Measurement and Mapping of Air Pollutants in Circle-V, Hyderabad City using Geomatics

Dr.K.Santosh kumar	Uma Devi Randhi
Centre for Environment, IST, JNT University, Hyderabad	Centre for Environment, IST, JNT University, Hyderabad

ABSTRACT *Geographical information technology has developed at a remarkable place over the past two decades and will play a key role in development of nation in 21st century. A geographical information system (GIS) based deterministic model would be created to assess the potential impact of different land use strategies for mitigating. Using a GIS, different spatial distribution maps were developed and different emissions of air pollutants were also identified. The new areas are created by implementing theoretical policies within the GIS designed to create new measurement techniques throughout the study area in an attempt to reduce its greenhouse gas emissions. The methodology to be adopted for this GIS approach is classified into various steps and the division of work to different phases for more effective results was suggested in this study.*

1. INTRODUCTION

Air pollution greatly affects both the environment and human health. According to the World Health Organization estimation, 8,00,000 premature deaths globally every year from lung cancer, cardiovascular and respiratory diseases caused by outdoor air pollution. In the present context, very few industries are located within the circle-V and hence the major sources of air pollution are motor vehicles. The other reason that can be attributed for increase in air pollution is due to dust from paved roads and factors such as fuel quality, age and condition of the vehicles (S.Chakraborty and P.K.Paul, 2004).

Remote sensing is not a new technology. Aerial photographs have been in use for at least 50 years and publicly available satellite images for almost 30 years. Since the launch of Land Sat series of satellite in 1972, remotely sensed data have been observed to have scientific value for the study of human environment relationships, especially the modification of earth surface features. There are different branches of population-environment research in which remote sensing data can be effectively used. Remotely sensed data both from aerial photographs and satellite images in combination with Geographical Information Systems (GIS) have scientific value not only in the study of land use/land cover change (e.g., decrease in open green areas, increase in impervious areas), but also for the study of depletion of surface, ground water, increasing air pollution and land surface temperature (M. Anji Reddy, 2001). Using satellite data can increase accuracy (vis-à-vis ground measurements), and also take less time and lower the costs of doing research (Y.srinivasa Rao, 1997). Remote Sensing has shown great potential in mapping and monitoring air pollutants due to its advantages over traditional procedures in terms of cost and time effectiveness in the availability of information over larger areas.

2. STUDY AREA

The Hyderabad City according to Municipal co-operation of Hyderabad has been divided into XI zones. The planning zone-V is situated to the north-west of Hussain Sagar Lake. The national highway –9 and state highway passes through it. It has adjoined by planning zones IV, VI and I on various sides. The total extent of the area is 31.689 sq km and extending from 780 25' 22 & longitude and 170 22' 48 N latitude and is an average of 1734 ft (525.4 mts) above mean sea level. (Fig.1)

3. METHODOLOGY

4. RESULTS

The air pollution concentration from the study were collected and the concentration of the air sample data were entered in to the ARCGIS software using spatial analyst tool and the map was developed on 1:25,000 scale. The Map was prepared for Carbon Monoxide, Hydro Carbon, Oxides of Nitrogen, Suspended Particulate Matter (SPM), using spatial interpolation technique (N. Senthilkumar, 2003). Total Pollution and Ranking of pollutants were calculated using ArcGIS Software and theses concentrations of air pollutants were overlaid on spatial distribution map. After considering all these, final Air Pollution Ranking map was prepared based on which the results are concluded for circle-V, Hyderabad District, Andhra Pradesh, India (Census of India, 1991). The Spatial Distribution Map, Concentration and pie charts are given below.
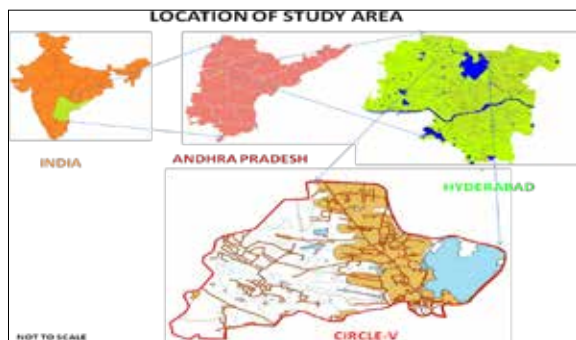
FIG.1: LOCATION OF STUDY

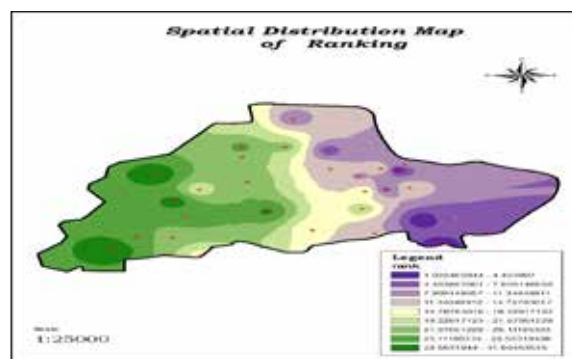FIG. 2: SPATIAL DISTRIBUTION MAP OF TOTAL POLLUTION & CHART SHOWING RANKING:

TABLE. 1: Ranking Based on the Total Pollution at Various Sample Locations

S No	Locations	CO	HC	NO$_v$	SPM	Total Pollution	Ranks
1	Greenland ,Begumpet	933.1	432.5	274.37	60.25	1700.27	2
2	Lakadikapul-Redhills	948.6	468.8	186.52	44.32	1648.25	3
3	Secretariate Circle	916.8	412.4	64.48	32.68	1426.38	5
4	SR Nagar	895.2	349.6	103.76	36.86	1385.43	6
5	Panjagutta	846.4	327.6	89.82	32.47	1296.34	7
6	Moosapet - Sanath Nagar	666.9	310.9	161.01	39.63	1178.6	9
7	Ameerpet	626.9	288.9	124.04	33.34	1073.19	11
8	Rajbhavan Road	604.4	207.4	56.24	28.43	896.42	15
9	CheckPost, Mumbai road	479.3	231.7	77.64	23.77	812.37	17
10	Banjarahills	466.4	210.7	50.22	19.43	746.71	18
11	Erragadda	459.9	196.8	42.06	17.98	716.79	20
12	Hakimpet Kunta Road	403.0	173.7	44.41	16.76	637.85	22
13	Police Parade X Road	342.9	152.0	51.34	16.5	562.77	25
14	Mumbai Road	323.3	129.5	57.01	16.56	526.33	27
15	Film Nagar	290.1	139.9	45.66	13.67	489.27	28

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