

# Quantification of Homa Effect on Air Quality in NCR, India: Pollution and Pandemic Challenges in Cities and Healthcare Remedies

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**Abstract.** The manuscript deals with the increasing pollution and vanishing of AQI in NCR region of India due to many factors like Parali (stubble) burning, traffic and pollution caused by factories to generate electricity by thermal power combustion. The Manuscript discusses the statistical effects of Indian Homa and Yajna process and its effect on curbing the pollution and improving AQI. It has been found that Yajna helps in purification of the environment and different AQI factors are improved by its continuous exercise for long time at a particular place. The python based data analysis has been presented to justify the problem statement and gadget and sensor based readings are produced in evidences. This paper is an attempt to convert the belief of one hundred thirty-eight crores Indians into practical and an evolutionary step towards Vedic sciences and natural prevention of Air-Pollutions. This is an effort to draw the attention of the masses and to bring into notice and consideration of this wonderful technique in front of the whole world.

**Keywords:** AQI, PM 2.5, PM 10, Climate Change, Yajna, Mantra, Human Health, Economic Growth

## 1 Introduction

### 1.1 Air Quality Global Challenge in 21st Century

The greed for rapid and fast attainment of technology and development is continuously degrading the quality of air leading to poor ratio of high ppm. A very large number of developing and underdeveloped countries can be considered as the main root cause for poor AQI and its related concerns. This is leading to the increasingly high amount of particulate matter, carbon dioxide, nitrogen and sulfur dioxide. This is causing breathlessness, lung infections, ischemic heart diseases, acute lower respiratory infections in children, lung cancer and chronic obstructive pulmonary disease

(COPD). The problem has reached a level so worse that the human race is continuously observing a repeated number of ozone holes. Data collected from 1979-2004 NASA's TOMS instruments, 2009-2011 RNMI institute's OMI, 2012-2019 by OMP's Soumi satellite have collaboratively demonstrated that the amount of earth's natural ozone layer is thinning dramatically every year(Jiang, M. et al., 2020)[2].

### **1.2 How Yajna and Vedic Rituals may curb Pollution**

Sustainable development is the only approach that could save the life of this planet from the monstrous pollution, global warming, el-nino and other environmental hazards taking toll on nature. This sustainable development can be done by using the Vedic wisdom which has gifted us the cure of everything in form of Yajna. The Yajna and the Vedic rituals are the only promising solution to the pollution. Yajna has been proved effective in reducing air pollution by diffusing the aroma of its Samagri in form of fumes which in turn purifies the air. Reduction of 40% to 90% of SO<sub>2</sub> is observed after Yajna. Also studies shows trend of decrease of PM 2.5, PM 10 and CO<sub>2</sub> as post Yajna effects. The ability of Yajna to reduce the electromagnetic radiation of electronic gadgets to significant levels is an easy solution to reduce electromagnetic pollution. The ghee and samagri are beneficial as environmental friendly insecticide and germicide due to their germicidal and insecticidal effects when burn in Yajna. Today when the nature is crying for help in its preservation Vedic rituals and Yajna seems to be the most effective way out of the problem (Kumar,D.,2019)[4].

## **2 Literature Review**

Today more than half the world's population is breathing polluted air. According to recent WHO report, 4.2 million people die annually due to air pollution. Air pollution from power plants, vehicles, households, industries and agriculture sector is due to inefficient use of energy. Air pollution is also generated due to dust, sand and unburnt matter. The paper uses Ground Monitoring (GM) techniques with DIMAQ (Data Integration Model for Air Quality) to provide analysis over AQI in various regions. Moreover it also makes use of the Global Human Settlement Layer to categories area as urban, rural and sub-urban. It is observed that the AQI level of middle and low-income countries is worse than high income countries. The countries of eastern-Asia, central-Asia, and southern-Asia and Sahara region of Africa have poor air quality index and the level of air pollution in these region is on increasing which is actually a threat to whole world. It is found that the Sahara desert is the major cause of PM<sub>2.5</sub> in the Sahara region of Africa and about 55.3 percent of the world's population is being affected by concentration of PM 2.5 .An annual decrement has been observed in the pollution level from 12.4 to 9.8 µg/m<sup>3</sup> in regions of North America and Europe but an opposite swing has been seen in the Southern and Central Asia where the pollution level has incremented from 54.8 to 61.5 µg/m<sup>3</sup>.The reason for decrease in the pollution level in Europe and North America is strict implementation of rule and regulation in controlling pollution level through 'Clean Air Act' and 'Smoke Control Act'. Similarly in Eastern Asia and South Eastern Asia air pollution rose from 2010-2013

but by the implementation of ‘Air Pollution Prevention’ and ‘Control Action Plan’ it declines from 2013-2016. The data presented is actually ground monitoring(GM) of 9690 locations of the world consisting of the trends from 2010 to 2016. There are still many locations that are not included in the database and locations that are monitored also lag spatial coverage (Jiang, M. et al., 2020)[2].

## 2.2 Air Pollution and Public Health

Kelly, F. et al. in their paper ‘Air pollution and public health: emerging hazards and improved understanding of risk’ have elaborated about the grave effects Air pollution have, had and will have on human health, but they also talked about how people are starting to understand the gravity of the matter. The team have talked about the historical and modern perspective of the problem, they have elaborated how air pollution has different health effects on humans like increase in mortality/death rate due to increased morbidity. Data now shows that long term exposure to PM has effects on diabetes, neurological development and major cardiovascular diseases.  $PM_{2.5}$  and  $PM_{10}$  are a complex heterogeneous mixture of different constituents- Black Carbon, Organic Carbon, Aerosols, Coarse PM(Dust) and ultra-fine particles. A qualitative graph on mortality rate (Deaths due to pollution vs years), flow charts over how PM exposure leads to different diseases, are used to compare the parameters more visually (Gowtham, S. et al, 2015) [1].

The result indicates that the majority of the population lives in a bad environment and is always in danger of different kinds of new and old chronic, life-threatening diseases. The problem strongly requires powerful and capable authorities to take appropriate actions towards it, traffic should be reduced, reforestation should be done on a large scale and environment friendly energy sources should be increased all over the world. But the most important factor in order to improve air quality is blatant engagement and awareness of the general public in this regard (Kelly, F., et al. 2015) [3].

## 3 Methodology And Setup of Experiment

This experiment was conducted during the second wave of covid 19 pandemic & lockdown 2.0 in India. It was performed using Havan Samagri and burnt into Havan Kunda. Dr. Mamata Saxena, a renowned scientist and ex-director general of Ministry of Statistics & PI (MoS-PI), performed this experiment at her residence, Lodhi road, New Delhi, India. Due to the ongoing lockdown 2.0, public ceremony was not possible.

### 3.1 Setup

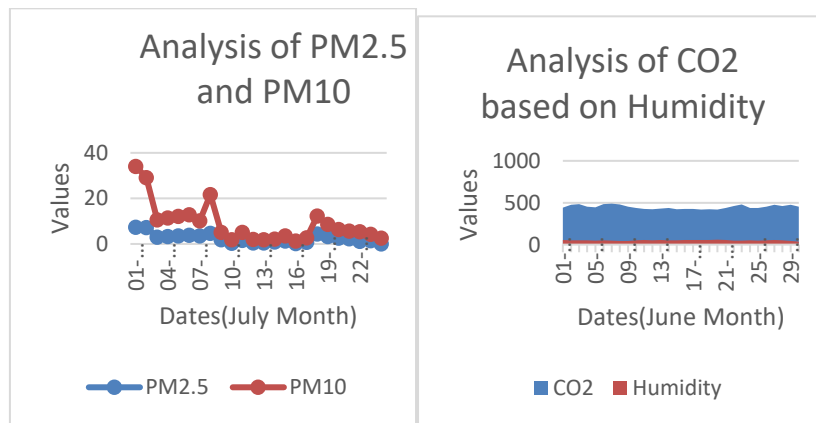
#### Steps

The apparatus was set up inside 8 by 10 room with one window for ventilation. The Air Veda machine was then permanently fixed inside this room. A



**Fig. 2.** The Summary of AQI factors in Results

As, above it has been discussed earlier that Yajna performed from April to July and research team recorded readings with the help of Airveda device. We can analyze that AQI, PM2.5, PM10 and CO2 are decreased rapidly. In July month, AQI and PM is very less as compared to April month due to continuous Yajna. Blue color shows AQI, orange color shows PM2.5 and yellow represents CO2 (Pl. refer Figure 2).

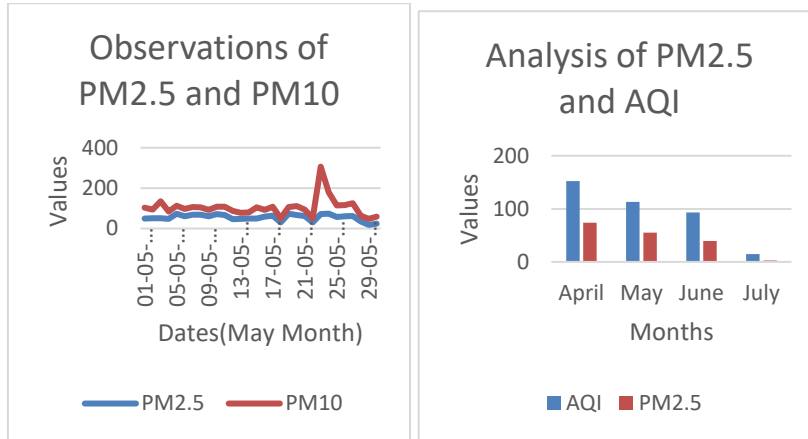


**Fig. 3.** The Analysis of PM factors in July, 2021 Month

**Fig. 4.** The Analysis of CO2 Based on Humidity in June 2021.

In the above graph, multiple line chart is shown. Orange line shows the PM10 and blue line represents the PM2.5. X axis denotes Dates in July month and Y axis indicates values of PM. Yajna performed on open balcony in July month. In the starting of July PM2.5 and PM10 is hazardous as compared to the last of July. So it will be very helpful in reducing PM and CO2 (Pl. refer Figure 3).

In the above graph, the research angle is that team had made stacked area chart which shows analysis of CO2 based on humidity. Blue color indicates CO2 and orange color denotes humidity. With the help of Yajna, CO2 is reduced from the environment. Yajna is performed in open balcony in June month. X axis denotes dates of June month and Y axis indicates values of CO2 and humidity (Pl. refer Figure 4).

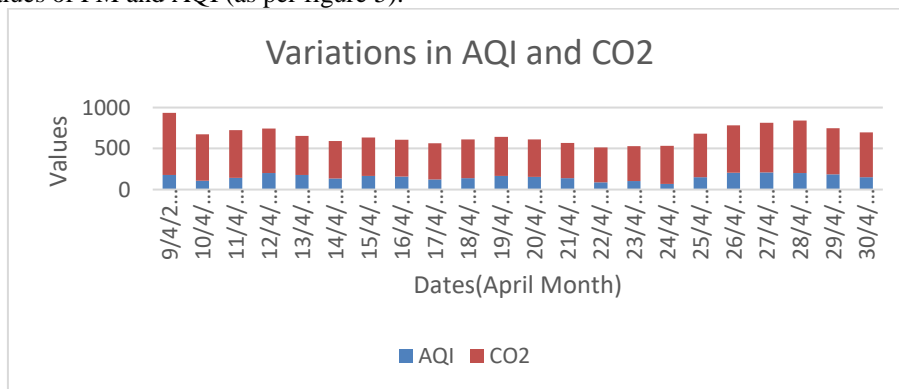


**Fig. 5.** The Summary of PM-AQI factors in May, 2021 Month

**Fig. 6.** The Summary of AQI factors in May, 2021 Month

In the above graph, it has been created line chart for observation of PM2.5 and PM10 in May month. X axis denotes Dates in May, 2021 month and Y axis indicates values of PM2.5 and PM10. Blue color indicates PM2.5 and orange color shows PM10. PM2.5 and PM10 values are reduced with the time, as you can see in the graph, PM values are high in the starting but at the end of month, it would be less. This happens with the help of daily Yajna (Pl. refer Figure 5).

The above graph is bar plot which shows the analysis of AQI and PM2.5 of 4 months data. Blue bar shows AQI of each month and Orange bar represents PM2.5 data. When experiment started in month of April, AQI is too high, but gradually due to daily Yajna, this level of AQI is decreased. X-axis shows Months and Y axis denotes values of PM and AQI (as per figure 5).



**Fig. 7.** The Analysis of AQI and CO2 in April, 2021 Month

The above graph is stacked bar chart which represents variation in AQI and CO<sub>2</sub> in the month of April, 2021. X axis denotes Dates in April Month and Y axis represents Values of AQI and CO<sub>2</sub> in April. April, 2021 is the starting month of experiment, so readings are bit high. But at the end of April, 2021, readings are low which is good for our experiment. Hence Yajna is helpful in reducing the AQI and PM level (as per Figure 6).

## **5 NOVELTIES & RECOMMENDATIONS**

The manuscript brings the importance of Vedic science and Indian Culture through this study. The analysis shows that the Vedic Science methods have the positive effects through Yajna and Havan on both isolated and non-isolated environments. It has been observed that the pollution level after the Yajna process has significantly decreased at that place. The report confirms that continuous use of Yajna and Havan are significant in improving human health and living. It can serve as Vedic and Natural remedy to cure and prevent lung diseases. Moreover, it can be an important step in controlling AQI level.

The reader is recommended to practice yajna at their homes to justify the results we've presented in paper. One should try to be as eco-friendly as possible to give contribution to a healthy future. One should encourage and make the public aware about the seriousness of Bad Air Quality. Vedic science offers a great range of scientifically true phenomena to be done in daily life, which have many benefits and everyone is recommended to practice these activities for their own good. One can do research on other topics offered by Vedic culture to justify them scientifically.

## **7 FUTURE RESEARCH DIRECTIONS AND LIMITATIONS**

The data set used here includes an inspection of three to four months, this analysis could be enhanced by collecting more dataset. It was quite difficult to predict exact results of analysis in a non-isolated environment. Sensors and computing devices used in the analysis were not of high precision and accuracy though this analysis is up to the mark for higher studies.

The datasets can be collected that are more precise and accurate and a detailed analysis can be performed in both isolated and non-isolated environments. There is a need for new innovation and deep research in the field of Vedic Science. This paper is just a gist but not the end. This analysis opens the door for discovering scientific facts and features of Indian Vedic Sciences. Havan has a significant role in reducing the harmful radiation emitted from electronic gadgets eg. the electromagnetic radiation emitted from smartphones covers a range of about 10 feet but it has been observed in the areas where Havan is performed on a regular basis the radiations get shortened to a range of 2 feet or less than it.

The byproducts of Hawan are very useful in the field of agriculture. Ashes generated from Hawan can be used in organic farming. Smoke emitted from Hawan helps in the process of ionization in the atmosphere which out-turns in cloud formation. Vedic Sciences, quite ancient but of great importance, can be considered as one more angle to analyse and solve those theories of nature that are still unsolved.

## 8 CONCLUSIONS

There is a clear cut indication in the graphical analysis presented here in result section that AQI factors, CO<sub>2</sub>, PM level were drastically reduced due to Yajna Activity in Lockdown period in India. This paper aims to bring the importance of Vedic science methods in the society for the improvement of society and human being. The results of the analysis have been shown through different graphs. The first graph depicts the dataset of every 30 minutes and the second graph shows the relationship of AQI level with time after the Hawan considering 24 hour supervision in that environment. The presented manuscript also brings into consideration the Hawan effects in isolated and non-isolated environment. The different patterns in the graph show an increasing air quality index with time through regular practice of Yajna and Hawan. The other graphs show level of PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>2</sub> and CO<sub>2</sub> before and after the Hawan and the variations are observable in each of the above parameters that proves the significance of Indian Vedic science. The article uses several mathematical derivations and formulas to produce an appropriate and accurate dataset to understand AQI level in the particular environment and positive effects of Yajna and Hawan.

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