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VEHICLES: MAJOR CONTRIBUTORY SOURCES OF GROWING AIR POLLUTION IN SOLAPUR CITY

Dr. N. I. Dhayagode
Assistant Professor, Department of Geography, Walchand Collage of Arts and Science, Solapur Maharashtra (India)

ABSTRACT

The city is situated on the southeast fringe of Maharashtra State and lsssies in the Bhima and Sina river basins. Climactically it falls in the drought prone region in Maharashtra state. Due to expansion of city limit, the number of vehicles was increased and it shows positive relation with vehicular pollution. The present study is based on secondary data. For analyzing the data, various cartographic and statistical techniques have been applied. Present study examines the state of emission level of various gaseous within the city and its impact on health of the population residing within the limits. The study highlights that So2, Nox and RSPM (Respirable Suspended Particulate Matter) levels were within the prescribed limits however, levels exceeded the limits. Increasing number of vehicle and Vehicular Pollution is the major contributory sources of air pollution and its impacts from 2001 to 2016 are mainly eye irritation, asthma, bronchitis, etc. In Solapur city, the condition of air quality is unsatisfactory.

KEYWORDS: *Air Pollution, Health Damages, Health Production Function.*

INTRODUCTION :

Environmental pollution has become a very dreadful cause of health hazards in growing urbanized cities in India and its effect is quite pervasive even in rural areas. The large-scale industrialization increases the production of material goods and urbanization creates mega cities, the ill effects of these activities are reflected in the form of various environmental problems. One such problem is the deterioration of urban air quality in India and other developing countries. The main contributing factors to air Pollution is the overwhelming concentration of vehicles, poor transport infrastructure, and the establishment of industries in urban agglomerations. Epidemiological studies have shown that there is a significant association between the concentration of air pollutants and adverse health impacts (Ostro, et al., 1995; MJA, 2004). Therefore, here an attempt has been to examine the state of level of Air pollution and its impact on health in the study region.

OBJECTIVE:

To examine the discharge level of major contributory sources of vehicles and various gaseous and its impact on the city

STUDY AREA:

The city is situated on the southeast fringe of Maharashtra State and lies in the Bhima and Sina river basins. Climactically it falls in the drought prone region in Maharashtra state. According to 2011census, the population growth rate of city is 11.16 per cent as compare to 2001 census. As per 2001 Census of India, the total population of Solapur was 8,72,390, with 53.36 percent males and 46.64

percent females. The current population is estimated to be 9,53,000. The number of households is estimated to be around 1,90,600.

Average annual rainfall is 533.07 mm and maximum temperature 410 C. As per 2015 RTO record the total number of various types of vehicles are 12,66,978. These are the major source of air pollution in the city.

DATABASE AND METHODOLOGY:

The present study is based on primary and secondary data .The data regarding air pollution level in the city at various locations such as, Ashok chowk , Saat Rasta chowk and near MIDC, Akkalkot Road (New) has been collected, regarding various air quality parameters such as Sulphur dioxide (So2), Oxides of nitrogen (Nox), Suspended particulate Matter (SPM) etc. The impact of these pollutants on human health was also studied by random sample methods. By visiting Civil Hospital and other prestigious hospitals in the city. With the help of random sampling, various diseases types were identified in the city. For analyzing the data, various cartographic and statistical techniques have been applied.

DISCUSSION:

"Valuation of Urban Air Pollution: A Case Study of Kanpur City in India'. The author estimated the monetary benefits to individuals from health damages avoided as a result on reductions in air pollution in the urban industrial city of Kanpur in India.1

Motor vehicles have significantly larger health costs than previously reported. Particulates are the most damaging pollutant, while ozone and other pollutants have smaller effects. Diesel vehicles cause more damages per mile than do gasoline vehicles, because of greater particulate emissions. Very fine particles appear more dangerous than larger particles, and combustion particles appear more dangerous than road dust.2

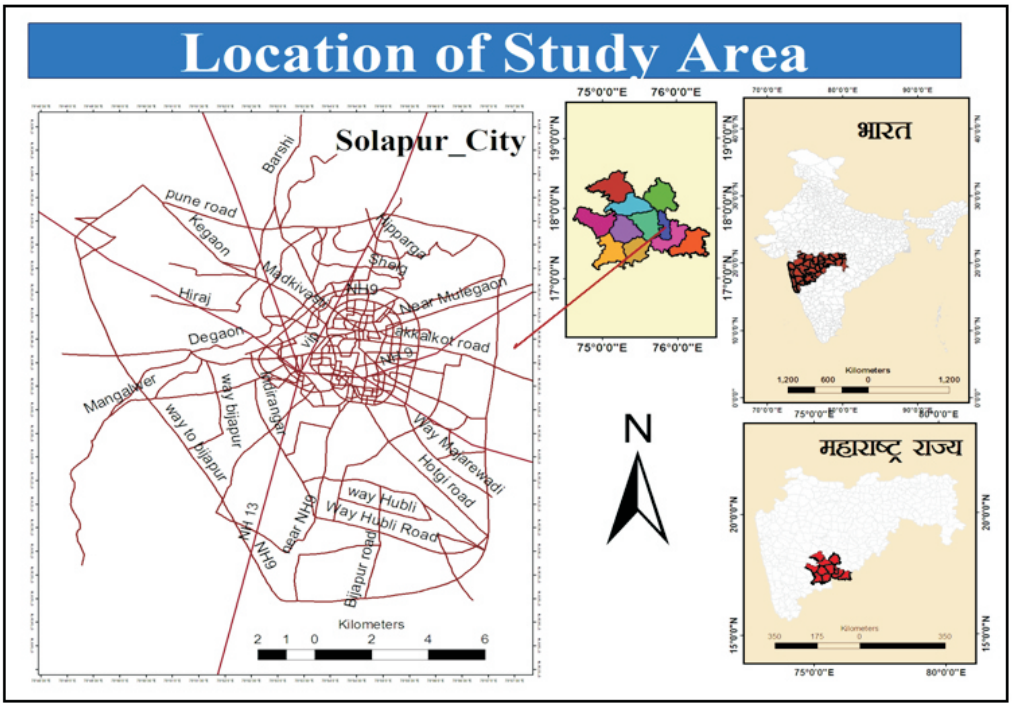
Increase in air pollution levels in urban centers of the world is closely identified with increase in the number of motor vehicles.3

Today, with an unprecedented population growth the physical expansion of the cities is inadvertent. The physical expansion of built up areas beyond their corporation boundaries is conspicuous. Much of the development has occurred in a spontaneous, haphazard, and unplanned manner. What were initially rural villages have now been transformed into urban residential, commercial, and industrial complexes. This phenomenal growth of cities has been the topic of concern to planners of the world over (Bhat,etal,1974). The importance of the link between air pollution and health is underscored in a study by Pope, et al.,(2002).In Solapur city the condition of ambient air quality is unsatisfactory.

Sources of air pollution in the City

The rapid urbanization and industrialization in and around Solapur city has attracted many migrants from various parts of the state to Solapur. This has resulted in expansion of the settlements in Solapur city. Since the first census of independent India & then onwards up to 1961, the population of the city has shown a constant and gradual increase ranging. While the city population was +2.6 percent in 1971-81, the

Figure No.1.1



figures were 5+1.83percent in 1981-91, +3.46percent in 1991-01 & +0.87percent in 2001-11 respectively. However, the census of 2011 reveals that the city population has reached phenomenal figure of 9,51,558 indicating a steep rise in the population of Solapur city as compared to earlier census figures starting from 1951. Due to expansion of city limit, the number of vehicles (722513) was increased and it shows positive relation with vehicular pollution.

The major contributory sources of air pollution in Solapur city are mainly Increasing number of Vehicular Pollution and Industrial Pollution (The industrial activity in Solapur city and surrounding areas is mostly confined to small scale sector and there are a very few medium and large scale industries located in Solapur city.

Vehicular Pollution:

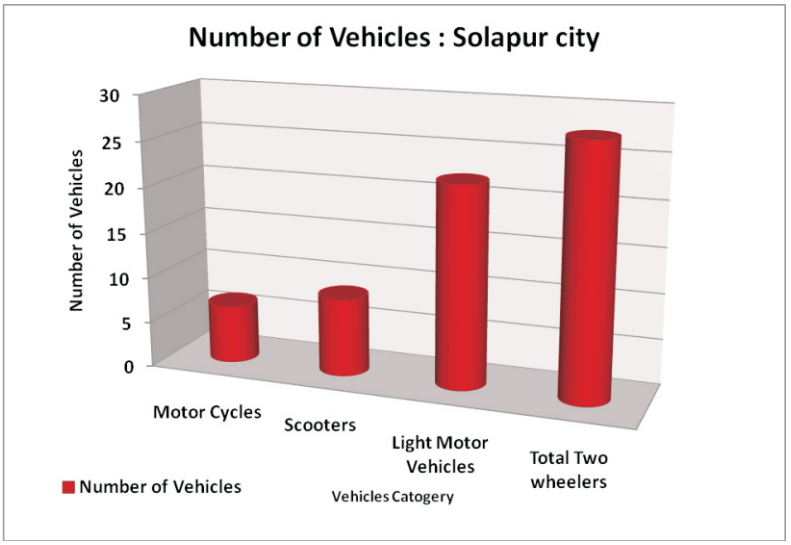
It is seen from the gathered data that the Air quality trend in Solapur city is disturbing.

Table No. 1.1 Solapur City- No. of Vehicles

Sr.No	Category	2001	31 March 2016	Increasing
1	Motor Cycles	28387	444099	**6.39**
2	Scooters	6403	74686	**8.57**
3	Light Motor Vehicles	16042	72605	**22.09**
4	Total Two wheelers	162371	591390	**27.45**
	Total	**213203**	**722513**	**29.05**

(Source: regional Transportation office, Solapur2001, 31st March 2016)

FigureNo.1.2



This is mainly because of heavy vehicular movement through Solapur City, re-suspension of the dust on city Roads due to prevailing climatic conditions and bad patches of untarred / un-concretized roads in the city and the frequent dust storms.

It is seen from the Table 1.1 that the number of two wheelers has steeply increased in Solapur city that may be partly responsible for the deterioration of the air quality in the city. The number of other vehicles in Solapur has also increased during last ten years however; the road development has not kept pace with these increased vehicles. Besides, the existing roads are having narrow carriageways and hence not capable of taking up this increased traffic volume

Table No. 1.2
The Air quality status at various locations in Solapur City

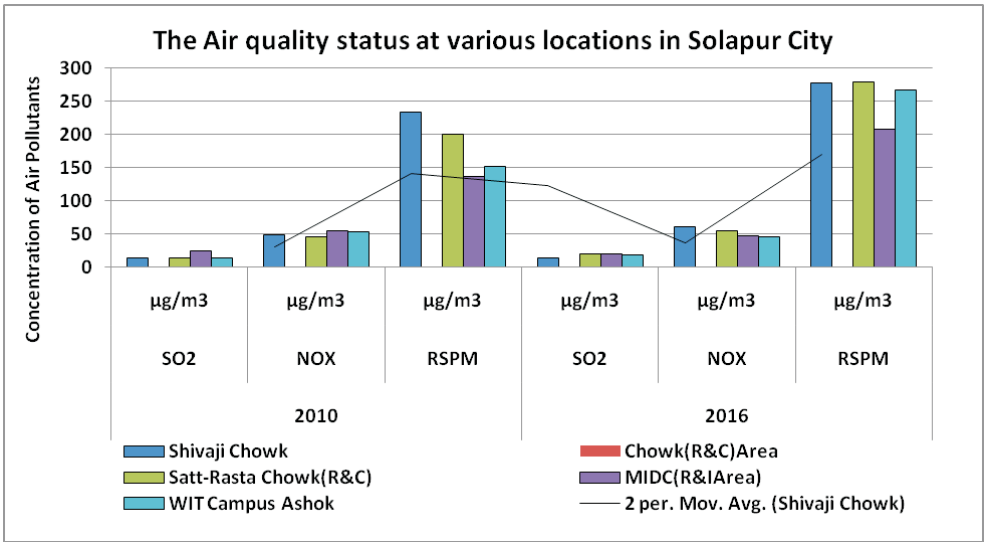
Location	Concentration of Air Pollutants					
	2010			2016		
	SO2 µg/m^3	NOX µg/m^3	RSPM µg/m^3	SO2 µg/m^3	NOX µg/m^3	RSPM µg/m^3
Shivaji Chowk(R&C)Area	14	48	233	14	61	278
Satt-Rasta Chowk(R&C)	13	45	200	20	55	279
MIDC(R&IArea)	24	54	137	19	47	207
WIT Campus Ashok Chow	14	53	152	18	45	267
Min	03	01	12	07	01	15
Max	67	212	233	76	232	279
Average	12.32	34.44	88.96	13.10	41.6	104.1

(Source: Maharashtra Pollution Control Board, Continuous Monitoring, 2017)

This results in the speed reduction of the vehicles and consequent increase in the pollution load. The survey reveals that the vehicles have to compulsorily run at a low speed during the peak traffic hours due to

traffic congestion. The heavy traffic density also aids in further aggravating the already increased air pollution in the city. The Two wheelers and Auto Rickshaws have shown a steep rise in the last three years as per the RTO registration. The table above shows the percentage contribution of air pollution made by the different categories of vehicles in Solapur city.

Figure No. 1.2



It is seen from the above air quality results that So2 and Nox levels were within the prescribed limits however; RSPM and SPM levels exceeded the limits. It is because of the vehicular movement is increased at the above locations in Solapur city and National HighwayNo.9 which passes through Solapur city.

CONCLUSION:

In Solapur city, the condition of ambient air quality is unsatisfactory. It is observed that pulmonary tuberculosis diseases stood first, followed by bronchitis, chronic and asthma etc, The level of SPM in the ambient air at various locations remains high and above prescribed limit at most of the time due to insufficient air control measures. Innumerable air pollutants in the form of particles of irrespirable sizes (smaller than 5 micron) such as dust and toxic trace metals and in the gaseous forms such as Co2, CO, So2, Nox and Fluorine enter the human body by inhalation or ingestion due to long exposure to polluted air from vehicular emission. These particles and gaseous forms can penetrate the lungs through the respiratory tract and be deposited in the alveoli or can enter the human body stream passing through the lung membranes. Health hazards associated with the inhalation of these parcels and gaseous forms are cardio-vascular

Respiratory oillments, It also contributes to illnesses like eye irritation, asthma, bronchitis, etc., which invariably reduce efficiency at work. In Solapur city, the condition of ambient air quality is unsatisfactory.

SUGESSTIONS:

- Make regular modification clean of the vehicles
- Keep its engine and silencer in good condition
- Get balancing of vehicles regularly
- Maintain air pressure in tubes properly
- Avoid using adulterated fuel
- Never use or apply pressure horn
- Use vehicle when very necessary
- If convenient rely mostly on public transport
- Use of CNG as fuel for processing /production

- To replace DG sets with Gas generators
- Phasing out grossly polluting vehicles plying within the city
- Checking for adulteration
- Strict checking of vehicular emissions
- Better traffic management. •
- Construction paved footpaths / widening of roads up to the boundary limit along the major roads to minimize natural dust and congestion.
- Providing LPG for domestic and commercial use

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