

Urbanization Effects On Land Use/Land Cover and Water Quality Using GIS

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ABSTRACT

Water is basic to individuals and the biggest accessible wellspring of crisp water lies underground. Expanded requests for water have animated investigation of underground water assets. Water assets get contaminated because of fast industrialization, headway in agrarian methods, expanding populace and other unfavourable effects of situations. Every one of these elements may bring about changing the hydrological cycle. The urban natural quality dependably relies upon the utilization of land. The nature of the earth is controlled by concentrate the land utilize highlights and their effects are investigated. In the present investigation, an endeavour is had to assess the effect of land use/land cover on groundwater nature of Zone VII under the Greater Hyderabad Municipal Corporation (GHMC) zone. Different topical maps are set up from the toposheet on 1:50000 scale utilizing ArcGIS Software. The land-use/landcover guide of the investigation region is set up from the straightly improved melded information of IRS-1D PAN and LISS-III satellite symbolism by utilizing Visual Interpretation Techniques. Groundwater tests were haphazardly gathered at pre-decided inspecting areas dependent on satellite symbolism of the investigation zone. Every one of the examples was broken down for different physical-synthetic parameters embracing standard conventions for the age of trait information. In view of the outcomes got maps demonstrating spatial circulation of chose water quality parameters is set up for the examination region. The varieties in the groupings of water quality parameters showed high convergences of Alkalinity, TDS, Fluoride, Hardness, Nitrates are surpassed as far as possible while different parameters like Sodium, Sulfate and Chloride were inside as far as possible aside from in a couple of zones like Golnaka, Imlibun, Kamalanagar and so forth., which might be ascribed to leakage of residential squanders through open nallahs and modern squanders. The water quality file (WQI) in the examination region is computed to decide the appropriateness of groundwater for drinking reason. Diverse appraisals of water quality have been seen which showed falling apart nature of groundwater. Control and therapeutic measures for the change of groundwater quality in the examination zone are proposed.

Keywords : GIS, Land Use/Land Cover, Remote detecting, Spatial Maps, Water Pollution.

I. INTRODUCTION

Hyderabad city, the capital of the province of Telangana is situated at the core of the Deccan level of the Indian sub-landmass. Hyderabad urban agglomeration territory covers one-fifth of the

aggregate urban region of Telangana state. The expansion in the populace and developed territory, the weight has expanded on the metro enhancements and is specifically influencing the nature of the condition. The two fundamental reasons for the examination are fast development in populace,

uncontrolled industrialization and unchecked movement. Study zone appears in Figure 1.

Ground Water Contamination

Many human exercises, for example, urban improvement, modern preparing, horticultural practices, synthetic spills, business/local squanders and family septic frameworks cause huge ground-water sullyng in regions that beforehand had perfect, consumable groundwater.

Goals of the Study Area

- 1) Assessment of the effect of Landuse/Landcover on groundwater quality in the investigation region
- 2) To dissect the evaluated groundwater quality and its appropriateness for drinking reason.
- 3) Determination of water quality list by utilizing factual methodology.
- 4) To make spatial maps for water quality and feature the zones under ecological pressure.

II. METHODS AND MATERIAL

Wellspring of Data Products: Satellite information from National Remote Sensing Center (NRSC) (IRS-ID LISS-III + PAN), Topo sheets of 1: 50,000 scale from Survey of India (SoI), water tests are gathered from the investigation zone.

The strategy considered for the investigation of ecological effects on an urban combination of part of Hyderabad City i.e. Zone-VII (think about zone) is fundamentally a five stages process. They are as following:

- (i) Spatial computerized database and Attribute advanced database creation.
- (ii) Integration of spatial database and Attribute database.

- (iii) Estimation of Ground Water Quality and Water Quality Index.
- (iv) Preparation of Spatial dispersion maps for the examination zone utilizing water quality information.
- (v) Comparison of Land Use/Land Cover and Ground Water Quality changes.

III. RESULTS

Land Use/Land Cover Map: Comprehensive data ashore utilize/arrive cover is the fundamental essential for land assets assessment, appraisal, use and administration (Figure 2). Today, with expanding populace weight ashore and the subsequent changes in the land utilize example and procedures, an extensive level of land change and ecological weakening is being seen (Table 1).

Along these lines, it is vital to comprehend the circumstances and end results of the progressions through logical examinations.

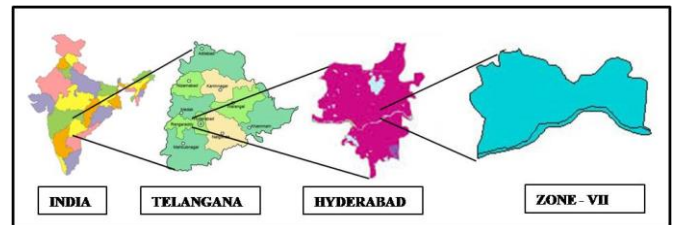


Figure 1. Location Map of the study area

FUSED DATA OF IRS IC PAN AND IRS LISS III IMAGERY OF ZONE VII UNDER MCH

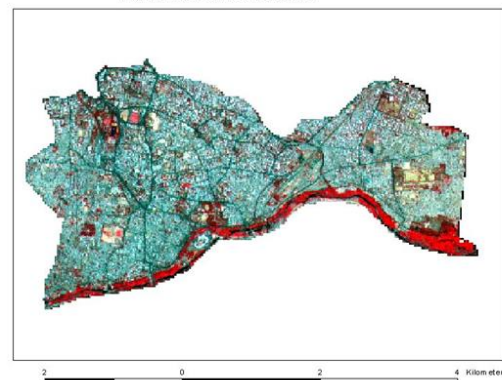


Figure 2. Satellite imagery and Land use / Land cover classified map of the study area

LAND USE class	AREA in Sq.Kms
Water Bodies	7.053
Land with scrub	10.678
Land without scrub	9.505
Plantation	0.303
Barren sheet area	9.36
Medium residential	36.103
Sparse residential	16.691
Dense residential	77.986
Public related places	1.74
Quarries	0.3
Agricultural land	1.605
Rivers	3.422

Table 1: Existing Land Use Pattern of the study area

1. Estimation of Water Quality Index (WQI) for the contemplate territory

An aggregate number of nine water quality parameters are assessed from 43 water tests arbitrarily gathered at various areas in the examined territory. These water quality parameters are assessed dependent on the standard techniques for water quality investigation. Spatial dispersion of every last one of the water quality parameter is produced on ArcGIS programming. These maps are produced based on the reconciliation of spatial and property database. The spatial dispersion maps may give an

unmistakable suspicion of the water quality in the examine territory. The nine water quality parameters pH, alkalinity, chlorides, sulfates, nitrates, sodium, add up to hardness, TDS and fluorides are considered for the estimation of water quality file for this zone.

2. Water Quality Index Computations

The list can be processed utilizing the technique proposed by Tiwari and Mishra, 1995.

Discussion

The water quality Index can be an exceptionally extraordinary and effective instrument for imparting the data on by and large nature of water. In the present examination, the water quality rating in MCH Zone VII shifted from great, poor, extremely poor to unfit for human utilization. The water nature of a place might be identified with land use in that area. The more land use more will be natural corruption.

From the Land utilize/Land cover and water quality record got in the present study.

It is seen that water quality has weakened in the examined territory. Private and business zones are sensibly great but Golnaka which demonstrated high estimation of fluoride. Anyway, water quality is poor in a few business zones like Narayanaguda, Begumbazar, Nimboliadda and in Amberpet where little scale ventures like flour mills and paper mills are found. Extremely poor water quality is found in thick private zones like Police Academy, close L.B. Stadium, Bazarghat, Navbath Rahar and so forth, which might be expected to drainage of local sewage. In zones like Golnaka, Zindathnagar, Koti, Hyderguda, Goshamahal, Imlibun, Sewerage treatment plant at Amberpet the WQI demonstrated that water isn't fit for human consumption. This can be attributed to high groupings of Fluoride, TDS,

Nitrates and Alkalinity saw in the above areas. Fluoride and hardness demonstrated the greatest centralization of (5.83 mg/l and 710 mg/l) separately at Golnaka. While most noteworthy estimations of TDS (1180 mg/l) at Imlibun transport station, the most noteworthy estimation of Alkalinity (690 mg/l) at Kamalanagar, Nitrate of 140 mg/l near Bathkammakunta were observed. The probability for the high fixation saw in the abovementioned parameters are sullyng of groundwater by household sewage and furthermore because of the way that sewage is specifically released into Musi River, Stream of Musi Stream (Kamalanagar Musi) and, Bathkammakunta.

3. End

In light of the water quality information got from physical substance examination and WQI, the zones where groundwater indicated high centralizations of water quality parameters are identified. The results demonstrated that specific parameters, for example, fluoride, TDS, Hardness, Alkalinity, Nitrates surpassed the passable points of confinement as given by the Bureau of Indian Standards. Concentrations of Sodium, Sulfate and Chloride and Phosphate were seen to be inside the permissible limits. The Recommendations are proposed dependent on the wellspring of poison and drinking water gauges of the parameters and the related land use.

Control of Fluorides

Water in contact with regular stores of fluoride, for example, flourspar and fluorapatite are found to contain the excess of fluoride. Nalgonda Method created by Neeri is utilized. It includes powder pursued by quick blending, flocculation, expansion of aluminium salts, lime and fading Sedimentation and filtration.

Control of TDS

Groundwater constantly contains broke up solids. The rainwater permeating through the dirt stratum break up salts like chlorides, fluorides, nitrates and so forth. The more profound the water permeates, the higher will be the broken down solids in groundwater. expulsion of broke down solids has been attempted with Coagulation, Ion Exchange,

Reverse Osmosis and Electrodialysis.

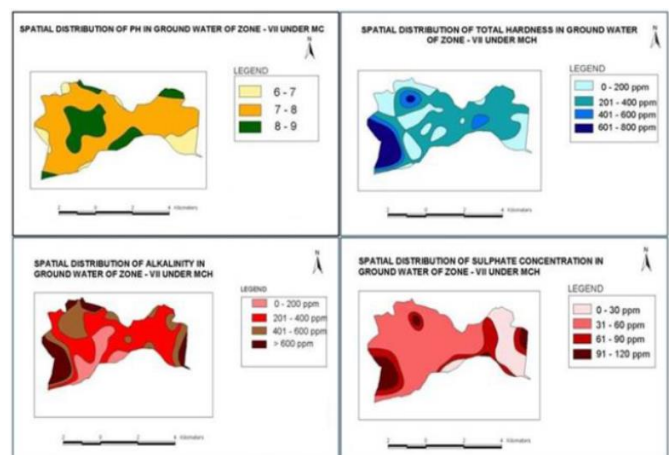
Control of Hardness

Hardness of Water isn't actually a contamination parameter, however, shows water quality (delicate water or hard water). The hardness substance of a water test can be lessened by the lime pop process.

Control of Nitrates

Natural constituent of groundwater is nitrate. High centralizations of nitrate may demonstrate wellsprings of past or present contamination. The principle wellspring of nitrates is synthetic manures, rotting vegetable, creature matter, local waters and modern releases.

Control of various wellsprings of contamination is important to keep groundwater from contamination.



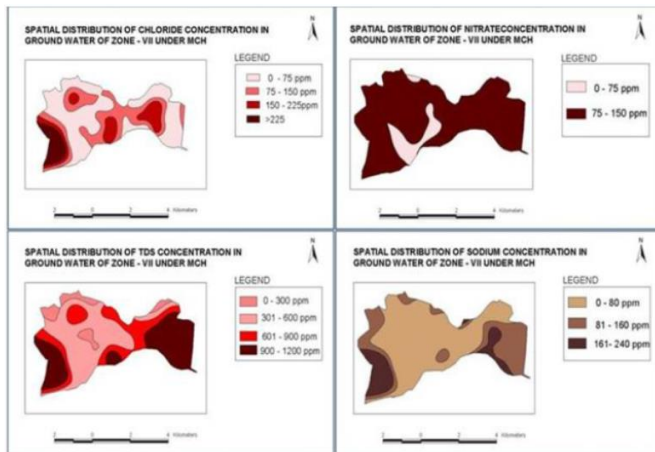


Figure 3. Spatial Distribution maps of the study area for various water quality parameters

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