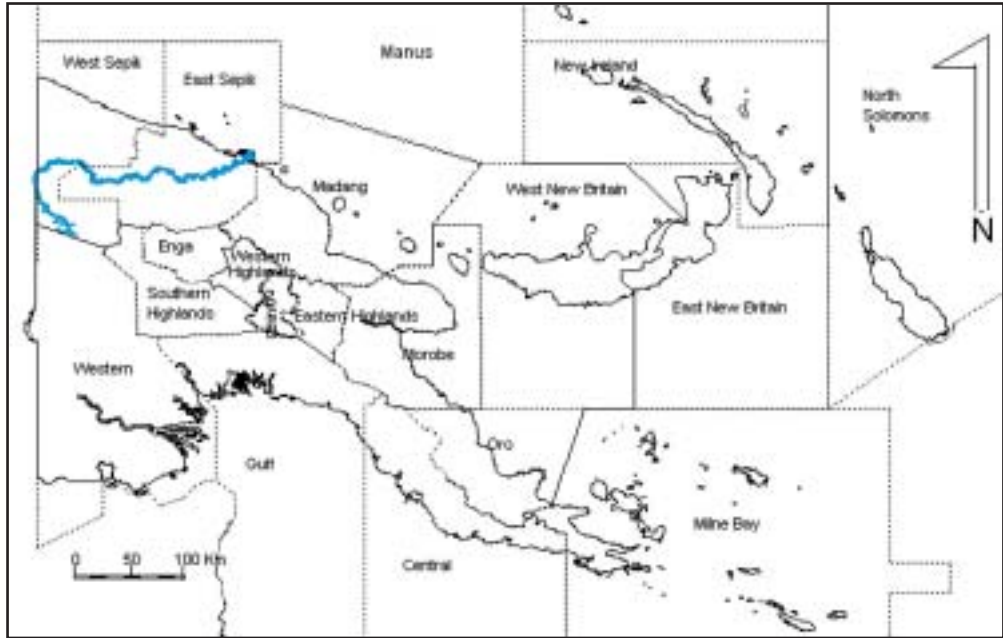


Papua New Guinea

PNG-3: Sepik Wara



Introduction

Papua New Guinea comprises over 1400 islands, atolls and coral reefs in the Bismarck, Solomon and Coral Seas. The mainland of Papua New Guinea (PNG) is made up of the eastern half of the island of New Guinea, which is located between the latitudes 2° and 12° south of the equator. This small but environmentally dynamic and diverse nation is situated to the north of Australia and east of Indonesia. The total land area is 462,000 km² of which 405,000 km² is on the mainland.

PNG is highly mountainous, with approximately half the land area over 1,000 metres above sea level. The Central Ranges, also named the Highlands and Central Cordillera, make up the backbone of PNG. They are a complex system of mountain belts, upland valleys and volcanoes running unbroken from Milne Bay to the border with West Papua and widening into a series of parallel ridges separated by high, flat, intermontane valleys.

The Sepik River flows across extensive lowland plains in the northwest of PNG and its basin runs parallel to the Central Ranges. In its middle and lower reaches the flat nature of the terrain causes the Sepik River to meander through broad and swampy flood plains.

Acknowledgements

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Particular mention should be given to Nason Yube for the maps and his technical officers for the data processing, retrieval, and analysis.

Sepik Wara

Map of River

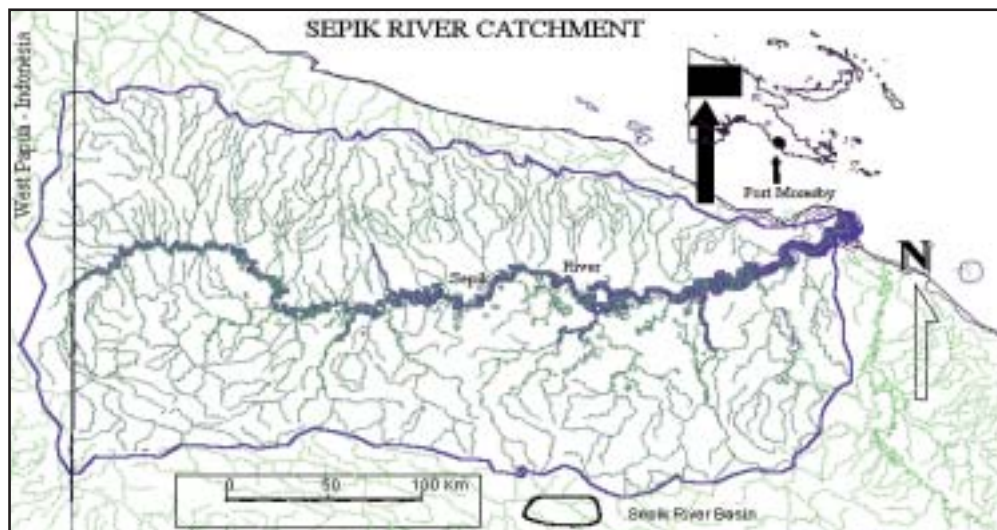


Table of Basic Data

Name(s): Sepik Wara		Serial No.: PNG-3
Location: East and West Sepik Province	S 3° 45' 00" - 4° 00' 00"	E 141° 35' 55" - 144° 30' 00"
Area: 40,922 km ²	Length of main stream: 847.65 km	
Origin: West Sepik Province (PNG)	Highest point: 3,993 m	
Outlet: Bismarck Sea	Lowest point: Mean sea level (msl)	
Main geological features: Quaternary, cretaceous-eocene, paleogene, pliocene and miocene.		
Main tributaries: Green River, Upper May River, Wario River, April River, Karawari River, Yuat River and Keram River.		
Main lakes: Chambri, Murik, Watang, Wabu and Caranburum		
Main reservoirs: None		
Mean annual precipitation: 2,085 mm at Upper Sepik River station (1978 - 1987)		
Mean annual runoff: 3,099.60 m ³ /s at Ambunti		
Population: 341,583 (2000)	Main cities: Wewak	
Land use: Forest (30%), sago (20%), urban (10%), secondary vegetation (30%), and others (10%) (1990)		

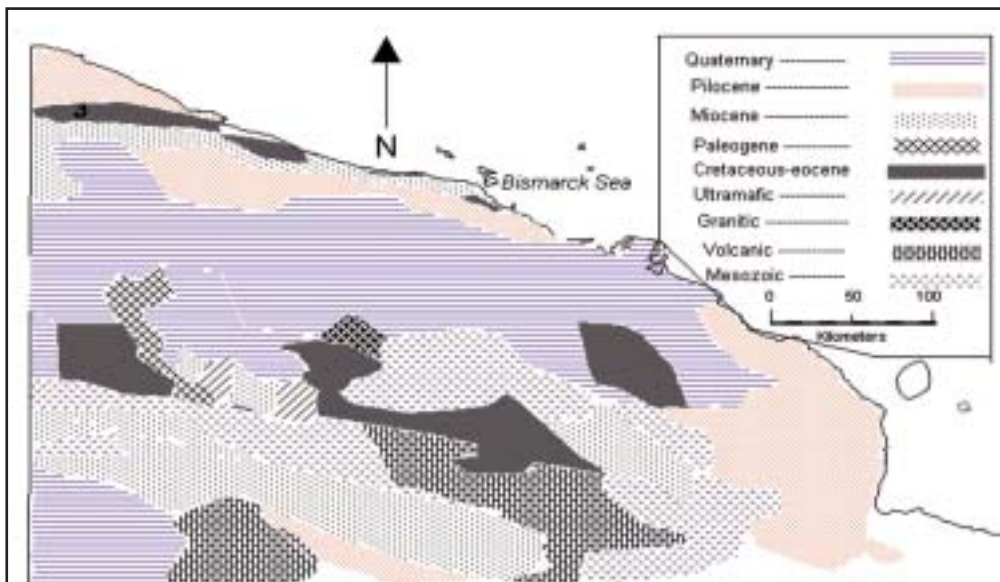
1. General Description

The mighty Sepik River is the second largest in Papua New Guinea and drains from the south before flowing out into the Bismarck Sea in the north. The catchment area at the river's mouth is approximately 80,000 km² and the length of the river channel is estimated to be 848 km and is formed from various tributaries originating in the Central and Bismarck ranges (1,300-1,500 m). The average annual precipitation at Sepik in the upper catchment is 2,157 mm. The maximum flow at the Ambunti station was 8,964 m³/s in July 1990, leading to the conclusion that the total maximum flow at the mouth of the river should amount to 11,000 m³/s. The population along the main river system in 2000 was 100,000. There are no major earth works such as dams and channel diversions. The river can be categorized into two: a high-energy, rapidly flowing river at high elevations, and a slow meandering flood plain river that passes through the plains of the East Sepik province, and subsequently discharges into the Bismarck Sea.

The entire river system does not change name despite flowing through many different ethnic regions. The upper tributaries flow through 50 km of narrow gorges and valleys between mountains over 2000 m high.

2. Geographical Information

2.1 Geological Map

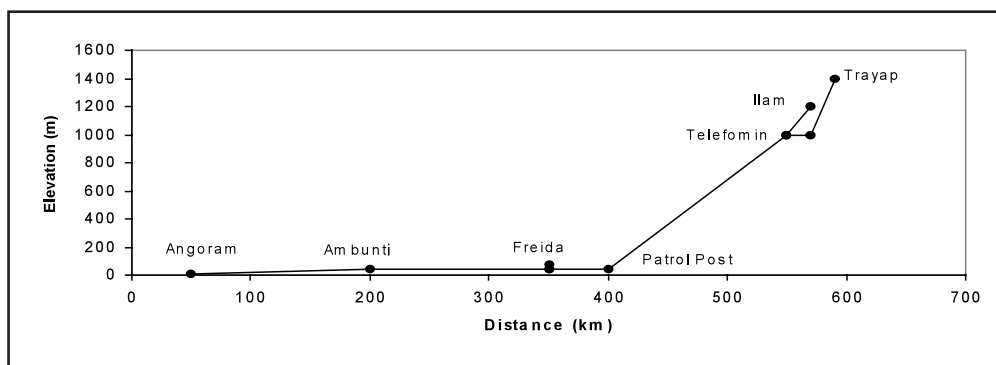


2.3 Characteristics of the River and the Main Tributaries

No.	Name of river	Length [km] Catchment area [km ²]	Highest peak [m] Lowest peak [m]	Cities Population (1985)	Land use [%] (1991)
1	Sepik Wara (Main River)	848 40,922	3,993 0	Wewak 50,000	A (20%) F (50%) O (5%) P (10%) U (15%)
2	Green River (Tributary)	18.0 860	120 40		
3	Ilam (Tributary)	3.2 282	2,000 1,200		
4	Trayap (Tributary)	7.8 700	1,800 800		
5	Freida (Tributary)	35.0 1,000	1,054 40		

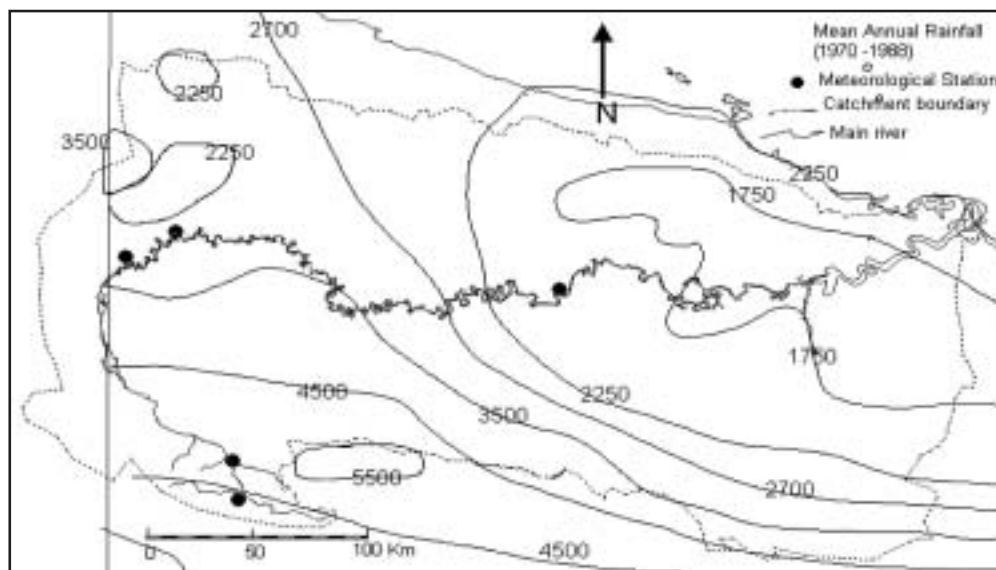
A: Agriculture field (vegetable, grass); F: Forest; O: Orchard; P: Pardy field; U: Urban

2.4 Profiles



3. Climatological Information

3.1 Annual Isohyetal Map and Observation Stations



3.2 List of Meteorological Observation Stations

No.	Station	Elevation [m]	Location* (UTM)	Observation period	Mean annual precipitation ¹⁾ [mm]	Observation Item ²⁾
104480	Waru	137	N 9420600 E 359700	1974 - 1976	2,204 ^a	P (TB)
104500	Upper Sepik	1,000	N 9424100 E 341700	1977 - 1991	1,776 ^a	P (TB)
104850	Sunday Hill	40	N 9271500 E 588700	1970 - 1988	2,950 ^a	P (TB)
105950	Ambunti	40	N 9266100 E 588700	1988 - 1990	1,900 ^a	P (TB)

* UTM coordinate at local zone

^a Missing data included

1) 1965-1990

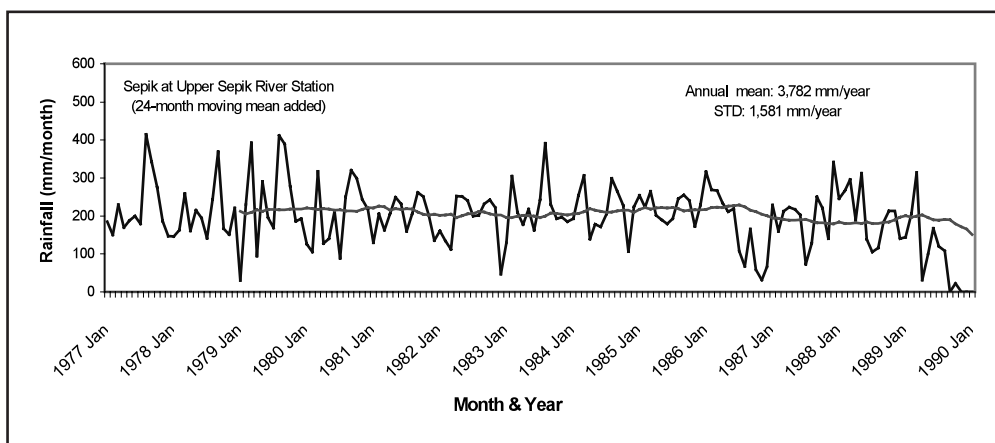
2) P: Precipitation; TB Tipping bucket with recording chart

3.3 Monthly Climate Data

Station: Sepik at Upper Sepik Station

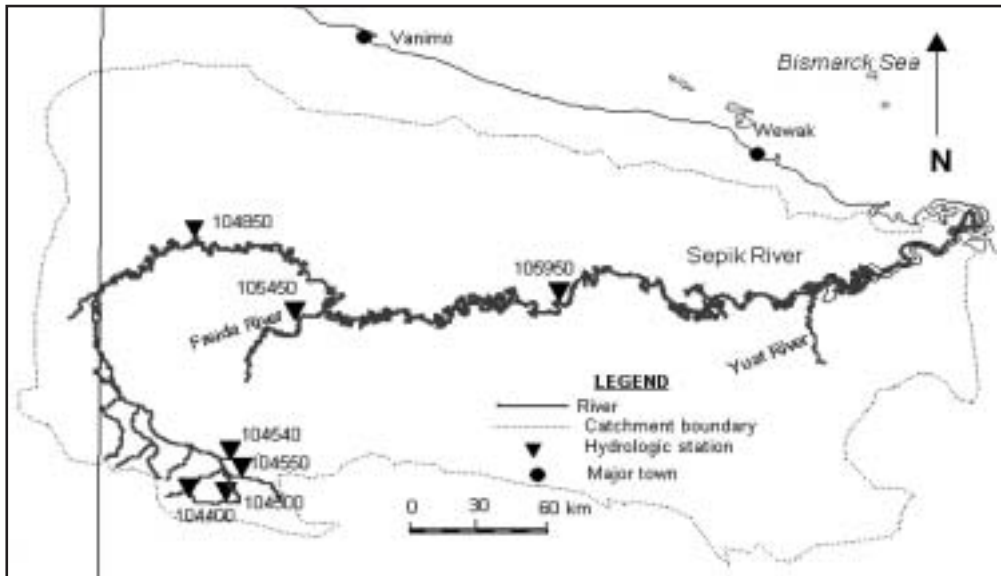
Observation Item	Observation Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Period for the mean
Precipitation [mm]	104500	176	200	257	169	212	193	152	237	250	206	158	165	3,782	1977 - 1989

3.4 Long-term Variation of Monthly Precipitation



4. Hydrological Information

4.1 Map of Streamflow Observation Stations



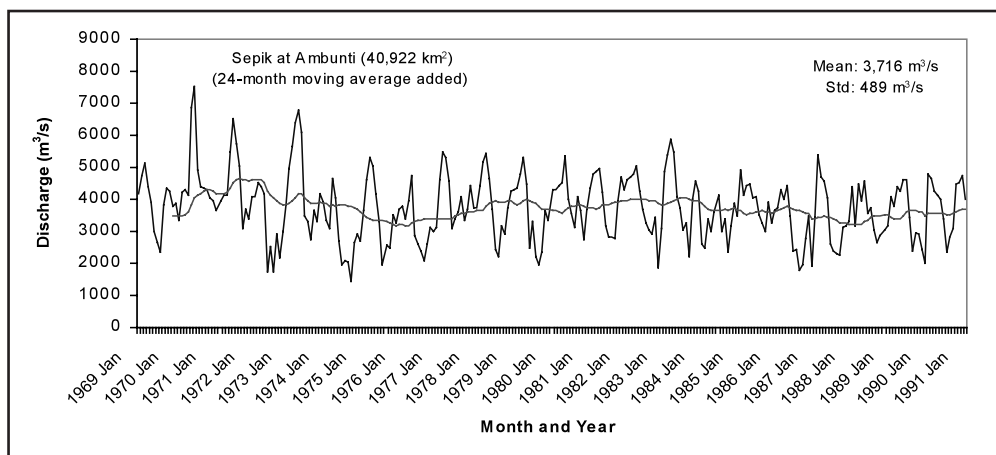
4.2 List of Hydrological Stations

No.	Station	Location (UTM)	Catchment Area (A) [km ²]	Observation period	Observation Items ¹⁾ (frequency)
104400	Ilam	N 9145000 E 360500	320	1977 - 1994	H1, Q
104500	Telefomin	N 9424100 E 341700	670	1976 - 1993	H1, Q
104550	Near Telefomin	N 9319700 E 521800	7.8	1983 - 1988	H1, Q
104850	Green River	N 9271400 E 588700	9,500	1970 - 1993	H1, Q
105450	Old Base Camp	N 9270600 E 590000	1,028	1980 - 1993	H1, Q
105950	Ambunti	N 9268800 E 594100	40,922	1967 - 1994	H1, Q
111600	Angoram	N 9265100 E 493300	78,706	1968 - 1980	H1

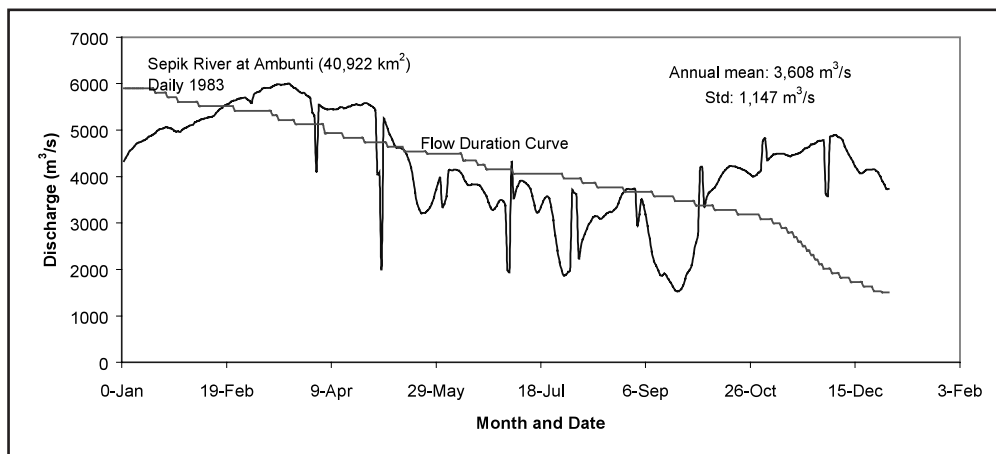
No.	$\bar{Q}^{2)}$ [m ³ /s]	$Q_{max}^{3)}$ [m ³ /s]	$\bar{Q}_{max}^{4)}$ [m ³ /s]	$\bar{Q}_{min}^{5)}$ [m ³ /s]	\bar{Q}/A [m ³ /s/100km ²]	Q_{max}/A [m ³ /s/100km ²]	Period of statistics
104400	15	187	46	14	4.7	58	1972 - 1990
104500	51	1,586	565	15	7.6	236	1976 - 1993
104550	0.6	17	15	0.064	7.7	218	1984 - 1988
104850	1,297	3,573	2,533	436	13.6	38	1970 - 1992
105450	200	2,221	1,579	69	19.4	216	1981 - 1993
105950	3,615	8,964	5,448	1,702	8.8	22	1967 - 1994

1) Q: Discharge, WQ: water quality
 H1: Daily water level
 2) Mean annual discharge
 3) Maximum discharge
 4) Mean maximum discharge
 5) Mean minimum discharge

4.3 Long-term Variation of Monthly Discharge



4.4 Annual Pattern of Discharge

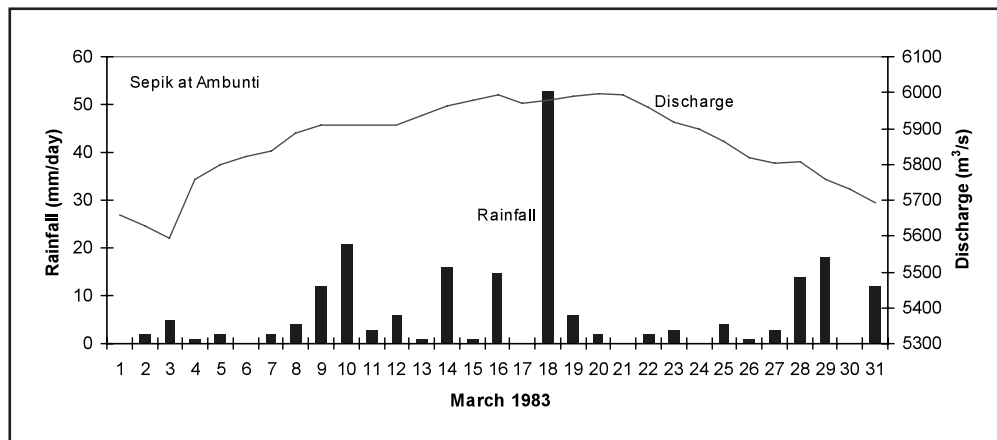


4.6 Annual Maximum and Minimum Discharge

Station: Sepik at Ambunti

Year	Maximum		Minimum		Year	Maximum		Minimum	
	Date	[m ³ /s]	Date	[m ³ /s]		Date	[m ³ /s]	Date	[m ³ /s]
1967	06/05	4,331	19/11	2,429	1981	30/04	5,602	27/08	1,632
1968	22/02	4,883	14/06	1,242	1982	28/03	5,465	25/11	1,142
1969	01/04	5,606	20/08	1,821	1983	13/03	5,999	18/09	1,509
1970	05/07	8,964	24/02	2,696	1984	29/12	4,703	28/01	1,828
1971	24/04	4,240	26/09	1,822	1985	25/01	5,232	22/08	2,111
1972	09/03	4,757	18/08	1,074	1986	24/04	4,808	31/08	999
1973	03/04	7,081	23/08	2,326	1987	09/02	5,502	01/08	932
1974	09/03	4,893	01/10	1,082	1988	20/12	5,008	07/11	2,736
1975	16/04	5,989	30/07	1,452	1989	28/06	6,203	10/12	1,448
1976	19/04	5,164	21/08	1,183	1990	27/11	5,809	10/07	1,907
1977	15/02	5,622	01/10	2,205	1991	05/01	4,926	12/10	1,482
1978	16/04	5,636	29/07	1,538	1992	25/05	4,938	14/07	1,747
1979	10/04	5,606	19/08	1,153	1993	30/12	5,017	15/11	1,320
1980	15/05	5,509	18/07	2,009	1994	12/03	5,061	31/03	2,825

4.7 Hyetographs and Hydrographs of Major Floods



5. Water Resources

5.1 General Description

The Sepik River is the second largest river system in Papua New Guinea in terms of river length and mean annual discharge. It drains the evenly populated upper Sepik catchment, and the sparsely populated middle and lower Sepik catchment before finally discharging into the Bismarck Sea. There are no major water resources developments such as hydro-power, water supply or irrigation in place or proposed. However, the Sepik River system has been used for transportation of heavy equipment, and for passage of tourist vessels that frequent the waterway. It is also a major natural tourist attraction because of its scenery.

Floods are frequent with gradually rising and receding limbs. This is attributed to the large catchment size with a high water retention capacity and slow catchment response times (days) causing delays in the discharge of stored water to the outlet. The greatest floods occur during the southeast trade winds that are associated with the monsoons that affect Southeast Asia.

The potential water resources of the Sepik River and its tributaries are virtually unexplored. The only anthropogenic impacts are areas associated with the subsistence agriculture and traditional farming practised by village communities. These are mainly on the river plains and the raw wastes and effluent produced by this activity affect the river system.

6. Socio-cultural Characteristics

The socio-cultural characteristics vary little from place to place, and are derived from the cultural beliefs and the background of the area. For instance, in the upper Sepik catchment the inhabitants believe that the river spirits can cause illness, especially to people. The villagers also believe that strangers can become sick if they venture into the restricted areas within the sacred areas. Folklore and legends are common but vary from place to place with the main theme being based around the river system.

The other major socio-cultural characteristic is the type of agricultural activities in the upper, middle and lower Sepik. The cash economy is declining because of the rising cost of goods and services. The inhabitants are predominantly subsistence farmers and their major produce is sago, with the river providing fish, recreation and water for domestic use.

7. Reference, Data Books and Bibliography

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