

Mae Nam Ping

Map of River

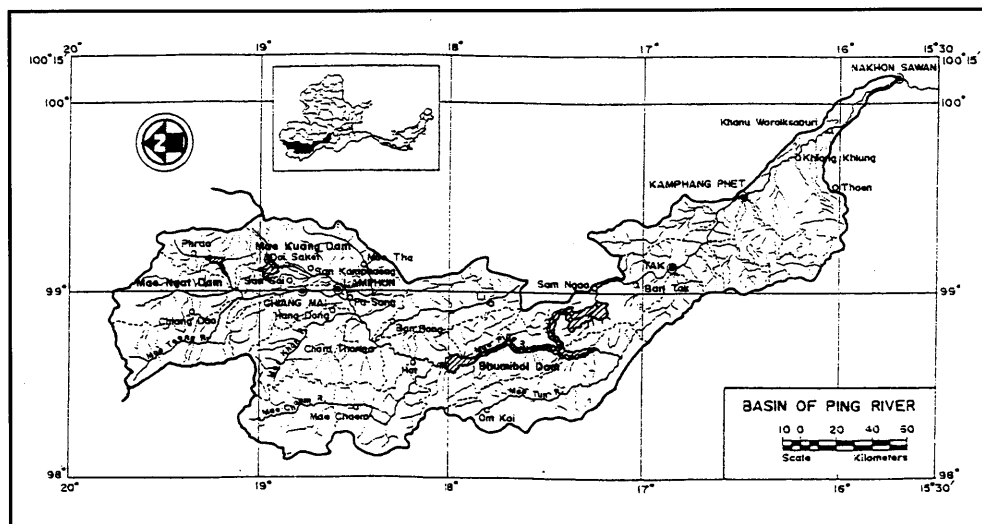


Table of Basic Data

Name: Ping River (Upper branch of the Chao Phraya River)		Serial No.: Thailand-1
Location: Northern part of Thailand	N 15° 24' 00" ~ 19° 49' 00"	E 98° 05' 30" ~ 100° 09' 12"
Area: 33 898 km ²	Length of main stream: 740 km	
Origin: Mt. Phi Pannam (650 m)	Highest point: Chiang Dao District (1 300 m)	
Outlet: Chao Phraya River	Lowest point: Confluence at Nakhon Sawan Province (25 m)	
Main geological features: Pre-Cambrian to Palaeozoic; Granite, Gneiss, Limestone		
Main tributaries: Mae Ngat River (1 295 km ²), Mae Kuang River (2 699 km ²), Mae Taeng River (1 695 km ²)		
Main lakes: None		
Main reservoirs: Bhumibol Dam (13 462 x 10 ⁶ m ³ , 1964), Mae Kuang Dam (263 x 10 ⁶ m ³ , 1991), Mae Ngat Dam (263 x 10 ⁶ m ³ , 1985)		
Mean annual precipitation: 1 055.6 mm (1952~1991) basin average		
Mean annual runoff: 261.62 m ³ /s at Ban Huai Yang (42 700 km ²) (1960~1991)		
Population: 3 023 231 (1992)	Main cities: Chiang Mai, Lamphun, Tak, Kamphaeng Phet, Nakhon Sawan	
Land use: Forest (68.78%), Agriculture and Urban (30.1%), Surface water (1.12%) (1990)		

1. General Description

The Ping River originates from Phi Pannam Mountain in Chiang Dao District, Chiang Mai Province in the northern part of Thailand and flows southwards to join the Nan River at Nakhon Sawan Province where the Chao Phraya River is formed. It is 740 km long and has a catchment area of 33 898 km². The basin recorded an average annual precipitation of 1 055.6 mm, and an average annual discharge at Ban Huai Yang (P7A, 42 700 km²), Khamphaeng Phet Province of 261.62 m³/s during the period 1960~1991. The three dams across the Ping River, the Bhumibol built in 1964, the Mae Ngat built in 1985 and the Mae Kuang built in 1991 have created reservoirs of capacities 13 462 x 10⁶ m³, 265 x 10⁶ m³, and 263 x 10⁶ m³ respectively. The river segment upstream of Bhumibol Dam which runs through mountainous areas is considered the upper reach while the segment downstream of the Dam which flows through alluvial plains in Kamphaeng Phet and Nakhon Sawan Provinces is considered the lower reach. The basin population has been 3 023 231 in 1992.

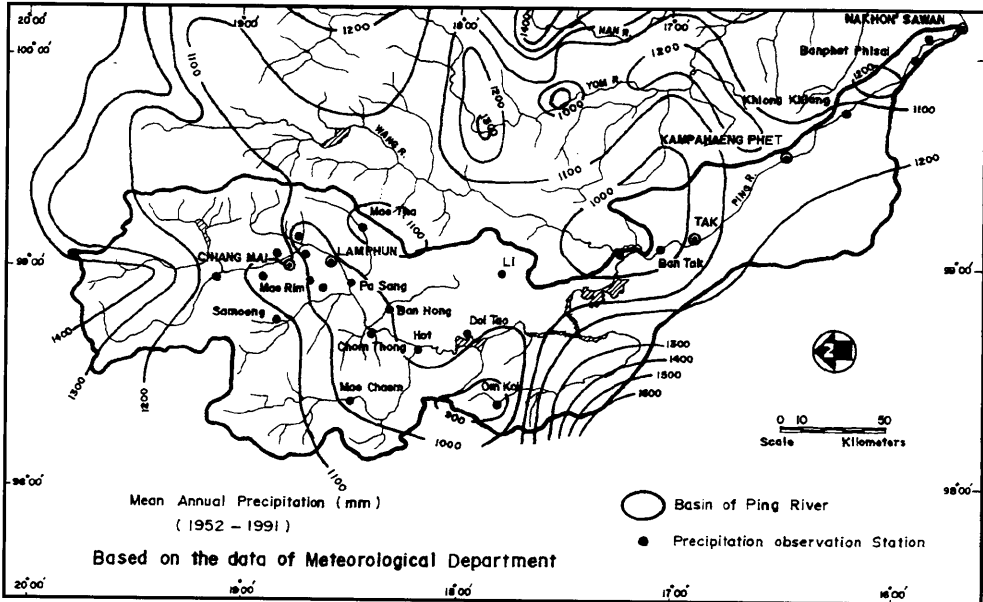
2.3 Characteristics of River and Main Tributaries

No.	Name of river	Length [km] Catchment area [km ²]	Highest peak [m] Lowest point [m]	Cities Population (year)	Land use [%] (1990)
1	Ping (Main River)	740 33 898	Mt. Intanon, 2 565 -----	Chiang Mai Province, etc 3 023 231 (1992)	A (30) F (68.78)
2	Mae Taeng (Tributary)	87 1 695	Mt. Khon Soon, 1 931 -----	Chiang Mai Province 1 307 694 (1992)	L (1.12) U (0.1)
3	Mae Ngat (Tributary)	61 1 295	Mt. Kam Phra, 1 794 -----		
4	Mae Tun (Tributary)	153 3 668	Mt. Pha Daeng, 1 243 -----		
5	Mae Chaem (Tributary)	143 3 637	Mt. Pha Sam Sao, 1 242 -----		
6	Mae Kuang (Tributary)	92 2 699	Mt. Lang Ka, 2 031 -----		
7	Mae Khan (Tributary)	81 1 699	Mt. Khun Mae Ta La, 1 501 -----		
8	Mae Li (Tributary)	143 2 419	Mt. Kui I Hong, 948 -----	Lamphun Province 419 633 (1992)	

A: Agricultural field F: Forest L: Lake, River, Marsh U: Urban

3. Climatological Information

3.1 Annual Isohyetal Map and Observation Stations



3.3 Monthly Climate Data

Station: Tak

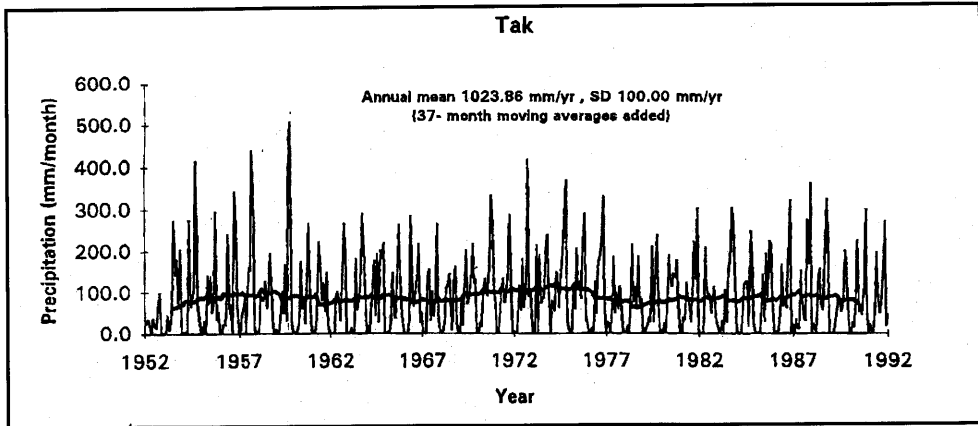
Observation item	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Period for the mean
Temperature [°C]	23.5	27.1	30.5	31.8	29.8	28.4	28.1	27.8	27.5	26.5	25.0	22.9	27.4	1954~1993
Precipitation[mm]	4.9	7.4	18.0	40.7	168.7	112.8	92.4	114.6	227.1	202.7	48.7	5.8	1 043.8	1955~1993
Evaporation [mm]*	123.4	175.0	252.7	268.3	222.6	149.9	159.0	150.8	134.7	108.8	97.2	101.7	1 944.1	1982~1993

Station: Chiang Mai

Observation item	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Period for the mean
Temperature [°C]	20.5	22.7	26.2	28.6	28.2	27.4	27.0	26.5	26.5	25.7	23.7	20.8	25.3	1951~1993
Precipitation[mm]	8.8	6.5	14.7	50.0	158.1	138.8	168.5	229.3	238.1	123.2	44.8	18.5	1 199.3	1951~1993
Evaporation [mm]*	106.9	129.1	171.8	194.6	180.5	142.0	133.5	126.7	129.7	128.6	105.1	95.4	1 643.9	1973~1993
Duration of sunshine [hr]	278.9	272.8	280.3	267.8	260.3	175.7	150.1	139.3	172.6	220.7	235.1	258.6	2 712.2	1975~1993

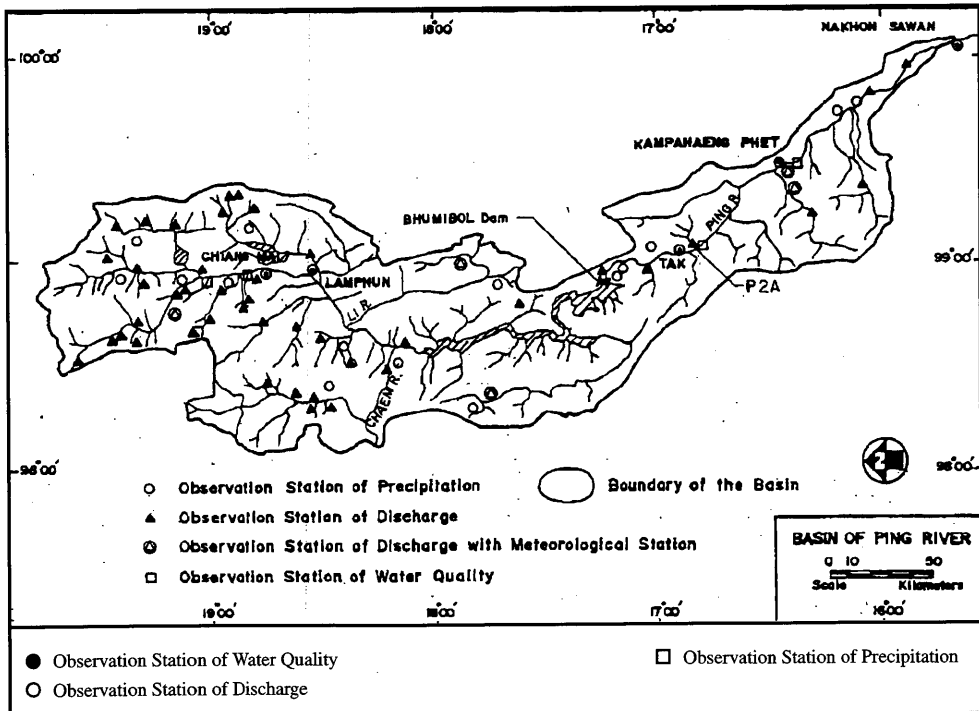
* Monthly average using Class A Pan

3.4 Long-term Variation of Monthly Precipitation



4. Hydrological Information

4.1 Map of Streamflow Observation Stations



4.2 List of Hydrological Observation Stations

No.*	Station	Location	Elevation [m]	Catchment area (A) [km ²]	Observation period	Observation item ¹⁾ (frequency)
P1	Nawarat Bridge	N 18° 47' 09" E 99° 00' 29"	305.3	6 356	1921~1991	Q(H1), WQ(6m)
P4A	Mae Taeng	N 19° 07' 20" E 98° 56' 51"	338.736	1 902	1955~1991	Q(H1), WQ(6m)
P12	Wang Kra Chao	N 17° 14' 30" E 99° 00' 45"	143.825	26 396	1934~1991	Q(H1)
P14	Kaeng Ob Luang	N 18° 13' 49" E 98° 33' 35"	282.20	3 853	1953~1991	Q(H1)
P23	Mae Khan Bridge	N 18° 31' 37" E 98° 51' 42"	289.483	1 777	1955~1987	Q(5d)
P29	Highway Bridge	N 18° 18' 35" E 98° 49' 35"	3.42 (A.D.)	1 970	1969~1987	Q(5d)
P2A	Ban Tha Khae	N 16° 51' 14" E 99° 07' 50"	115.37	38 862	1952~1991	Q(H1), WQ(6m)
P2A	Ban Huai Yang	N 16° 28' 38" E 99° 31' 06"	77.446	42 700	1960~1991	Q(H1), WQ(6m)

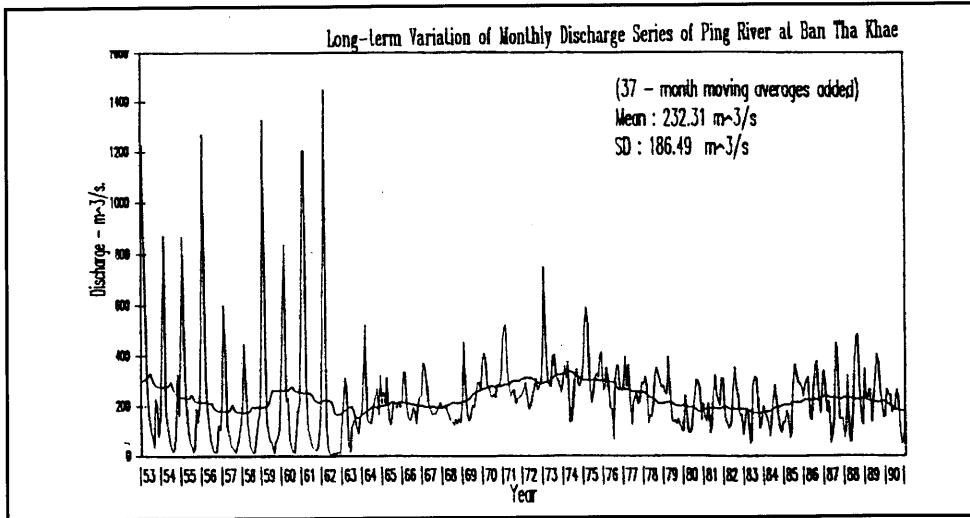
No.*	\bar{Q} ²⁾ [m ³ /s]	Q max ³⁾ [m ³ /s]	\bar{Q} max ⁴⁾ [m ³ /s]	\bar{Q} min ⁵⁾ [m ³ /s]	\bar{Q} / A [m ³ /s/100km ²]	Q max / A [m ³ /s/100km ²]	Period of statistics
P1	59.38	716	407.28	7.95	0.934	11.26	1921~1991
P4A	17.34	739	170.31	1.45	0.912	38.85	1955~1991
P12	210.22	4 380	774.09	27.52	0.796	16.59	1934~1991
P14	35.17	770	315.46	5.50	0.913	19.98	1953~1991
P23	12.44	320	148.08	0.03	0.700	18.01	1955~1987
P29	5.65	225	121.58	0.11	0.287	11.42	1969~1987
P2A	234.48	4 760	1 936.58	43.95	0.603	12.25	1952~1991
P7A	261.62	2 333	1 098.26	69.22	0.613	5.46	1960~1991

* Serial number used by Royal Irrigation Department and Electricity Generating Authority of Thailand

- 1) H1: Water level in recording chart
Q: Discharge, WQ: Water quality
5d: 5-day, 6m: 6-monthly
A.D.: Assumed data

- 2) Mean annual discharge
3) Maximum discharge
4) Mean maximum discharge
5) Mean minimum discharge

4.3 Long-term Variation of Monthly Discharge



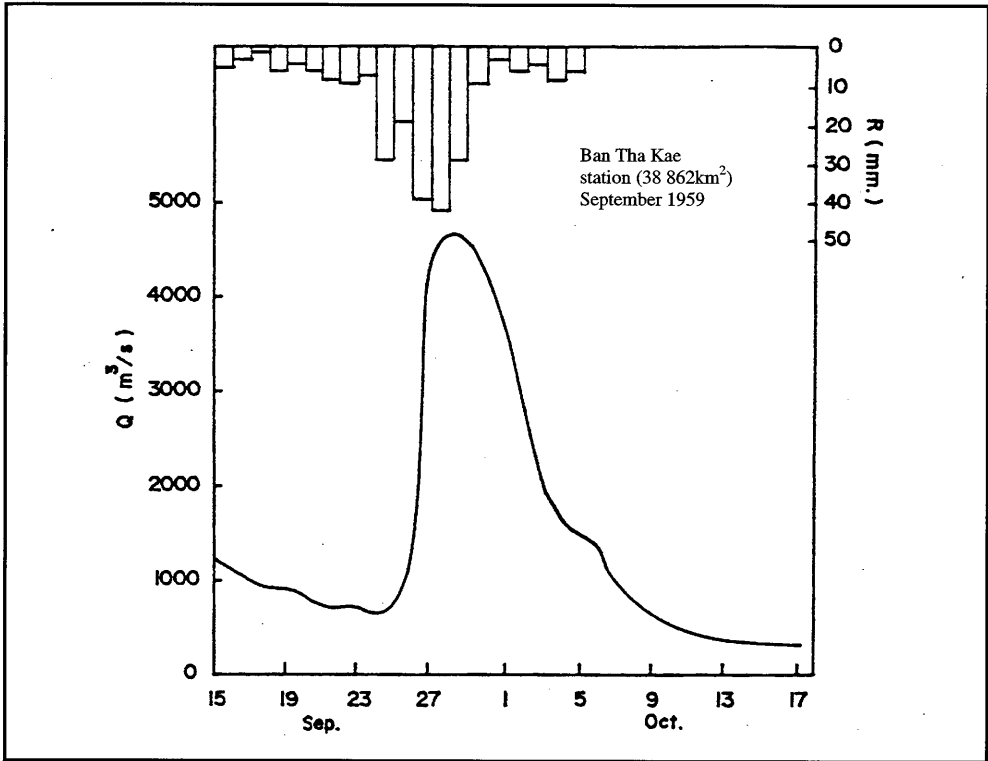
4.6 Annual Maximum and Minimum Discharges

At Ban Tha Khae (P2A) [38 862 km²]

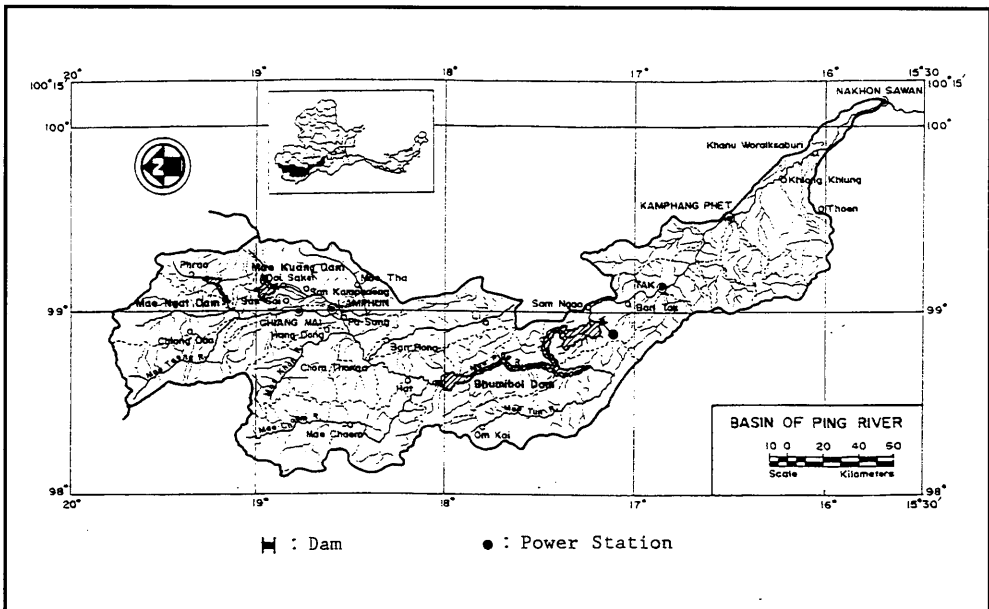
Year	Maximum ¹⁾		Minimum ²⁾		Year	Maximum ¹⁾		Minimum ²⁾	
	Date	[m ³ /s]	Month	[m ³ /s]		Date	[m ³ /s]	Month	[m ³ /s]
1952	9.27	2 152	3	20.0	1972	10.07	475	1	85.0
1953	9.25	1 960	4	12.0	1973	9.24	1 447	1	125.0
1954	10.14	2 066	3	10.0	1974	11.07	720	1	74.0
1955	9.30	1 507	3	9.0	1975	10.16	1 132	1	124.0
1956	9.25	2 268	3	7.8	1976	10.31	628	8	107.0
1957	9.10	1 280	4	6.0	1977	9.13	643	1	25.0
1958	9.26	966	4	5.0	1978	7.11	591	7	57.0
1959	9.28	4 760	3	12.0	1979	6.15	469	1	20.0
1960	10.09	1 412	4	5.2	1980	5.23	585	1	51.6
1961	10.26	2 170	4	3.6	1981	5.27	500	7	22.5
1962	10.04	2 117	3	1.5	1982	3.11	436	9	32.0
1963	10.09	581	4	0.3	1983	10.20	600	12	17.2
1964	10.08	1 191	5	35.0	1984	4.01	399	7	12.1
1965	11.23	762	1	66.0	1985	3.11	414	1	28.2
1966	10.18	1 016	1	122.0	1986	7.02	545	12	60.2
1967	9.30	942	5	67.0	1987	3.31	579	1	11.7
1968	7.03	292	2	75.0	1988	10.19	1 292	12	14.0
1969	9.22	894	5	90.0	1989	4.11	583	6	15.3
1970	8.24	620	4	147.0	1990	4.07	445	7	35.0
1971	10.30	799	1	134.0	1991	3.24	355	6	12.8

1), 2) Instantaneous observation by recording chart

4.7 Hyetographs and Hydrographs of Major Floods



5.2 Map of Water Resources Systems



7. References, Databooks and Bibliography

- Electricity Generating Authority of Thailand (1992): *Surface runoff and specific yield of river basins in Thailand*, Survey and Ecology Department (February 1992) Meteorology and Hydrology Division. (4.7)
- Meteorological Department, *Climatological Data of Thailand, 1951-1990*, Bangkok, Thailand.
- Panya Consultant Company Limited (1994): *Study of potential development of water resources in the Mae Ping River Basin*, submitted to The Office of National Economic and Social Development Board, Main Report, April 1994 (in Thai). (2.3, 3.1, 3.4, 4.1, 5.2)
- Royal Irrigation Department, *Thailand hydrological yearbook*, Hydrology Division, Bangkok, Vol. 4-34. (4.1, 4.2, 4.3, 4.6)