

MARPHO METRICAL PARAMETERS ESTIMATION OF NALGANGA RIVER, BULDHANA (M.S.)



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Rainwater after falling on the surface follows a natural law and flows in the direction of slope. The total amount of rain water, however, does not become available to mankind; as much of it is lost due to natural processes, such as : evaporation, evapotranspiration, runoff surface and subsurface, some quantity of rain water is held up by soil and subsoil which can be available to vegetation, but not to mankind to fulfill his requirements, either drinking or irrigation or for purpose of industries. The various processes mentioned above of the rainwater movement found to be confined to a unit of the earth surface that is termed as a 'basis' and therefore constitutes a fundamental basic unit in hydrological studies. Such fundamental unit is geomorphic feature, which can be demarcated with the help of topographic features, which can be demarcated with the help of topographic maps. In present study various parameters of the basin that are significance to ground water studies are outlined and the importance in context of harvesting of ground water has been detailed.

Study Area :- The study area is a part of Purna river basin which located in western part of the district comprising Motala and Malkapur tahsil. Nalganga river is a left bank tributary of River Purna. It rises from Buldhana plateau with height of 690 meter. It flows towards north having length of 54.70 km and near Narwel Nalganga meets to river Purna. Nalganga basin lies between $20^{\circ}31'$ to 21° N latitude and 76° to $76^{\circ}16'$ East longitude (Fig.1) The elevation of the study area ranges from 690 to 216 m (Fig.1) above mean sealevel. The total area of the basin is 1008 sq.km and perimeter is 199.30km. The soil texture is mainly clayey (i.e. Black Cotton Soil) having a slope up to 3% in majority of drainage area. Nalganga is flowing through Motala and Malkapur tahsils of Buldhana district.

Material and Methodology :- Topographical maps

(55D/1, 55D/2) were collected from Survey of India (SOI). The soil map collected from District planning map. The boundary of the study area and drainage network along with contour was delineated using SOI toposheets drawn 1:50,000 scale, (Fig2) Shows digitized drainage networks. Morphometric parameters were estimated from the Nalganga river basin in GIS environment.

Morphometric Parameter estimation :- The conventional method of morphometric analysis is time consuming, tiresome and errorprone, while GIS technique overcome all these drawbacks associated with conventional method. Therefore in the present study the quantitative analysis of morphometric parameters is done for Nalganga basin in a GIS environment. The morphometric parameter estimated for the Nalganga river basin are as shown in Table-1. The basin is 1008 sq.km. It falls under semiarid region. The total length of Nalganga river is 75.40 km. The elevation of the study area ranges from 216 m to 690 m, above mean sea level. The soil texture varies from coarse to clayey (black cotton soil) having a slope of upto 3 percentage in majority of drainage area.

The drainage pattern is dendritic, streams have been given order based on Strahler's method (Fig.2). It is 6th order drainage basin, having a drainage density of 1.8337 as shown in Table-1. The drainage density is indicative of the closeness of channels, thus providing a quantitative measure of average length of stream channel for whole basin. It also indicated about the physical properties of underlying rocks, lower value drainage density i.e. 1.83 indicates region of highly permeable subsoil strata, Smith (1950) and Strahler (1957) described drainage density value less than 5.00 as coarse. The coarse texture gives more time for overland flow and hence no ground water recharge. Channel storage also varies with stream length as simple power function. Circularity ratio is low (0.318) will not generate runoff soon. Elongation-Circularity-Farm factor give fairly good estimates of hydrological

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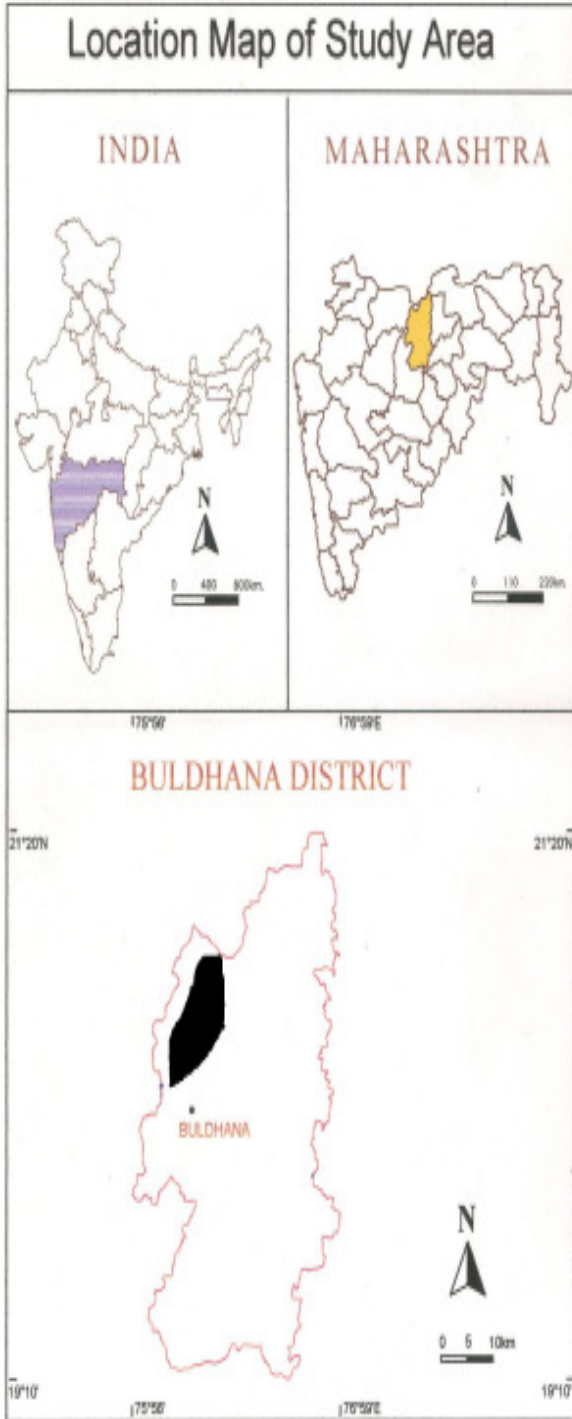
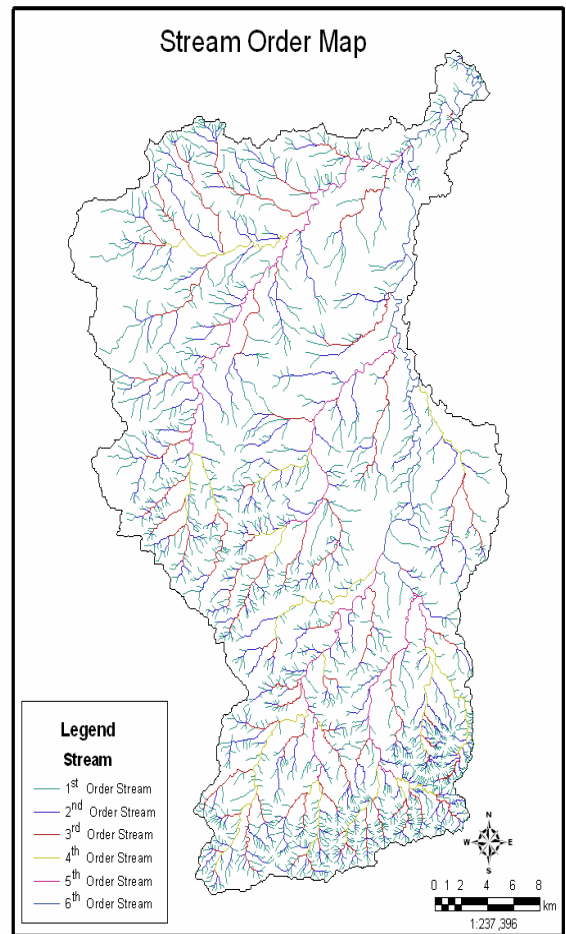
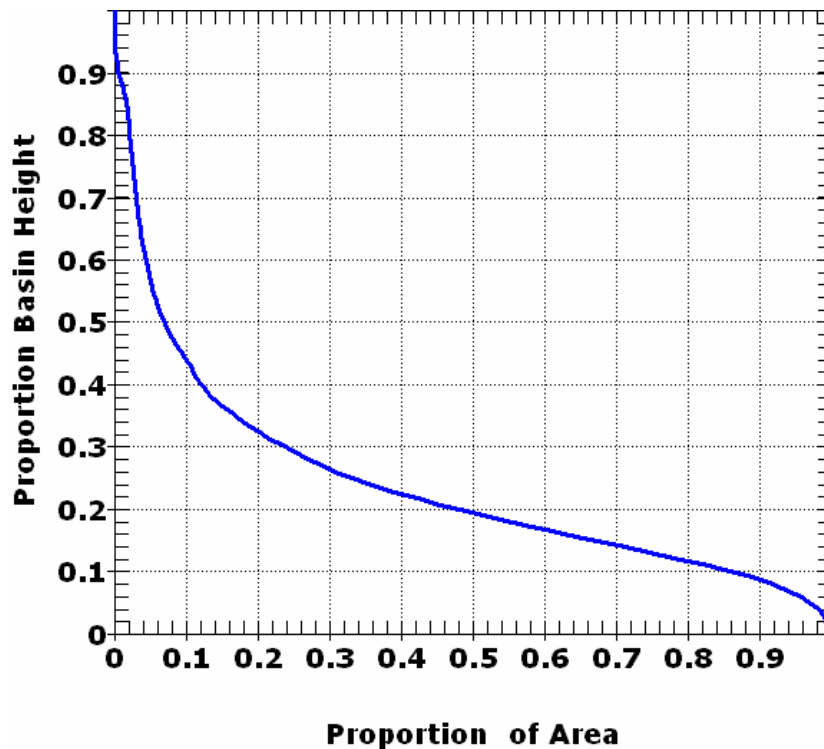


Fig. 1

Morphometric parameters of Nalganga River basin

Area Sq.Km.	1008
Perimeter Km.	199.30
Circularity ratio	0.3189
Farm factor	0.33
Basin Shape	2.96
Elongation ratio	0.6549
Length Km.	54.70
Drainage density	1.8337
Stream Order	
Density	
Stream Order 1	2.70
Stream Order 2	0.63
Stream Order 3	0.32
Stream Order 4	0.12
Stream Order 5	0.10
Stream Order 6	0.052





phenomena. Lower stream density with the higher order shown that number of stream is decreasing with increase of stream order. There is a decrease in slope with the length along metric curve (Fig.3) indicates that linear increase of drainage area with the elevation along the drainage and it indicates that the drainage system is attaining a mature stage from youth stage.

The bifurcation ratio, ratio is higher for 5th order stream. The bifurcation ratios between 3 and 5 indicate the homogeneous character and geological structures of the basin. These parameters are of importance because they control the rate of discharge after rain. The high value of relative relief is characteristics of high region

and lower value is the characteristics of Pediplain and Valley.

CONCLUSION

The various geomorphological parameter

considered in the present investigation are, absolute relief, relative relief, drainage density, bifurcation ration, form factor etc. All these factors are significantly correlated with ground water table, amount of discharge.

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