

POLLUTION STUDIES IN NAGPUR CITY WITH SPECIAL EMPHASIS ON THE SOURCES AND POSSIBLE CONTROL MEASURES

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Abstract

Nagpur city is located in Maharashtra state of central India. Business hub and increased industrialization in study area is affecting the environment adversely. On the other hand migrated man power contributed in the increase of population. Changing life style of corporate community and their effects on other population enhancing the contamination of environment. Irritating sound sources are tremendously increasing in the study area includes highway No-6, Air port, market areas such as *Sadar*, *Sitabuldi*, *Mahal* market etc. Under recent corporate development a cargo hub is sanction for the city, which may prove the reason of headache for the localities. If lawful control measures are not applied with its proper enforcement, it might be a main reason for declining the health of localities. Permanent wall fencing around the lake may lower the quantity of solid wastes deposition. *Nag Nalla* is a big waste water channel originated from the city and deteriorating the Kanhan River. A water treatment plant may solve the problem of pollution of other sources and conservation of water for agricultural purposes. Loud noise of automobiles in the city is one of the supplementary causes for the accidents on roads. Physiological exertion of human body due to continued irritating sounds are lowering the work efficiency of man power. However the locked doors and windows of hospitals in order to avoid the noise, keep away the patients from free aeration and healthy environment. In present study the certain sources of pollutants are assessed to suggest their possible control measures, so as to lower the fouling human activities and conservation of environmental status in Nagpur city.

Introduction

Environmental pollution is a global problem and is common to both developed as well as developing countries. The decline in environmental quality as a result of pollution is evidenced by loss of vegetation cover and biological diversity, excessive concentration of heavy chemicals in the ambient atmosphere and in food grains, growing risks of environmental accidents and threats to life support system. Fertilizers, detergents, biocides, chloro-fluorocarbons, plastics and pesticides, solvent, fuel, paints, dyes, medicines, food additives etc. are the chemical products made and disseminated for the benefit of humans. All these xenobiotic substances have the inherent capacity to disturb the life support system. The problem of pollution has gained serious dimensions in industrialized countries and is spreading fast worldwide. The buildup of carbon dioxide concentration in the atmosphere is threatening to change the global climate pattern. Acid rains add to the problem by damaging Lakes Rivers and forests. Pollution is seriously damaging the environment of planet earth at a fast age, threatening the very survival of life in it's entirety.

The great solvent power of water makes the creation of absolutely pure water a theoretical

rather a practical goal. Even the highest quality distilled water contains dissolved gases and to slight degree solids. The problem therefore is one of determining what quality of water is needed to meet a given purpose and then finding practical means of achieving that quality. The problem is further compounded because every use to which water is put washing, irrigation, flushing away wastes, cooling; making paper etc. adds something to the water. In fact for Centuries, Rivers and lakes have been used as dumping grounds for human sewage and industrial wastes of every conceivable kind. Many of them are highly toxic. Added to this are the materials leached and transported from land by water percolating through the soil and running off its surface to aquatic ecosystems.

Human ear is found sensitive to an extremely wide intensity from 0 to 180 dB, as 0 dB is the threshold of hearing and 180 dB is threshold of pain. The effect of sound on human beings depends upon its frequency or pitch. The frequency can be defined as 1 vibration sound - 1. The loudest sound that a person can stand without much discomfort is about 80 dB. Transport noise is an increasingly prominent feature of the urban environment, making noise pollution an important environmental public health issue¹. In present study the loudness of

sound during the day and at night is studied to assess the level of noise pollution, as compared to air quality standards given in environment protection, third amendment rules 1989.

Materials and Methods

The water quality assessed with the physical and chemical parameters, given National Environmental Engineering Institute, Central India, Nagpur. In order to obtain overall picture of water contamination five stations were selected. Station S1 is the Nag-nala water before drains in to the Kanhan River at Sawangi villege. Station S2 is the middle stretch of Kanhan river at Jawahar nagar. Confluence of Kanhan and Wainganga River at Ambhora is selected as station S3. Station S4 is the basin of Wainganga river 1 Km downstream from the confluence. Station S5 is the Gosikhurd dam, constructed in the Basin of Wainganga River. All the physico-chemical parameters are performed in the field and tested in the laboratory. The results are expressed as minimum values to maximum values².

To assess the average sound pollution in the Nagpur city, the main crowding places at various directions were selected. Analogue sound meter is used to measure the loudness of sound in the unit of Desibel. Periodical measurement of sound is measure during the afternoon between 1.00P.M. to 4.00 PM and 11.00 PM to 2.00 AM at night time. The results are expressed in average values at each selected places with in the study area.

Results and Discussions

Data harvested during the study period indicates that, the Nagpur city is intensely polluted by the unwanted and irritating sound exceeds over 40 to 60 dB even in the residential areas also. The growing load of population, and day by day increasing number of vehicles making conditions more miserable. At certain places such as market areas and road side areas showed the noise than the Indian and European standards, above 88 decibel. The increased continuity of noise enhancing the susceptibility of man to various hear and other health diseases. However, the frequently observed aggressive behaviors of localities may prove the intensity of hazards of noise in Nagpur city. The noise at night time is also found exceeded over the limits of central pollution control board³.

Alarming signs of sound pollution in the city are seen near the pre existed hospitals. Mure hospital, Care hospital and orange hospitals are

located along the main roads and highway roads facing the problem of noise. Actually the managements have their noise reduction system by closing the doors and windows of rooms and wards. But in present situation the open environment necessary for fast recovery of patient, is completely lost due to the air pollution and noise. Increasing anxiety and mental fatigue are the primary hazards found at most of the places in the study area.

In present situation the airport is located inside the city, as the residential extensions are settled along the Wardha road around the Mihan area. It exceeds the noise more than 160 dB around the air port localities. Proposed cargo airport and 400 daily flights and landing from the international airport may form the hazardous situation around the concerning areas. Noise climate in city may be closely linked with urbanization of nearer localities of Nagpur district.

Present values observed during the collection of data showed the areas along the highway No-6 form Wadi town to Bhandara road is having noise climate. In fact the transportation of cargo vehicles produces more sound due to presence of high power engines. More rising of truck and bus engines on sloppy areas on the road make more and more sounds environment. However, the flyovers constructed with in the heart of city transfers the noise on upper floor of hospital and other buildings. In contribution with industrial cargo vehicles, most of the educational institutions are having buses to carry the student, which passes through the residential areas and causes noise. Values of noise in Nagpur city were higher than their prescribed standards which may pose a significant impact on quality of life^{4,5}.

A new trend of social noise production arises in the form of DJ-sound systems. Most of the occasions in the city is now celebrated by running the louder sound systems. During winter and summer months, wedding ceremonies in city blocks the road traffic, where the mixing of traffic and DJ-sound, harms the localities on greater extent which sound exceeds over 160 dB on sound scale. *Gandhibaug, Itwari, Buldi, and Mahal* markets are more noisy places due to community sound mixed with the sound of diesel trucks and three wheelers showed the sound more than 105 dB. Naredra nagar area is suffering from the sound of railway engines, as the railway line is passed in the middle of

residential area, which creates the problems during day time as well as at night also⁶.

The most attention should be given in the fact, that some areas having dense tree plantation of trees reduce the loudness of noise. Civil lines, Khamla area, South ambazari road, Sneha nagar etc showed the reduction in sound intensity due to presence of more municipal and domestic tree plantations.

As the noise pollution is concern, reduction of sound intensity may be achieved by following attempts. - 1. The highways should be bypassed at the peripheral areas of the city. 2. The main roads may be divided in to separate lanes where, the one lane with acoustic fencing should be reserved for the trucks and buses. 3. Compulsion of tree plantations along the roads at every 10 feet distances may form the sound control cover. 4. Most important problem of flight sound may also be lowered by formation of tree covers around the airport areas.

Contamination of water bodies in the city is closely related with the population explosion and urbanization of the rural localities. The precious lakes, Gandhisagar lake, Futala Lake, Gorewada Lake, Ambazari lake, etc are located in heart of the city are the means of recreation for the localities. The uncontrolled wrong human activities along the bank of lakes deteriorating the water. Continuous depositions of wastage papers and polythene bags is now commonly observed. Moreover, the various religious activities has increased the organic load on the lake waters. Deposition of clay and plaster statues, flowers and other organic matter in the water during various occasions is observed during the study period.

As the industrial waste water of the city is collected in a common channel called as Nag-nala, which openly runs from the middle of city. It solved the problem of waste water of the city, but it is conveyed in the nearer river Kanhan. Kanhan river is greatly polluted by the waste water drain and water quality is deteriorated, as the water became useless for all human

purposes. Moreover, the polluted water of Kanhan river mixes with Wainganga river at confluence point of Ambhora town of Nagpur district. Wainganga river water is indirectly contaminated due to waste water drain of Nagpur city. Not last but not least, the Wainganga river water is collected in the Gosi-Khurd dam at Gosi town. All the solid wastes and pollutants are concentrating in the dam water and now the assessment of quality of dam water may give considerable facts. Serious attention of govt. authorities, on the protection of such precious water bodies, is the need of time⁷. Preparation of waste water plant at the distal end of Nag-nala may reduce the contamination of two rivers. The strict enforcement of pollution laws and preparation of some local rules and regulations for the localities may reduce the deposition of solid wastes in the lakes of Nagpur.

As pollution of air is concerned in the city, only the formation of cement concrete forest due to construction activities in all the areas of the Nagpur city is greatly responsible to deposit the dust particles in air. However, increased population tends to increase the diesel and petrol vehicles, which continuously going on contaminating the air. Mainly the diesel and three wheelers silencers produce half burned hydrocarbons and other harmful gases in the air. Though the insufficient effort of concerned authorities, are often played in the society and media, but it is serious concern today and appropriate attempts are needed to face the fact. Now it is very necessary for each and every social individual to spend some time on thinking over the fact, which was enlighten by Dixit during last decades⁸. Now the under construction of industrial hub in the city creates a threat of industrial air pollution. A separate unit of checking the tuning of engines and adulteration of fuels and strict action on the faulty vehicles may solve the problem on some extent. Each and every individual in the society is now needed to teach a lesson for the same otherwise the threat may come in to existence in further decades.

Table- 1.1 Traffic Sound Level in dB at Various Areas in Nagpur, Maharashtra.

Area	Average sound in day time	Average sound in night	Traffic noise index	Noise climate
East				
<i>Gandhibaug market</i>	105	78	-33	-27
<i>Itwari market</i>	110	72	-72	-38
<i>Mayo hospital campus</i>	95	62	-70	-33
<i>Badcus square market</i>	98	73	-32	-25
<i>Mahal market</i>	95	73	-37	-22
<i>Central avenue road</i>	115	74	-79	-41
<i>S.T. bus stand</i>	106	71	-64	-35
<i>Baidyanath square</i>	108	70	-74	-38
South East				
<i>Bhande plot road</i>	107	78	-39	-29
<i>Dighori Naka</i>	112	69	-90	-43
South				
<i>Air port (Jaitala side)</i>	118	98	08	-20
<i>Naredra Nagar rly bridge</i>	116	91	-14	-25
<i>Orange city hospital</i>	106	73	-56	-33
<i>Chatrapati square</i>	111	76	-59	-35
<i>Dhawle hospital</i>	110	78	-48	-32
West				
<i>Laxmibhuan square</i>	92	62	-58	-30
<i>Ramnagar square</i>	91	64	-47	-27
<i>Ravinagar</i>	108	88	-02	-20
North				
<i>Hingna MIDC</i>	111	79	-47	-32
Central Nagpur				
<i>Mor bhavan</i>	104	71	-58	-33
<i>RBI square</i>	102	76	-32	-26
<i>Buldi market</i>	104	72	-54	-32
<i>Inst. Of science</i>	113	76	-65	-37
<i>Sadar market</i>	102	68	-64	-34
<i>Mure hospital amt. road</i>	100	74	-34	-26
Residensial Areas				
<i>Neeri colony</i>	52	48	-	-
<i>Chatrapati nagar</i>	69	48	-	-
<i>Ajni area</i>	56	46	-	-
<i>Civil lines</i>	52	43	-	-
<i>Khamla</i>	53	50	-	-
<i>Snehanagar</i>	49	42	-	-
<i>Gopal nagar</i>	51	42	-	-
<i>Trimurti square</i>	55	40	-	-
<i>Laxmi nagar</i>	53	43	-	-
<i>Mahal</i>	62	49	-	-

Mean values of 5 readings on sound meter.

Table- 1.2 Levels of various water Quality Parameters found in Kanhan river and Wainganga river

Station ► Parameters ▼	S-1 Max - Min	S-2 Max - Min	S-3 Max - Min	S-4 Max - Min	S-5 Max - Min
Temp. (°C)	24 - 35	22 - 33	22 - 32	22 - 31	22 - 31
pH	7.9 - 8.6	7.4 - 7.9	7.2 - 7.6	7.1 - 7.8	7.1 - 7.7
TDS (Mg/L)	1351 - 2219	468 - 718	338 - 769	416 - 621	225 - 527
DO (Mg/L)	Nil - 1.6	5.8 - 8.7	6.9 - 8.6	6.8 - 8.9	6.8 - 8.3
BOD (Mg/L)	276 - 564	15.7 - 72	14.1 - 52.6	9.9 - 41.7	10.6 - 22.3
Chlorides (Mg/L)	176 - 415	15.8 - 33.4	16.0 - 34.4	12.2 - 18.6	13.8 - 27.9
Ammonia-N Mg/L)	26 - 33	3.83 - 11.48	2.99 - 10.9	3.11 - 12.6	1.68 - 8.66
Phosphates (Mg/L)	1.5 - 5.2	0.17 - 0.98	0.19 - 0.82	0.26 - 0.66	0.18 - 0.68
Sulphates (Mg/L)	38 - 51.4	1.2 - 11.6	1.4 - 8.2	0.69 - 13.3	1.13 - 10.11

Values between six samples

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