

Nam Ngiep

Map of River

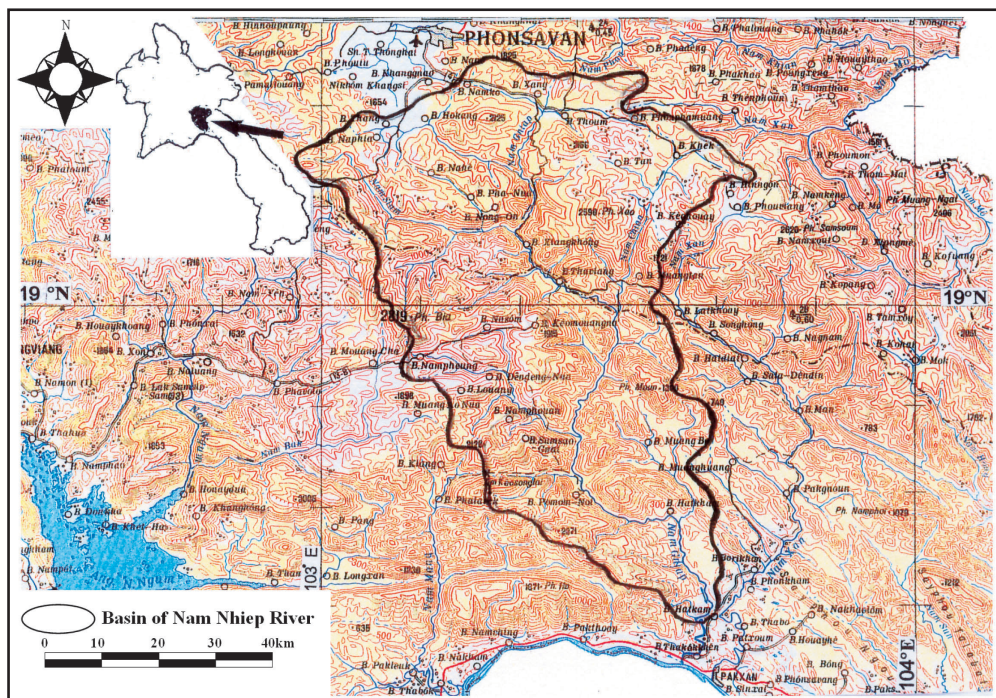


Table of Basic Data

Name: Nam Ngiep		Serial No. : Lao-10
Location: Phongsavan, Xiengkhuang	N 18° 28' - 19° 25'	E 102° 55' - 103° 43'
Area: 4,270 km ²	Length of the main stream: 156 km	
Origin: Xiengkhuang plateau	Highest Pt: Phoufia, 2,819 m	
Outlet: Mekong River (Paksane)	Lowest Pt: 161 m (Muang Mai)	
Main base rocks: upper basin: triassic-permian; lower: cretaceous and carboniferous		
Main tributaries: Nam Siam (120 km ²), Nam Chian (124 km ²)		
Main lakes: None		
Main reservoirs: None		
Mean annual precipitation: 2,736.0 mm (basin average rainfall)		
Mean annual runoff: 186.62 m ³ /s		
Population: 58,279 (2002)	Main cities: Muang Mai, Thavieng, Phongsavan	
Land use: Forest (51.0), Paddy (23.0), Urban (5.0), Agriculture (15.0), Lake, river, marsh (1.5), Other (4.5)		

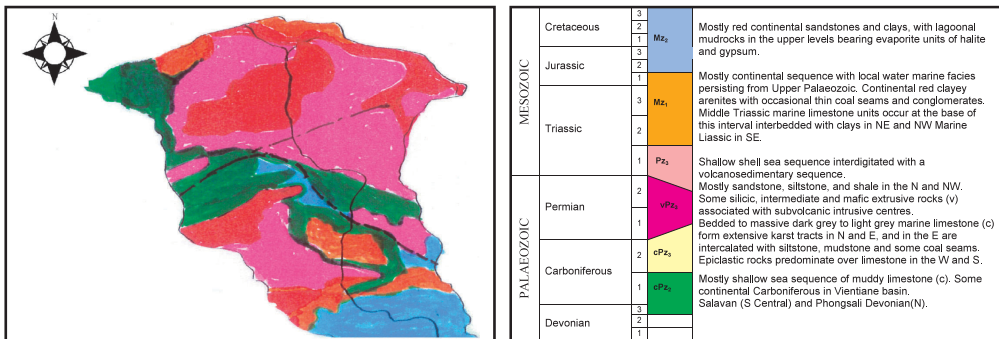
1. General Description

Nam Ngiep is a local name meaning quiet river. It originates from Phonesavan in Xiengkhuang plateau with an altitude of 1,050 m above mean sea level, flows in a southerly direction to meet an important tributary called Nam Siam near Ban XiangKhong and changes to the southeast direction to meet another tributary, Nam Chian. From this point to the outlet near Paksan, the river flows southerly for a distance of about 95 km. The length of Nam Ngiep is 156 km and the catchment area at Muang Mai gauging station is 4,270 km². It is located within 18°28' to 19°25' N and 102°55' to 103°43' E. The annual average basin rainfall is 2,736 mm with nearly 90% occurring in the rainy season from May-September.

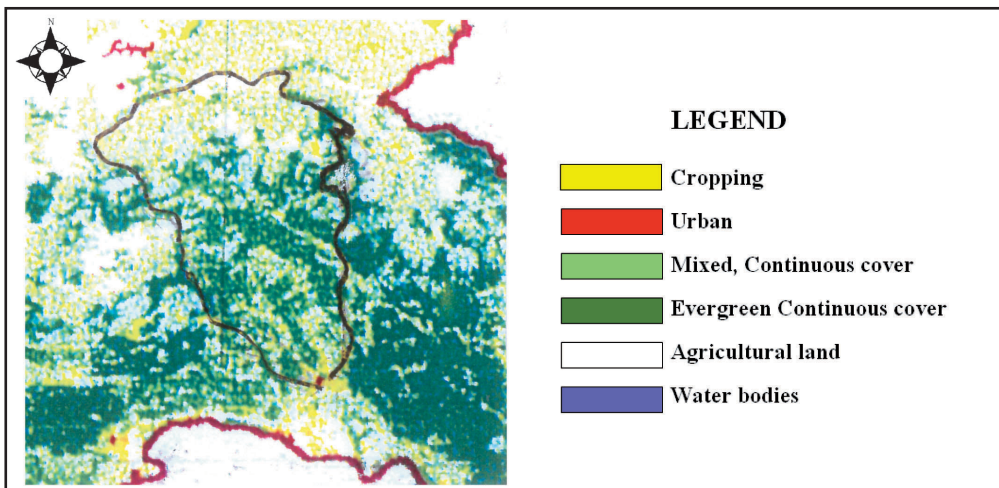
The source of the Nam Ngiep is the most densely populated areas, severely deforested, with important agricultural developments on gentle slopes and with an important extension of the communication system. As a result, most of the small tributaries in the upper watershed cannot contribute an important grown water discharge of the perennial flow in dry season.

2. Geographical Information

2.1 Geological Map



2.2 Land Use Map

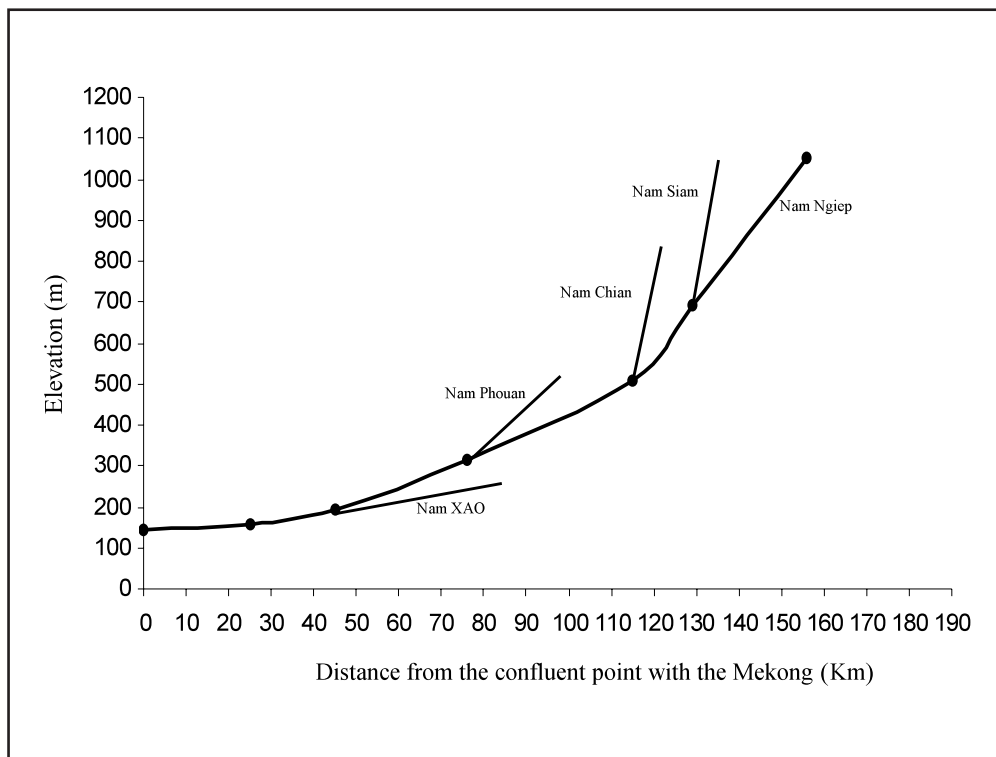


2.3 Characteristics of the River and Main Tributaries

No	Name of River	Length [km] Catchment area [km ²]	Highest peak [m] Lowest point [m]	Cities Population (year)	Land use [%]
1	Nam Ngiep (Main river)	156 4,270	Phoubia 2,819 Paksane 157	15,000	F (51.0)
2	Nam Siam (Tributary)	25 120	Phouphaxai 2,100 600	Muang Phaxai 4,000	P (23.0)
3	Nam Chian (Tributary)	36 124	Phouxao 2,590 500	Ban Nongguak 1,500	U (5.0) A (15.0)
4	Paksane (Lower branch)	23 276	163 157	Paksane	L (1.5) O (4.5)

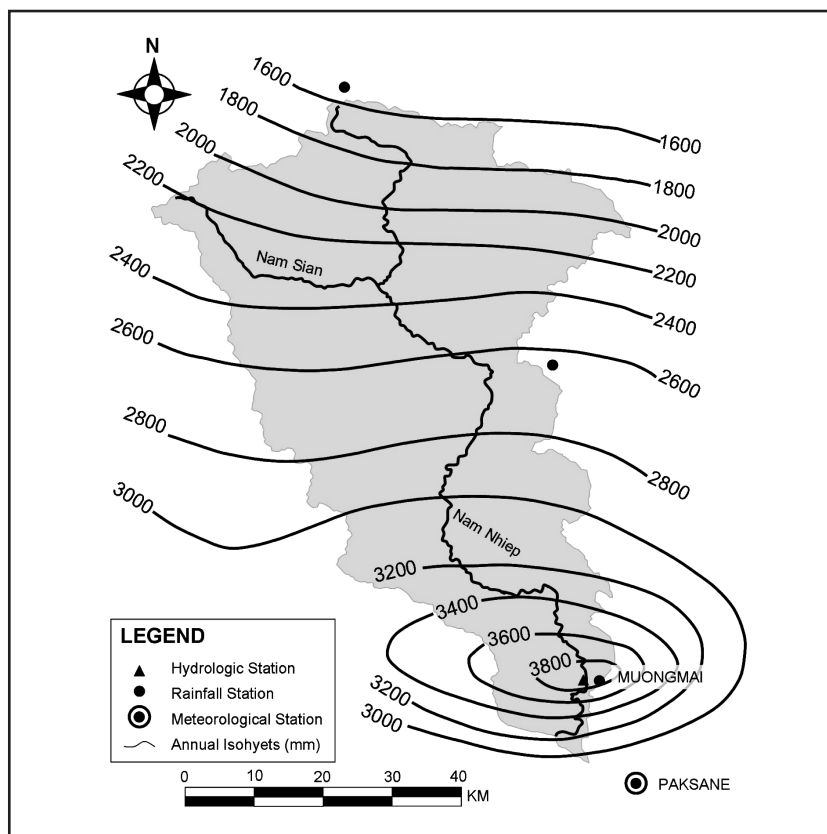
F: Forest; L: Lake, river, marsh; P: Paddy field; U: Urban; O: Orchard; A: Agricultural field (vegetable field, grass field)

2.4 Longitudinal Profiles



3. Climatological Information

3.1 Annual Isohyetal Map and Observation Stations



3.2 List of Meteorological Observation Stations

No.	Station	Elevation [m]	Location	Observation period	Mean annual precipitation [mm]	Mean annual evaporation [mm]	Observation items ¹⁾
1	Xiengkhuang (Phonesavan)	1,050	N 19° 28' E 103° 08'	1982 - 2000	1,433.4	1,240.4 (pich)	P, T, E, S, Wind
2	Thathom	600	N 19° 00' E 103° 37'	1929 - 1941	2,720.2	-	P
3	Muang Mai	161	N 18° 30' E 103° 39'	1988 - 2000	3,852.5	-	P
4	Paksane	157	N 18° 24' E 103° 40'	1965 - 2000	2,939.6	1,759.7 (PAN)	P, T, E, S, Wind

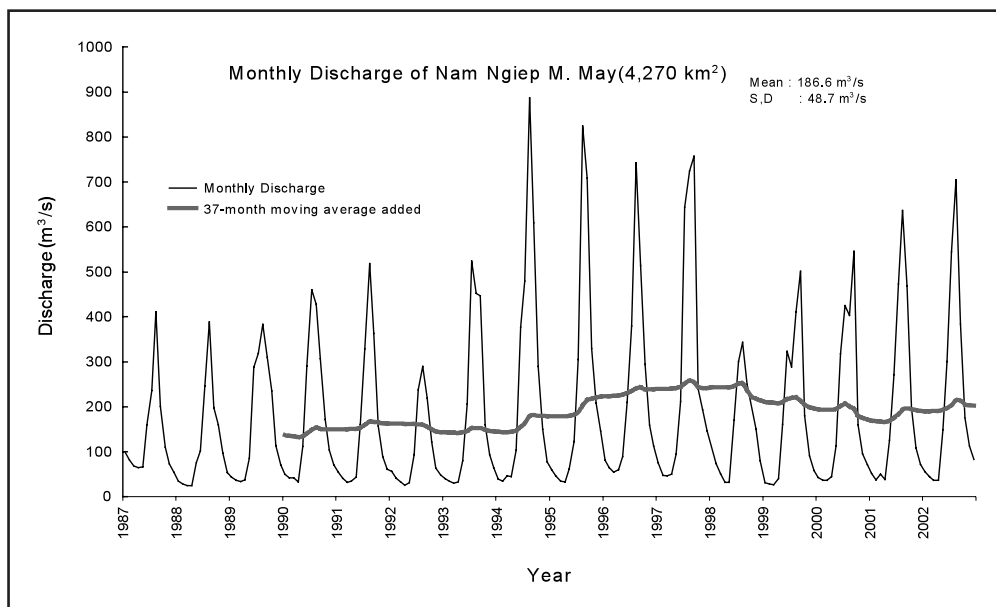
1) P: Precipitation T: Temperature E: Evaporation S: Solar radiation W: Wind

3.3 Monthly Climate Data

Observation station: Paksan

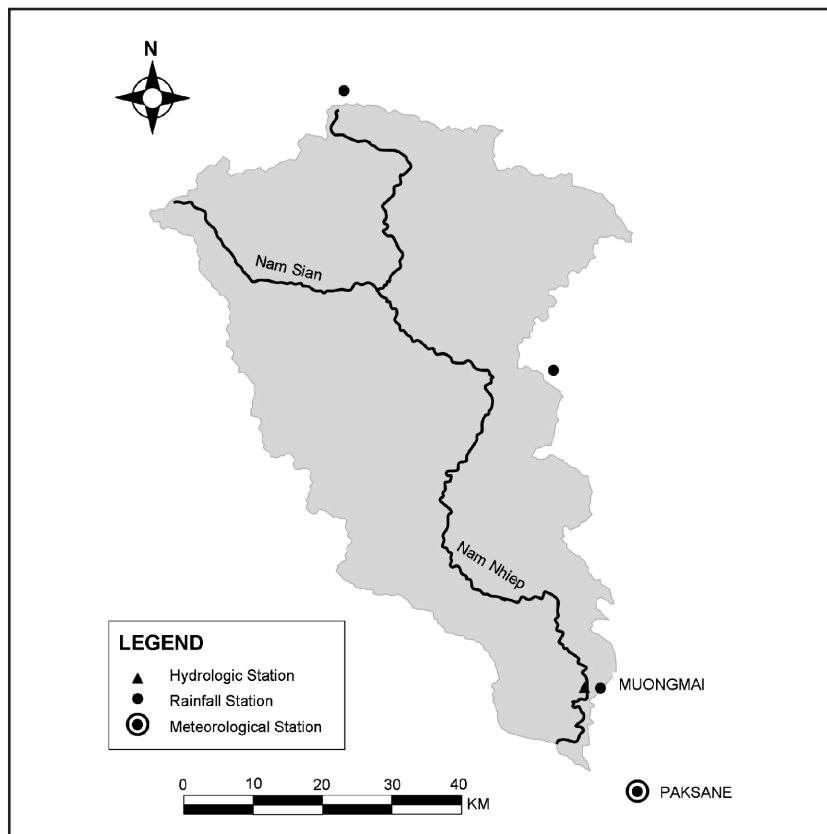
Observation item	Observation station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Period for the mean
Temperature [°C]	Paksan	21.9	24.3	27.4	28.7	28.2	27.8	28.0	27.6	27.4	25.9	24.5	22.6	26.2	1990 - 99
Precipitation [mm]	Paksan	4.8	26.0	43.3	116.2	374.8	679.1	633.9	636.1	332.2	79.7	11.8	1.7	2,940.0	1965 - 00
Evaporation [mm]	Paksan	193.6	111.8	191.5	160.1	125.3	98.5	112.2	123.4	138.1	156.8	133.2	215.2	1,759.7	1996 - 00
Solar radiation [MJ/m ² /d]	Paksan	16.08	17.12	18.09	19.59	18.04	15.49	14.61	13.65	15.95	16.66	16.45	15.32	16.42	1990 - 99
Duration of sunshine [hr]	Paksan	234.7	189.3	197.5	195.9	155.0	101.1	81.5	66.3	135.0	201.5	228.0	230.3	2,016.1	1990 - 99

3.4 Long-term Variation of Monthly Precipitation



4. Hydrological Information

4.1 Map of Stream flow Observation Stations



4.2 List of Hydrological Observation Stations

No. *	Station	Location	Catchment area (A) [km ²]	Observation period	Observation items (frequency)
1	Muang Mai	N 18° 30' 03" E 103° 39' 07"	4,270	1987 - 2002	H, Q = f (H)

No. *	\bar{Q} ²⁾ [m ³ /s]	Q_{max} ³⁾ [m ³ /s]	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
1	186.62	1,640.0	1,046.76	29.72	4.37	38.41	1987 - 2002

1) Q: Discharge and water level (daily)

2) Mean annual discharge

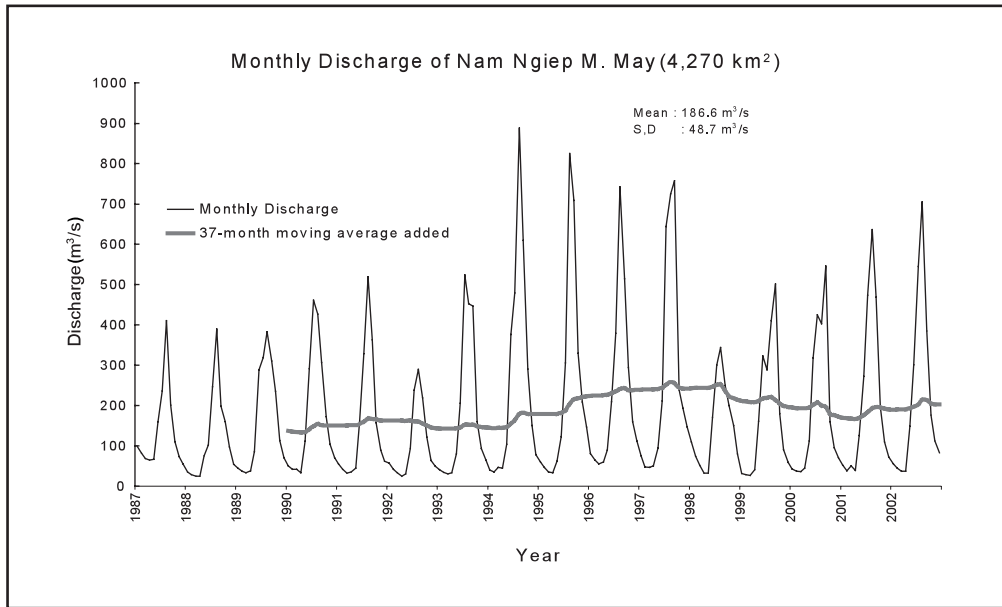
3) Maximum discharge

4) Mean maximum discharge

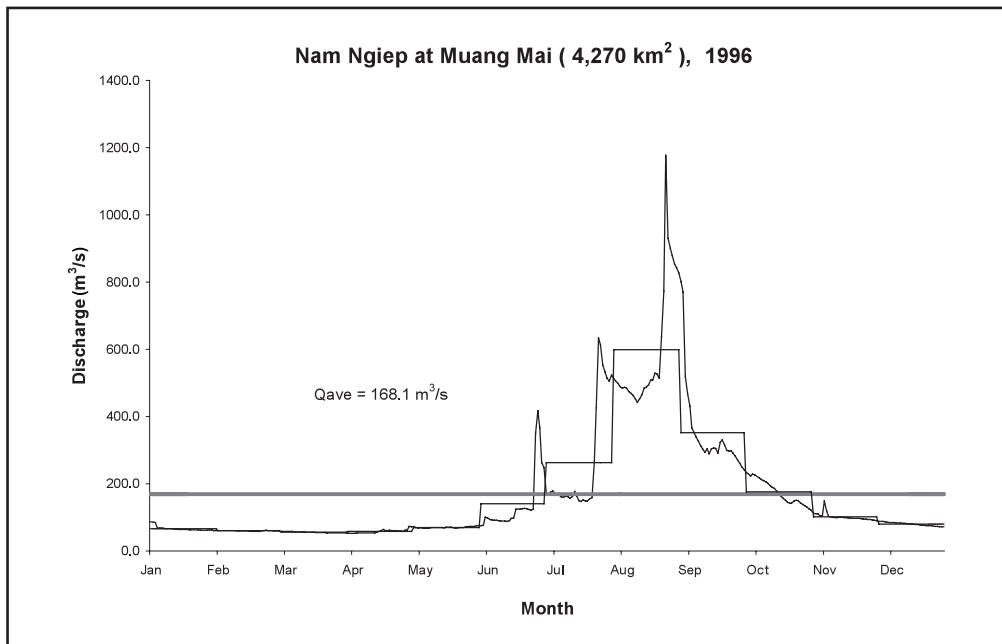
5) Mean minimum discharge

* Muang Mai, serial number used by MRC is 250101

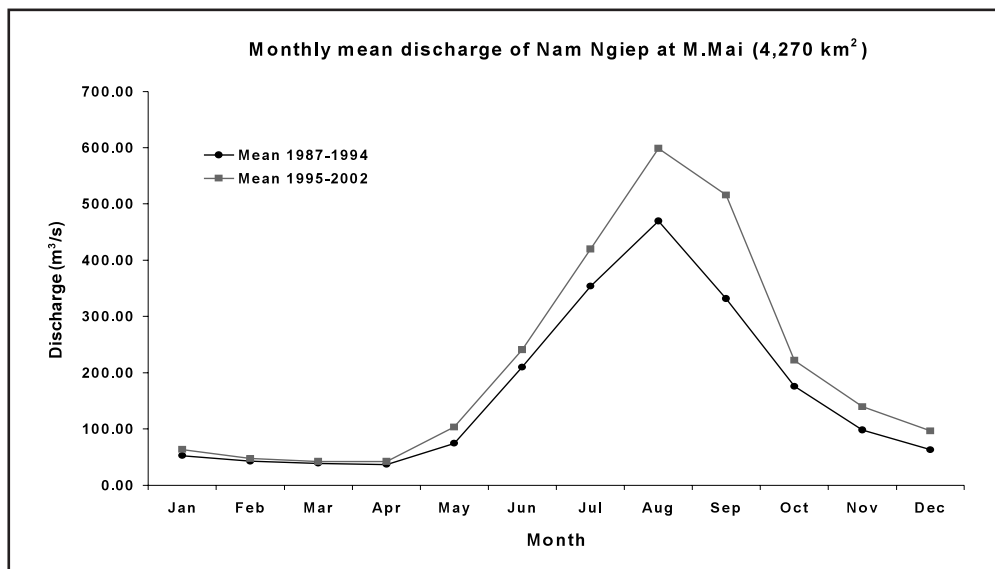
4.3 Long-term Variation of Monthly Discharge



4.4 Annual Pattern of Discharge



4.5 Unique Hydrological Features

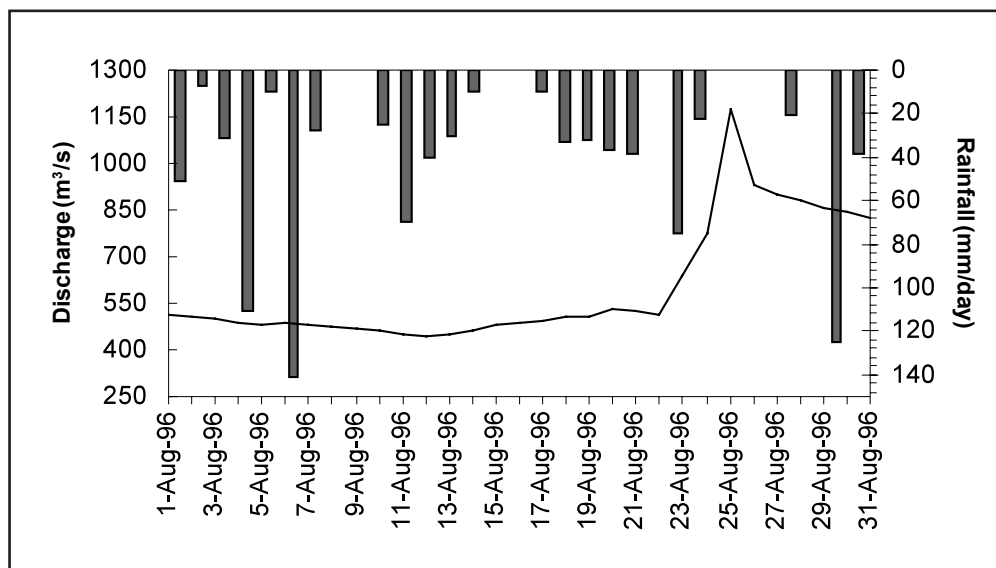


4.6 Annual Maximum and Minimum Discharges

Station: Muang Mai [4,270km²]

Year	Maximum		Minimum		Year	Maximum		Minimum	
	Date	Discharge [m ³ /s]	Month	Discharge [m ³ /s]		Date	Discharge [m ³ /s]	Month	Discharge [m ³ /s]
1987	24-Aug	788.00	Dec	46.60	1997	23-Jul	1,104.00	Feb	32.90
1988	21-Jul	1,020.00	April	15.40	1998	5-Jul	682.00	April	18.70
1989	20-Jul	1,080.00	April	24.80	1999	16-Sep	729.5	March	11.29
1990	31-Jul	1,190.00	April	23.50	2000	13-Sep	1,106.05	March	89.45
1991	25-Aug	956.00	May	23.80	2001	14-Aug	1,117.02	April	25.73
1992	25-Jul	674.00	May	20.00	2002	7-Aug	1,046.54	April	28.44
1993	15-Jul	1,640.00	April	24.40	Sum =		16,748.11		475.51
1994	31-Aug	1,224.00	March	15.90	Mean =		1,046.76		29.72
1995	7-Aug	1,266.00	April	28.30					
1996	25-Aug	1,125.00	April	46.30					

4.7 Hyetographs and Hydrographs of Major Floods



5. Water Resources

5.1 General Description

People living in the lower reaches of Nam Ngiep are waiting for dam construction in the Nam Ngiep River basin to provide hydropower. However, the problem is not crucial because actually most of the people can use electricity from the Nam Ngum and Nam Leuk projects. There are many pumping stations for irrigation. The main water resources for most families is the exploitation of aquatic animals from a permanent wetland, small size but the lake never dries up. Nong Nia is a wetland type as a permanent lake, marsh with floating vegetation, mats with a size of 800 m times 150 m surrounded by areas of boggy marshland. The maximum depth is about 2 m. On the northern and western sides of the lake there are forests. The northern side is a provincial protected area. The location is only 9 km northwest of Paksane. Natural products derived from the wetland such as fish, reptiles and amphibians, can provide protein sources almost every day for the people. The government has therefore proposed the wetland as a reserve.

5.2 Major Floods and Droughts

Major Floods at Muang Mai

Date	Peak Discharge [m ³ /s]	Rainfall [mm] Duration	Meteorological Cause	Dead and missing	Major damages (Districts affected)
7-Aug 95	1,266	402.9 mm (1-10 Aug)	Monsoon	-	5,300 ha (flooded area) 3,000,000 USD
1-Aug 96	1,125	656.3 mm	Monsoon	-	3,000 ha (flooded area) 2,000,000 USD

Major Droughts

Period	Affected areas	Major damages and counteractions
1998/1999	9,000 ha	Major damages are counteraction: rice culture and forest fires in dry season

5.3 Groundwater and River Quality

River Water Quality at Paksane

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
pH	7.2 (91)	7.4 (91)	7.5 (91)	7.7 (91)	7.5 (91)	7.4 (91)	6.0 (90)	6.4 (90)	5.5 (90)	5.1 (90)	6.2 (90)	5.0 (90)
COD _{Mn} [mg/l]	1.8 (91)	1.5 (91)	1.3 (91)	1.0 (91)	1.5 (91)	0.2 (90)	0.2 (90)	0.2 (90)	0.2 (90)	0.2 (90)	1.5 (90)	2.2 (90)

6. Socio-cultural Characteristics

In the upper Nam Ngiep, the ethnic group is called Phouane; Mong highlander shifting cultivation is the traditional lifestyle. This form of agriculture affects the natural environment and the habitats of rare species change to land use and traditional agricultural practice is still difficult. People living in the plateau celebrate their lunar New Year. In the lower reach of Nam Ngiep the situation is different. The main ethnic group is Lao Lum who are mostly Buddhist and celebrate annual festivities such as the racing boats.

7. References, Data books and Bibliography

- National Geographic Department: all scale maps since 1987.
- Department of Geology and Mines: 1 : 1,000,000 scale map 1991.
- MRC hydrologic year books available until 1998 and additional data from 1999-2002.
- IUCN, The World Conservation Union: Inventory of wetlands in Lao PDR, 1991.