

DRAINAGE SYSTEM - II

THE PENINSULAR DRAINAGE SYSTEM

The Peninsular drainage system is older than the Himalayan one. This is evident from the broad, largely-graded shallow valleys, and the maturity of the rivers. The Western Ghats running close to the western coast act as the water divide between the major Peninsular rivers, discharging their water in the Bay of Bengal and as small rivulets joining the Arabian Sea. Most of the major Peninsular rivers except Narmada and Tapi flow from west to east. The Chambal, the Sind, the Betwa, the Ken, the Son, originating in the northern part of the Peninsula belong to the Ganga river system. The other major river systems of the Peninsular drainage are – the Mahanadi the Godavari, the Krishna and the Kaveri. Peninsular rivers are characterised by fixed course, absence of meanders and non-perennial flow of water. The Narmada and the Tapi which flow through the rift valley are, however, exceptions.

The Evolution of Peninsular Drainage System

Three major geological events in the distant past have shaped the present drainage systems of Peninsular India: (i) Subsidence of the western flank of the Peninsula leading to its submergence below the sea during the early tertiary period. Generally, it has disturbed the symmetrical plan of the river on either side of the original watershed. (ii) Upheaval of the Himalayas when the northern flank of the Peninsular block was subjected to subsidence and the consequent trough faulting. The Narmada and The Tapi flow in trough faults and fill the original cracks with their detritus materials. Hence, there is a lack of alluvial and deltaic deposits in these rivers. (iii) Slight tilting of the Peninsular block from northwest to the southeastern direction gave orientation to the entire drainage system towards the Bay of Bengal during the same period.

River Systems of the Peninsular Drainage

There are a large number of river systems in the Peninsular drainage. A brief account of the major Peninsular river systems is given below: The Mahanadi rises near Sihawa in Raipur district of Chhattisgarh and runs through Odisha to discharge its water into the Bay of Bengal. It is 851 km long and

its catchment area spreads over 1.42 lakh sq. km. Some navigation is carried on in the lower course of this river. Fifty three per cent of the drainage basin of this river lies in Madhya Pradesh and Chhattisgarh, while 47 per cent lies in Odisha. The Godavari is the largest Peninsular river system. It is also called the Dakshin Ganga. It rises in the Nasik district of Maharashtra and discharges its water into the Bay of Bengal. Its tributaries run through the states of Maharashtra, Madhya Pradesh, Chhattisgarh, Odisha and Andhra Pradesh. It is 1,465 km long with a catchment area spreading over 3.13 lakh sq. km. 49 per cent of this, lies in Maharashtra, 20 per cent in Madhya Pradesh and Chhattisgarh, and the rest in Andhra Pradesh. The Penganga, the Indravati, the Pranhita, and the Manjra are its principal tributaries. The Godavari is subjected to heavy floods in its lower reaches to the south of Polavaram, where it forms a picturesque gorge. It is navigable only in the deltaic stretch. The river after Rajamundri splits into several branches forming a large delta.

The Krishna is the second largest east-flowing Peninsular river which rises near Mahabaleshwar in Sahyadri. Its total length is 1,401 km. The Koyna, the Tungbhadra and the Bhima are its major tributaries. Of the total catchment area of the Krishna, 27 per cent lies in Maharashtra, 44 per cent in Karnataka and 29 per cent in Andhra Pradesh.

The Kaveri rises in Brahmagiri hills (1,341m) of Kogadu district in Karnataka. Its length is 800 km and it drains an area of 81,155 sq. km. Since the upper catchment area receives rainfall during the southwest monsoon season (summer) and the lower part during the northeast monsoon season (winter), the river carries water throughout the year with comparatively less fluctuation than the other Peninsular rivers. About 3 per cent of the Kaveri basin falls in Kerala, 41 per cent in Karnataka and 56 per cent in Tamil Nadu. Its important tributaries are the Kabini, the Bhavani and the Amravati.

The Narmada originates on the western flank of the Amarkantak plateau at a height of about 1,057 m. Flowing in a rift valley between the Satpura in the south and the Vindhyan range

Goa has two important rivers which can be mentioned here. One is Mandovi and the other is Juari. You can locate them on the map. Kerala has a narrow coastline. The longest river of Kerala, Bharathapuzha rises near Annamalai hills. It is also known as Ponnani. It drains an area of 5,397 sq. km. Compare its catchment area with that of the Sharavati river of Karnataka.

The Periyar is the second largest river of Kerala. Its catchment area is 5,243 sq. km. You can see that there is a marginal difference in the catchment area of the Bhartapuzha and the Periyar rivers.

Another river of Kerala worth mentioning is the Pamba river which falls in the Vemobanad lake after traversing a course of 177 km.

River Catchment area sq. km

Sabarmati 21,674

Mahi 34,842

Dhandhar 2,770

Kalinadi 5,179

Sharavati 2,029

Bharathapuzha 5,397

Periyar 5,243

Small Rivers Flowing towards the East

There are small rivers which join the Bay of Bengal, though small, these are important in their own right. The Subarnrekha, the Baitarni, the Brahmani, the Vamsadhara, the Penner, the Palar and the Vaigai are important rivers.

River Catchment area sq. km

Subarnarekha 19,296

Baitarni 12,789

Brahmani 39,033

Penner 55,213

Palar 17,870

in the north, it forms a picturesque gorge in marble rocks and Dhuandhar waterfall near Jabalpur.

After flowing a distance of about 1,312 km, it meets the Arabian sea south of Bharuch, forming a broad 27 km long estuary. Its catchment area is about 98,796 sq. km.

The Sardar Sarovar Project has been constructed on this river. The Tapi is the other important westward flowing river. It originates from Multai in the Betul district of Madhya Pradesh. It is 724 km long and drains an area of 65,145 sq. km. Nearly 79 per cent of its basin lies in Maharashtra, 15 per cent in Madhya Pradesh and the remaining 6 per cent in Gujarat.

Luni is the largest river system of Rajasthan, west of Aravali. It originates near Pushkar in two branches, i.e. the Saraswati and the Sabarmati, which join with each other at Govindgarh. From here, the river

comes out of Aravali and is known as Luni. It flows towards the west till Telwara and then takes a southwest direction to join the Rann of Kuchchh. The entire river system is ephemeral.

Smaller Rivers Flowing Towards the West

The rivers flowing towards the Arabian sea have short courses. Why do they have short courses? Find out the smaller rivers of Gujarat.

The Shetruniji is one such river which rises near Dalkahwa in Amreli district.

The Bhadra originates near Aniali village in Rajkot district.

The Dhadhar rises near Ghantar village in Panchmahal district.

Sabarmati and Mahi are the two famous rivers of Gujarat.

The Vaitarna rises from the Trimbak hills in Nasik district at an elevation of 670 m.

The Kalinadi rises from Belgaum district and falls in the Karwar Bay. The source of Bedti river lies in Hubli Dharwar and traverses a course of 161 km.

The Sharavati is another important river in Karnataka flowing towards the west.

The Sharavati originates in Shimoga district of Karnataka and drains a catchment area of 2,209 sq. km.

RIVER REGIMES

Do you know that the quantity of water flowing in a river channel is not the same throughout the year? It varies from season to season. In which season do you expect the maximum flow in Ganga and Kaveri?

The pattern of flow of water in a river channel over a year is known as its regime. The north Indian rivers originating from the Himalayas are perennial as they are fed by glaciers through snow melt and also receive rainfall water during rainy season. The rivers of South India do not originate from glaciers and their flow pattern witnesses fluctuations. The flow increases considerably during monsoon rains. Thus, the regime of the rivers of South India is controlled by rainfall which also varies from one part of the peninsular plateau to the other. The discharge is the volume of water flowing in a river measured over time. It is measured either in cusecs (cubic feet per second) or cumecs (cubic metres per second). The Ganga has its minimum flow during the January-June period. The maximum flow is attained either in August or in September.

After September, there is a steady fall in the flow. The river, thus, has a monsoon regime during the rainy season.

There are striking differences in the river regimes in the eastern and the western parts of the Ganga Basin. The Ganga maintains a sizeable flow in the early part of summer due to snow melt before the monsoon rains begin. The mean maximum discharge of the Ganga at Farakka is about 55,000 cusecs while the mean minimum is only 1,300 cusecs. What factors are responsible for such a large difference?

The two Peninsular rivers display interesting differences in their regimes compared to the Himalayan rivers. The Narmada has a very low volume of discharge from January to July but it suddenly rises in August when the maximum flow is attained. The fall in October is as spectacular as the rise in August.

The flow of water in the Narmada, as recorded at Garudeshwar, shows that the maximum flow is of the order of 2,300 cusecs, while the minimum flow is only 15 cusecs. The Godavari has the minimum discharge in May, and the maximum in July-August. After August, there is a sharp fall in water flow although the volume of flow in October and November is higher than that in any of the months from January to May. The mean maximum discharge of the Godavari at Polavaram is 3,200 cusecs while the mean minimum flow is only 50 cusecs. These figures give an idea of the regime of the river.

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