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Preparation of Drainage Map using Geo informatics

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Abstract*: Remote sensing Technology is influences to lesad the everyday life of human beings, ranging from to study the weather changes and Resources management. This attempt deals with the use of Geospatial Technology for preparation of drainage nets work mapping of Vamsadhara River Basin to study the drainage characteristics. The geo coded Remote sensing Satellite data and toposheets collected from Survey of India to conduct primary study. Visual Interpretation technique has been applied and field work also done to gathered the data from different departments to prepare the final drainage map. This drainage map has been scanned and digitized using Arc Info software .the generated digital information is linked with the spatial and attribute data base. Integration of above data using GIS software drainage map has been prepared. This type of drainage map is very useful for decision makers to effective water management and monitoring of water resources based on the predetermined water resources action plan.

Keywords: Drainage map, Remote Sensing, Geographical Information system

I. INTRODUCTION

Water table is becoming a scarce due to utilization human activities. to meet the increasing demands for basic human needs and welfare optimal use is essential for the selection, planning and implementation of water resources management. The managing natural resources and monitoring environmental changes Water resource is a key component. The drainage map preparation has useful to improve the research on water to provide an correct estimation of the water status and its priority to improve the importance. The human development depends on the use of water. The drainage map give the present drainage and its changes its useful for decision makers for water resource planning. Water is play very key role for land use, ecological, urban cluster development. GIS and Remote Sensing technology is providing new techniques for better management of drainage. The study is the Vamsadhara river basin having a spatial extent of 10,515 km^2. It is one of the major basins in southern part of India. The survey of India topographic maps that cover the entire watershed are 65M/5-16, 65N/9, 65N/13-15, and 74/1-8 and B/1-3 and 74B/5. It is located in between the 83^0 15^1 and 84^0 57^1 E longitude and 18^0 15^1 and 19^0 57^1 N latitude (Fig:1) The basin forms part of Orissa and Andhra Pradesh States. The water flow is along the south easterly direction. The area includes mineral soils of various textures as well as organic soils.

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II. OBJECTIVE

To prepare Drainage map using the Survey of India toposheet and Satellite data for water resources management

III. METHODOLOGY

III.I. Data Collection:

The Survey of India (SOI) toposheets of 65M/5-16, 65N/9, 65N/13-15, and 74/1-8 and B/1-3 and 74B/5 on 1:50,000 scale. And merged data of IRS–1D PAN and LISS-III satellite imagery obtained from National Remote Sensing Centre, Hyderabad, India. The remaining data collected from related organizations.

III.II. Database Creation:

Using SOI toposheets ground control points and EASI/PACE Image processing software Satellite imageries are geo-referenced and prepared final hard copy image of study area. The drainage map has been prepared using visual interpretation technique in the final hard copy of Image. This map has been scanned and digitized using Arc/Info, ARCVIEW software for generation of digital drainage map and field work conducted for confirmation of drainage network patron in the study area. The above all the data's has been integrated for preparation of final output.

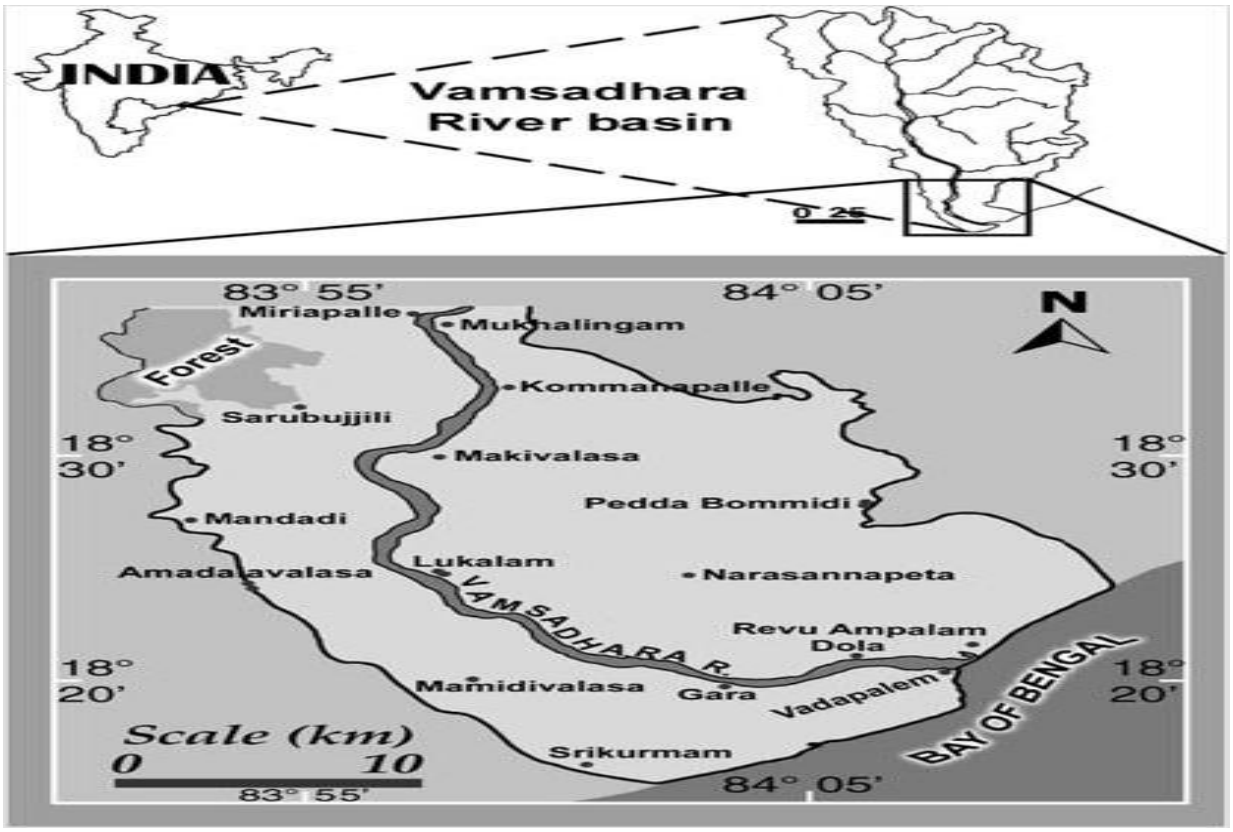


Figure 1: Location Map

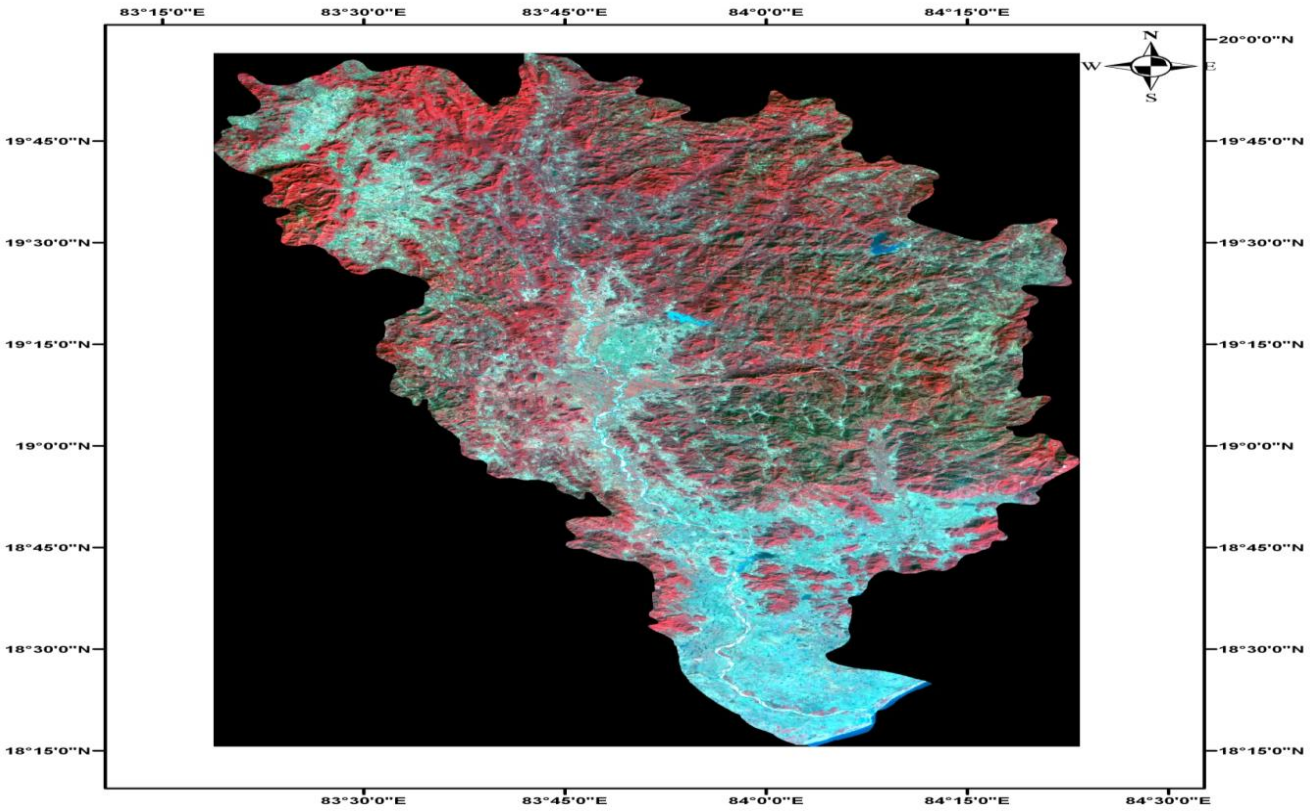


Figure 2: Satellite Image of study area

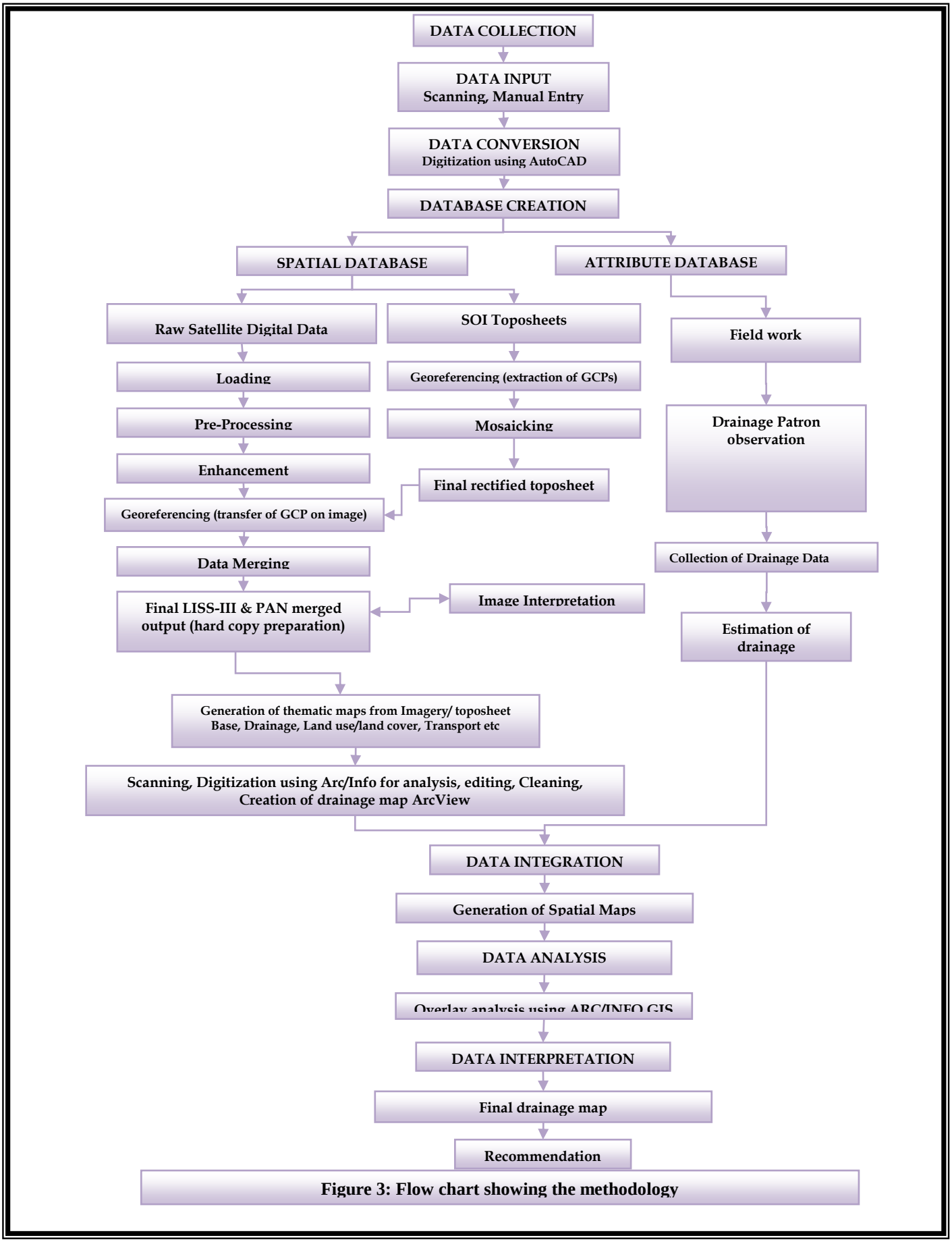


Figure 3: Flow chart showing the methodology

IV. RESULTS AND DISCUSSIONS

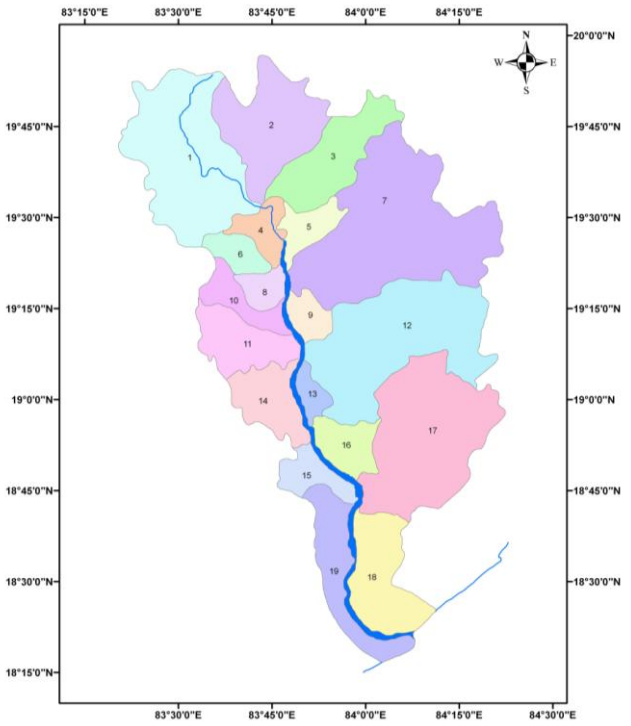
The total length of the river is 125 km is in Andhra Pradesh. The important tributaries of the river are Chuvaldhua, Poladi, Gungudu, Sannanoi and Mahendratanaya, Bhangipedda, Peddadedda and Bellagedda. The river is prone to frequent floods. This is interstate drainage basin between Andhra Pradesh and Orissa. The river joints the sea at Kalingapatnam.

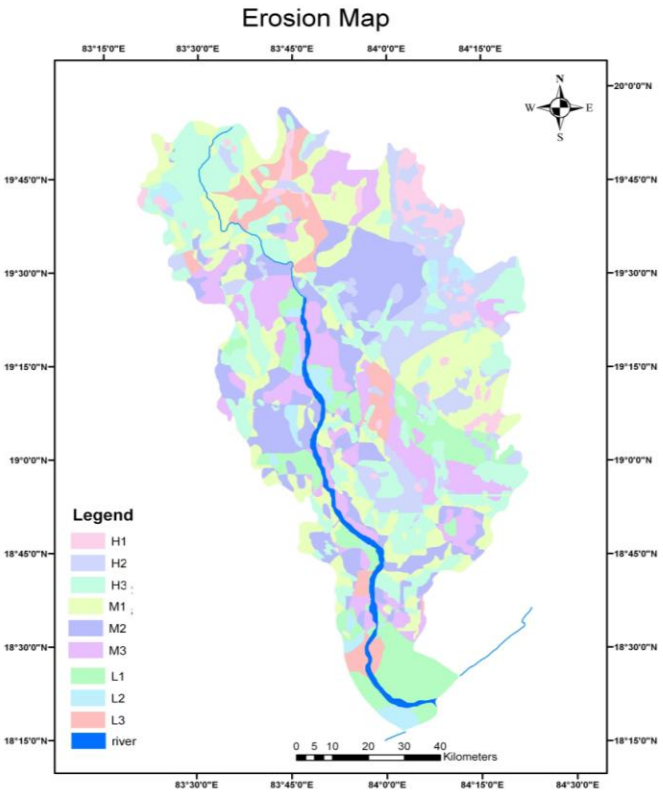
IV.I.Drainage Density

It is an important indicator of landforms impacts in the stream eroded topography. An increased drainage density means a proportionate decrease in the size of individual drainage units of the first ordered streams. The study of drainage density parameter is associated with rock type, relief, runoff and slope. Drainage density is important in hydrology as it is one of the factors that control the speed of runoff following a period of precipitation. Dense Drainage density is calculated for each sub-basin. According to the sub-basin wise analysis, The low drainage density of the sub-basin 18 is because of its high infiltration soils with very low relief. Similarly the sub-basin 19 has a drainage density more than the sub-basin 18 because this is occupied by steep hills on the north western side. The high drainage density is obtained for the sub-basins 2, 3, 5 and 10. This is correlated with dense vegetation and high relief10. Except basin nos. 9, 18 and 19 the order basins are well drained and could be classified as excellent type of drainage. The basin No.18 is poorly drained and the sub basins 9 and 19 have medium drained densities.

IV.II. Stream Frequency:

Stream is an important parameter, along with drainage density. Generally it is used as a supplementary measure of the fineness of the texture of the topography. It is associated with litho logy, degree of slope, stage of fluvial cycle and amount of surface runoff. High frequencies are observed for the sub basins 2, 3, 5 and 6(more than 6.0) in the regions of non-homogenous bed rock and thick vegetative cover11. The

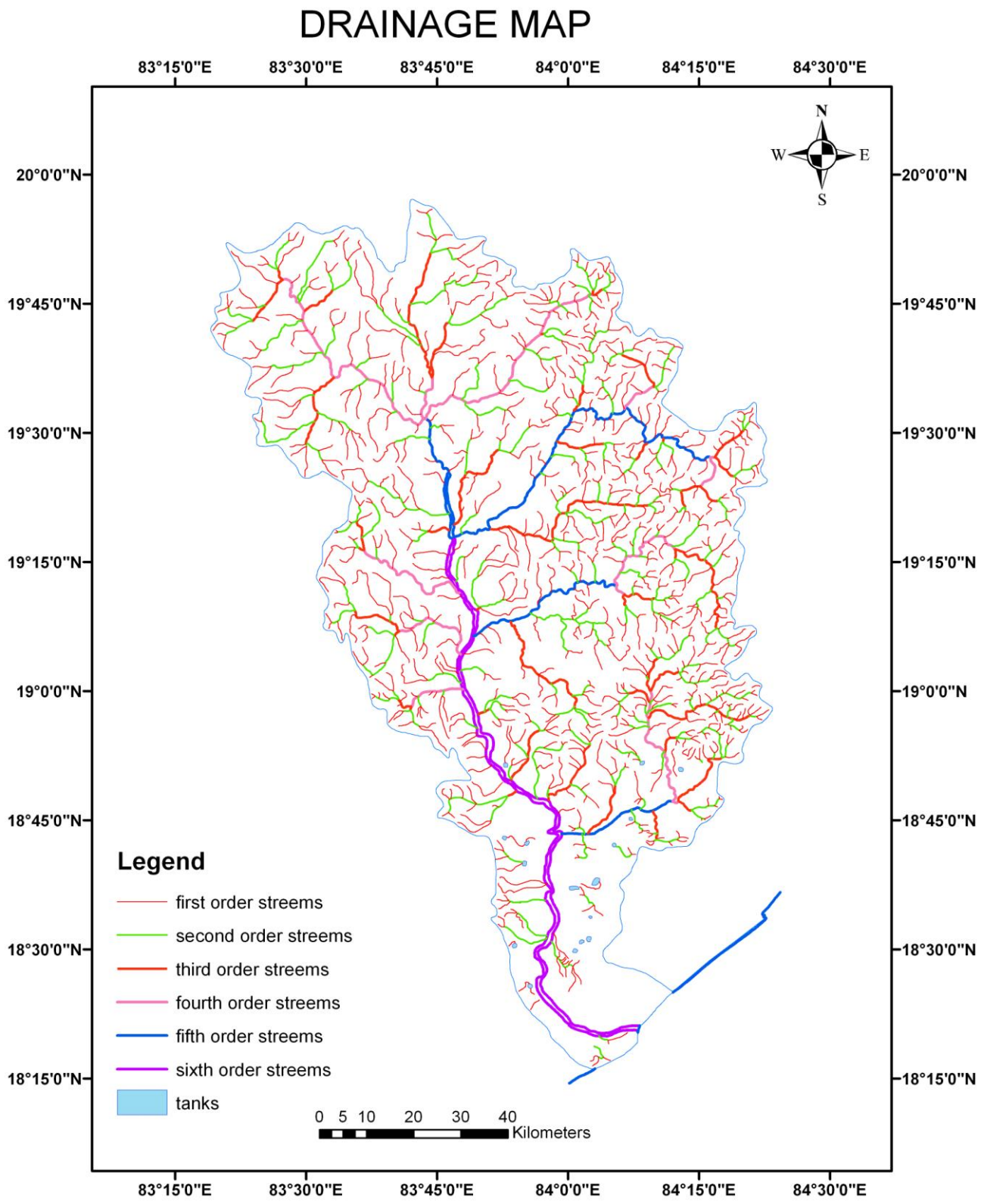




river basin shows almost a positive correlation between drainage density and stream frequency as inferred from the linear correlation coefficient value (0.92).

IV.III. Drainage Erosion:

The texture of topography depends upon two classes, natural factors and map factors. The natural factors are impact texture ration, climate, vegetation, rock type, rainfall, infiltration rate of soil, relief and stage of development observed in sub basins 12. the weak rock not protected by vegetation, it's produce fine texture, the course texture form because of massive resistant rocks. The humid climate has been observed in sub basins 13 because of Sparse vegetation, arid climates due to this finer textures are developed in similar rocks. the erosion cycle initial and early stages Texture tends the coarse of soil. The finest in early stages and maturity observed in relief is greatest.



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