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## Mapping Of Existing Waste Dumping Sites And Newly Proposed Waste Dumping Sites In And Around Chitradurga Taluk, Karnataka State, Using Remote Sensing And GIS Techniques.

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### ABSTRACT

*The management of municipal solid waste has become an acute problem due to enhanced economic activities and rapid urbanization. Increased attention has to be taken to handle this problem in a safe and hygienic manner. The village Dyamavanahalli, which is situated about 8 Kms north east of the Chitradurga city, Karnataka, South India, which covers an area of 36 acres. The Waste is being dumped from last 3 yrs. An attempt is made to study the mode of action of waste dumping sites by digital mapping techniques. Geomorphology, Land use/Land cover, and slope map etc. has been prepared for the study area, results shown the Landfill site is in the high slope region where rain water which passes through this may pollute the agricultural fields surface and groundwater in the low lands of the Landfill sites.*

**Keywords : Google Earth, Remote Sensing, GIS, Waste dumping Sites**

### Introduction:

Land fill sites were originally small informal and uncontrolled tips used by local authorities or industry for the disposal of waste to land. As urban sites became more scarce, larger sites were developed towards the edges of towns and cities.

Chitradurga one of the district headquarters of Karnataka, located at a distance of 202 Kms northwest of Bangalore, in the heart of the Deccan Plateau, lies in the Heart of Vedavathi River Valley with Tungabhadra River flowing in the Northwest direction. In the study area, the existing Landfill site is located near the village Dyamavanahalli of, which is situated about 8 Kms north east of the Chitradurga city which covers an area of 36 acres. The Waste is being dumped from last 3 yrs. Other than the Landfill site, the Municipal waste is also dumped near the Highways near Agricultural lands and also in and around the city. About 14 ground water samples were collected in the study area during the month of february 2011. Water sample locations are well distributed throughout the study area. The impact of landfill leachate on the surface and groundwater has given rise to a number of studies in recent years (Saarela, 2003; Abu-Rukah and Kofahi, 2001; Looser et al., 1999; Christensen et al., 1998; De Rosa et al., 1996; Flyhammar, 1995). Many approaches have been used to assess the contamination of underground water. It can be assessed either by the experimental determination of the impurities or their estimation through mathematical modeling (Moo-Young et al., 2004; Hudak, 1998; Stoline et al., 1993; and Butwa et al., 1989).

Pesticides are another source of groundwater contamination. Leavitt et al (1975) has made a study of Atrazine (a widely used pesticide) contamination of ground water in Nebraska. Guerrero (1981) has detected aldicarb (used for potato pests) in groundwater in the San Joaquin valley and Santa Anna River basins are contaminated with 1,2, dibrows-3-chloropropane DBCP a pesticide. Vaughn, Handy and Vaughn et al (1978) reported isolation of viruses from groundwater recharge sites in New York. The disposal of sewage by land application is one of the forms of groundwater recharge. It is estimated that in the United States more than three billion gallons of sewage effluent is disposed on more the three thousand land treatment sites and in fifteen million septic tanks. The potential microbial contamination of ground water is therefore considerable. In a

earlier study Welling et al (1984) recovered viruses from groundwater after spray irrigation of secondary sewage effluent.

A case study on ground water pollution due to improper treatment and disposal arrangement by Maharashtra distilleries was conducted by Biradar et al., (1999). They arrived at the conclusion that among the various physico-chemical parameters analyzed, few parameters namely Dissolved Oxygen (DO), Alkalinity, Biological Oxygen demands (BOD) were affected by percolation of distillery effluent stored in katcha lagoon and there by the water quality became unsuitable for drinking, domestic and irrigation purposes. Krishna Rao, et al., (1999) has carried out analytical work of tank irrigation on ground water quality in the Vijayanagaram district of Andhra Pradesh. The results obtained revealed that the ground water quality deteriorates due to teaching of agrochemical in layout area by registering very high construction of salinity, sodium, potassium and Sulphates.

### Study Area:

The study area Chitradurga District bound by the Geocordinates of Latitude 14° 15'41.82" N to Longitude 76° 24' 42.6" E, and latitude 14° 11'30.3" N and Longitude 76° 21' 33.24" E. and falls under the Survey of India toposheets 57 B/7 and 57 B/8 of 1:50,000 scale. Chitradurga one of the district headquarters of Karnataka, located at a distance of 202 Kms northwest of Bangalore, in the heart of the Deccan Plateau, Chitradurga is lies in the Heart of Vedavathi river Valley with Tungabhadra River flowing in the Northwest direction.

### Methodology:

#### Software Used:

The software's used in the preparation of various thematic maps and analysis is discussed below:

#### Remote Sensing And Gis:

Remote sensing is an effective tool for handling large amount of Geo spatial data. Study area has been analyzed and interpreted using Google earth and imageries have been extracted and processed in arcGIS 9.2 and ERDAS imagine 8.7: In the present study, the software is used to rectify and mosaic the toposheets, reprojecting the satellite imagery and to extract the are of interest.



Figure. 1. Location map of the study area.

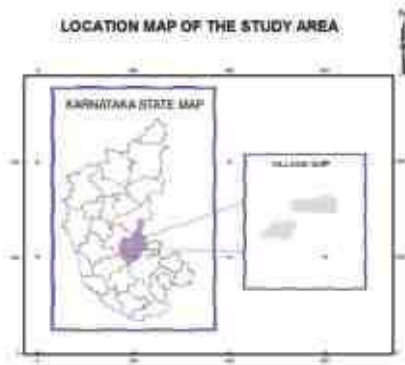
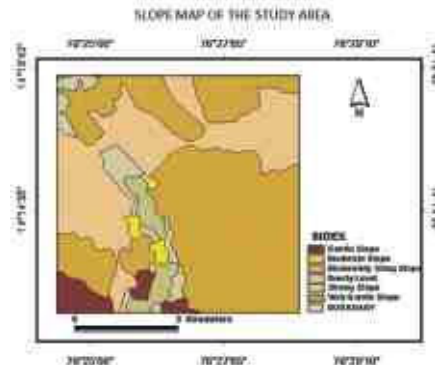


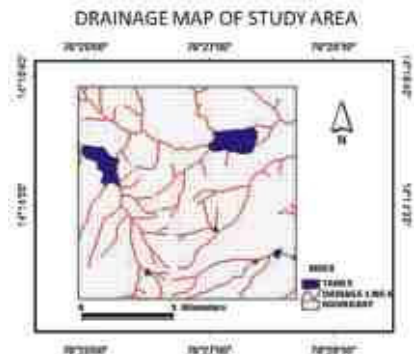
Figure. 4. Slope map of the study area.



**Geographic Information System (GIS) AND GPS.**

To collect ground co-ordinates points GPS is used, Geographic information System is a tool for handling geographic (Spatial and descriptive) data. It is designed to effectively capture, store, retrieve, update, manipulate, analyze and display all forms of geographically referred information according to the user defined specifications. We can visualize the real world which consists of many geographical features such as topography, land use, water bodies etc.

Figure. 5. Drainage map of the study area.



**Results And Discussions:**

Ground control points were taken using GPS, from adjacent to the waste dumping sites, nearby surface water bodies and all among the corners of the waste dumping sites. Geomorphology, Land use/Land cover, and slope map etc. has been prepared for the study area, results shown the Landfill site is in the high slope region where atmospheric water which passes through this may pollute the agricultural fields surface and groundwater in the low lands of the Landfill sites. Geomorphology map shows that majority of land covered by Pedi plain, pediment, inselberge complex and valley fill region. Slope map shows that strong slope in the sites and majority of the study area is covered by moderate slope. Land use Land cover map shows that Majority of the area is covered by agricultural fields i.e. kharif and rabi (Double crop), mixed plantation, Lakes/tanks, land with scrub and villages. Stream network and streams as shown in the drainage map they are the main source to cause agricultural fields, surface and ground water pollution.

Figure. 6. LU/LC map of the study area.



Figure. 2. Road network map of the Study area.

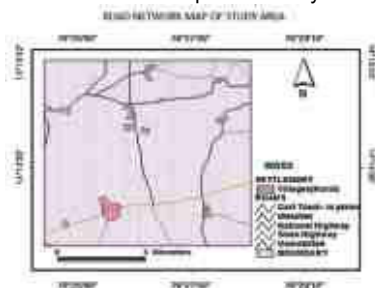


Figure. 3. Geomorphology map of the study area.

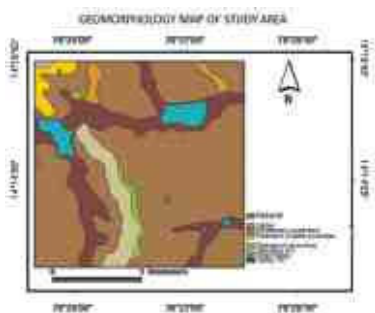


Figure. 7. Lithology map of the study area.

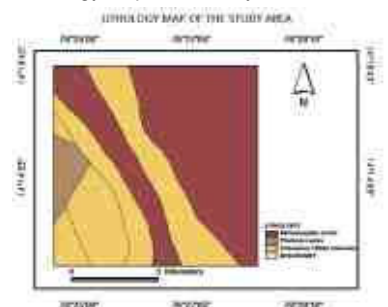
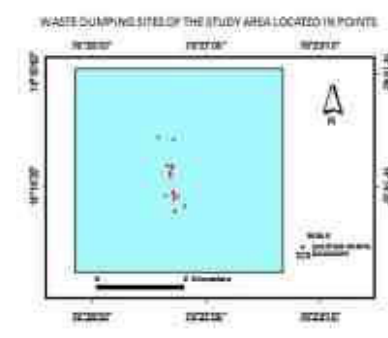


Figure. 8. Waste dumping sites shown in map as point theme.



### Conclusion

As per the Landfill criteria is concerned, the existing Landfill which is situated is in the suitable but avoid zone and agricultural circumstances and this may effect near by farmers and the fields in fore coming days, the Landfill site is in the high slope region where atmospheric water which passes through this may pollute the Groundwater in the low lands of the Landfill sites. For better results, in the Chitradurga city, dump the waste in the better manner that does not affect the Public and Environmental conditions a better Landfill site is urgently needed and the site selected here may be chosen for the better Landfill. The Municipality has planned to generate Electricity from the Waste but not implemented yet. New proposed landfill sites near Gollarahatti near Mallapura (Latitude 14° 15'41.82" N and Longitude 76° 24' 42.6" E) and Erajjannahatti near Jankoda village (latitude 14° 11'30.3" N and Longitude 76° 21' 33.24" E). These areas are suitable for landfill waste dumps.

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