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ASSESSMENT AND DISTRIBUTION OF SLOP OF MOSAM RIVER BASIN IN NASHIK DISTRICT

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Abstract: *Study of slope plays a significant role in the development of landforms and slope associated land degradation processes. To carry out assessment, distribution and types of slope Mosam river basin is selected from northern part of Nashik district in Maharashtra. It is extend from 20 32 to 20 52 North latitude and 73 56 to 74 32 20 East longitude (fig. 1). It covers an area of 501 sq. km. and its total length is 85 km Mosam basin entirely lies on the Deccan Trap. The valley is filled disintegrated basalt of various sheds from gray to black, washed by rain. It is an argillaceous nature and its color depends greatly upon the organic matter and length of time, it has been exposed to the air. Altitude is ranging in between 420 m. to 800 m. Slope is ranging between 2 to 13 degrees using Wentworth's Method. It is divided into four categories i.e. less than 3, 3 to 5, 5 to 10 and more than 10 degree and found maximum area falls under the 5 degree to 10 degree slope and minimum area falls under the group of less than 3 degree. Whole basin comes under gentle and moderate slope. Correlation between slope vs. relative relief and slope vs. absolute relief is found 0.74 and 0.57 respectively. Using topographical maps area is divided into convex, concave, undulating and uniform slope types. An attempt has been also made to identify the impact of litho structure and altitude.*

Key Words: *Assessment, Correlate, Average Slope, Slope Types, Stratigraphy.*

1. INTRODUCTION:

In geomorphological study slope is very important part and contributes a significant role in the landform development. Slope is a combined action of many factors viz. lithology, structure, climate, vegetal cover, drainage, relief and denudational processes (weathering and mass wasting). Stratigraphically this basin comes under Salher Formation. This formation has a maximum thickness of 300 m. and is exposed along the river valley. Generally the slope is modified by the denudational processes. The common slope associated problems are soil erosion and mass wasting. The slope assessment methodology is developed by many geographers and some of them are Rich (1916), Wentworth (1930), Raisz and Henry (1937), Strahler (1950), Clark (1932) etc. In this work, observation is made as indicated by using Wentworth's method.

1.1. OBJECTIVES:

The main aim of the study is: a) To assess average slope. b) To correlate spatial distribution of average slope with litho-structural set-up of the area and c) to identify slope type of the study region.

2. DATABASE AND METHODOLOGY:

The study is based on 1: 50000 scale topographical maps have been utilized to identify basin demarcation. C. K. Wentworth's method used for identified slope types.

3. STUDY AREA:

The study area which is a sub basin of Girna River Basin is located in the north part of Nashik district in Maharashtra. Mosam River lies in the Tapi drainage system. Mosam is the tributary of river Girna and Girna is the tributary of River Tapi. Northern divide of the basin is the district boundary between Nasik and Dhulia, Nandurbar district. Western divide is the boundary between Nasik and Dang district (Gujarat State). From the hill fort (Salher) of western divide overlooking the Konkan. There are five branches of the Sahyadri tending eastwards along the Mosam

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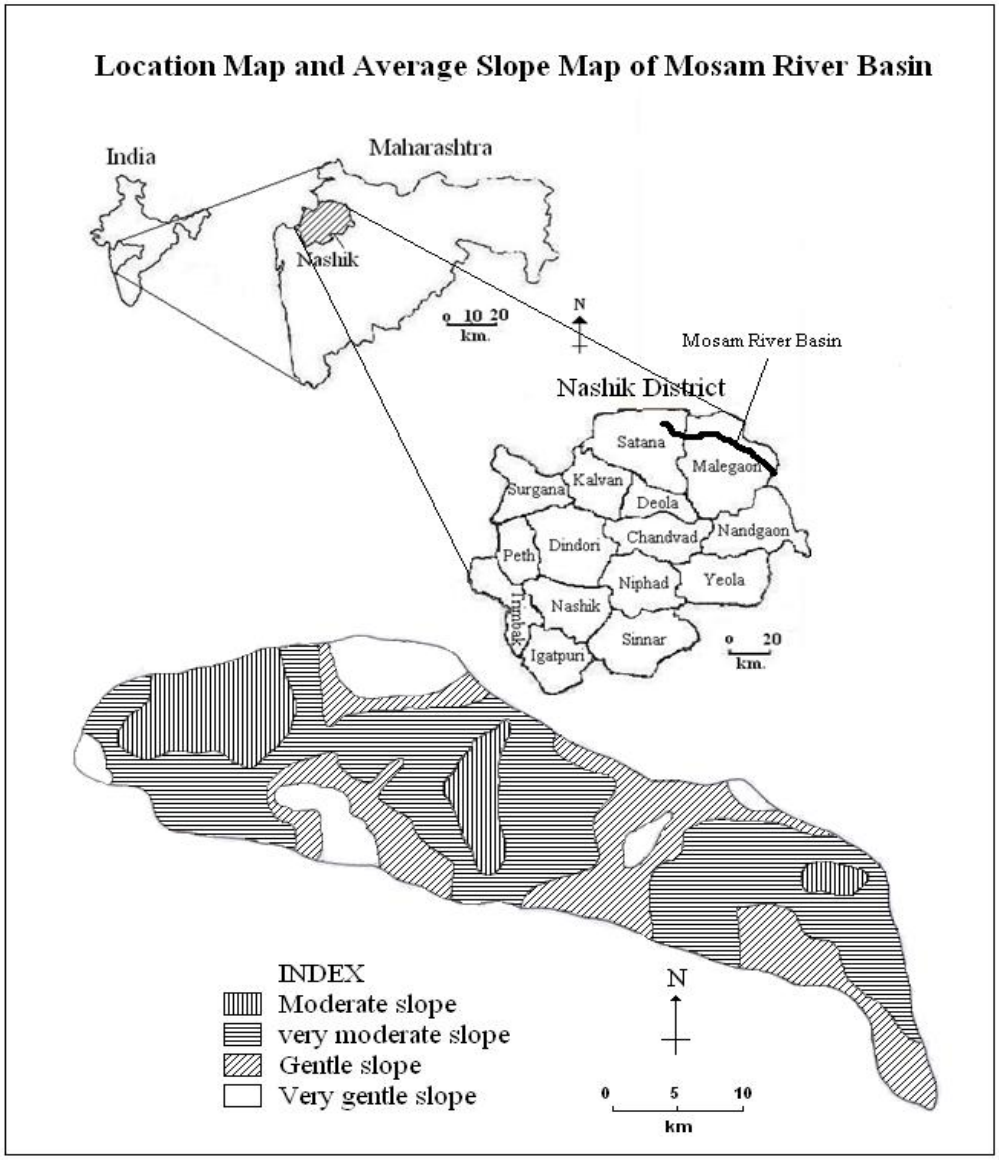
river basin i.e. Satmala ranges. Small streams of Mosam descend from the hills, most of them containing water. Narrow belts of level land bearing good soil are found on both the banks of Mosam and its tributaries. It is extend from 20˚ 32' to 20˚ 52' North latitude and 73˚ 56' to 74˚ 32' 20" East longitude .It covers an area of 501 sq. km. and its total length is 85 km. The average annual rainfall of the basin various between 899 mm. to 508 mm.



Mosam basin entirely lies on the Deccan Trap. The existing rock of trap is basalt. With regards to soil, little needs to be said from geological point of view. The valley is filled disintegrated basalt of various sheds from gray to black, washed by rain. It is an argillaceous nature and its color depends greatly upon the organic matter and length of time, it has been exposed to the air.

4. SLOPE ASSESSMENT AND DISTRIBUTION:

Slope assessment has been done according to the method suggested by C. K. Wentworth (1930). The original formula is converted into the metric system which is as follows:

Average Slope: Tan Q = N x CI / 636.6

Where Q = Average angle slope, CI = Contour Interval

N = Average Number of contours crossing, 636.6 = constant

The total range of the slope is 13 degree and divided into following slope categories;

4.1. VERY GENTLE SLOPE: This slope zone is found in between 0˚ to 3˚ group. The total area covered by this category is 46.84 square km. which is 9.35 percent of the area. Generally this zone is found between the front of lower

and middle reaches of this basin as well as it is found to the northern part and southern part of upper reaches of the region. Maximum part of this category is being under undulating hills.

Table -1: Average Slope in Mosam River Basin

Slope(Degree)	Area (Sq. Km.)	Area(%)	Cumulative Area (%)	Remark
0 to 3	46.84	9.35	9.35	Very Gentle Slope
3 to 5	135.77	27.10	36.45	Gentle Slope
5 to 10	248.15	49.53	85.98	Very Moderate Slope
Above 10	70.24	14.02	100.0	Moderate Slope
Total	501.00	100		

4.2. GENTLE SLOPE:

This zone includes the area where average slope angle ranges in between 3˚ to 5˚. The total area covered by this category is 135.77 square km. which is 27.10 percent of the area. The maximum area of this category is found low-lying part as well as it is found between the front of lower and middle reaches of this basin and the some part of the upper reaches of source area. This is second largest region of the basin.

4.3. VERY MODERATE SLOPE:

This includes the region where average slope angle ranges in between 5˚ to 10˚ covering an area 248.15 square km. (49.53 percent).This category covers up to 50 percent area of Mosam Basin. Maximum area of this category is found in upper, middle and lower reaches of the basin. Comparatively it aquarius maximum part of the upper and middle reaches.

4.4. MODERATE:
SLOPE:

The fourth and last category of slope unites having above 10˚ gradient which has the 70.24 square km. areal coverage of about 14.02 percent of the basin area. Each part of the basin where this category of slope will be present. Such slopes are generally covered with light vegetation cover and are not suitable for agricultural.

5. CENTRAL TENDANCY AND DISPERSION:

The mean, median and mode of the average slope values stand at 5˚, 6˚ and 6˚1’ respectively. The median value of the average slope indicates that 50 percent area lies below 6˚ slopes and the rest 50 percent above it, which is the middle value of the variables. The mode value of the average slope stands at 6˚1’. The measure the variation has shown the degree of the scatter about an average.

Table-2: Slope v/s Absolute Relief

Absolute Relief	Area Under Various Slope Categories				Total
	0 - 3	3 - 5	5 - 10	Above 10	
< 500	0.24	44.24	24.15	nil	68.63
500-600	6.01	68.39	72.44	8.07	154.91
600-700	26.15	40.03	74.45	20.14	160.77
>700	2.00	18.09	60.37	36.23	116.69
Total	34.4	170.75	231.41	64.44	501.00

6. CORRELATION BETWEEN SLOPE V/S RELATIVE RELIEF AND ABSOLUTE RELIEF:

The relationship between relative relief and slope is positive. As the relative relief rises the average slope degree also increases. The coefficient of correlation value is 0.57 which shows positive correlation. Table -2 reveals that with an increase of slope the absolute relief also increases and when absolute relief is very high the slope inclination also reaches very high. The correlation coefficient for slope v/s absolute relief is 0.74.

Table-3: Slope v/s Relative Relief

Relative Relief	Area Under Various Slope Categories				Total
	0 - 3	3 - 5	5 - 10	Above 10	
<20	30.33	104.08	44.64	nil	179.05
20 – 40	4.07	56.6	120.37	40.03	221.34
40 - 60	nil	10.07	57.34	21.12	88.53
>60	nil	nil	9.06	3.02	12.08
Total	34.4	170.75	231.41	64.44	501.00

7. SLOPE TYPES:

Using topographical map different slope types are identified. Space between two contours and their pattern is the main consideration for the identification of slope types. In this regard across the contours in between watershed line and main river channel observations were made. Those areas where the shape between the contour decreases towards the main channel from watershed line, is delineated as convex slope. Toe cutting of valley sides by lateral erosion of river channel is the main cause of convex slope formation. Area where the contours are close together near the top of the hill and further apart downwards is identified as convex slope. Concave slopes are originated because of active denudation mainly by rain-wash, rill and gully erosion. It indicates undulating slope when the spacing of the contours is variable. The alternate resistant and weak rocks are generally indicating undulating slope. Evenly spaced contours indicate uniform slope. Uniform slope controlled by angle and repose of debris and denudational processes. Homogenous rock type characteristics may indicate the uniform slope. It is very difficult to identify the influence of one particular geomorphic aspect in isolation because the slope types are the combination of many factors. Here an attempt has been made to identify the distribution of slope types within the different lithological, slope and altitudinal range. The maximum area of convex type is found in the northern part of the basin whereas southern part of the basin is almost covered by concave slope type. Along the lower reaches of Mosam basin few small patches of uniform slope type is observed. The concave and convex type is almost equally covered in the middle reaches of river Mosam. Above 700 m. of altitude the maximum area is covered by convex slope. In general slopes are convex along the top of the hill and concave towards bottom. The curve along the valley side slope is mostly convex.

REFERENCES:

1. Balaselvakumar S., Kumarswamy K , Shrilekha S , Jawahar Raj N (2000): “Morphometric Characteristics of Arujuna River Basin in Tamil Nadu : A Quantitative Approach’’ , The Deccan Geographer , Vol. 38 (1 and 2) Pp 31-40.
2. Chorley, R. J. (1969): “The Drainage Basin as the Fundamental Geomorphic Unit, In: Water Earth and Man’’ (edited by R.J. Chorley), Methuen, London, Pp 77-100.
3. Ganesh, A. and Vishwanath (1988) : “ Morphometric Charectaristics of the Upper Vaigai Basin’’,The Deccan Geographer , Vol. 26(2 and 3).Pp.389-405.
4. Gregory, K.J. and Walling, D.E. (1973): “Drainage Basin Form and Process’’, Edward Arnold Publishers, London.
5. Horton, R. E. (1945): “Erosional Development of Streams and their Drainage Basin’’ Hydro-physical Approach to Quantitative Morphology’’, Bulletin of the Geographical Society of America, Vol. 56. Pp. 275 – 370.
6. Kumaraswamy, K. and Sivagnanam N. (1988): “Morphometric Characteristics of the Vaippar Basin, Tamil Nadu: A Quantitative Approach’’, Indian Journal of Landscape System and Ecological Studies Vol. 11 (1), 101.
7. Padmini, V. (1983): “Quantitative Geomorphic Studies of the kuttiyadi River Basin on the Malbar coast’’, Institution of Engineers, Vol. 63 (5). Pp.21-25.
8. P. Y. Vyalij (2009): “Morphometric Characteristics of Mosam River Basin in Nashik District”. National Journal ‘Research Link’ Indore, MP. Vol. 58 –VII (11), Jan.-2009, P. No. 74-76.
9. Raundal N. H. (2001): “Morphometric Analysis of Gangapur Dam Site’’, the Deccan Geographer, Vol. 39 (1) Pp 36-44.
10. Strahler, A. N. (1957): “Quantitative Analysis Applied to Fluvially Eroded Landforms’’, Geological Soc. America Bull, Vol. 69. Pp. 279-300.