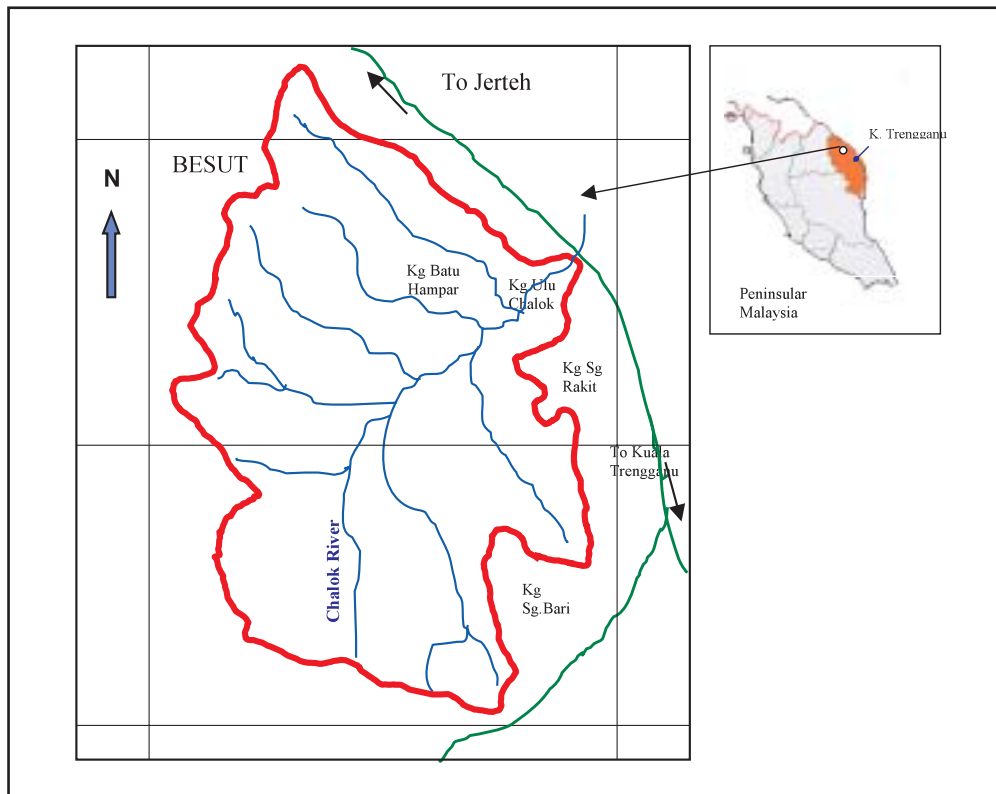


# Chalok River

## Map of River



## Table of Basic Data

<b>Name:</b> Chalok River		<b>Serial No. :</b> Malaysia-4
<b>Location:</b> East coast of Peninsular Malaysia	N 5° 23' 15" ~ 5° 27' 15"	E 102° 48' 10" ~ 102° 50' 45"
<b>Area:</b> 20.5 km <sup>2</sup>	<b>Length of main stream:</b> 6.9 km	
<b>Origin:</b> Mt Durian (80.5 m)	<b>Highest point:</b> Mt Tinggi (221 m)	
<b>Outlet:</b> South China Sea	<b>Lowest point:</b> River mouth (0 m), Gauging Station (4.37 m)	
<b>Main geological features:</b> granite, phyllite, slate, shale and sandstone, slate and shale, schist.		
<b>Main tributaries:</b> Pak Pengas River		
<b>Main lakes:</b> Nil		
<b>Main reservoirs:</b> Nil		
<b>Mean annual precipitation:</b> 3,560 mm		
<b>Mean annual runoff:</b> 1.22 m <sup>3</sup> /s		
<b>Population:</b> 3,000	<b>Main cities:</b> Kuala Trengganu	
<b>Land use:</b> Forest (2%), Rubber (78%), Scrub (10.8%), Horticulture (5.3%), Orchard (1%)		

## 1 General Description

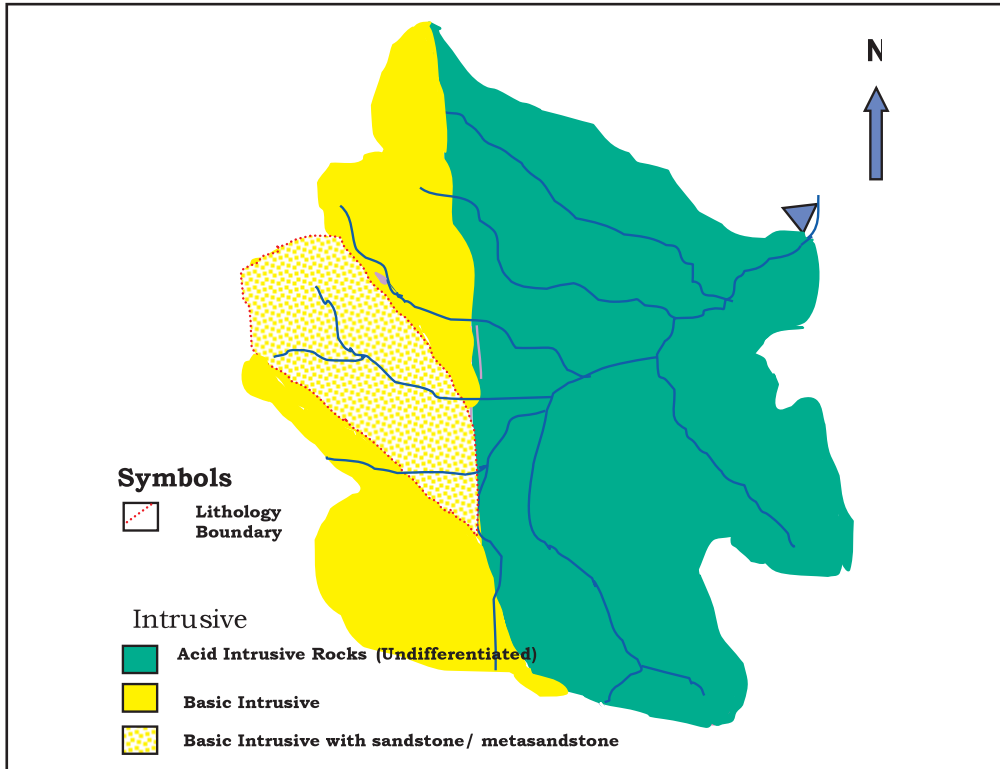
The Chalok River is located between latitudes 5° 23' 15" and 5° 27' 15" North and longitudes 102° 48' 10" and 102° 50' 45" East. The basin can be accessed via the Kuala Trengganu - Jerteh road, 22 km north of Kuala Trengganu. There is an airport at Kuala Trengganu. The Chalok River basin is one of the representative basins selected by the Drainage and Irrigation Department (DID) of Malaysia for water resources study, and drains an area of 20.5 km<sup>2</sup>. The basin measures about 6.0 km x 3.5 km wide. The Chalok River is 6.9 km long and flows north to meet the Bari River before discharging into the South China Sea.

The basin is undulating land with the highest peak at Bukit Tinggi standing at 221 m above mean sea level. The area is covered with belukar and some agricultural crops, mainly rubber trees. The soils in this catchment are deep friable soils developed over granite. Soil textures are coarse sandy clay loam to coarse sandy clay with a weak to moderate medium subangular blocky structure. An igneous body comprising undifferentiated rocks are the main geological formation structures found in this area. In the southern part of the basin the granite is in contact with a meta-sediment and in the northern part with recent alluvium.

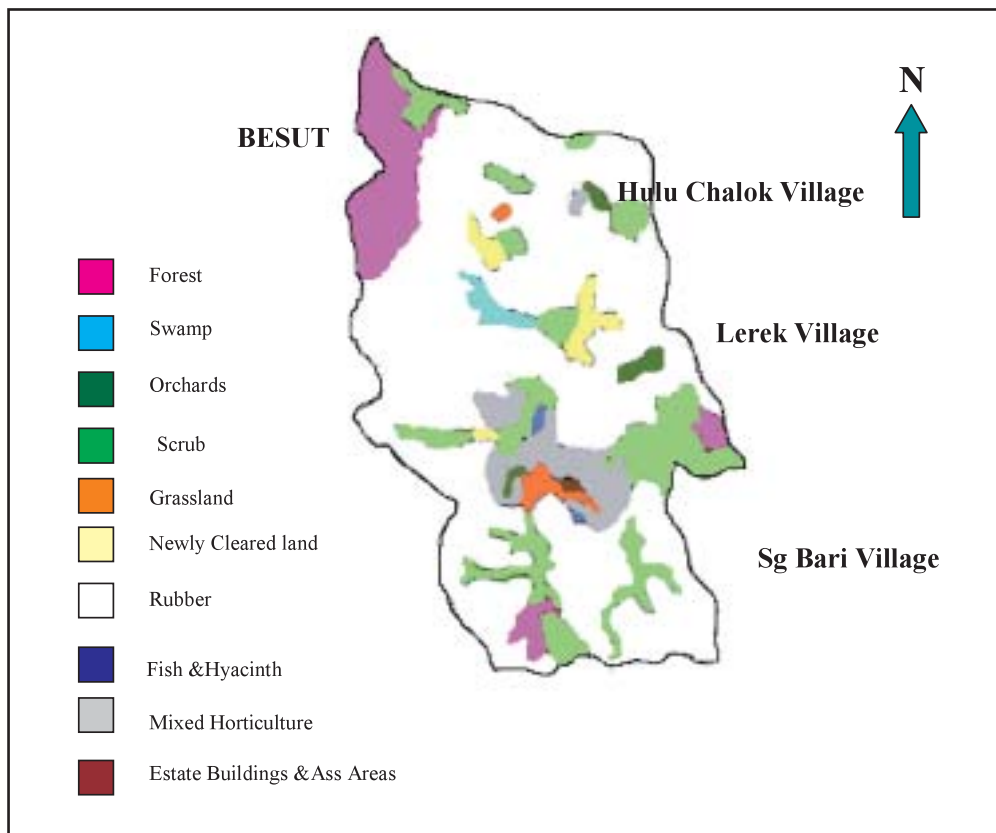
The basin temperature ranges from 25° C - 27° C. The catchment receives an average annual precipitation of 3,560 mm, while the mean annual discharge at Chalok Bridge (20.5 km<sup>2</sup>) was 1.51 m<sup>3</sup>/s for the period 1979-1993. The Chalok's major tributary is the Pak Pengas River.

## 2. Geographical Informtion

### 2.1 Geological Map



## 2.2 Landuse Map



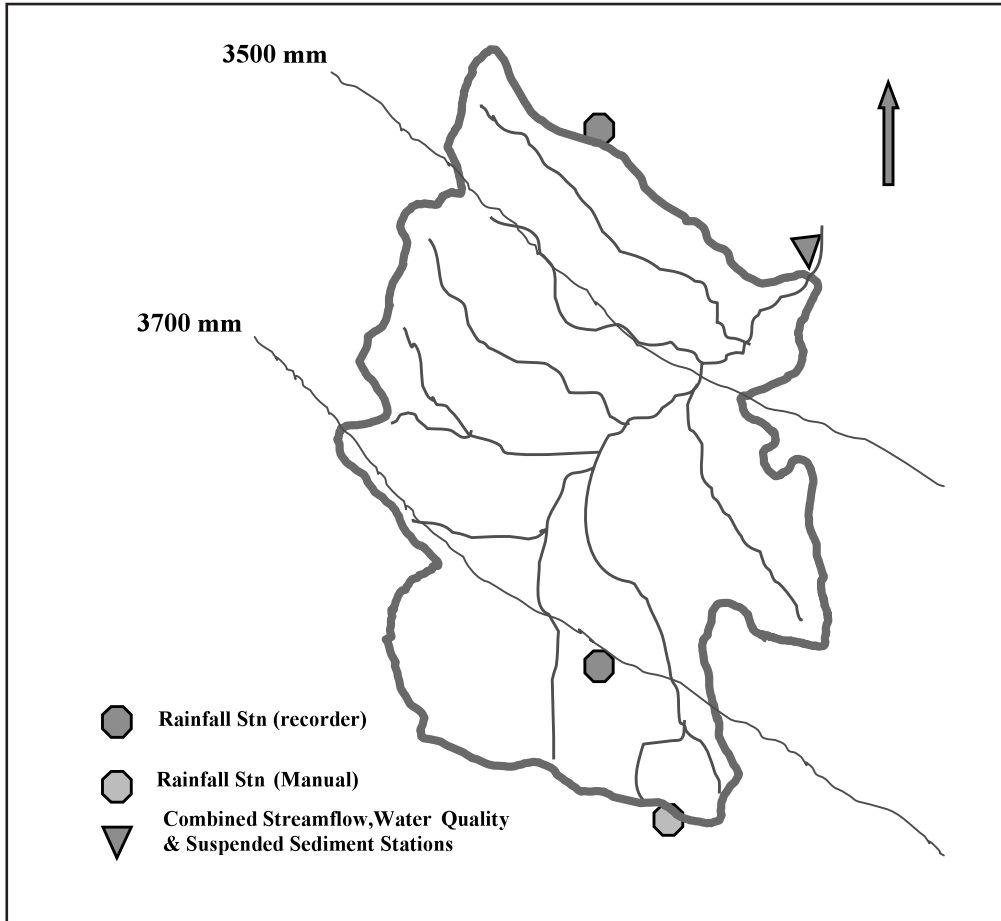
## 2.3 Characteristics of River and Main Tributaries

No.	Name of river	Length [km] Catchment area [km <sup>2</sup> ]	Highest peak [m] Lowest point [m]	Landuse [%] (1990)
1	<b>Chalok river</b> [Main river]	6.9 20.5	113 0 (River Mouth) and 4.37 (Main Road Bridge)	Rubber [78%] O [1%], A [5.3%] F [2%]
2	<b>Pak Pengas river</b>	2.6 2	136 10	

O: Orchard F: Forest A: Other Agriculture (vegetable, grass)

### 3. Climatological Information

#### 3.1 Annual Isohyetal Map and Observation Stations



#### 3.2 List of Meteorological Observation Stations

No <sup>1)</sup>	Station Name	Elevation [m]	Location	Observation period	Mean annual precipitation [mm]	Mean annual evaporation [mm] <sup>2)</sup>	Observation items <sup>3)</sup>
5428001	Bt Hampar (Site 1)	-	N 05° 26' 50" E 102° 48' 55"	1979 - 1995	3,412	1,652	Hw, S8
5428002	Klinik Chalok (Site 2)	-	N 05° 24' 40" E 102° 49' 25"	1979 - 1995	3,709	1,652	Hw, S8

1) Station number used by DID Malaysia.

2) Evaporation measured at Kuala Trengganu.

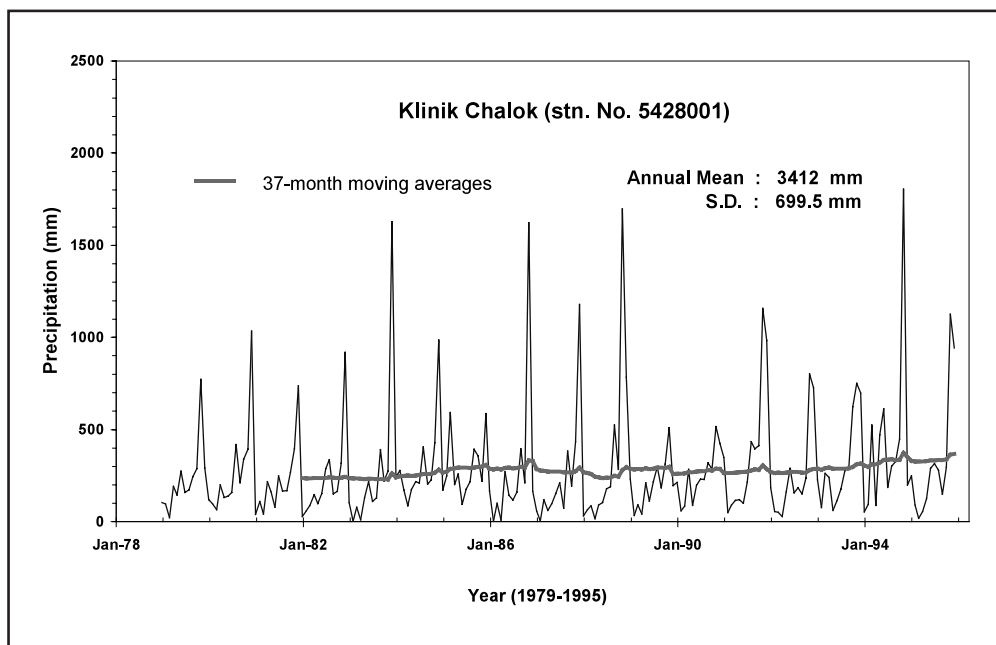
3) HW: Hattori weekly S8: Secondary Station (with 8" orifice)

### 3.3 Monthly Climate Data

Observation item	Observation station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Period for the mean
Temperature [°C]	Kuala Trengganu	25.2	25.7	26.4	27.2	27.3	27.0	26.6	26.5	26.3	25.1	25.7	25.5	26.2	1973 - 1993
Precipitation [mm]		132	48	174	100	105	114	105	155	185	226	847	527	2,718	1984 - 1996
Evaporation [mm]		4.1	4.7	5.1	5.3	4.8	4.4	3.9	4.2	4.3	3.9	3.6	3.8	4.3	1983 - 1993
Duration of sunshine [hr]		6.2	7.8	8.0	8.2	7.9	6.9	7.0	5.8	6.1	5.5	4.5	4.2	6.5	1973 - 1993

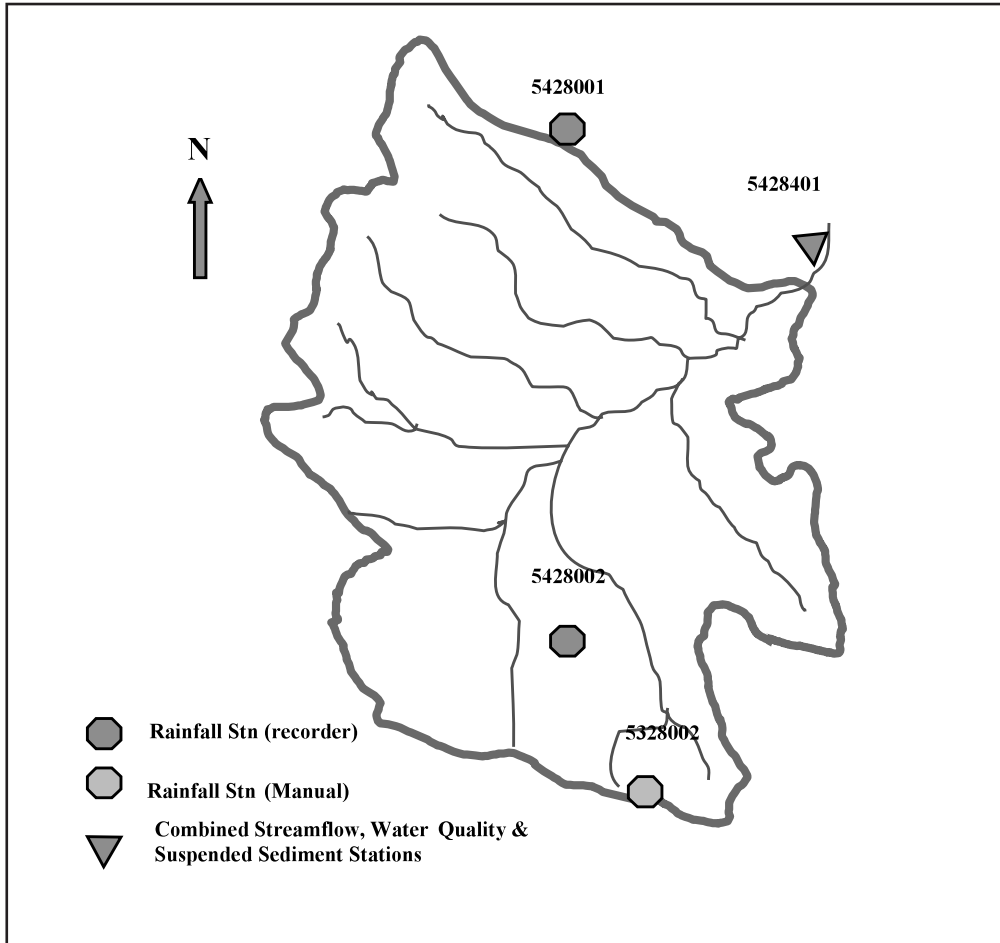
Note: Above are derived from Malaysian Meteorological Service data.

### 3.4 Longterm Variation of Monthly Precipitation



## 4 Hydrological Information

### 4.1 Map of Rainfall and Streamflow Observation Stations



### 4.2 List of Hydrological Observation Stations

No.*	Station	Location	Catchment area (A) [km <sup>2</sup> ]	Observation period	Observation items <sup>1)</sup>
5428401	At Chalok bridge	N 05° 26' 30" E 102° 50' 05"	20.5	1979 - 1993	WL, Q (A)

No.*	$\bar{Q}$ <sup>2)</sup> [m <sup>3</sup> /s]	Q <sub>max</sub> <sup>3)</sup> [m <sup>3</sup> /s]	$\bar{Q}_{max}$ <sup>4)</sup> [m <sup>3</sup> /s]	$\bar{Q}_{min}$ <sup>5)</sup> [m <sup>3</sup> /s]	$\bar{Q}/A$ [m <sup>3</sup> /s/100km <sup>2</sup> ]	Q <sub>max</sub> /A [m <sup>3</sup> /s/100km <sup>2</sup> ]	Period of statistics
5428401	1.2	127.7	63.6	0.19	5.9	622.9	1979 - 1993

\* Water level recording station number used in DID Malaysia

1) WL: Water level, Q: Discharge (rating curve used), WQ: Water quality,  
A: Automatic water level recording station

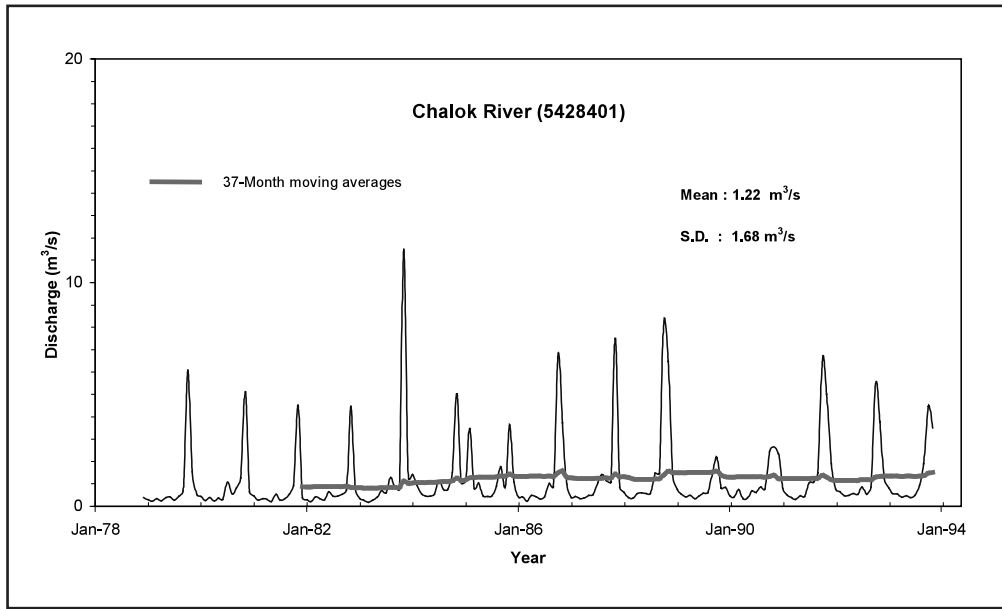
2) Mean annual discharge

3) Maximum discharge

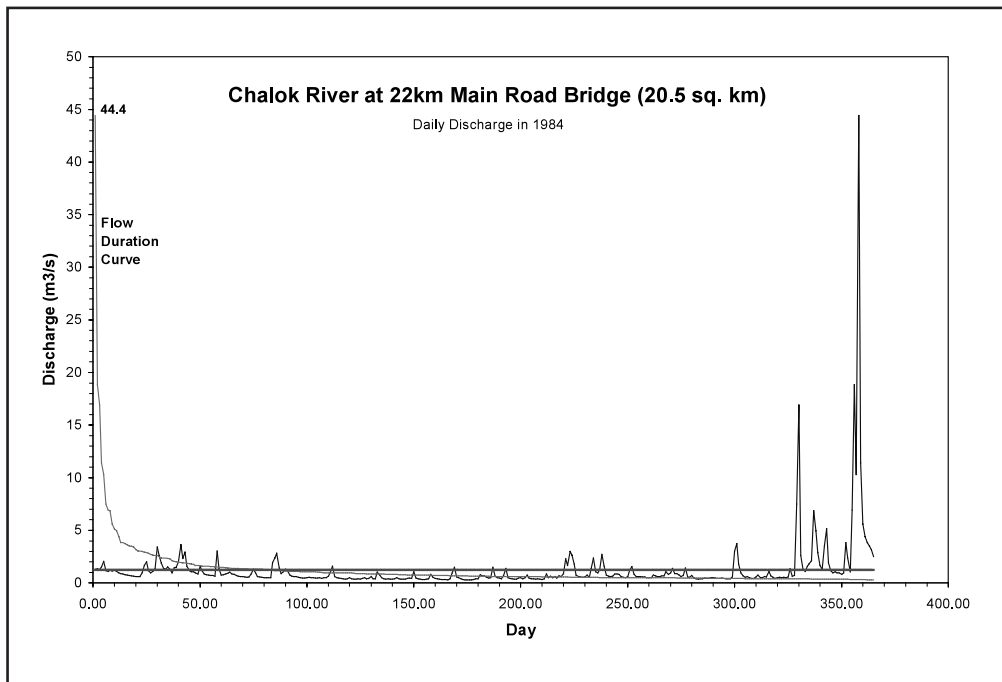
4) Mean maximum discharge

5) Mean minimum discharge

### 4.3 Longterm Variation of Monthly Discharge



### 4.4 Annual Pattern of Discharge



### 4.6 Annual Maximum and Minimum Discharges

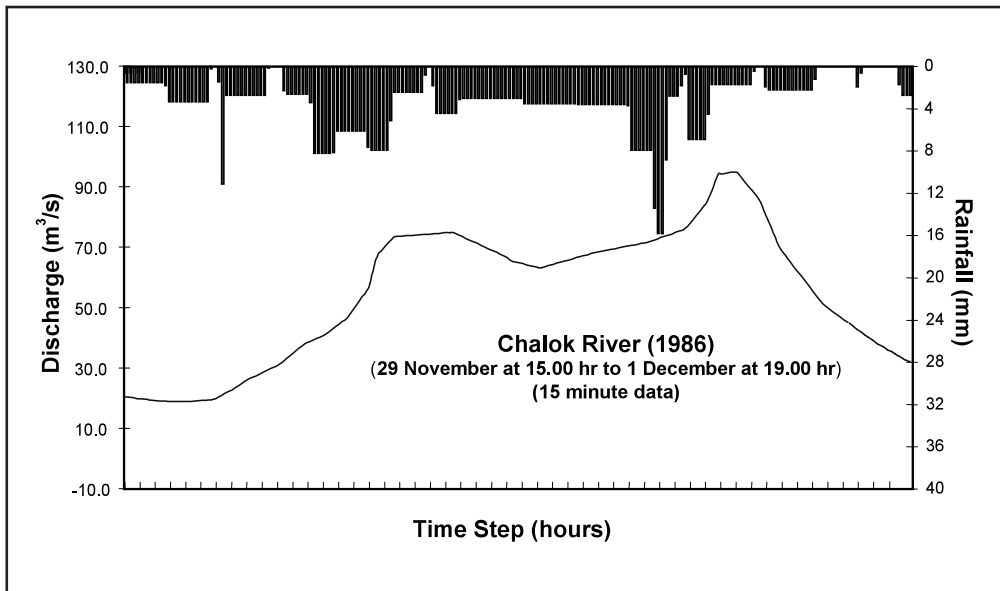
Station: Chalok Bridge (5428401) [20.5 km<sup>2</sup>]

Year	Maximum <sup>1)</sup>		Minimum <sup>2)</sup>		Year	Maximum <sup>1)</sup>		Minimum <sup>2)</sup>	
	Date	[m <sup>3</sup> /s]	Date	[m <sup>3</sup> /s]		Date	[m <sup>3</sup> /s]	Date	[m <sup>3</sup> /s]
1979	01.11	60.8	05.04	0.157	1987	03.12	67.6	28.05	0.228
1980	19.12	34.8	03.06	0.175	1988	01.12	127.7	26.04	0.316
1981	05.12	74.1	26.06	0.174	1989	18.11	29.2	01.07	0.302
1982	15.12	78.0	06.12	0.105	1990	26.11	26.3	08.06	0.234
1983	15.12	84.6	16.04	0.145	1991	19.11	91.9	30.06	0.203
1984	23.12	56.3	25.06	0.274	1992	12.11	93.5	12.06	0.284
1985	09.03	28.1	28.07	0.225	1993	31.10	23.1	30.05	0.212
1986	01.12	95.1	20.05	0.127	1994*				
					1995	17.11	45.7	26.04	0.224

1), 2) Instantaneous observation by data logger.

\* Data not available

### 4.7 Hyetograph and Hydrograph of Major Floods





## 5 Water Resources

### 5.1 General

The water use in this basin is generally limited to agricultural activities, mainly rubber plantation and other cash crops. There is no water supply scheme nor groundwater extraction in this basin. So far, the basin has not been inundated extensively by any major flood.

### 5.5 Groundwater and River Water Quality

#### River Water Quality<sup>1)</sup> at Chalok Bridge<sup>2)</sup> 1986

Date	Apr 21	May 19	Jun 2	Jun 24	Jul 7	Jul 21	Aug 18	Aug 25	Sep 29	Oct 14	Nov 3
pH	7	6.8	6.9	6.4	6.9	6.8	7	6.9	6.9	6.9	6.8
BOD [mg/l]	0.2			1			0.9				1.3
COD <sub>Mn</sub> [mg/l]	9.5	8.6	7.8	5.4	7	7.1	9.4	12.5	19	12.3	9.2
SS [mg/l]	18	5	7	6	3	13	10	10	9	11	6
Discharge <sup>3)</sup> [m <sup>3</sup> /s]	0.4	0.3	0.7	0.5	0.5	0.5	0.5	0.4	1.1	0.7	1

1) Observed once a month on a dry day normally several days after rainfall.

2) Located at about 22 km along the main road from Kuala Trengganu.

3) Discharge on the water quality observation date.

## 6. Socio-cultural Characteristics

The FELDA (Federal Estate and Land Development Authority) scheme found in this basin forms the primary agricultural activity and main source of income for most households in and around this area. FELDA is a Federal Government agency entrusted with the development and management of mainly rubber and oil palm estates from undeveloped State owned lands. The Agency involves the locals in the participation of the scheme by giving them a contractual equity share of the estate. There are a few rural villages in the basin with a majority of the inhabitants being from the Malay ethnic group. Most of them are farmers working on the FELDA scheme. The water taken from Chalok River is primarily for agricultural activities in the basin.

## 7. References, Databooks and Bibliography

Department of Agriculture (1991): Agricultural Statistics of Peninsular Malaysia

Department of Irrigation and Drainage, Hydrological data, compiled by Hydrology Division, Malaysia.

Department of Statistics Malaysia (1997): Yearbook of statistic (Table of Basic Data, 2.3)

Geological Survey Department of Malaysia (1991): Geological map of Chalok Basin.

Land and Survey Department, Topography and land use maps, Johore (Table of Basic Data, 2.3)