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A Mathematical Model of Air Pollution in the Period Covid-19 and its Effect on Environment

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ABSTRACT

In this paper we develop mathematical model for air pollution on during COVID-19.This model is taken account of special characteristic to decreases air pollution on during COVID-19 period. The air pollution problem depends upon various values of parameter I, V, and t. It has been observed that value air pollution decreases, as decrease the value of I. Again we observed that air pollution decreases with decrease the value t, v and increase the value t in lockdown period COVID-19.

KEYWORDS: *COVID-19, Pandemic, Pollution, Environment, Air pollution index*

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INTRODUCTION

The pandemic has resulted in numerous impact on environment and climate worldwide. The travel plan has caused many regions to experience a large drop in air pollution[1]. In world lockdowns and other measures resulted in a 25 percent reduction in carbon emmission[4] and 50 percent reduction in nitrogen oxide emmission[9]. Governance system is other positive impact which controlled investments towards a sustainable energy transition and other goals related to environmental production[5].

However the outbreak has also provided cover for illegal activities such as a deforestation of the Amazon rainforest[4]. In Africa hindered environmental diplomacy efforts and created economic fallout some predict will slow investment in green energy technologies[4].

Experts say that there are still lessons to be gleaned including a chance to imagine a different future. The decrease in air pollution is proof of concept that demonstrates clean air doable. The first step is to ensure that the vast number of Indian sustainable livehood by government.

The current air pollution reduction has come at a step price. In that time in this world much person has been idled, forcing vulnerable workers to travel on her village on foot.

In India, the Himalayan Mountain range is visible from the distance for the first time in year's waterways chocked by industrial pollution. Pollution is increased to release of chemicals in atmosphere. Common gases pollutants are carbon monoxide, sulpherdioxide, chlorofluoro carbons, nitrogen oxides produced by industries and motor vehicles. Photo chemical ozone and smog are created by Nitrogen oxide.

Delhi is the worlds most polluted megalopolis in normal times. For much of winter air quality reading remains at levels that in the united states are considered unhealthy .In last November the Delhi, city experienced its longest spell of hazardous air.

In corona virus lockdown period Delhi cities are stuck at home except when picking up essential goods. But in these

days blue skies, the moon and the stars seen without the usual barrier positive of smog. Every one fell that this time the sky is seen neat and clean.

Corona virus has been spread by air travel. Death may result of progressive from failure of respiratory system[6,7,8]. Due to this COVID-19 India has announced national wise lockdown to prevent the spread of this pandemic in our country.

The purpose of this paper is to develop a mathematical model for air pollution problem during corona virus diseases in India.

Mathematical formulation of the problem

The details some of the model out puts will be performed. This model are of relevance studies in research approach.

In this model air pollution of the country is dynamic in period of COVID -19

The basic equation of model is

$$\frac{dA}{dt} = A(P - I - V) \quad (1)$$

where

A= Air pollution
P=Air pollution before covid-19
I =Industrial air pollution
V=Vehicle pollution

With the boundary conditions

$$A = A_0, \text{ at } t = 0$$
$$P = P_0, \text{ at } t = 0$$
$$I = I_0, \text{ at } t = 0 \quad (2)$$
$$V = V_0, \text{ at } t = 0$$

Solution of the problem:

Separate to variable in equation (1), we get

$$\frac{dA}{dt} = (P - I - V) \quad (3)$$

Integrating equation (3), we, get

$$\log A = (P - I - V)dt + \log C \quad (4)$$

Applying the boundary condition (2) in equation (4), we get

$$A = A_0 e^{(p-I-V)t} \quad (5)$$

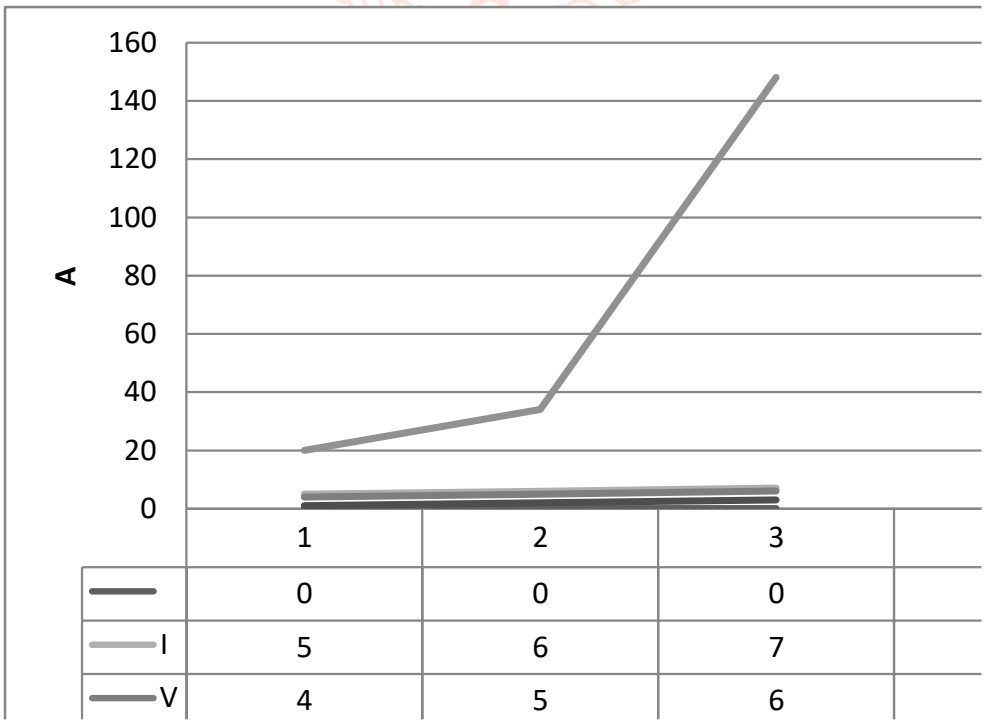
Result:

The form of show that decreases in, I and V result in decreases in A .In this period increases the value of t, also cause decreases in air pollution Values has been noted to some of the parameters used in model thus there was a good result obtained of this air pollution .General curves with air pollution plotted against time for some Cities. Which show that parameter of the air pollution decreases rapidly in lockdown period.

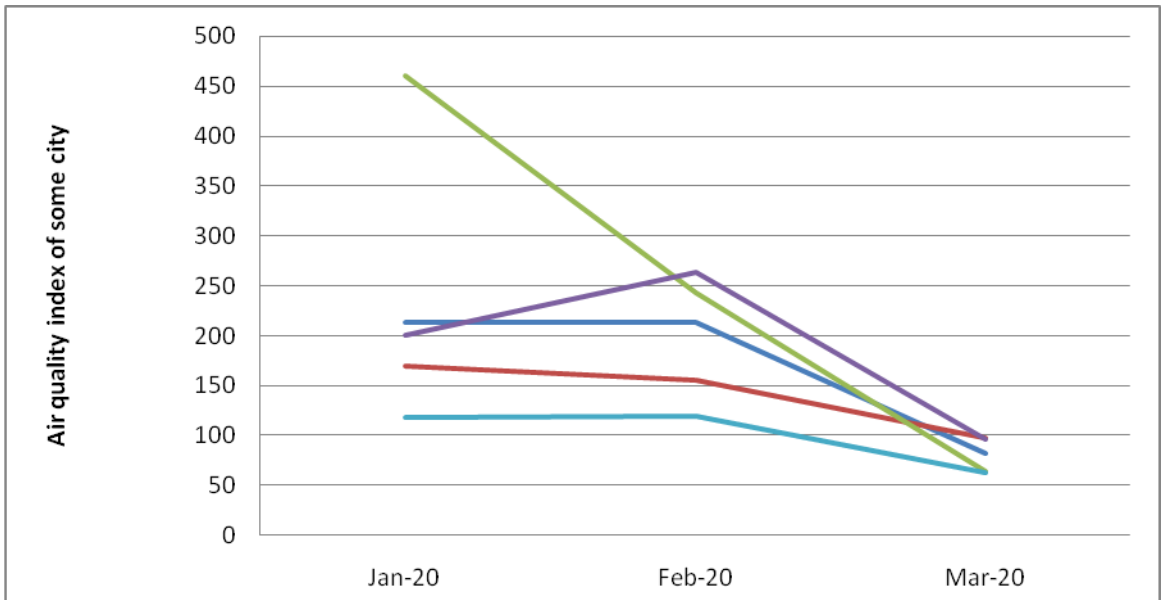
DISCUSSION:

This study describes some essential feature of air pollution. The model predict air pollution that are consist with observed in Environment .In Ahmadabad Jan. 2020 air quality index 170, February2020 air quality index 156, march 2020 air quality index 110, and march 2020 air quality index is 9 .Which is a good quality air range 50—100. The air quality in lock down period improved about 37 percent.

In Kanpur January 2020 air quality index 460, 1 February air quality index 243, 31 march 2020 air quality index 64.Which is good quality of air for human health and Environment. From graph Delhi January 2020 air quality index 213, 1feburay 2020 air quality index 213, march 2020 air quality index 82 .Which is very satisfactory and good air quality range 50—100.This air quality index is very useful for people and Environment. From graph talchar January 2020 air quality index 300, February 2020 air quality index 263, march 2020 air quality index 96. Which is very good for Environment and human health. From graph Visakhapatnam January 2020 air quality index 118, February 2020 air quality 119, march 2020 air quality index 63.Which is very useful for Environment and humanity.



Variation of air pollution to different value of A_o I,V



	Jan-20	Feb-20	Mar-20
Delhi	213	213	82
Ahmedabad	170	156	98
kanpur	460	243	64
Talchar	200	263	96
Visakapatnam	118	119	63

Air quality index for some city

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