



The Study Of Drainage system of Western Palamau Upland, Jharkhand (India)

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Abstract- *Drainage basin is one of the fundamental geomorphic unit. It occupies a model position in geomorphic studies. Morphometric analysis is an attempt to measure the degree to which the present set of process has externally or internally adjusted to variables of drainage basin in the relation to each other. The present fluvial landscape of Auranga basin of different magnitude. The surface is, no doubt, polygenetic in origin, where numerous new drainage basin have developed and the order has advanced their basin after the Tertiary elevation. They all provide convenient unit for the measurement and analysis of their morphometric properties and for the understanding of the landscape as a whole in the sense that they all evolving in a similar way in relation to each other. Horton, R.E.(1945), Strahler, A.N.(1952), Morisawa, M.E.(1953) and King L.C.(1967) have made notable contribution to the study of drainage basin and their morphometric properties. Horton, in particular, has defined certain law of drainage composition which have been tested again and again. The present analysis an attempt has been made to obtain the morphometric attributes of important drainage basins area and to asses their significance in landscape evolution.*

Dury, G.H.(1963) states that, "subjective assessments, however, can be of very little use in comparing one drainage system with another, unless they are made by single observer, who maintains a constant standard of judgment. It is now possible to superceed subjective assessment of qualitative description by quantitative measurement." He has also defined about morphometry, " it is a measurement and mathematical analysis of configuration of the earth's surface and of the shape and dimensions of landforms."

Study-Area- The Western Palamau Upland (23°39'N to 24°32' N latitudes and 83°09' E to 83°58' E longitudes) occupies the northwestern part of the Chotanagpur highlands. It comprises the whole part of the Garhwa district of Jharkhand and mid-eastern part of Sonbhadra district in U.P. and Garhwa is the district headquarter. It lies between the North Koel, Kanhar drainage system. It is bounded by the middle Son river in the north, Semli-Burha hill-complex in the south, lower North Koel river in the east and lower Kanhar river in the west respectively.

Its elevation varies from 140m to 849m and its area is 4104 km². The main ranges are alinged in SE to NW direction and there are Kotam (440m), Kumbakhurd (364m), Ambakhoria (384m), Bairia (467m), Baligarh (264m), Belwadamar (598m), Karri (661m), Jogikhura (657m) pahars and Semli-Burha hill-complex. Its general height decreases to the south to the north. The topography of the area is rugged due to complex action of denudational processes. It is bounded by the Rohtas district of Bihar and Sonbhadra district of U.P. in the north, Sarguja district of M.P. in the southwest, NorthKoel valley in the east and Palamau patland in the south. (Fig.1)

Methodology- Drainage system analysis with the help of topographical seats. It is represented on 1: 50000 scale and no of seats: 63P/3, 6,7,8,10,11,12,14,15,16;64M/9,10,13 and 14 issued by the Survey of India. We have measured the length of stream by the rotameter and area calculated by grid method.

Main Drainage System- Drainage, the channel arrangement to remove the surplus waters of an area, provides th pecific directions of the slope of an area and constitute a component of the surface hydrology. Thus, in an area of complex natural environment, like the one in hand, one is sure to come

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across a complex drainage alignment in respect of its orientation and distributional pattern (Fig 2). The evolution of drainage is determined, in the beginning, by the disposition of the surface on which the streams are initiated and subsequently by the geological structure associated with that surface, namely faults, joint, folds, angle of dip and lithology. Structurally Western Palamau Upland is an ancient landmass; it has perhaps never gone under sea an has been, therefore, subjected to long continued erosion.

Table.1
Drainage System of Western Palamau Upland(Area &Attributes)

Master stream	Secondary Tributary	Tertiary Tributary	Total Area (km ²)	% of Total Area (km ²)	% of Master stream system	Upper Hight (m)	Lower Hight (m)	Total Falls	Total Length (Km)
Son	-	-	4104	100.0	-	277	140	137	80
	North koel	-	1830.1	44.6	44.6	277	140	260	45.5
		Barkhi	86.4	-	4.7	502	220	282	30.7
		Banki	285.3	-	15.5	400	200	200	37.5
		Perwa	39.5	-	2.1	435	210	225	28.3
		Phulwaria	14.5	-	0.7	457	200	257	12.3
		Baghi	11.4	-	0.5	366	220	146	7.5
		Gora	120.4	-	1.1	410	320	90	16.7
		Danro	530.1	-	28.9	474	249	225	52.7
		Arraj	250.2	-	13.7	584	300	284	28.4
		Harwaria	312.3	-	17.6	500	300	200	27.5
		Others	280	-	15.2	-	-	-	-
	Panda	-	900	21.9	21.9	500	300	200	30.5
		Dhorara	141.3	-	15.7	360	300	60	15.0
		Domin	139.5	-	15.5	412	340	72	17.3
		Demak hula	44.0	-	4.9	300	200	100	9.7
		Dhura	18.9	-	2.1	320	240	80	5.3
		Others	556.3	-	61.8	-	-	-	-
	Kanhar	-	1373.9	33.5	32.9	600	200	400	140.4
		Hariyakhan	36.7	-	2.7	260	200	60	9.4
		Danmarwa	44.1	-	3.2	320	260	60	7.5
		Gularia	27.4	-	2.4	340	320	20	10.0
		Basin	36.0	-	2.6	422	260	164	25.5
		Malia	232.2	-	17.0	380	253	127	22.5
		Gaith	134.1	-	9.8	377	240	137	7.5
		Gujha	27.4	-	2.0	360	320	40	9.7
		Khonarso	42.3	-	3.0	674	384	290	14.9
		Dhengura	62.1	-	4.5	704	575	129	9.8
		Dhardnria	18.9	-	1.4	640	430	210	15.0
		Sarsotala	48.4	-	3.5	849	440	440	12.8
		Others	664.3	-	48.3	-	-	-	-8

The upland streams traverse the region comprising rocks of varying hardness. These streams have carved out erosional plains in areas where they pass through softer rocks. Some of the upland streams, including the Son river appear to be fault-guided and it is the main drainage system of the study-area.

The Son Drainage System- The Son river is the main drainage system of Western Palamau upland and it covers the total study-area. Its flow in west to east direction and leaves the area about 80km. The most striking features of the river are its merger stream of water and that too in braided form fordable in most places during dry periods specially in April and May when the river bed is a wide stretch of drifting and blinding sand. But in the rainy season, specially after a storm has burst on the plateau of central India, the river presents an extra-ordinary contrast as the channel forms the single outlet for an extensive hilly country. Consequently, the river rises with incredible rapidity, resulting in heavy floods of short duration, seldom lasting more than four days. The main secondary tributaries of the Son river(Table.1) system are:

A. NorthKoel river system



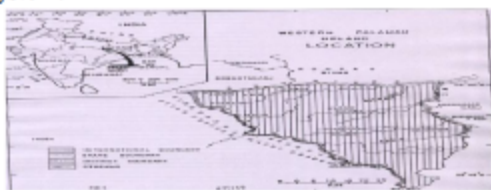
- B. Panda river system
- C. Kanhar river system

North Koel River System- The North Koel and its tributaries constitute the most important drainage system of Western Palamau upland with a drainage area of about 1830.1km² or 44.6% of study-area. North Koel river is demarked the eastern boundaries of the study-area. It is capricious stream, rising at an elevation of about 400m. In the upper part of its course, it has a rapid flow and bring down large quantities of silt. The North Koel has been interrupted at several section in its course. Its interrupted profile marks the stages of uplift though the North Koel has cut back the uplifted higher Western Palamau upland. Early and Mid-Tertiary uplifts are reflected by the rejuvenated of North Koel. New streams were initiated over the lava country during the Early-Tertiary uplift. The Barkhi, Banki, Perwa, Phulwaria, Baghi, Gora, Danro, Arraj and Harwaria are the tertiary tributaries of the North Koel river and its main drainage system area of about 4.7%, 15.5%, 2.1%, 0.7%, 0.5%, 1.1%, 28.9%, 13.7 and 17.6% respectively.

Panda river System- The Panda Nadi has covered the drainage area of about 900km² or 21.9% of study-area. Its originate on the Gularia upland (310m) in Sonbhadra district and meet with Son river near the Lohargara village in the Garhwadistrict. Panda river before the Sonbhadra district boundaries has many meanders near the Kon village. It traverses the area from west to east with a meandering course almost parallel to the Son river. The Dhorara, Domini, Damakhola and Dhurta are the tertiary tributaries of the Panda river and its major drainage system area of about 15.7%, 15.5%, 4.9% and 2.1% respectively.

The Kanhar river system- The Kanhar drainage system has covers about 1373.9 km² or 33.5% of the study-area. Its demarked the western boundaries of the study-area. Its total length is about 140 km. and its drainage flows in the southeast to northwest direction. The Hariyakhari, Danmarwa, Gularia, Basin, Malia, Goitha, Gujha, Khonrso, Dhengura, Dhardnria and Sarsotala are the tertiary tributaries of the Kanhar river and its main drainage system area of about 2.7%, 3.2%, 2.4%, 2.6%, 17.0%, 9.8%, 2.0%, 3.0%, 4.5%, 1.4% and 3.5% respectively.

Conclusion- In Western Palamau Upland, the Son is the main drainage systems. The secondary tributaries of the Son river are North Koel(44.6%), Kanhar(33.5%) and Panda river cover s total drainage area. The other main tertiary tributaries are Barkhi, Banki, Baghi, Gora, Danro and Arraj of North Koel, Dhorara, Domini and Dhutra of Panda and Malia, Khonrso, Dhengura and Sarsotal a of Kanhar drainage system.



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