

Ravine Morphology of Bamanwas Tehsil, District Sawai Madhopur (Rajasthan)

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INTRODUCTION

The study of ravines is an important aspect of any geomorphic region. Ravines forms the conspicuous geomorphic feature of the basin under study.

The study of ravines has been made by Bennet(1955), Peterson (1950) Bryan (1941), Anter's (1952), Schumm(1956), Scheonwetter (1962), Martin (1963), Tuen (1966), Young(1969) in European and American countries. In India researchers like Gorrie (1938) Ahuja and Tejwani (1956), Acharya (1958). Kaul (1967), Ahmed (1968, 1971) Sharma (1968, 1970, 1976,1978 and 1980), Varma (1960), Padmaja (1976) have made efforts to comprehend and solve this problem of ravine genesis and formation.

It has been studied by geomorphologists that the formation of ravine is the function of geology lithology soil type, character of streams run off, slope and upliftment. Process of ravine formation differs in its intensity. planimetric, areat and relief properties in different environment.

Generally, it believed that gullies and ravines are synonymous to each other. But, in fact it is not so. Gully erosion is initiated and developed along the animal trails, roads, cart-tracks and paths in the agricultural barren or pastine lands. Contrary to it, ravines grow and develop along the river channels and extend its linear and areal dimensions through headward erosion Bryan (1925), Sharma (1980) observed that a ravine is a channel of ephemeral flow, denuded and guided essentially by the process of rejuvenated streams and having steep sides and head scraps with a width and a depth always greater than a gully".

STUDY AREA

Bamanwas tehsil is located in the western part of Sawai Madhopur District in the state of Rajasthan. The tehsil is located between 26° 15'40"N to 26° 40' 50"N latitude and 76° 24'00"E to 76° 35'40"E longitude. Kareli and Morel rivers forms the national boundary in the east and south of tehsil respectively. The area of the tehsil is 739.25 sq. kilometres. The tehsil is composed of 145 villages. Physio graphically, a major part of the tehsil is plain. The extreme north west portion of the tehsil is covered by fore Aravalli's and Delhi super group rocks. Climatically, it falls under the semi-arid

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climate with an average rainfall of 686 millimetres and the maximum temperature goes up to 47°C in June.

DISTRIBUTION OF RAVINES AND GULLIE

As referred above, ravines are developed along the river channels while gullies occupy the position between the plough fields following the trails. Consequently, ravines are the geomorphic features developed along the river channels in the river basin of the area. More categorically the high intensity of ravines is visible along and within the weaker zone in the basin of the area. On the basis of the intensity of ravine erosion rates and morphological characteristics, the areas of ravines erosion in the tehsil can be divided into three parts.

- 1- The areas of maximum Ravine intensity
- 2- The areas of Medium Ravine intensity
- 3- The areas of low Ravine intensity

The areas of Maximum Ravine Intensity-

The area stretches over the south eastern part of the tehsil. The whole area of the Kareli River and its tributaries are engulfed by ravines (Fig. 6). The zone is stretched on the height of 200 to 260 metres from mean sea level and the depth of the ravines varies from 15 to 20 metres. The width of the ravines of this area varies from 5 to 8 metres. The area is also evident along the Bhain Ka Nala where depth of ravines varies from 5 to 10 metres.

Barh phulwara, palasod, Jeewad Jakhelas Khurd, Barh Govindpura Nananwas etc. villages of the tehsil lie in this part

The areas of Medium Ravine Intensity-

The areas between the Moran Dongar and Liwali hills comes under this category. The streams and nallahs descending from the hills are responsible for more erosion. Here the depth is generally 5 to 10 metres. The small streams which descend from liwali and Moran hills, having an elevation of 400 metres is characterized with the ravines.

Riwali -liwali Meena Koleta Bhileli etc. villages lie in this region.

The areas of Low Ravine Intensity-

The area of the Morel River and other alluvial plain area have low ravine intensity. Relatively small patches of ravines are found at many scattered places. Depth of ravines of this area is very shallow.

CLASSIFICATION OF RAVINES

In order to have a scientific and systematic study of ravines it would be appropriate to classify them. Ravines can be classified on the basis of depth, width, size and form (Sharma 1976).

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The dimension of the ravines varies in nature, time and space, therefore, a clear-cut line of demarcation between each of them cannot be drawn. Yet keeping in view the intermingling stage of their growth, they may be classified as specified in Table -1.

GULLY CLASSIFICATION(TEJWANI 1961)				
S. No.	Type Of Ravine	Depth	Width	Side Slope
1	G1	3 M	18	Varying
2	G2	3 M	18	Varying
3	G3	3-9 M	18	8-15%
4	G4	A-3-9 M	18	Varying
		B-9 M	18	Varying

Recently Sharma H.S. (1968) in his work has classified ravines on the basis of their width, depth and slope side and head scarp into three grades as given in Table 2.

Gully Classification(Sharma H.S. 1968)				
S. No.	Particulars Of Ravine	Description Of Symbols of Ravines		
		G1	G2	G3
1	Depth Of Metres	Up to 1 Metre	1-5	Up to 40
2	Bed Width in Metres	Up to 18	18-25	Above 25
3	Slope Of Head Scarp	Gently Sloping	Varies	Steep
4	Slope Of Sub Scarp	45° -80°	50° -90°	50° -90° But Mostly Vertical

FACTORS AFFECTING RAVINE DEVELOPMENT

Ravines are the various environmental and climatic factors acting upon earth surface. Among them climate, slope, vegetation, lithology, structure, character of streams soil and upliftment process are of utmost importance. n ^ 1 Sharma (1976) suggested an equation for this complicated nature of ravine erosion= $T \times G \times S \times C \times R \times U$

Where

- T = Type of Soil
- G = Geological Structure
- S = Slope
- C = Character of Streams
- R = Rainfall

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- U = Upliftment

These factors governing the ravine formation have been discussed in the following pages.

Climate

Climate is an important ingredient which controls the growth and development of ravines. As the diurnal range of temperature is high in this part of semi-arid climate, the cricking of the land surface initiates the growth of ravines in pre-monsoon season and later their growth is accelerated by greater amount of run-off through headward erosion and thus climate helps in its expansion and larger dimension.

Vegetative Factor-

Ravines develop on barren lands. Thick vegetative cover retards the growth of ravine topography while this vegetation accelerates the emergence of bad land topography. Therefore, most of the highly ravine infected areas are situated on lands of low alluvium devoid of luxuriant growth of vegetation.

Lithology and Structure

Lithology plays a dominant role for the institution and development of gullies and ravines. The hard resistant sandstone, limestone conglomerates phyllites and gneissic rocks retard the growth of ravines.

Structure is also the main controlling factor for the growth development and degree of intensity of ravine formation. Broadly the basin comprises of three main structural zones vis. (I) the Delhi Super Group, (II) The Pre-Aravalli Group and (III) Alwar Group.

Topographic factors-

The formation of ravines is highly affected by slopes. In the deeper and more narrow ravines, the slope ranges 2-4°. In the gentle slopy area, the ravines are shallow in depth.

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References:

1. Ahmad, E. (1973, "Soil erosion in India". Asia Publishing House, Calcutta, pp. 63-64.
2. Amani, K.Z., (1970)," Geography and land use Planning. "Philippine Geographical Journal (Manila), Vol 14/46
3. Shafi, M., (1969), "Land use planning, land classification and land capacity. "The Geographer, Vol. XVI.
4. Sharma, H.S., (1984), "The study of palaeo-drainage in Rajasthan". Annals of the Association of Rajasthan Geographers, Vol IV pp. 12-17.
5. Sharma, H.S. and Padmaja, G., (1977), "Quantitative Geomorphic characteristics of Morel River Basin, Rajasthan". Geographical Review of India, Vol 39(4).pp-65-66.

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