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RESTRICTIONS DURING COVID-19 AND ITS IMPACT ON AIR POLLUTION: A CASE STUDY ON AIR QUALITY IN KAMRUP(M) DISTRICT, ASSAM, INDIA*

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ABSTRACT

Unlike other epidemic COVID-19 is also countable as severe natural disaster in all over world. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), known to consider for 2019 corona virus disease (COVID-19) pandemic situation, which infected the human population specially advanced countries. It is may be partly due to the high an unscientific use of technology. As a result, nationwide lockdown is being adopted to stop the transmission of virus human-to-human. People are instructed by the government to avoid public transport, stay at home and out of their physical work, and maintaining social distance. Though the society or human being effected by that type of pathetic situation, on the other hand it appeared as blessing for nature during this calamity time. This was more so in 3rd world countries like India. Due to congenial condition lockdown in India was forced for three weeks from 24th March to 14th April 2020 in the initial stage, which is later extended up to 3rd May 2020. In India almost all the states are affected from this pandemic COVID-19, however few states are severely affected. Among then the state Assam is considerable due to high density of population. In Assam Kamrup metropolitan district is not exceptional in this regard. Increasing Covid-19 positive patient in the district of Kamrup (M), the administration has decided to lock down the district again from 29th June to 19th July. As a result, the pollution level especially in district like Kamrup (M) drastically decreased within a few days. In this paper the researchers tried to carry out the study to evaluate the scenario of air quality for pre and during the lockdown periods in Kamrup (M) district. To carry out this research work few selected air pollutant parameters have been considered like SO_2, NO_2, PM_{10}, $PM_{2.5}$, NH_3, CO, and O_3 from 6 monitoring stations spread over the Kamrup (M) to check the air quality. After proper analysis of these parameters, it has been found that the air quality is significantly improved during the lockdown period in the district of Kamrup (M) as it was before lockdown period.

KEYWORDS: Air quality, Covid-19, environment, lockdown, pandemic, pollution.

Article History

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INTRODUCTION

Pandemics are not new to our civilization and currently our benevolent earth has been on the receiving end of the on-going global catastrophe which has paralysed our daily normal life. The last cataclysmic viral pandemic, which caused an exorbitant amount of death and social unrest, was "Spanish Flu" of 1918 (William, 2018). Before the current outbreak, six corona viruses (CoVs) known to have vitiate human's capacity to fight diseases; among six, four are prevalent, these include- HCoV-229E, HCoV-NL63, HCoV-OC43, HCoV-HKU1; These four viruses are non-fatal to humans who have better immune response to viruses but can cause severe respiratory infections in infants and people with compromised immune system whereas, the spread of severe acute respiratory syndrome (SARS CoV) in 2002 and Middle Eastern respiratory syndrome (MERS-CoV) in 2012 proved to be more infectious and fatal (Jie,2019). The novel corona virus is reportedly caused by SARS-CoV-2; was first reported in Wuhan, China in December 2019, By January 7, 2020 the Chinese authorities were able to detect a new strain of corona virus and the virus was successfully isolated from the ailing patients. On 11th of February 2020 the virus name was revamped from "2019-nCoV" to "SARS-CoV-2" (Corona viridae Study Group of the International Committee, 2020). The disease caused by SARS-CoV-2 has been named as COVID-19 by World Health Organisation (Darryl, 2020).

The on-going pandemic has paralysed the arteries of the modern world, both in developed and under develop countries. Within a month from its inception globally reported cases has skyrocketed from mere 8 million cases to 27 million cases in thickly populated cities. The patients with high commodities have the highest susceptible to infection (Richardson, 2020). Global movement has been restricted by world Health Organisation caused socio-economic damaged in all over world. In that situation the Kamrup (M) district of Assam is also not exceptional. Due to spreading nature of the COVID-19 pandemic the entire district has been badly affected as like other districts of the Assam. Considering the hazard nature of the COVID-19 the district authority has called lockdown for long time. As a result, though the socio-economic conditions have been affected but on the other hand the air quality significantly improved as it was earlier. Now-a-days, all environmentalists are very much concerned regarding world climatic condition. Therefore, limitations in the use of machines and tools specially traffic vehicles plays vital role to enhance better environmental conditions. A healthy environment is always desirable to sustain human life along with ecological balance on the surface of the earth.

STUDY AREA

The Kamrup metro district is one of the foremost districts among all districts of Assam as well as North-East India. The district has been carved out of the erstwhile Kamrup District.

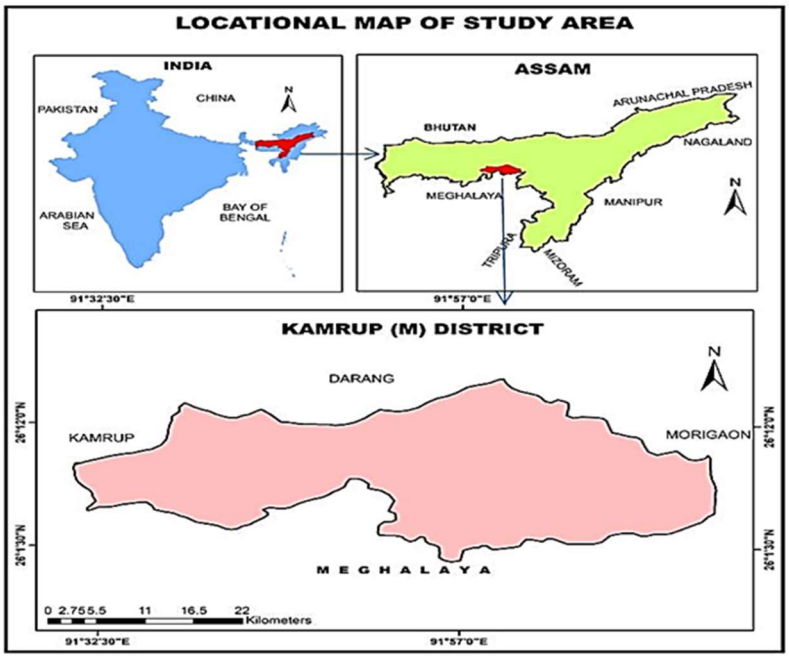

Figure1: Location map of the study area

The district headquarter is in Guwahati, which is the biggest city in the North-East and contains the maximum area of the district. Guwahati being the premier city in the north eastern part India has been experiencing rapid growth of population and socio-economic changes in many ways during the last two or three decades, especially since the shifting of the capital of Assam from Shillong to Dispur in 1972. The district situated in the middle part of the Brahmaputra Valley of Assam. Geographically the study area located between $25^0 59' 52.45''$ N to $26^0 15' 31.54''$ N latitude and $91^0 33' 08.04''$E to $92^0 10' 49.8''$ E longitude occupies an area of 1528 sq. km. It is bounded in the north by Darrang and Kamrup district and west by Kamrup district, south by the state of Meghalaya and east by Morigaon district. This district consists of only one sub-division, i.e., Guwahati has six Revenue Circles viz.: Azara, North Guwahati, Sonapur, Chandrapur, Dispur and Guwahati. The district experiences Sub-Tropical with semi-dry summer where 6 °C to 39 °C variation in both winter and summer. Average humidity of this area is 76% and annual rainfall ranges between 1500mm to 2600mm.

OBJECTIVES

The objectives of the study are mentioned below:

1. To understand the nature of Covid-19 and its hazardous character
2. To study the status of ambient air quality of Kamrup(M) during pandemic
3. To identify the crash of lockdown on healing the environment from air pollution

METHODOLOGY

To study the crash of the adopted Covid-19 lockdown measures on air quality in the district of Kamrup (M) various methods have been adopted. The data base of the study has been analysed mainly based on the secondary sources, relevant journals, newspaper articles etc. are reviewed. Apart from this the few relevant data has been

generated specifically by analysing the observations of the air quality monitoring networks. Basically, the secondary data are collected from Pollution Control Board, Assam. The researcher used Arc GIS 10.3 was used to digitize maps document to show the map and chart. Special focused has been given on air pollutant elements i.e., SO2, NO2, PM10, PM2.5, NH3, CO, and O3 of 2019 and 2020 (March, April, May June and July). To better understand the data, maps (in Arc GIS) and scatter diagram has been used.

NATURE OF COVID-19

The furious forms of epidemics are declared as pandemics which are familiar form the ancient period of human civilization. Currently our benevolent earth has been on the receiving end of the on-going global catastrophe which has stopped our daily normal life. COVID-19 stands for Corona virus disease 2019 and it originated by the severe acute respiratory syndrome (SARS). Corona Virus is a form of many viruses. These are common in people and many different species of animals including cat and bats.

Rarely the corona virus that infects animals can involve and becoming new human corona virus which then infect and spread between people. Some important examples of corona virus are SARS (severe acute respiratory syndrome) 2003, MERS (Middle East Respiratory Syndrome) 2012.A novel infectious disease of coronavirus family was identified in Wuhan, China in late December 2019, which was later named as COVID-19 (Chen, 2020). The clinical symptoms are sneezing, nausea, fever, lung problem etc. In January 2020, WHO (World Health Organization) confirmed human to human transmission of COVID-19 through respiratory droplets. On January 7th Chinese Scientist identify that this unusual pneumonia is caused due to the Novel Corona Virus And gradually this virus spread outside the China and then the whole World. And in a very short period of time, it became nationwide pandemic.

RESTRICTIONS

COVID-19 risk in India is high, because if one gets sick in India and need medical care, resources may be limited, so from the very beginning government has taken such strict rules and regulations. CDC recommends travellers avoid all nonessential international travel to India. On 24 March 2020, Government of India ordered a nationwide lockdown for 21 days, restricted all i.e., 1.3 billion population of India as a defensive measure against this deadly catastrophe. During first part of the restriction, the workplace and other work plants were shutdown. All were trying to cope with this situation by hock and crock with essential commodities. Law and order came into force to tackle this drastic situation and many people were punished across and abroad the states due to the negligence and ignorance of the government protocol. Many hotspots were marked as "red zone", "orange zone" indicating some infection, and "green zone" with no infections. Government of Assam has declared fully lockdown from 1st April to 3oth May 2020. At the same time Central government has announced certain relaxations from 20 April, allowing manufacturing farms and few business institutions by maintaining all the COVID-19 protocols laid by the government time to time observing social distancing, using mask, sanitizer and gloves etc. All are the influencing factors on environment need to analyse from the various angles. On the one hand, climate specialists envisage that greenhouse gas (GHG) emanations could plunge to proportions never before seen since World War II (Manuel, 2020). As per Assam Government guidelines for lockdown issued by Assam Disaster management

Authority, there is a large scale spread of COVID-19, which has created major threat to public health and hygiene. So, total lockdown in Kamrup (M) district has continued for few more weeks, where first 7 days were stringent and next 7 days got it relaxed. Additionally, government ordered 7pm to 7am curfew in all districts.

RESULTS AND DISCUSSION

Quality of air be able to defined the existence of pollutants, such as sulphur dioxide (SO2), particle substances (PM), nitrogen oxides (NO2) and ozone (O3) in the air that we inhale at levels which can generate some harmful effects on the environment and human health. The research specializes in the adjustments in air quality at some stage in the lockdown length of Guwahati city. There may be wanted to see meticulous impact of performance of such rapid term lockdown as an substitute quantity for pollution reduction and its impact on the financial system. This study may be used as a hand report to analyse post Covid-19 situation as properly to examine the effect of reduced pollutants on health statistics of touchy receptors.

Comparatively, in the year 2019 and 2020, it is found that all the major pollutants likewise NO2, SO2 and PM10 in 5 months i.e., during the lockdown periods (March, April, May, June and July) the values are decreased in 2020.Because during the lockdown period the traffic and other pollutant factors were totally absent. April 2020, the whole month was in total lockdown. So, all the pollutants decreased very vigorously. In April 2019, SO2 concentration was 55µg/m3 and in April 2020, SO2 concentration decreases to 23µg/m3(Fig. 2 to 7).

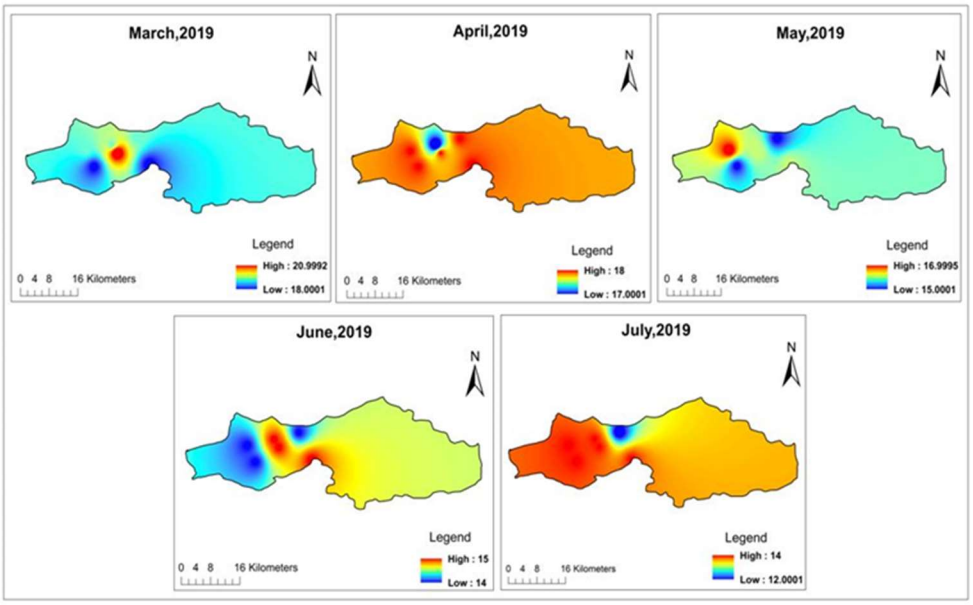

Figure 2: NO2 concentration (µg/m3) before lockdown period

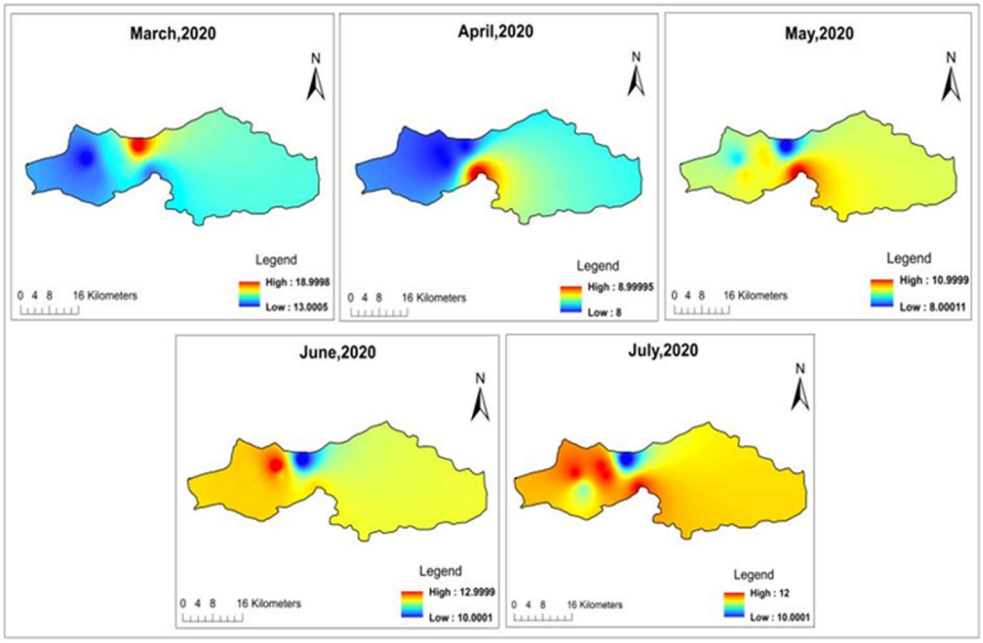

Figure 3: NO2concentration (µg/m3) during lockdown period

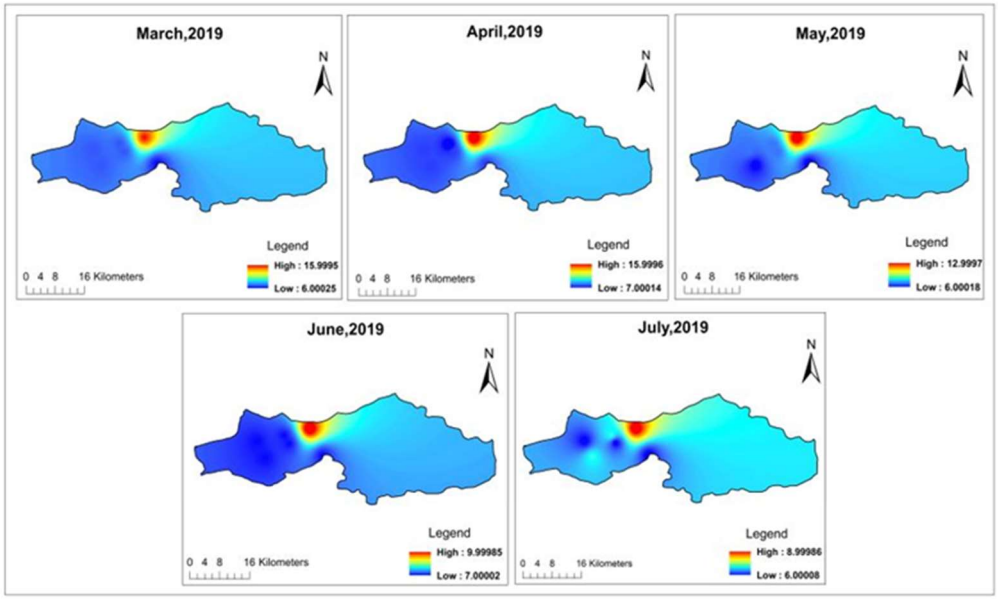

Figure 4: SO2 concentration (µg/m3) before lockdown period

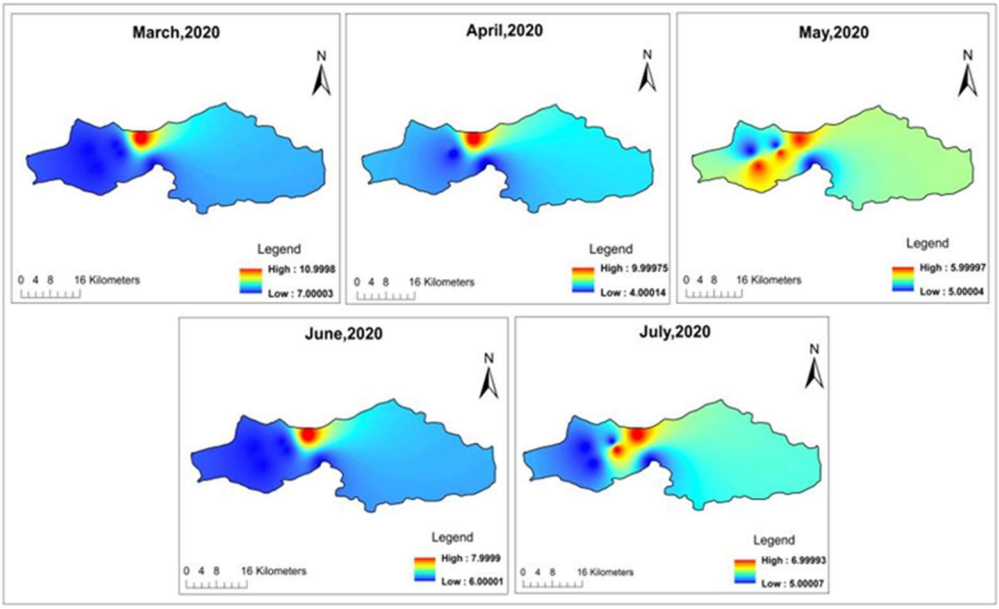

Figure 5: SO2 concentration (µg/m3) after lockdown period

On the other hand, like NO_2 the PM_{10}concentrations also reduce from 114µg/m^3, 984µg/m^3 to 33µg/m^3 and 189µg/m^3 respectively. Moreover, the $PM_{2.5}$, NH_3, CO and O_3 concentration, all these elements are showing diminution during the lockdown period than the previous year. In 2019 $PM_{2.5}$, NH_3, CO and O_3 pollution raises to 109µg/m^3, 21µg/m^3, 101µg/m^3 and 50.7µg/m^3respectively. But in 2020 all the pollutants could raise its range up to 77µg/m^3, 12µg/m^3,0.58µg/$m^3$0and34.2µg/m^3respectively.

Earlier, the 'Janata Curfew' in Kamrup (M), observed on March 22, (from 7 am-9 pm) dramatically change in nitrogen dioxide (NO_2) and particulate substance (PM_{10}), where 63.1% and 76.6% reduction between March and April 2020. The reason is same that is the low or total lockdown of traffic and other pollutant activities which was the driven factor to increase the air pollution.

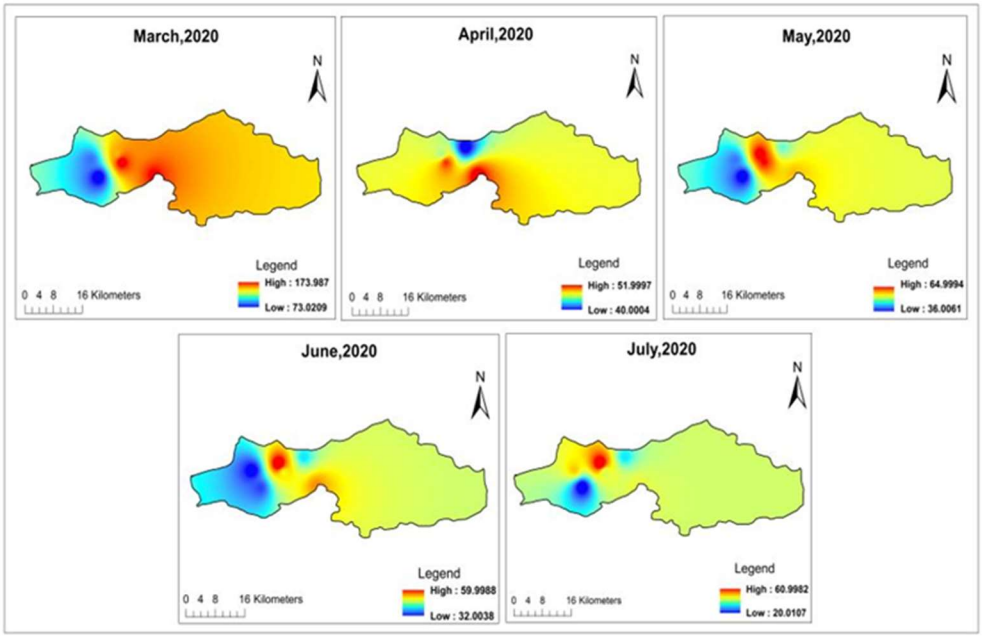

Figure 6:PM10concentration (µg/m3) before lockdown period

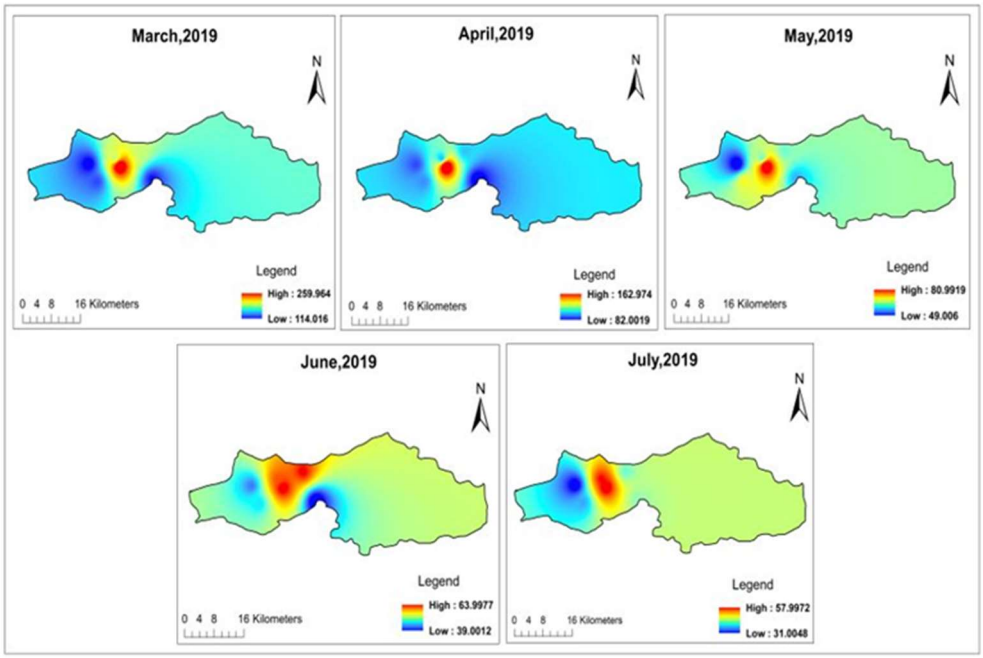

Figure 7: PM10concentration (µg/m3) after lockdown period

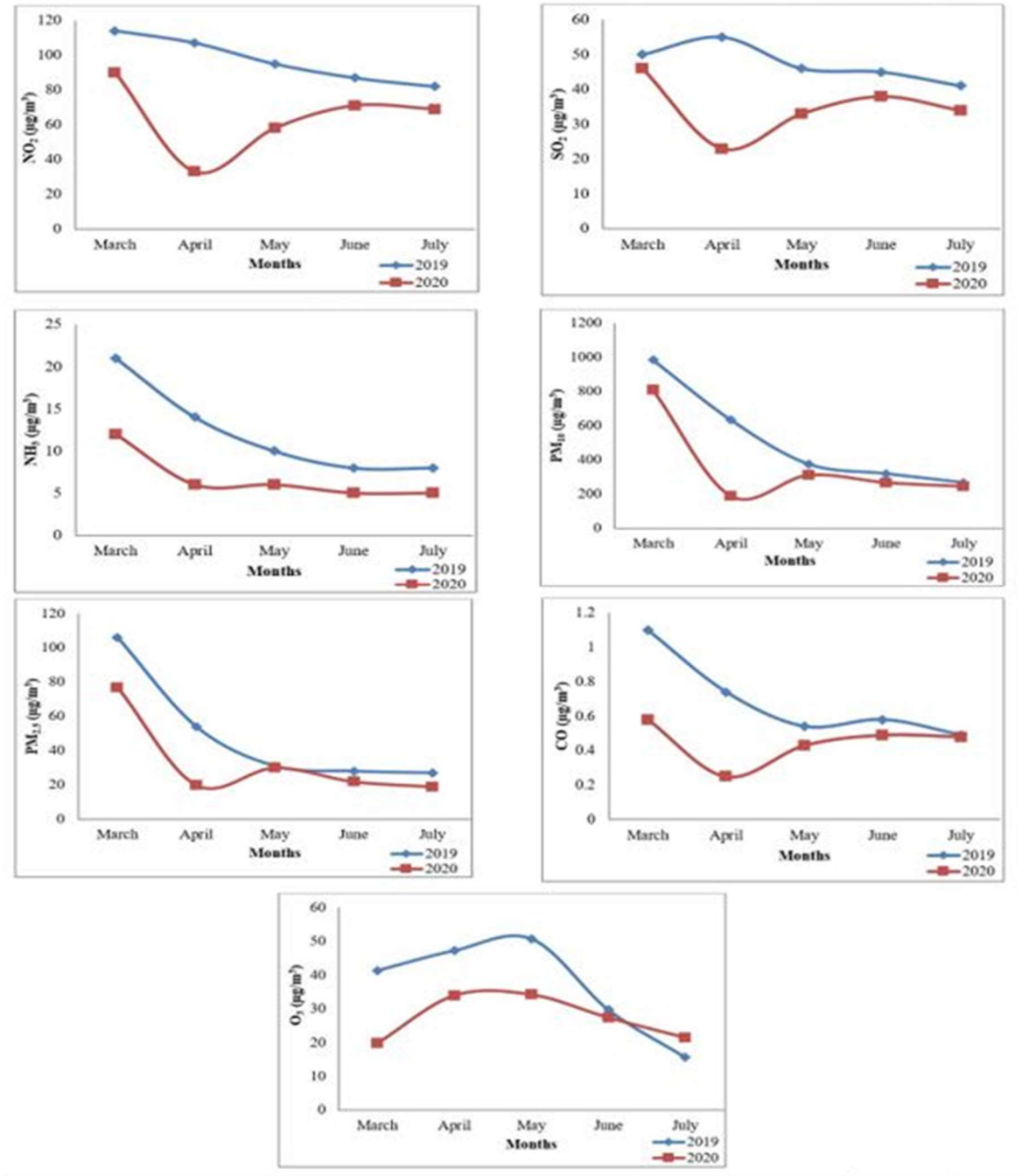

Figure 8: Showing trend of pollutants matters

The decreasing trend of air pollution can be well traced with the help of the trend line of different matters as already mentioned in the paper. From the graphical representation (Fig.8), it is very clear that the pollution level in the district is sharply decreases during the lockdown period than the normal.

CONCLUSION

The present study reveals a sharp decline on the whole air quality indexes and in the absorption of primary air pollutants. This type of study will surely help to know the actual fact of the air pollution in a developing country like India. However, the study desires comprehensive analysis of secondary air pollutants. But in practical it is not possible for the developing or developed countries to continue the lockdown process as it is observed in the pandemic situation. But, to sustain or to protect our beautiful earth and its environment we can surely predict the effect of over use of machines and tools without compromising the environment. Therefore, the researchers proposed to protect the environment through the minimal use of machines and tools in our daily life. Instead of lockdown some other measures can be adopted to get sound environment for the sustainable development of human society as well as the entire ecosystem.

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