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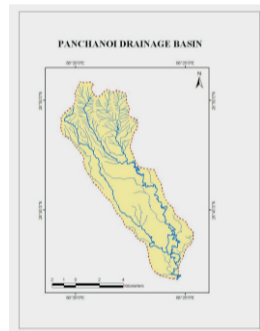
BASIN MORPHOLOGY AND LAND USE WITH SPECIAL REFERENCE TO PANCHANOI RIVER BASIN, A MICRO WATERSHED OF MAHANANDA RIVER SYSTEM, INDIA

SUBHADIP GUPTA

Lecturer in Geography, PCMM, Bonhoogly, Kolkata

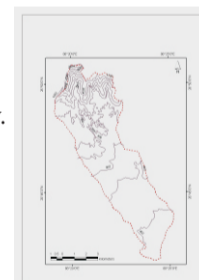
Abstract:

Micro watershed is defined as a small watershed, in which a certain number of families live, make use and manage the resources of the area, mainly the soil, water, vegetation, including crops and native vegetation, and fauna, including domestic and wild animals. From the operational point of view, the micro watershed has an area that may be planned by a technician counting on local resources and/or a number of families that may be treated as a social nucleus that shares some common interests and here the use of land is very much associated with the local physiography and that is why the study about land use should give emphasis on the relief characteristics. The present paper is based on a small river basin and its changing land use. So here it is very important to study about the drainage morphology as a whole or especially on that particular area where the changing tendency of land use has already been recognized. At the same time it is also to be noticed that the land use pattern may also be affected by the anthropogenic effect. So it is also very necessary to give stress on the anthropogenic factors associated with the basin area.



OBJECTIVE

The main objective of this study is to find the morphological status of the river basin and the general land of that area. Not only that the stress is also given to the changing land use pattern and its probable cause after it. At the same time the study will try to find out the future problem that may occur due to unscientific anthropogenic activity.

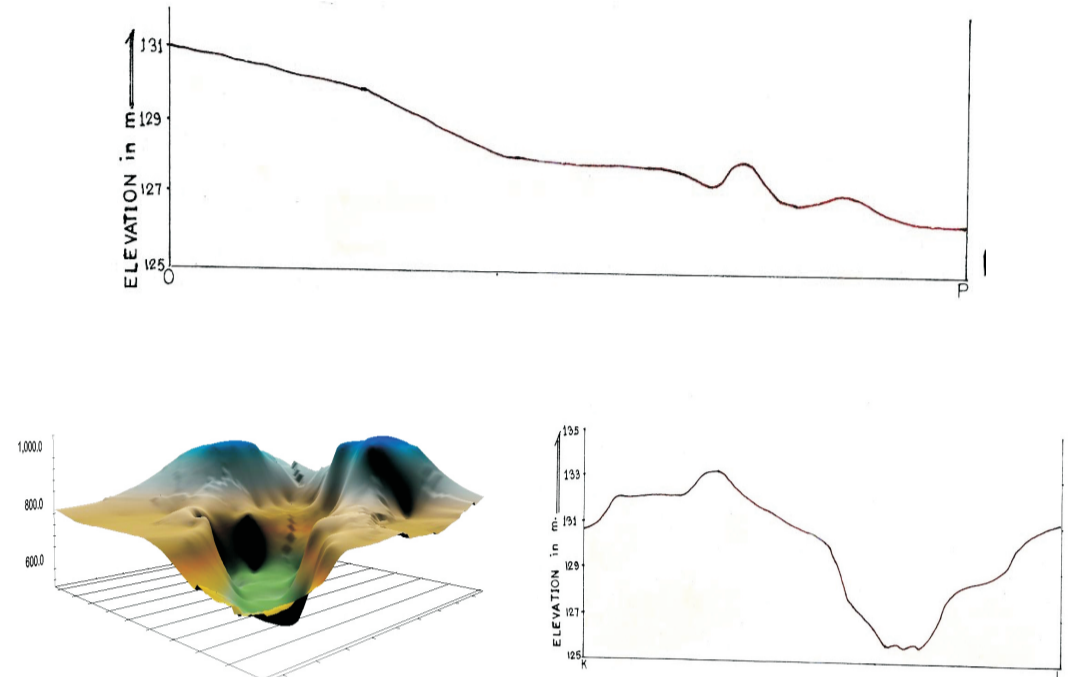


STUDY AREA

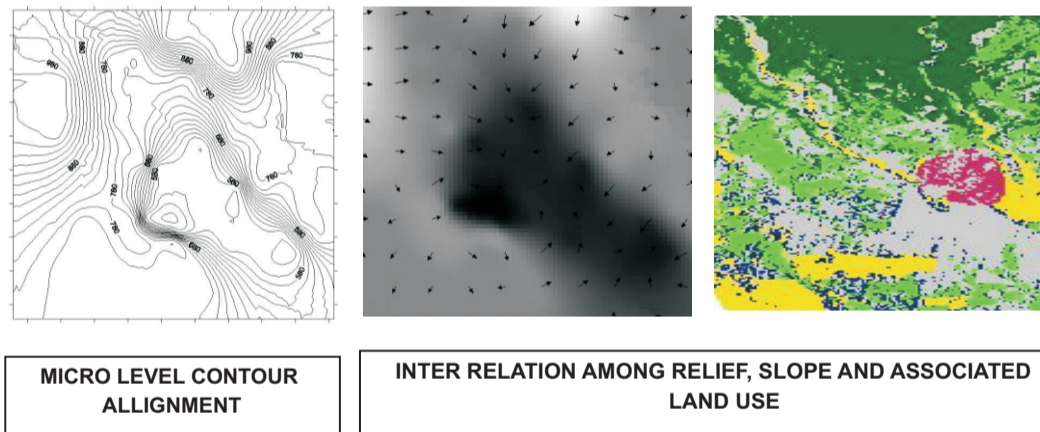
The study has been made in the area of Panchanoi river basin, Sukna, Terai region, North Bengal (25.50 sq. mile area). It is located at the Darjeeling Himalayan foothill region. Siliguri is the nearest town of the studied basin.

BASIN MORPHOLOGY AND FLOW OF WATER

Morphology of a river basin can be analyzed on the basis of different aspects. It has several linear and areal aspects. Some of those criteria can be analyzed on the basis of



Panchanoi drainage basin. If we give stress on the shape of the basin, we find that it is an elongated shaped or leafy shaped drainage basin. On the basis of elevation, it can be said that the relative relief of the drainage basin is greater than 2100 m. The minimum value of



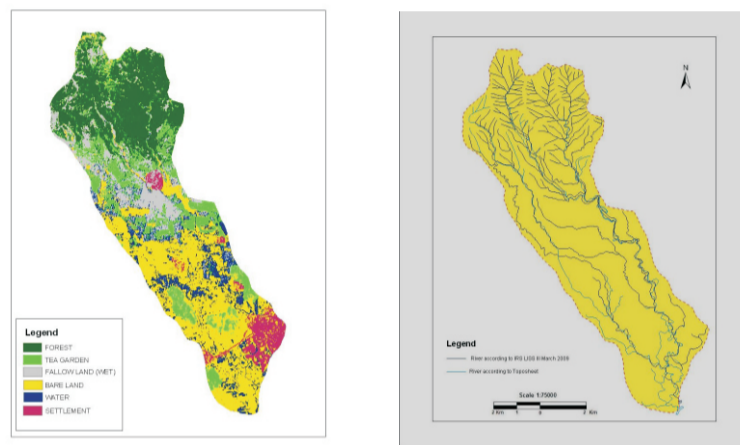
contour in the basin area starts from 400 m. and the highest value of the contour is observed 2500m. The break of slope value is nearer to 550 m. On the basis of slope it can be said that steep slope is only observed in the upstream of the Panchanoi river basin. After getting down the mountainous terrain the river profile becomes very flat and the stream becomes braided.

On the basis of the broad observation of the entire drainage basin the emphasis is given to a certain reach of the downstream of the Panchanoi river. A few number of cross profile have been drawn, as well as a long profile along the stream of a particular reach is also prepared to study the micro relief variation, channel configuration of the studied basin.

This experiment and its result is nothing but the replica of the entire drainage basin. Thus we can easily get a basic conception over all the morphological characteristics of the drainage basin. At the same time it can be seen that the long profile denotes a specific notch which is nothing but the break of slope. In the upstream portion the intermediate distance between two contour lines is not very wide but in the portion

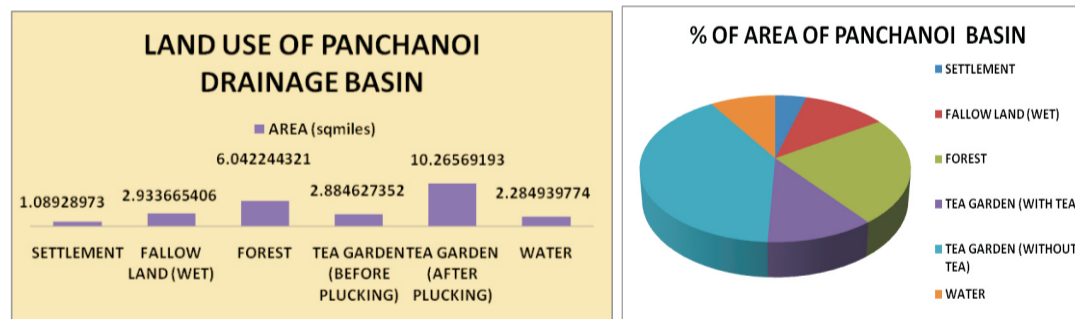
of downstream, followed

by the break of slope point the intermediate distance gradually increases. If we give stress on the specific cross profile, drawn in the particular downstream area shows some specific relief variation across the river bed also. At the same time it has to be considered that the streams show the tendency of oscillation here. A map has also prepared to show the tendency of oscillation as well as temporal change of stream network of the studied area as well as basin.



LAND USE

One of the prime objectives of the present study is to get about the land use of the studied area as well as studied basin. If we give stress on the nature of land use here it is clearly noticed that natural vegetation has pre dominance over the basin area, especially over the upstream segment of the basin. On the other hand it can also be observed that a significant area go under the category of water body or wetted bare land. This particular type of land use shows the temporal variation on the basis of



availability of rain. In the rainy season the total volume of this type of land use gradually increases. On the other hand two significant type of land use can be identified in that downstream area, one of those is settlement and the second one and significant one is tea garden. At the same time it can be said that the settlement density is not so significant in most of the basin. A small settlement patch is found near the Sukna rail station. The main settlement area is located near the Siliguri and its surroundings. But the main anthropogenic activity in this river basin is plantation agriculture. A huge number of tea gardens are located here. Not only that the number of tea garden gradually increases with time to time to solve the economic purpose of the inhabitants.

CHANGING LAND USE AND FUTURE THREAT

Abrupt increase of plantation agriculture in that area clearly refers to the depletion of natural vegetation of the foot hill region. Most of the area is going under the tea plantation and that tea gardens illegally occupy the river bed area of the Panchanoi stream. Thus the stream has been losing its load carrying capacity and the rate of accumulation gradually increases. The river is not capable to carry the higher volume of water in the rainy season through its course. There is an obvious change in channel dynamics also and as a result the rate of bank erosion also increases. The phenomenon like bank failure becomes a daily occurrence in different parts of the studied drainage basin. Due to the encroachment of those tea gardens the natural slope of downstream is very much disturbed and that is why the foot hill area shows a higher tendency of water logging and overtopping in the full bank situation.

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SUBHADIP GUPTA

Lecturer in Geography, PCMM, Bonhoogly, Kolkata

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258/34 Raviwar Peth Solapur-413005,Maharashtra
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