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Research paper

Drainage Network Alignment for Namakkal District By Using GIS

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Abstract

Drainage specifies the groundwater conditions and assurance of speed and groundwater stream of a region. Arrangement of drainage as characteristic and technogenic segments on level of drainage basis. Alignment of sewers and water drains must has regular drainage pattern for maintain a strategic distance of surface obstacles. Arrangement of drains is a typical methodology consider elements like geography, land use, land cover and right of way will assume vital part. For the preparation of topographic data used advanced GIS techniques. The following results will obtained using GIS for Namakkal dist such as erosion network, density and depth of erosion network, as well as land surface sloping and further total evaluation as a drainage parameters. Also mentioned the valuable suggestions for better drainage management and drainage rate and disaster management at the time floods.

Keywords: *Drainage, network alignment, Namakkal district, GIS*

1. Introduction

1.1. General

Rapid urbanization is the cutting edge pattern and this urban sprawl brings about increment of populace thickness, impervious cover, water and strong wastes. This urbanization requests modernization of existing drainage pattern in sparing way. The financial aspects can be accomplished just if drainage design takes after normal streams. Drainage arrange proficiency in a situation is perplexing in nature. This requires sufficient experience of the arranging engineer and suitable information. Urban territories are described with dynamic change regarding demography, arrive utilize, expectations for everyday comforts of occupants, increment in per capita water request and therefore in the waste water that is discharged from family units and businesses.

1.2. Drainage Pattern

In a drainage system, a stream or a waterway is a characteristic conduit, streaming towards a sea, a lake, or another waterway. Aside from a couple of situations where a waterway essentially streams into the ground or becomes scarce totally before achieving another waterway, waterways dependably associate together to frame systems, accomplishing a specific drainage design. The stream design portrays the morphological structure of a waterway organize at the stream bowl scale and is not the same as the channel design which depicts the waterway morphology at the waterway channel scale. There are a few kinds of drainage designs. Slope geomorphology and hydrologic factors are essential contemplations in the area, outline, and development of a street. Slope morphology impacts street drainage and at last street stability. Essential elements are slope shape (uniform, curved, sunken), slope inclination, slope length, stream drainage attributes (e.g., twisted, dendritic), profundity to bedrock, bedrock qualities (e.g., cracked, hardness, bedding), and soil surface and penetrability. Slope shape gives a sign of surface and subsurface water focus or dispersion.

2. Methodology

Methodology explained in Fig 1.

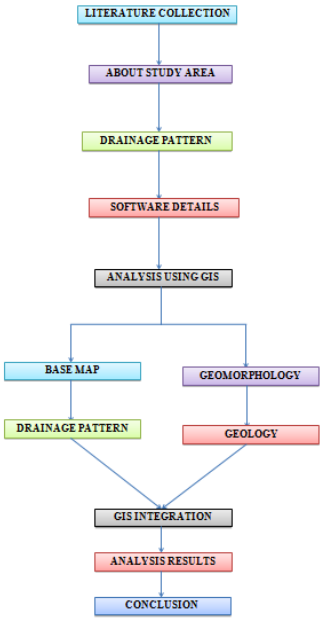

Fig.1: Methodology

3. About Software

3.1. Functions of GIS

- Data pre-processing, manipulation & retrieval
- Data analysis
- Data display
- Database management

4. Analysis Results

Fig.2 shows the study area.

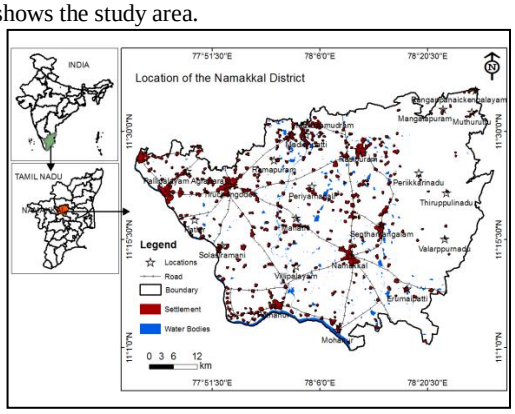

Fig. 2: Study area

Fig.3 shows the geomorphology map of Namakkal district.

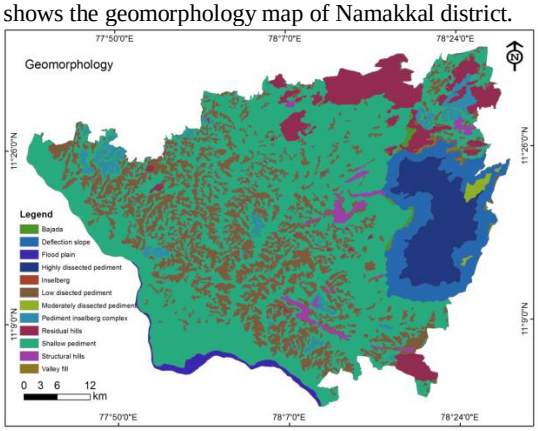

Fig. 3: Geomorphology Map of Namakkal dist

Fig.4 shows the geology map.

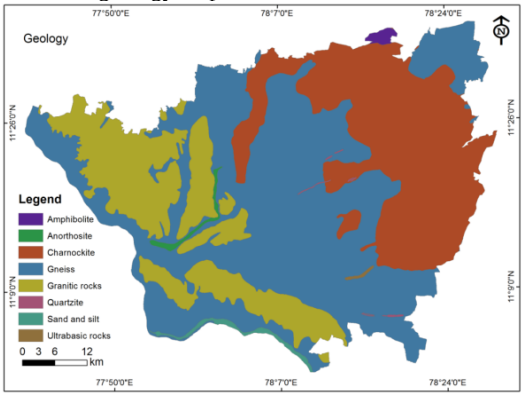

Fig. 4: Geology map

4.1 Application Technique of GIS in Analysing Digital Elevation Models

GIS analysis categorized in 3 various steps which is base map preparation using point features with height grids data. The resultant map is transporting the obtained DTM data to GIS. Next step is data processing by DTM data, For the calculation of surface runoff and its flow direction for each unit cell for surrounding area. Final step of analysis is mapping of drainage network density and depth. In this study relationship between surface and underground water determines the potential discharge Of drainage network. Hydraulic gradients indicates by surface slope value. The map elements are classified as low drained, poorly drained, moderately drained and well drained. Fig.5 shows Road network Map.

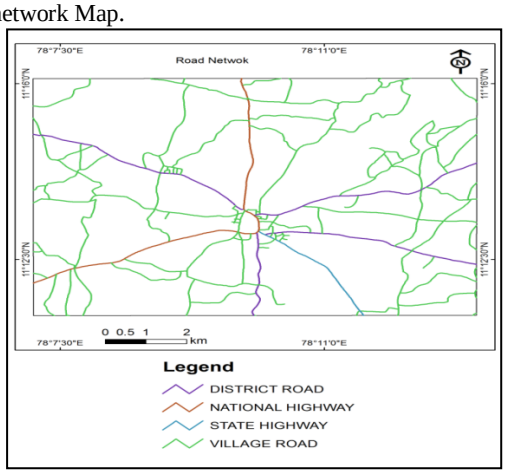

Fig. 5: Road network Map

Fig.6 shows SRTM DEM Image.

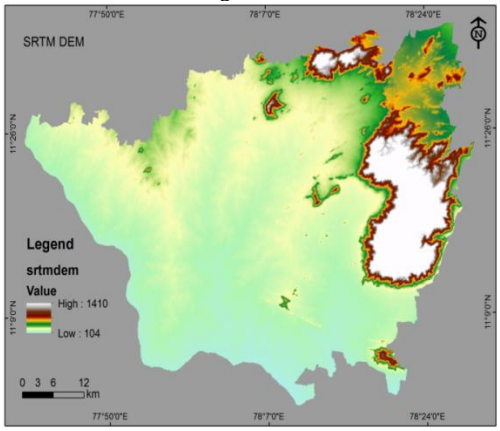

Fig.6: SRTM DEM Image

Fig. 7 shows Drainage Pattern.

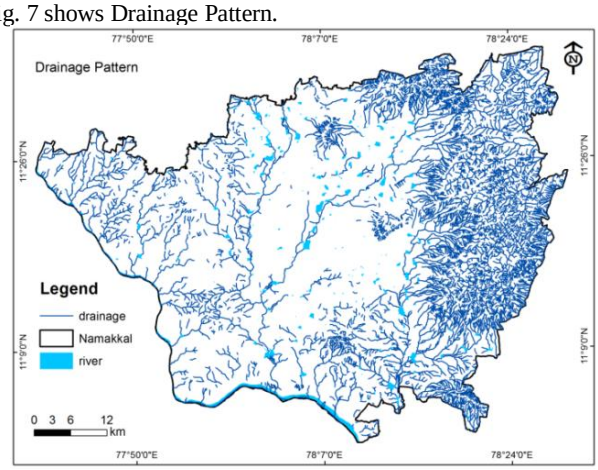

Fig. 7: Drainage Pattern

Table.1 shows Indexes of drainage rate.

Table 1: Indexes of drainage rate

	Density of erosion network min-max	Depth of erosion network	Surface area slope, Min-max	Drainage co-efficient Min-max
	Km/km^2 (number)	m(number)	Degree(number)	(number)
Well drained	0.01-0.03 (0.33-1)	31-62 (0.5-1)	4.8-17.3 (0.28-1)	1.01-3
Moderately drained	0.005-0.01 (0.17-0.33)	9-31 (0.14-0.5)	2.4-4.8 (0.14-0.28)	0.45-1.01
Not drained	0-0.002 (0-0.07)	0-4 (0-0.06)	0-1.2 (0-0.07)	0-0.2

5. Conclusion

Our investigation directed on the case of Namakkal demonstrates that advanced geo data frameworks utilized as a part of the qualitative plotting of the drainage organize and decide its fundamental attributes of study region. In light of the acquired information, a regional drainage assessment was led. Remote detecting satellite information and GIS strategies have been ended up being a compelling device in drainage outline. Raster based guide investigation gave an abundance of abilities to joining territory data encompassing straight infrastructure. Expenses coming about because of territory, geomorphology, arrive utilize and drainage for the examination region.

- To monitor and efficiently control the geological environment conditions;
- To assess probability, scale and intensity of the human impact after growth;
- The network map can be effectively used in alignment of drains.

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