Pasak River

Map of River

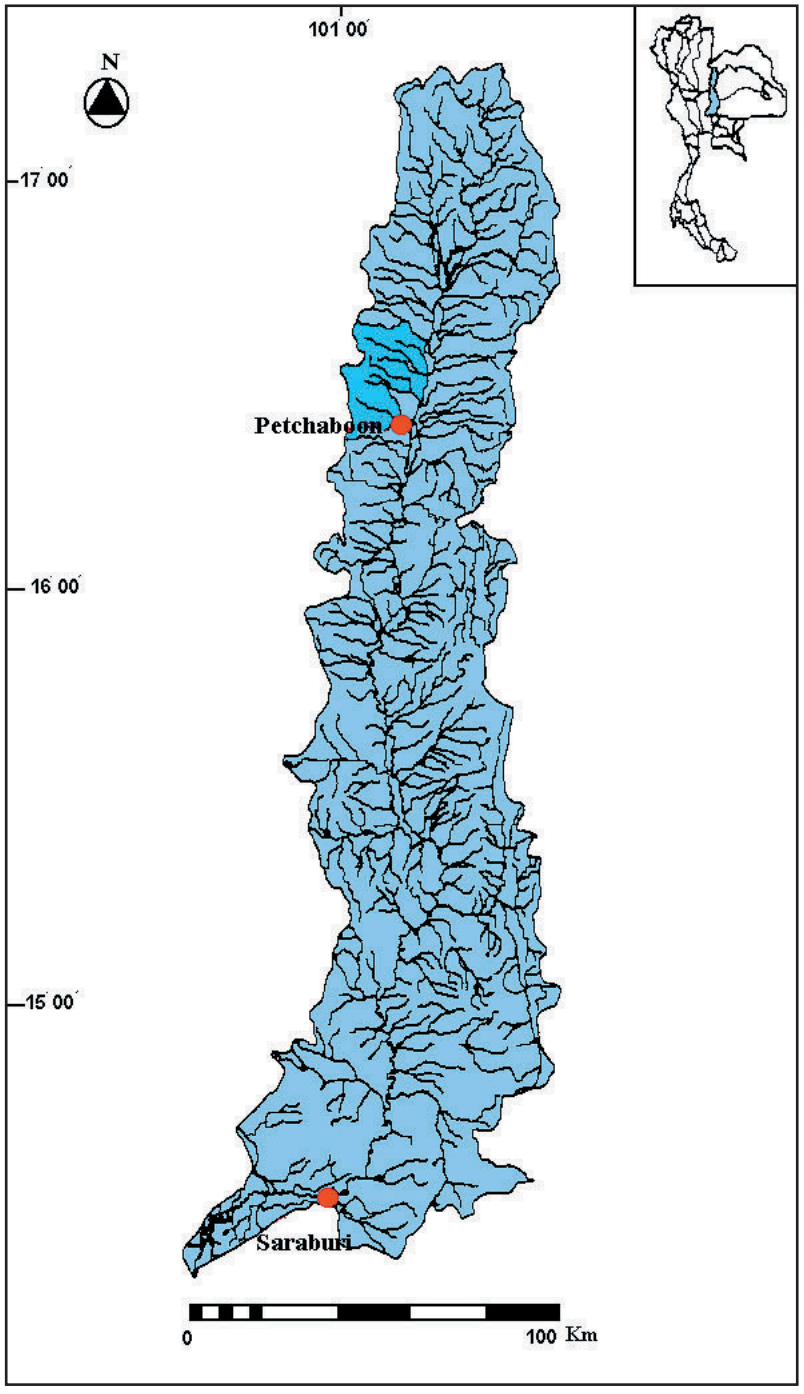


Table of Basic Data

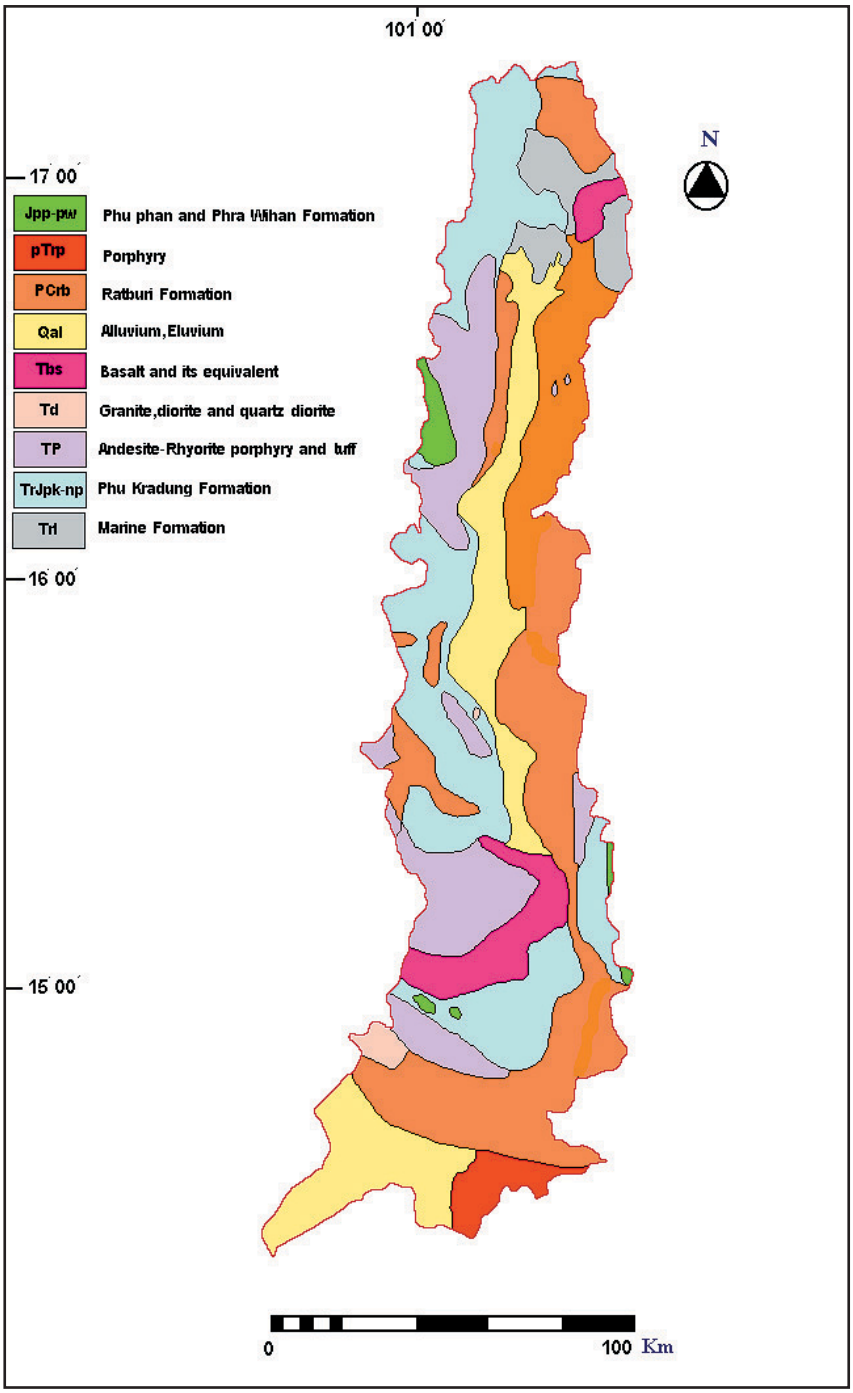
Name: Pasak river		**Serial No. :** Thailand-12
Location: Central part of Thailand	N 14° 21' 44" ~ 17° 06' 02"	E 100° 34' 40" ~ 101° 32' 56"
Area: 15,779 km^2	**Length of main stream:** 1,039 km	
Origin: Phetchaboon range	**Highest point:** 1,746 m (Dan Sai District, Loei Province)	
Outlet: Cha Phraya river	**Lowest point:** 3 m (Uthai District, Ayutthaya Province)	
Main geological features: Phu Kradung, Phu Phan and Phra Wihan Formation, Ratburi Formation, Alluvium, Eluvium, Marine Formation, Andesite-Rhyorite, Porphyry and Tuff, Basalt and its equivalents, Granite, diorite and quartz diorite		
Main Tributaries: Upper Pasak (1,465 km^2), Huai Nam Pung (655 km^2), Second part of Pasak (2,205 km^2), Third part of Pasak (4,717 km^2), Huai Kao Kaew (520 km^2), Lam Sonthi (1,410 km^2), Lower Pasak (4,152 km^2), Huai Muak legk (655 km^2),		
Main Lake: None		
Main Reservoir: Pa Sak Cholasist Dam (764 million m^3, 1999)		
Mean annual Precipitation: 1,207.6 mm. (1973-2001) At station 03120505 Wichienburi District, Phetchaboon Province		
Mean Annual Runoff: 76.04 m^3/s (1969-1997) at station 01120806 Kaeng Khoi District, Saraburi Province		
Population: 1,785,424 (1998)	**Main Cities:** Phetchaboon, Lopburi, Saraburi and Ayutthaya Province	
Land use: Forest 19.4 %, Agriculture & urban area 80.4 %, Water resource 0.2 %		

1. General Description

The origin of the Pasak River is in the highlands of Phetchaboon Province and flows through hundreds of kilometers of the central plain of Lopburi, Saraburi and joins the Chao Phraya River at Ayutthaya Province. This river flows from the mountainous north to the south. There are short tributaries from the east and the west joining the river as it flows to Chao Phraya River.

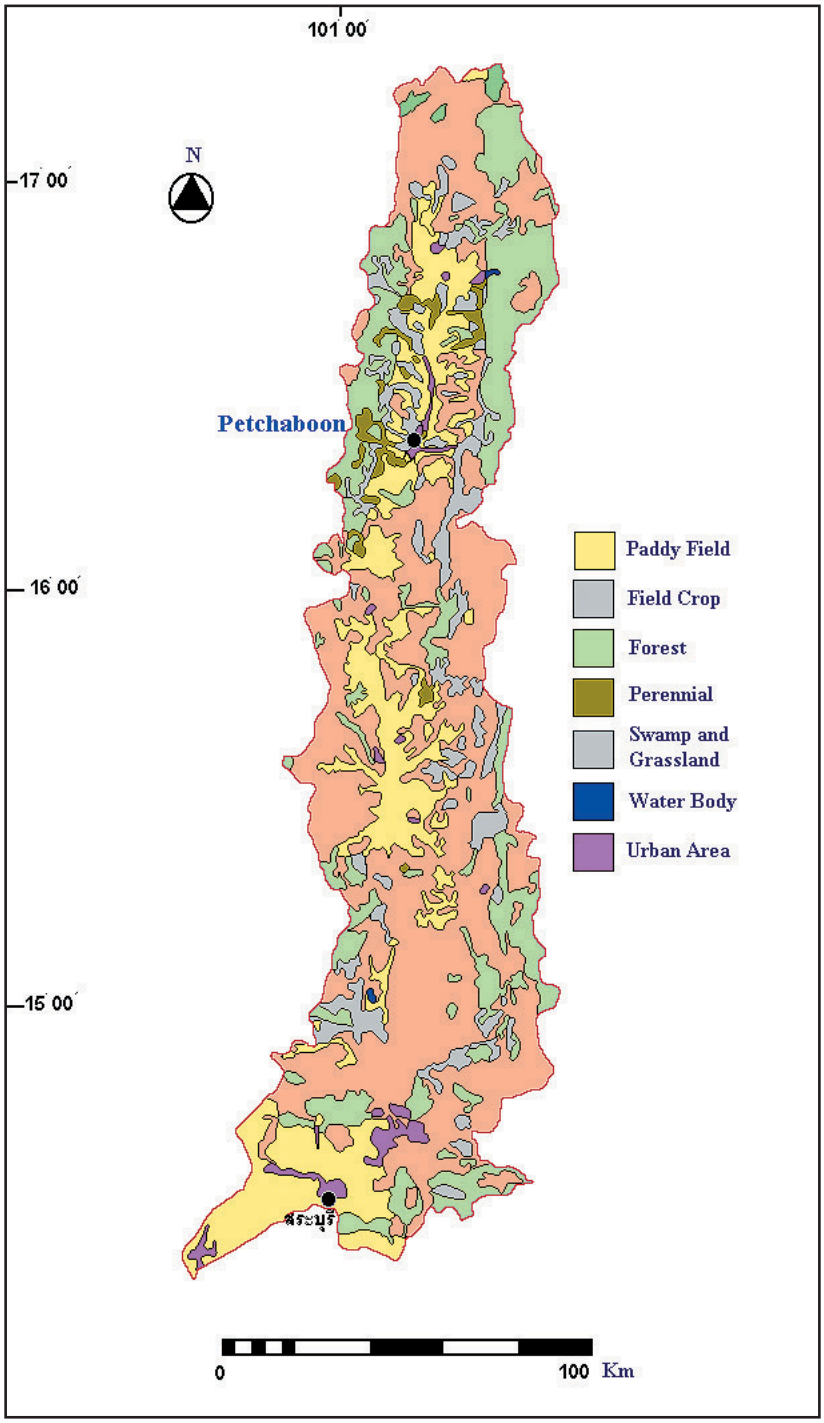
2. Geographical Map

2.1 Geological Map



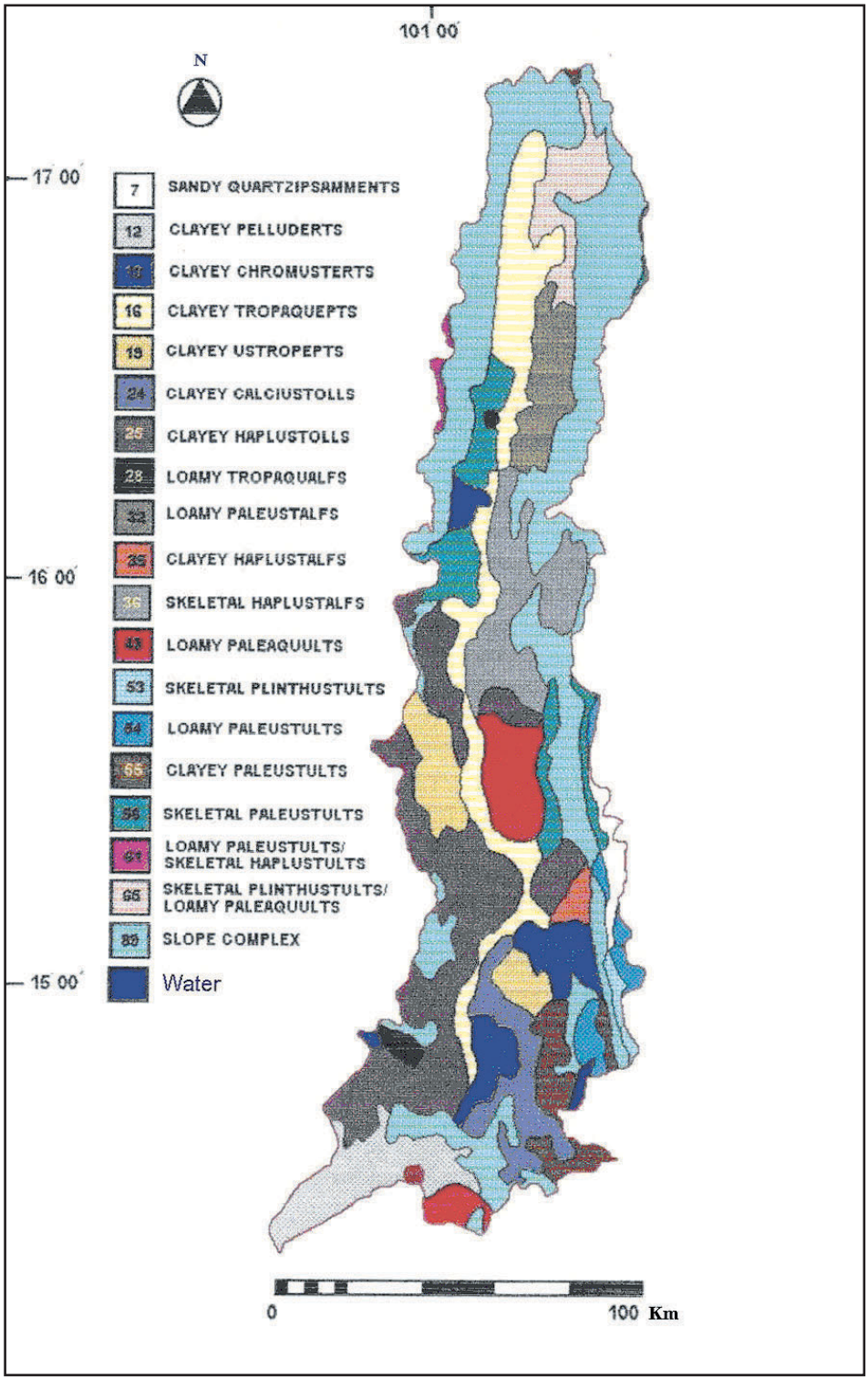
Source: Geological Map of Thailand
: Jumchet C. and Javanaphet, 1969, Department of Mineral Resources.

2.2 Land-use Map



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

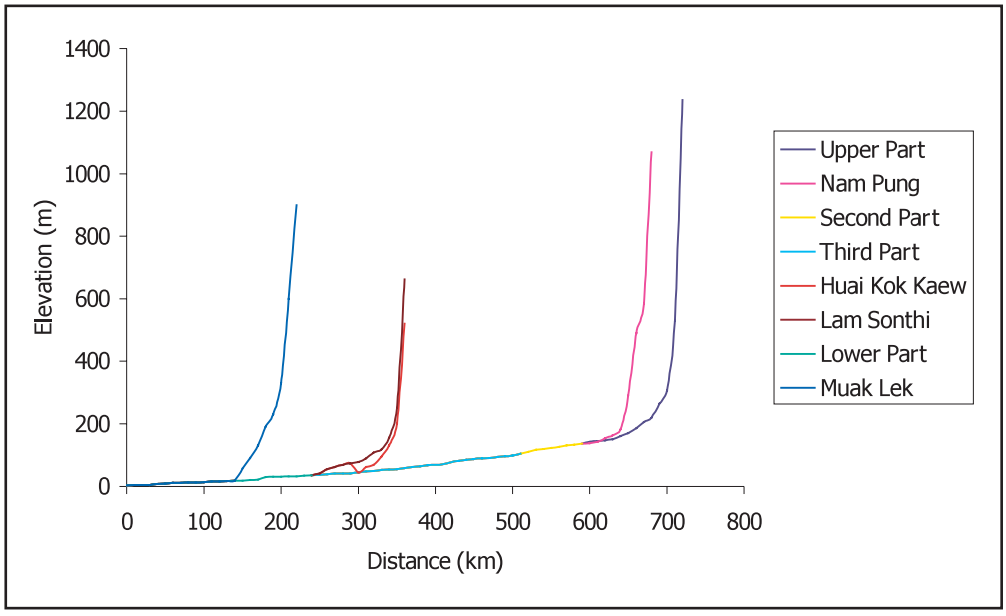
2.3 Soil Map


101 00´
N
17 00´
16 00´
15 00´
7 SANDY QUARTZIPSAMMENTS
12 CLAYEY PELLUDERTS
13 CLAYEY CHROMUSTERTS
16 CLAYEY TROPAQUEPTS
19 CLAYEY USTROPEPTS
24 CLAYEY CALCIUSTOLLS
25 CLAYEY HAPLUSTOLLS
28 LOAMY TROPAQUALFS
33 LOAMY PALEUSTALFS
35 CLAYEY HAPLUSTALFS
36 SKELETAL HAPLUSTALFS
43 LOAMY PALEAQUULTS
53 SKELETAL PLINTHUSTULTS
54 LOAMY PALEUSTULTS
55 CLAYEY PALEUSTULTS
56 SKELETAL PALEUSTULTS
61 LOAMY PALEUSTULTS/ SKELETAL HAPLUSTULTS
66 SKELETAL PLINTHUSTULTS/ LOAMY PALEAQUULTS
89 SLOPE COMPLEX
Water
0
100 Km

2.4 Characteristic of River and Main Tributaries

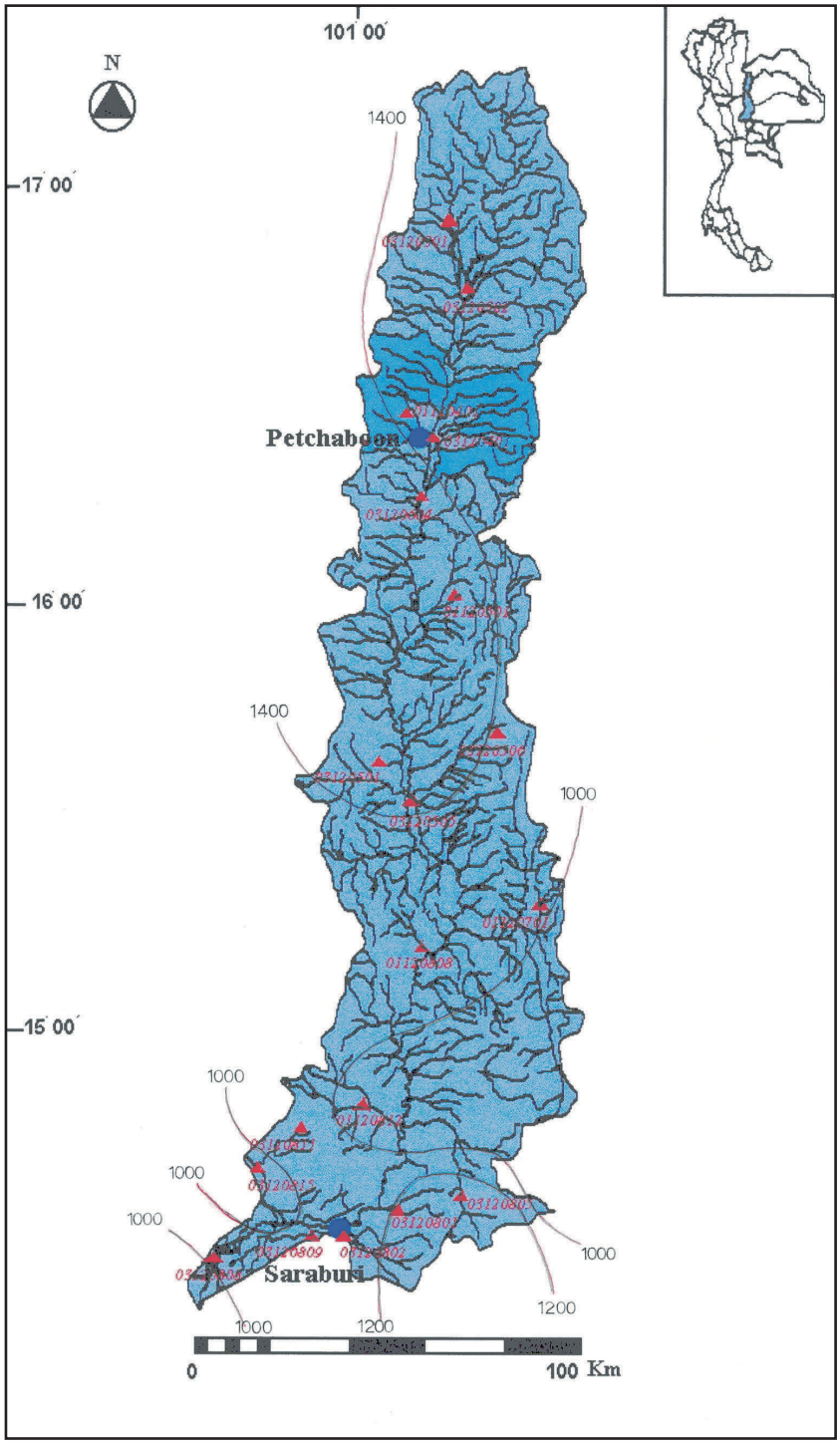
No.	Name of River	Length (km) Catchment area (km^2)	Highest Peak (m)	Cities Population (1998)	Land-Use [%] (1994)
1	**Pasak** (main river)	718 15,779	1,746 m	Phetchaboon, Lopburi, Saraburi and Ayuthaya Province	Forest (19.4%), Agriculture & Urban Area 80.4 (%), Water Resource 0.2(%)
2	**Upper Pasak**	125 1,465	1,235 m	Lom Sak, Lom Kao, Nam Nord District, Phetchaboon Province	
3	**Huai Nam Pung**	84 655	1,746 m	Lom Sak, Lom Kao District, Phetchaboon Province, Dan Sai District, Loei Province	
4	**Second part of Pasak**	85 2,205	1,279 m	Muang, Khao Ko, Lom Sak, District, Phetchaboon Province	
5	**Third part of Pasak**	268 4,717	677 m	Srithep, Wichienburi, Nong Phai, Muang, Bungsamphan District, Phetchaboon Province	
6	**Huai Kao Kaew**	55 520	600 m	Srithep District, Phetchaboon Province Chaibadan, Kokcharoen District, Lopburi Province	
7	**Lam Sonthi**	110 1,410	846 m	Lam Sonthi, Chaibadan District, Lopburi Province Muak Legk District, Saraburi Province Wichienburi District, Phetchaboon Province Si Kue, Dankhuntot District, Nakhon Ratchasima Province Thepsatit District, Chaiya Phum Province	
8	**Lower Pasak**	240 4,152	722.0	Muak Legk, Kaeng Khoi, Muang, Phraphutabath, Sao Hai, Wang Muang, Ban Mor, Nong Done District, Saraburi Province Chaibadan, Tha Luang, Pattananikhom District, Lopburi Province Nakhon Luang, Tha Rua District, Ayuthaya Province	
9	**Huai Muak legk**	72 655	1,078 m	Muak Legk, Wang Muang, District, Saraburi Province Pak Choung District, Nakhon Ratchasima Provincee	

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)]
03120301	**Lom Kaod**	N 16° 53' 02" E 101° 14' 00"	1975 - 2002	1,057.5	P (S)
03120302	**Lom Sak**	N 16° 46' 25" E 101° 14' 48"	1970 - 2002	1,047.6	P (S)
03120401	**Muang Phetchaboon**	N 16° 26' 00" E 101° 09' 00"	1975 - 2002	1,139.1	P (S)
01120401	**Khao Ko**	N 16° 13' 00" E 101° 11' 00"	1971 - 1996	1,649.2	P (S)
01120501	**Ban Wang Dee**	N 15° 59' 50" E 101° 14' 28"	1978 - 1996	1,360.0	P (S)
03120501	**Sri Thep**	N 15° 28' 15" E 101° 04' 10"	1975 - 2002	1,059.8	P (S)
03120502	**Bua Chum Chaibadan**	N 14° 15' 50" E 101° 11' 13"	1970 - 2002	1,096.2	P (S)
03120504	**Nong Phai**	N 15° 59' 13" E 101° 03' 53"	1970 - 2002	1,268.8	P (S)
03120505	**Wichiengburi**	N 15° 41' 20" E 101° 16' 40"	1970 - 2002	1,207.6	P (S)
01120701	**Ban Tha Yium Chaibadan**	N 15° 20' 21" E 101° 22' 30"	1978 - 1996	1,138.8	P (S)
03120801	**Kaeng Hkoi**	N 14° 36' 54" E 101° 03' 56"	1964 - 1996	1,417.6	P (S)
03120802	**Muang Saraburi**	N 14° 31' 32" E 100° 54' 50"	1952 - 1996	1,344.2	P (S)
03120803	**Sao Hai**	N 14° 32' 56" E 100° 50' 48"	1952 - 1996	1,300.1	P (S)
03120808	**Chaibadan**	N 15° 12' 17" E 101° 08' 06"	1952 - 1996	1,216.9	P (S)
03120809	**Pu Kae**	N 14° 40' 05" E 100° 53' 15"	1975 - 2002	1,617.0	P (S)
03120811	**Phutabaht**	N 14° 44' 44" E 100° 47' 56"	1960 - 1996	1,183.8	P (S)
03120812	**Pattananikhom**	N 14° 51' 16" E 100° 59' 32"	1968 - 2002	977.5	P (S)
03120815	**Nong Done**	N 14° 38' 00" E 100° 43' 00"	1986 - 2002	1,027.1	P (S)
03120905	**Muak Legk**	N 14° 39' 20" E 101° 12' 07"	1977 - 2002	1,201.9	P (S)

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

3.3 Monthly Climatic Data

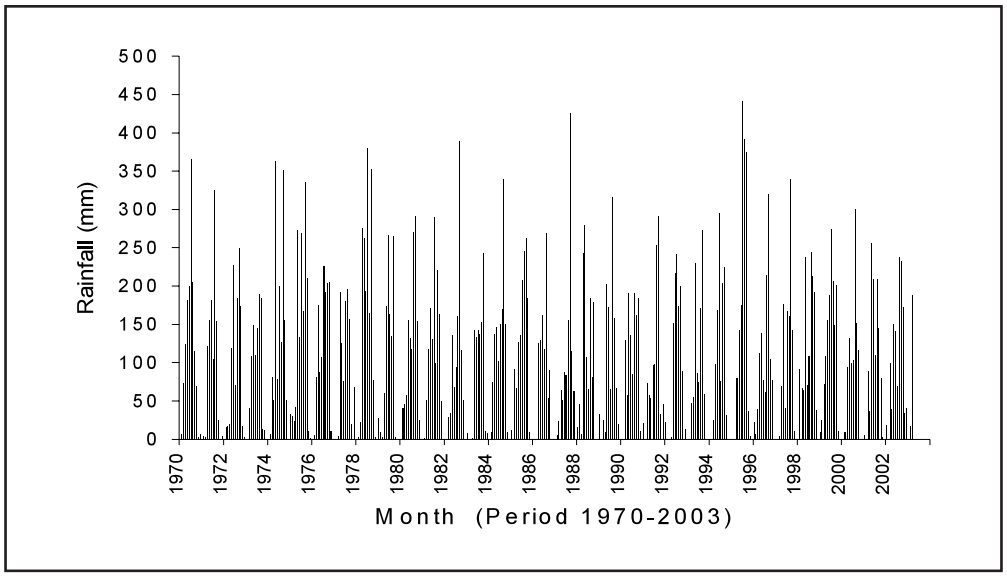
Station: 03120606 Wichien Buri District, Phetchaboon Province

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Av. monthly	Av. annual	Period
1	24.5	25.7	29.7	29.6	28.7	28.8	28.6	27.9	27.6	27.8	26.5	23.9	27.4	-	1951 - 1995
2	6.8	13.0	47.0	86.2	169.6	141.5	161.3	206.0	237.1	117.0	16.3	5.8	100.6	1,207.6	1970 - 2002
3	120.3	130.3	170.0	167.5	165.0	130.4	132.2	130.4	115.9	126.3	126.1	129.1	136.9	1,643.3	1970 - 2002

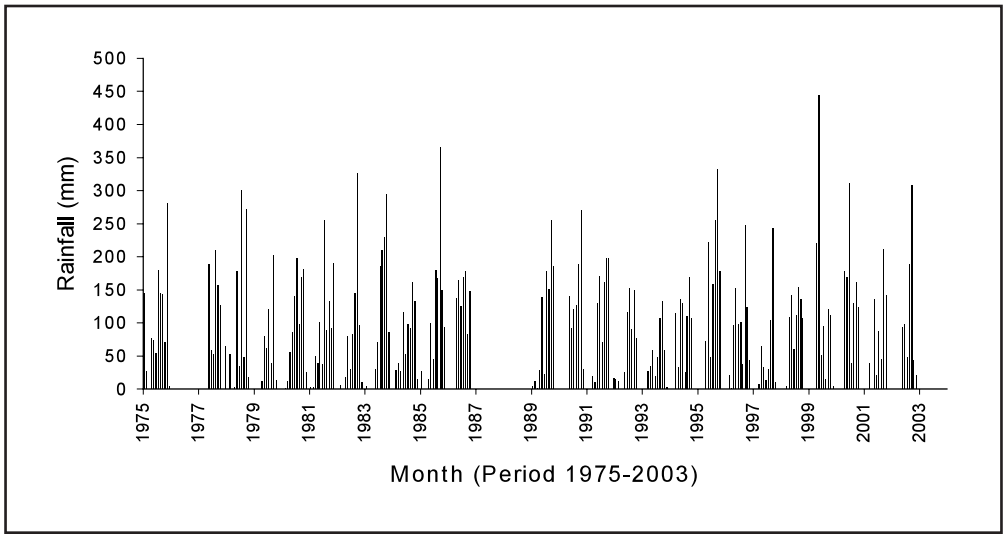
1: Temperature [°C]
2: Precipitation [mm]
3: Evaporation [mm]

3.4 Long-term Variation of Monthly Precipitation Series

Station: 03120606 Wichien Buri District, Phetchaboon Province

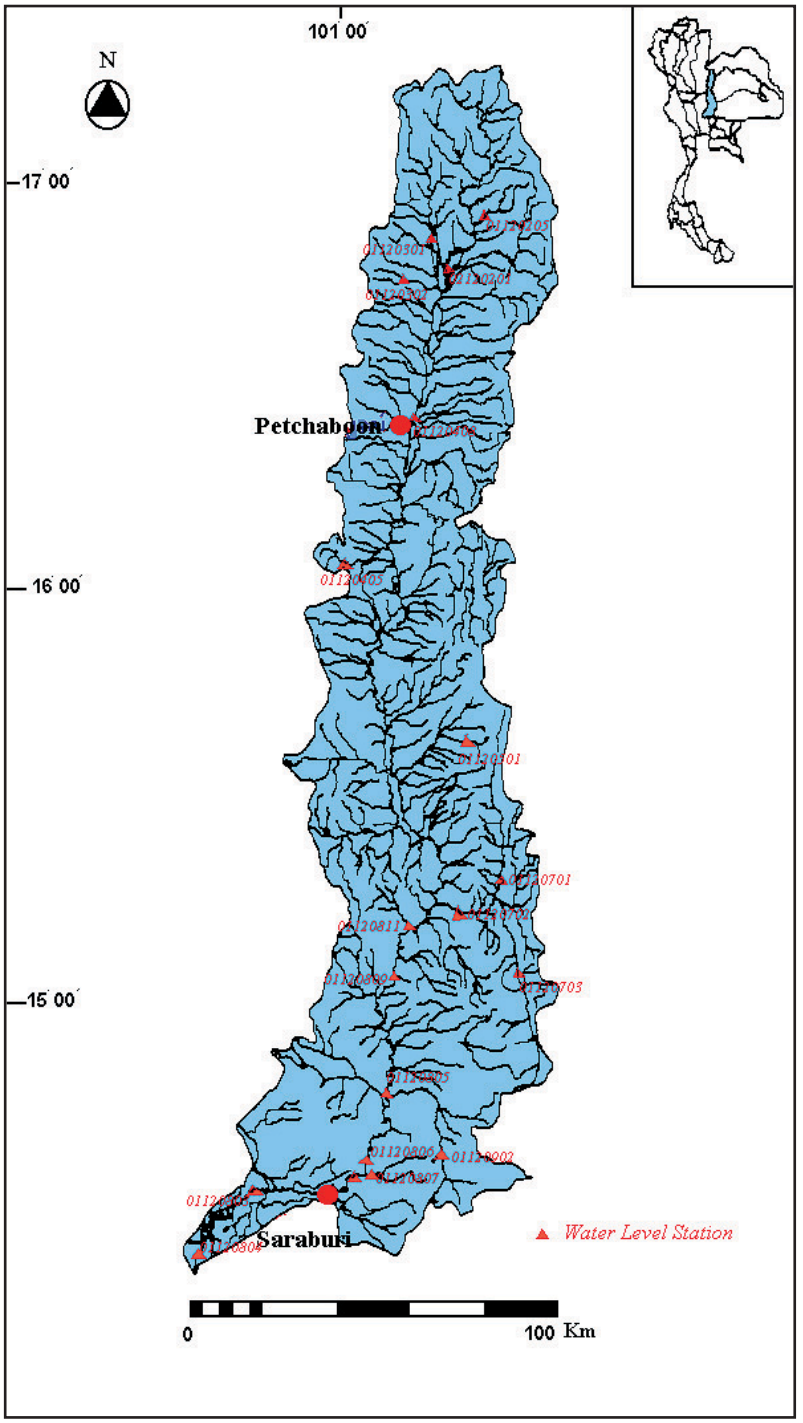


Station: 03100348 Ban Mee District, Lopburi Province



4. Hydrological Information

4.1 Map of Streamflow Observation Stations



4.2 List of Hydrological Observation Stations

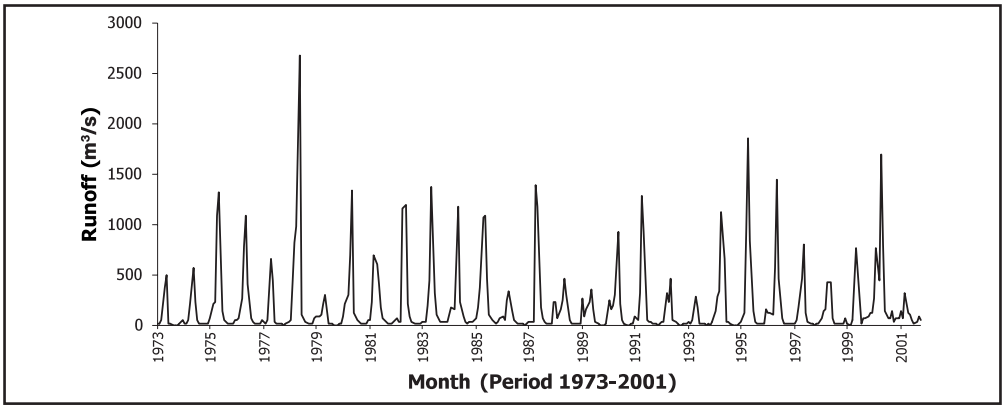
No.	Station	Location	Catchment area (A) [km^2]	Observation period	Observation items[1] (frequency)
01120501	**Nong Phai**	N 15° 59' 50" E 101° 14' 28"	471	1978 - present	Q (H1)
01120701	**Ban Tha Yium**	N 15° 20' 21" E 101° 22' 30"	359	1978 - present	Q (H1) WQ
01120702	**Ban Na Som Chaibadan**	N 15° 13' 24" E 101° 16' 51"	1,247	1980 - present	Q (H1) WQ
01120703	**Ban Pang Sua Hue Chaibadan**	N 15° 06' 05" E 101° 24' 11"	381	1987 - 2000	Q (H1) WQ
01120806	**Keang Khoi**	N 14° 37' 33" E 101° 01' 00"	14,374	1973 - present	Q (H1) WQ
01120902	**Muak Legk**	N 14° 38' 04" E 101° 12' 37"	177	1967 - 1998	Q (H1)

No.	$\overline{Q}$[2] [m^3/s]	Qmax[3] [m^3/s]	$\overline{Q}$max[4] [m^3/s]	$\overline{Q}$min[5] [m^3/s]	$\overline{Q}$/A [m^3/s/100km^2]	Qmax/A [m^3/s/100km^2]	Period
01120501	3.91	485	148	0.25	0.83	102.97	1978 ~ 2001
01120701	2.58	300	114	0.05	0.72	83.56	1778 ~ 2001
01120702	5.34	242	120	0.18	0.43	19.41	1980 ~ 2001
01120703	1.40	166	83	0.25	0.37	43.57	1987 ~ 2000
01120806	76.04	3,254	647	2.93	0.52	22.64	1773 ~ 2001
01120902	1.68	370	74.7	0.29	0.95	94.35	1967 ~ 1997

1) H1 : Water level at recording chart
2) $\overline{Q}$: Mean annual discharge
3) Qmax : Maximum discharge
4) $\overline{Q}$max : Mean annual maximum discharge
5) $\overline{Q}$min : Mean annual minimum discharge

4.3 Long-term Variation of Monthly Discharge Series

Station: 01120806 at Ban Muang Nua,Keang Khoi District, Saraburi Province

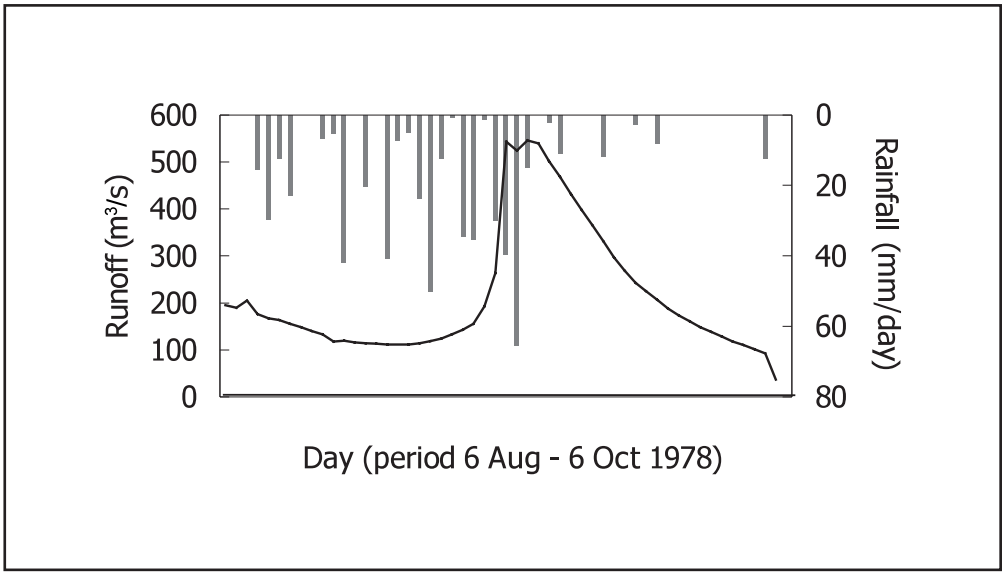


4.4 Annual Maximum and Minimum Discharge

Station: 01120806 Ban Muang Nua, Kaeng Khoi District, Saraburi Province (14,374 km^2)

Year	Maximum		Minimum		Year	Maximum		Minimum	
	Date	m^3/s	Date	m^3/s		Date	m^3/s	Date	m^3/s
1973	10.05	293	3.03	1.30	**1985**	9.25	794	3.26	8.10
1974	10.13	376	4.09	2.10	**1986**	8.15	178	3.23	5.60
1975	10.04	670	4.30	3.00	**1987**	9.26	1,000	4.16	2.20
1976	10.12	541	4.20	4.00	**1988**	10.28	432	4.09	2.00
1977	9.30	593	3.26	2.40	**1989**	6.16	181	2.27	1.40
1978	10.03	3,254	4.06	2.20	**1990**	10.06	757	4.13	0.80
1979	9.30	292	3.14	1.90	**1991**	9.03	658	5.10	3.20
1980	10.05	890	4.27	2.70	**1992**	10.17	295	3.31	2.20
1981	8.09	335	4.10	1.50	**1993**	9.10	278	5.08	1.50
1982	9.19	797	3.30	5.70	**1994**	10.03	585	4.13	1.70
1983	10.14	857	4.30	5.00	**1995**	9.23	1,429	4.26	2.10
1984	10.20	579	3.04	8.90	**1996**	10.11	828	3.24	2.40
					1997	10.18	411	3.18	1.50

4.5 Hyetoghraphs and Hydrographs of Major Floods



4.6 Major Peak Discharge Experiences

No.	Drainage Area (km^2)	Discharge		Date	Period
		m^3/s	$m^3/s/km^2$		
01120501	471	485	1.030	19/8/91	1978 - 1997
01120701	359	287	0.799	30/9/78	1978 - 1997
01120702	1,247	233	0.187	17/9/85	1980 - 1996
01120703	381	166	0.436	18/9/87	1987 - 1997
01120806	14,374	3,254	0.226	3/10/78	1973 - 1997
01120902	177	167	0.944	18/9/72	1967 - 1997

4.7 Water Quality

Point	Year	PH	DO (mg/l)	BOD (mg/l)	Coliform (MPN/100 ml)
1) Pasak River	1989	7.3 - 7.7	4.5 - 6.8	0.9 - 2.7	3,300 - 500,000
2) Pasak River	1997	-	6.2	1.6	5,500
3) Pasak River Lom Sak Muang Phetchaboon	1999	7.0 - 7.3 7.2	6.1 - 9.0 8.2	- -	- -

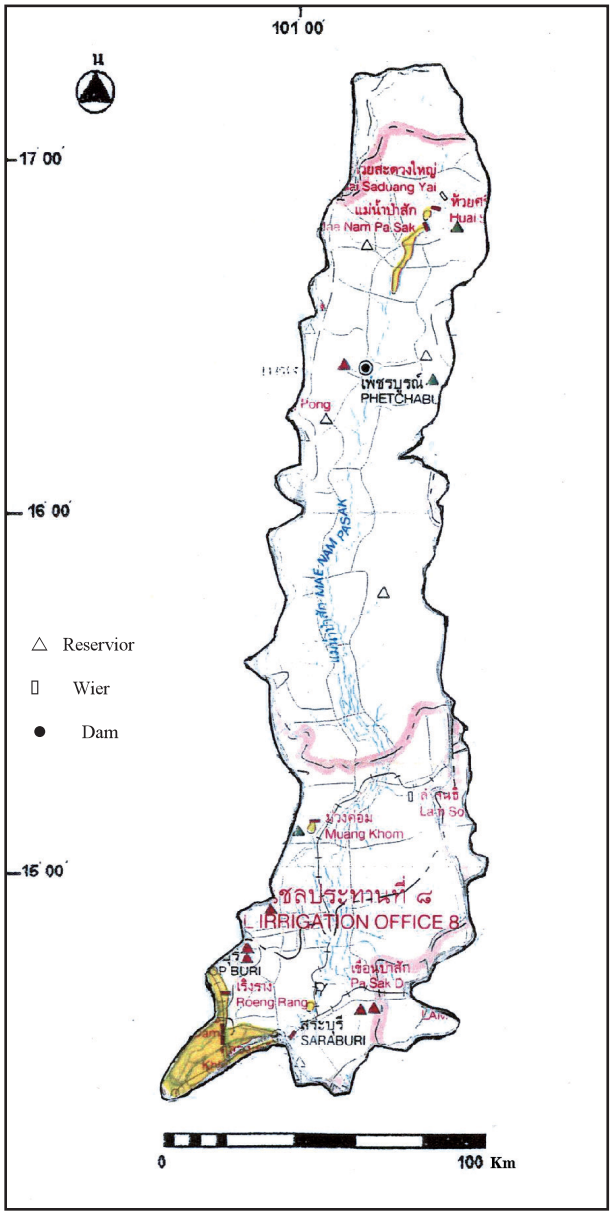
5. Water Resources

5.1 General Description

The Pasak River includes both the central alluvial plain and North-east plateau. It is divided into 9 sub-basins. The river basin contains both urban and agricultural areas with the water resource being utilized mainly for paddy irrigation.

Pasak Cholrasist Dam is the only existing impounding reservoir in the basin which has gross and effective capacities of 780 x 10^6 m^3 and 764 x 10^6 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
Pasak	**Pasak Chonrasist**	14,520	780	764	A, F, I, W	1999

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

6. Socio-cultural Characteristics

The population of northern culture are found in the upstream while central culture are found in the downstream part of the river basin. Water related cultures are the Songkran festival, flower float or Loy Kratong festival and long rowing boat racing while the non water related cultures are rice harvest , general merit giving and flower offering to monks festivals. Phetchaboon Province is the main tourist attraction of this river basin because of its mountains and highlands thus providing it an economic advantage.

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 Hydrology Division.