

Sakae Krang River

Map of River

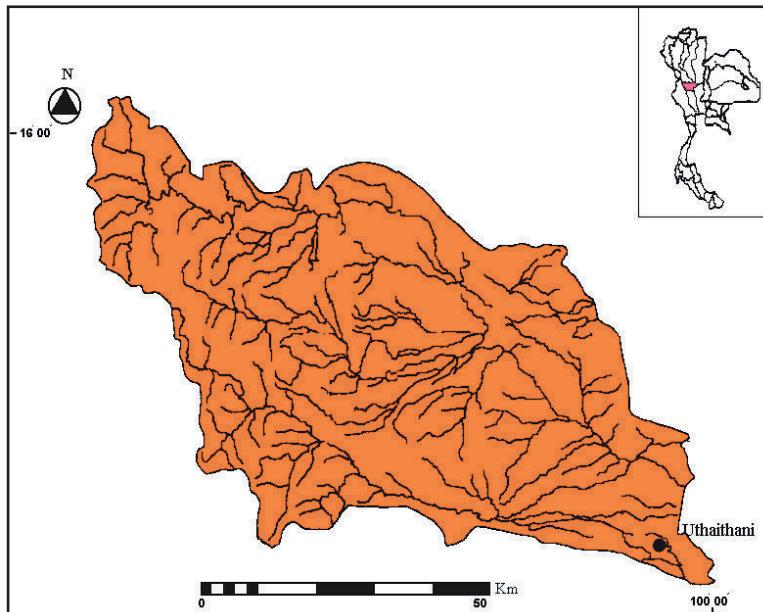


Table of Basic Data

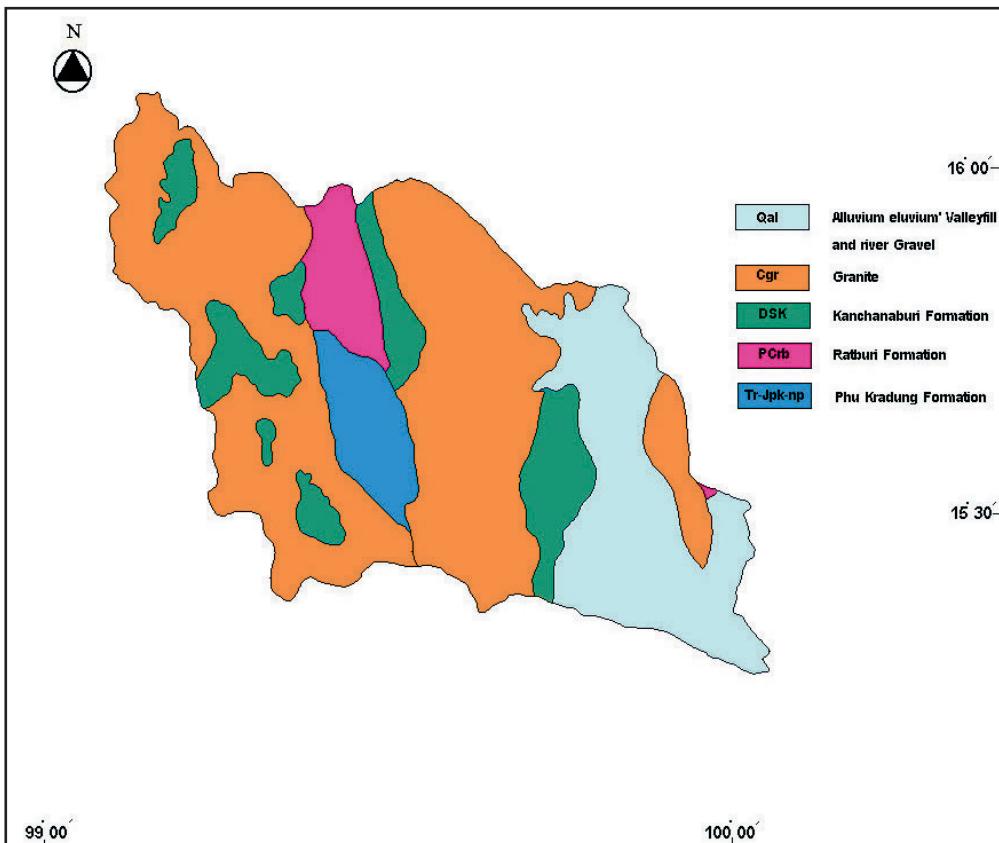
Name: Sakae Krang river		Serial No. : Thailand-11
Location: Central part of Thailand	N 15° 15' 00" ~ 16° 08' 00"	E 99° 00' 00" ~ 100° 00' 00"
Area: 21,725 km ²	Length of Main stream: 427 km	
Origin: Mokju range	Highest point: 1,960 m	
Outlet: Cha Phraya river	Lowest point: 250 m (Krok Phra District, Makhon Sawan Province)	
Main geological features:	Alluvium, (is it alluvium?) Eluvium, Granite, Kanchanaburi Formation, Rattburi Formation, Phu Kradung Formation	
Main Tributaries:	Nam mae Wong (1,060 km ²), Klong Pho (1,512 km ²), Huai Tap Salao (778 km ²), Lower Sakae Krang (1,842 km ²)	
Main Lake:	None	
Main Reservoir:	Tap Salao Dam (152 mmc 1988)	
Mean annual Precipitation:	1,162.1 mm. (1975-2002) At station 03110503 Nong Kha Yang District, U-thai Thani Province	
Mean Annual Runoff:	11.14 m ³ /s (1969-2001) at station 01110202 Khanu Woralak District, Kam Phaeng Phet Province	
Population: 427,997 (1998)	Main Cities: U-thai Thani, Nakhon Sawan, Kham Phaeng Phet Province	
Land use:	Forest 29.0 %, Agriculture & urban area 70.8 %, Water resource 0.2 %	

1. General Description

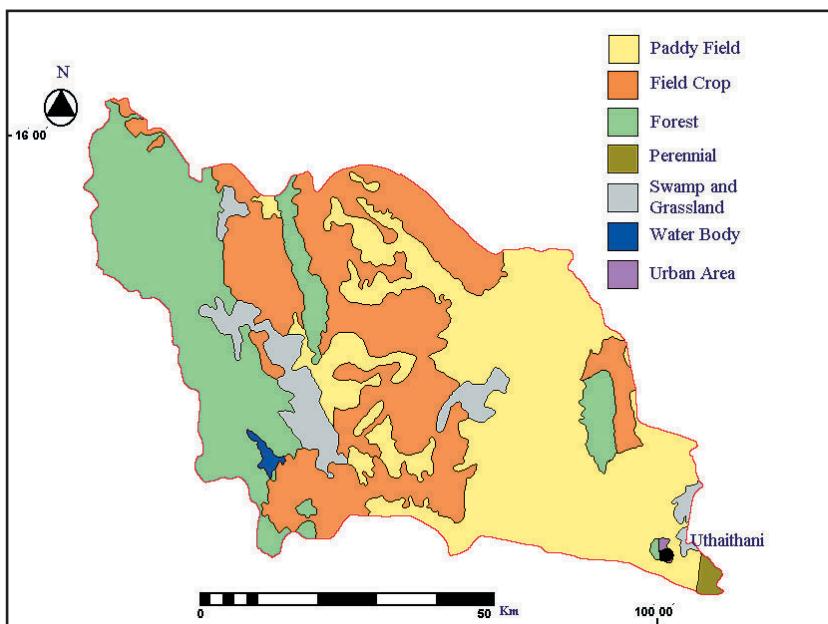
Sakae Krang river basin is located in the Central Plain of Thailand. It flows from northwest to southeast in direction, that is from Mae Wong district and Lard Yao district in Nakhon Sawan Province. It then joins Khlong Pho at Sawang Ar-rom district in U-thai Thani province and then joins Huai Thap Salao at Thap Than district of the same province. This river finally joins Chao Phraya river at Krokphra district in U-thai Thani province. The high and steep mountainous upstream area of Sakae Krang river and flat downstream area before joining the Chao Phraya river causes flash flooding every rainy season.

2. Geographical Information

2.1 Geological Map

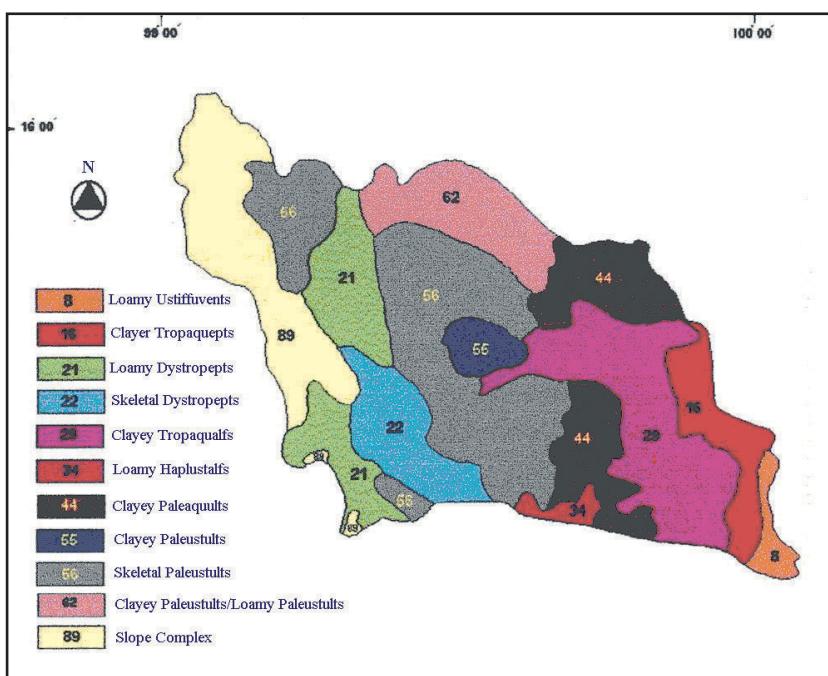


2.2 Land-use Map



Source: Landuse Map of Central of Thailand, 1998
 Landuse Planning Division
 Department of Land Development

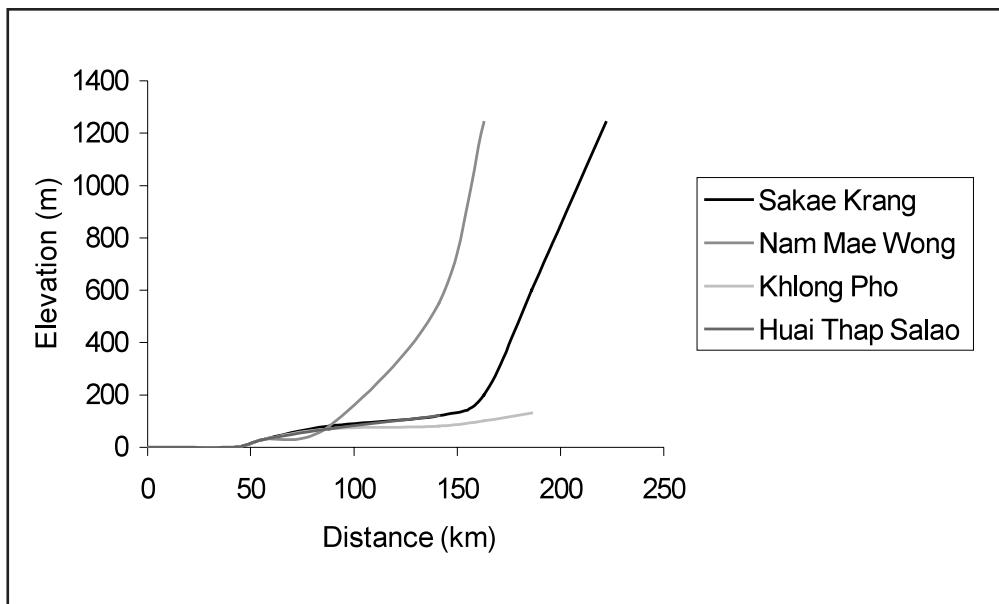
2.3 Soil Map



2.4 Characteristic of River and Main Tributaries

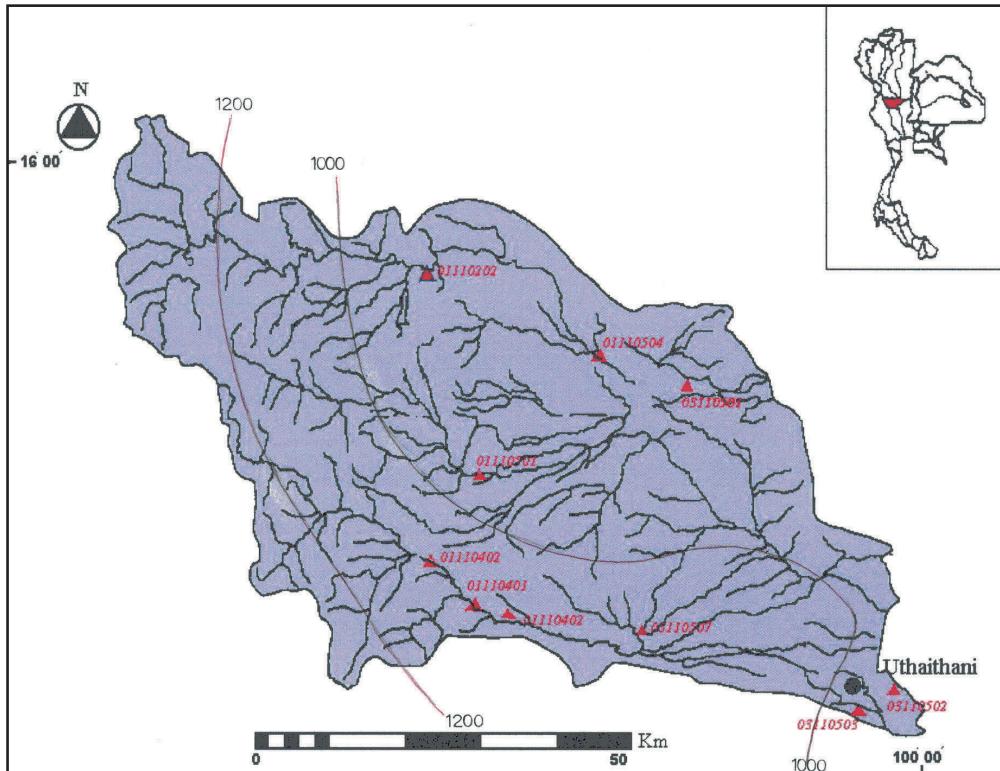
No.	Name of River	Length (km) Catchment area (km ²)	Highest Peak (m)	Cities	Land-Use [%] (1994)
1	Nam Mae Wong	81 1,060	Mokoju 1,960	Lat Yao District Nakhon Sawan, Kha Woralakbur district Kham Phaeng Phet Province	
2	Khlong Pho	107 1,522	1,304	Lat Yao District Nakhon Sawan Province	Forest (29.0 %), Agriculture & Urban Area (70.8 %), Water Resource (0.2 %)
3	Huai Thap Salao	98 778	Khao Yai 1,554	Lan Sak District U-thai Thani Province	
4	Lower Sa Kae Krang	141 1,842	Khao Luang 772	Thap Than, Nong Chang, Lat Yao, Sawang Arlom, Nong Krayang District, U-thai Thani Province	
5	Sa Kae Krang (main river)	222 5,202	-	U-thai Thani, Kham Phaeng Phet Province	

2.5 Longitudinal Profiles



3. Climatological Information

3.1 Annual Isohyetal Map and Observation Stations



3.2 List of Meteorological Observation Station

Station No.	Station Name	Location	Observation period	Mean annual Precipitation (mm)	Observation items ¹⁾
01110202	Ban Pang Ma Ka	N 15° 54' 10" E 99° 28' 15"	1970 - 1996	1,232.4	P (S)
01110301	Ban Hang Rai	N 15° 38' 23" E 99° 32' 20"	1975 - 1996	1,061.9	P (S)
01110402	Ban Bung Ai	N 15° 31' 38" E 99° 28' 10"	1977 - 1996	1,276.8	P (S)
03110402	Lan Sak	N 15° 27' 00"	1977 - 1996	1,030.1	P (S)
01110504	San Chao Kai To, Lat Yao	N 15° 47' 01" E 99° 40' 55"	1970 - 1996	1,184.4	P (S)
03110501	Lat Yao	N 15° 44' 58" E 99° 47' 34"	1951 - 1996	1,040.8	P (S)
03110502	Muang, U-thai Thani	N 15° 22' 39" E 100° 01' 39"	1975 - 2002	1,051.0	P (S)
03110503	Nong Kha Yang	N 15° 21' 46" E 99° 55' 56"	1975 - 2002	1,162.5	P (S)
03110504	Thap Than	N 15° 27' 27" E 99° 53' 41"	1975 - 2002	1,166.2	P (S)
03110506	Sawang Arlom	N 15° 34' 56" E 99° 51' 49"	1975 - 2002	1,171.7	P (S)
03110507	Nong Chang	N 15° 26' 00" E 99° 44' 00"	1975 - 2002	1,168.3	P (S)
01110401	Ban Rai	N 15° 28' 23" E 99° 31' 18"	1969 - 1996	1,311.3	P (S)

1) P(S) : Precipitation from standard rain gauge

3.3 Monthly Climatic Data

Station: 03110502 Muang, Uthaithani

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Period of the mean
1	24.5	26.9	28.9	30.8	29.6	28.3	28.1	27.7	27.7	26.9	25.5	23.4	27.4	1966 ~ 1996
2	6.0	12.2	31.2	60.6	128.5	119.4	132.9	179.7	270.1	159.7	31.7	2.4	1,134.4	1952 ~ 1996
3	108.1	123.2	154.0	178.3	162.8	120.3	118.1	109.4	109.7	99.4	93.7	98.4	1,475.4	1966 ~ 1996

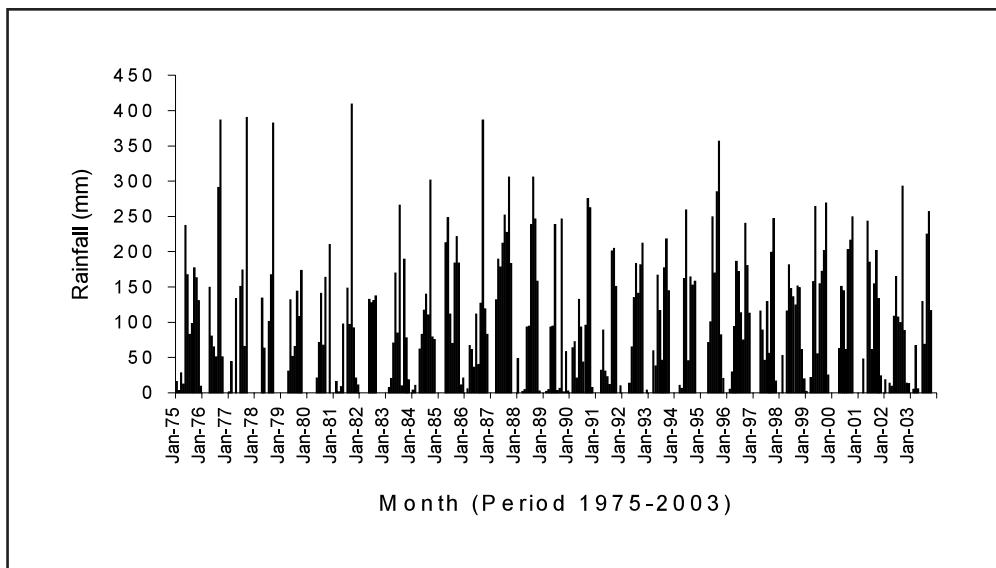
1 : Temperature [°C]

2 : Precipitation [mm]

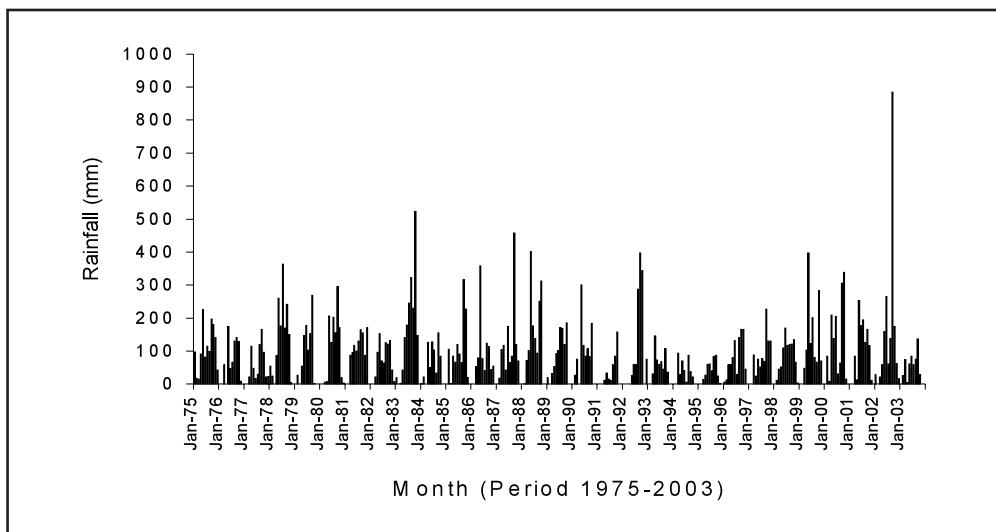
3 : Evaporation [mm]

3.4 Long-term Variation of Monthly Precipitation Series

Station: 03110502 Amphoe Muang, Uthaithani Province

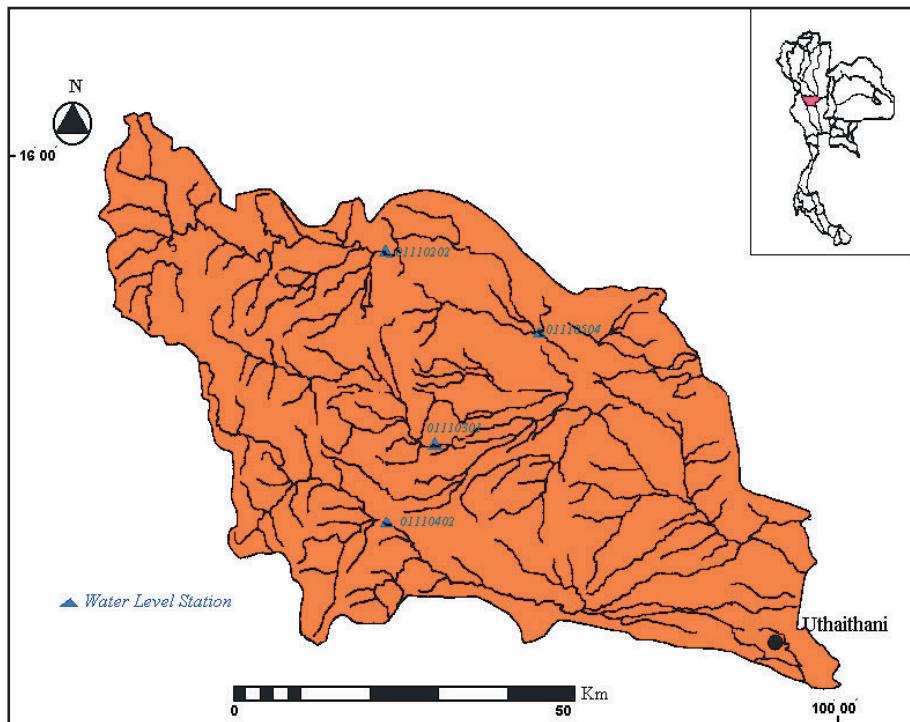


Station: 03030504 San Chao Kai To, Lat Yao District, Nakhon Sawan Province



4. Hydrological Information

4.1 Map of Streamflow Observation Stations



4.2 List of Hydrological Observation Stations

No.	Station	Location	Catchment area (A) [km ²]	Observation period	Observation items ¹⁾ (frequency)
01110202	Khanu Woralakburi District, kham Phaeng Phet Province	N 15° 54' 10" E 99° 28' 45"	979	1969 - present	Q (H1)
01110301	Lat Yao District, Nakhon Sawan Province	N 15° 38' 23" E 99° 32' 20"	457	1975 - present	Q (H1)
01110402	Lan Sak District, U-thai Thani province	N 15° 31' 38" E 99° 28' 10"	522	1977 - present	Q (H1)
01110504	San Chao Kai To, Lat Yao District, Nakhon Sawan Province	N 15° 47' 01" E 99° 40' 55"	1,246	1975 - 1988	Q (H1)

No.	$\bar{Q}^2)$ [m ³ /s]	Qmax ³⁾ [m ³ /s]	$\bar{Q}_{\text{max}}^4)$ [m ³ /s]	$\bar{Q}_{\text{min}}^5)$ [m ³ /s]	\bar{Q}/A [m ³ /s/100km ²]	Qmax/A [m ³ /s/100km ²]	Period
01110202	11.14	787	291	0.34	1.14	83.39	1969 ~ 2001
01110301	3.94	442	138	0.04	0.86	96.72	1975 ~ 2001
01110402	4.22	230	86.4	0.07	0.81	61.88	1977 ~ 2001
01110504	9.76	261	120	0.03	0.78	20.95	1975 ~ 1988

1) H1 : Water level at recording chart

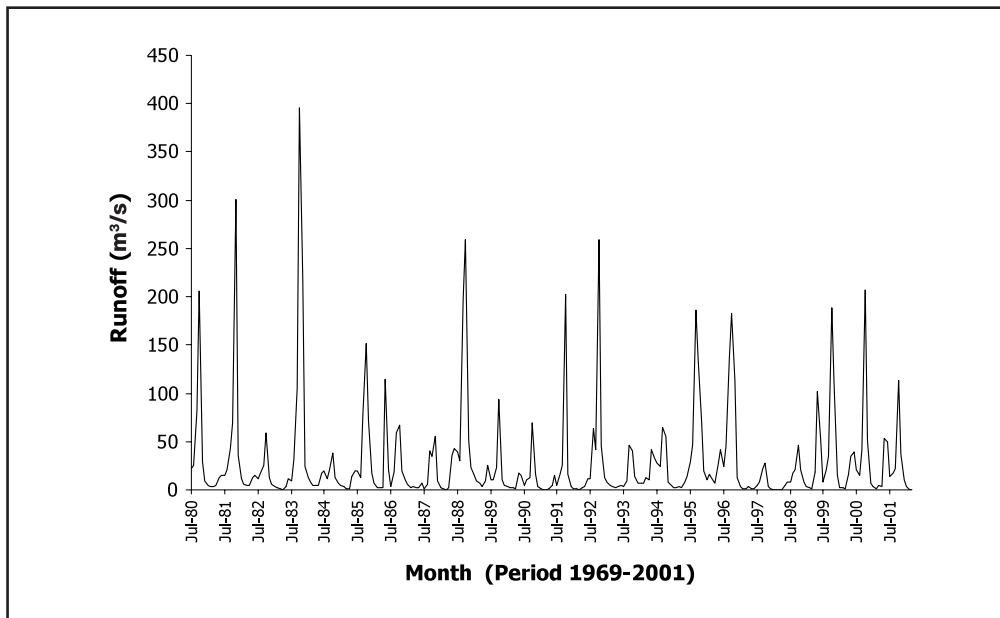
2) \bar{Q} : Mean annual Discharge

3) Qmax : Maximum Discharge

4) \bar{Q}_{max} : Mean annual maximum Discharge5) \bar{Q}_{min} : Mean annual minimum Discharge

4.3 Long-term Variation of Monthly Discharge Series

Station: 01110202 at Ban Pang Makha, Kamphaeng Phet Province

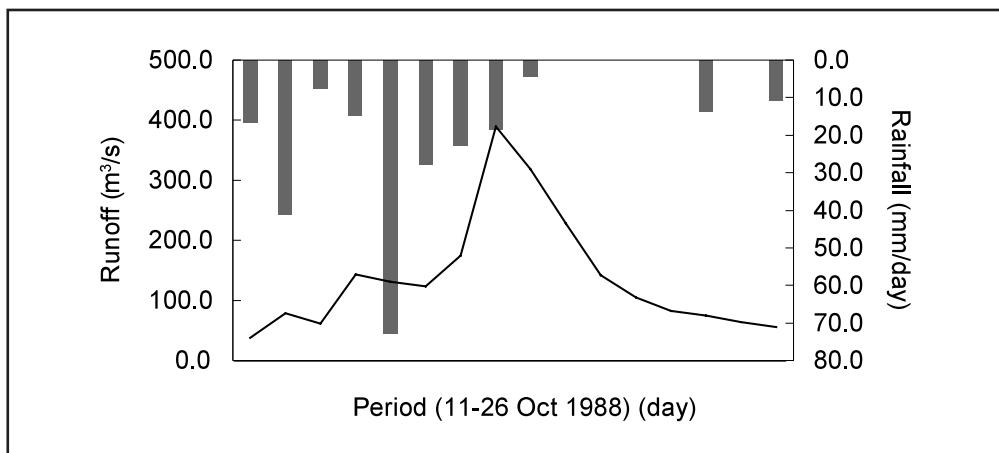


4.4 Annual Maximum and Minimum Discharge

**Station: 01110202 Khanu Woralakburi District, Kham Phaeng Phet Province
(938 km²)**

Year	Maximum		Minimum		Year	Maximum		Minimum	
	Date	m ³ /s	Date	m ³ /s		Date	m ³ /s	Date	m ³ /s
1969	11 - 05	117	12 - 17	0.18	1983	10 - 13	514	4 - 29	0.15
1970	10 - 01	283	4 - 02	0.26	1984	10 - 20	34	12 - 21	0.32
1971	10 - 29	387	12 - 17	0.82	1985	10 - 23	263	4 - 16	0.10
1972	10 - 06	230	4 - 26	0.28	1986	5 - 09	517	4 - 18	0.44
1973	9 - 30	141	4 - 01	0.70	1987	11 - 19	98	12 - 30	0.04
1974	9 - 26	493	4 - 24	0.99	1988	10 - 18	443	4 - 08	0.30
1975	10 - 15	162	4 - 30	0.80	1989	10 - 20	173	12 - 28	0.48
1976	11 - 02	329	12 - 27	0.16	1990	10 - 10	135	12 - 15	0.00
1977	10 - 30	55	12 - 28	0.28	1991	10 - 24	276	12 - 15	0.16
1978	10 - 01	592	12 - 22	0.14	1992	10 - 16	674	4 - 23	0.70
1979	9 - 26	321	12 - 11	0.10	1993	10 - 21	73	5 - 16	0.78
1980	5 - 22	404	5 - 15	0.00	1994	9 - 30	84	12 - 21	0.45
1981	11 - 08	778	12 - 17	1.00	1995	9 - 15	333	4 - 01	0.05
1982	10 - 15	96	12 - 26	0.30					

4.5 Hyetographs and Hydrographs of Major Floods



4.6 Major Peak Discharge Experiences

No.	Drainage Area (km ²)	Discharge		Date	Period of year
		m ³ /s	m ³ /s/km ²		
01110202	938	778	0.829	11/09/1981	1969 - 1996
01110301	457	566	1.239	09/20/1988	1975 - 1994
01110402	522	590	1.130	10/18/1988	1977 - 1996
01110504	1,246	261	0.209	11/09/1981	1975 - 1988

4.7 Water Quality

Point	Year	PH	DO (mg/l)	Bod (mg/l)	Coliform (MPN/100 ml)
1) Wong River Khao Chon Kan Ban Kaeng Kao Yai Ban Tha Yu Sawang Arlom	1990	7.2 - 8.2 8.7 - 8.9 7.6 - 8.0 7.6 - 8.3	8.0 - 8.17 7.34 - 8.10 6.09 - 6.37 6.94 - 7.55	1.1 - 0.20 0.69 - 1.08 0.94 - 1.51 5.24 - 5.78	-
2) Sawang Arlom Thap Than District Nong Kha Yang District Muang District	1993	7.5 7.0 7.0 7.5	7.0 3.5 8.0 6.2	1.6 2.7 1.5 2.0	-
3) Huai Thap Salao		6.39	6.37	2.5	
4) Nam Mae Wong		7.40	6.75	0.8	
5) Sakae Krang River		6.82	5.88	3.2	
2) Sakae Krang River	1997	-	4.7	1.5	-

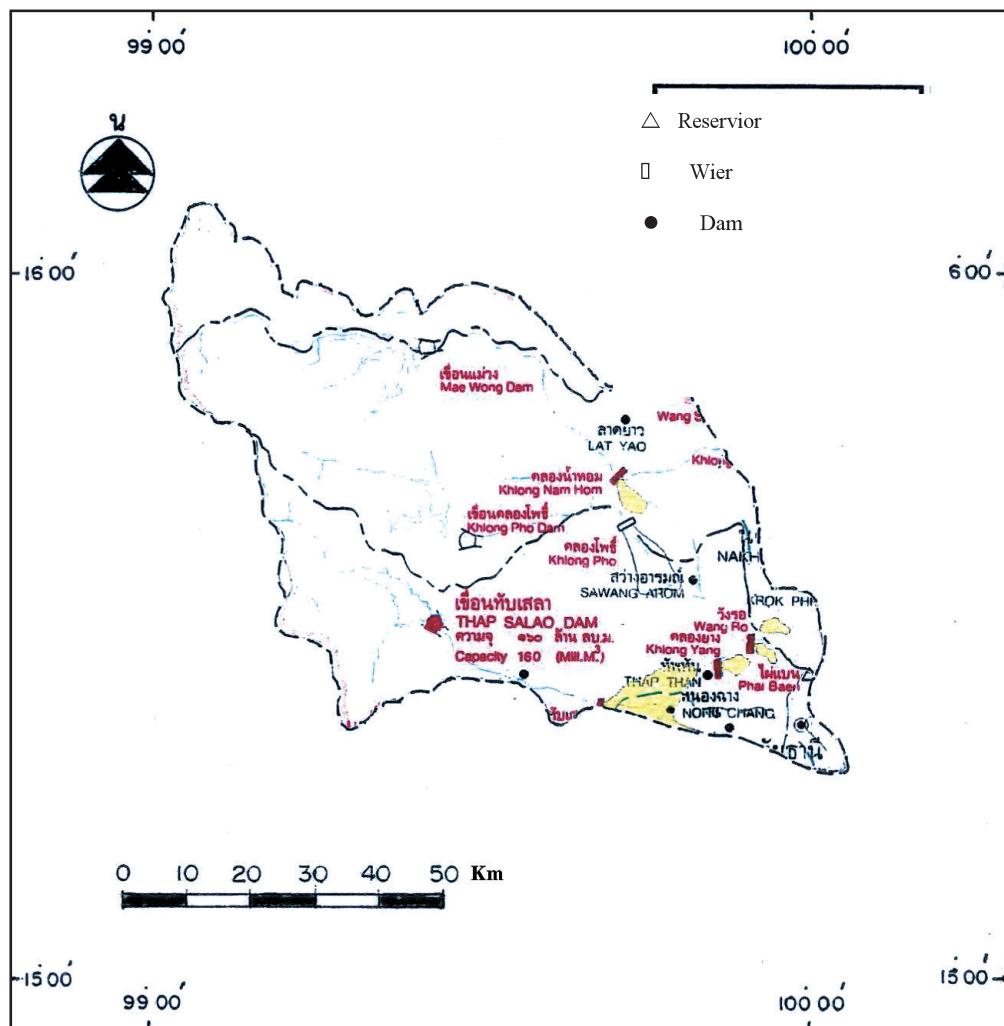
5. Water Resources

5.1 General Description

The Tha Chin River basin is divided into 5 sub-basins. Most of the areas in the river basin are field crop and paddy field. The water resource is utilized mainly for paddy irrigation.

Thap Salao Dam is the only existing impounding reservoir in the basin which has the gross capacities and effective capacities of $160 \times 10^6 \text{ m}^3$ and $152 \times 10^6 \text{ m}^3$ respectively.

5.2 Map of water Resources Systems



5.3 List of major Reservoirs

Name of River	Name of Reservoir	Catchment area [km ²]	Gross Capacity [10 ⁶ m ³]	Effective Capacity [10 ⁶ m ³]	Purpose ¹⁾	Year of completion
Huai Thap Salao	Thap Salao	534	160	152	A, F, I, P, W	1988

1) A: agriculture, F: Flood control, I: Industry, P : Hydropower, W: Municipal water supply

6. Socio-cultural Characteristics

The source of the Sakae Krang river is in a mountain watershed in the north and central regions of Thailand in U-thai Thani, Kam Paeng Phet and Nakhon Sawan provinces. The people living in the river basin grow crops for their livelihood. They have their own local dialects. Water related festivals are food offering to monks day in July in U-thai Thani province and folk music festival and first harvest celebration in Kam Phaeng Phet province. In general inhabitants of this river basin are nice and calm and enjoy their active participation in the annual festival. Tourist attractions in this river basin invite tourists to visit all year round. The richness of natural resources and tourist destinations in this river basin fuels economic wealth in many provinces.

7. References

- Department of Mineral Resources, (1969): Geological map of Thailand.
Meteorological Department, (2001): Climatological Data of Thailand. 1951-2001.
Royal Irrigation Department, (2000): Hydrology Division: Thailand Hydrological Yearbook 1922-2000.
Department of Land Development. Soil of the Kingdom of Thailand, (1972): Explanatory Text of the General Soil Map, Soil Survey Division.
Electricity Generating Authority of Thailand, (1992): Surface runoff and specific yield of river basin in Thailand, Survey and Ecology Department, Meteorology and Hydrlogy Division.