

Air Quality Mapping Using GIS Tools for Vadodara City

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Abstract - Clean air is the prime requirement to sustain healthy lives of humankind and those of the supporting ecosystems which in return affect the human welfare. Release of various gaseous emissions and particulate matter (PM) has been on the rise due to anthropogenic emissions of various kinds into atmosphere.

Key Words: Air, healthy, particulate matter (PM)

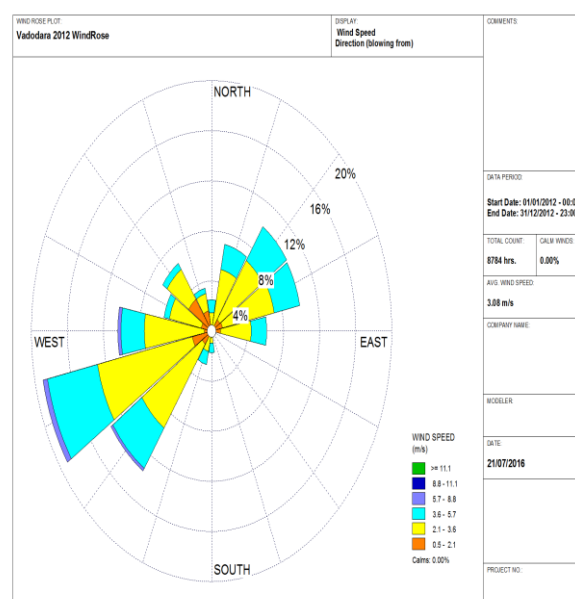
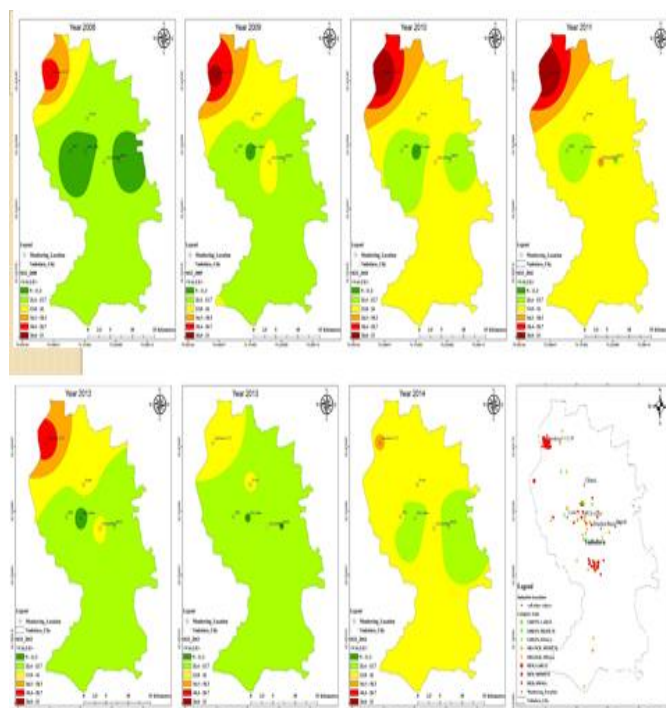
1.INTRODUCTION (Size 11, Times New roman)

Rapid growth in urban population and increased volume of motorized traffic in cities have resulted in severe air pollution affecting the surrounding environment and human health. It is reported that over 70–80 % of air pollution in mega cities in developing nations is attributed to vehicular emissions caused by a large number of older vehicles coupled with poor vehicle maintenance, inadequate road infrastructure and low fuel quality. It has been observed that in some mega cities of developed countries, urban air quality is showing signs of improvement on account of efficient implementation of Urban Air Quality Management Plan (UAQMP). Air quality has deteriorated in most large cities in India, a situation driven by population growth, industrialization and increased vehicle use. It is essential that the hazardous impacts from environmental pollution are regularly reported and monitored. National Ambient Air Quality Management (NAAQM), which is an evaluation and monitoring tool, it is a challenge to carry out in most developing countries because of the lack of information on sources of air pollution and insufficient ambient air monitoring data that is available in the public domain (Gulia et al, 2015, TERI, 2015).

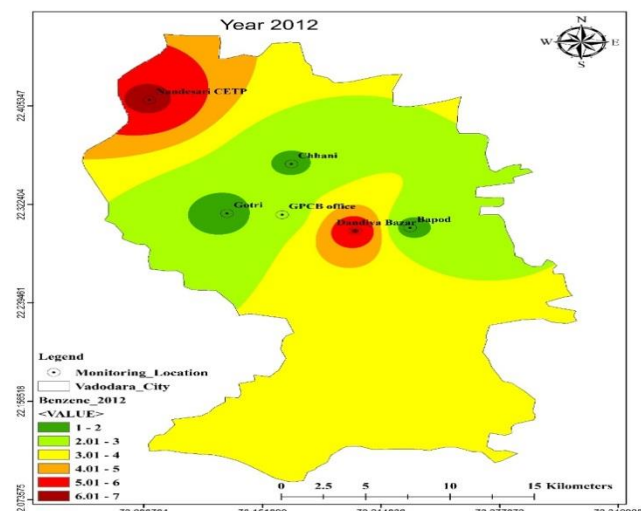
2. Need of Study

Purpose of this study is to have easy understanding of air quality for a common man by calculating AQI from available data. Also for the visualization of air quality at a glance, and to note variations in air quality with season and traffic density, pollution mapping is done using GIS.

Secondary data are collected from RTO, Vadodara and SPCB, Gujarat and applying said data in Arc GIS application by taking six different locations of Vadodara city in Gujarat state, in said application, I got following graphical representations showing AQI of different locations :



Charts



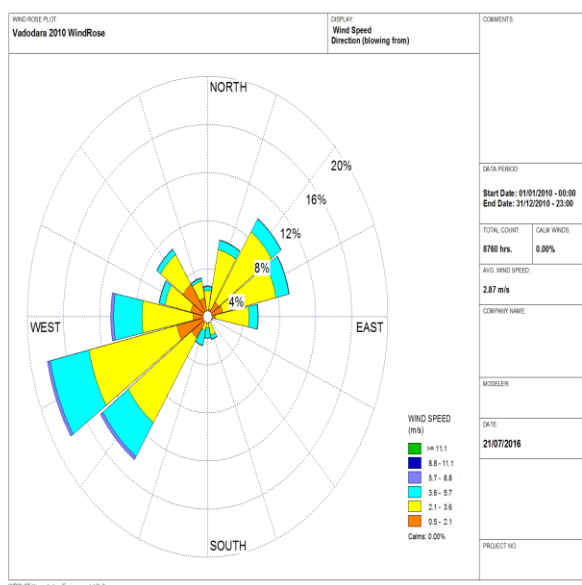
At Dandia Bazar monitoring station concentration of pollutants are observed relatively higher than other four monitoring stations (except Nandesari GIDC). At Dandia Bazar monitoring station particulate matter (PM10 & PM2.5) is exceeding the permissible limits for many times of the year. Dandia Bazar area witness heavy vehicular traffic and it is densely built up area. This explains the higher concentration of PM10 & PM2.5 in this area. Another important observation for this station is for Ni and Pb pollution. Though concentration of these pollutants is within permissible limit, a constant increasing trend is observed since the year 2011.

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3. CONCLUSIONS

Air Quality Index calculated on the basis of monitoring results of six monitoring stations reveals that air quality of the city is 'satisfactory' for most time of the year in 2014. At Dandia Bazar & Nandesari GIDC monitoring stations slight increase in pollution levels during winter months, show deterioration of air quality, and it belongs to 'moderate' category.

In present study GIS mapping is done on the basis of monitoring results of six monitoring stations. It is observed that in south area of Vadodara city there is no monitoring station. Mean wind direction in Vadodara city is south-west for most period of year. This may be the reason that all monitoring stations are established in NW, NE & central area of the city.