

Impact Assessment And Factors Affecting Air Quality In Delhi

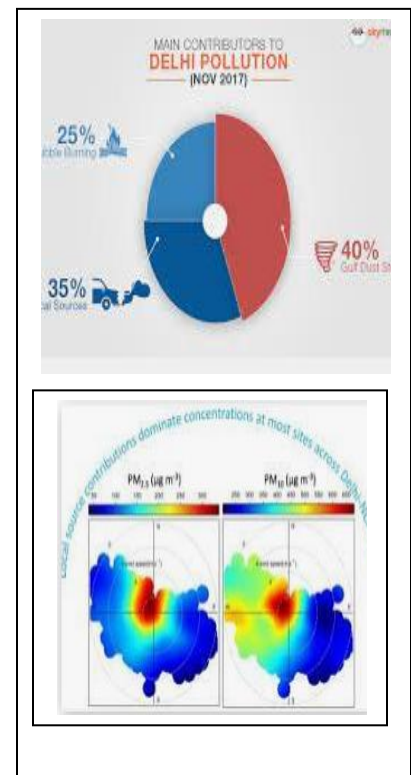
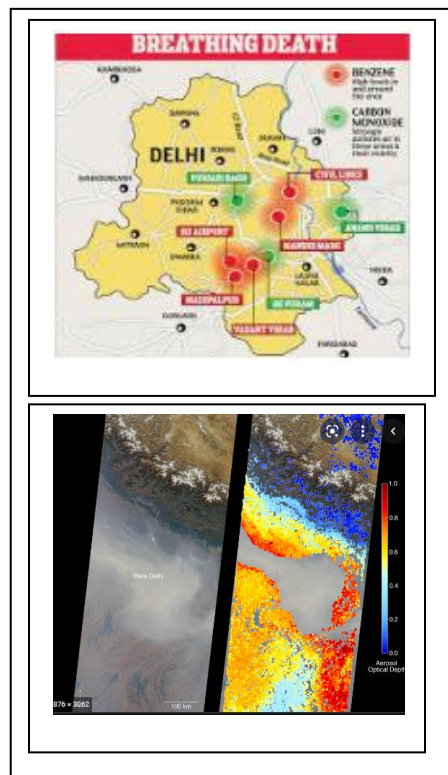
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HIGHLIGHTS

- **Role of Nature in Human life**
- **Participation of human life in Nature**
- **Role of various air pollutants in Delhi**
- **Causes of poor quality in Delhi**
- **Current situation of NCR Delhi**
- **Air quality level in Delhi**
- **Comparison of air quality index**
- **Govt. steps & Recommendations**
- **Conclusion**

GRAPHICAL ABSTRACT



ABSTRACT

Nature is God Gifted to human beings. Nature provides us many beautiful things like fresh air, water, beautiful mountains, oceans, rivers etc. These have crucial role in human lives. Human life cannot exist without its absence. Out of gifted things, role of air cannot be ignored because in its absence, we cannot think about human life. Recently Nature is facing very chronic problem of air pollution due to legion things utilized by human beings like vehicles, industrial wastes, thermal power stations, burning of crops wastes, stoves, refrigeration activities, using nuclear

weapons, dust particles from natural resources, forest fires etc. Thus Air Pollution has become a burning issue for major cities like Delhi, Calcutta, Madras, Ahmadabad, Lucknow and Hyderabad. Out of these, air pollution has become talk of the town and serious problem for Delhi NCR which is creating many health problems for children, ailing and elderly people. According to survey, 35000 deaths take place in Delhi NCR due to air pollution and 15000 in industrial areas¹.

Objective: The main objective of the current study is to throw light on impact assessment and factors affecting air quality of Delhi NCR.

Research Methodology: For this study, data will be utilized from Primary and Secondary sources like research papers, journals, newspapers, NAQI, CPCB and NAMP etc.

Keywords: Air quality, Delhi NCR, Impact assessment, Factors, Recommendations

INTRODUCTION

Recently air pollution has become a burning issue in India. It has been creating anxiety for India which is growing by leaps and bounds. Though some steps have been applied by India in order to control it but all in vain. According to survey, India has become the world's worst air pollution country. That's why its toxic air has been killing more than one million people each year. Its impact is obvious on human vigor, agricultural practices, climatic change and in eco system. The situation of its metropolitan cities like Delhi, Madras, Bombay, Kolacutta has become unexplainable these days. World study reports that Delhi which is capital and home of India has become the most polluted city with lot of vehicular emissions, thermal power plants releasing SPM, hydrocarbons, CO, Sulphur Dioxide of nitrogen and carbon monoxides. By considering the current situation of Delhi, this study tried to provide some comprehensive review of impact assessment and factors effecting air quality in Delhi by suggesting some recommendations in the future.

ROLE OF NATURE IN HUMAN LIFE

Nature has crucial role in our life. Thus Nature survives us in many ways. Without nature, human survival is impossible. Here it is duty of humans to understand it. If it is duty of Nature to protect us, it is also powerful enough to destroy human kind at any time according to his will. That is why his various forms like animals, rivers, mountains, moon and more holds equal vitality to us. Nature underpins our economy, society and surroundings. Nature is the self created gift by God. Nature has everything for us but humans do not anything for Him. That is why humans are destroying all things created by Him in order to fulfill his selfish aspirations.

ROLE OF HUMANS IN NATURE

Human has vital role in Nature just like everything else. If nature gives everything to human, On the contrary, it is duty of human to survive it all at costs. According to third law of Newton, action and reaction take place simultaneously. In the same if Nature survives human, then human should also survive it. But whenever any imbalance occurs, then destruction and havoc take place. Thus it is prime duty of humans to never disturb it in any manner.

THE ROLE OF VARIOUS POLLUTANTS IN DELHI

Delhi is the heart of India. These days its air quality index is deteriorating to the severe category. According to the ministry of earth sciences monitor SAFAR, AIR QUALITY INDEX will remain severe in the coming days. They reported intrusion of stubble burning is not reason of pollution in Delhi, there are some other pollutants like thermal plants, SO₂, NO, RSPM, SPM as shown in the figure

Table: Pollution level of thermal plant at Delhi

Thermal capacity	SO ₂	NO ₂	PM Without control device	PM Without control device
1083	61	91	3242	162

Table: various pollutants at Delhi

Pollutants	Concentration
SO ₂	11
NO ₂	45
RSPM	130
SPM	290

CAUSES OF POOR QUALITY IN DELHI

There are some specific causes of poor air quality in Delhi like lack of monitoring system, proper action by the authority, passiveness in political parties, motor vehicle emissions, mist emissions from wet cooling towers, using of coal by people, fire in Bhalswa landfill, heavy metal rich fire crackers and agricultural stubble burning.

LACK OF MONITORING SYSTEM

There is paucity of monitoring system in Delhi which may take effective steps in order to eradicate this chronic problem. Recently some steps are being taken by the ruling party but this problem cannot be solved in short time. Active monitoring system is the need of the hour.

PASSIVENESS IN POLITICAL PARTY

Though ruling party is trying to perform his duty but in order to solve this problem more investment is necessary like installing of Smog Free Tower, Central Park etc.

MOTOR VEHICLE EMISSIONS

Motor vehicle emissions are the major reasons of polluting in Delhi. There is a noxious mix of emissions from 9 million vehicles, dust from constructing buildings and burning garbage.

BURNING OF WOOD AND COW DUNG

Pollution is also generating from wood burning fires, cow dung cake combustion, exhaust from diesel generators.

EXISTENCE OF BADARPUR THERMAL POWER STATION

This plant was installed in 1973 which is producing coal fire. This is another major source of pollution in Delhi. It is producing less than 8% electric power but on the contrary it is generating 80% to 90% particulate matters in Delhi.

DRIFT OR MIST EMISSIONS

These emissions are producing from the wet cooling towers which are source of particulate matters. Actually these are using widely in industries and other areas in order to generate cooling.

USE OF COAL FOR COOKING

Although Delhi is supposed to be free from kerosene and 90% people use LPG BUT 10% people use coal, crop residue and cow dung for cooking purpose (Census India, 2011)

FIRE IN BHALSWALANDFILL

Survey reports that airborne particles in Delhi have been generating due to fire in Bhalswa landfills.

GENERATION OF SMOG

Smog is generating continuously in Delhi which is polluting air quality. The level of PM_{2.5} and PM₁₀ had been recorded at peak level in 2017. It results in low visibility and more accidents. (Yamuna express). This level of smog also creates delay of public transport like trains, flights etc.(48)

REVIEW OF LITERATURE

Rizwan et al (2013) studied on air pollution in Delhi and its magnitude and effects on health. It was concluded that air pollution is the major cause which is creating many health problems in the urban areas. According to data of WHO (2011) reported that PM₁₀ limit has enhanced by 10 times at 198 $\mu\text{g}/\text{m}^3$ within ten years. The main pollutants are vehicular emissions and industrial activities in Delhi. Thus, more serious steps should be taken by Government of Delhi in order to reduce the levels of air pollution.

Gosh and Parida (2015) studied on air pollution and India: Current scenario. The main objective of the study was to throw light on bad impacts of air pollution on health of children and old people. After studying it was suggested that significant measures should be taken by the government of India in order to eradicate the problem of air pollution in India

Gordon et al (2015) studied on air [pollution health research priorities for India: perspectives of the Indo U.S communities of researchers. The main objective of the study was to train people in order to make them expertise in air pollution exposure, modeling and population health research. This research was done by arranging workshop and training was provided so air pollution may be eradicated in the future.

Chatterji Arpan (2020) studied on Air Pollution in Delhi: filling the policy gaps.

This study proved that the policies of Delhi government are very weak in improving air quality because the magnitude of air pollution is massive in Delhi. It is causing devastating impacts on people's health. In order to solve this problem, India should try to adopt green recovery model which is less emission intensive.

OBJECTIVES OF THE STUDY

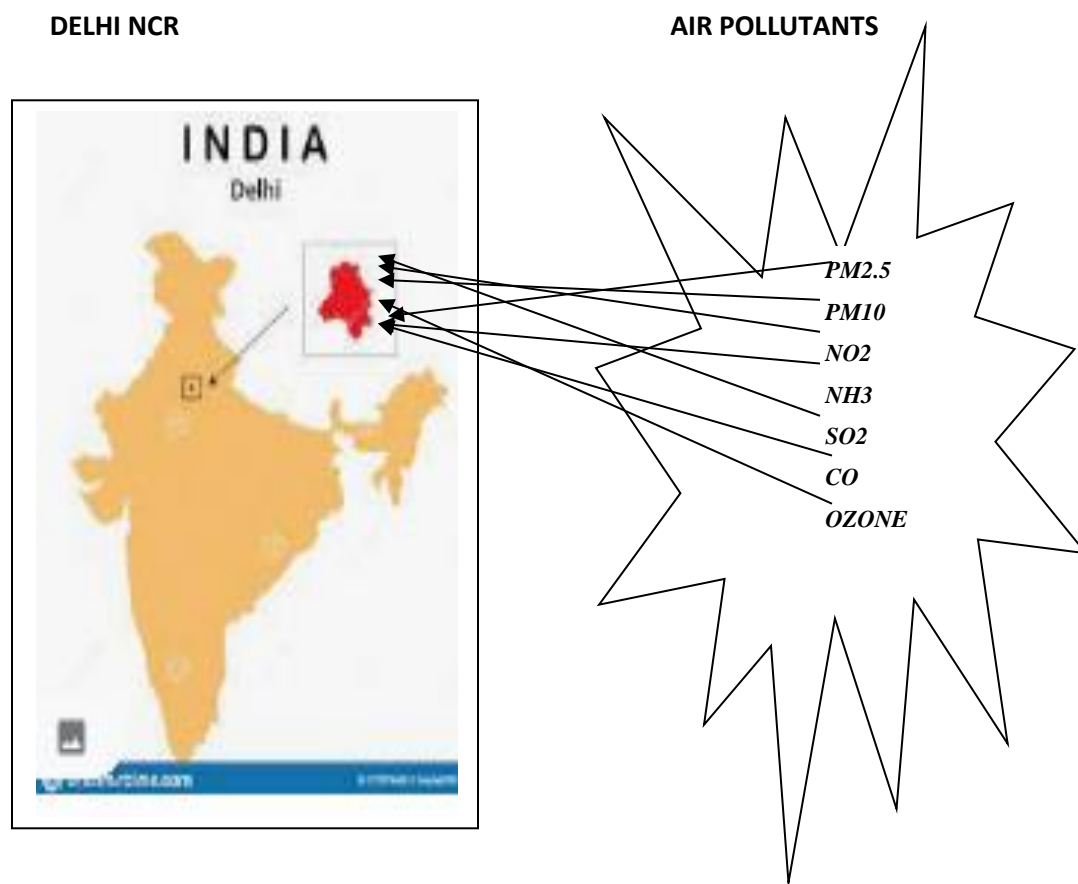
The primary objective of the study is to throw light on impact assessment and factors affecting air quality of Delhi NCR. The crux of the study is destined to provide vital information to general public about air quality index and various factors affecting it. The Specific objectives of the present study are;

- 1) To throw light on air quality index of Delhi NCR
- 2) To explore information on various pollutants in Delhi NCR
- 3) To suggest recommendations for removing air pollution in Delhi NCR

RATIONALE OF THE STUDY

This study focuses on U.T Delhi NCR which is known as Home of India. Thus this study will be very helpful to science and community by becoming conceivable addition. Secondly it will be more beneficial to policy makers not only to assess impacts of air pollutants on air quality, but also its vitality as an alternative effective measures for improving air quality of U.T Delhi NCR by public participation in the near future.

CONCEPTUAL MODEL

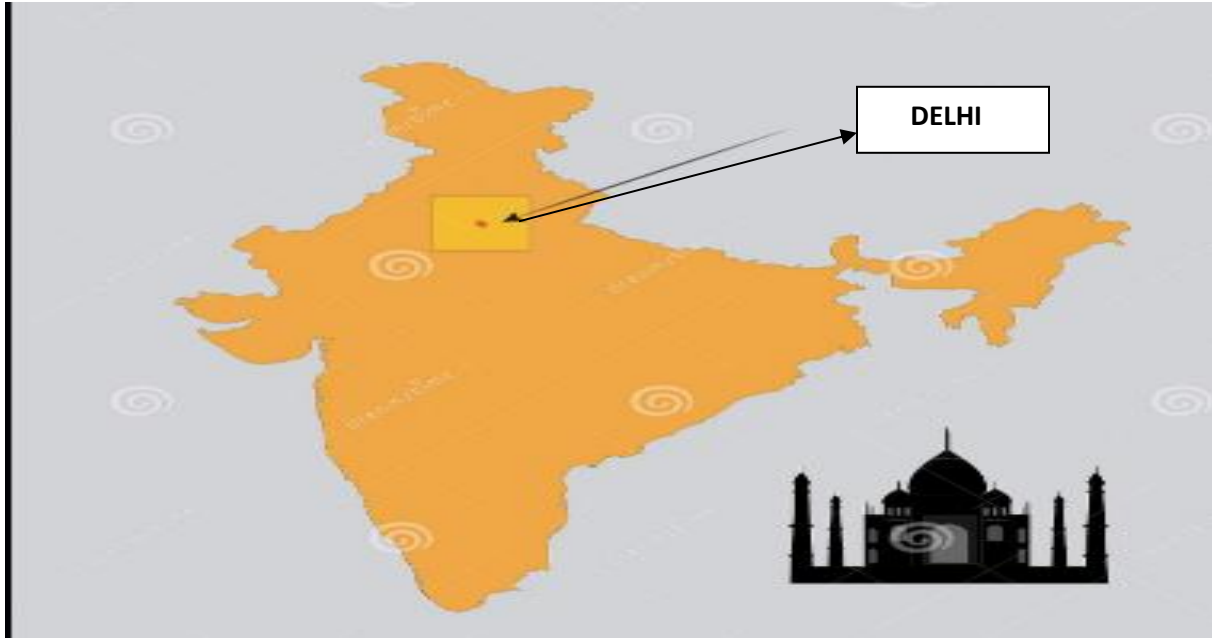


METHODOLOGY

The data has been collected from Air Monitoring Station ANAND BIHAR relating to seven pollutants (PM2.5, PM10, NH3, NO2, CO)(parameters) from September 1 to November 4 during more pollution period including impact of DIWALI FESTIVAL. These parameters are primarily based on the objectives outlined earlier. The sub indices for each pollutant at Air Monitoring Station has been calculated based upon on 24hrs with the help of Air Quality Index as prescribed by Government of India as shown in the following figures with various levels and its impact on health. Air Quality Index is a government agency whose main function is to communicate to public how polluted air is and how polluted it is forecast to become.

THE STUDY AREA

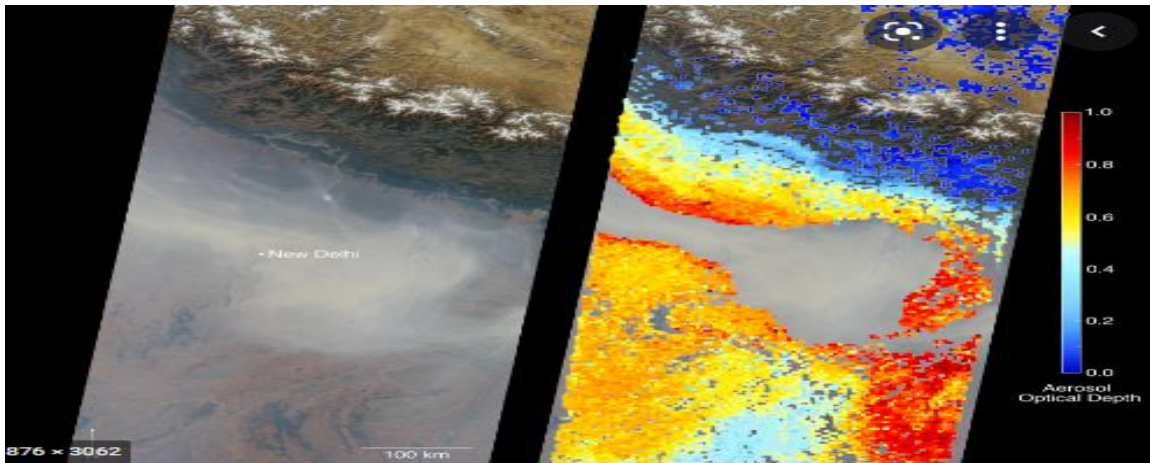
The present study focused on Delhi NCR U.T as capital of India. It came into existence in 1911 named by RAJA DHILU. It is a capital of India. It sits astride the ZAMUNA River, a tributary of the GANGA about, 100 miles of the Himalaya. It embraces old and new Delhi and the surrounding metropolitan region as well as adjacent rural areas. To the East side, it is bounded by Uttar Pradesh and on the South side Haryana. It has area approximately 700 sq km and having population around 11 million. Delhi stands 2nd in the world regarding population level. It has rich and deep culture and includes many historical locations for India and Asia. Its climate is characterized by extreme dryness with hot summers. Its location is shown in map of India in the following figure



SOURCE dreamstime.com

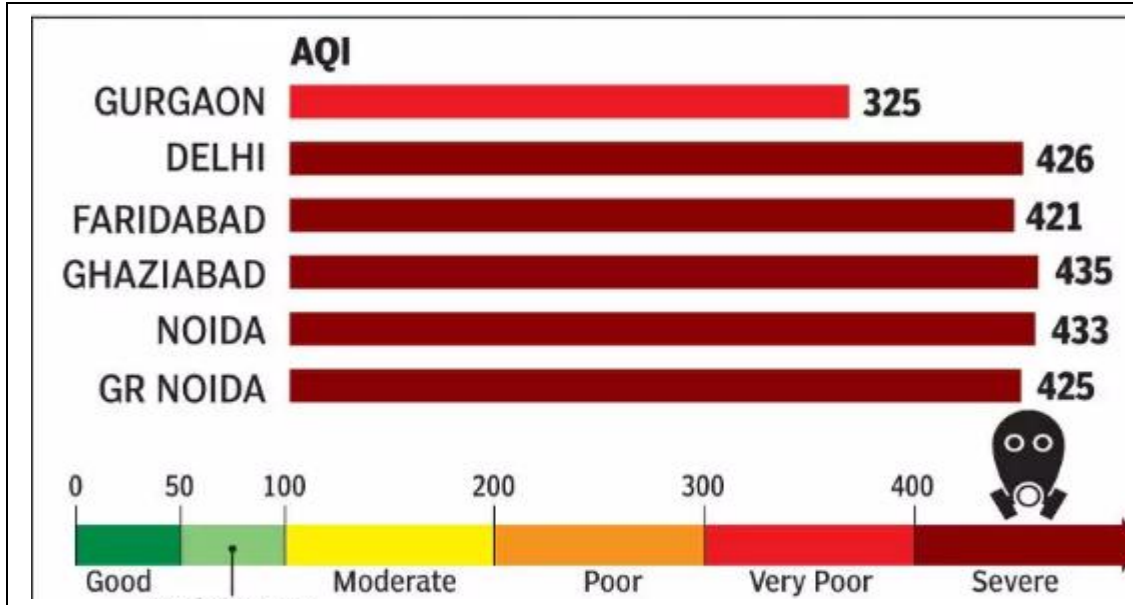
CURRENT SITUATION IN DELHI

The situation of air quality of Delhi NCR is very chronic. It is obvious from the image taken by NASA. This depicts major air pollutants like PM2.5, PM10, NO2, NH3, SO2, CO and OZONE which are responsible for polluting air quality in Delhi NCR. The breathing death situation has been reported recently.



SOURCE: NASA

MAJOR AIR POLLUTANTS PLACES IN DELHI NCR



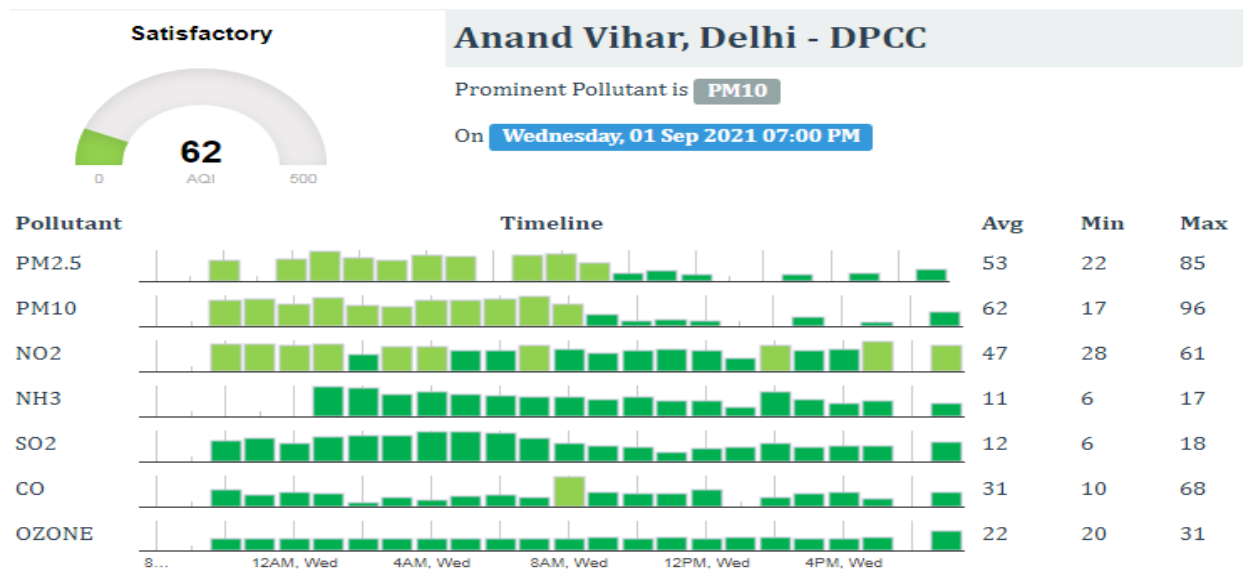
This image shows major air pollutant places in Delhi NCR. The situation of air pollution at these places has become very critical due to rapidly increasing air pollution these days. Though some precautionary measures have been imposed like shutting up of schools and colleges, work from homes, use of public transport minimal but all in vain.

According to report of Times of India, in order to eradicate this air pollution problem, public awareness is mandatory because it depends upon thinking of public to what extent they are aware about this problem. Though the ruling party has been adopting various steps to solve this problem but public should come first in order to solve this problem. In this matter, role of public is primary. With their cooperation, this problem can be solved to maximum extent. No doubt, Air pollution also has been facing by advanced countries like, U.S, Japan, Russia, England etc. But here public is very aware and they try to stop this problem heartily.

ANALYSIS OF AIR QUALITY INDEX AT DELHI

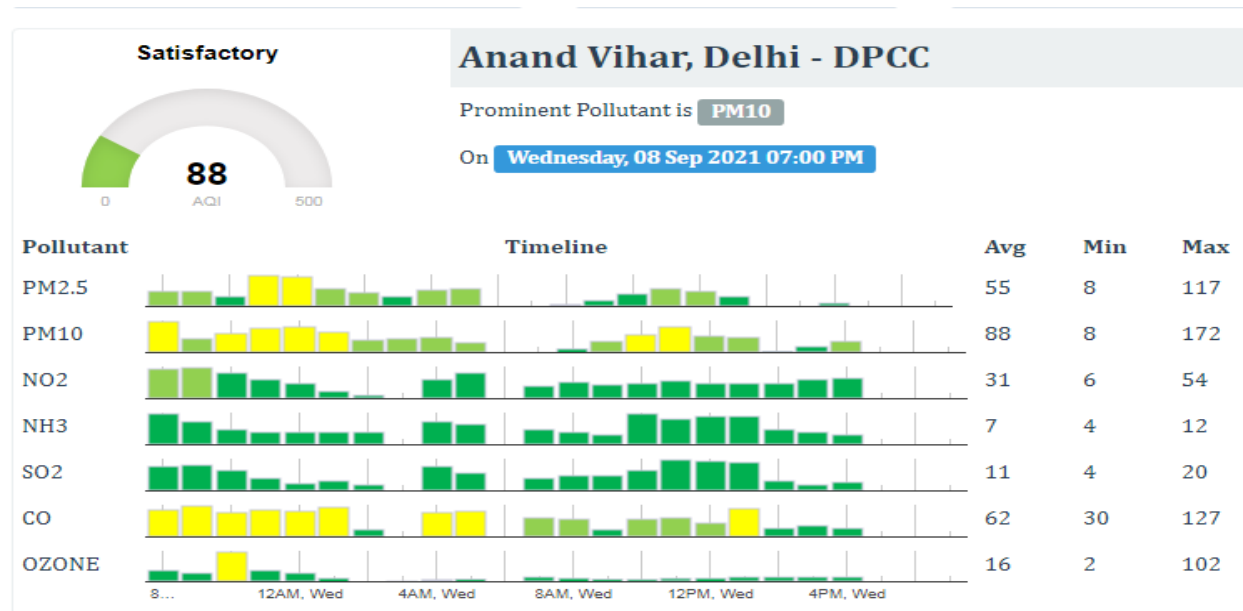
AIR QUALITY INDICES OF RESEARCH PERIOD

SEPTEMBER-1



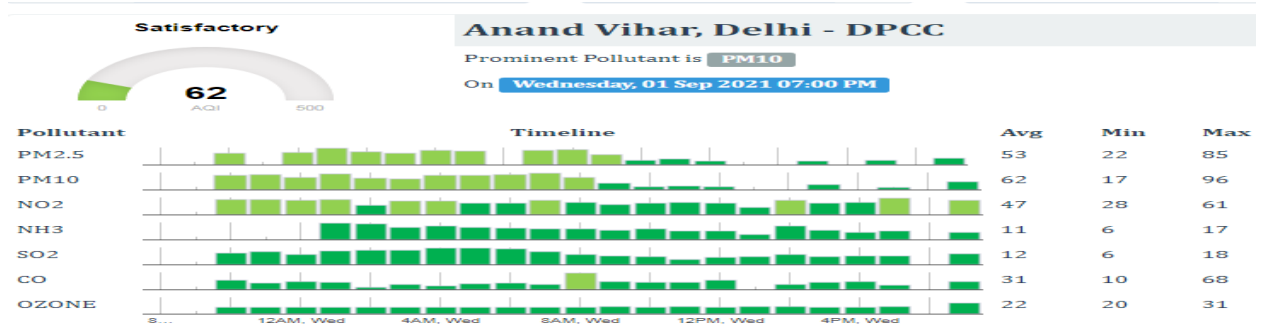
This figure exhibits indices of air quality of Delhi NCR during September, 2021. According to Air Quality Monitoring Station, these seven pollutants are having various average indices like PM2.5(85),PM10(96),NO2(61),NH3(17), SO2(18), CO(68) and OZONE(31) respectively. It results satisfactorily level of air quality in Delhi. It concludes satisfactory situation during this period.

SEPTEMBER -7



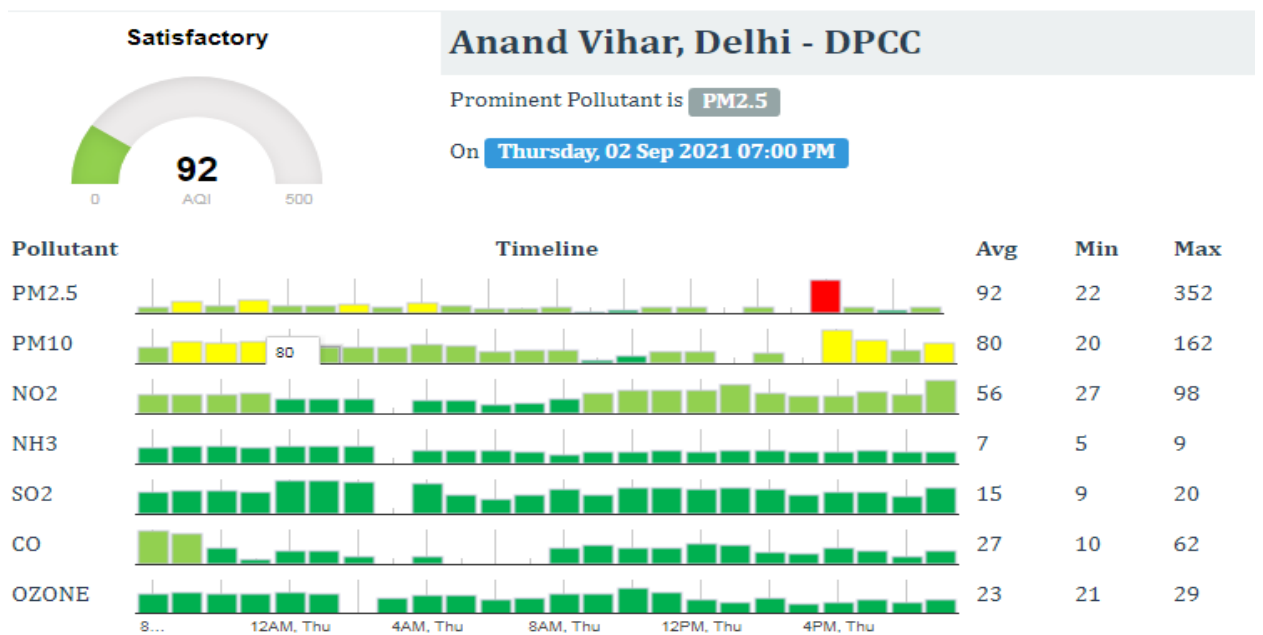
This figure presents different air quality indices of PM2.5, PM10, NO2, NH3, SO2, CO and OZONE according to changes in air pollution in Delhi. These seven pollutants are showing average indices like 117, 172, 54, 12, 20, 127 and 102 which indicate good level of air quality in Delhi.

September 15



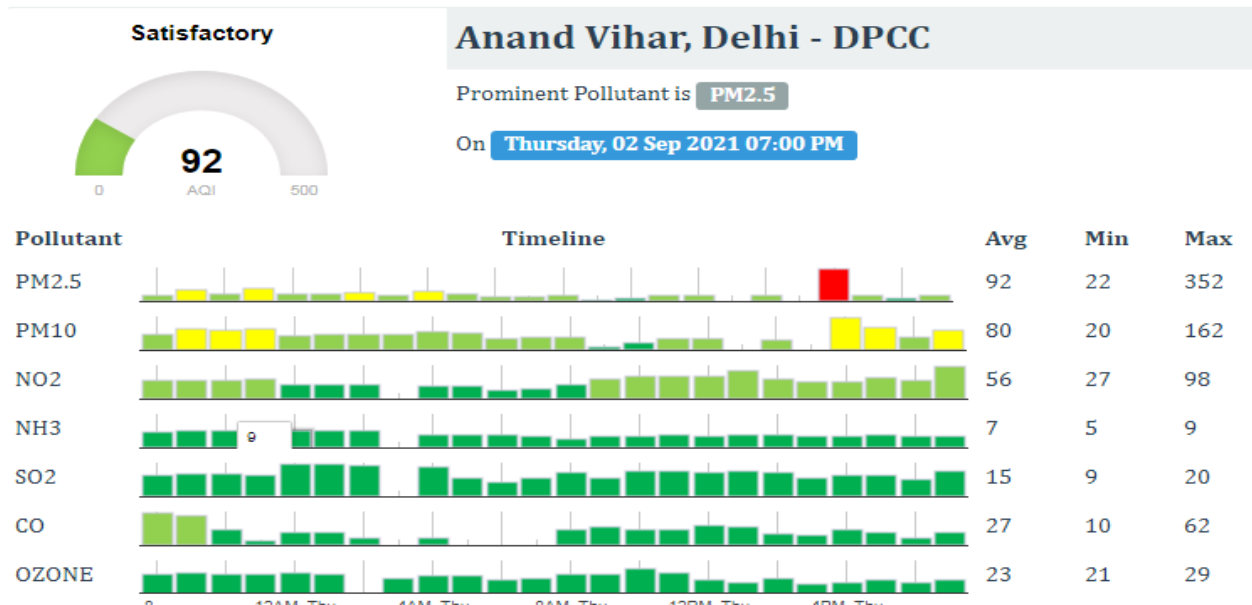
This figure depicts that seven pollutants have different indices like PM10 (85), PM2.5(96), NO2(61), NH3(17), SO2(18), CO(68), OZONE(31) respectively during third week of September which are also satisfactory

SEPTEMBER 22



This figure depicts that seven pollutants have different indices like PM10 (352), PM2.5(162), NO2(98), NH3(9), SO2(20), CO(62), OZONE(29) respectively during third week of September which are more but also satisfactory.

SEPTEMBER 29

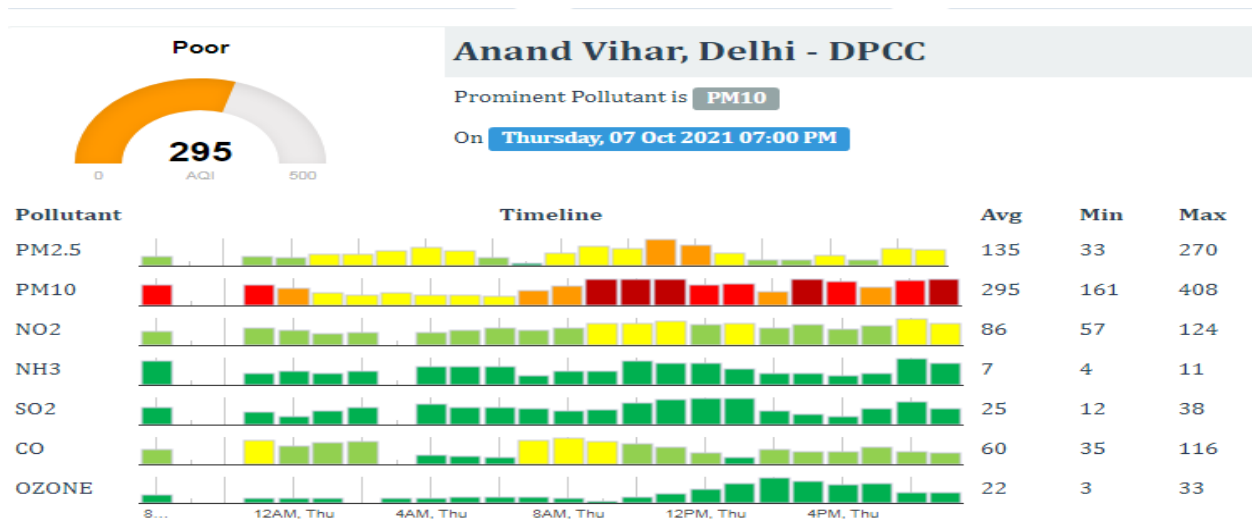


This figure depicts that seven pollutants have different indices like PM10 (27), PM2.5(36), NO2(11), NH3(8), SO2(11), CO(14), OZONE(23) respectively during fourth week of September which are more but satisfactory

It concludes that during month of September the level of air quality index is almost satisfactory.

LEVELS OF AIR QUALITY INDEX IN OCTOBER 2021

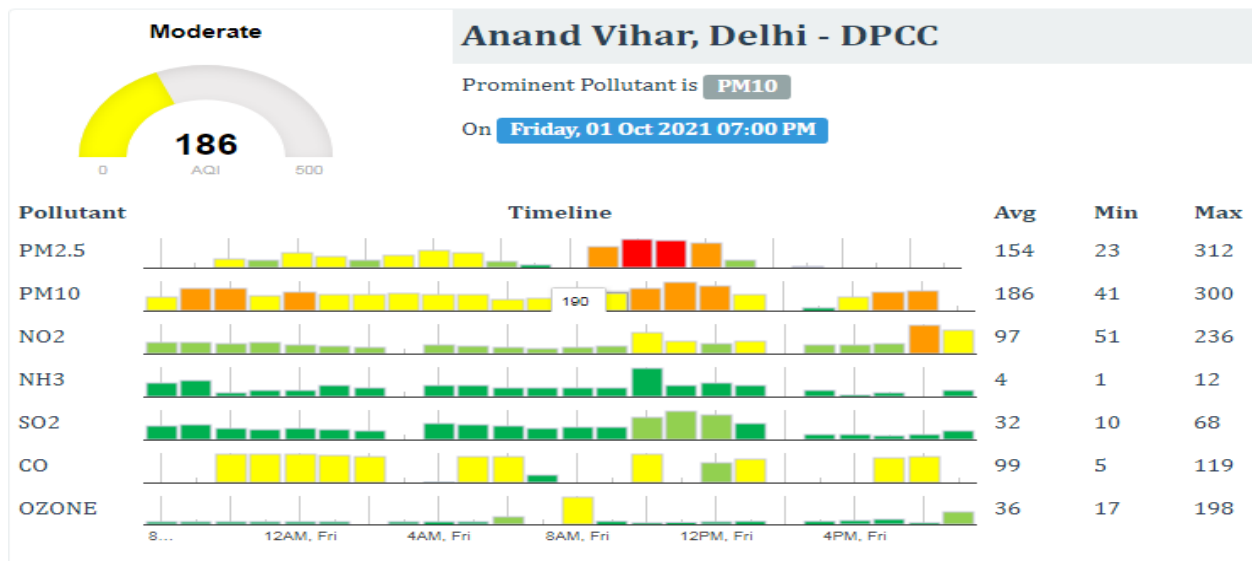
OCTOBER 7



This figure depicts that seven pollutants have different indices like PM10 (270),PM2.5(408),NO2(124),NH3(11),SO2(38),CO(116),OZONE(33) respectively during first week of October which are more as compare to indices during September. This represents poor situation due to

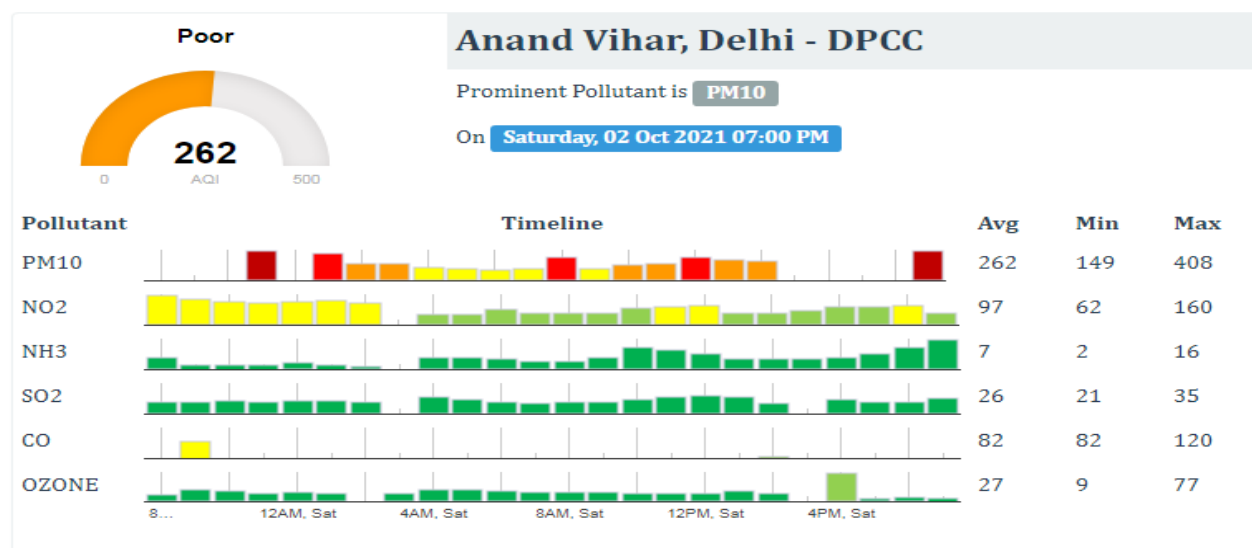
DIWALI FESTIVAL.

OCTOBER 14



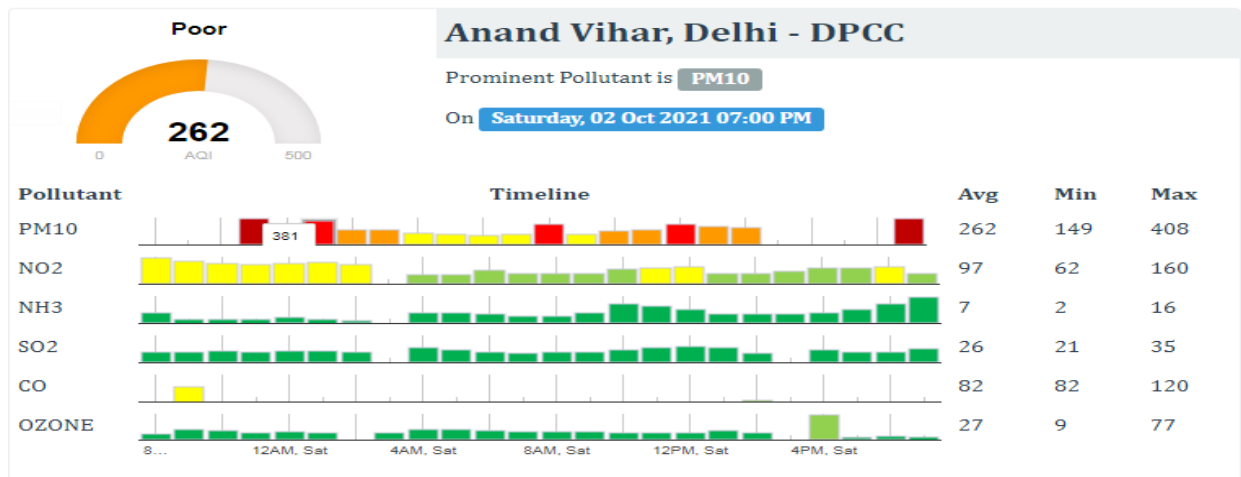
This figure depicts that seven pollutants have different indices like PM10 (312),PM2.5(300),NO2(236),NH3(812),SO2(68),CO(119),OZONE(198) respectively during second week of October which are not satisfactory but also moderate

OCTOBER 21



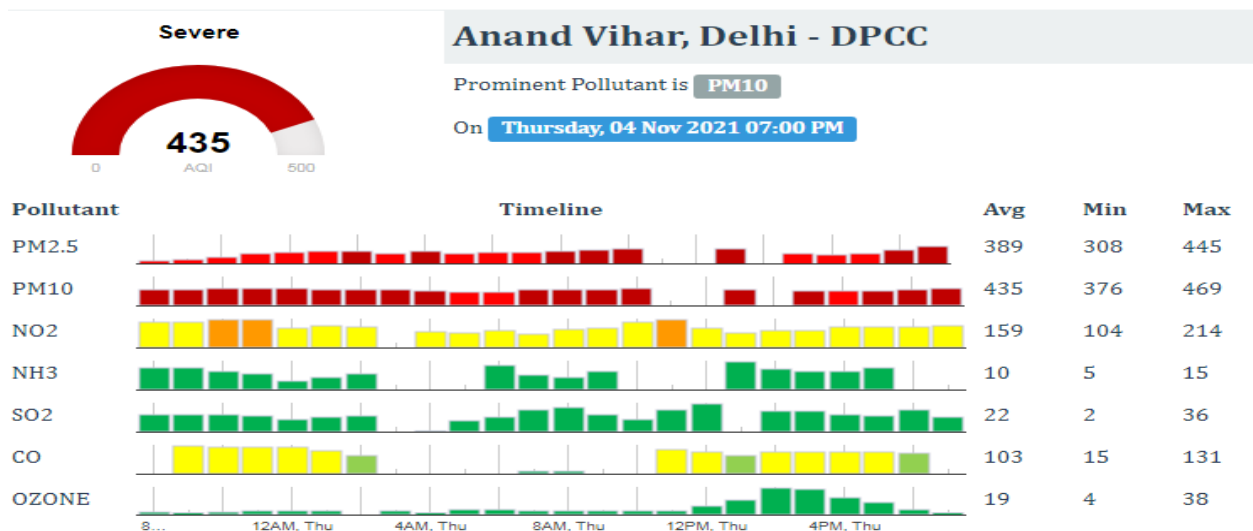
This figure depicts that seven pollutants have different indices like PM10 (408),PM2.5(160),NO2(16),NH3(35),SO2(35),CO(120),OZONE(77) respectively during third week of October which are more and poor also.

OCTOBER 28



This figure depicts that seven pollutants have different and more indices like PM10, PM2, NO2, NH3, SO2, CO, OZONE respectively during fourth week of October which are more and poor.

NOVEMBER 4



This figure depicts that seven pollutants have different indices like PM10 (445),PM2.5(469),NO2(214),NH3(15),SO2(36),CO(131),OZONE(38) respectively during first week of November which are more and severe . It can be concluded that level of air quality index is not satisfactory during October 2021.

From the upper study of air quality index during month of September and October, it is obvious that air quality index of Delhi NCR is increasing ie severe for public.

GOVERNMENT STEPS & RECOMMENDATIONS:

- **LESS USE OF MOTOR VEHICLES**

People should be encouraged to use of public transport to maximum extent in order to reduce air pollution because vehicle emissions are the main source of air pollution in Delhi. This will control use of vehicles. For meeting this target, Government should try to reduce the fair of the public transport in order to encourage people.

- **DISPLACEMENT OF INDUSTRIAL AREA FROM DELHI TO ANY COASTAL REGION**

The industrial area is one of the reasons why Delhi is most polluted and populated capital in the world. Many MNC's and industries are running in Delhi. If the industrial area will be displaced from Delhi NCR, then it will reduce pollution to maximum extent

- **PROMOTE ELECTRICAL VEHICLE, BIKE AND SCOOTER SHARING SCHEMES**

Automobile industries should have a good look over electrical vehicle even the model 3 of TESLA launched in 2017 can travel up to 320 km with just one hour of charging. Electrical vehicle are the good alternatives to reduce pollution and they are eco friendly as well. Carpool system, bike sharing system also help to reduce air pollution. Government should also promote these schemes.

- **USE OF CATALYTIC CONVERTERS IN FACTORYS AND IN MOTOR VEHICLES**

CATALETIC CONVERTER is an exhaust emission controlling device that converts toxic gases and pollutants into less harmful byproducts such as water vapor and carbon dioxides.

- **ECO WEEKS CELEBRATION**

Governments should organize Eco weeks not only at state level but at global level after every six months. So people may use vehicle only if it is very necessary in case of emergency. All the factories should be closed for a week like in lockdown.

It has its own drawbacks also like direct effect on GDP but we must take such steps to reduce the pollution because it is now a major threat to every living creature in this world.

- **STARTING OF CHANGE AT GROUND LEVEL**

We must first educate people about the environment and harmful effects of pollution at ground level. Government alone cannot t change it is the participation of every individual that will help in the implementation for changing

- **BY ACCEPTING OLD INDIAN CULTURES AND TRADITIONS**

We must replace the things which we buy from industries with the traditional things like using bamboo containers instead of plastic containers. We should use leaf plates instead of plastic plates. They are our old tradition and are biodegradable in nature. Even when we will start using these products, we can promote the local entrepreneurs also.

- **REFORESTATION ND VERTICAL FORESTS**

Planting of trees around the metropolitan cities can reduce air pollution. Government should make all the drunken arrests to plant trees. Thanks to Italian architect Stefano Boeri, the first vertical tower the Bosco vertical had completed in Milan in 2014. The 2 towers in Milan are the residential towers but with the difference. They are covered in total 900 trees, 500 shrubs, and over 11000 other plants. If we have land, we can create vertical forest if we don't have land to plant the trees.

- **SMOG FREE TOWERS**

The tower is effectively a giant vacuum cleaner, 7 meter in height can be install in public place and sucks in smog turning it into clean air in city's using Pay ten dent positive ionization technology.

- **CENTRAL PARK**

Just like the metropolitan cities of the developed nations like New York central parks area must be in the upcoming projects in the developing areas of India also. It will create a balance in the environment and industrialization, and will reduce pollution.

- **STRICT PUNISHMENT**

Strict punishment and penalties should be fixed to industries which cause pollution. For this purpose, firstly Government should identify polluting units and then fine them . There are existing laws under which PBC and Environment ministry can do that. There is need to implement the laws properly. There must be strict laws on pollution creating industries and stricter punishments for breaking of rules.

CONCLUSION

At last it is obvious that reduction in air quality is the need of the hour. Therefore it is clear from the images of **NASA, TIMES OF INDIA AND DATA OF ANANAD BIHAR MONITORING SYSTEM**. The situation of **BREATHING DEATH OF DELHI NCR** can be changed with the cooperation of people by applying upper states suggestions in order for reducing air pollution to maximum extent. No doubt, it has negative impact on general public by **CREATING VARIOUS DISEASES LIKE ASTHMA, STROKE, HEARET ATTACK, LUNG CANCER etc**. Therefore human is the major creator of air pollution. It is saying that Human creates problems and HE has also solution of it. Thus **NATURE IS BLESSED TO US BY GOD**. By surviving its gifted things, we should try to make its things clean, clear and fresh so they may provide us good results in the coming future.

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