

FIGURES

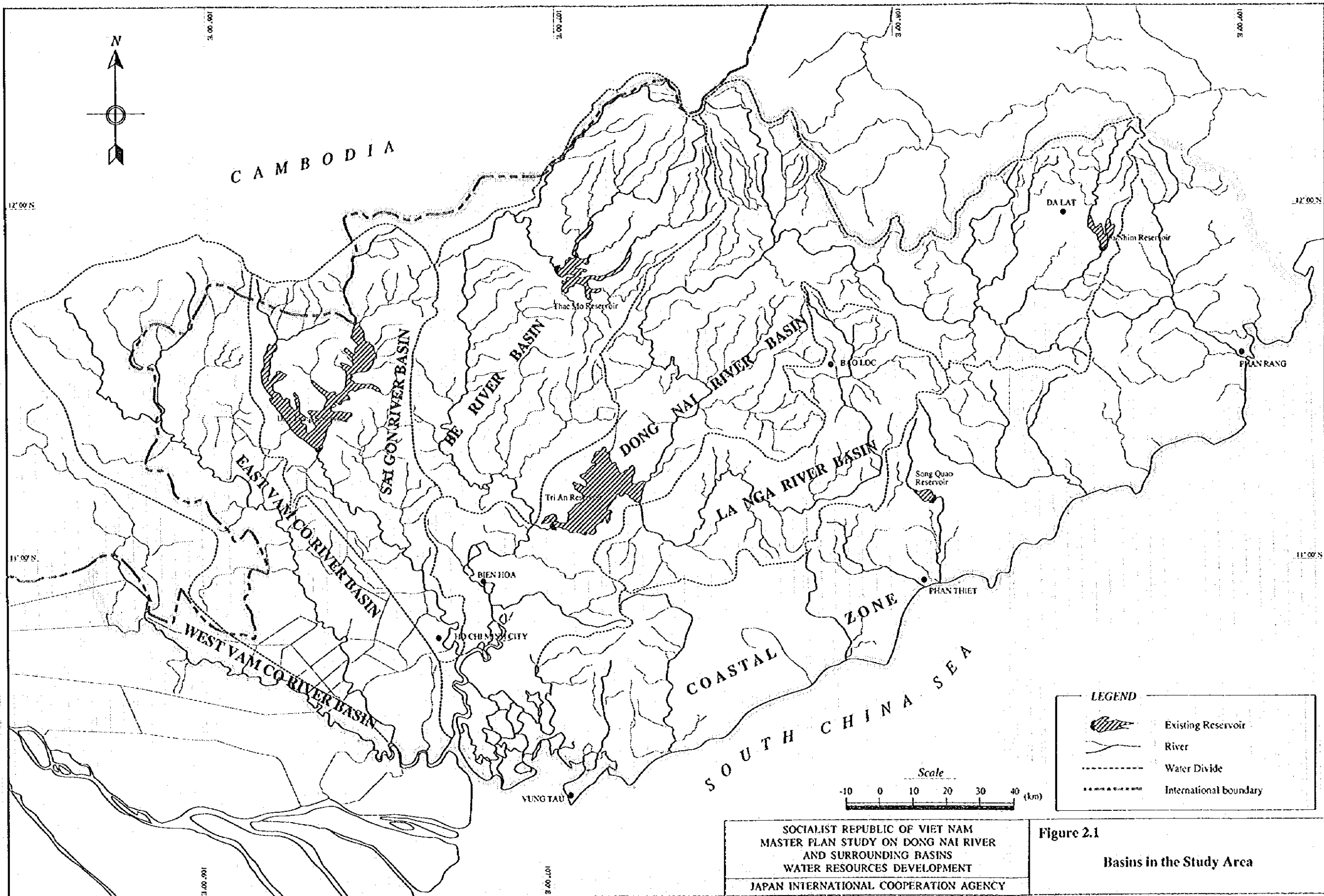
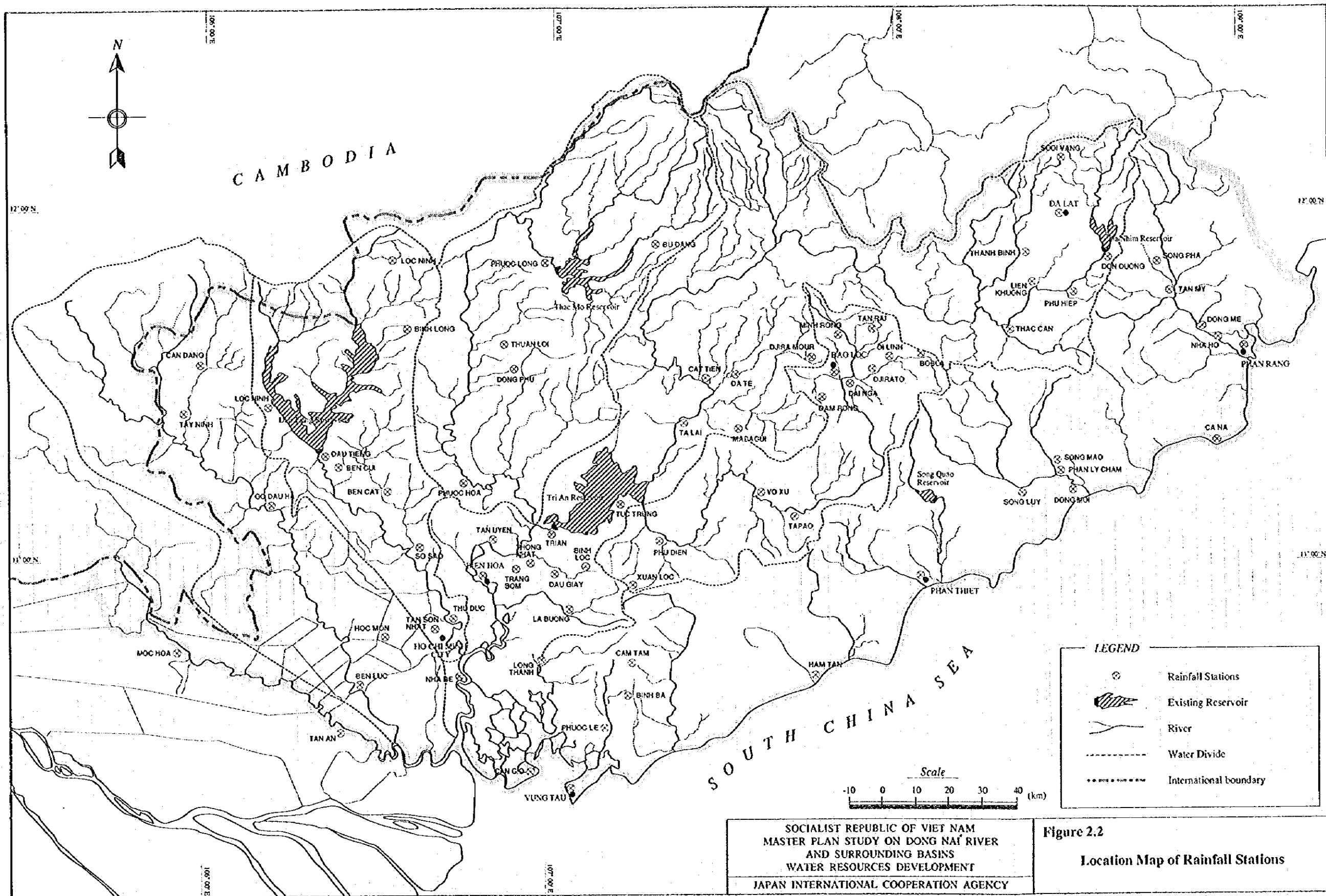


Figure 2.1
Basins in the Study Area



LEGEND

- Rainfall Stations
- Existing Reservoir
- River
- Water Divide
- International boundary

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Figure 2.2
 Location Map of Rainfall Stations

No.	Name of Station	Coordinates	Operation Status	20	30	40	50	60	70	80	90
1	AN LOC	D- 18	Stop								
2	BAO LOC	107.12 D- 10.56 B	Continue								
3	BEN CAT	106.35 D- 11.09 B	Continue								
4	BEN CUI	106.20 D- 11.16 B	Stop								
5	BEN LUC		Continue								
6	BIEN HOA	106.49 D- 10.57 B	Continue								
7	BINH BA	107.14 D- 10.37 B	Continue								
8	BINH LOC		Stop								
9	BINH LONG	106.36 D- 11.38 B	Continue								
10	BOBIA	108.01 D- 11.35 B	Continue								
11	CANA	108.47 D- 11.18 B	Continue								
12	CAM TAM	107.09 D- 10.51 B (195 m)	Stop								
13	CAN DANG	106.00 D- 11.30 B	Continue								
14	CAN GIO	106.59 D- 10.24 B	Continue								
15	CAT TIEN	107.28 D- 11.30 B	Continue								
16	CHON THANH	106.37 D- 11.24 B	Continue								
17	CON SON	Con Son Island	Continue								
18	DA AN PIN	107.53 D- 11.32 B	Stop								
19	DA LAT	108.26 D- 11.57 B	Continue								
20	DA TEH		Continue								
21	DAI NGA	107.52 D- 11.32 B (800 m)	Continue								
22	DAM RONG	107.50 D- 11.31 B (800 m)	Stop								
23	DAU GIAY	107.03 D- 10.56 B	Stop								
24	DAU TIENG	106.20 D- 11.18 B	Continue								
25	DI LINH	108.05 D- 11.35 B	Continue								
26	DJRAMOUR	107.57 D- 11.32 B (800 m)	Stop								
27	DJURATO	107.58 D- 11.33 B (800 m)	Stop								
28	DON DUONG	108.35 D- 11.50 B	Stop								
29	DONG ME	108.52 D- 11.40 B	Stop								
30	DONG MOI	108.25 D- 11.12 B	Stop								
31	DONG PHU	106.54 D- 11.32 B	Continue								
32	GO DAU		Continue								
33	HAM TAN	107.45 D- 10.41 B	Continue								
34	HOC MON	106.36 D- 10.53 B	Continue								
35	LA BUONG		Continue								
36	LIEN KHUONG	108.23 D- 11.45 B	Continue								
37	LOC NINH (SB)	106.35 D- 11.49 B (760 m)	Continue								
38	LOC NINH (TN)	Tren Rach Sanh Doi	Stop								
39	LONG THANH	106.56 D- 10.45 B	Continue								
40	MADAGUI	107.32 D- 11.23 B	Continue								

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Figure 2.3

Duration of Record at Rainfall
 Gauging Stations (1/2)

No	Name of Station	Coordinates	Observation Status	70	80	90	00	10	20	30	40	50	60	70	80	90
41	MINH KONG	107.49 D- 11.36 B (850m)	Stop													
42	NHA BE		Continue													
43	NHA HO	108.54 D- 11.40 B	Continue													
44	PHAN LY CHAN	108.31 D- 11.13 B	Stop													
45	PHAN RANG	109.00 D- 11.40 B	Continue													
46	PHAN THIET	108.06 D- 10.56 B	Continue													
47	PHU DIEN	X. Phu Dien - H. Tan Phu	Continue													
48	PHU HIEP	108.30 D- 11.43 B (990 m)	Continue													
49	PHUOC HOA	106.46 D- 11.14 B	Continue													
50	PHUOC LE	107.10 D- 10.29 B	Continue													
51	PHUOC LONG	106.59 D- 11.50 B	Continue													
52	SO SAO	X. Tan Dinh - H. Ben Cat	Continue													
53	SONG LUY	108.21 D- 11.12 B	Continue													
54	SONG HAO	108.30 D- 11.15 B	Continue													
55	SONG PHA	108.41 D- 11.50 B	Continue													
56	SUOI VANG	108.22 D- 11.59 B	Stop													
57	TA LAI	107.22 D- 11.22 B	Continue													
58	TA PAO	107.43 D- 11.08 B	Continue													
59	TAN MY	108.49 D- 11.23 B	Continue													
60	TAN RAI	107.51 D- 11.43 B	Continue													
61	TAN SON NHAT	106.42 D- 10.47 B	Continue													
62	TAN UYEN	106.48 D- 11.03 B	Continue													
63	TAY NINH	106.10 D- 11.01 B	Continue													
64	THAC CAN	108.17 D- 11.42 B	Continue													
65	THANH BINH	108.18 D- 11.47 B	Continue													
66	THONG NHAT	107.02 D- 10.57 B	Continue													
67	THU DUC	106.45 D- 10.50 B	Continue													
68	THUAN LOI	106.52 D- 11.30 B	Stop													
69	TRIAN	107.05 D- 11.05 B (50 m)	Continue													
70	TUC TRUNG	107.12 D- 11.05 B	Continue													
71	VO XU	107.37 D- 11.10 B	Stop													
72	VUNG TAU	107.05 D- 10.20 B	Continue													
73	XUAN LOC	107.14 D- 10.51 B	Continue													

Note Bound: Following stations are located at the same site with different name by different regime

Binh Duong = Thu Dau Mot = Phu Cuong

An Loc = Binh Loc

Binh Long = Chon Thanh

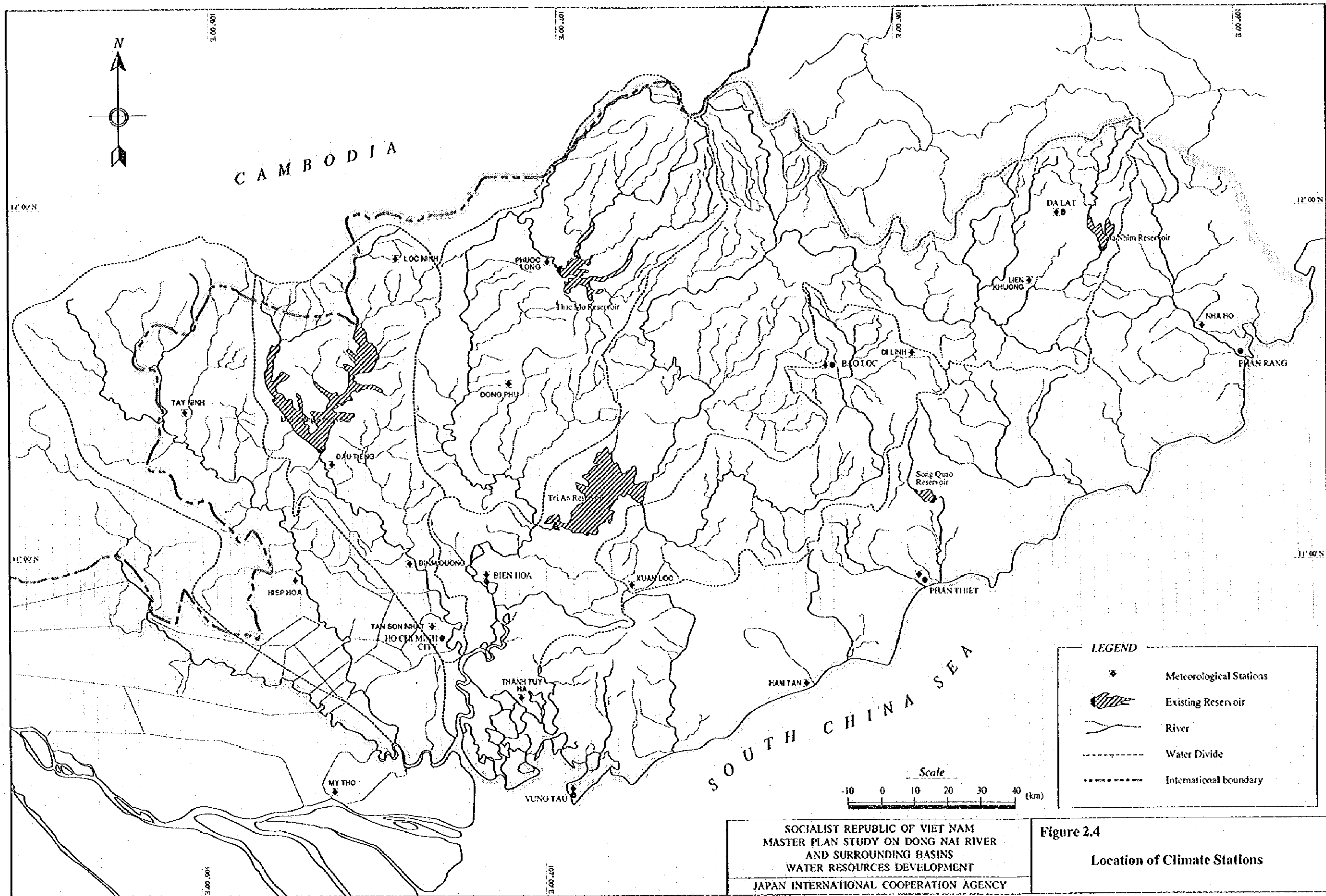
Da Ampy = Dai Nga

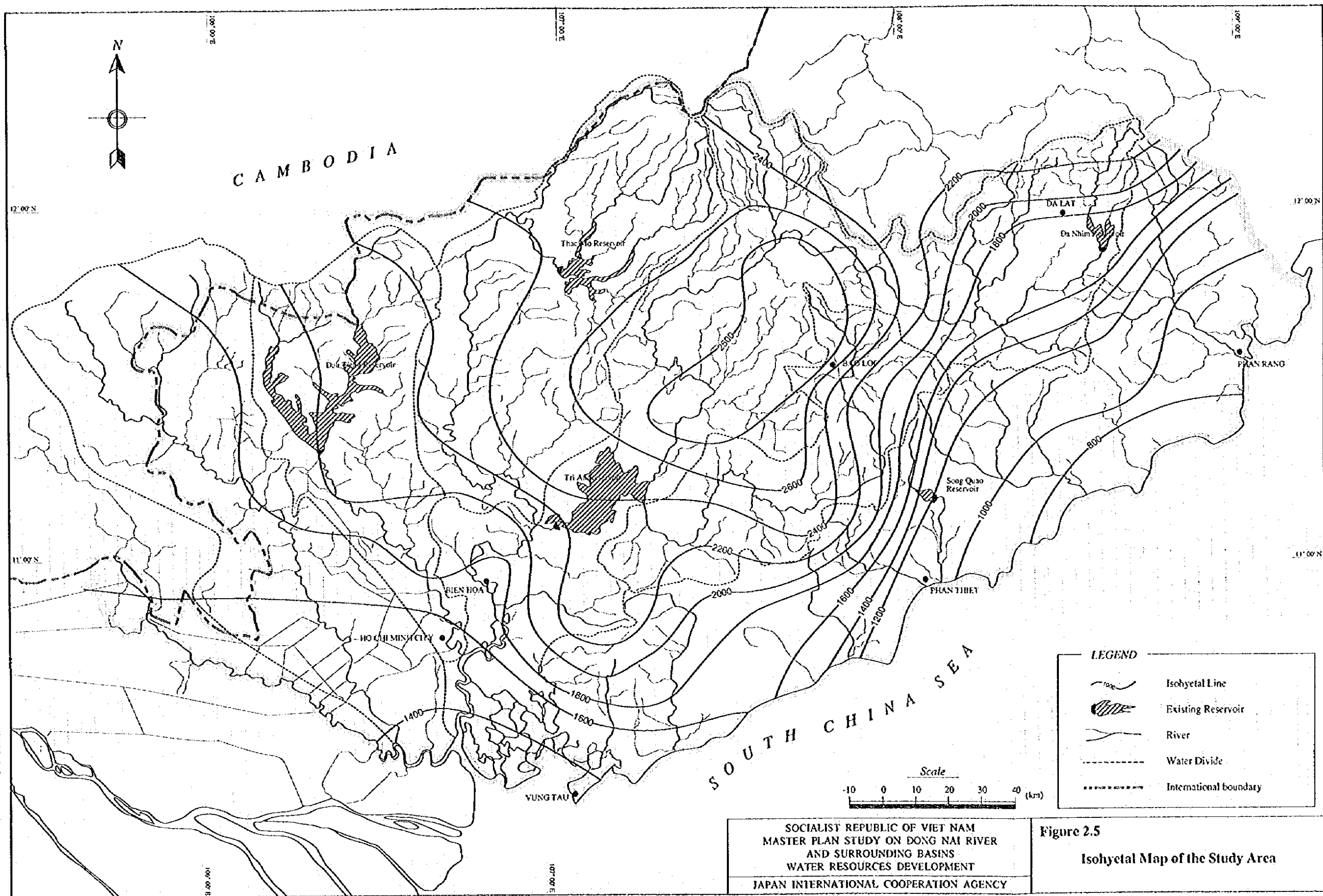
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Figure 2.3

Duration of Record at Rainfall
 Gauging Stations (2/2)

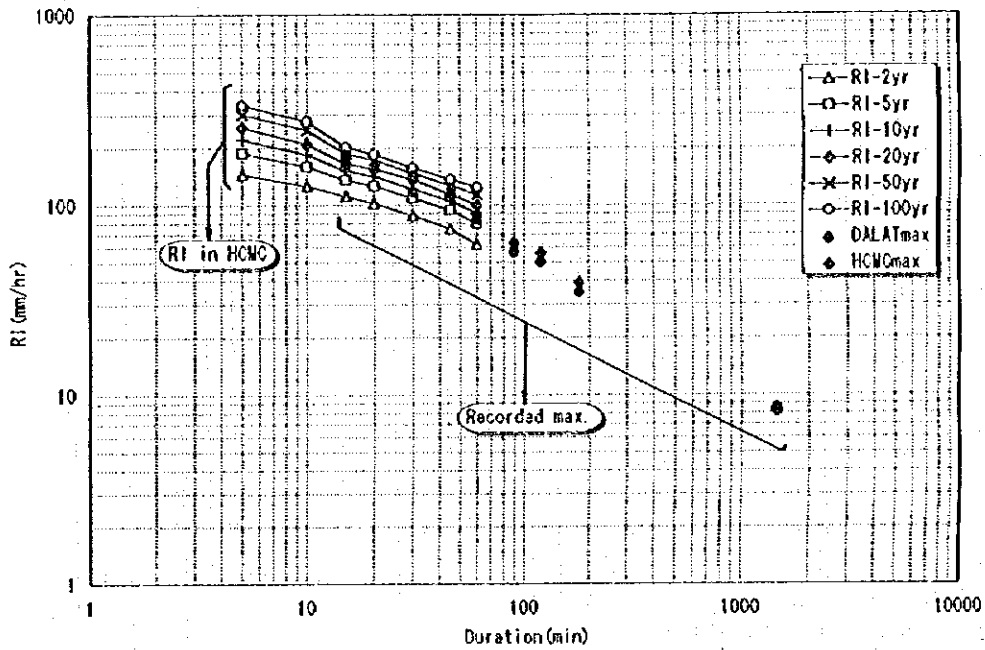




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Figure 2.5
 Isohyetal Map of the Study Area

Rainfall Intensity Curve



Percentage of T-hr Rainfall (Rt) to Daily Rainfall (Rd)

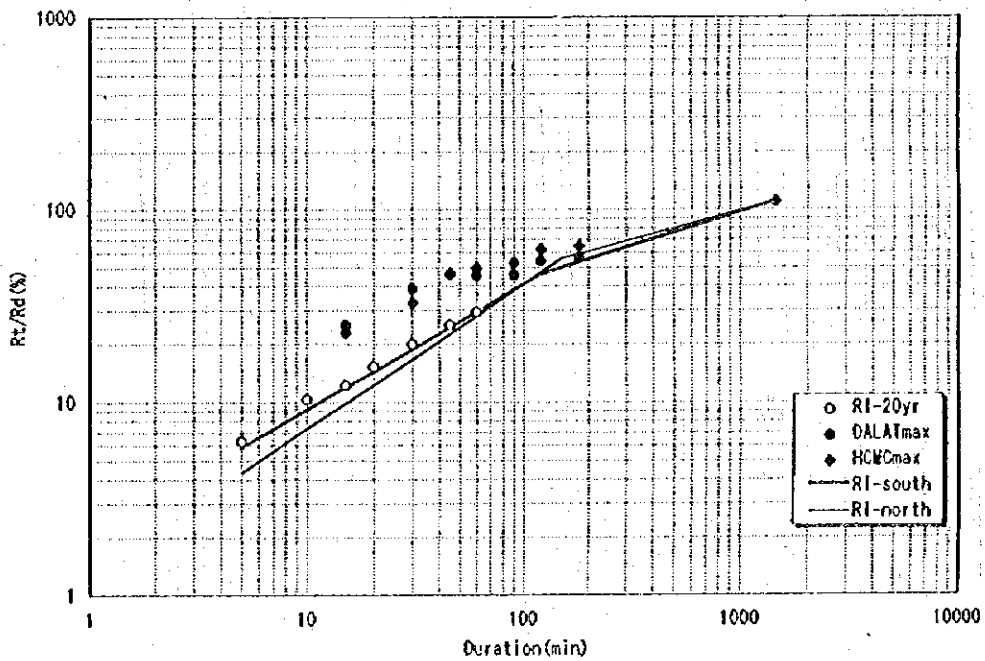
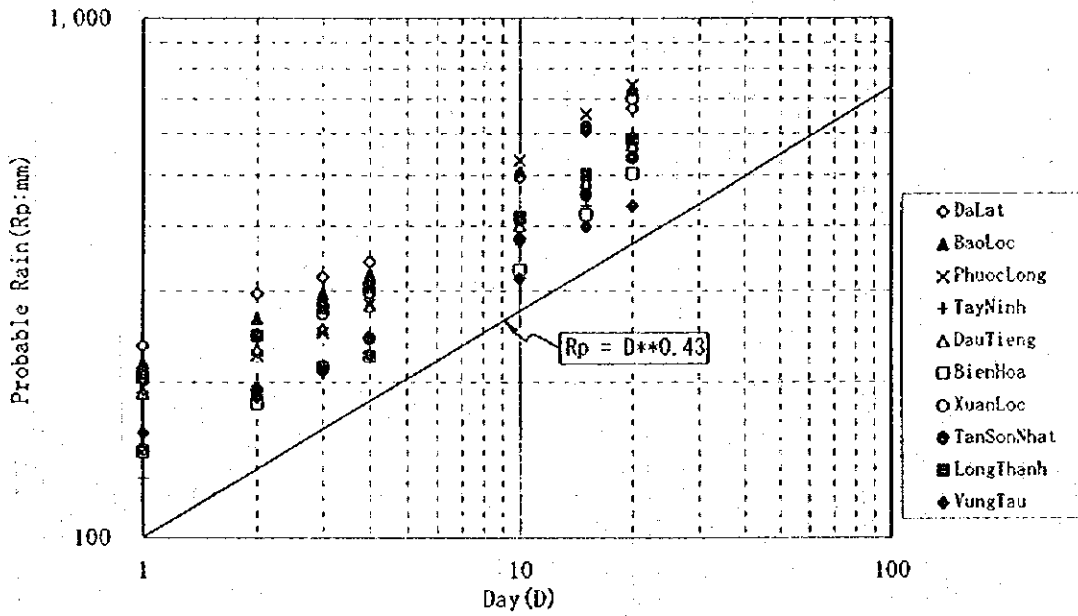


Figure 3.1

Rainfall Intensity for the Short Duration

20-year Probable Rainfall



100-year Probable Rainfall

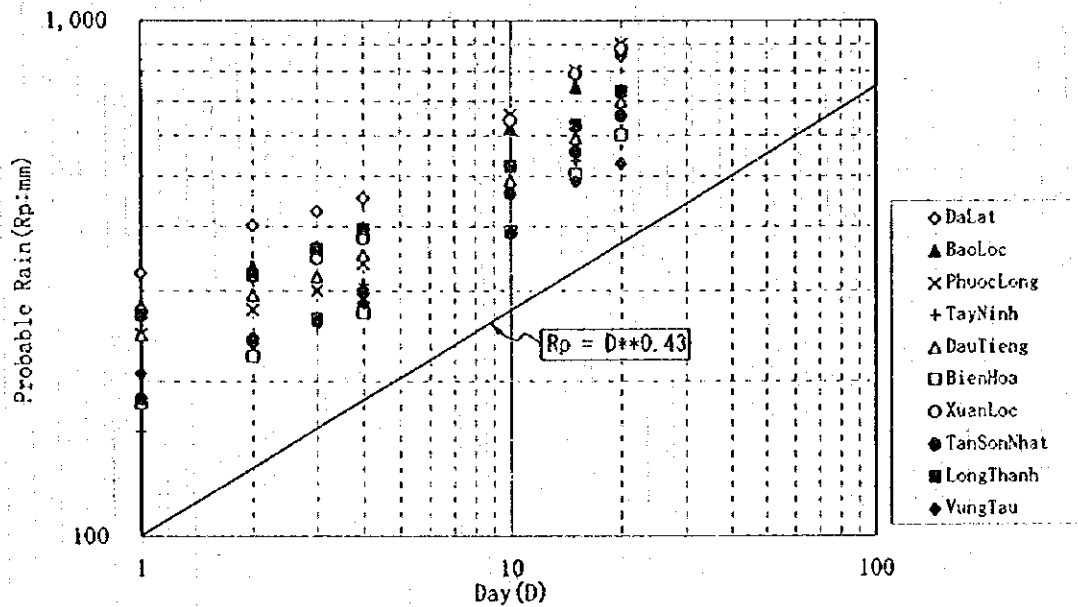
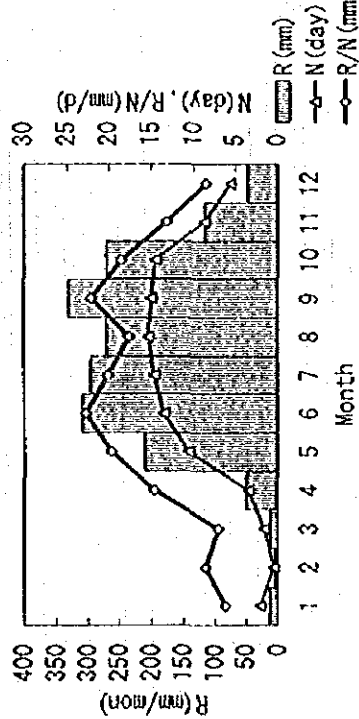
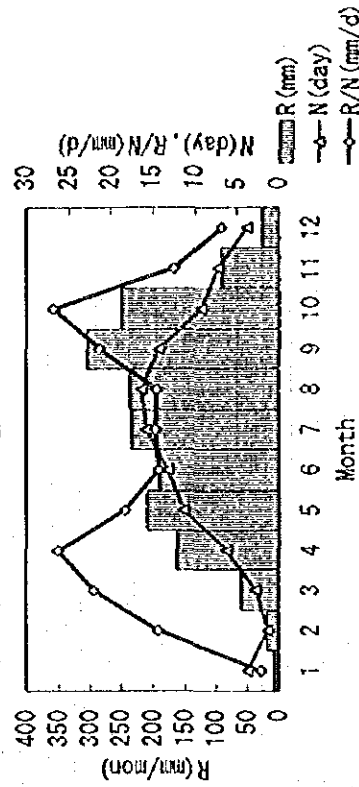


Figure 3.2
 Probable N-day Rainfall

Tan Son Hoa/H. C. M. City



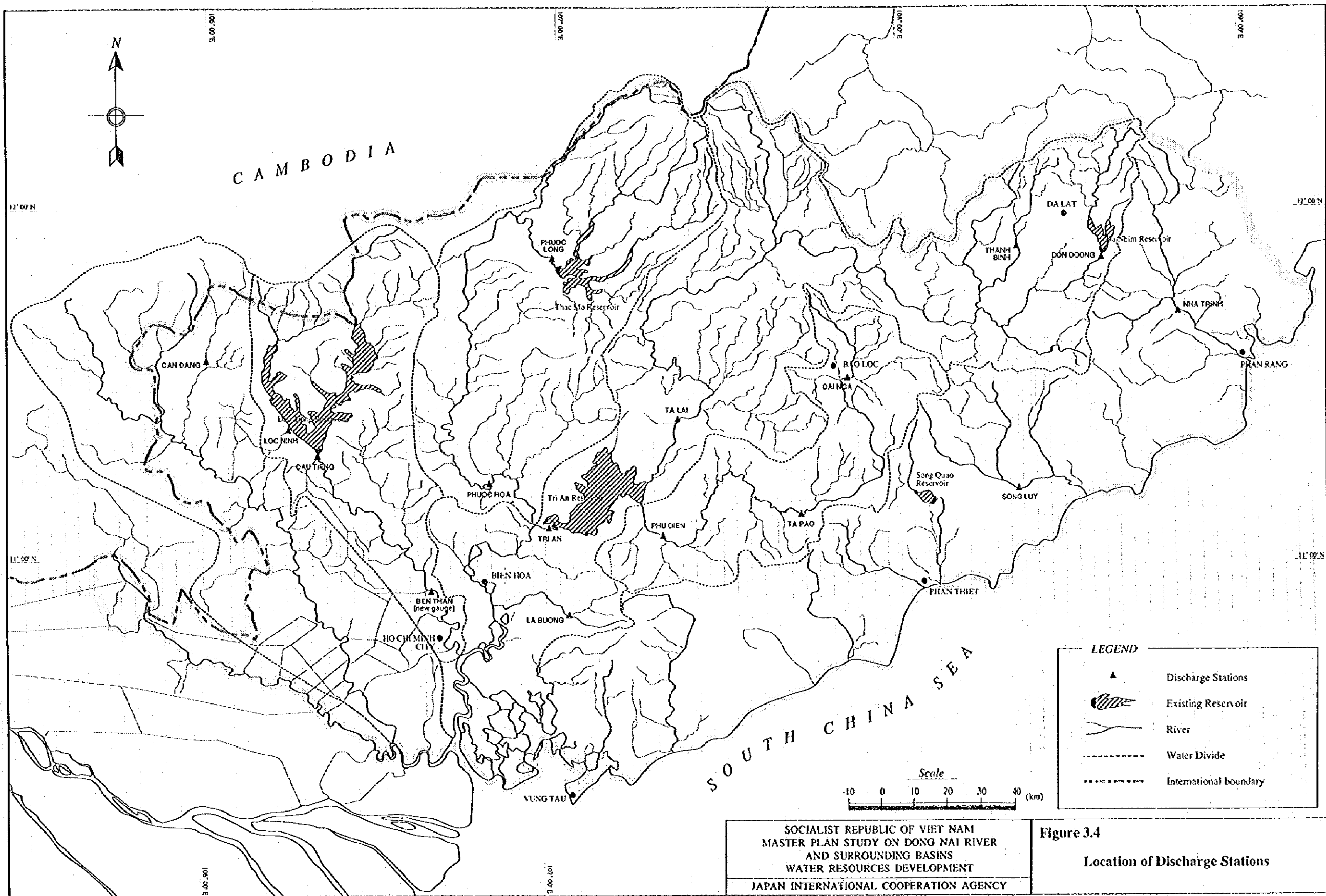
Lien Khuong/Da Lat



Month	Tan Son Hoa/H. C. M. City			Lien Khuong/Da Lat		
	R (mm)	N (day)	R/N (mm/d)	R (mm)	N (day)	R/N (mm/d)
Jan	13.1	2.1	6.2	7.7	3.7	2.1
Feb	4.3	0.5	8.6	18.7	1.3	14.4
Mar	11.3	1.6	7.1	59.5	2.7	22.0
Apr	49.6	3.4	14.6	163.3	6.2	26.3
May	211.0	10.7	19.7	209.1	11.4	18.3
Jun	309.8	13.6	22.8	190.8	13.3	14.3
Jul	295.8	14.7	20.1	232.7	15.8	14.7
Aug	270.8	15.4	17.6	236.6	16.3	14.5
Sep	331.3	15.0	22.1	305.4	14.3	21.4
Oct	270.9	14.6	18.6	250.3	9.3	26.9
Nov	116.6	8.8	13.3	91.7	7.3	12.6
Dec	47.9	5.6	8.6	26.0	3.8	6.8
Total	1932.4	-	-	1791.8	-	-
Mean	-	8.8	14.9	-	8.8	16.2

(Remarks)
 R : Monthly rainfall
 N : Number of rainy days
 R/N: Average rainy day rainfall

Figure 3.3
 Rainy Day Rainfall



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Figure 3.4
 Location of Discharge Stations

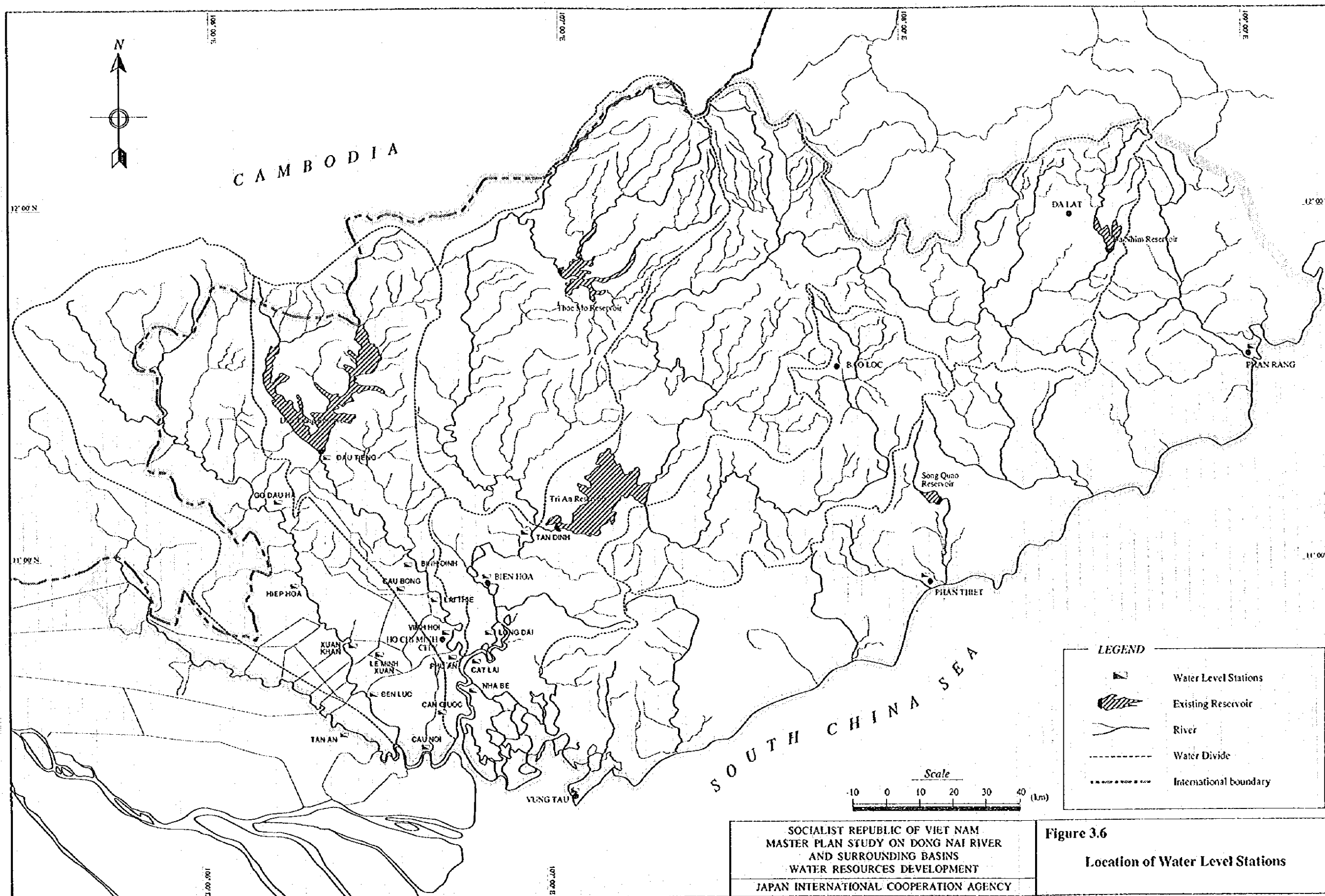
Stream Gauge	River Basin	Catchment Area (km ²)	Observation Period	Observation										Status		
				4	0	5	0	6	0	7	0	8	0		9	0
1. CANDANG	Vam Co Dong	617	1974-1992													
2. DAINGA	La Nga	373	1974-1992													
3. DAUTENG	Sai Gon	2,700	1977-1980													
4. DONDUONG	Da Nhim	775	1934-1944; 1949-1992													
5. ANVIEN	La Buong	264	1978-1990													
6. LOCNINH	Sai Gon	500	1974-1983													
7. NHATRINH	Cai	2,140	1934-1937													
8. PHUDIEN	La Nga	3,060	1987-1992													
9. PHUOCHOA	Be	5,765	1974-1992													
10. PHUOCLONG	Be	2,215	1974-1992													
11. SONGLUY	Luy	982	1978-1992													
12. TALAI	Dong Nai	8,850	1987-1992													
13. TAPAO	La Nga	2,000	1960-1964; 1973-1992													
14. THUANBINH	Da Dung	294	1980-1991													
15. TRIAN	Dong Nai	14,025	1974-1986													

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Figure 3.5

Inventory of Discharge Stations



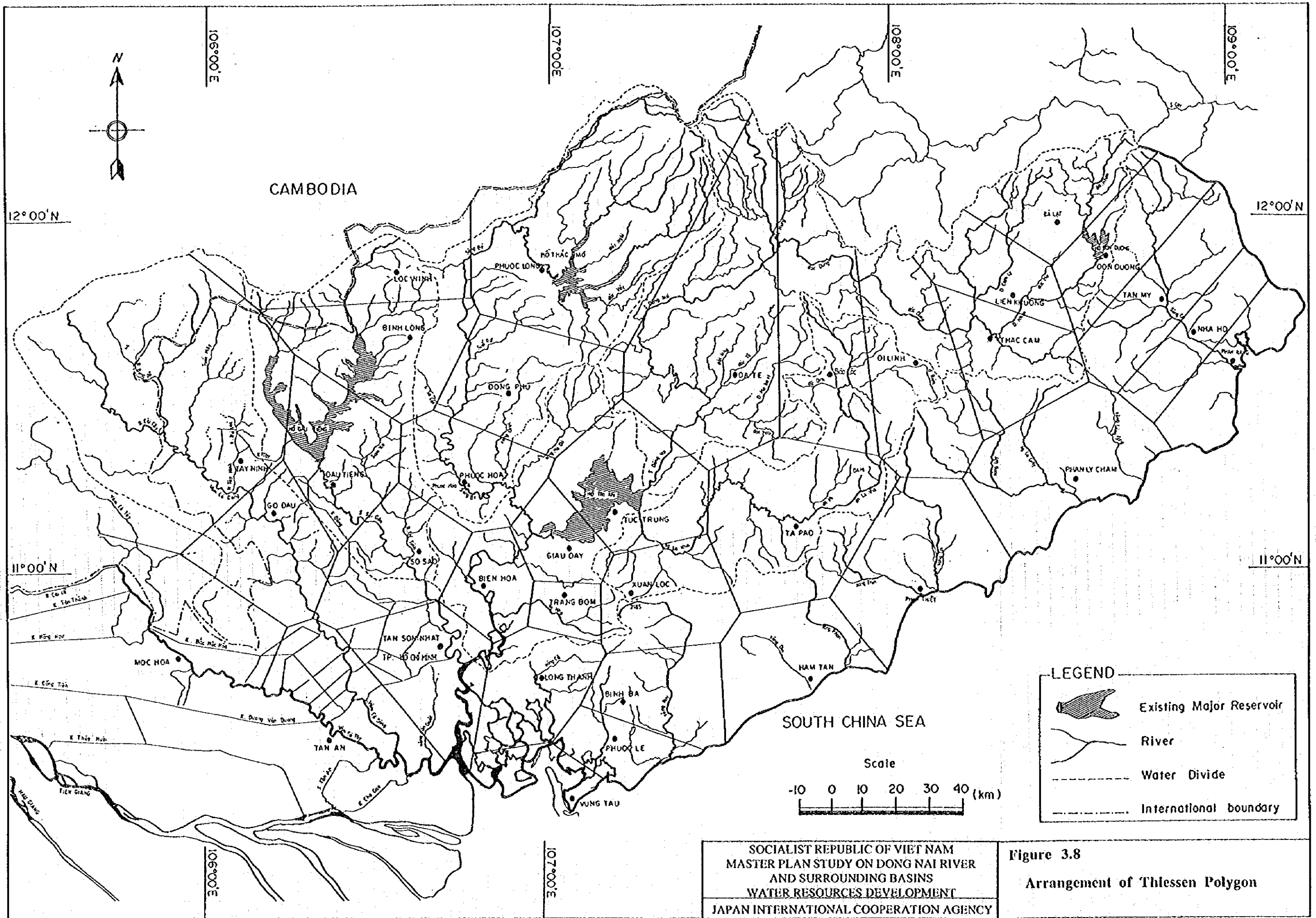
No	STN NAME	RIVER	OBSERVED DURATION	N	4	0	5	0	6	0	7	0	8	0	9	0
1	PHU AN	SAIGON	1942-1943.1949-1990	46												
2	LAI THIEU	SAIGON	1984-1985	2												
3	BINH DUONG	SAIGON	1966-1990	25												
4	DAU TIENG	SAIGON	1977-1979	3												
5	NHA BE	DONG NAI	1982-1990	9												
6	CAT LAI	DONG NAI	1982-1985	4												
7	BIEN HOA	DONG NAI	1960-1990	31												
8	TAN DINH	DONG NAI	1978-1990	13												
9	LONG DAI	DONG NAI	1984-1985	3												
10	GO DAU HA	VAM CO DONG	1963-1990	28												
11	HIEP HOA	VAM CO DONG	1982-1985	4												
12	XUAN KHANH	VAM CO DONG	1982-1985	4												
13	BEN LUC	VAM CO DONG	1961-1966.1974-1975.1976.1981-1990	19												
14	TAN AN	VAM CO TAY	1940-1975.1976-1990	51												
15	CAU NOI	VAM CO	1982-1985.1990	5												
16	CAN GIUOC	RACH CHANH	1982-1983	3												
17	VUNG TAU	BEN DA	1955-1965.1972-1975.1982-1990	24												
18	LE MINH XAUNNOI DONG		1982-1985	4												
19	CAU BONG	NOI DONG	1982-1985	4												
20	DAO LONG	SONG CAI	1966-1971. 1978-1990	18												
21	PHAN THIET	CA TY	1968-1969.1978-1990	15												
22	MOC HOA	VAM CO TAY														
23	TUYEN NHON	VAM CO TAY														

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Figure 3.7

List of Water Level Stations in the Study Area



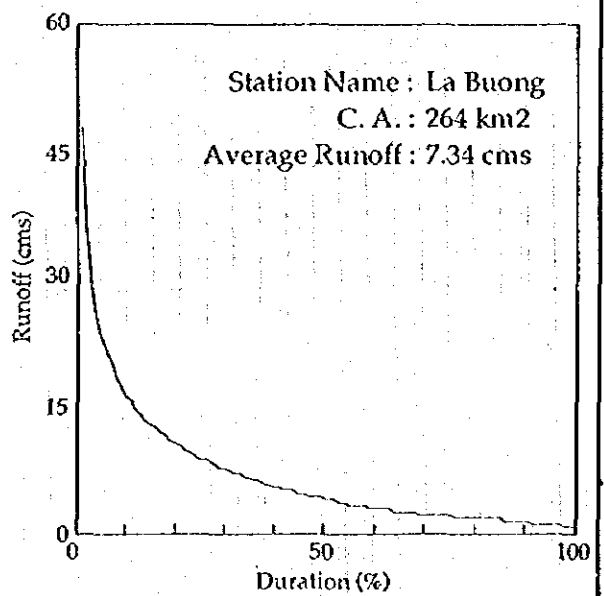
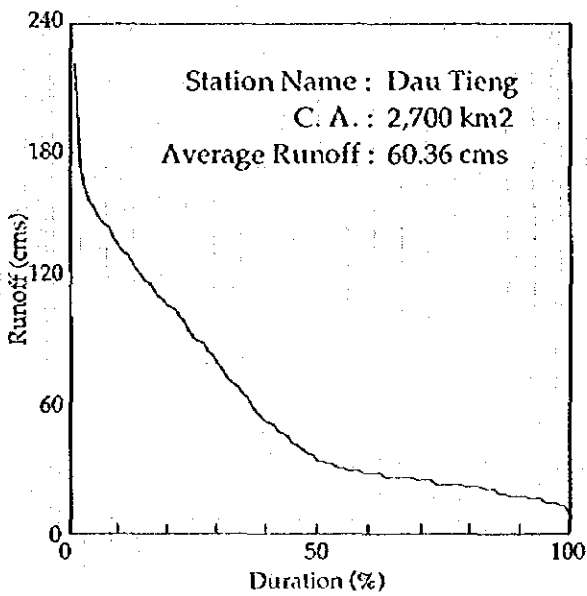
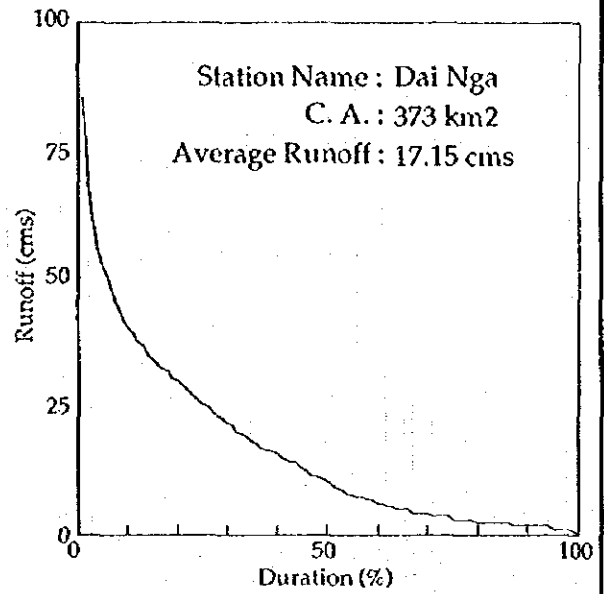
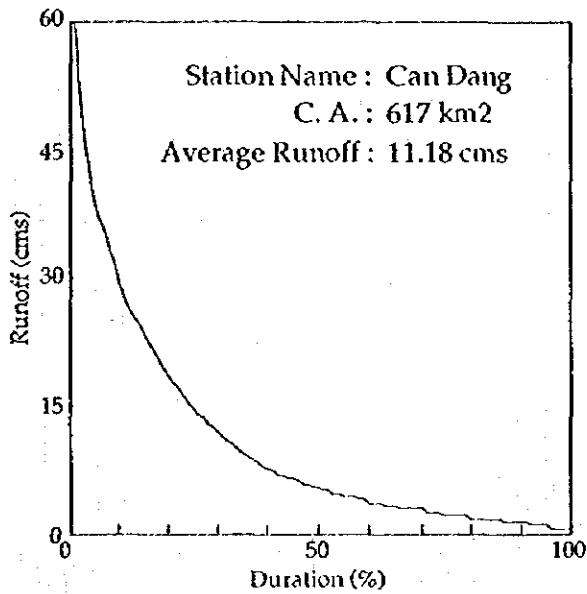


Figure 3.9
Flow Duration Curve at Hydrological Stations (1/4)

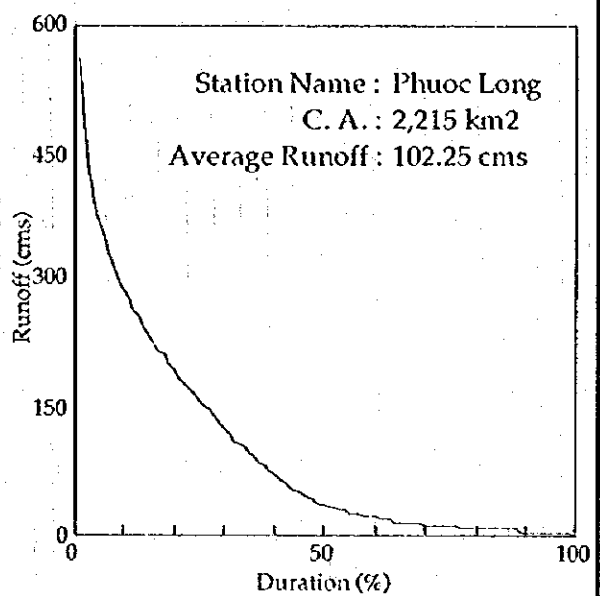
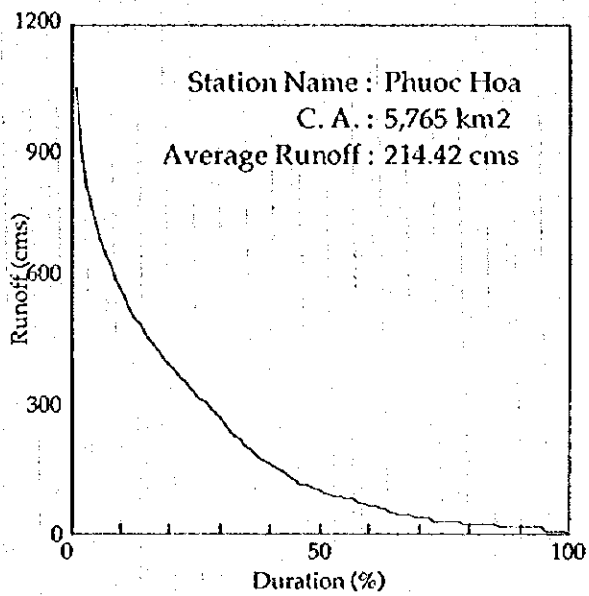
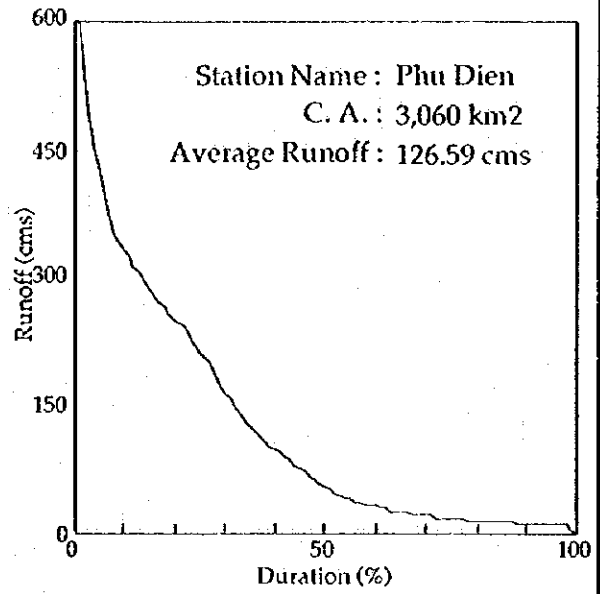
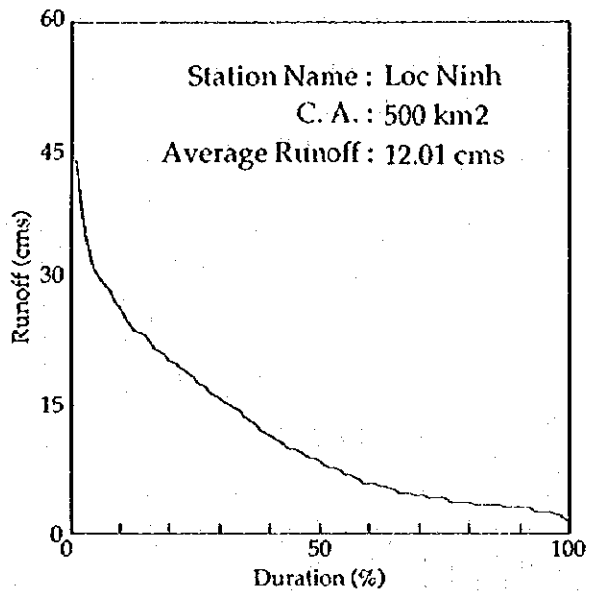


Figure 3.9
Flow Duration Curve at Hydrological Stations (2/4)

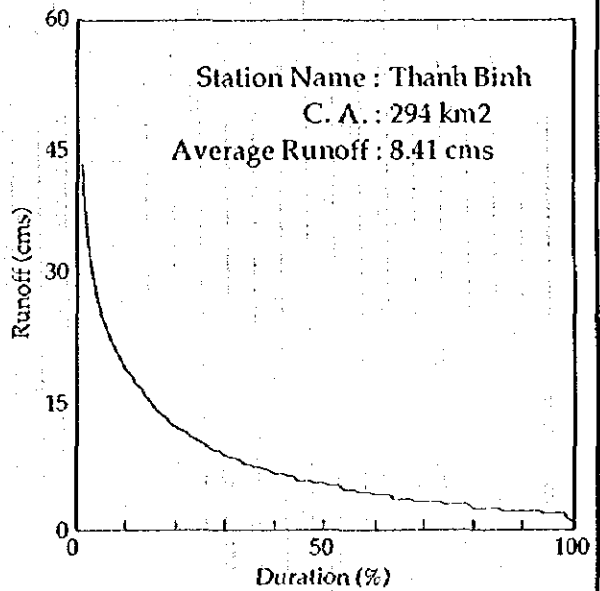
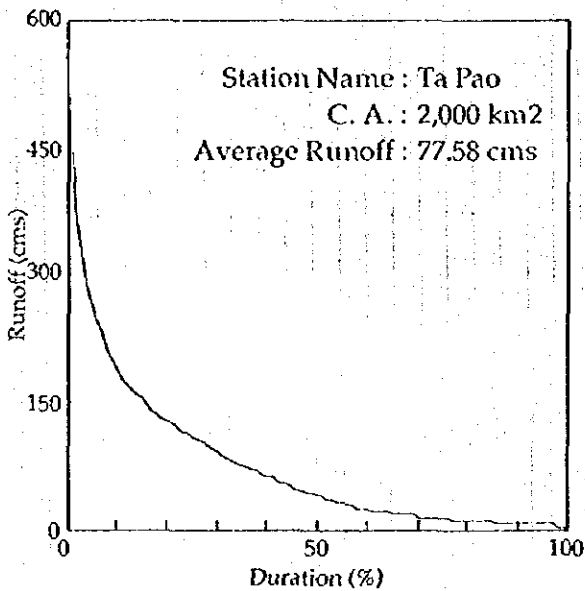
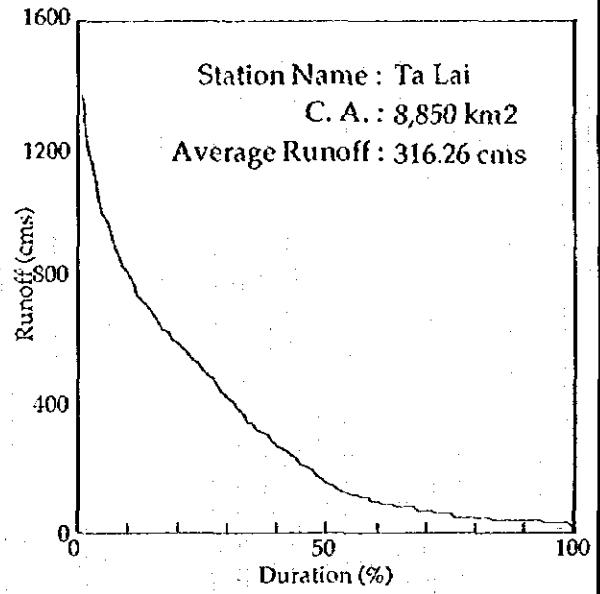
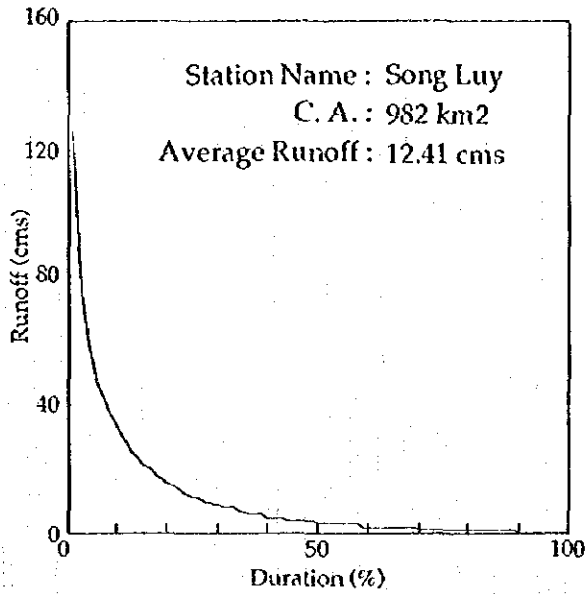
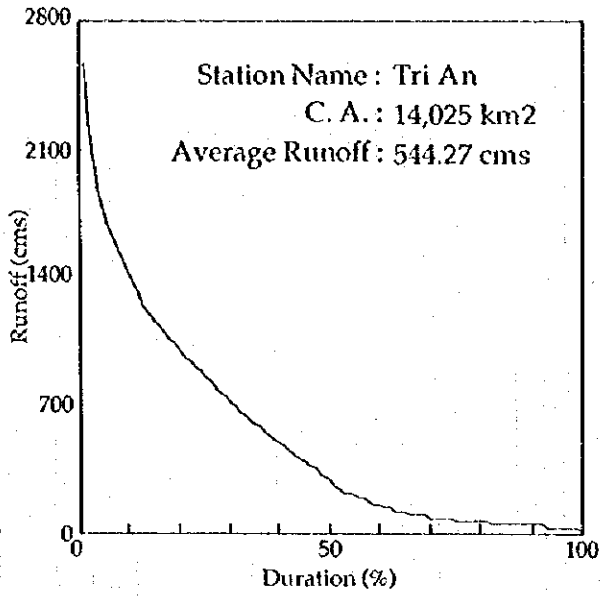


Figure 3.9
Flow Duration Curve at Hydrological Stations (3/4)



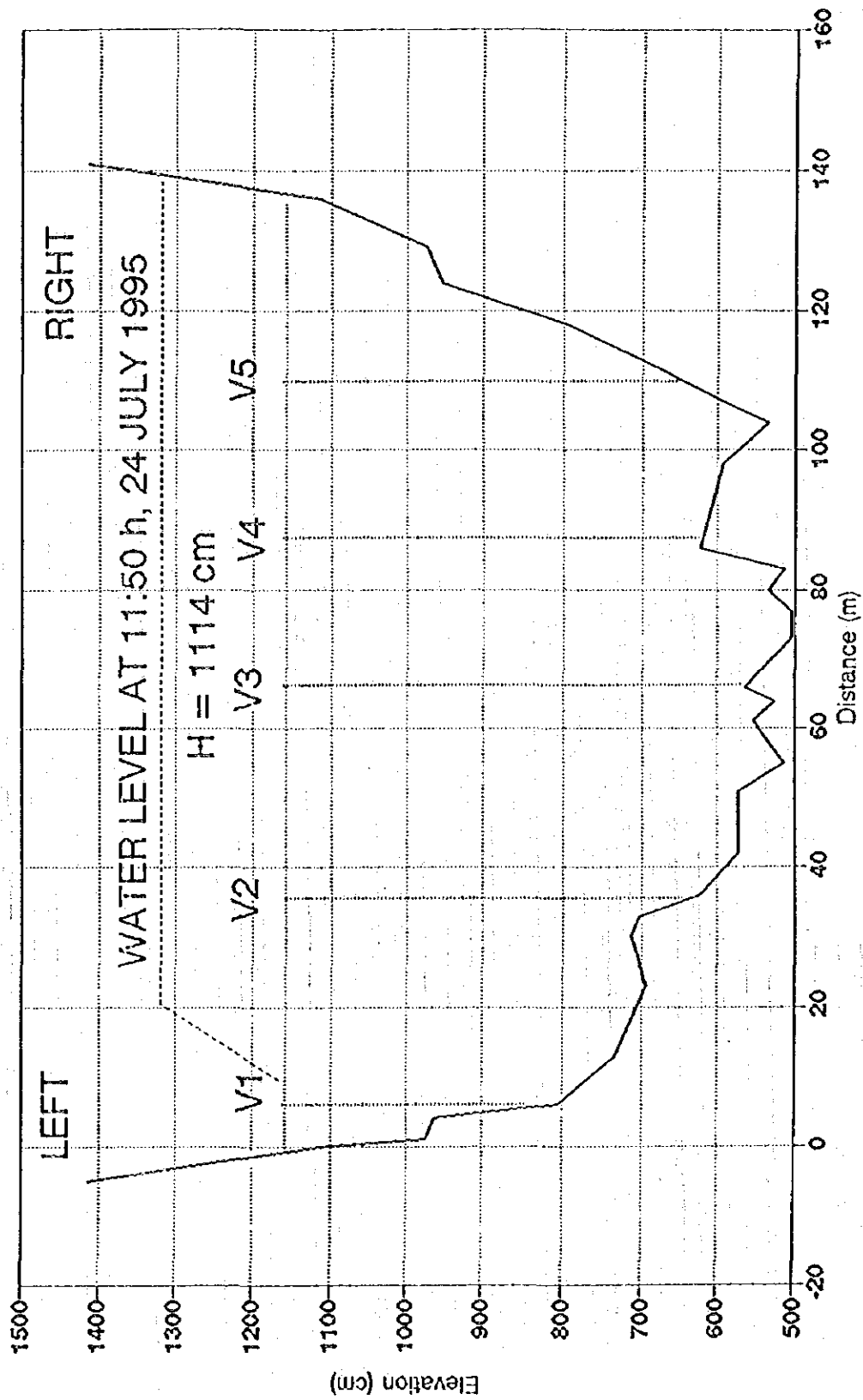
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Figure 3.9

Flow Duration Curve at Hydrological Stations (4/4)

CROSS SECTION AT TA LAI
DONG NAI RIVER - 24 JULY 1995



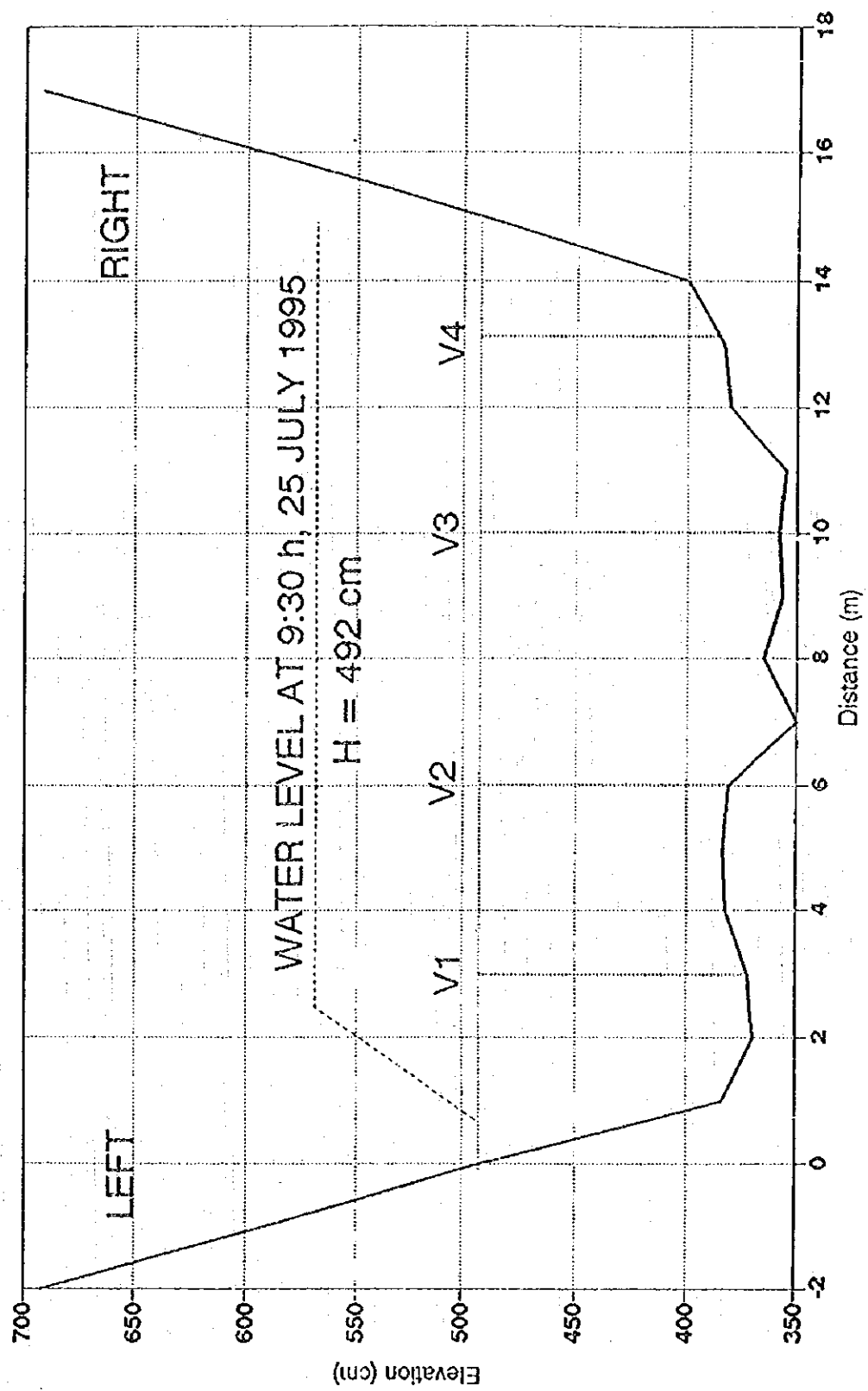
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Figure 3.10

Cross Section at the Discharge Station
(1/5)

CROSS SECTION AT AN VIEN
LA BUONG RIVER - 25 JULY 1995

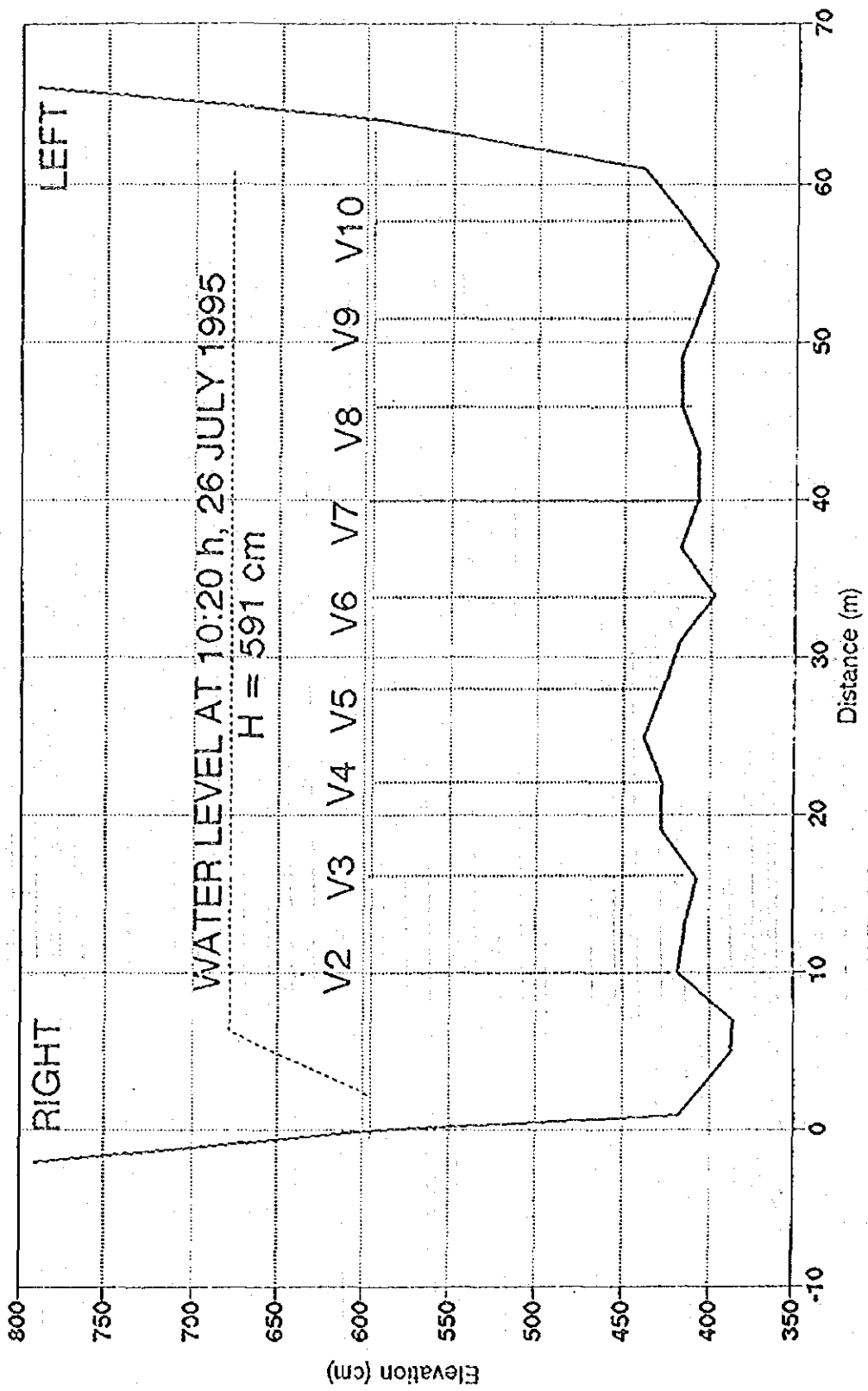


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Figure 3.10
Cross Section at the Discharge Station
(2/5)

CROSS SECTION AT TA PAO
 LANGA RIVER - 13 JULY 1995

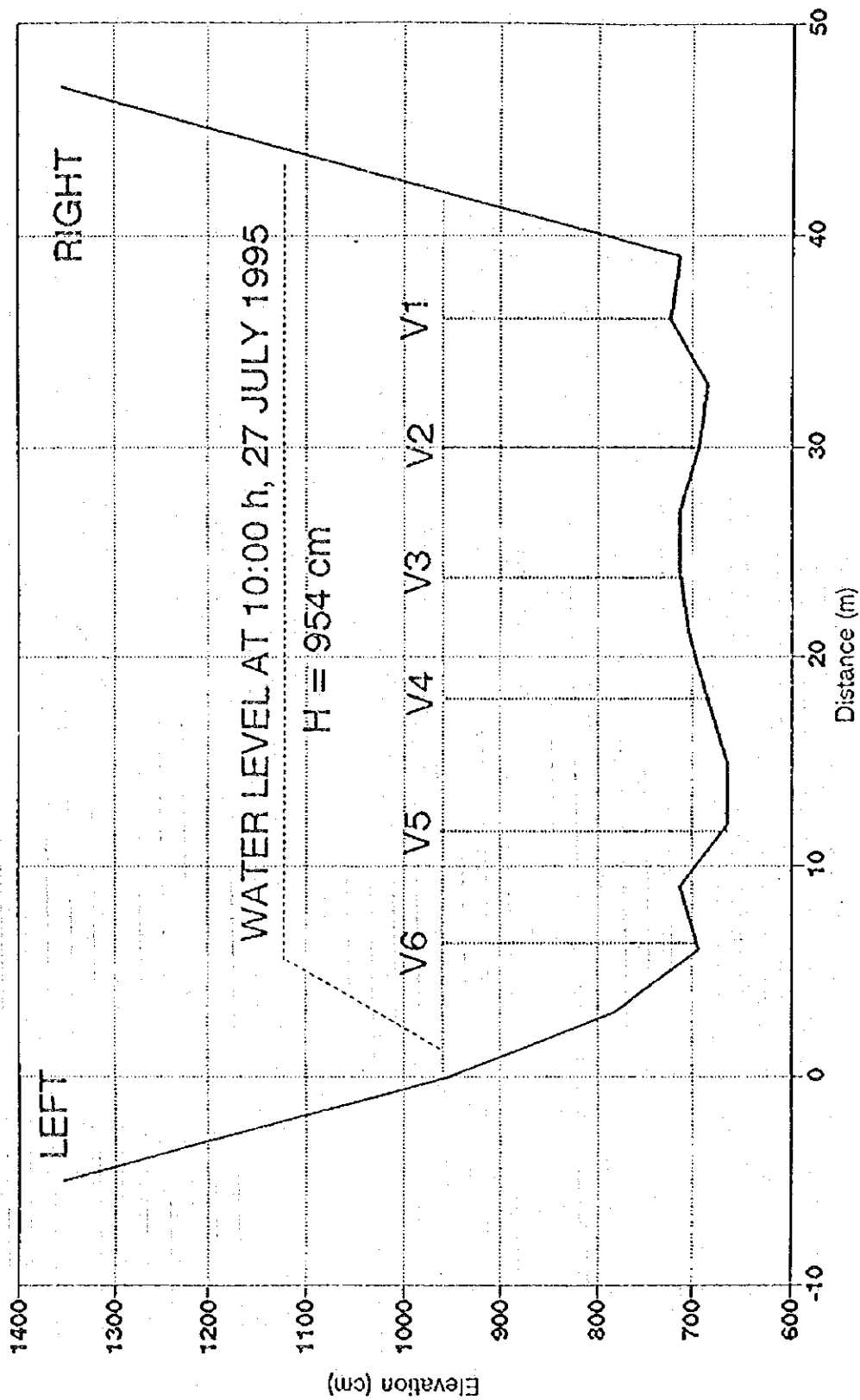


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Figure 3.10
 Cross Section at the Discharge Station
 (3/5)

SUB-CROSS SECTION AT PHUOC HOA
BE RIVER - 27 JULY 1995

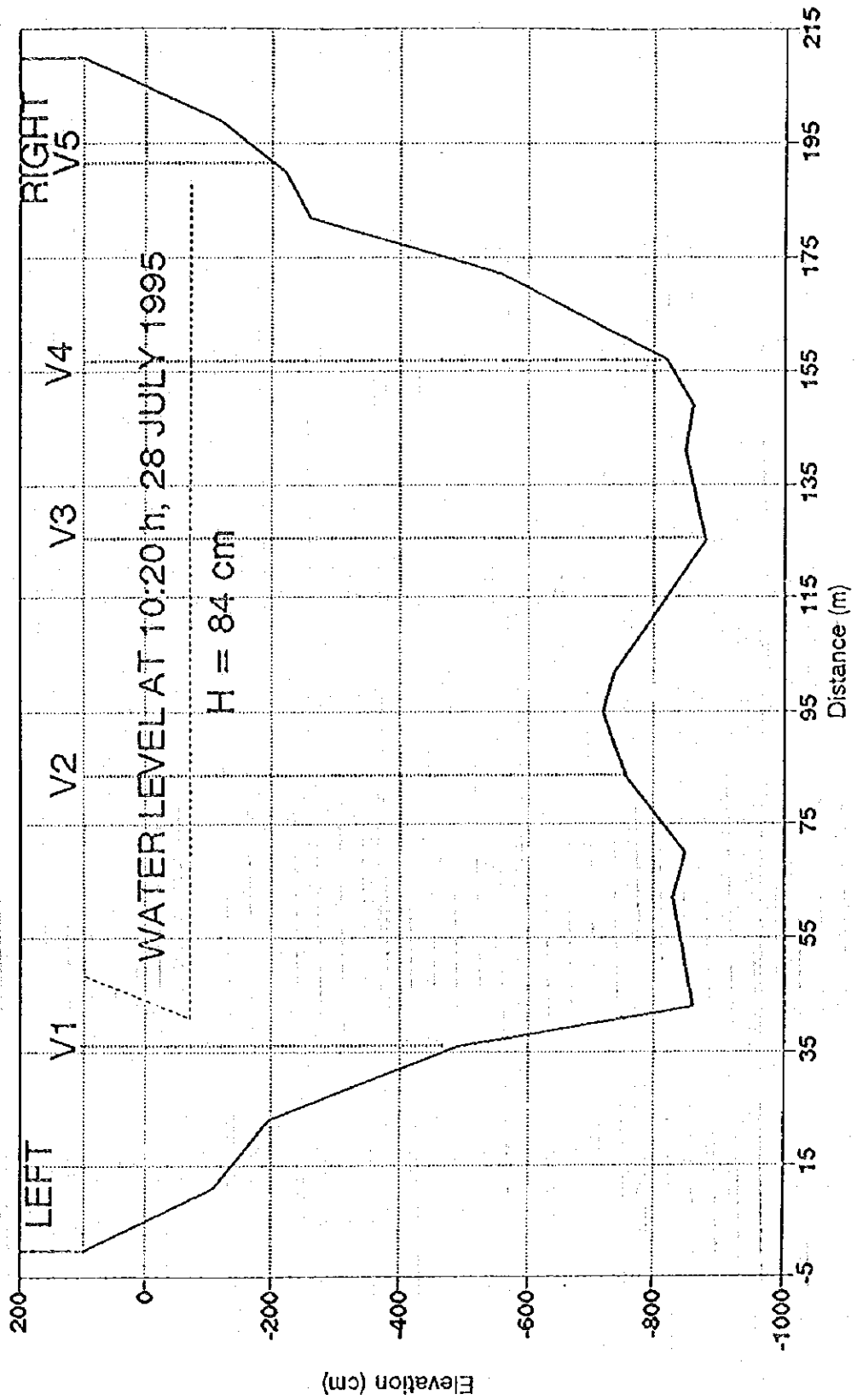


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Figure 3.10
Cross Section at the Discharge Station
(4/5)

CROSS SECTION AT BEN THAN
SAIGON RIVER - 28 JULY 1995



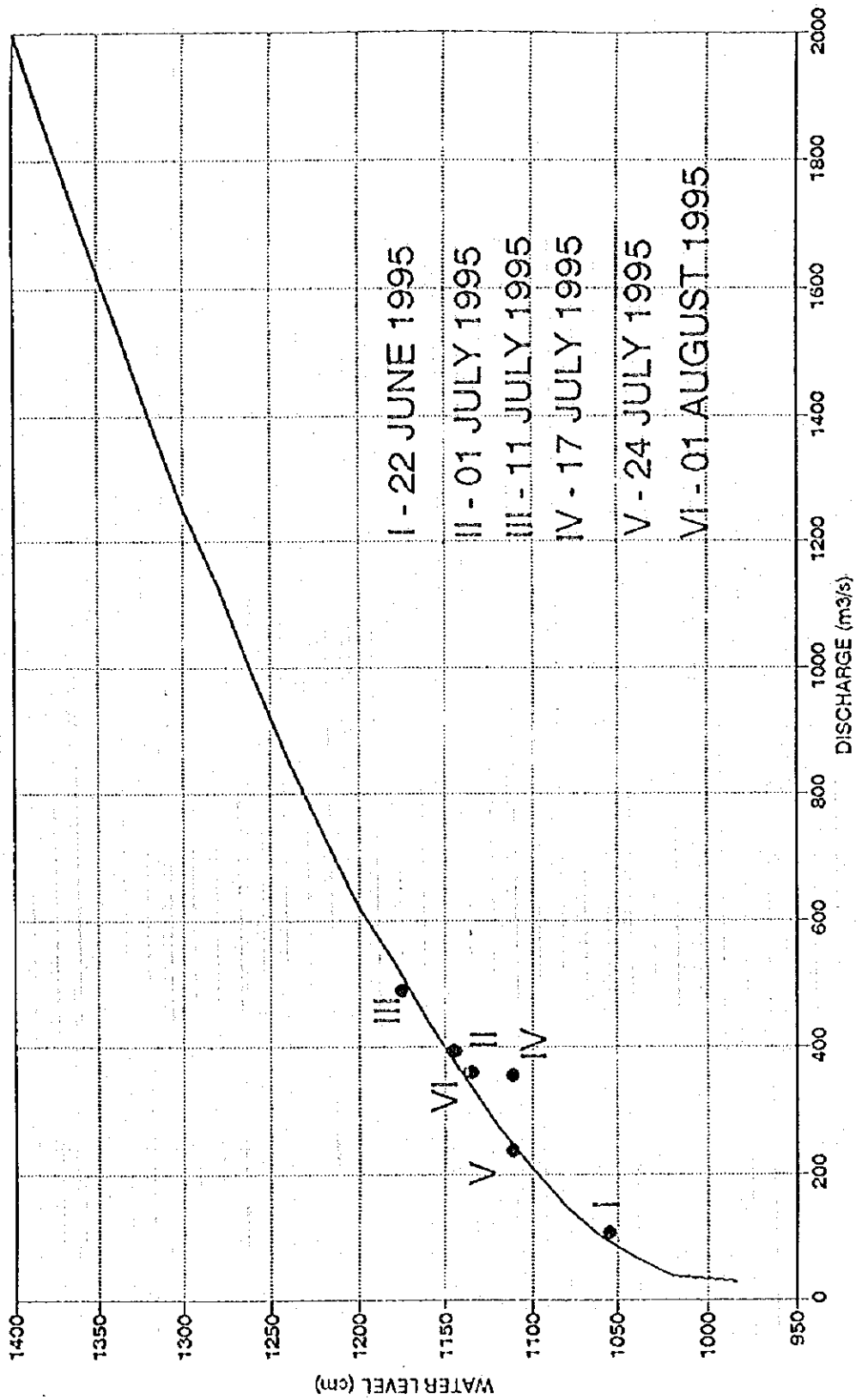
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Figure 3.10

Cross Section at the Discharge Station
(5/5)

RATING CURVE AT TA LAI STATION
DONG NAI RIVER

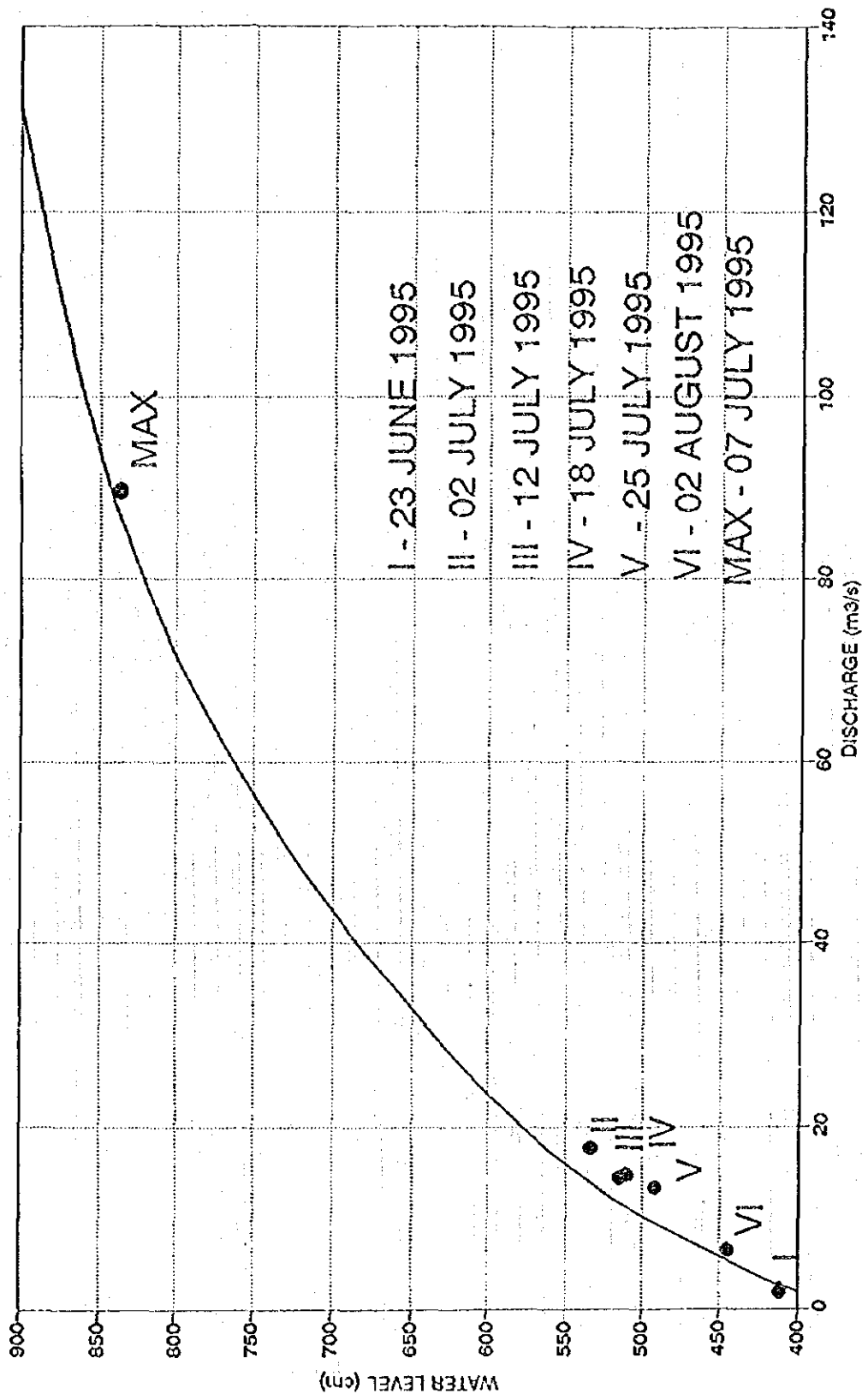


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Figure 3.11
Rating Curve and Result of
Discharge Measurements (1/4)

RATING CURVE AT AN VIEN STATION
LA BUONG RIVER

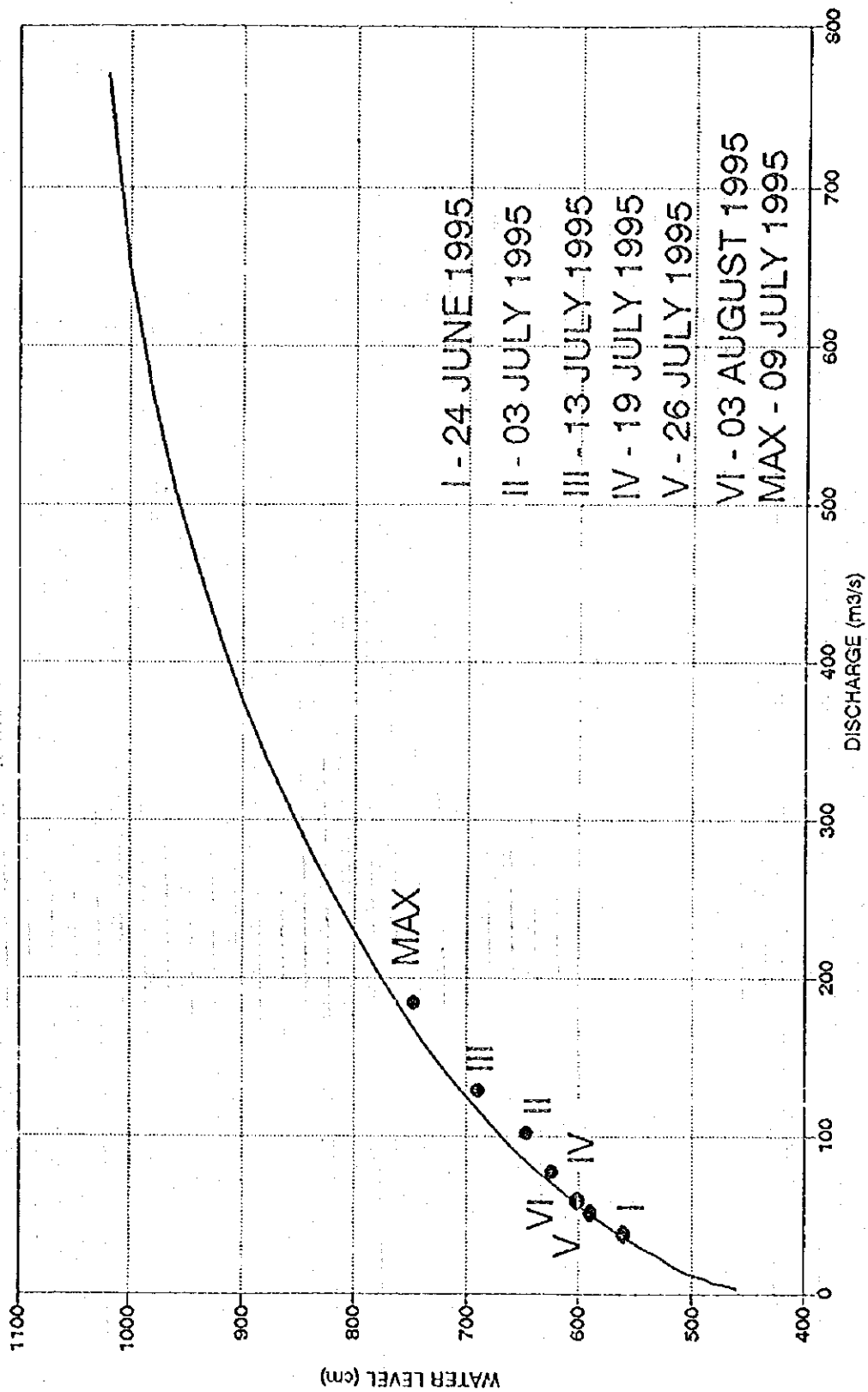


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Figure 3.11
Rating Curve and Result of
Discharge Measurements (2/4)

RATING CURVE AT TA PAO STATION
LA NGA RIVER

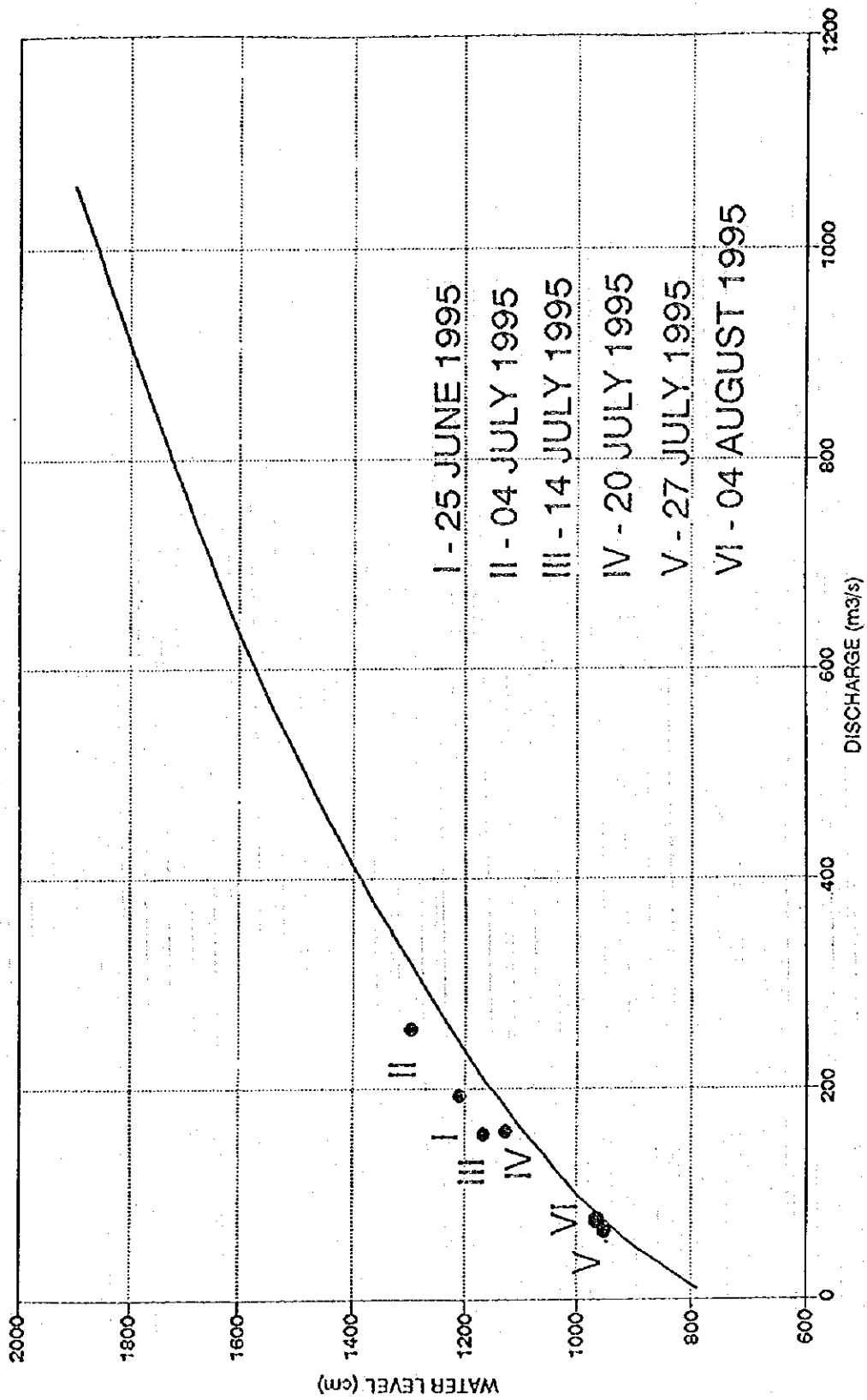


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Figure 3.11
Rating Curve and Result of
Discharge Measurements (3/4)

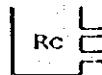
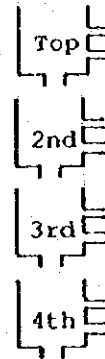
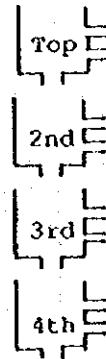
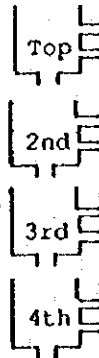
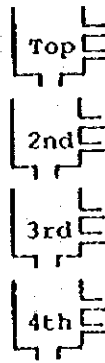
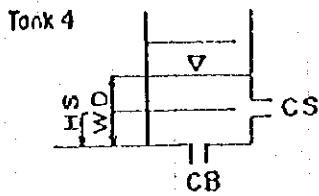
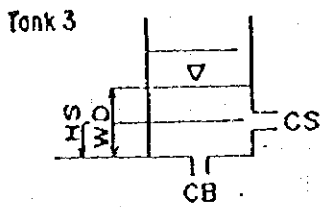
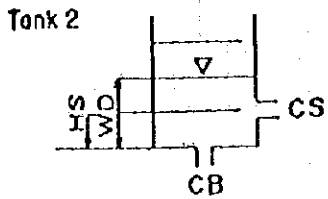
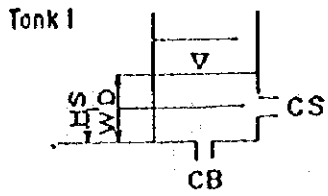
RATING CURVE AT PHUOC HOA STATION
BE RIVER



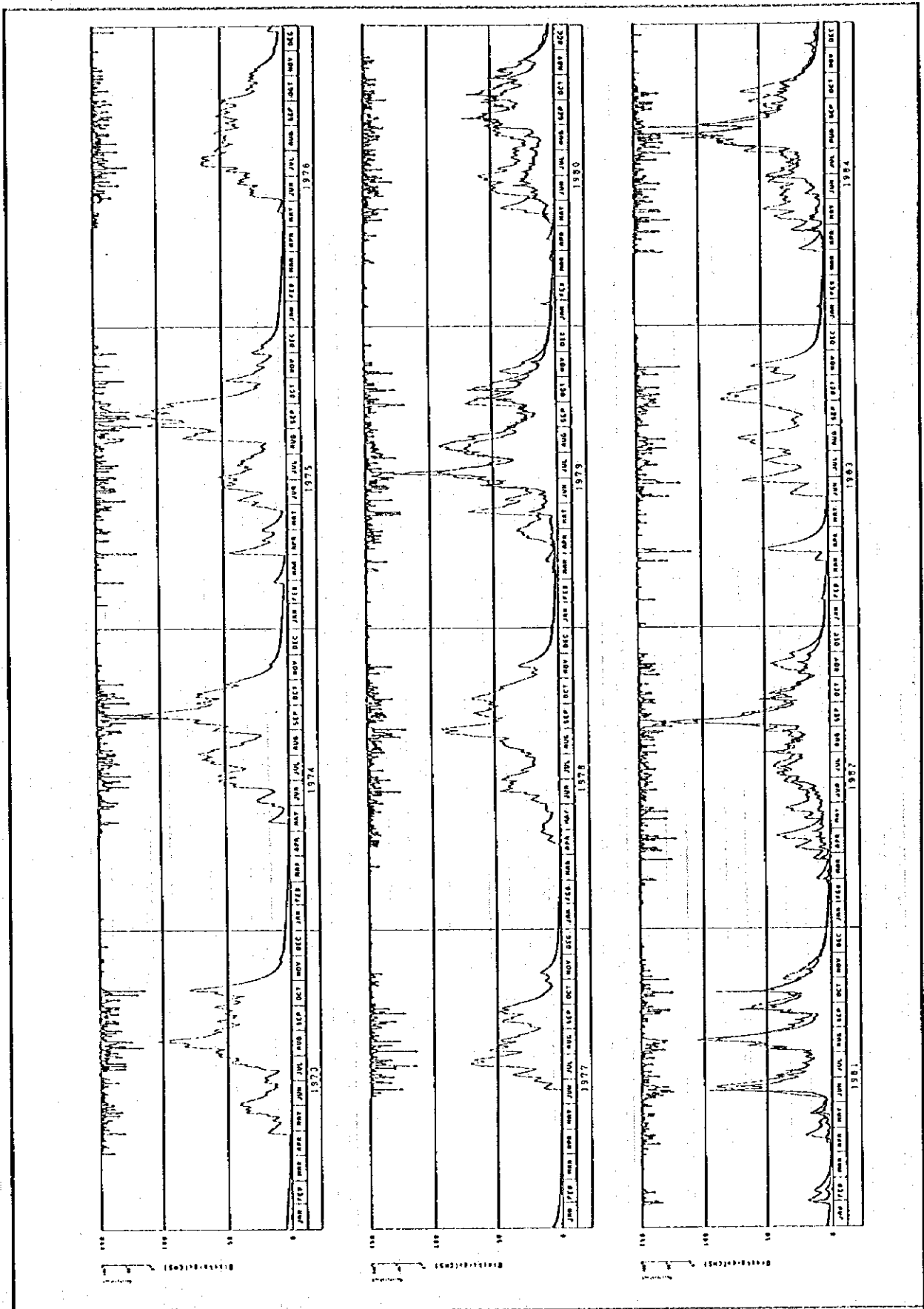
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Figure 3.11
Rating Curve and Result of
Discharge Measurements (4/4)



CS : Coefficient of side hole
 CB : Coefficient of bottom hole
 HS : Height of side hole (mm)
 WD : Initial water depth (mm)

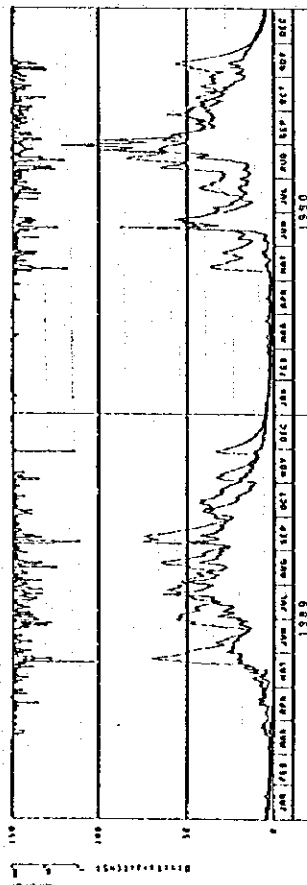
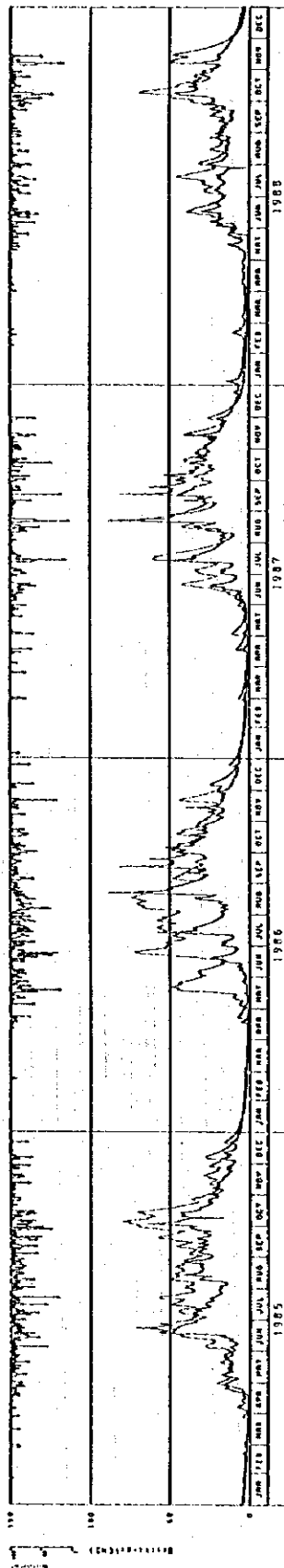


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Figure 3.13

Tank Model Hydrograph (1/7)

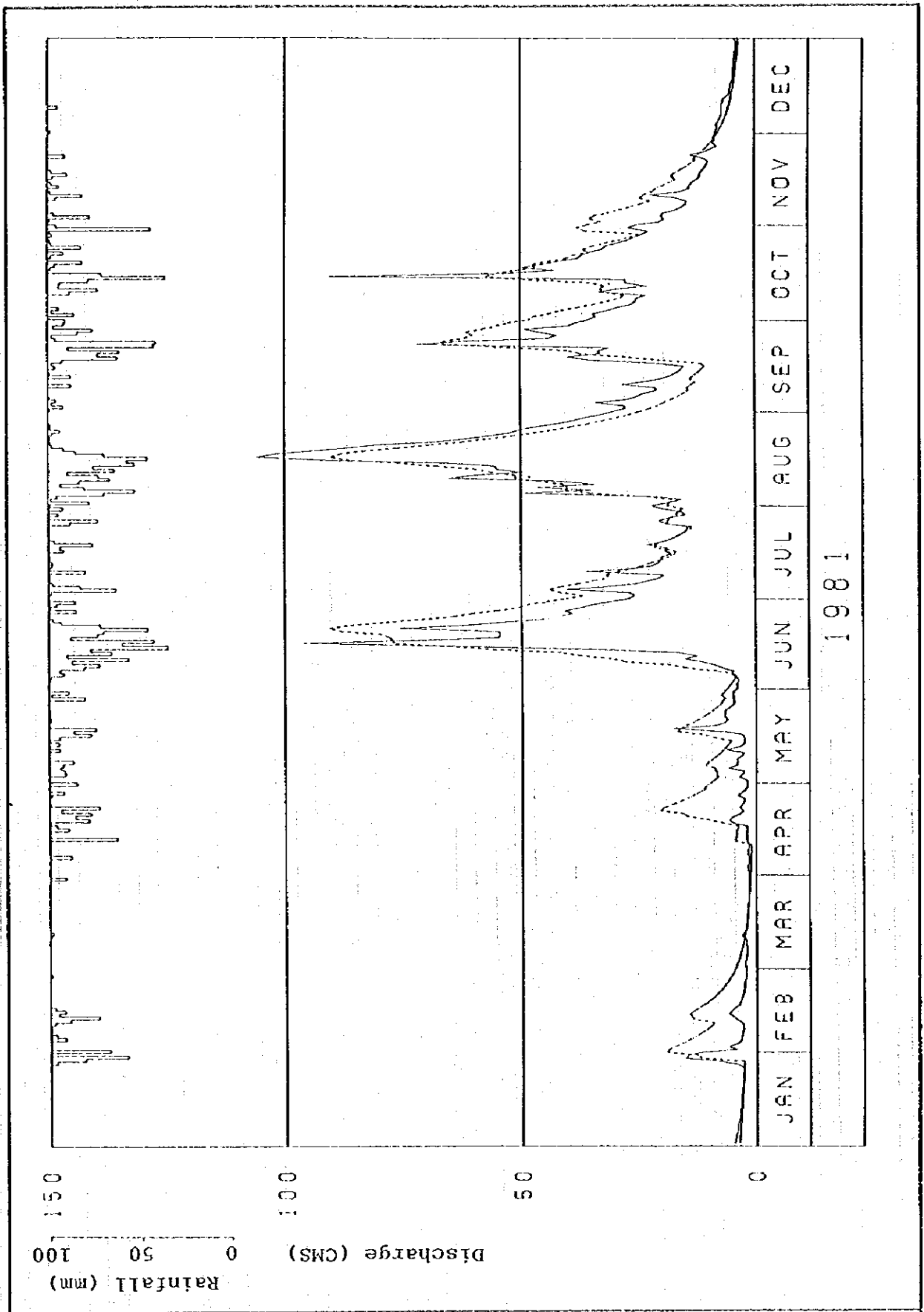


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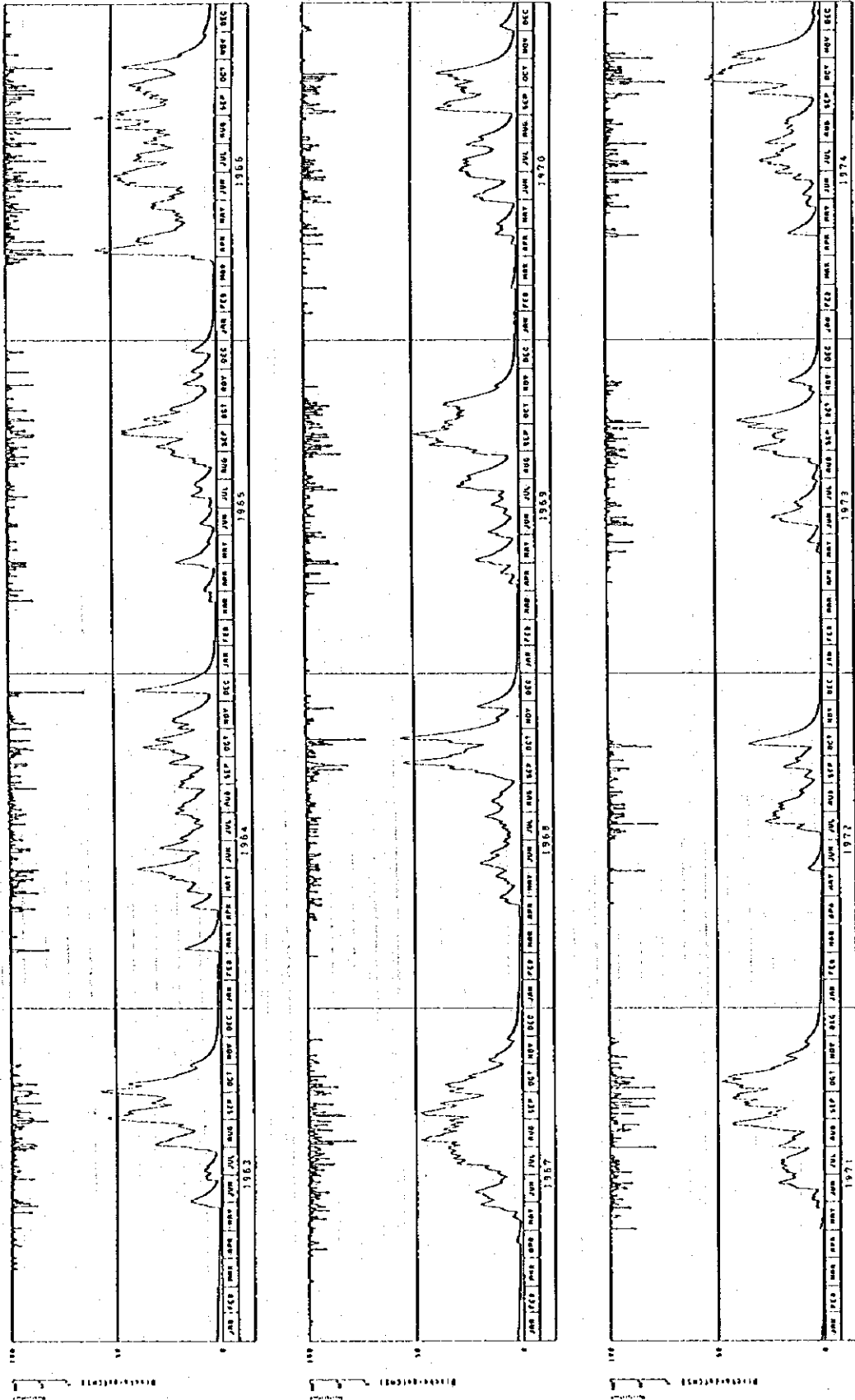
Figure 3.13

Tank Model Hydrograph (2/7)



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Figure 3.13
Tank Model Hydrograph (3/7)

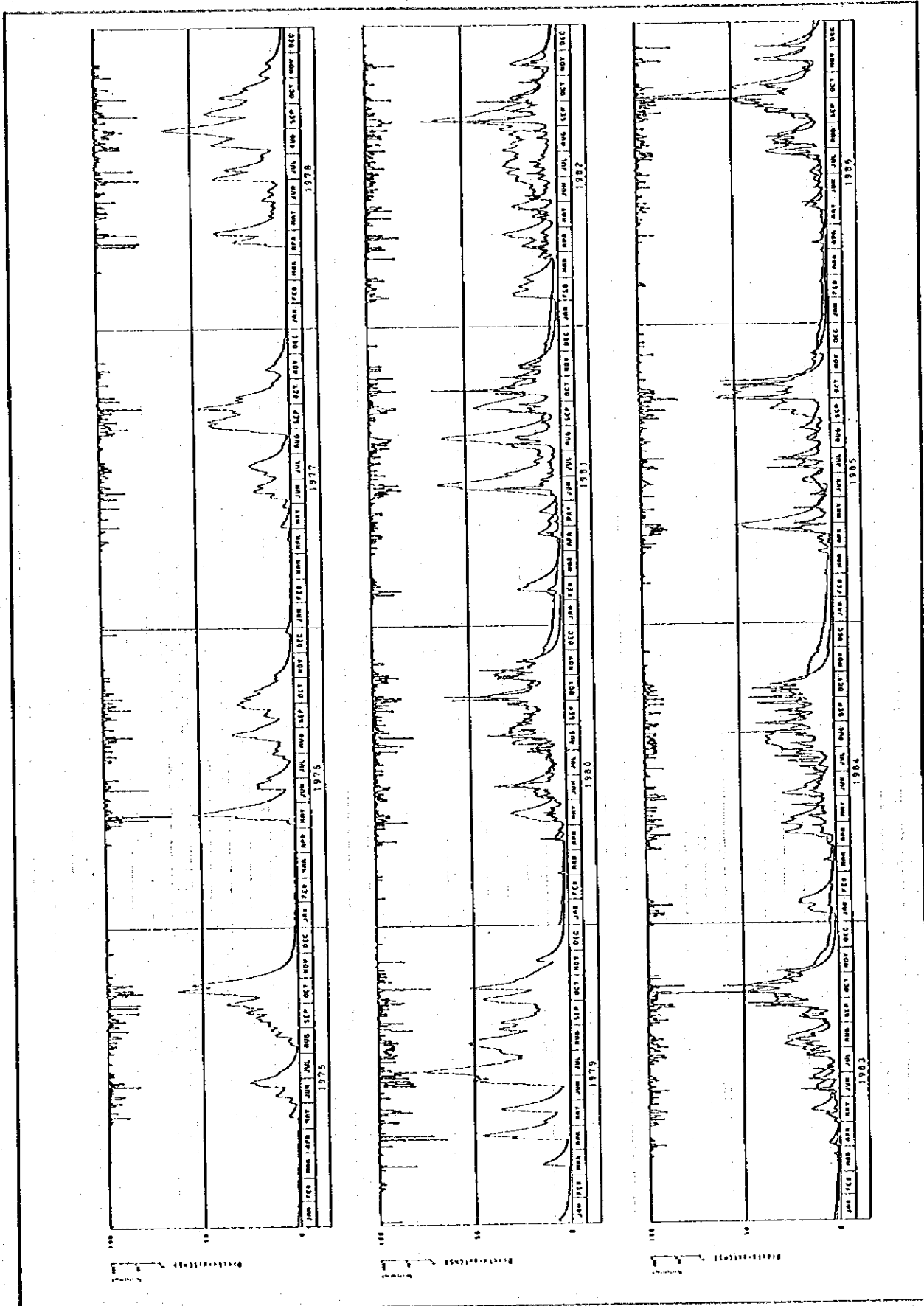


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 AND SURROUNDING BASINS
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JAPAN INTERNATIONAL COOPERATION AGENCY

Figure 3.13

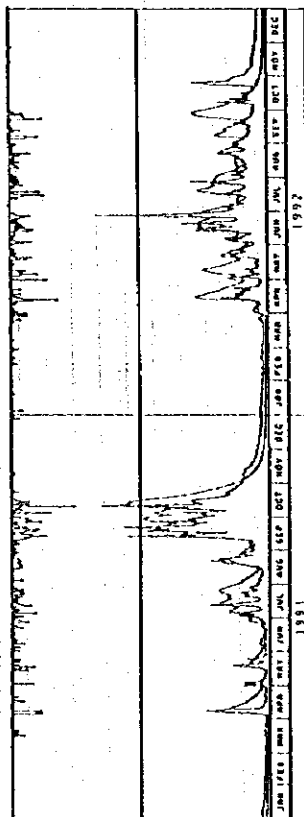
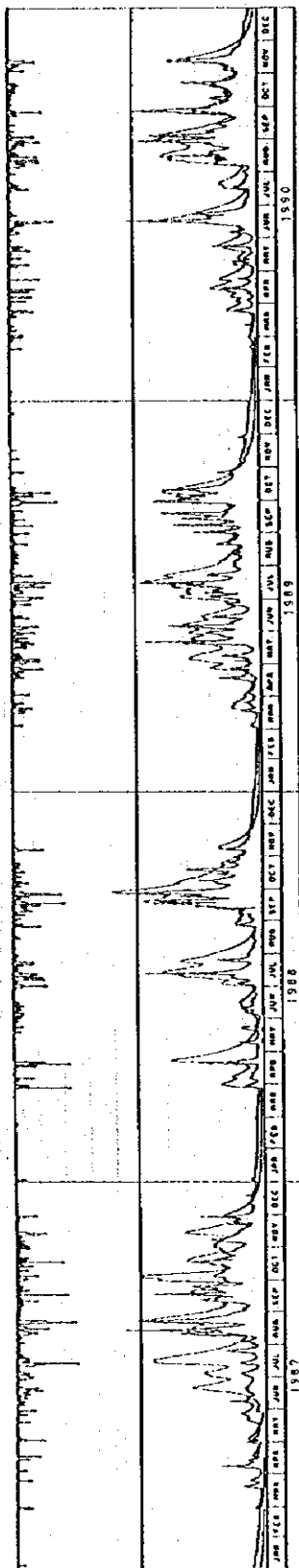
Tank Model Hydrograph (4/7)



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Figure 3.13
 Tank Model Hydrograph (5/7)

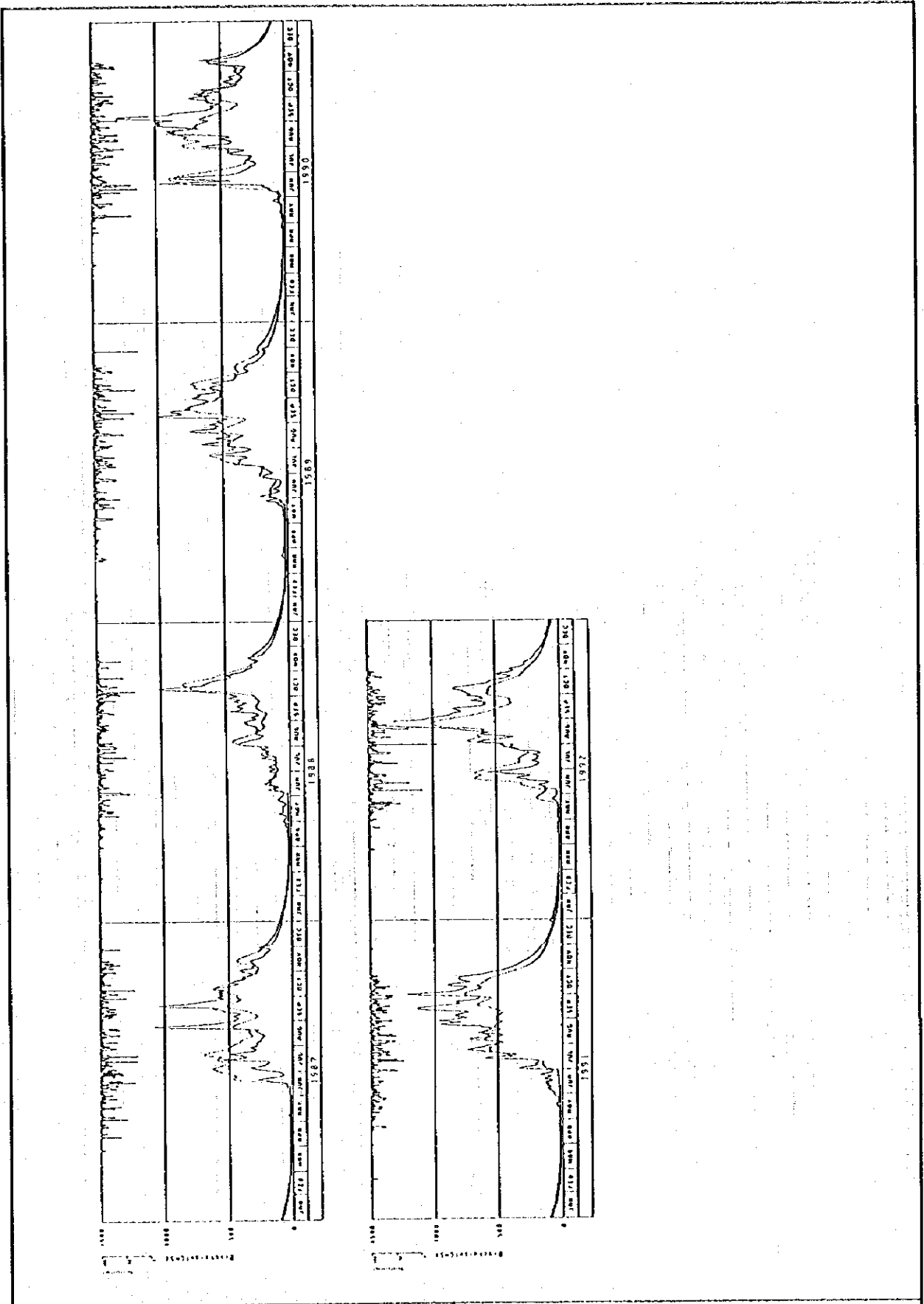


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Figure 3.13

Tank Model Hydrograph (6/7)



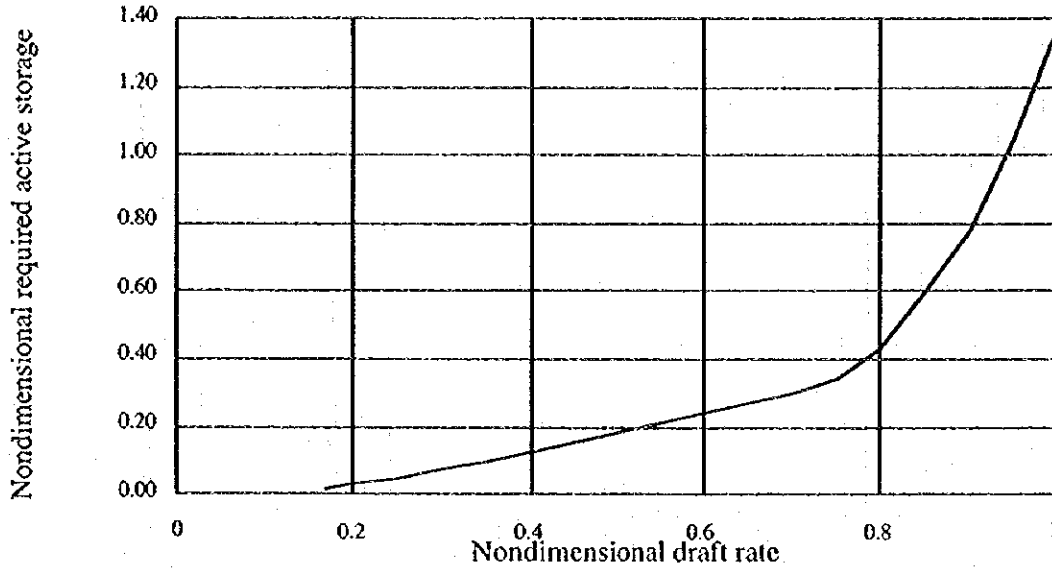
SOCIALIST REPUBLIC OF VIET NAM
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Figure 3.13

Tank Model Hydrograph (7/7)

Dai Nga Gauging Station
 $Q_{mean} = 15.92 \text{ cms}$
 Catchment Area = 373 km²
 Annual Rainfall = 2506 mm



Loc Ninh Gauging Station
 $Q_{mean} = 12.84 \text{ cms}$
 Catchment Area = 500 km²
 Annual Rainfall = 1987 mm

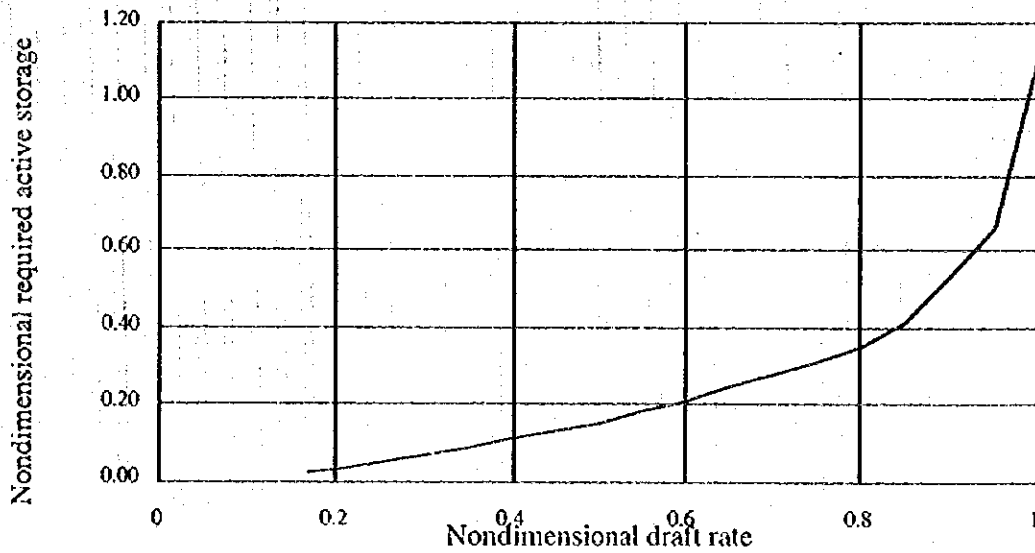
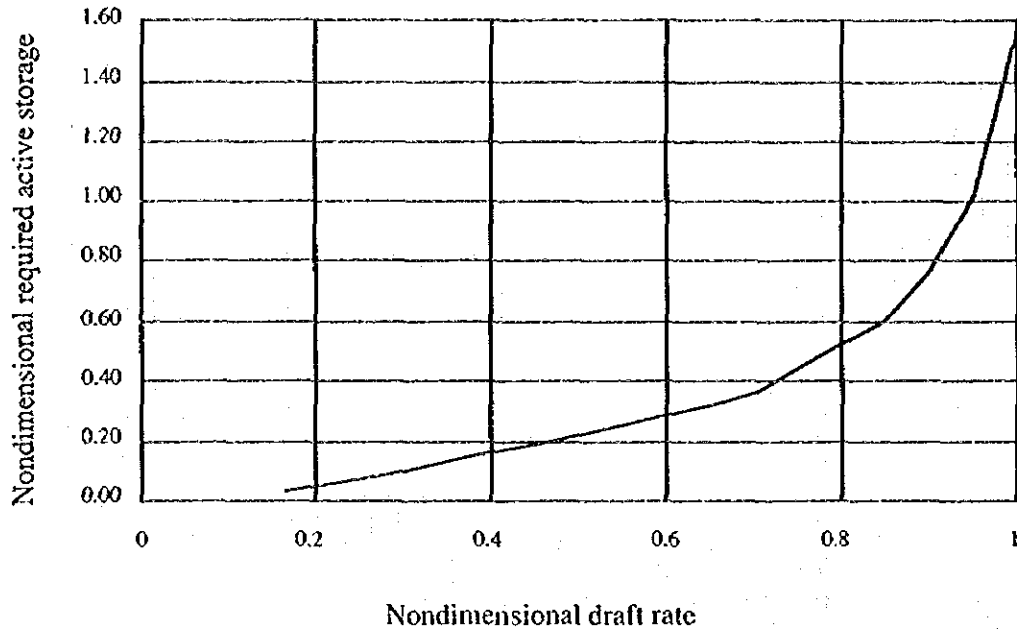


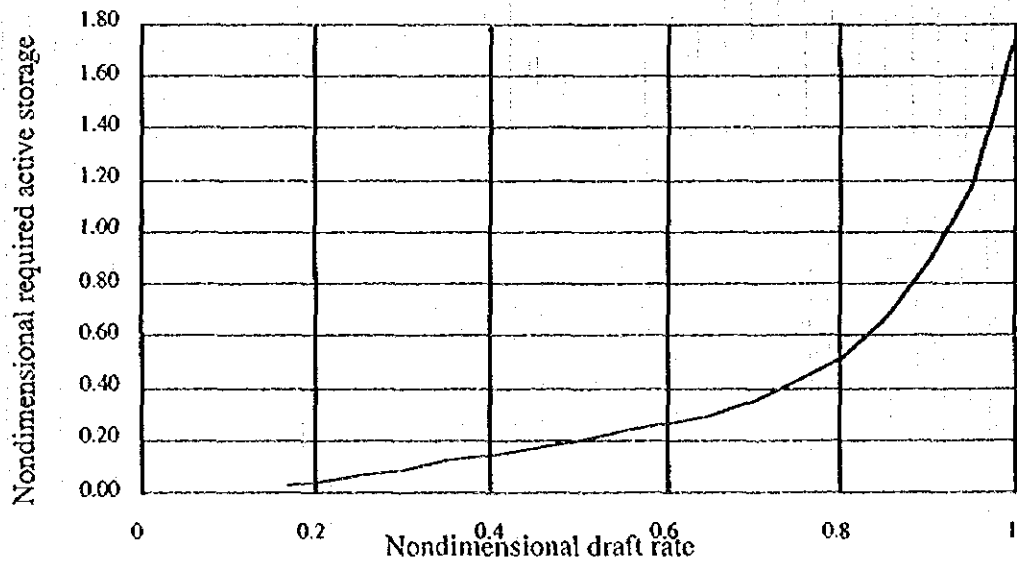
Figure 3.14

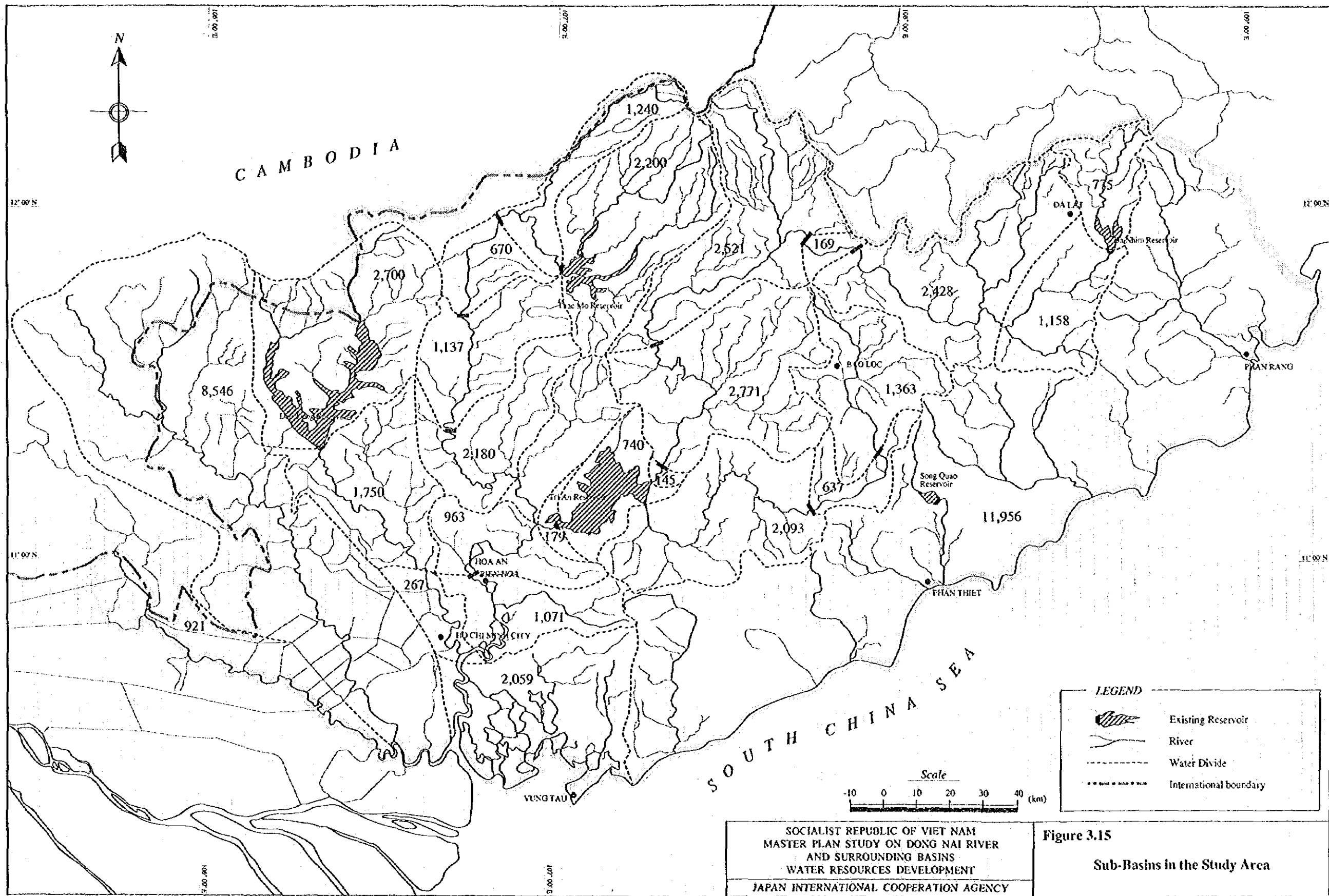
Storage Draft Curves (1/2)

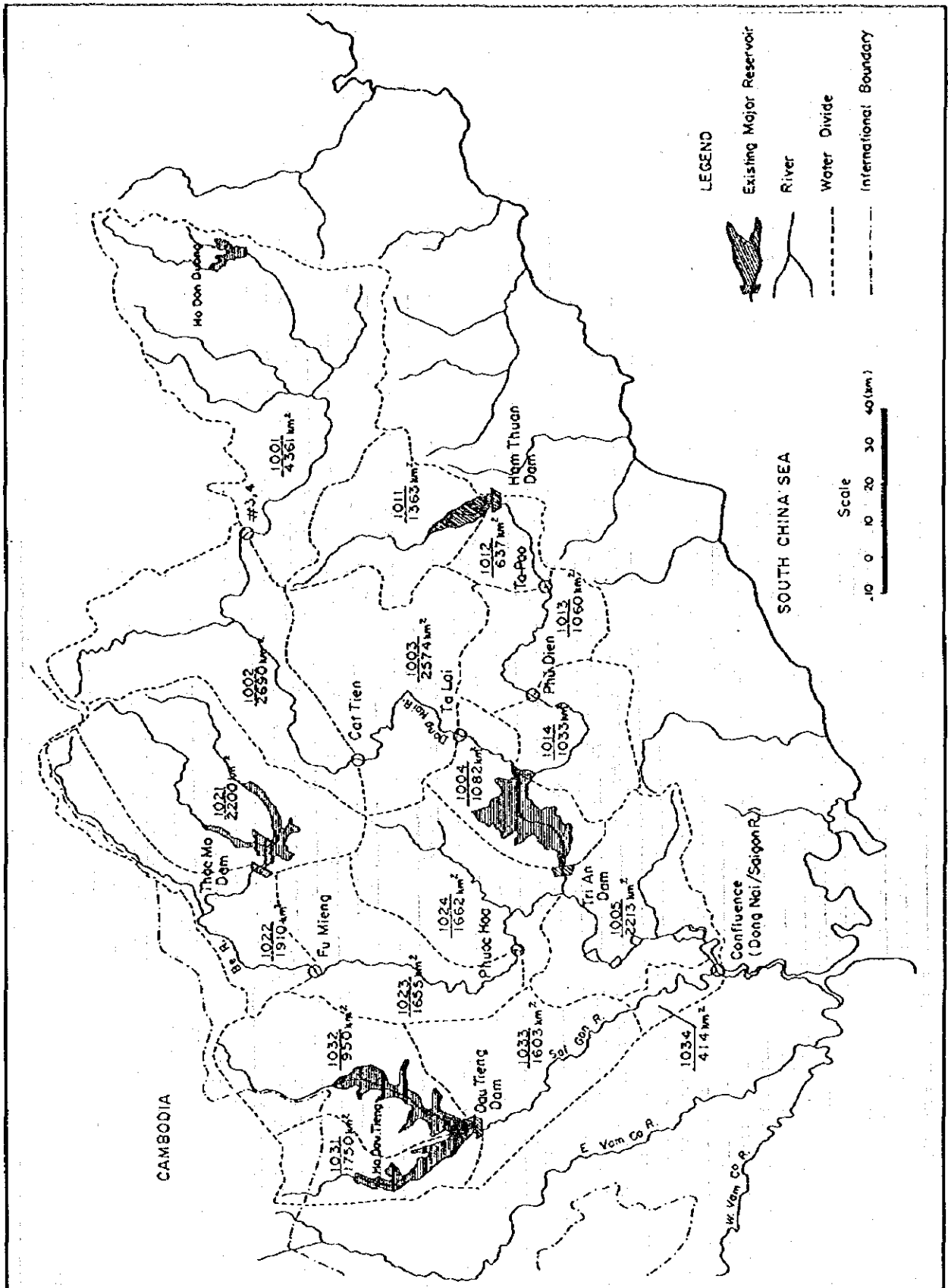
Phuoc Hoa Gauging Station
 $Q_{mean} = 221.6 \text{ cms}$
 Catchment Area = 5765 km²
 Annual Rainfall = 2304 mm



Ta Lai Gauging Station
 $Q_{mean} = 300.28 \text{ cms}$
 Catchment Area = 8850 km²
 Annual Rainfall = 2130 mm







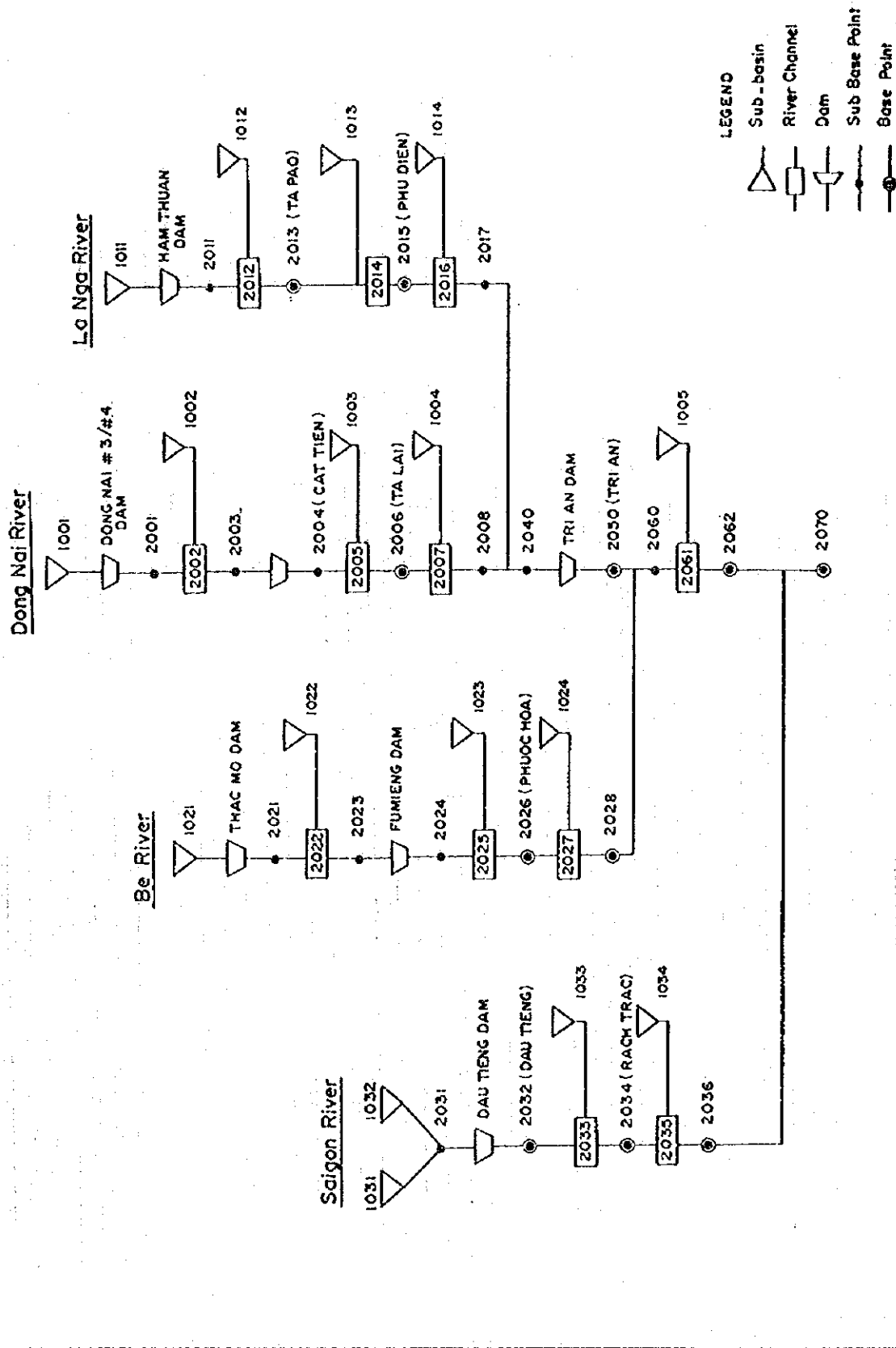
LEGEND

- Existing Major Reservoir
- River
- Water Divide
- International Boundary

Scale
0 10 20 30 40 (km)

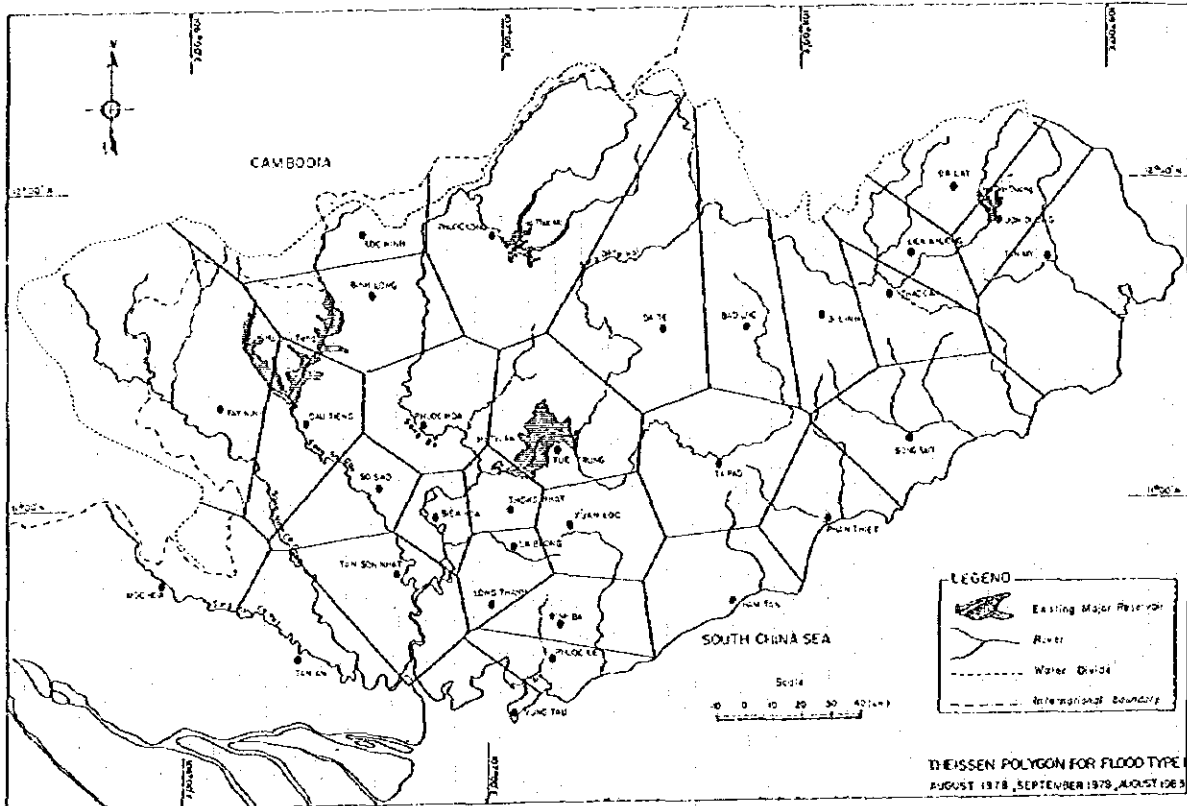
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Figure 3.16
Basin Boundary for Flood Runoff Analysis



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Figure 3.17
 Runoff System Configuration



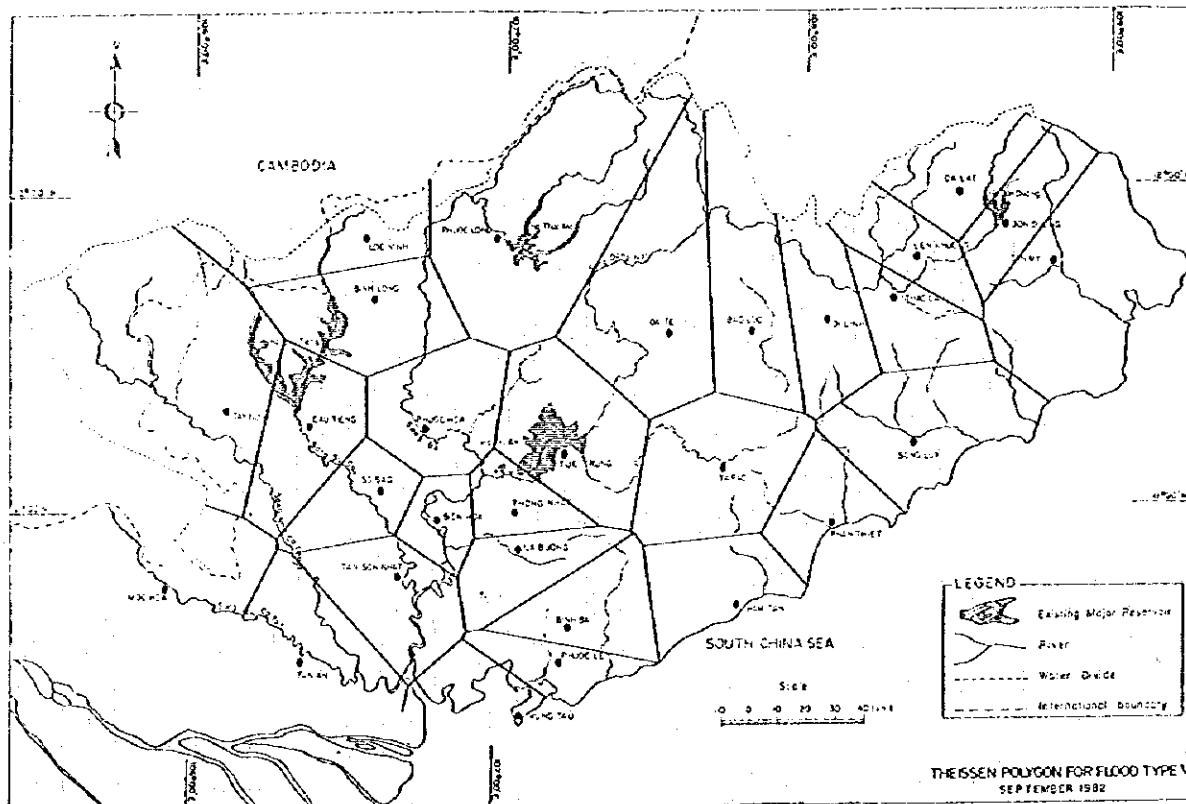
Type I (Period: August and September 1978, August 1981)

Station	DH 3	DA 6	TA 14	TA 14	HAM THUAN	TA 20	PHU DEN	CON DINH	THUO KHA	FO MEI NG	PHUOC HOA	OT (SARON)	OT (SARON)
1 Bao Loc	0.009	0.293	0.143		0.589	0.063							
2 Ben Hoa													
3 Ben Ba										0.029	0.905	0.480	0.274
4 Ben Long													
5 Da Lat	0.102												
6 Da Lat		0.562	0.279	0.018			0.094		0.056			0.206	0.183
7 Dau Leng													
8 Da Lanh	0.212				0.304	0.872							
9 Con Duong	0.071												
10 Dang Phu													
11 Go dau Me													
12 Ham Tan													
13 Kha Bung													
14 Lien Huong	0.260												
15 Long Khay										0.118		0.314	0.158
16 Long Thanh													
17 Muc Hoa													
18 Phan Bang													
19 Phuoc Hoa											0.351	0.457	
20 Phuoc Long		0.144	0.008						0.844	0.853	0.244	0.217	
21 Phan Thiet													
22 Phuoc Le													
23 Song Lay													
24 So Sao													
25 Tan An													
26 Tan My													
27 Te Pan			0.547			0.765	0.873	0.083					
28 Tay Ninh													0.408
29 Thac Can	0.185												
30 Thong Nhat				0.376								0.036	
31 Tan Son Mat													
32 Tay Trung			0.023	0.713			0.933	0.458				0.290	
33 Vung Tay													
34 Kuan Loc				0.692	1.000	1.000		0.451	1.000	1.000	1.000	1.000	1.000
Total	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

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Figure 3.18

Thiessen Polygon of Rainfall
Stations for Flood Analysis (1/6)

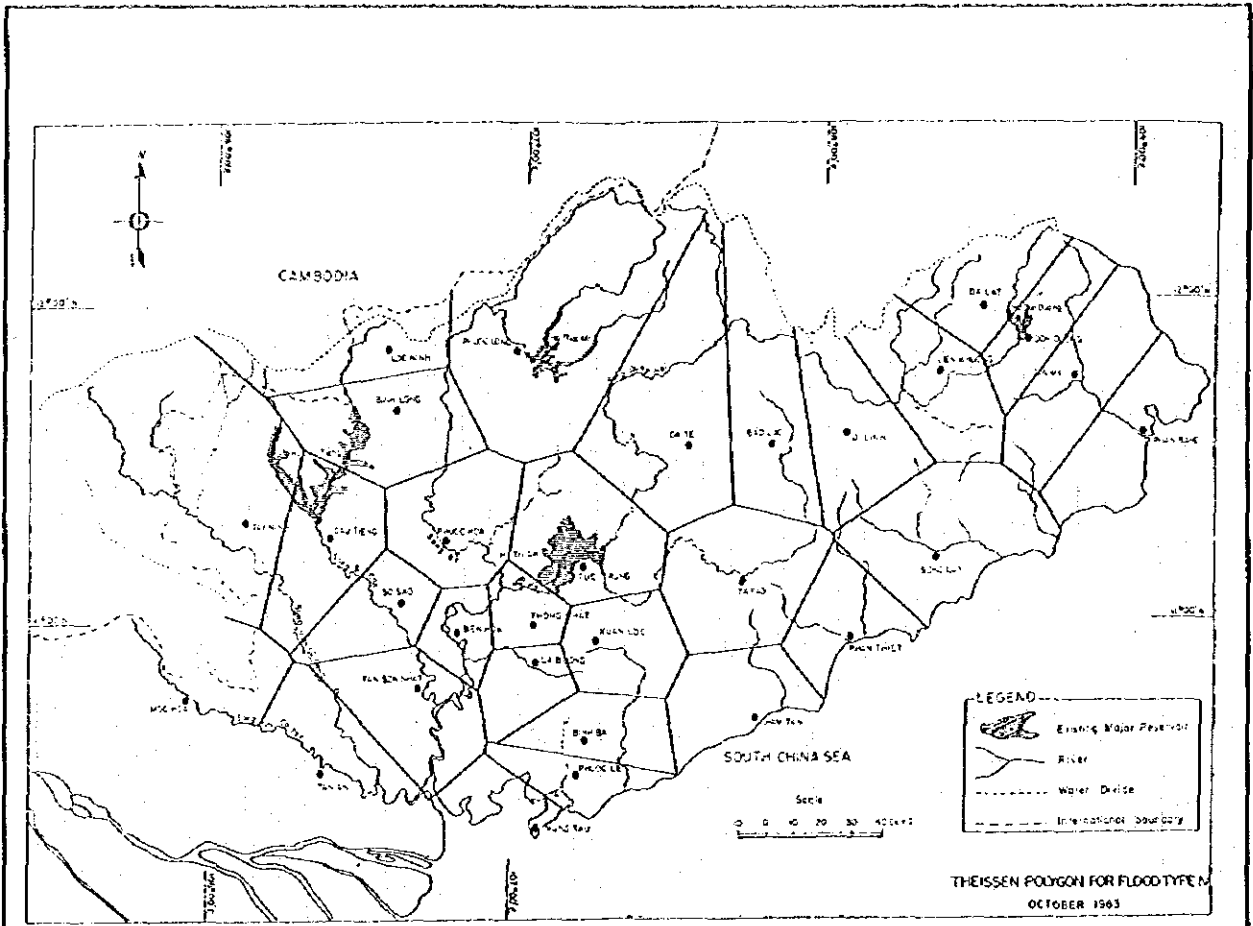


Type 6 (Period: September 1982)

Station	DN3	DN6	Ta La	Tn An	Nam Thuan	Ta Pa	Phu Den	Conh (H79)	Thac Ho	Fu Meng	Broc Hoa	Conh (B74)	D1 (Sagon)	D1 (Sa HDo)
1. Bao Loc	0.089	0.293	0.145		0.699	0.263								
2. Binh Ba														
3. Binh Ba														
4. Binh Long										0.029	0.405		0.480	0.274
5. Da Lat	0.182													
6. Da Lat		0.362	0.779	0.018			0.094		0.056				0.206	0.163
7. Cao Lanh														
8. Da Lat	0.212				0.301	0.372								
9. Con Duong	0.071													
10. Song Phu														
11. Co da Ma														
12. Nam Tan														
13. La Buong														
14. Con Khuong	0.260													
15. Con Thach													0.314	0.158
16. Con Thach										0.110				
17. Con Hoa														
18. Phan Rang														
19. Phuoc Hoa											0.351	0.457		
20. Phuoc Hoa		0.144	0.008						0.844	0.853	0.244	0.217		
21. Phan Thiet														
22. Phuoc Le														
23. Song Ly														
24. So Sao														
25. Tan An														
26. Tan An														
27. Tan An						0.765	0.873	0.157						
28. Tay Ninh			0.042											0.405
29. Tay Ninh														
30. Tay Ninh	0.185													
31. Tay Ninh				0.268				0.048				0.036		
32. Tay Ninh														
33. Tay Ninh			0.023	0.713			0.033	0.795				0.290		
34. Tay Ninh														
35. Tay Ninh														
36. Tay Ninh														
Total	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

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 WATER RESOURCES DEVELOPMENT
 JAPAN INTERNATIONAL COOPERATION AGENCY

Figure 3.18
 Thiessen Polygon of Rainfall
 Stations for Flood Analysis (2/6)

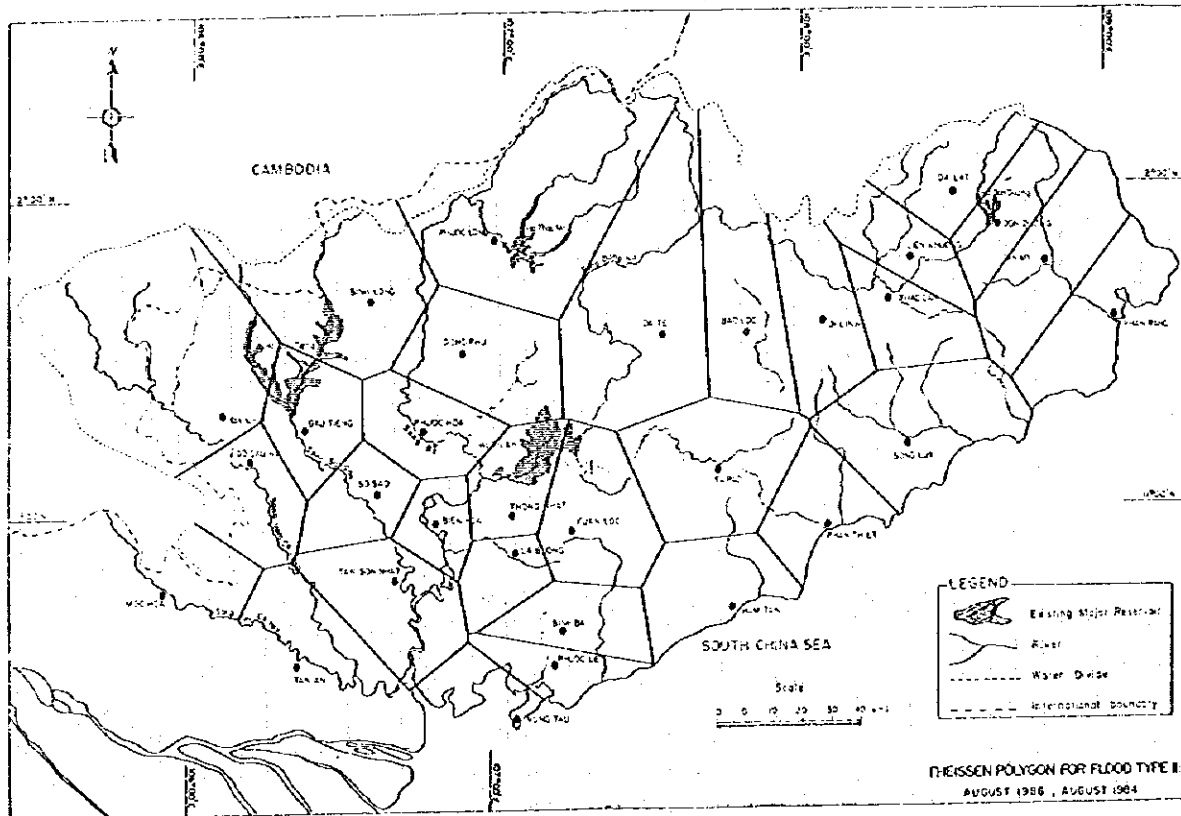


Type 4 (Period October 1963)

Station	DN 3	DN 6	Te. 1	Te. 2	Ham Thuan	Te. Pau	Phu Dien	COVONAN	Teac Mo	Phu Meng	Phuoc Hoa	Long Be Da	ST (Sa. 20)	ST (Sa. 20)
1. Ba. 100	0.039	0.283	0.143											
2. Ba. 104														
3. Ba. 105														
4. Ba. 106										55,000	0.029	0.405	0.450	0.274
5. Da Lat	0.182													
6. Da Te		0.582	0.728	0.018			0.054		0.054					
7. Day Te														
8. Da. 108	0.255				0.301	0.172							0.206	0.483
9. Da. 109	0.077													
10. Da. 110														
11. Da. 111														
12. Ham Tan														
13. La. 102														
14. Len. 103	0.402													
15. Loc. 104										228,000	0.115		0.314	0.158
16. Long. 105														
17. Mo. 106														
18. Phan. 107														
19. Phu. 108														
20. Phuoc. 109		0.114	0.008											
21. Phan. 110									0.814	1628,000	0.853	0.851	0.457	
22. Phuoc. 111											0.241	0.827		
23. Song. 112														
24. So. 113														
25. Tan. 114														
26. Tan. 115														
27. Te. 116			0.252			0.765	0.873	0.083						
28. Te. 117														0.405
29. Te. 118														
30. Te. 119				0.178									0.036	
31. Te. 120														
32. Te. 121			0.023	0.713			0.033	0.458					0.230	
33. Te. 122														
34. Te. 123				0.030				0.461						
Total	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1910,000	1.000	1.000	1.000	1.000

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Figure 3.18
 Thiessen Polygon of Rainfall
 Stations for Flood Analysis (3/6)



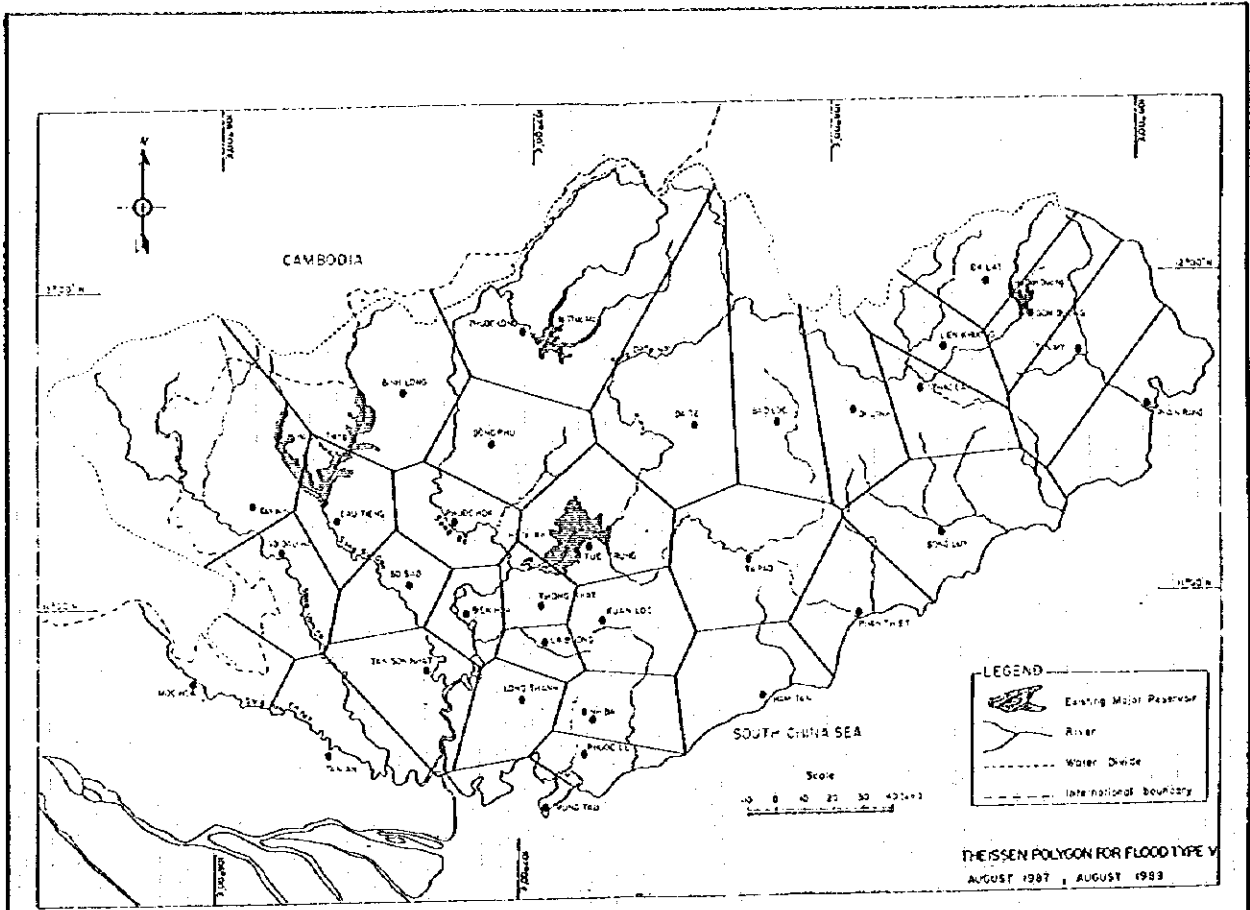
Type 2 (Period: August 1984, August 1986)

Station	DN 3	DN 6	Da Lat	To An	Ham Thuan	Fa Pa	Phu Dien	Con Phri Tu	Thac Mu	Fa My	Phung Hoa	coal Be Di	D1(Sagon)	D1(Sa Hoa)
1 Bac Loc	0.083	0.293	0.145		0.699	0.662								
2 Bich Hoa														
3 Binh Ba										0.100	0.260		0.790	0.432
4 Binh Long														
5 Da Lat	0.182						0.127	0.039	0.056					
6 Da Lat		0.562	0.740	0.240									0.206	0.163
7 Chu Yang														
8 Da Lat	0.212				0.301	0.172								
9 Dan Duong	0.071													
10 Dong Phu		0.010	0.043	0.129					0.026		3.316	0.456		
11 Go Dau Ma														
12 Ham Tan														
13 La Bung														
14 Lien Khung	0.263													
15 Loc Ninh														
16 Long Thanh														
17 Mac Hoa														
18 Phan Rang														
19 Phuoc Hoa														
20 Phuoc Long		0.134							0.917	0.900	0.295	0.373		
21 Phan Thiet														
22 Phuoc Le														
23 Song Lay														
24 So Tac														
25 Tam An														
26 Tam My														
27 Ta Ray			0.042			0.763	0.873	0.155						
28 Tay Ninh														0.405
29 Thai Can	0.189													
30 Thung Suat				0.408									0.036	
31 Tam Son Suat													0.132	
32 Tam Trung			0.023											
33 Vung Tau														
34 Xuan Loc				0.222				0.806						
Total	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

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Figure 3.18

Thiessen Polygon of Rainfall
 Stations for Flood Analysis (4/6)

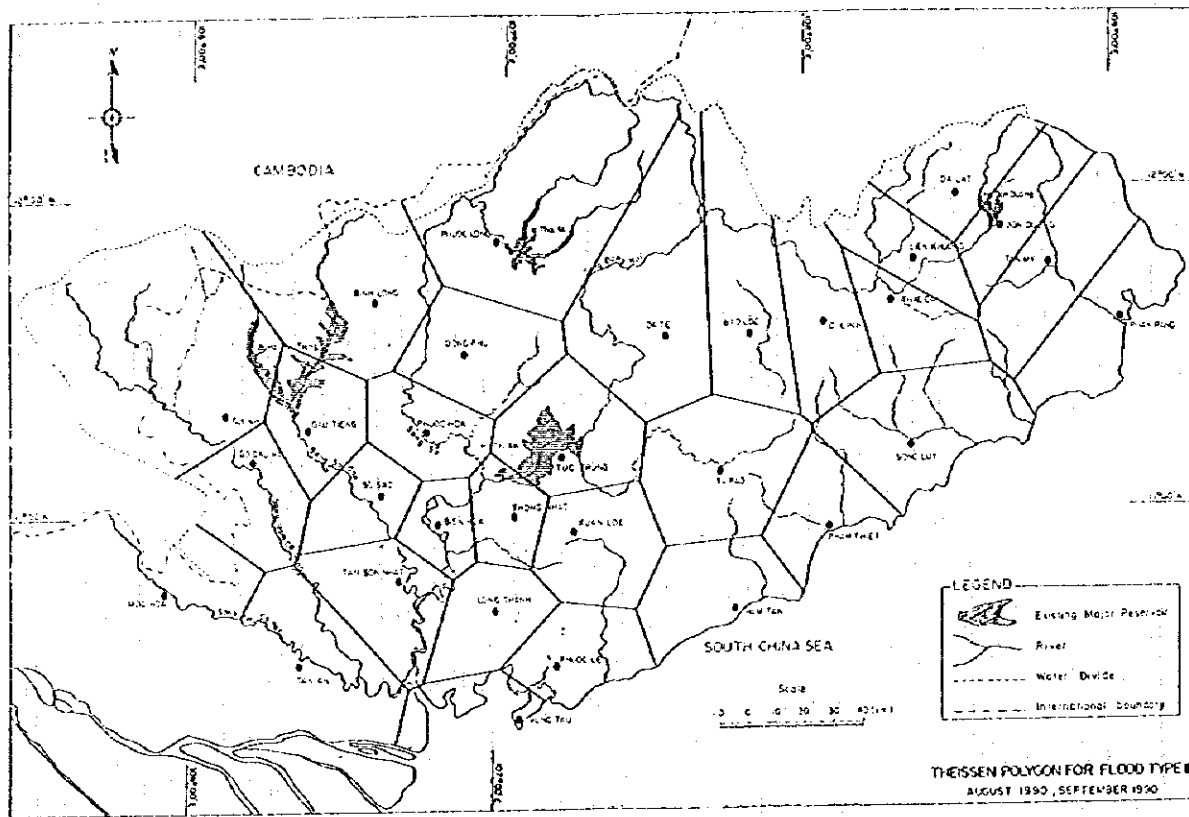


Type 5 (Period: August 1987 and August 1983)

Station	DH 3	DH 6	Ta Lan	Ta An	Ham Thuan	Ta Pao	Phu Dan	Confort/LN	Thac Mo	Fu Mang	Phuc Hoa	cond Ba/EN	DT(Sagon)	DT(SanDo)
1 Bao Loc	0.039	0.283	0.148		0.699	0.063								
2 Ben Hoa														
3 Binh Pa										0.106	0.269		0.794	0.432
4 Binh Long														
5 Da Lat	0.182													
6 Da Ye		0.552	0.742	0.018			0.094		0.059				0.205	0.163
7 Dau Tac g														
8 Da Lat	0.212				0.301	0.172								
9 Dam Duong	0.071		0.041						0.026		0.316	0.456		
10 Dong Phu														
11 Ga dao Ma														
12 Han Tan														
13 La Bui														
14 Lam Khuong	0.269													
15 Loc Noh														
16 Long Thanh														
17 Moc Hoa														
18 Phan Rang														
19 Phouc Hoa											0.295	0.373		
20 Phouc Long		0.114							0.917	0.900	0.729			
21 Phan Thiet														
22 Phouc Le														
23 Song Loy														
24 So Sao														
25 Tan An														
26 Tan Ky														
27 Ta Pao			0.042			0.765	0.873	0.083						0.405
28 Tay Ninh														
29 Thac Can	0.185													
30 Thong Binh				0.176								0.036		
31 Tan Soc Binh												0.132		
32 Tuc Trung			0.023	0.713			0.033	0.556						
33 Yang Tau														
34 Xuan Loc					0.092			0.451						
Total	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

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Figure 3.18
 Thiessen Polygon of Rainfall
 Stations for Flood Analysis (5/6)



Type 3 (Period August and September 1990)

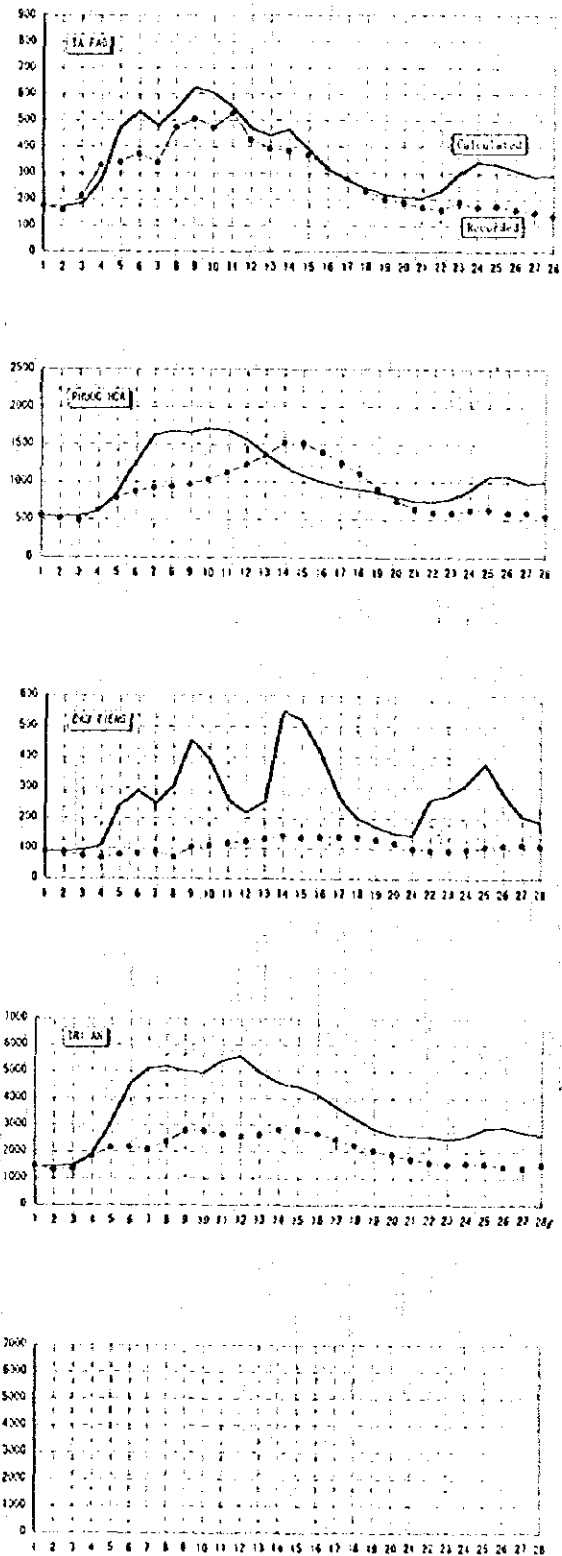
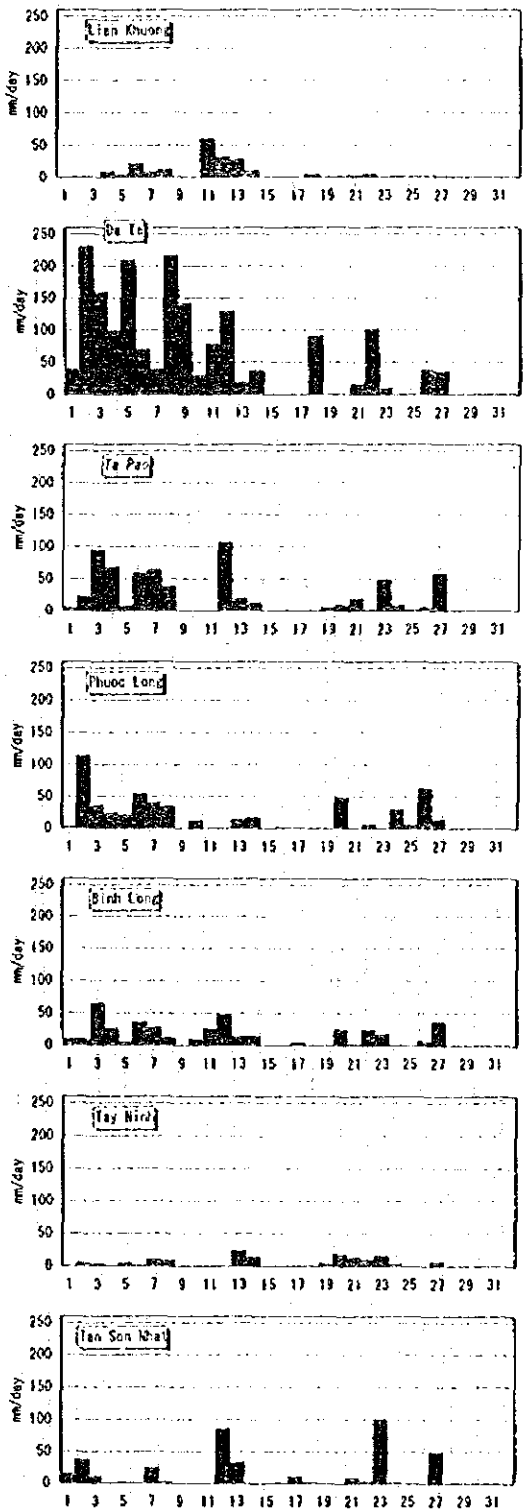
Station	GN 3	PHI	Ta Le	Tn An	Ham Thuan	Ta Pau	Phu Dan	Con Dao/AN	Thac Mo	Fu Meng	Phung Hoa	Co Ph Ba Tan	Di Saigon	Di Sa Hoi
1 Bac Loc	0.088	0.233	0.148		0.639	0.063								
2 Ben Hoa														
3 Binh Ba														
4 Binh Long										0.100	0.260		0.794	0.482
5 Da Lat	0.182													
6 Da Lat		0.582	0.740	0.018			0.094	0.039	0.056				0.205	0.183
7 Dai Trang														
8 Da Lach	0.212				0.305	0.177								
9 Dai Duong	0.071													
10 Dong Phu			0.047						0.036			0.316	0.458	
11 Co Dao Ma														
12 Ham Tan														
13 La Bung														
14 Lac Thuong	0.260													
15 Loc Hoi														
16 Long Thanh														
17 Moe Hoa														
18 Phan Rang														
19 Phung Hoa											0.295	0.373		
20 Phung Long		0.144							0.917	0.900	0.129			
21 Phan Thiet														
22 Phuoc La														
23 Song Loi														
24 Sa Sap														
25 Tan An														
26 Tan My														
27 Ta Pau			0.242			0.265	0.077	0.155						
28 Tay Ninh														0.405
29 Thac Can	0.185													
30 Thong Nhat				0.178								0.056		
31 Tan Son Thut												0.132		
32 Tac Trang			0.023	0.113			0.033							
33 Vung Tau														
34 Kan Lac				0.092				0.866						
Total	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

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Figure 3.18

Thiessen Polygon of Rainfall
 Stations for Flood Analysis (6/6)

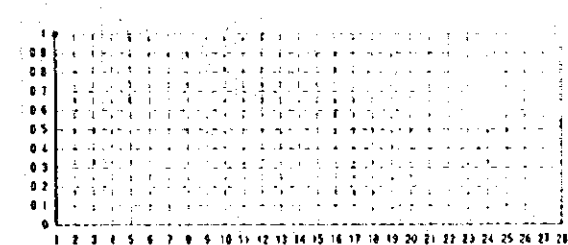
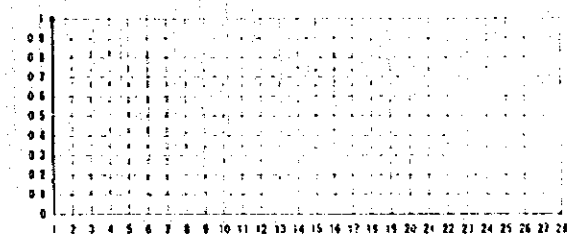
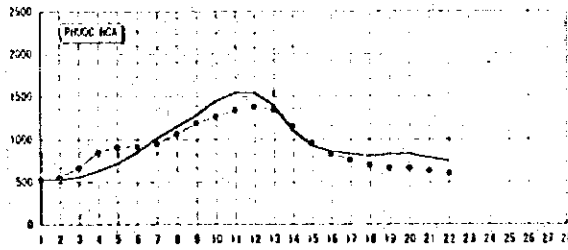
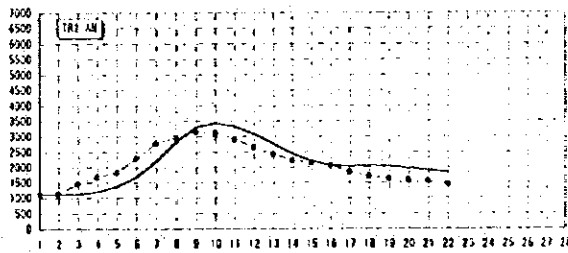
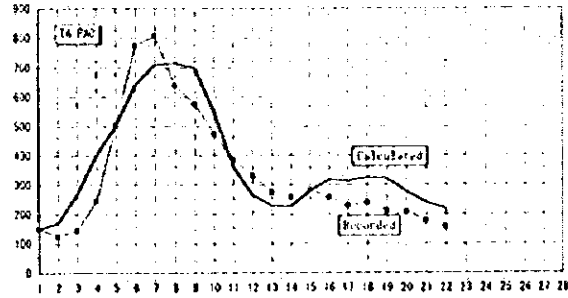
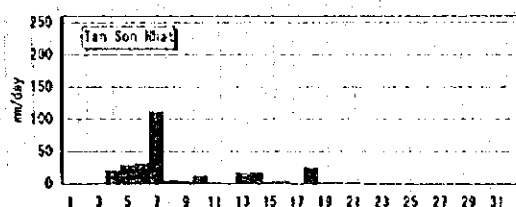
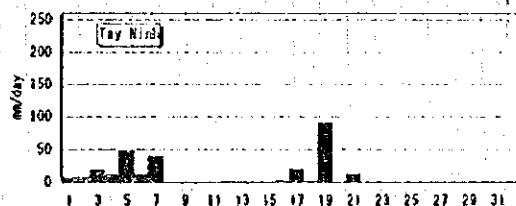
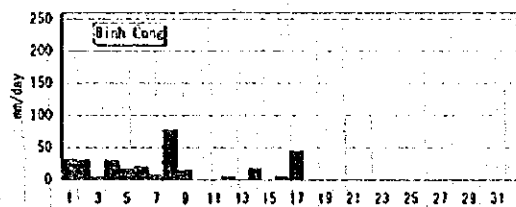
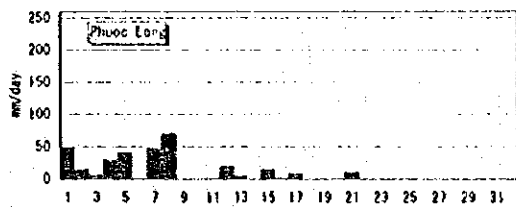
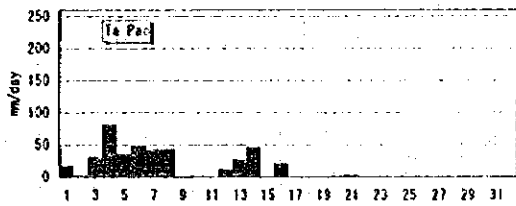
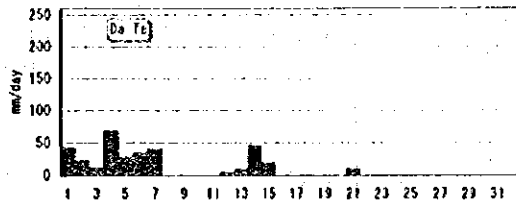
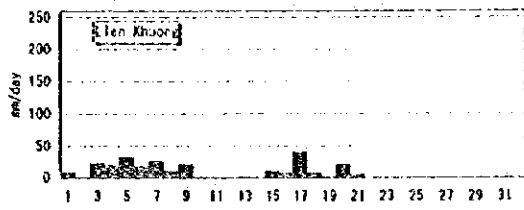
1978 - FLOOD



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Figure 3.19
 Calibration Result of Flood Runoff
 Model (1/6)

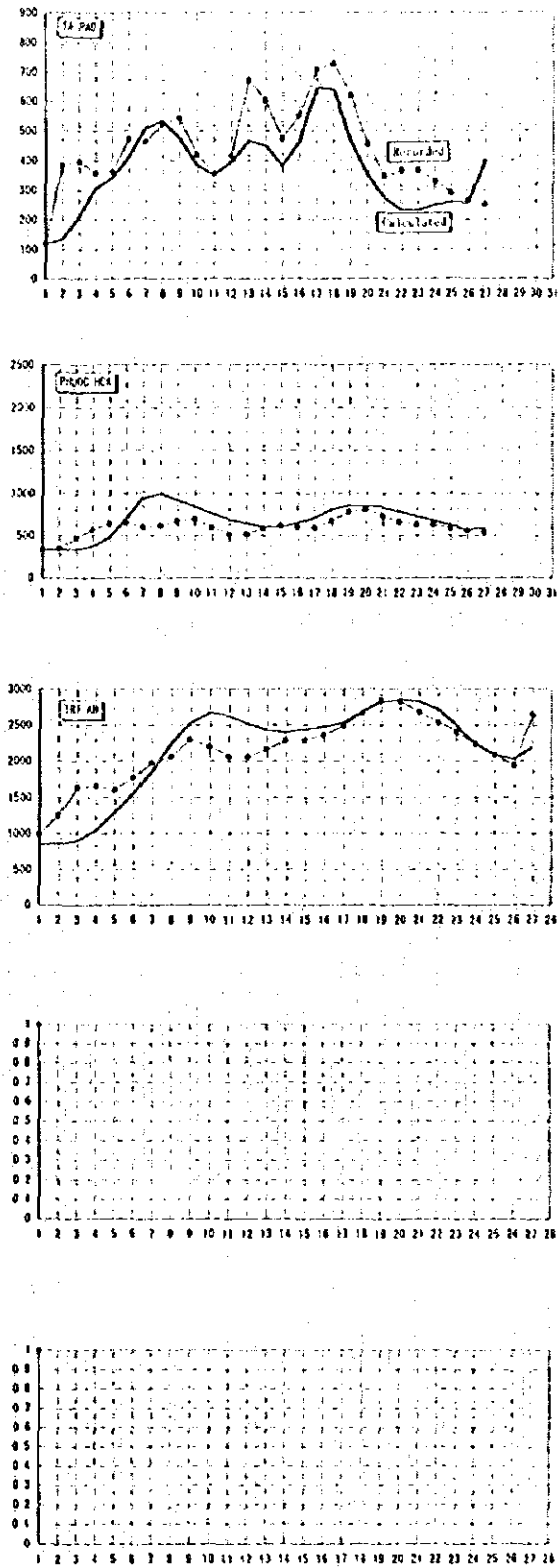
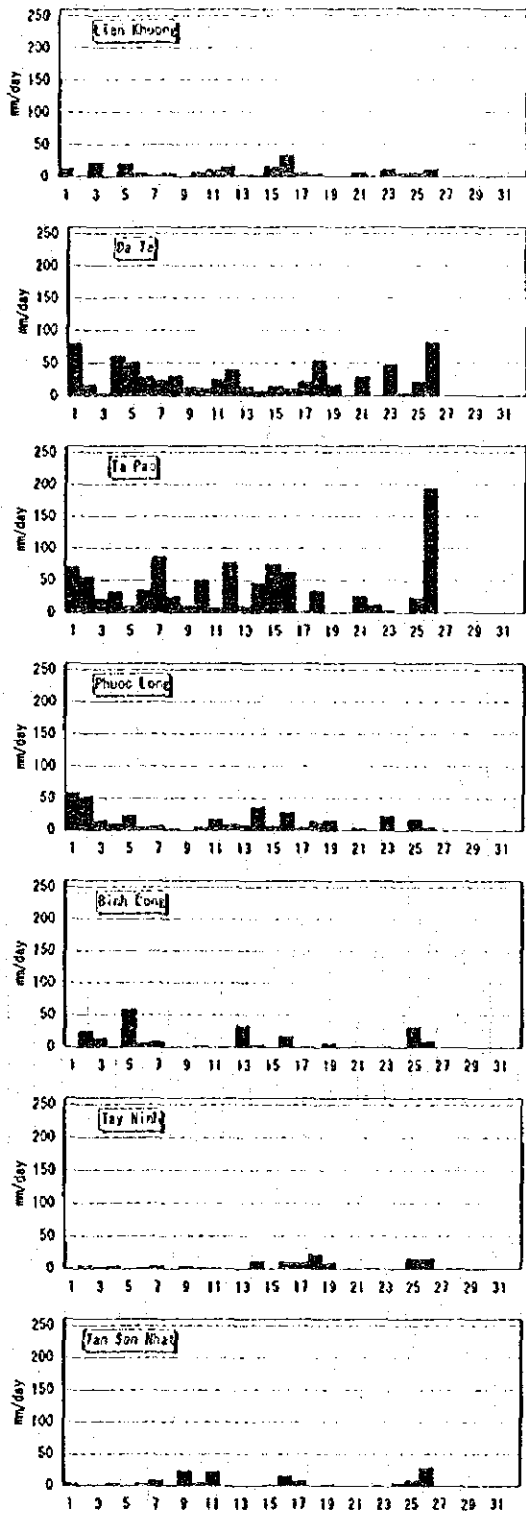
1982-FLOOD



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Figure 3.19
 Calibration Result of Flood Runoff
 Model (2/6)

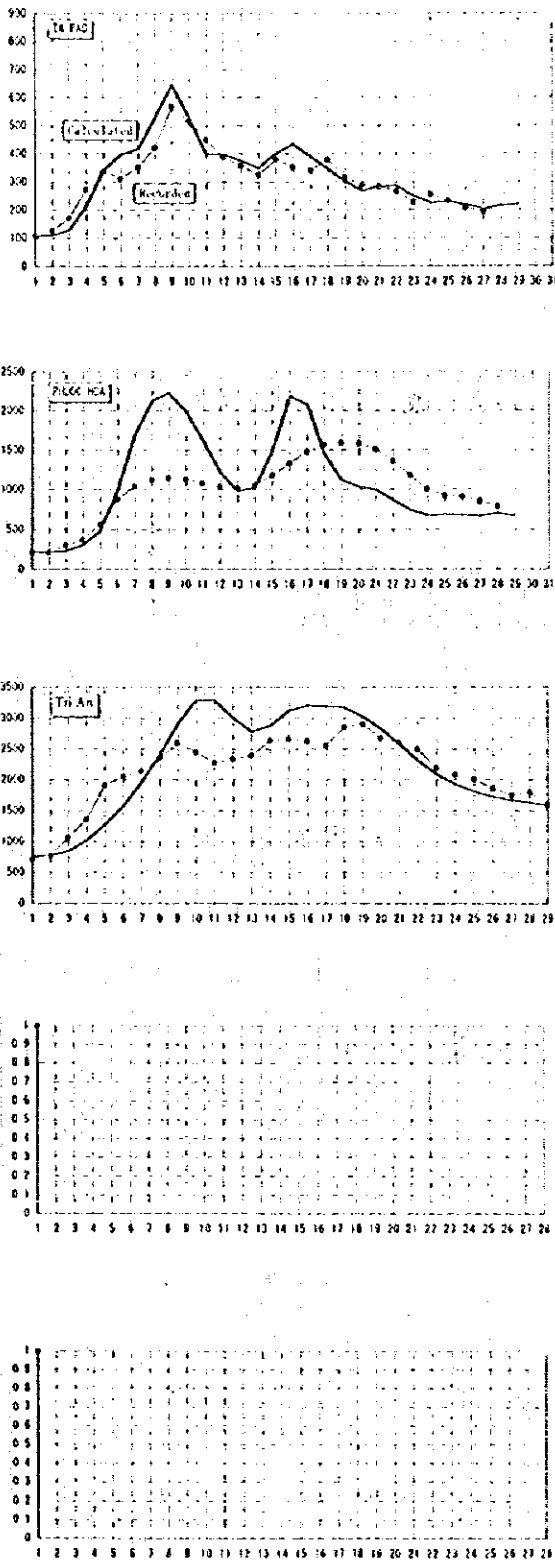
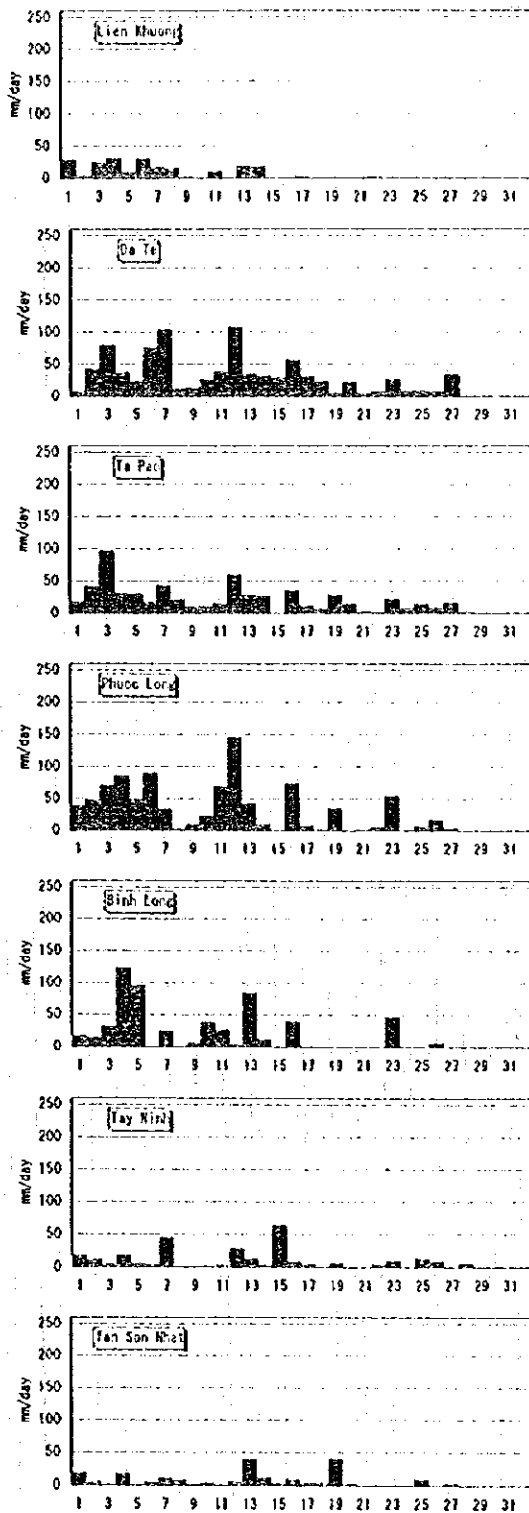
1981 FLOOD



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Figure 3.19
 Calibration Result of Flood Runoff
 Model (3/6)

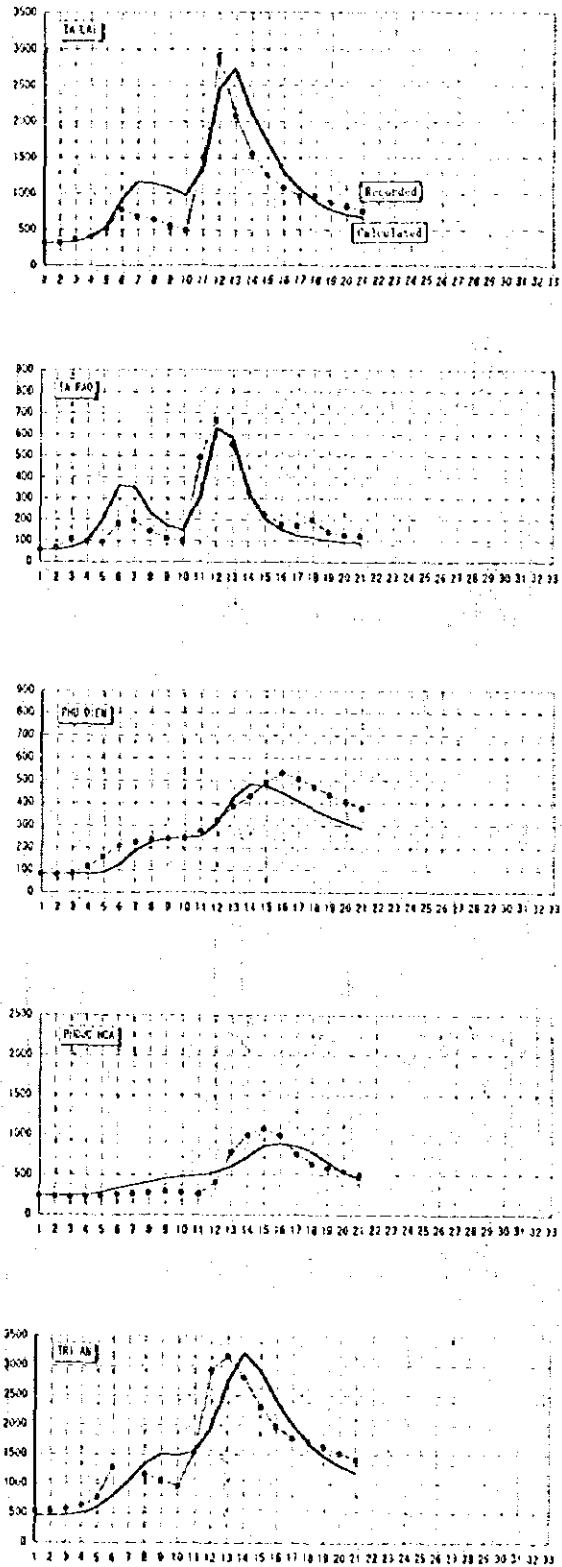
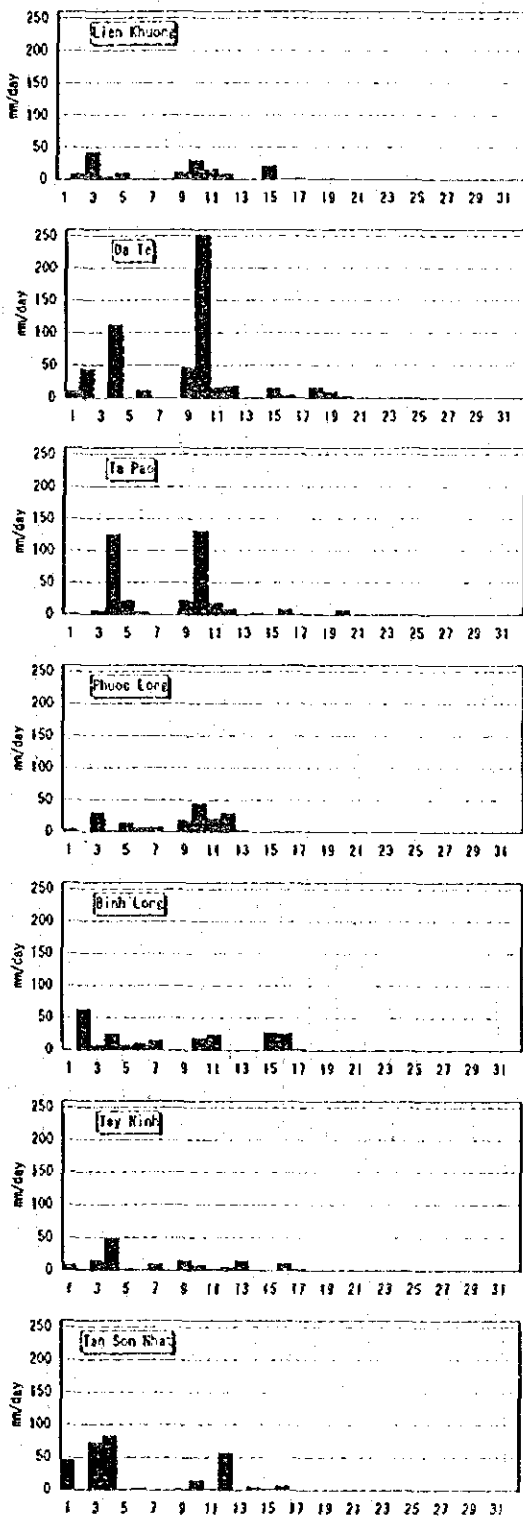
1985 - FLOOD



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Figure 3.19
 Calibration Result of Flood Runoff
 Model (4/6)

1987 - FLOOD

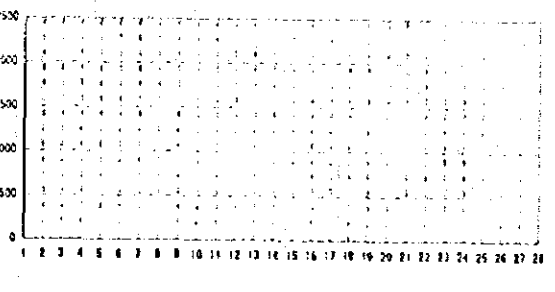
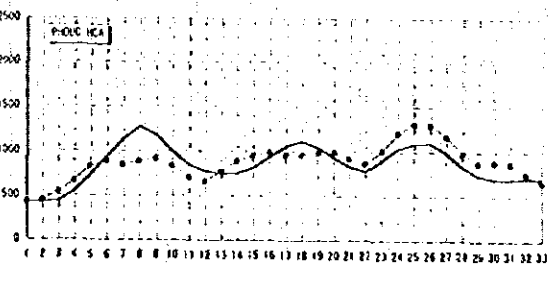
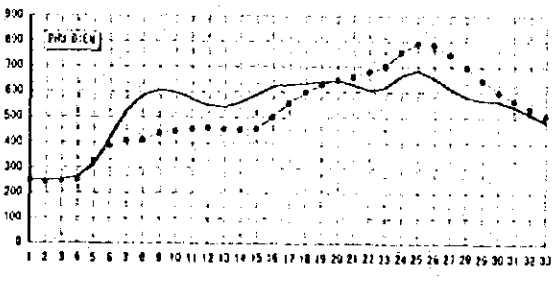
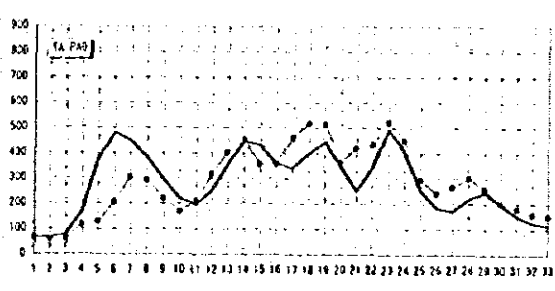
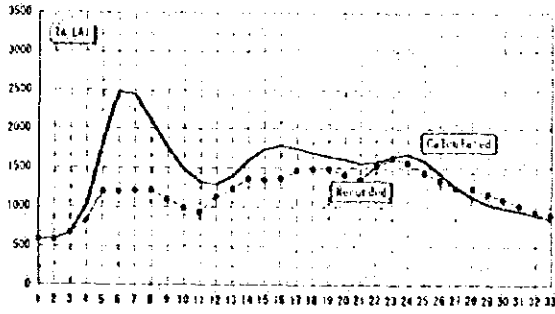
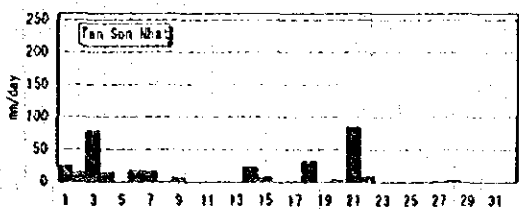
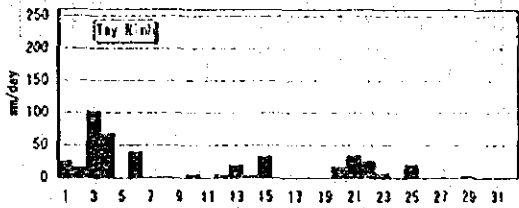
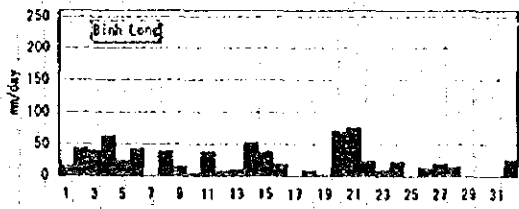
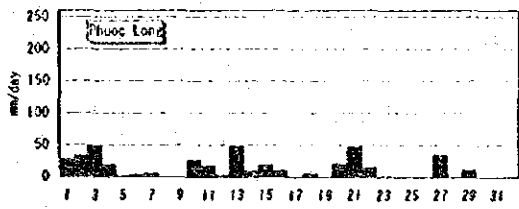
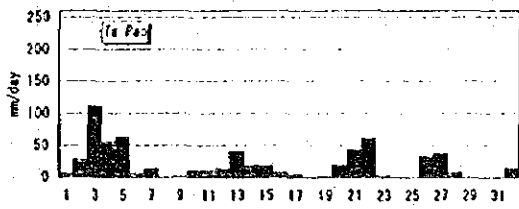
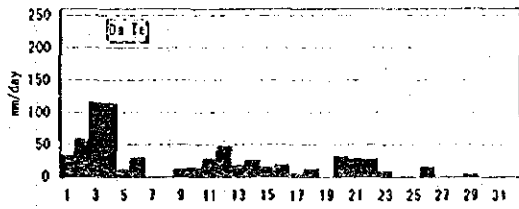
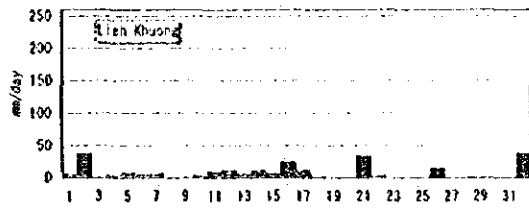


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Figure 3.19

Calibration Result of Flood Runoff
 Model (5/6)

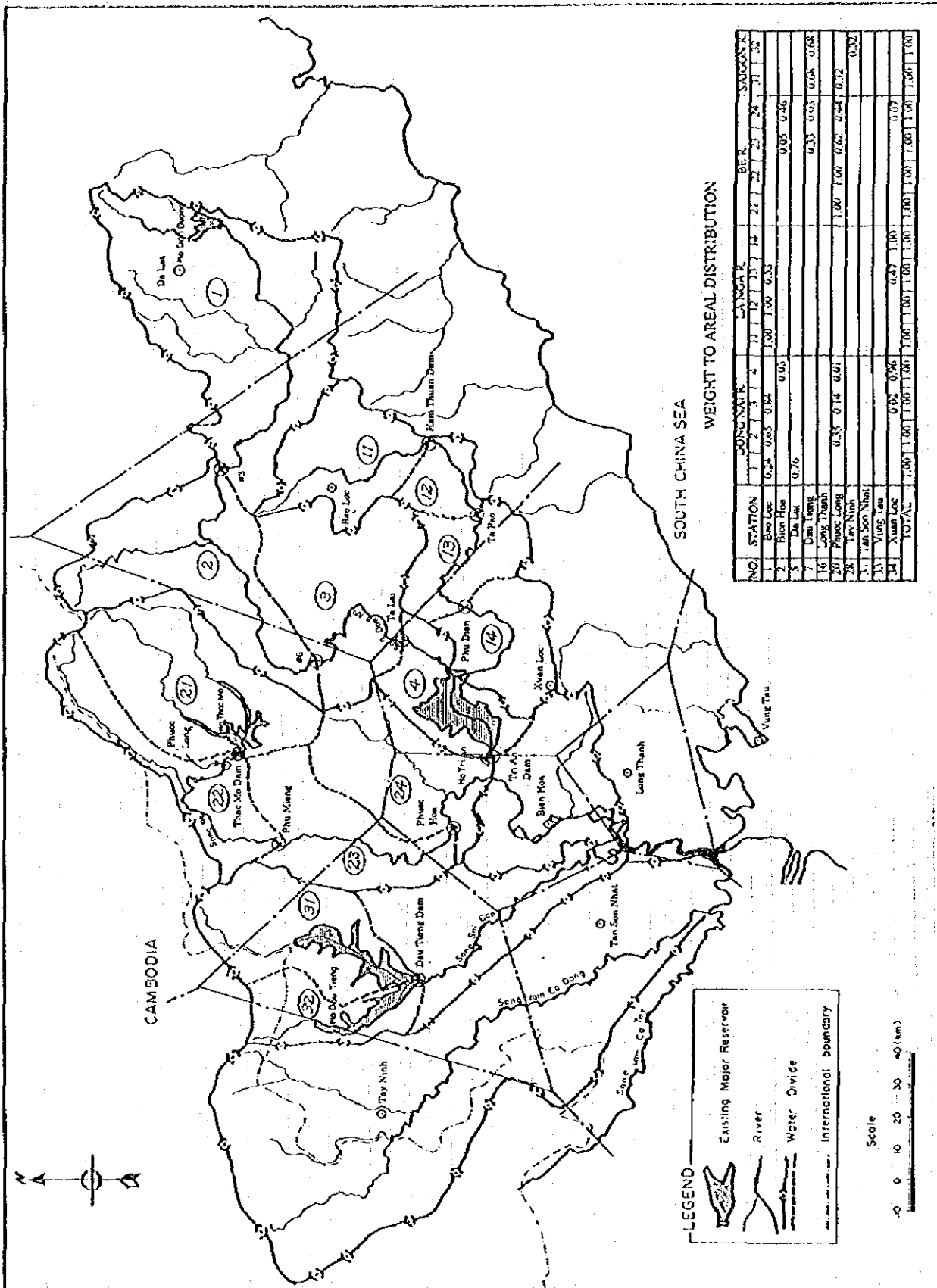
1990 - FLOOD



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Figure 3.19

Calibration Result of Flood Runoff
 Model (6/6)



WEIGHT TO AREAL DISTRIBUTION

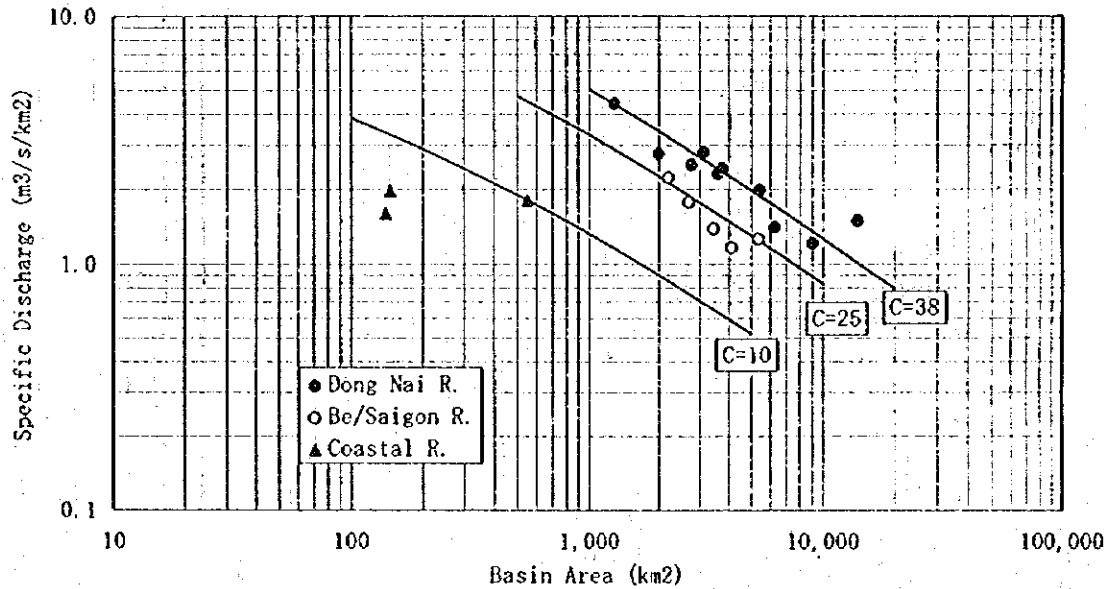
NO	STATION	DONG NAI K	LANG K	BEK	SAIGON K
1	Bac Loc	0.24	0.05	0.84	1.00
2	Bien Hoa			0.05	0.05
3	Da Lat	0.76			
4	Dan Trong				0.33
5	Long Thanh				0.68
6	Phuoc Long	0.35	0.14	0.01	1.00
7	Tay Ninh				0.02
8	Tan Son Nhat				0.02
9	Vung Tau				0.07
10	TOTAL	1.00	1.00	1.00	1.00

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Figure 3.20
 Thiessen Polygon for the Selected 34
 Rain Gauges

Design Discharge for Spillway

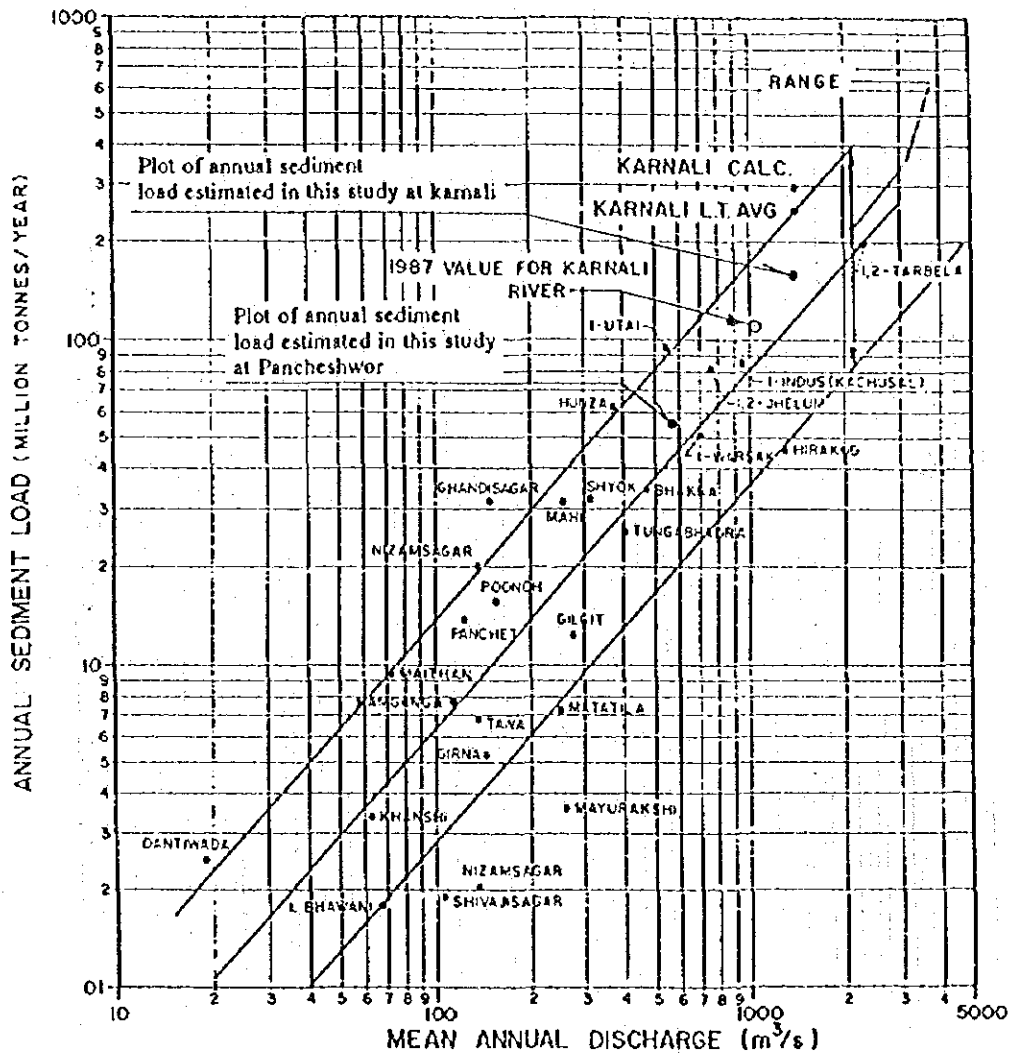
Specific Design Discharge for Spillway



Creager's C-values of Existing and Proposed Dams

Dam	A(km ²)	Q(m ³ /s)	Q/A	C	Cave	Cmax
DONG NAI RIVER					38.0	56.2
D. N. #1	2778	6976	2.51	33.7		
D. N. #2	3115	8800	2.83	40.5		
D. N. #3	3586	8300	2.31	36.2		
D. N. #4	3751	9100	2.43	39.0		
D. N. #5	5421	10767	1.99	40.1		
D. N. #6	6276	8850	1.41	31.2		
D. N. #8	9043	11000	1.22	34.1		
TriAn	14025	21000	1.50	56.2		
HamThuan	1287	5700	4.43	38.2		
La Nga	2000	5560	2.78	30.7		
BE/SAIGON RIVERS					23.2	26.0
ThacMo	2200	4900	2.23	26.0		
CanDon	3440	4790	1.39	21.2		
FuMieng	4110	4800	1.17	19.8		
PhuocHoa	5357	6780	1.27	25.3		
DauTieng	2700	4800	1.78	23.4		
COASTAL RIVERS					6.9	10.0
Ca Giay	146	288	1.97	5.9		
Luy R.	554	1000	1.81	10.0		
Ca Tot	140	224	1.60	4.7		

Remarks: $C = Q / (A^{0.05})$



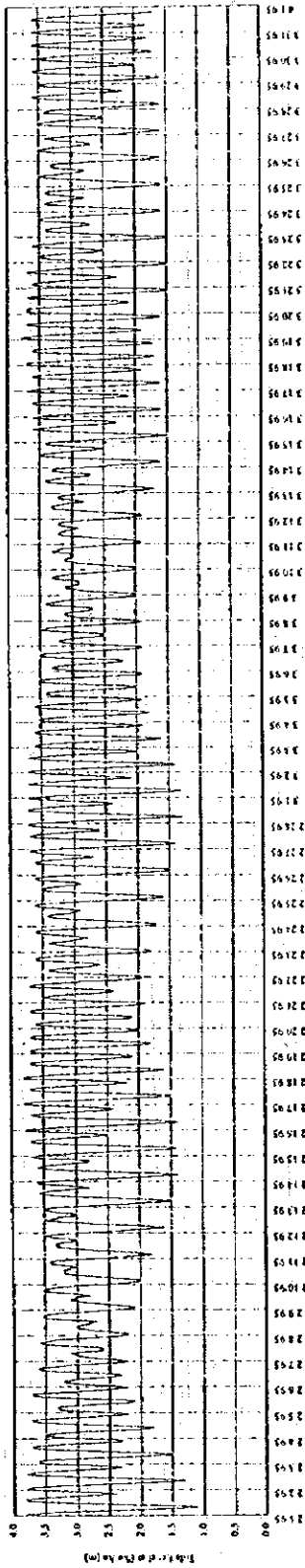
Source: Master Plan Study for Water Resources Development of the Upper Karnali River and Mahakali River Basins, (JICA; 1992)

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 AND SURROUNDING BASINS
 WATER RESOURCES DEVELOPMENT

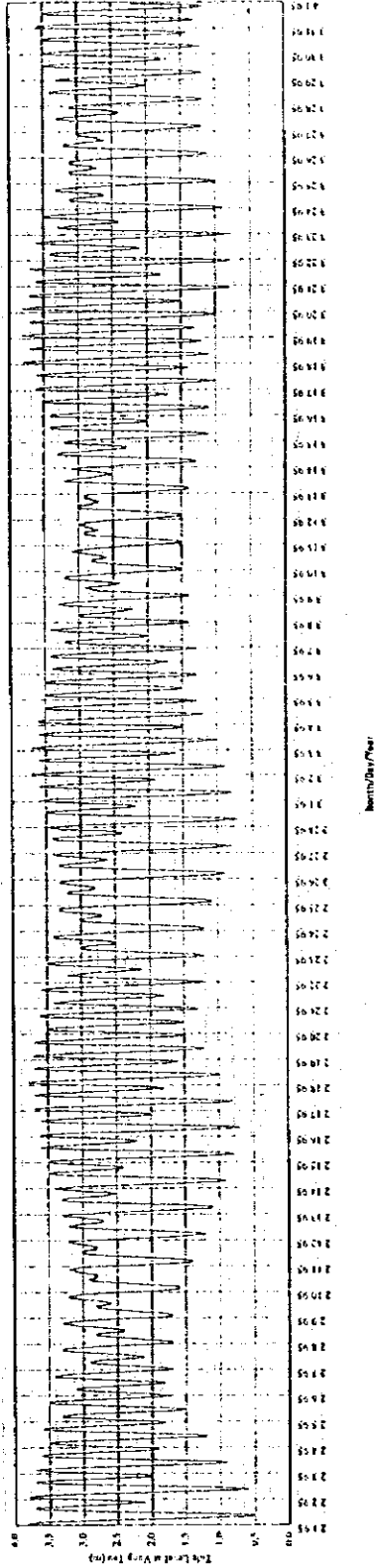
JAPAN INTERNATIONAL COOPERATION AGENCY

Figure 3.22
 Annual Sediment Deposit Rates in
 India Subcontinental Reservoirs

Phu An/ Saigon R: Feb-Mar, 1995



Yung Tau/ Yung Tau Port: Feb-Mar, 1995



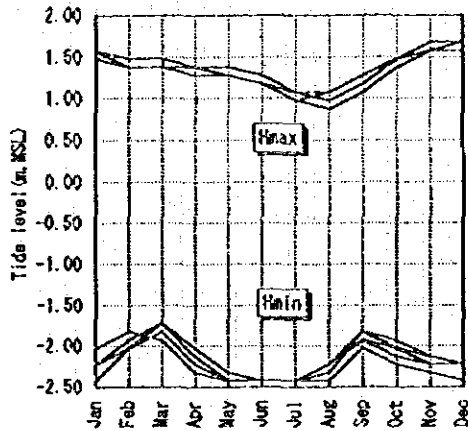
Predicted Tides at Phu An and Yung Tau

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AND SURROUNDING BASINS
WATER RESOURCES DEVELOPMENT
JAPAN INTERNATIONAL COOPERATION AGENCY

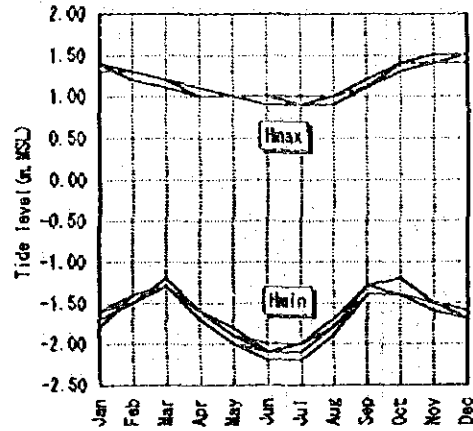
Figure 3.23

Predicted Tides at Phu An and
Yung Tau

VUNG TAU



SAIGON PORT/PHU AN



Predicted Tide Level (1991-1995)

VUNG TAU

Month	1991		1992		1993		1994		1995		Average		5-yr. extreme	
	Hmax	Hmin	Hmax	Hmin	Hmax	Hmin	Hmax	Hmin	Hmax	Hmin	Hmax	Hmin	Hmax	Hmin
Jan	1.58	-2.42	1.48	-2.22	1.58	-2.22	1.48	-2.02	1.58	-2.22	1.54	-2.22	1.58	-2.42
Feb	1.38	-2.02	1.38	-2.02	1.48	-2.02	1.38	-1.82	1.38	-1.92	1.40	-1.95	1.48	-2.02
Mar	1.38	-1.82	1.38	-1.72	1.48	-1.72	1.38	-1.92	1.38	-1.72	1.40	-1.78	1.48	-1.92
Apr	1.38	-2.22	1.28	-2.12	1.38	-2.02	1.28	-2.32	1.38	-2.12	1.34	-2.16	1.38	-2.32
May	1.38	-2.42	1.28	-2.42	1.28	-2.32	1.28	-2.42	1.38	-2.42	1.32	-2.40	1.38	-2.42
Jun	1.28	-2.42	1.18	-2.42	1.18	-2.42	1.18	-2.42	1.28	-2.42	1.22	-2.42	1.28	-2.42
Jul	1.08	-2.42	1.08	-2.42	0.98	-2.42	0.98	-2.42	1.08	-2.42	1.04	-2.42	1.08	-2.42
Aug	0.98	-2.42	1.08	-2.22	1.08	-2.22	0.88	-2.22	0.98	-2.32	1.00	-2.28	1.08	-2.42
Sep	1.18	-2.02	1.28	-1.92	1.28	-1.92	1.08	-1.82	1.18	-1.82	1.20	-1.90	1.28	-2.02
Oct	1.48	-2.22	1.48	-2.02	1.48	-2.12	1.38	-1.92	1.48	-2.02	1.46	-2.06	1.48	-2.22
Nov	1.68	-2.32	1.58	-2.12	1.68	-2.22	1.58	-2.12	1.68	-2.22	1.64	-2.20	1.68	-2.32
Dec	1.68	-2.42	1.58	-2.22	1.68	-2.22	1.68	-2.22	1.68	-2.22	1.66	-2.26	1.68	-2.42
Average	1.37	-2.26	1.34	-2.15	1.38	-2.15	1.30	-2.14	1.37	-2.15	1.35	-2.17	1.38	-2.26

Average of rainy months(May-Sep): 1.27 -2.24

Note: Tide in MSL-datum = (Tide table value)-2.42m for Vung Tau

SAIGON PORT

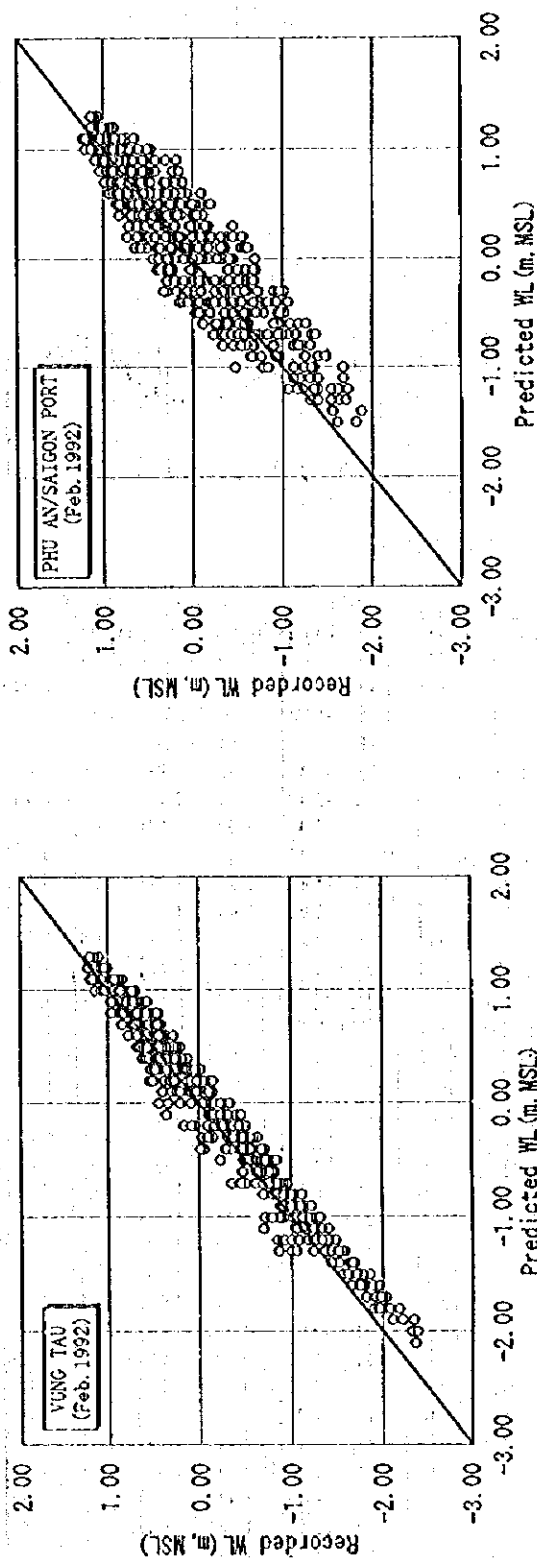
Month	1991		1992		1993		1994		1995		Average		5-yr. extreme	
	Hmax	Hmin	Hmax	Hmin	Hmax	Hmin	Hmax	Hmin	Hmax	Hmin	Hmax	Hmin	Hmax	Hmin
Jan	1.41	-1.79	1.41	-1.69	1.41	-1.59	1.31	-1.59	1.41	-1.69	1.39	-1.67	1.41	-1.79
Feb	1.21	-1.39	1.31	-1.49	1.31	-1.49	1.31	-1.39	1.21	-1.49	1.27	-1.45	1.31	-1.49
Mar	1.11	-1.29	1.21	-1.19	1.21	-1.29	1.21	-1.29	1.11	-1.29	1.17	-1.27	1.21	-1.29
Apr	1.01	-1.69	1.01	-1.59	1.01	-1.59	1.11	-1.69	1.01	-1.59	1.03	-1.63	1.11	-1.69
May	1.01	-1.99	1.01	-1.79	1.01	-1.89	1.01	-1.99	1.01	-1.89	1.01	-1.91	1.01	-1.99
Jun	1.01	-2.19	1.01	-2.09	0.91	-1.99	1.01	-2.09	1.01	-2.09	0.99	-2.09	1.01	-2.19
Jul	1.01	-2.19	1.01	-2.09	0.91	-1.99	0.91	-1.99	1.01	-1.99	0.97	-2.05	1.01	-2.19
Aug	1.01	-1.89	1.01	-1.79	1.01	-1.69	0.91	-1.69	1.01	-1.79	0.99	-1.77	1.01	-1.89
Sep	1.11	-1.39	1.11	-1.39	1.21	-1.29	1.11	-1.29	1.11	-1.29	1.13	-1.33	1.21	-1.39
Oct	1.41	-1.39	1.31	-1.39	1.41	-1.39	1.41	-1.19	1.31	-1.39	1.37	-1.35	1.41	-1.39
Nov	1.51	-1.59	1.41	-1.49	1.41	-1.49	1.41	-1.49	1.41	-1.49	1.43	-1.51	1.51	-1.59
Dec	1.51	-1.69	1.41	-1.59	1.41	-1.59	1.41	-1.69	1.51	-1.69	1.45	-1.65	1.51	-1.69
Average	1.19	-1.71	1.19	-1.63	1.19	-1.61	1.16	-1.62	1.18	-1.64	1.18	-1.64	1.19	-1.71

Average of rainy months(May-Sep): 1.13 -1.72

Note: Tide in MSL-datum = (Tide table value)-2.59m for Saigon Port/Phu An

Figure 3.24

Predicted Mean Tide Level



Month	Vung Tau Tm(m)		
	Max.	Ave.	Min.
Jan	0.41	-0.09	-0.48
Feb	0.46	-0.10	-0.44
Mar	0.52	-0.14	-0.48
Apr	0.36	-0.05	-0.42
May	0.42	0.01	-0.32
Jun	0.56	0.03	-0.58
Jul	0.58	0.11	-0.30
Aug	0.72	0.07	-0.78
Sep	0.54	0.02	-0.52
Oct	0.58	0.16	-0.20
Nov	0.50	0.05	-0.42
Dec	0.30	-0.07	-0.40
	0.72	0.00	-0.78

* Tm: Difference between recorded and predicted tides in 1992

0.16 Mean W. L. at Phu An in 1992
 0 MSL-datum/ Gauge datum of Phu An sta.
 -0.08 Mean W. L. at Vung Tau in 1992

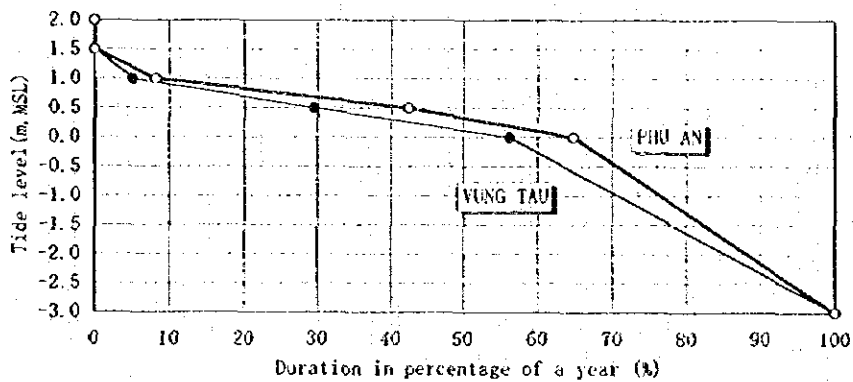
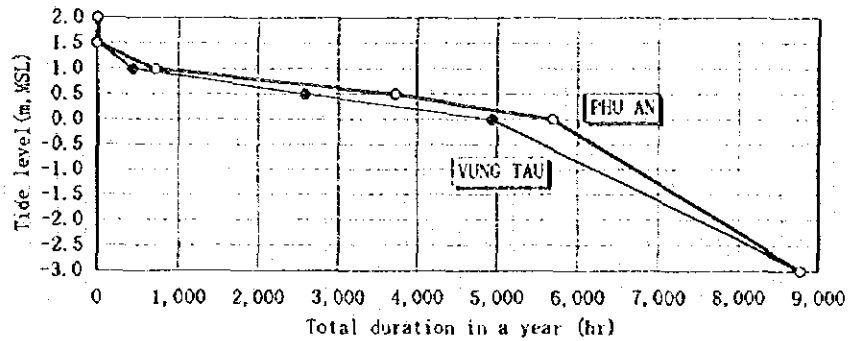
-2.42 Tide table datum for Vung Tau
 -2.59 Tide table datum for Phu An
 -2.72 Gauge datum at Vung Tau sta.

Unit:m, MSL
 (out of scale)

Month	Phu An Tm(m)		
	Max.	Ave.	Min.
Jan	1.02	0.00	-0.90
Feb	0.62	-0.07	-0.76
Mar	0.70	-0.06	-0.80
Apr	0.96	0.03	-0.82
May	0.70	0.05	-0.77
Jun	0.74	0.02	-0.90
Jul	0.62	0.04	-0.75
Aug	0.60	-0.01	-0.74
Sep	0.80	-0.05	-0.96
Oct	0.97	0.07	-0.71
Nov	1.04	0.02	-0.67
Dec	0.66	-0.06	-0.81
	1.04	0.00	-0.96

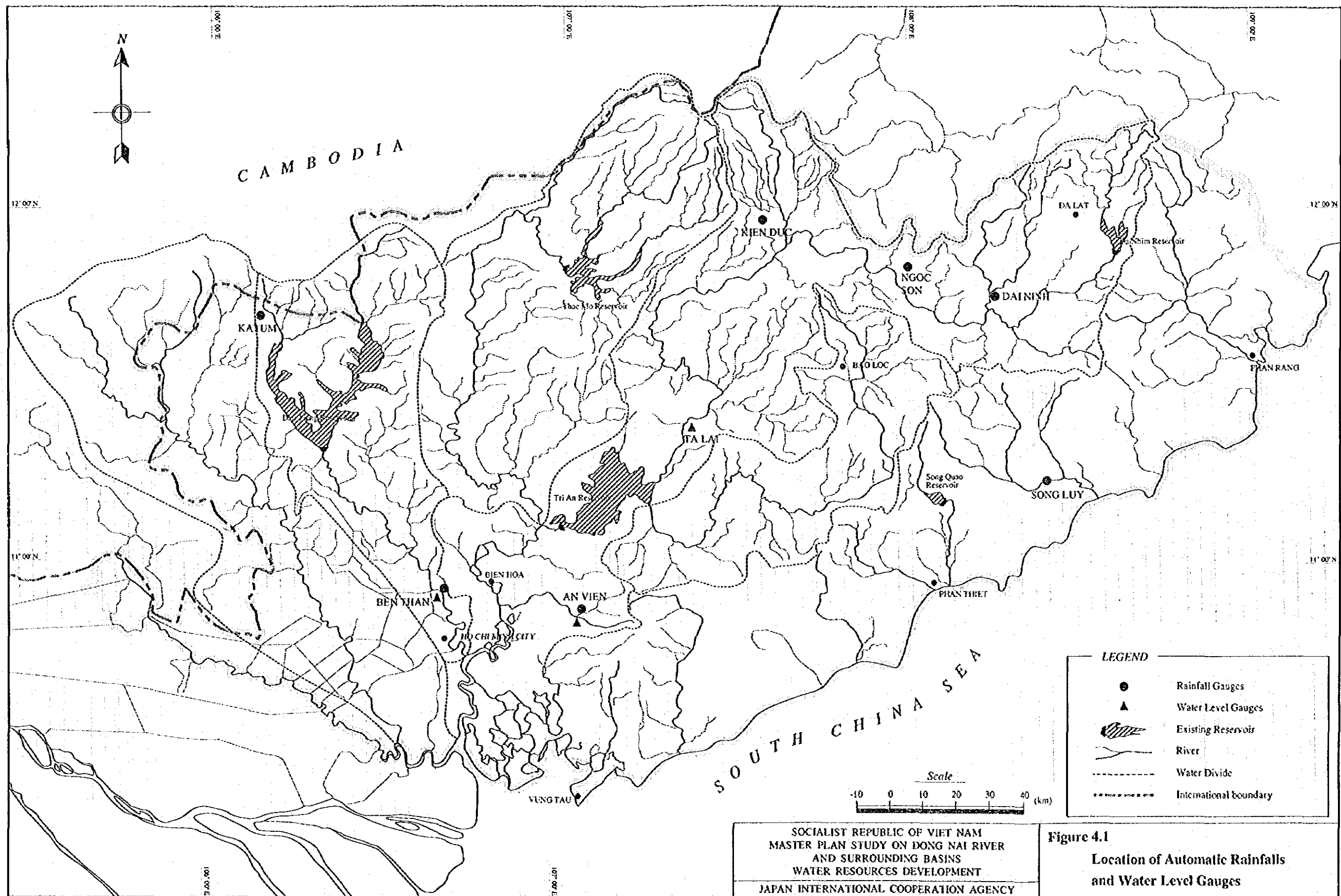
Figure 3.25
 Recorded and Predicted Tides

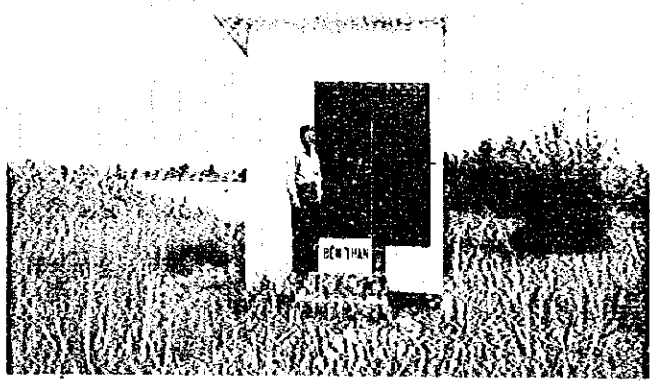
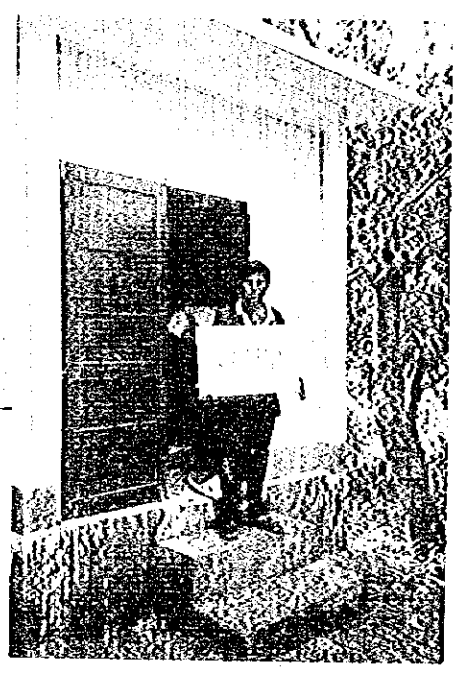
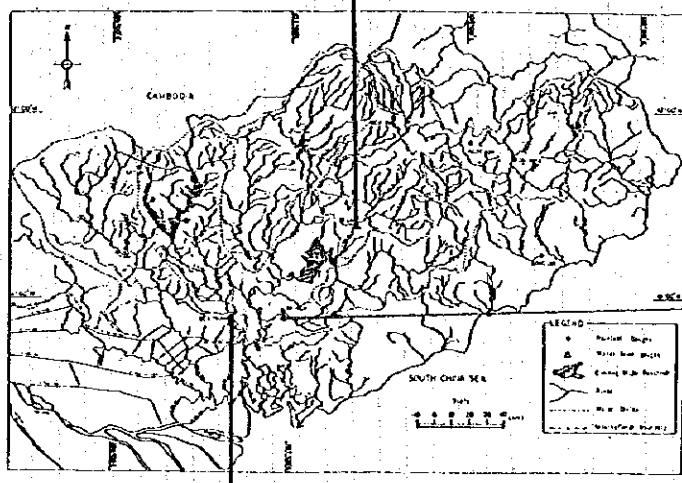
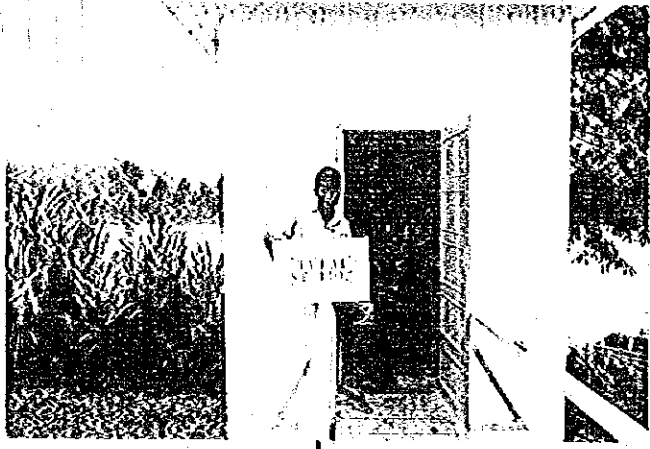
RECORDED AND PREDICTED TIDES



Elevation (m. MSL)	Tide in 1992			
	Tide level-duration			
	Vung Tau		Phu An/Saigon P.	
	(hr)	(%)	(hr)	(%)
2.0 or more	0	0	0	0
1.5 to 2.0	2	0	0	0
1.0 to 1.5	449	5	725	8
0.5 to 1.0	2,593	30	3,726	42
0.0 to 0.5	4,942	56	5,702	65
-3.0 to 0.0	8,784	100	8,784	100

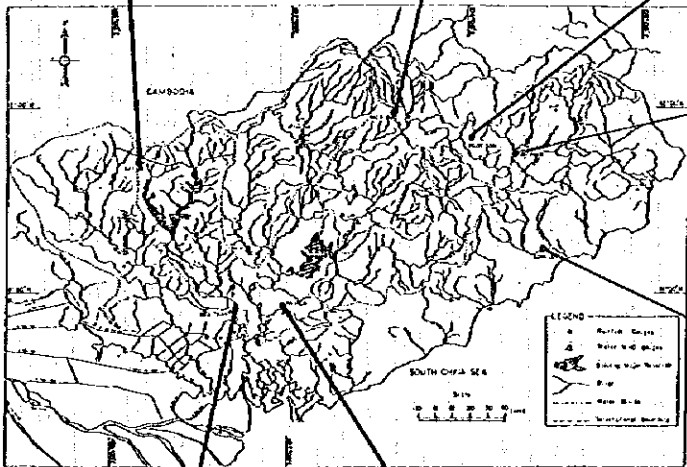
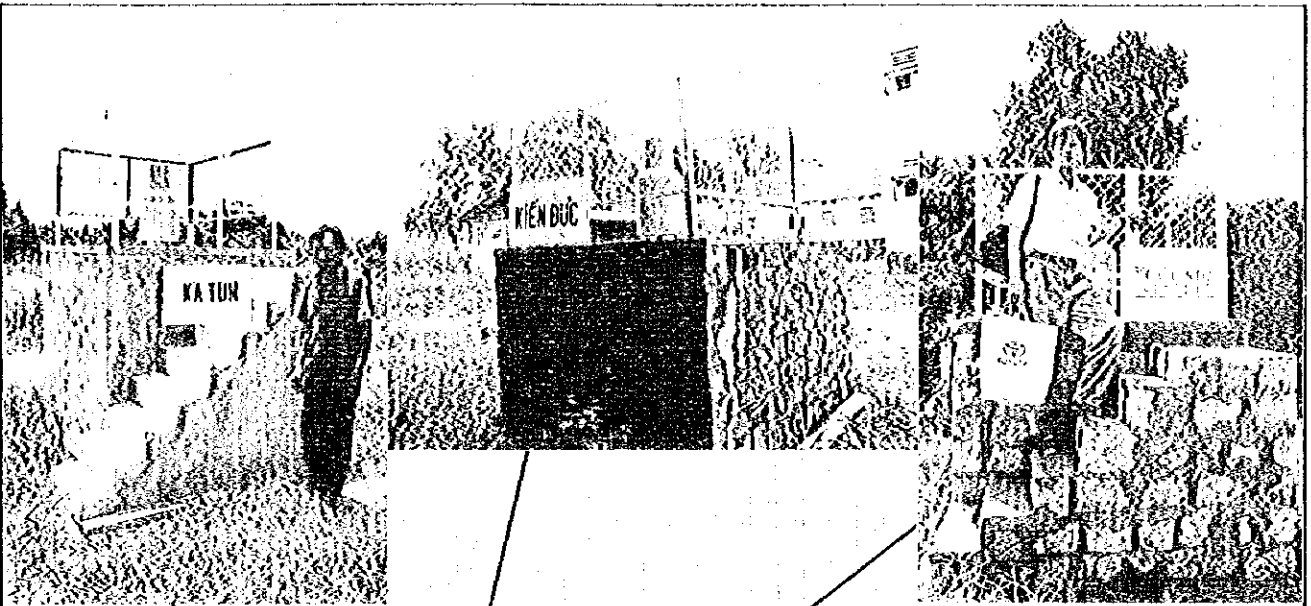
Tide Level and Duration





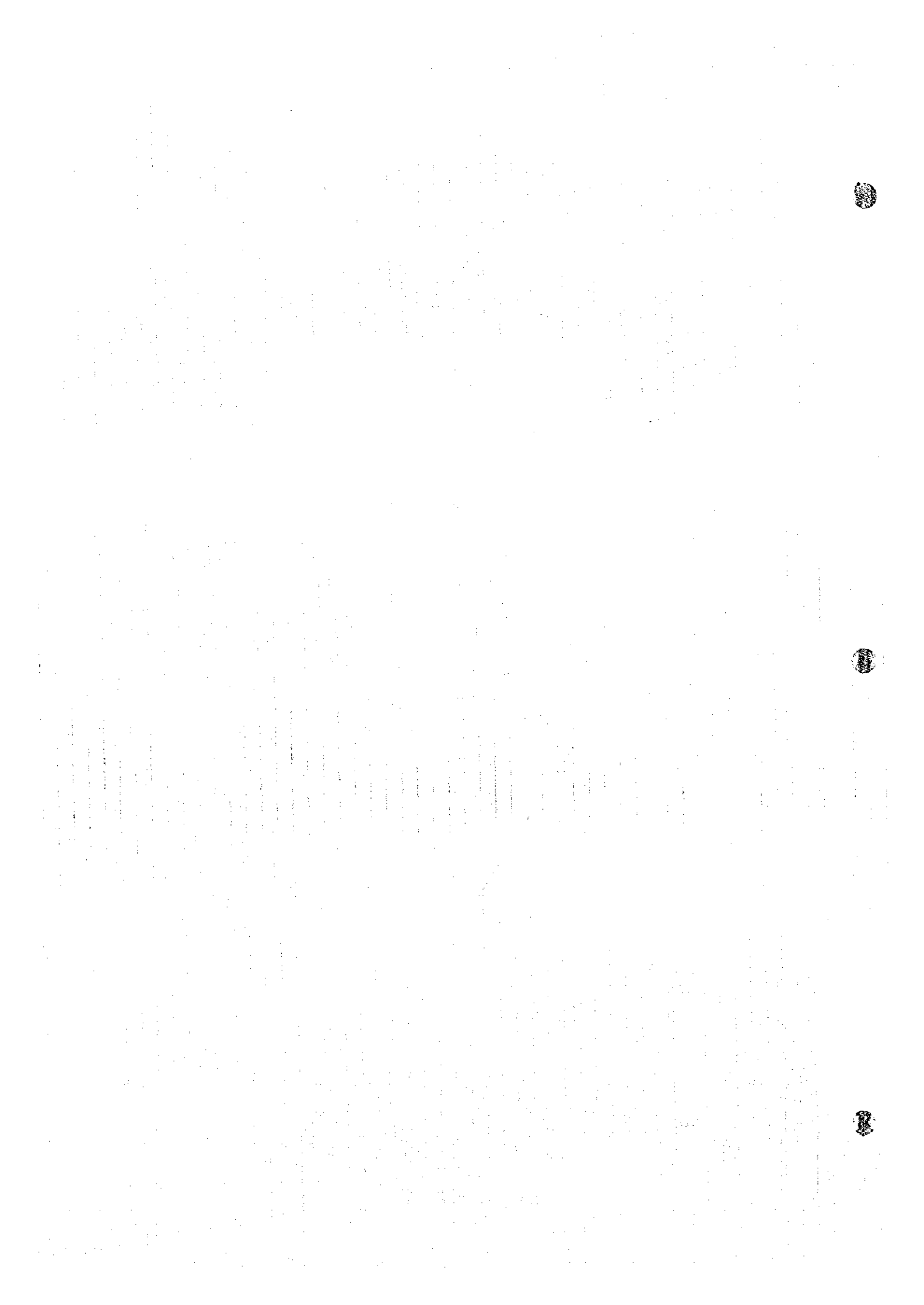
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Figure 4.2
 Installed Automatic Water Level
 Stations

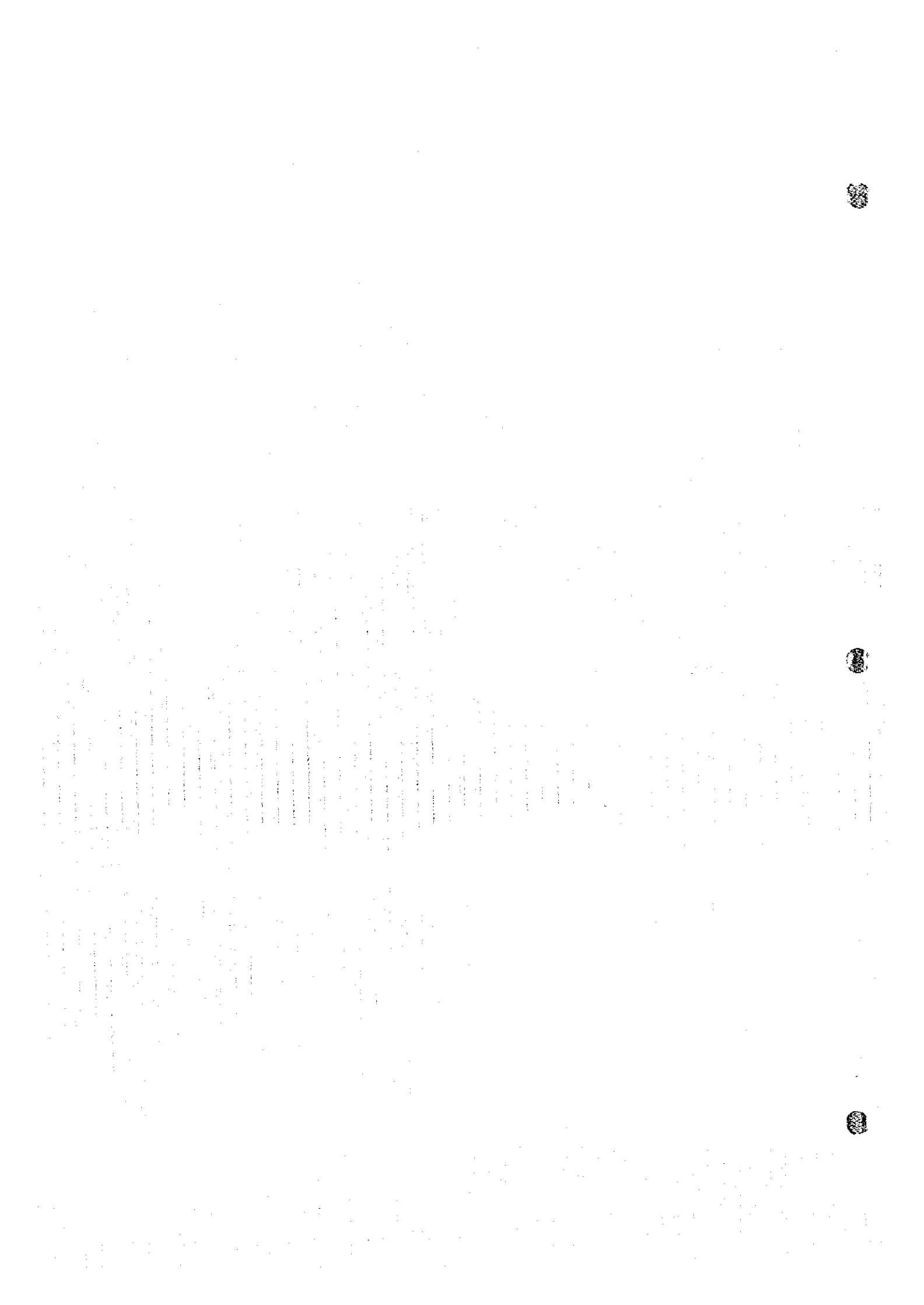


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Figure 4.3
 Installed Automatic Rainfall Stations







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