A REVIEW ON INTEGRATED STUDY ON GUNDIA RIVER BASIN-A CASE STUDY

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ABSTRACT

Remote Sensing and Geographical Information System (GIS) has become an efficient tool in delineation of drainage pattern and water resources management and its planning. Geographical Information System (GIS) have been taken to evaluate Linear and Areal aspects of different morphometric parameters using ArcGIS software. The present study deals mainly with the geometry more importance being given on the evaluation of morphometric parameters such as stream order (Nu), stream length (Lu), bifurcation ratio (Rb), drainage density (D), stream frequency (Fs), texture ratio (T), elongation ratio (Re), circularity ratio (Rc), and form factor ratio (Rf). The land-use and land-cover pattern of a region is an outcome of natural and socio-economic factors andtheir utilization by man in time and space. The modelling and projecting of land cover change is essential tothe assessment of consequent environmental impacts.Remote sensing becomes useful because it provides synoptic view and multitemporalLand uses / Land cover data that are often required.Flood depth is considered crucial for flood hazard mapping and a digital elevation model isconsidered to be the most effective means to estimate flood depth from remotely sensed or hydrological data.

Keyword*: Geographical Information System; Morphometric Analysis; ASTER GDEM; Gundia River Basin.*

1. INTRODUCTION

Remote Sensing and GIS techniques are the proven efficient tools in the delineation, updating andmorphometricanalysis of drainage basin. The drainage basin analysis is important in any hydrological investigation likeassessment of groundwater potential and groundwater management. Various important hydrologic phenomenacan be correlated with the physiographic characteristics of drainage basins such as size, shape, slope of drainagearea, drainage density, size and length of the tributaries. Remote sensing data can beused in conjunction withconventional data for delineation of ridgelines, characterization, priority evaluation,problem identification,assessment of potentials and management needs, identification of erosion prone areas,evolving water conservationstrategies, selection of sites for check dams and reservoirsLand use/cover changeanalysis is an important tool toassess global change at various spatial–temporalscales. In addition, it reflects thedimension of human activities on a given environment. As global populationincreases rapidly, pressure exerts on the land

resultingflimsy cohesion among environmental variables. The rapid changes of land use/cover than ever before, particularly in developingnations, are often characterized by rampant urbansprawling,land degradation by agricultural development andtourism industry, or thetransformation of agricultural land to shrimp farmingensuing enormous cost to the environment. This kind ofchanges profoundly affect local and/or regionalenvironment, which would eventually affect theglobal environment. Human induced changes in landcover for instance, influence the global carbon cycle,and contribute to the increase in atmospheric CO2. Unusual or above normal surface water flow thatinundate otherwise high ground is called a flood. Floodhazard has long been recognized as one of the mostrecurring, widespread and disastrous natural hazards in thedensely populated regions of South Asia. In many parts of Indian subcontinent, flooding reaches catastrophicproportions during the summer season. Flooding is notjust confined to monsoon Asia but is a globally pervasivehazard. Therefore, flood monitoring for damage and reliefmanagement is a prerequisite. In recent years, satellitetechnology has become extremely important to providecost-effective, reliable and critical mechanism for prevention,preparedness and relief management of flooddisaster. With the availability of multiple satellite data, itis now possible to monitor flood situation in the particulararea.

2. LITERATURE REVIEW

2.1Study of Geomorphology and Drainage Basin. TriptiJayal et.alThis paper discusses a new and more suitable methodology for drainage network. The Kaphani River originates from Kaphni glacier at the height of 3810m and is located in the central Himalaya of Uttarakhand at Bageshwar District in Kumaon region. It is the fourth order stream of Pindar river and its confluence point to Pindar River is at the height of 2544m which is known as Dawali. In this study morphometric analysis of the Kaphni basin developed in a shear zone of central Himalaya is reported. The main aim of this study is to analysis morphometric parameter of river basin area. The geometric properties of drainage basin are estimated on Topographical Sheet, Satelliteimagery and GIS techniques on the scale of 1:50,000. The study gives a wide description of drainage networkanalysis, like streams order, drainage density, drainage frequency, length ratio, relief ratio etc. and these are clearevidences for the structural control. The drainage analysis involves the study of drainage textures. The drainagefeatures of the Kaphni gad Basin are dependent on the geology, geomorphology, topography and climate.

2.2Morphometric Analysis.A.K. Bharadwaj et.al [2] Remote Sensing and Geographical Information System (GIS) has become an efficient tool in delineation of drainage pattern and water resources management and its planning. Adyar watershed in the Chennai basin with an area of 686.13 Km2 was taken up for the study. In the present study, with the aid of GIS several morphometric parameters were determined to understand the nature, landscape development and hydrologic responses of Adyar watershed. The Shuttle Radar Topographic Mission (SRTM) data is used for the morphometric analysis of the watershed to derive linear, relief, and aerial aspects. Strahler's stream ordering techniques and analysis were followed for further analysis. This study would be of assistance to utilize the resources for sustainable development of the watershed

2.3Application of Remote Sensing andGis, Land use land cover. BhagawatRimalThe land-use and land-cover pattern of a region is an outcome of natural and socio-economic factors andtheir utilization by man in time and space. Land-use and land-cover change has become a centralcomponent in current strategies in managing natural resources and monitoring environmental changes.Remote sensing and Geographical Informationsystem (GIS) provide fundamental tools which can be useful in the investigation at the village district aswell as the city levels. Remote sensing becomes useful because it provides synoptic view and multitemporalLand uses / Land cover data that are often required. All Landsat images of Kathmandu city are rectified and registered in Universal Transverse Mercator (UTM) zone 45 N andSupervised image classification system has been observed to classify the images in different land usecategories. Five land use classes have been identified. GIS is the technology which has been used to view and analyze data from ageographic perspective.

2.4 Development of flood hazard maps. MD Monirul Islam et.al Flood hazard maps were developed using remote sensing (RS) data for the historical event of the 1988 flood with data of elevation height, and geological and physiographic divisions. Flood damage depends on the hydraulic factors whichinclude characteristics of the flood such as the depth of flooding, rate of the rise inwater level, propagation of a flood wave, duration and frequency of flooding, sediment load, and timing. In this study flood depth and "flood-affected frequency "within one flood event were considered for the evaluation of flood hazard assessment, where the depth and frequency of the flooding were

assumed to be the majordeterminant in estimating the total damage function. Different combinations ofthematic maps among physiography, geology, land cover and elevation wereevaluated for flood hazard maps and a best combination for the event of the 1988flood was proposed. Finally, the flood hazard map for Bangladesh and a flood risk map for the administrative districts of Bangladesh were proposed.

3. CONCLUSIONS

The study comprised of morphometric analysis, Land use and Land cover analysis of the study area. The morphometric characteristics like stream order, stream length, drainage density, bifurcation ratio, circulatory ratio, elongation ratio etc. are analysed.The present study has brought out that the varied characteristic of drainage network is due to the geological and climatic condition of the study area. Thus, the result obtained can be used in watershed management strategy. GIS softwares have demonstrated that they have great significance in the morphometric analysis of the drainage basins. On the basis of the drainage orders, has been classified as seventh order basin. The mean Rb indicates that the drainage pattern is not much affected by geological structures. Drainage density (Dd) and stream frequency (Fs) are the most important criterion for the morphometric categorization of drainage basins which unquestionably control the runoff pattern, sediment yield and other hydrological parameters of the drainage basin.Multi-temporal land use, landcover classification using topographic mapsand remote sensing was described in this paper. Usinga post-classification comparison, the dynamics of land use land, cover change are presented. The result revealedthat we are experiencing rapid urban growthleading to the quick loss of rural and arable lands.

4. REFERENCES

1. Tripti Jayal, **Study of geomorphology and drainage basin charcteristic of Kaphni Glacier**, ISSN: 2348 – 0343, International Journal of Interdisciplinary and Multidisciplinary Studies (IJIMS), 2015
2. A.K.Bharadwaj, **Morphometric analysis of adhyar watershed**, IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE) e- ISSN: 2278-1684, 2014.
3. BhagawatRimal, **Application Of Remote Sensing And Gis, Land Use/Land Cover Change In Kathmandu Metropolitan City**, 2005 - 2011 Jatit&Lls.
4. Kamila klemesova, **Using gis in the flood management**– FLOOD MAPS, GeographiaTechnica, Vol. 09, Issue 2, 2014.
5. Pawar Amol D, **Application of GIS for Flood Mapping: A Case Study of Pune City**, e-ISSN No.:2349-9745, Date: 28-30 April, 2016 @IJMTER-2016
6. Jieying Xiao, **Evaluating urban expansion and land use change in Shijiazhuang**, China, by using GIS and remote sensing, Landscape and Urban Planning 75 (2006) 69–80, 2000.
7. Meena Y.R, **A Study on Urban Flood Vulnerability Vrishabhavathi Valley Watershed, Bengaluru**, Karnataka using AHP, GIS and RS Techniques, ISSN 2320 – 0243, 2017
8. Fei Yuan, **Land cover classification and change analysis of the Twin Cities** (Minnesota) Metropolitan Area by multitemporal Land sat remote sensing, Remote Sensing of Environment 98 (2005) 317 – 328, 2017
9. Vishnu Dayal, **Quantitative Morphometric Analysis of Bhadar River Basin**, India using ASTER (GDEM) Data and GIS, ISSN 2320 – 0243, International Journal of Advanced Remote Sensing and GIS 2015.
10. Tribhuvan, **Morphometric Analysis of a Phulambri River Drainage Basin** (Gp8 Watershed), Aurangabad District (Maharashtra) using Geographical Information System, ISSN 2320 - 0243, International Journal of Advanced Remote Sensing and GIS 2016.
11. B. Satheesh, **Gis Based On Morphometric Analysis of Part of Manair River Basin** in Karimnagar District, Telangana State, IOSR Journal of Applied Geology and Geophysics (IOSR-JAGG) e-ISSN: 2321–0990, 2017.