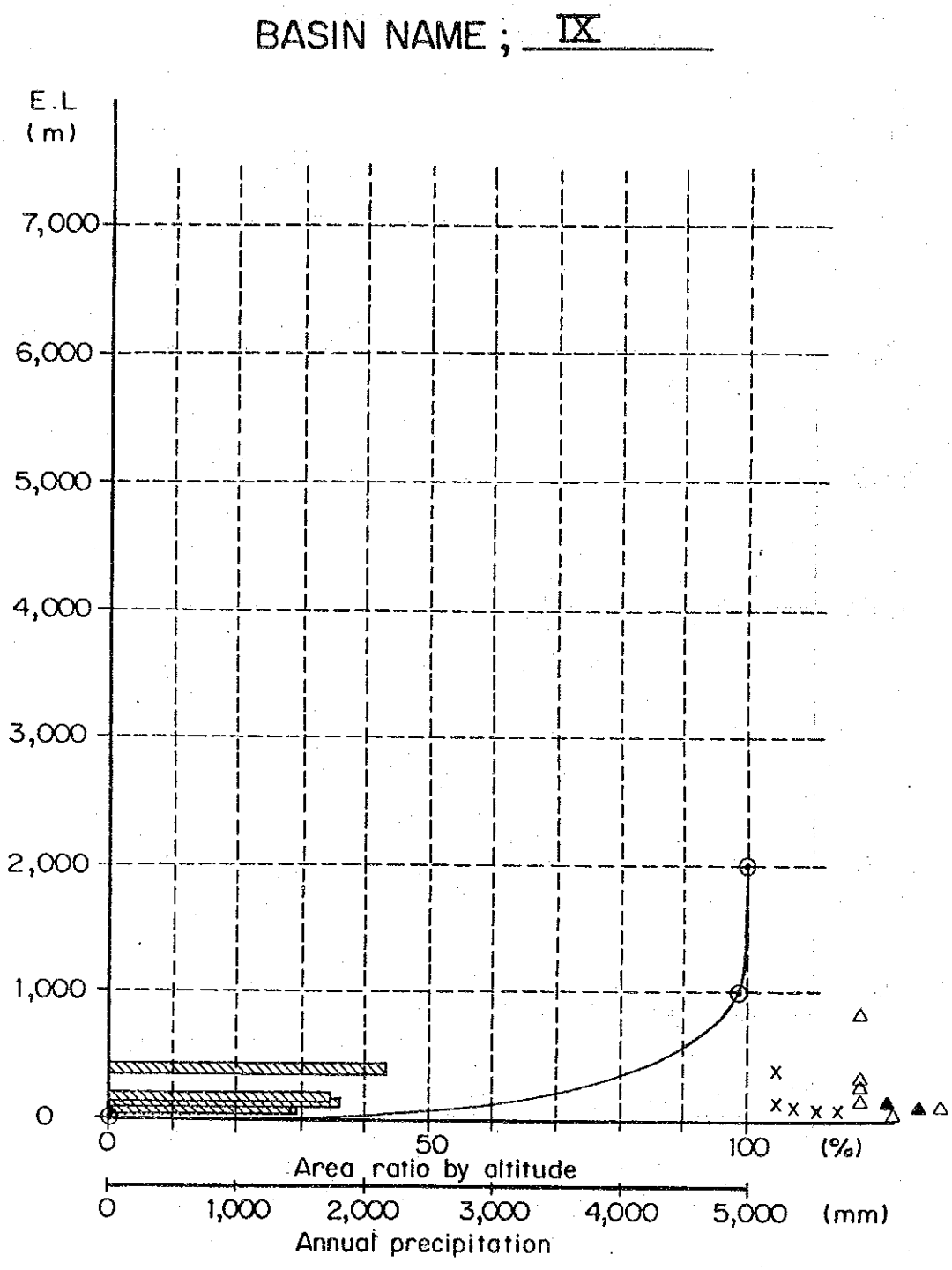


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (21/33)

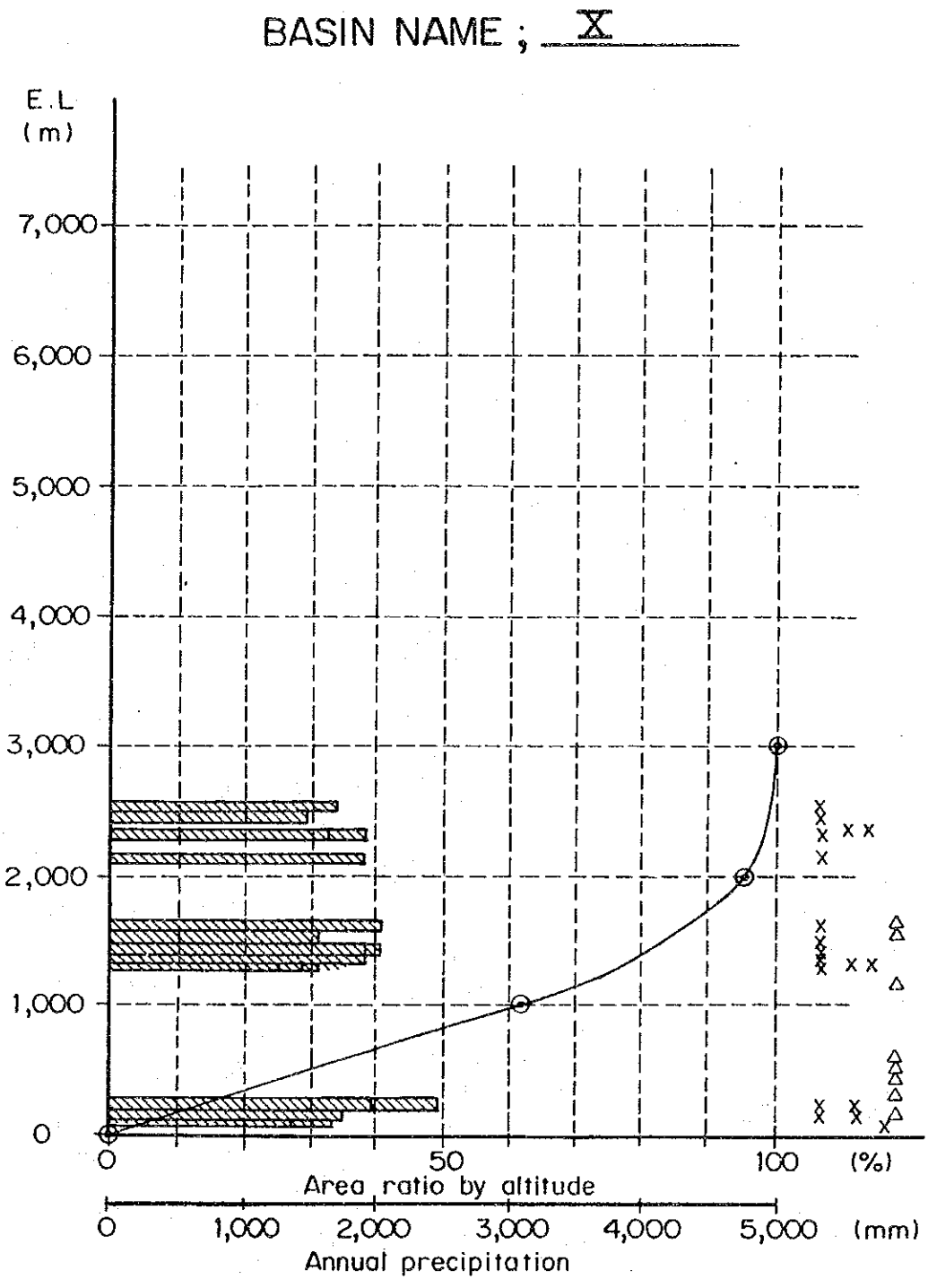


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (22/33)

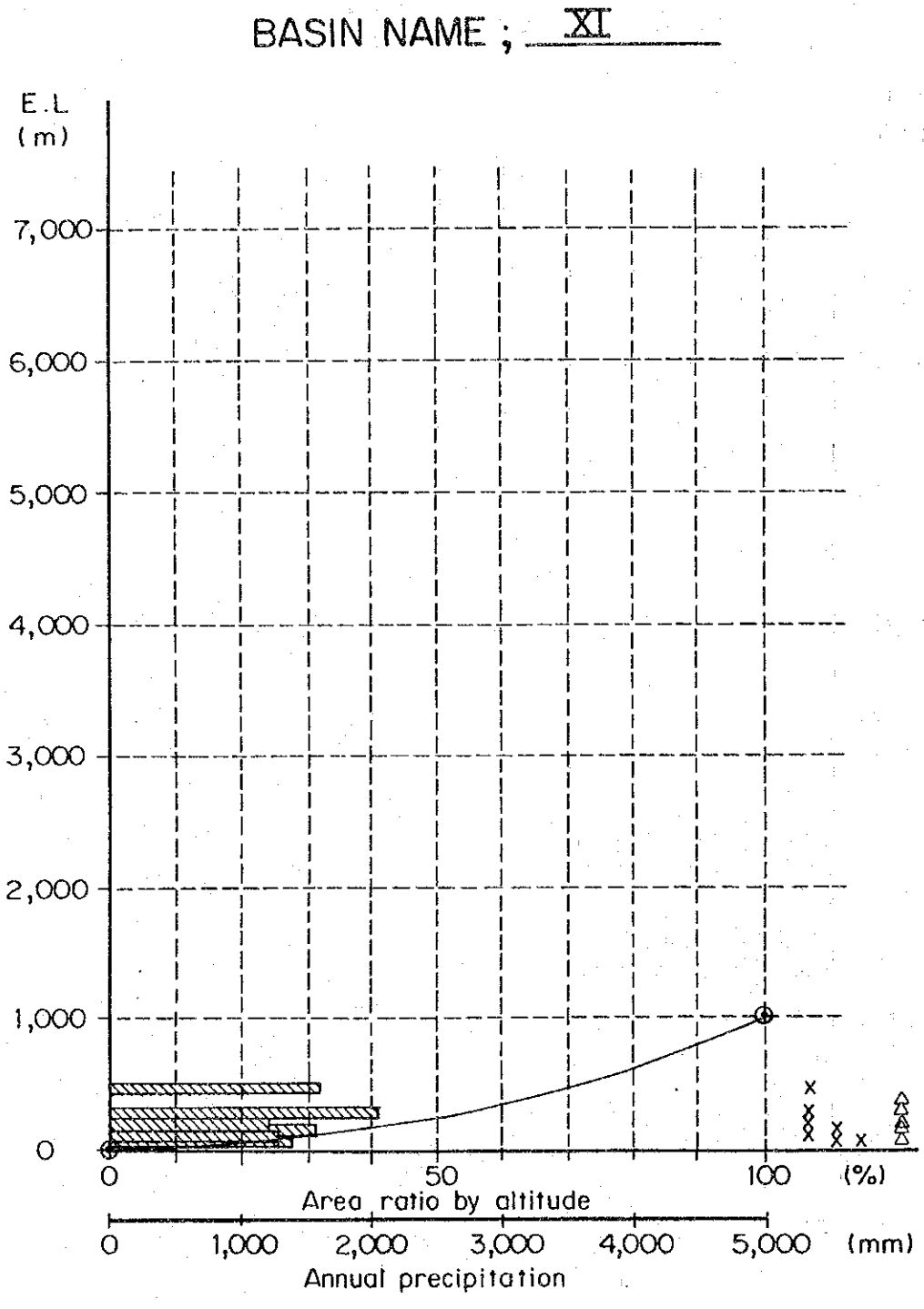


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (23/33)

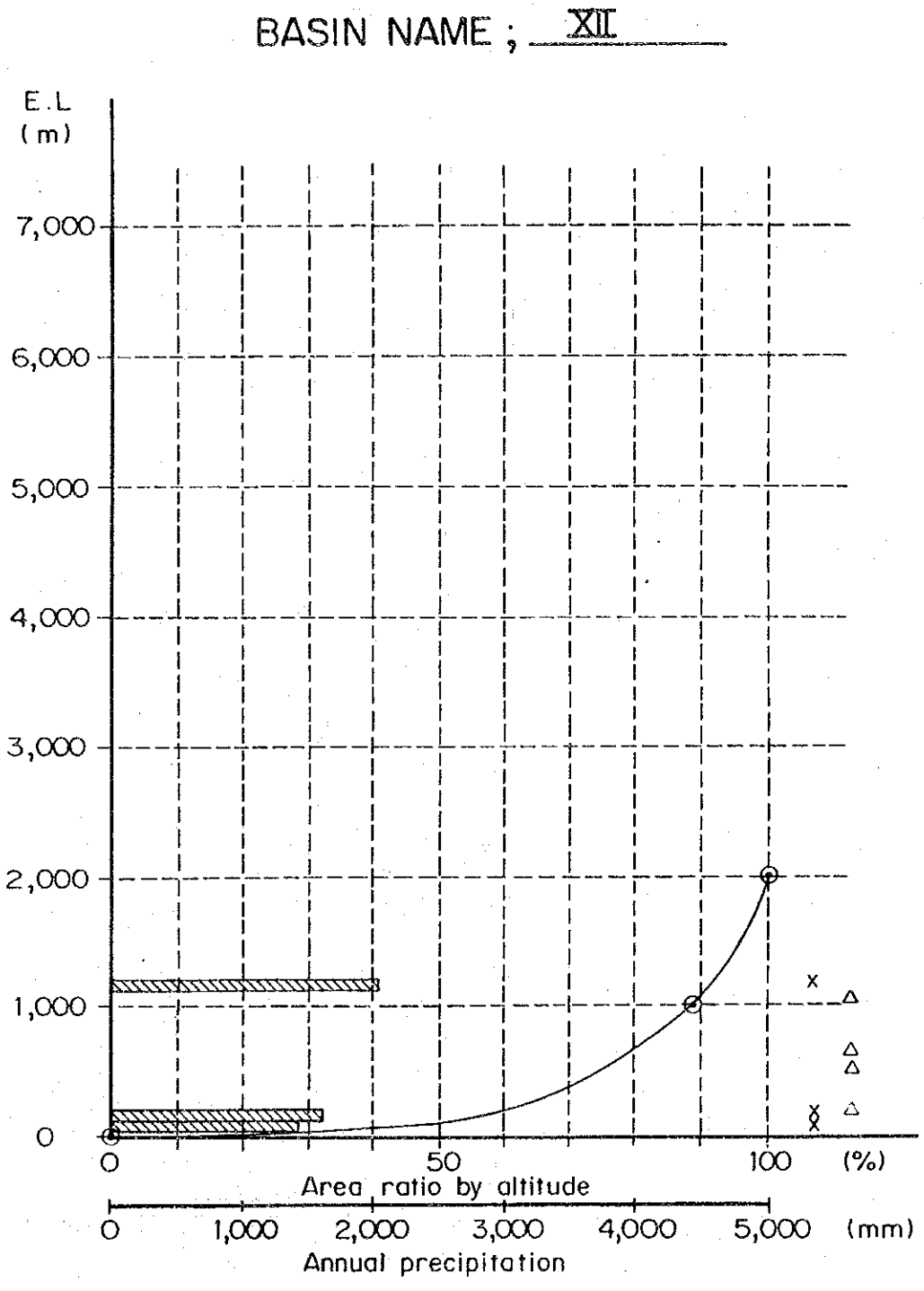


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (24/33)

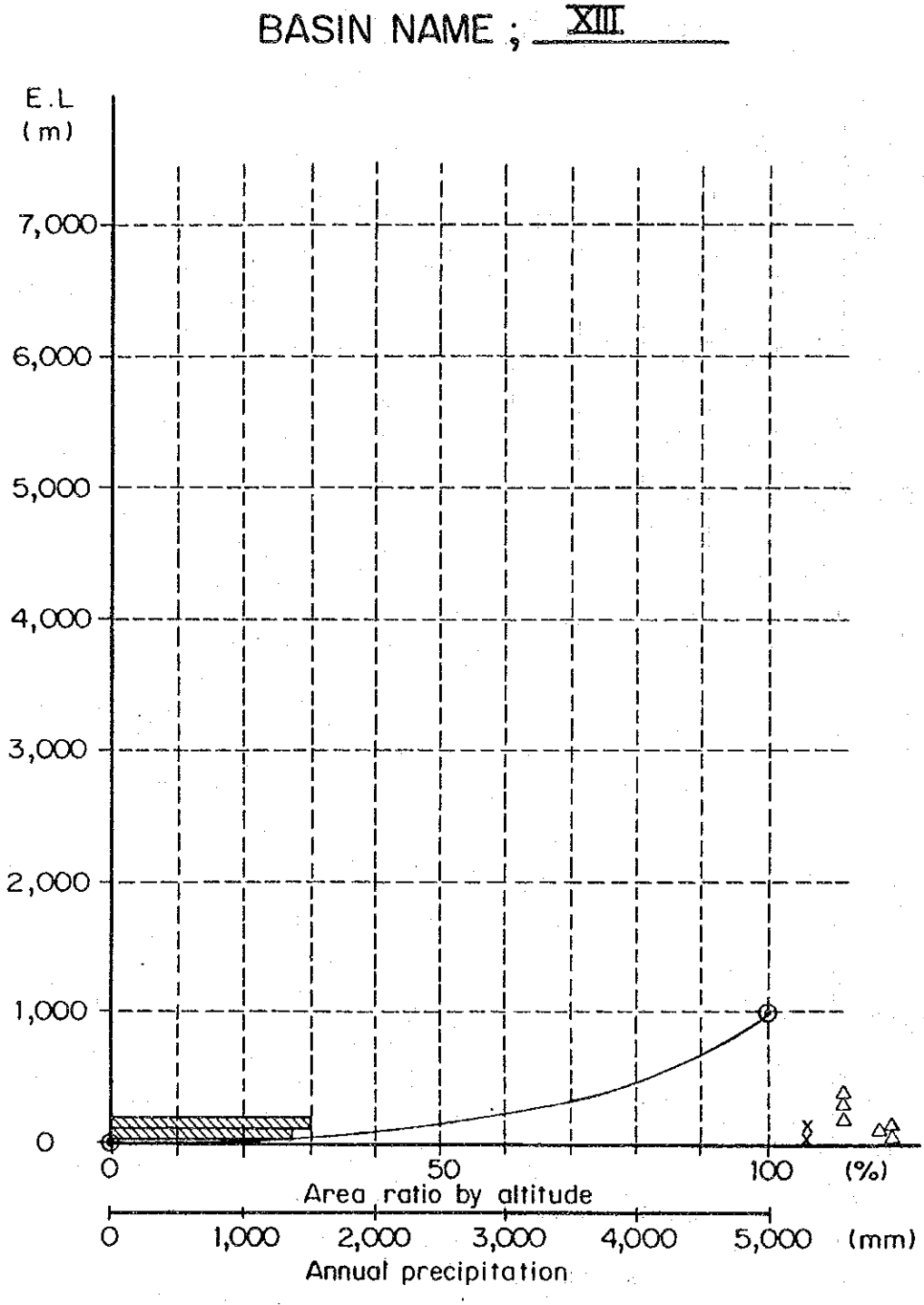


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (25/33)

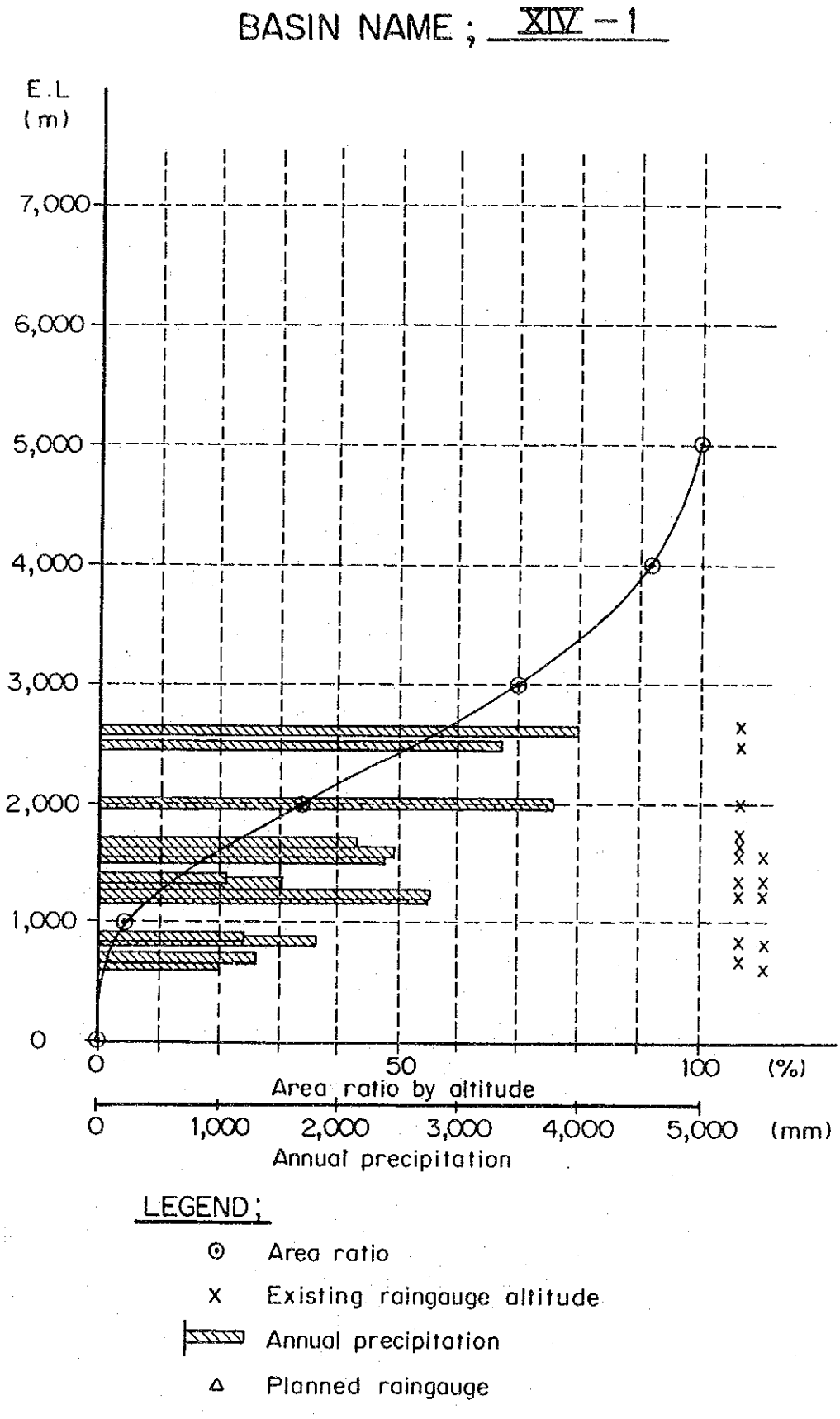


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (26/33)

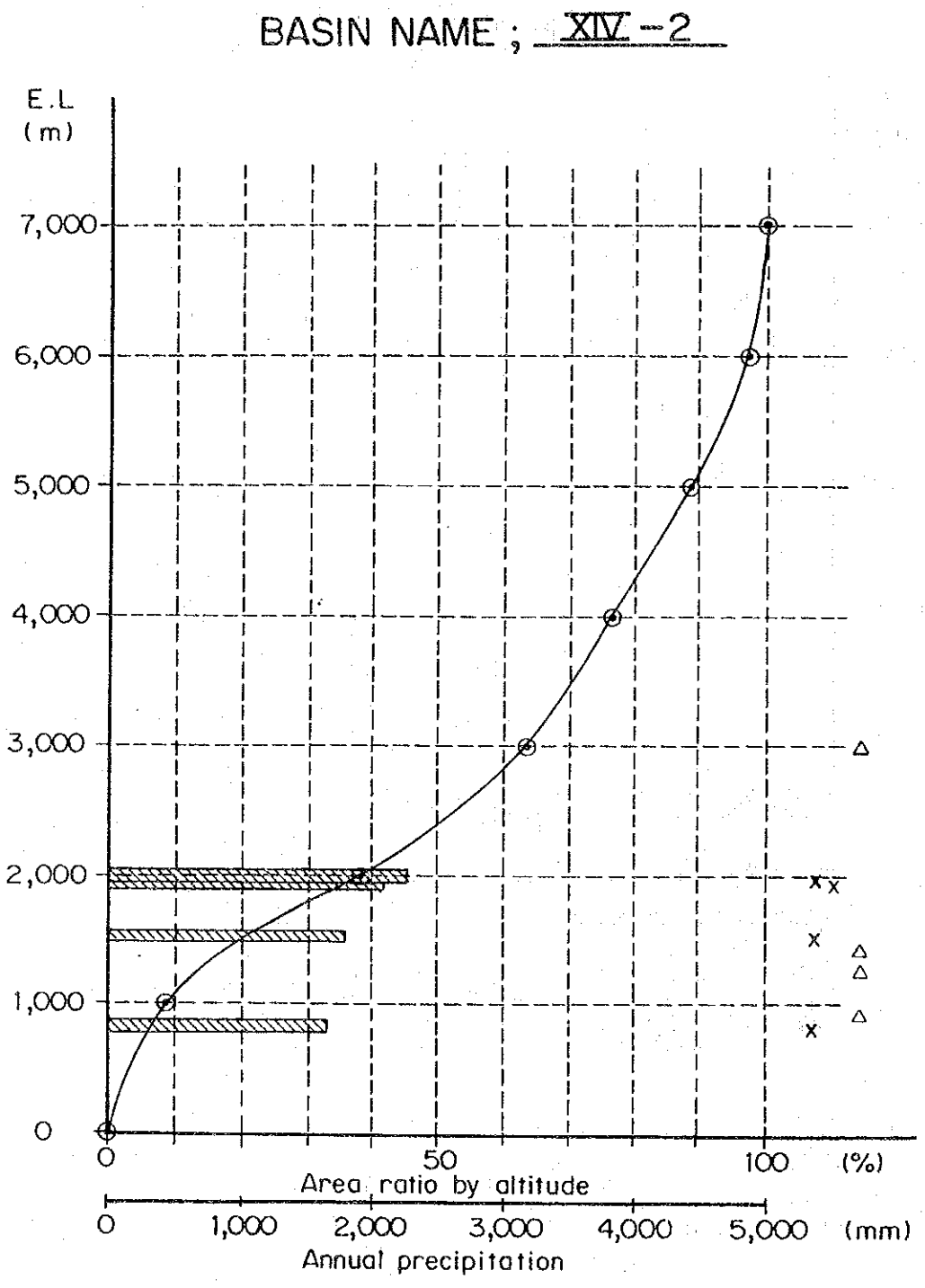


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (27/33)

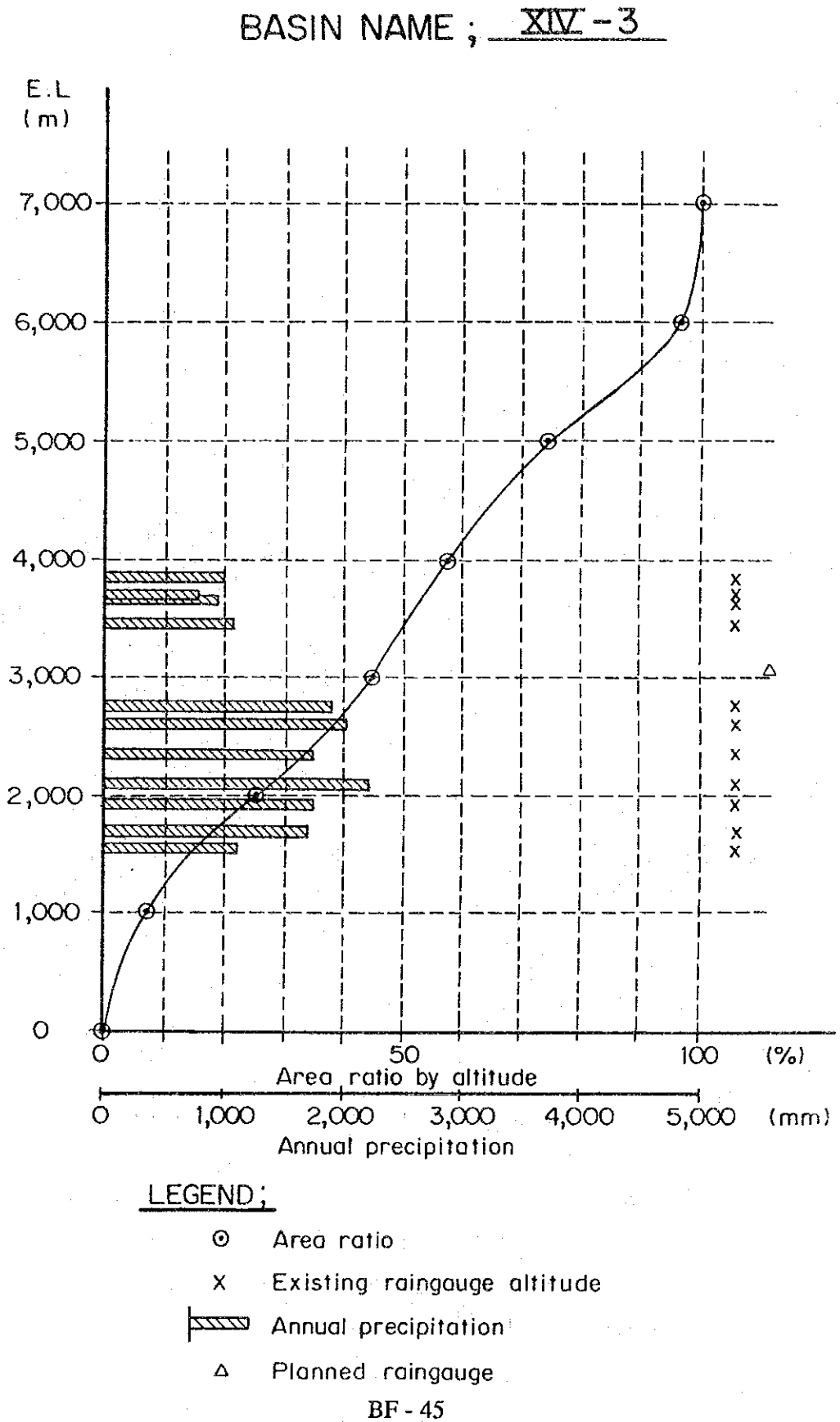


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (28/33)

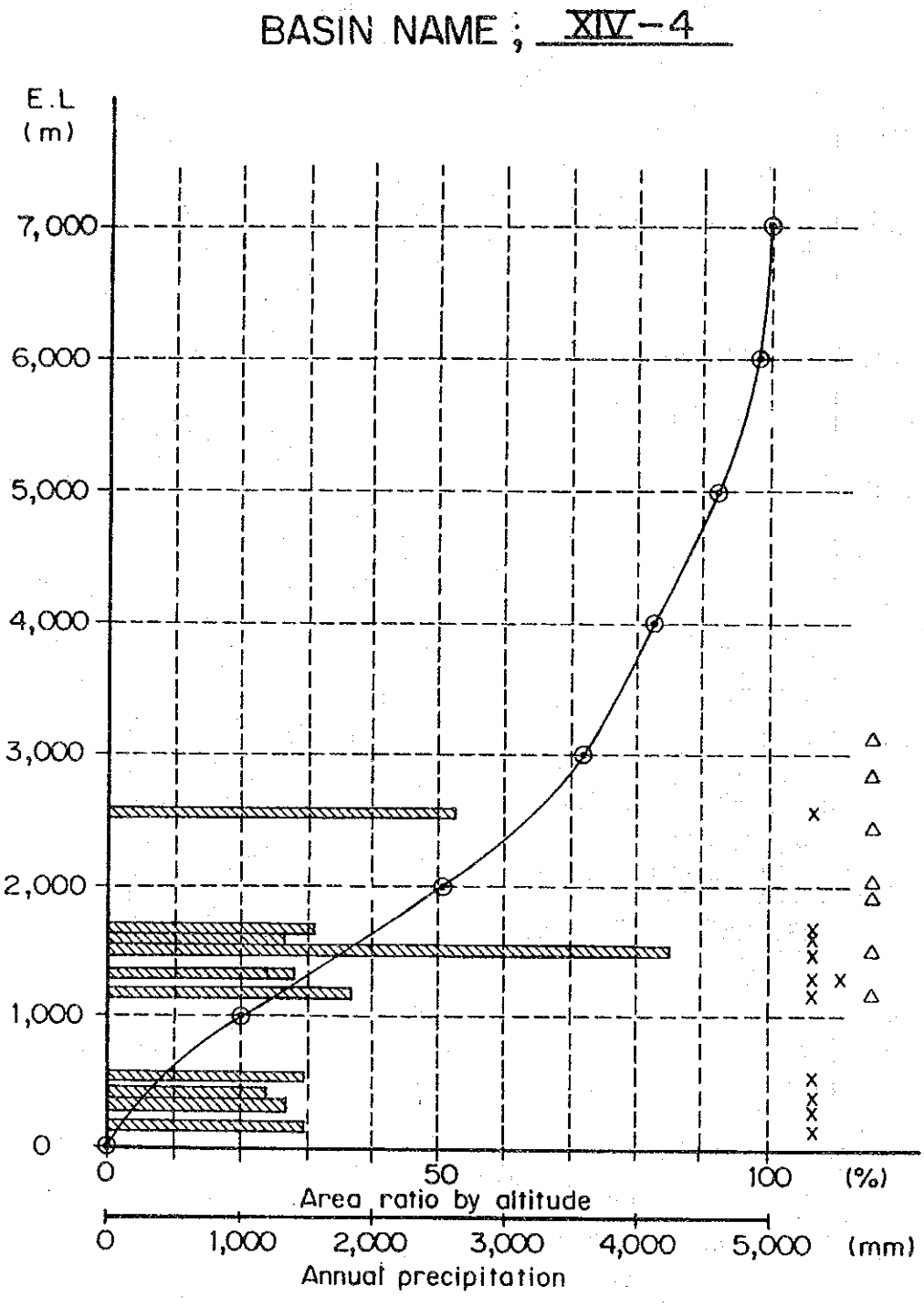


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (29/33)

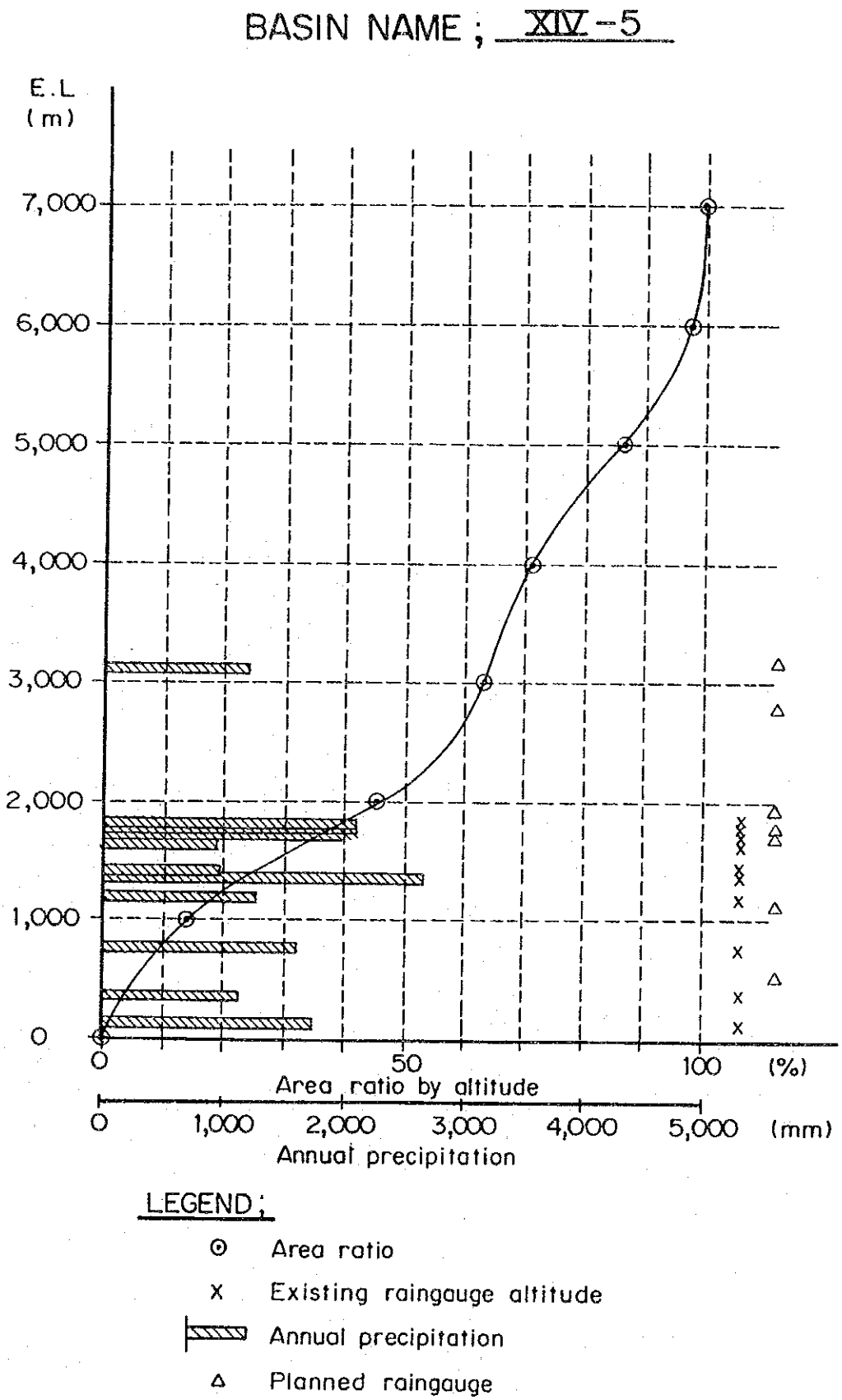


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (30/33)

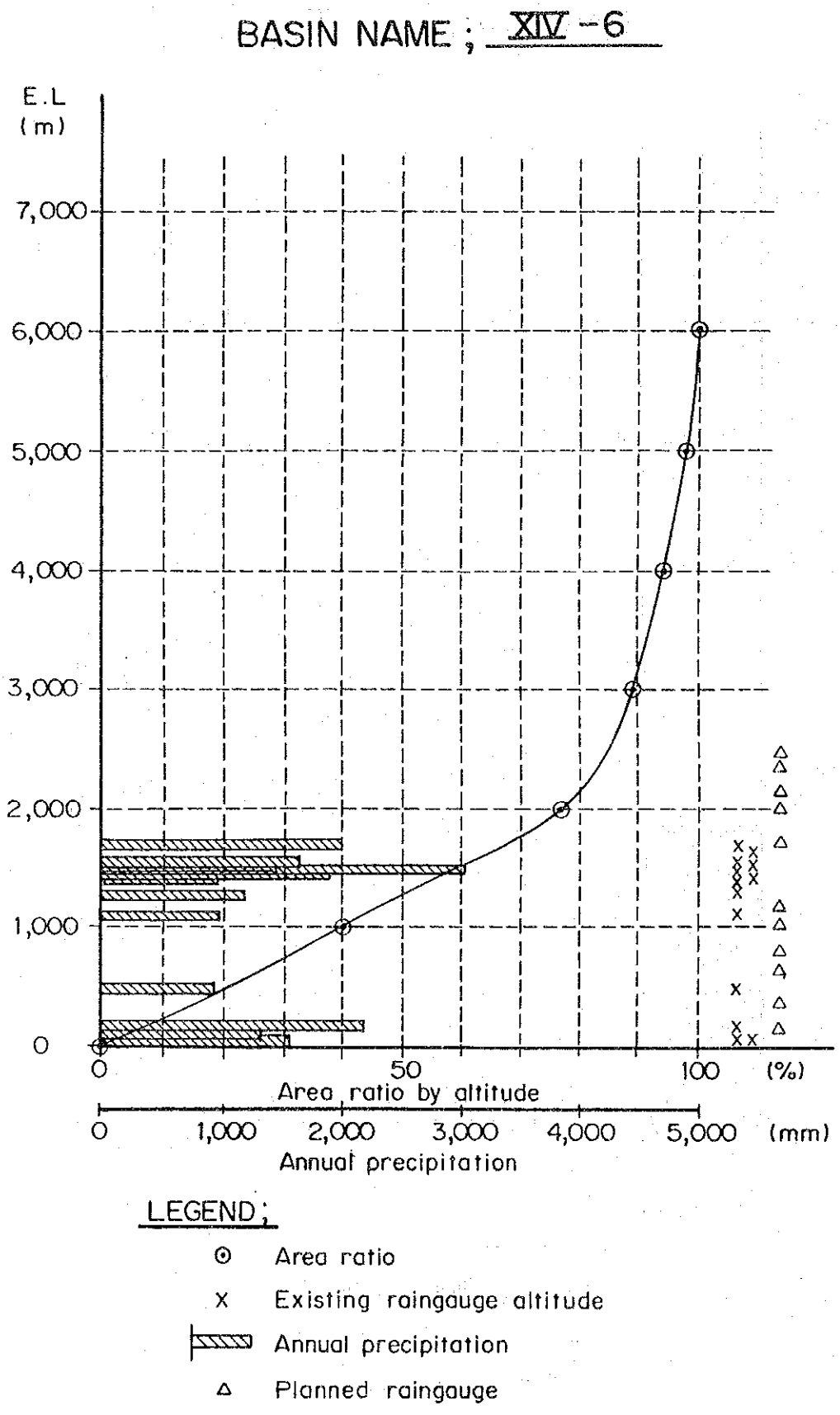


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (31/33)

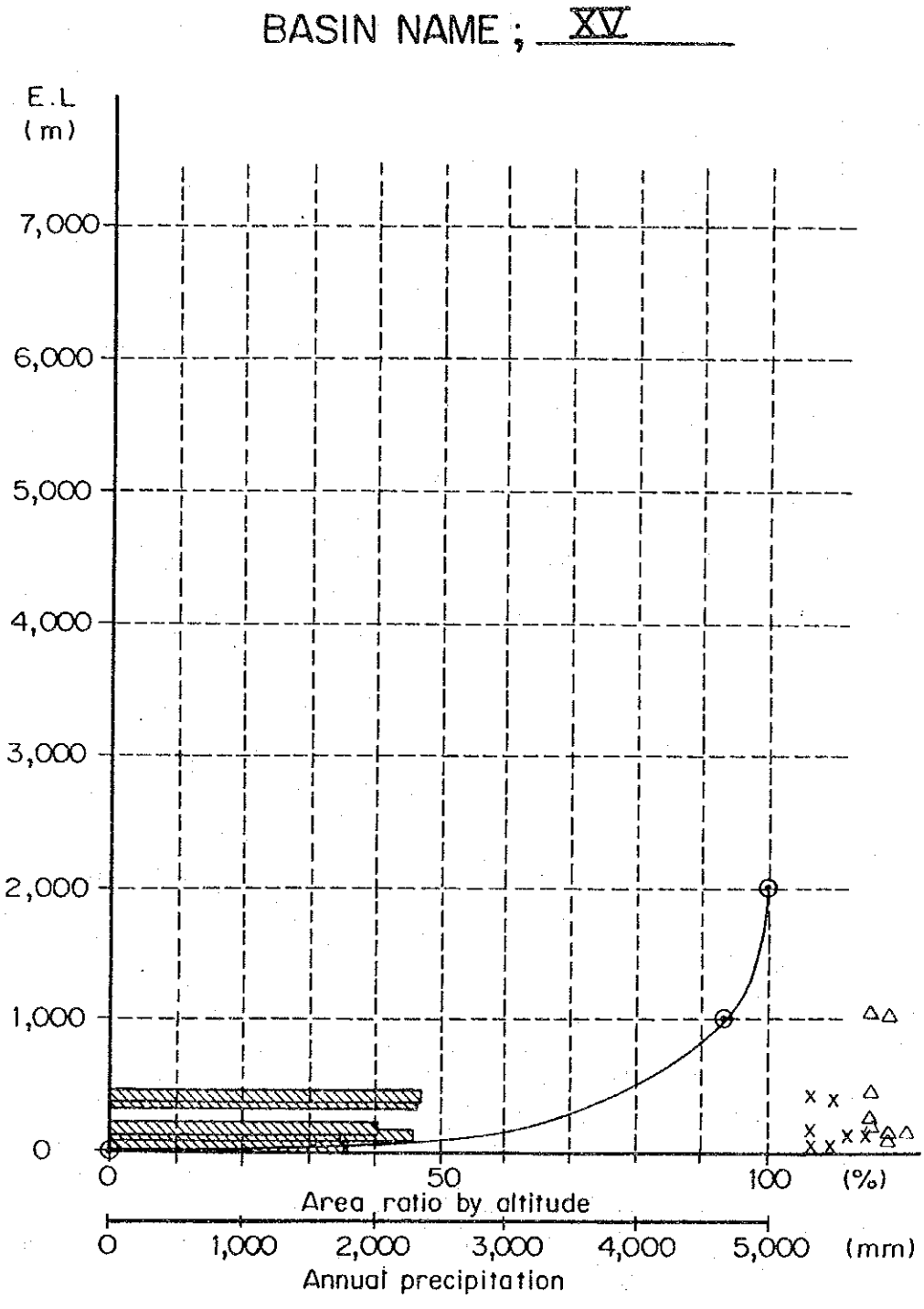


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (32/33)

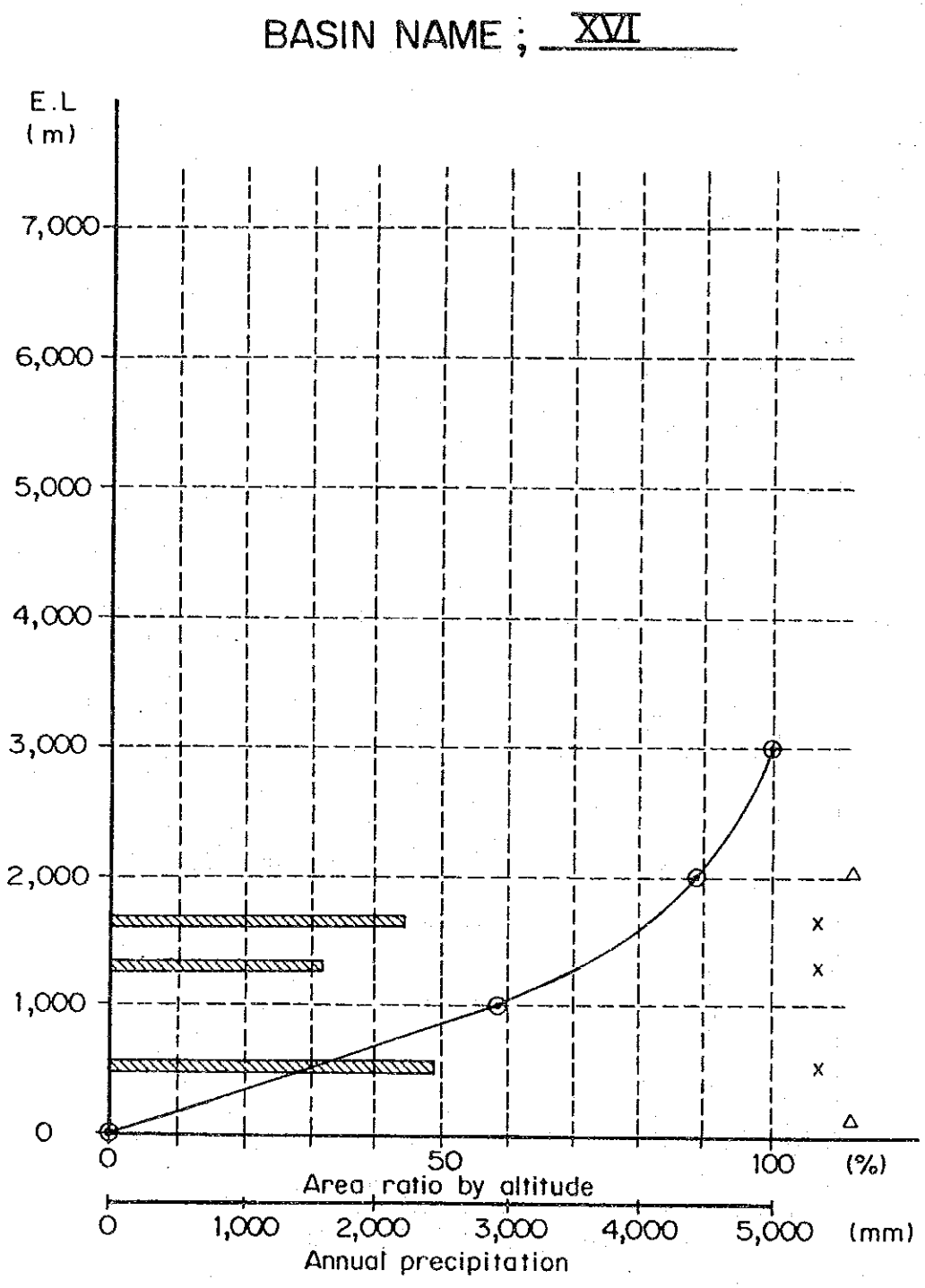
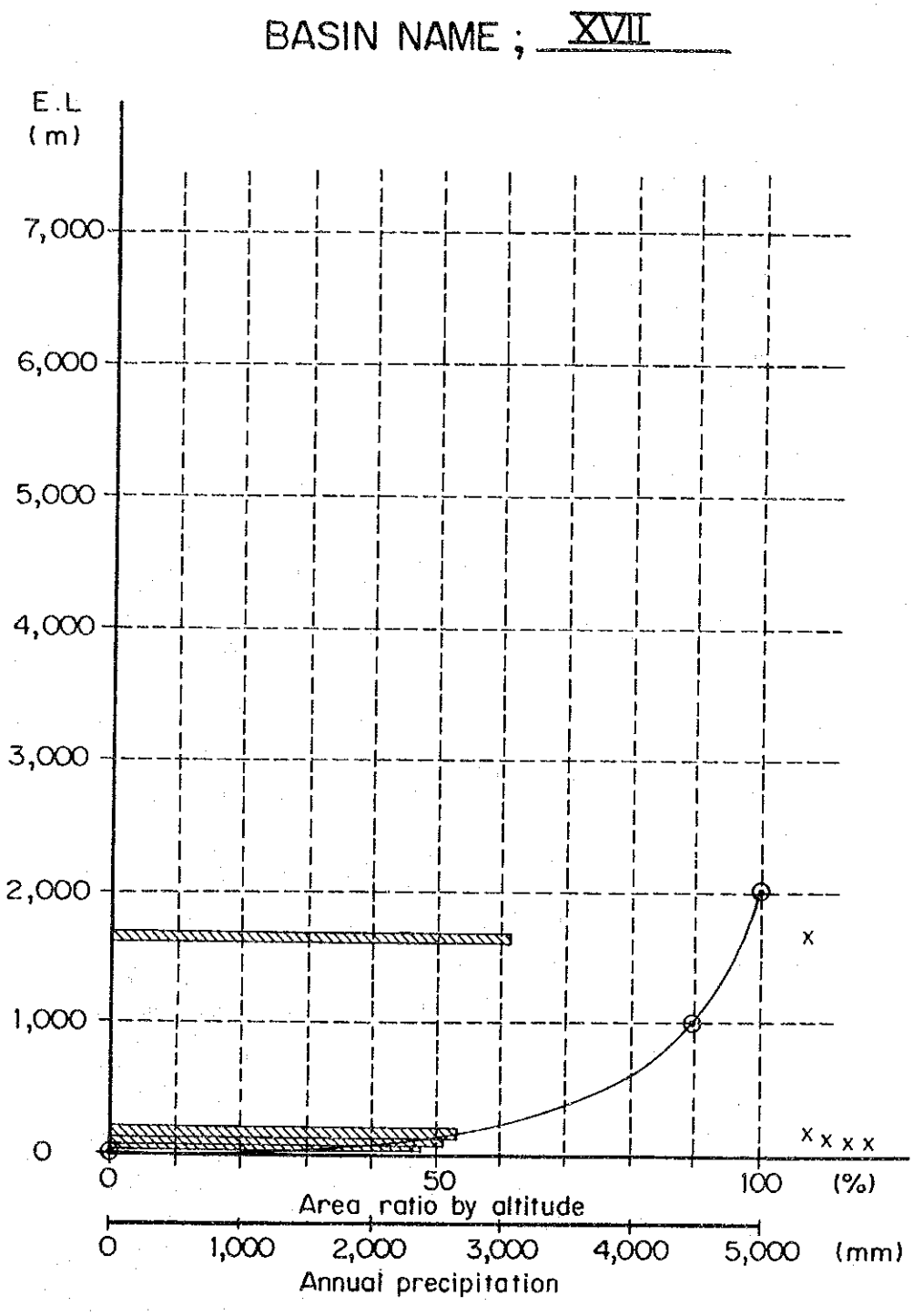
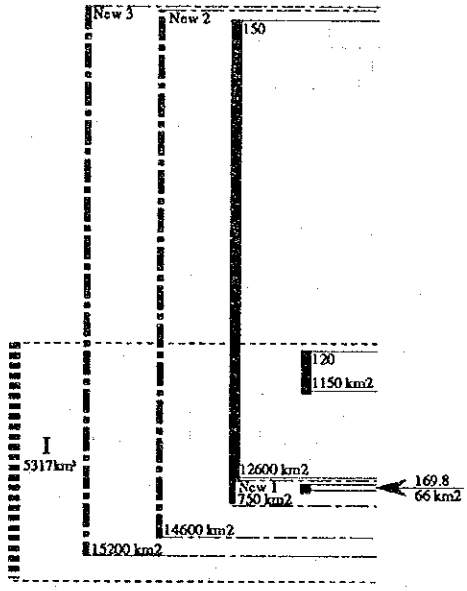
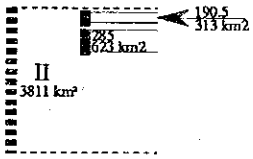


Fig. 4.3 RAINGAUGE DISTRIBUTION AND ALTITUDE IN EACH RIVER BASIN (33/33)





MAHAKALI RIVER



KANARA / PATHATAIYA RIVER
(SOUTHERN BORDER RIVER GROUP NO.1)

LEGEND

I ~ XVII : River basin number

: River basin

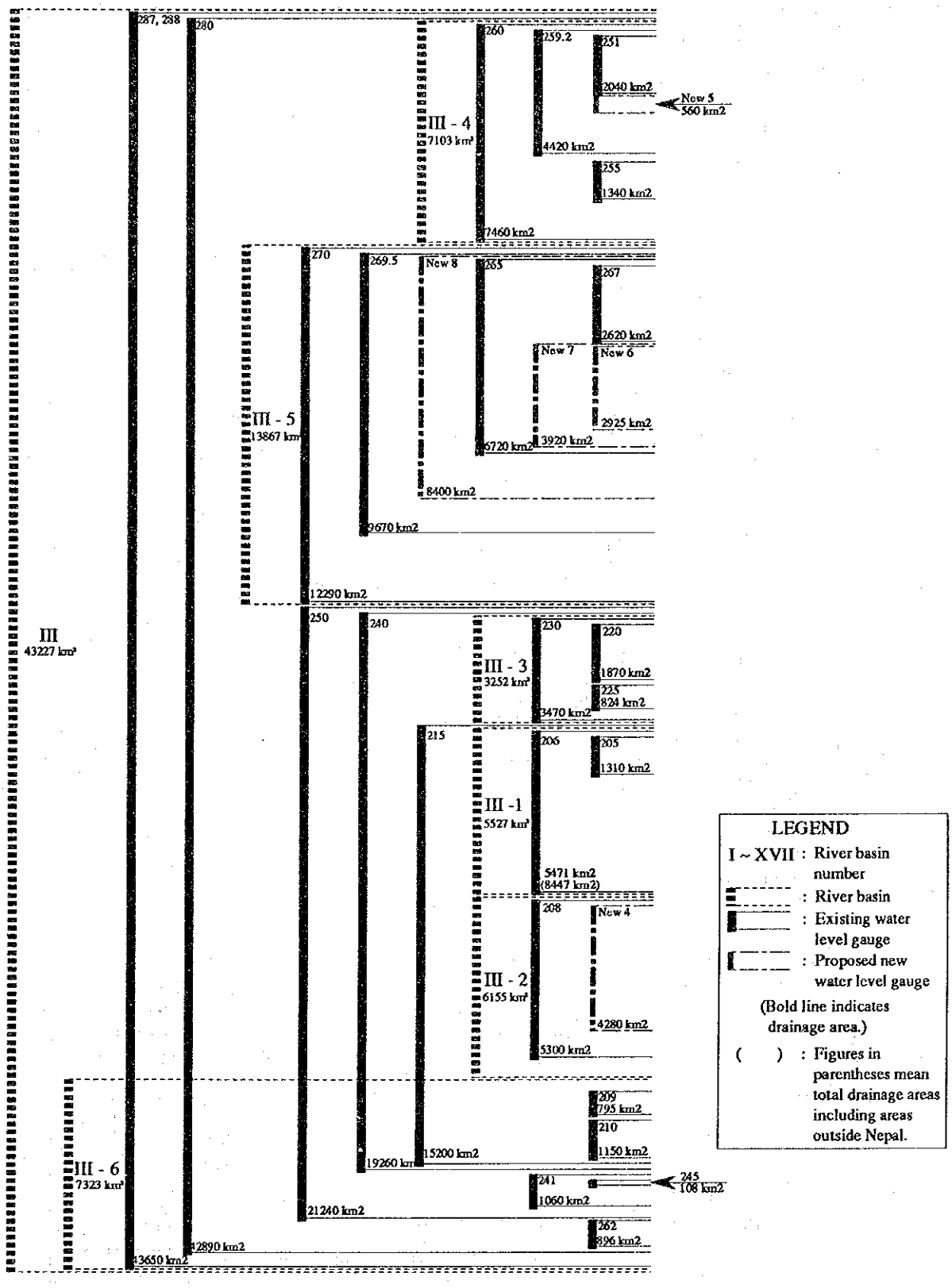
: Existing water level gauge

: Proposed new water level gauge

(Bold line indicates drainage area.)

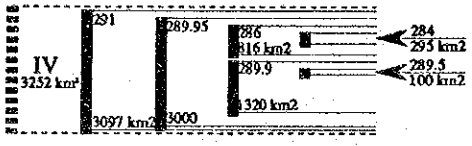
( ) : Figures in parentheses mean total drainage areas including areas outside Nepal.

Fig. 5.1 DRAINAGE AREA AT WATER LEVEL GAUGING STATION (1/6)

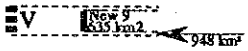


KARNALI RIVER

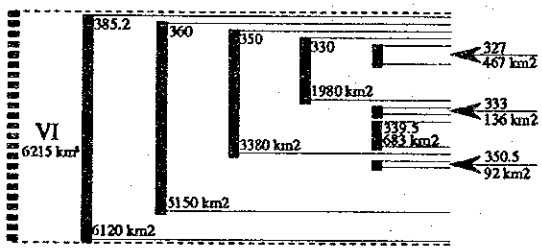
Fig. 5.1 DRAINAGE AREA AT WATER LEVEL GAUGING STATION (2/6)



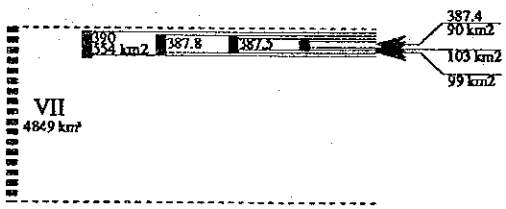
BABAI RIVER



MAN RIVER
(SOUTHERN BORDER RIVER GROUP NO.2)



RAPTI (WEST) RIVER



TINAU RIVER
(SOUTHERN BORDER RIVER GROUP NO.3)

LEGEND

I ~ XVII : River basin number

: River basin

: Existing water level gauge

: Proposed new water level gauge

(Bold line indicates drainage area.)

( ) : Figures in parentheses mean total drainage areas including areas outside Nepal.

Fig. 5.1 DRAINAGE AREA AT WATER LEVEL GAUGING STATION (3/6)

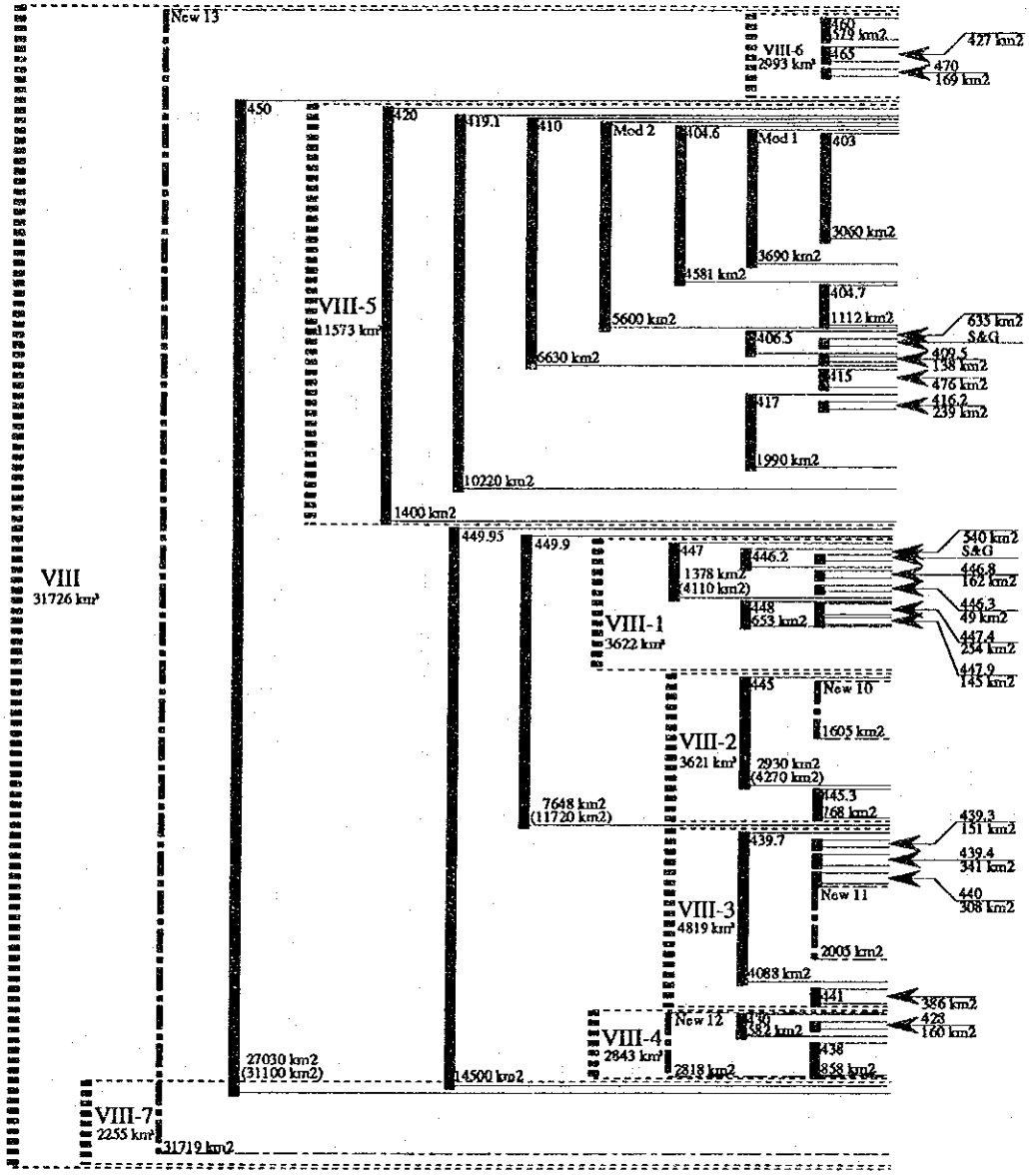


Fig. 5.1 DRAINAGE AREA AT WATER LEVEL GAUGING STATION (4/6)

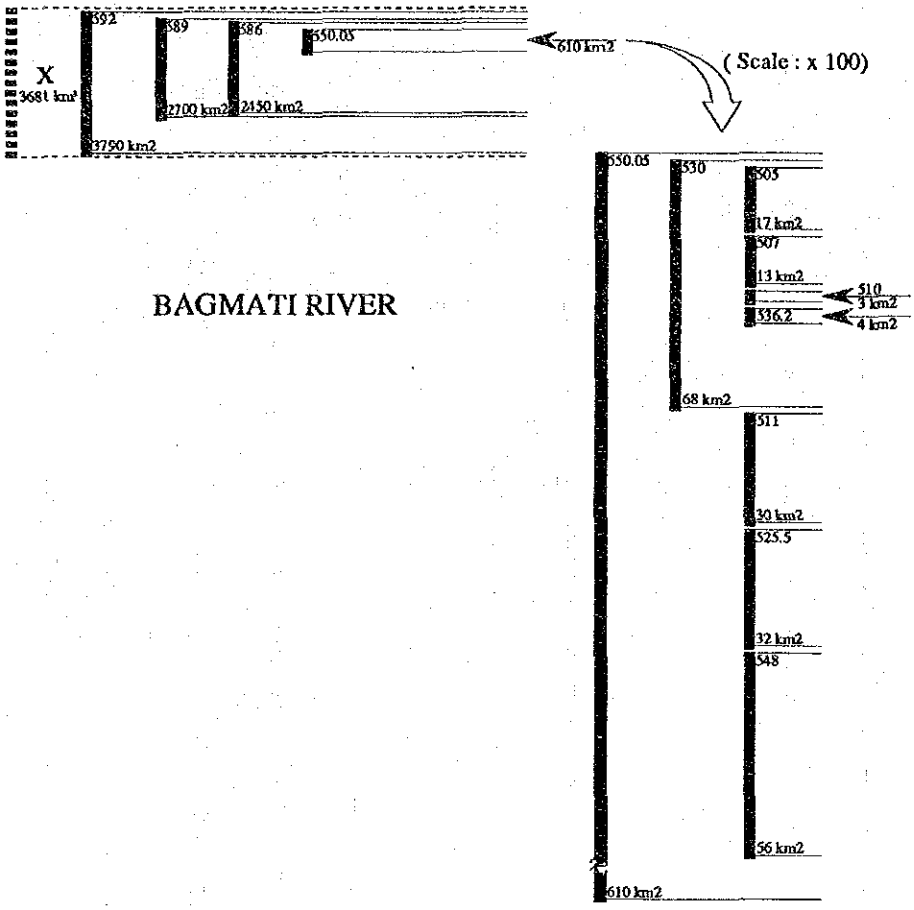
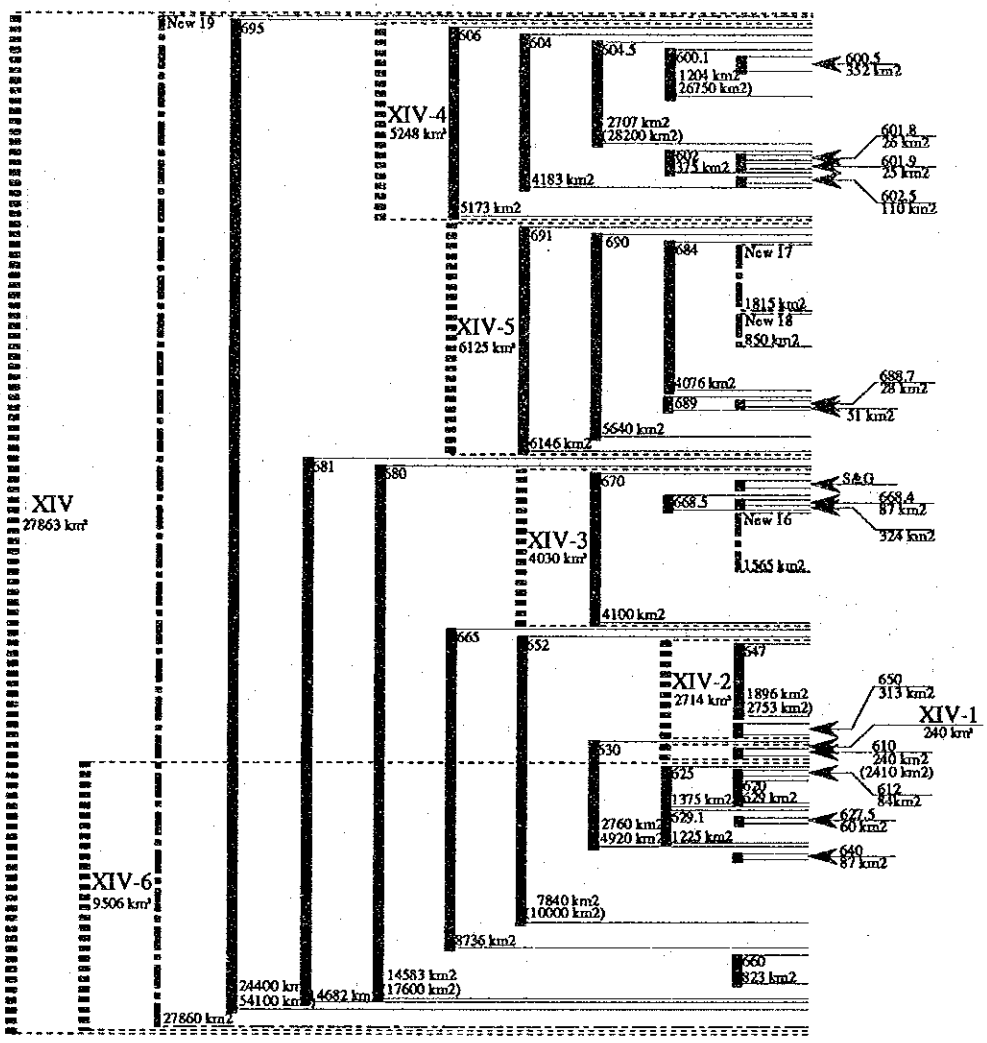
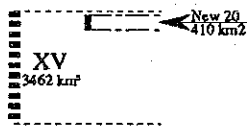


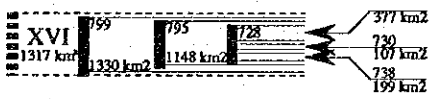
Fig. 5.1 DRAINAGE AREA AT WATER LEVEL GAUGING STATION (5/6)



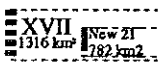
SUN KOSHI / SAPTA KOSHI RIVER



BUDHI RIVER
(SOUTHERN BORDER RIVER GROUP NO.7)



KANKAI RIVER



MECHI RIVER
(SOUTHERN BORDER RIVER GROUP NO.8)

LEGEND

I ~ XVII : River basin number

: River basin

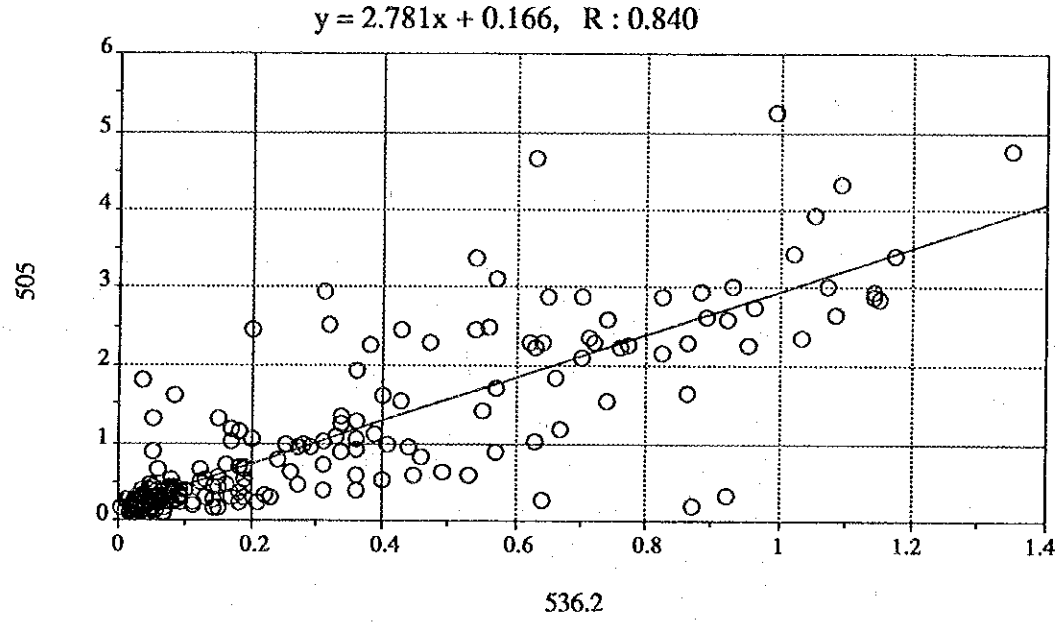
: Existing water level gauge

: Proposed new water level gauge

(Bold line indicates drainage area.)

( ) : Figures in parentheses mean total drainage areas including areas outside Nepal.

Fig. 5.1 DRAINAGE AREA AT WATER LEVEL GAUGING STATION (6/6)



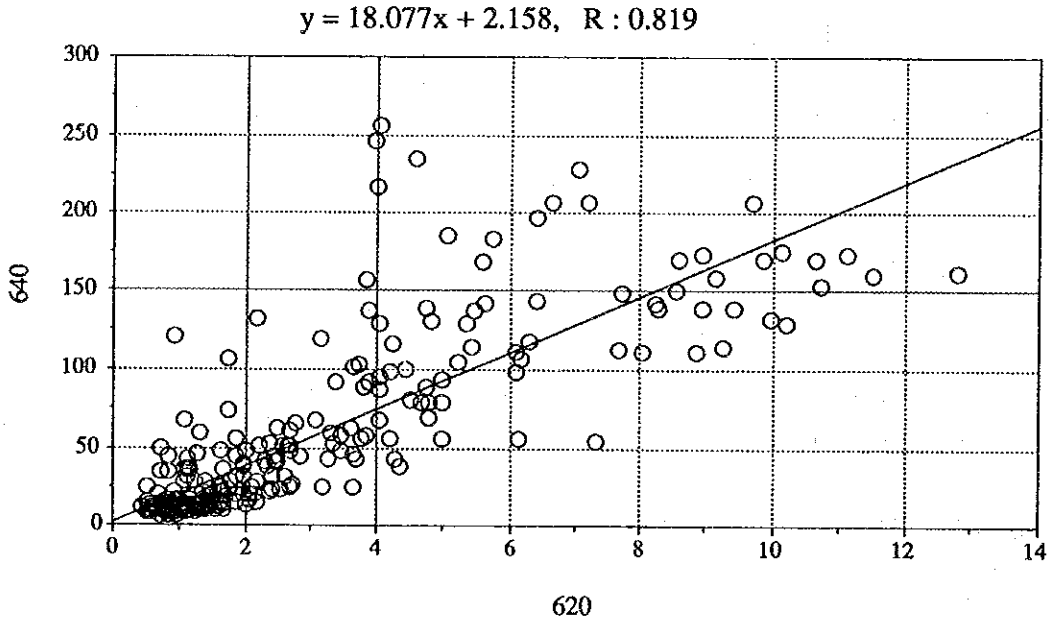


Fig. 5.2 CORRELATION OF RIVER DISCHARGE

ANNEX C

RIVER AND RIVER BASIN

NATIONWIDE HYDRO-METEOROLOGICAL DATA MANAGEMENT PROJECT

ANNEX C RIVER AND RIVER BASIN

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1. INTRODUCTION

This report aims at compiling the results of investigation carried out by the River engineer. The attention was paid for the priority of work to make meaningful results of investigation. That is, it was considered that the work should be available for the major purpose of study which is to make a plan for establishing a system of nationwide hydro- meteorological observation as well as data collection, process, and management. The major tasks were as follows:

(A) Data collection such as maps and data/reports on rivers, river basins, river/river-related structures, flood/inundation, and river improvement projects.

(B) Data analysis and compilation such as river basin division map, river system map, list of rivers, main features of rivers/river- basins, location and main features of river/river-related structures, and data and information on flood and inundation due to major rivers.

Furthermore, preliminary study/investigation of Long-Term Programme and investigation and study on Model system were also carried out.

2. DATA COLLECTION

The data collection was carried out comparatively well mainly through the following offices/agencies.

(a) JICA Tokyo office

(b) Nippon Koei Tokyo head office

(c) Nippon Koei Kathmandu office

(d) Map sale office of HMG

(e) German volunteer team for DHM

(f) Book shops in KTM

(g) DHM (Department of Hydrology and Meteorology)

(h) DOI (Department of Irrigation)

(i) NEA (Nepal Electricity Authority)

(j) Others (such as WECS, ICIMOD, etc.)

Major data used by the river engineer are listed in Table 2.1.

3. RIVER AND RIVER BASIN

3.1 Topographic Features

It would be appropriate to show the topographic features of Nepal described in some books as there are more or less similar in grasping the features and generally well described.

Nepal with an area of 147,181 km^2 is a mountainous country. About 77% of its total area consists of mountains, hills, elevated plains and river valleys. The topographic altitude generally increases from south towards north. The highest peak is Mt. Everest (8,848 m) and the lowest point (61 m) is the southern part of Saptari district in the Terai plain. The country is topographically divided into the following regions from south toward north.

(A) Terai Region

This plain, of which elevation ranges generally from 60 m to 300 m, is located along the southern border and has been formed out of alluvium brought and deposited by the rivers flowing down from the northern mountain region. The region covers some 23% of the total area of Nepal and is predominantly used for agriculture which is the most important industry in Nepal.

(B) Hilly Region

This region covers approximately 50% of the total area of Nepal. Its elevation ranges generally from 300 m to 3,000 m. The region consists of Mahabharat ranges, Churia hills, elevated flat lands, and river valleys. There are some isolated broad valleys lying between the Mahabrahat and Churia ranges which are known as Duns in Inner Terai.

(C) Himalayan Region

The region covers approximately 27% of the total area of Nepal. Its elevation ranges generally from 3,000 m to the peaks over 8,000 m. The region is a part of so-called the roof of the earth and contains various Himalayan ranges with lofty peaks.

The nation can also be divided into the following five regions from the topographic viewpoints.

(a) High Himalaya Region

(b) High Mountains Region

(c) Middle Mountain Region

(d) Siwaliks Region

(e) Terai Region

This division is more or less a detailed one to divide the Hilly region or Central region into three sub-regions. However, the method of division is basically the same.

3.2 Division of River Basins

There are many rivers running in Nepal. It would be an essential matter to make definite division/classification of rivers and river basins in Nepal. The rivers can be divided in the term of scale (length, discharge, area, etc.), geological periods/age of origin, development potentiality, level of socio-economic importance, location, etc.

All the rivers in Nepal finally come out of the southern border to India, therefore, the division shall be made on the basis of the following.

(A) Major/Large-scale rivers coming out of the border is to be one basic unit. The rivers with the drainage area of over 3,000 km^2 at the outlet/border are to be selected in any case, however, the rivers with the area between approximately 1,000 km^2 and 3,000 km^2 are selected in accordance with the importance from the viewpoints of development potentiality and/or present condition of land use.

(B) Rivers which lie between the major/large-scale rivers are treated as a basic unit of river basin area which is called as the rivers in the southern border river group.

The division of basic unit is made as listed as follows:

Basin No.	Name of River Basin
I	Mahakali river system
II	Southern border river group No.1
III	Karnali river system
IV	Babai river system
V	Southern border river group No.2
VI	Rapti river system
VII	Southern border river group No.3