

# Status of Air Pollution in Kolkata

Prepared by the students of semester-VI, Geography Honours -2022, under the guidance of  
Dr. Bansari Guha

## Name of the students:

1. Anupurba Mistry
2. Katha Roychowdhury
3. Peyali Naskar
4. Maitree Das
5. Bidisha Chakraborty
6. Ritu Naskar
7. Srabani Saren
8. Priya Nath

## 1.0 Preamble

Our Planet earth is in a dilapidated condition. Since Industrial revolution the environment started changing towards adverse direction.

Scientists and experts recognised so many issues like air and water pollution, soil degradation, solid waste etc. which has posed great threat to the human civilization and started damaging the equilibrium of our ecosystem. This has further been manifested in multifaceted climate related threats including sea level rise.

Air pollution has disastrous effect on environment and human health.

According to the World Air Quality Report 2020 by Swiss organisation, IQAir, 22 of the world's 30 most polluted cities are in India. This includes New Delhi, which has been cited as the most polluted capital city in the world for the third year running. Of the world's top 10 cities with the worst air quality, rank wise Kolkata stands 4<sup>th</sup>. Except the lockdown period air pollution in Kolkata is rising very fast.

## Objectives

- To identify the pattern of Air pollution of Kolkata
- To find the areas-wise pollution status
- To put emphasis on the diseases caused due to air pollution
- To unearth the causes behind such high rate of air pollution
- To assess the vulnerability of people and areas
- To assess the hazard perception of people
- To suggest few remedial measures to be helpful for preparedness, mitigation and management strategies for the policy makers.

## Location of Study Area

The bustling city of [Kolkata, India's oldest metropolitan city](#), is located in the eastern part of India at 22° 28 N to 22° 58 N and 88° 10 to E 88° 27 E. Spread roughly north south along the east bank of the Hooghly River, Kolkata sits within the lower Ganges Delta of eastern India (Figure 1). It covers an area of 205 sq km. Kolkata has a total population of 4,486,679 persons, of which 2,362,662 are males and 2,124,017 are females.

## **Methodology**

The entire research is based on secondary literature. Data collected from these secondary data sources are processed both quantitatively and qualitatively. Through simple diagrams statistical data were represented and analysed.

At the outset, this must be mentioned that due to pandemic situation no library or archives could be accessed for books, journals and other archival documents, much needed for any research. Thus only option remained for us was to thoroughly dependent on online data sources. Mainly Google searches in different sites led to the majority of the data acquirement. Few articles help immensely to get data as well as the analysis done by the authors. An Air quality Index has been tried to develop for assessing the problem of air quality of Kolkata.

## **Air Quality of Kolkata**

The ambient concentration statistics of Kolkata with respect to air quality are highly sensitive relating to month of recording and the exact time of the day when the metering is done.

Based on available data published in Annual Report, 2010-11 by West Bengal Pollution Control Board, the understanding about the air pollution in Kolkata has been developed. The concentration of three major air pollutants, i.e. sulphur di oxide (SO<sub>2</sub>), Nitrogen oxide (NO<sub>2</sub>) and respirable particulate matter (RPM) has been taken for analysis.

From the analysis it is clearly evident that the average annual concentration of SO<sub>2</sub> is less than 10ug/m<sup>3</sup> recorded in all 17 monitoring stations. This is well within prescribed limit of the Indian National Ambient Air Quality Standard (NAAQS). Presence of such low volume of SO<sub>2</sub> in the air of Kolkata perhaps owes to the absence of any power plant or metallurgical industries within the jurisdiction of Kolkata. It is because the source of SO<sub>2</sub> is due to burning of coal and oil. Power plant emits huge SO<sub>2</sub> in the atmosphere.

NO<sub>2</sub> concentration is high almost everywhere barring two exceptions recorded in two monitoring stations namely Rajarhat and Paribesh Bhavan. The prescribed level of annual concentration of NO<sub>2</sub> ranges between 23.640.9 ug/m<sup>3</sup>. Four monitoring stations at Picnic Garden, Topsia, Baishnabghata and Gariahat is slightly above the higher value. Rest of all the monitoring stations have recorded alarmingly high NO<sub>2</sub> concentration in the air. Elevated levels of NO<sub>2</sub> can cause damage to the human respiratory tract and increase a person's vulnerability to and the severity of respiratory infections and asthma. Long term exposure to high level of NO<sub>2</sub> can cause chronic lung diseases, and the numbers of patients are rising. Combustion of fuel is again the main source of NO<sub>2</sub>. Transportation (vehicles) clearly has affected high share of NO<sub>2</sub> in the air above Kolkata surface.

A minute observation of the data reveals the fact that all the area surrounding 17 monitoring stations has been suffering from high to severe concentration of RPM. In Topsia, the value is marginally above the threshold point, i.e. 60ug/m<sup>3</sup>. Monitoring stations at Dunlop, Moulali and Paribesh Bhavan have recorded highest concentration of RPM >90ug/m<sup>3</sup>. This kind of particulate matter comes from burning fuel and even little amount of different dust. It is important to note here that air pollution caused due to extremely high concentration of RPM is one of the leading causes of death in Kolkata.

## **The Air Quality Index of Kolkata**

The Air quality Index (AQI) is the system used to warn the public when air pollution has become really dangerous for mankind.

To calculate AQI at least three pollutants out of 10 must be taken care of. Different Countries have their own prescribed AQI. AQI as prescribed The Central Pollution Control Board, India has six categories. The method of calculation is slightly complex. Thus an attempt has been made to develop an AQI for Kolkata on the basis of the data provided by the 17 monitoring stations. Index has been calculated based on the difference between the total and standard mean of air quality. It has been formulated on the three basic pollutants though it has not been validated. As per this AQI, it is clear that 5 stations have shown satisfactory air quality (Picnic garden, Topsia, Gariahat, Minto Park and Rajarhat). Availability open space, vegetation and proximity to water bodies may be responsible for this condition. Ten stations are equally divided under poor and very poor categories. Records of two monitoring stations have shown that the area under Dunlop and Moulali are worst polluted region. These two regions are noted for a junction of 5 lanes. Heavy traffic congestion may be responsible for such air pollution in this area.

# Pollutants in City

Lower Green Cover Other Reasons, Says Study

## WHAT'S CHOKING KOLKATA?

**SOURCES OF CITY'S AIR POLLUTION**

- 31.40% | Vehicular emissions
- 24.50% | Industrial emissions
- 11.00% | Dust particles from construction and road dust

**WHY IS AIR QUALITY DECLINING?**

- Reduced green cover | From 3.7% in 2006 to 2.2% now
- Reducing green cover | City has 5.5% less than the national average in 2019
- Green space per person | 0.57 sqm in city while WHO prescribes 5sqm
- Reducing waterbodies | From 20% a decade back to 9% now
- Rise in vehicular density | 6.5% in a decade

**AIR QUALITY: MOST FOUL EVEN IN GREEN ZONE**

The AQI level in Wednesday

## PERSON IN EVERY BREATH

PM2.5 in 2019

City	Highest	Lowest
Kolkata	566	111
Delhi	314	77
Bombay	102	33

Source: CSE analysis based on CPCB's Centre and Data submitted to WHO

Kolkata's annual average of PM2.5 concentration is about 80 micrograms per cubic metre



## 70%

of people in Kolkata suffer from respiratory ailments, which worsen in air pollution

**70% of people in Kolkata suffer from respiratory ailments, which worsen in air pollution**

Air pollution deaths among highest in Bengal: Study

Annual 80% increase in PM2.5 levels in Kolkata, report says

PM2.5 levels in Kolkata have increased by 80% annually, according to a study by Centre for Science and Environment (CSE)

PM2.5 levels in Kolkata have increased by 80% annually, according to a study by Centre for Science and Environment (CSE)



## STUBBLE BURNING

Stubble burning incidents have come down from two to three daily to a few cases a week, however, it will take time for the problem to be checked completely

Delhi Bhagat | A resident of the New Town, Kolkata

Stubble burning incidents have come down from two to three daily to a few cases a week, however, it will take time for the problem to be checked completely

Delhi Bhagat | A resident of the New Town, Kolkata

## Deaths due to air pollution\*

Bengal	91.1
Maharashtra	86.9
West Bengal	65.3
Kerala	100.1
Gujarat	84.9
Rajasthan	112.5
Uttar Pradesh	106.4
Uttar Pradesh	111.1

\*Per 1,000 people

Source: Global Burden of Disease Study, 2017

## Stubble burning kills birds in New Town

Stubble burning incidents have come down from two to three daily to a few cases a week, however, it will take time for the problem to be checked completely

Delhi Bhagat | A resident of the New Town, Kolkata

Stubble burning incidents have come down from two to three daily to a few cases a week, however, it will take time for the problem to be checked completely

Delhi Bhagat | A resident of the New Town, Kolkata

# LIFE EXPECTANCY IN CITY CUT SHORT BY OVER 6 YRS



## 3 WORST DAYS (AQI COUNT)

409 415 406

Nov 25 Dec 5 Dec 6

Source: RBU air quality monitoring station

- Kolkataans breathe 3 to 5 times more polluted air than the permissible limit
- Air pollution shortening life expectancy in city by 6.1 years, 2nd highest after Delhi (6.4 yrs)
- 61% rise in particulate matter in 4 yrs (2010-13)
- 70% of Kolkataans suffer from respiratory disorders due to pollution

65% city kids suffer from lung ailments as against 24% in Sunderbans

Nearly 75% of non-smoking, healthy adults in Kolkata show respiratory distress

42,000 people under risk of developing some kind of cancer

Source: ITM, NCAR, CNCI, Bengal env dept, CPCB, CSE and NAABI

# WHO REPORT RINGS ALARM BELLS

## PM2.5 COUNT

City	2015	2016
Delhi	123	143
Kolkata	52	74
Mumbai	66	64
Bengaluru	40	27
Chennai	54	52



# Relentless digging and tree felling turn James Road into dust bowl, pushing up pollution level

James Road in Kolkata has become a dust bowl due to relentless digging and tree felling, pushing up pollution levels. The road is now a construction site with heavy machinery and workers. The dust is thick and covers the surrounding area.

James Road in Kolkata has become a dust bowl due to relentless digging and tree felling, pushing up pollution levels. The road is now a construction site with heavy machinery and workers. The dust is thick and covers the surrounding area.

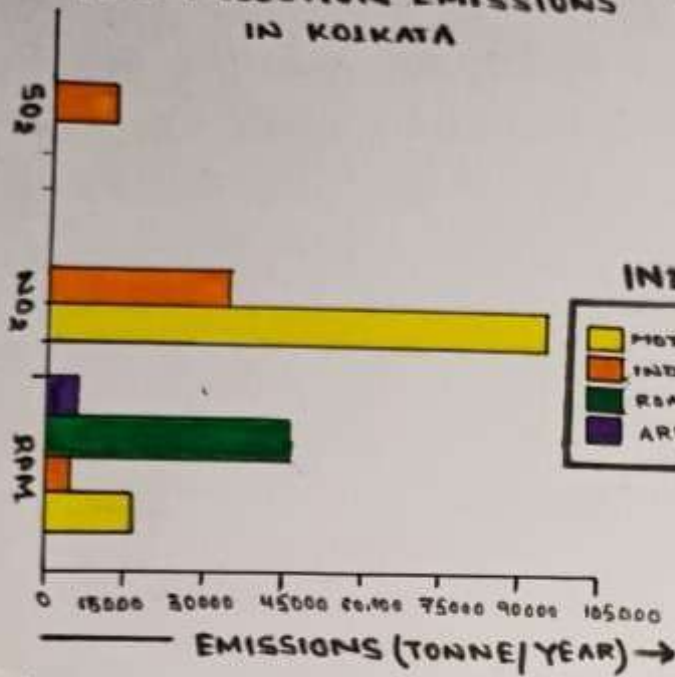
# WORRYING FACTS FOR KOLKATA

- 65% children in Kolkata suffer from lung impairment as against 24% in the Sunderbans
- Nearly 75% of non-smoking, healthy adults in Kolkata show respiratory distress
- Close to 42,000 persons under threat of developing some kind of cancer due to inhalation carcinogens floating in the air.
- 61% increase in particulate matter has been reported in just four years
- Kolkata residents are breathing 3 to 5 times more polluted air than the permissible limit

Source: Centre for Science and Environment

VIVO Y73

### AIR POLLUTION EMISSIONS IN KOLKATA



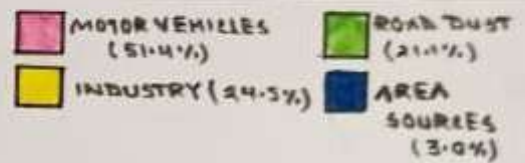
a.

SOURCE: COMPILED BY RESEARCHER FROM WBPCB, 2005

### SOURCES OF AIR POLLUTION EMISSIONS IN KOLKATA (IN %)



INDEX



b.

### AIR QUALITY INDEX

SATISFACTORY

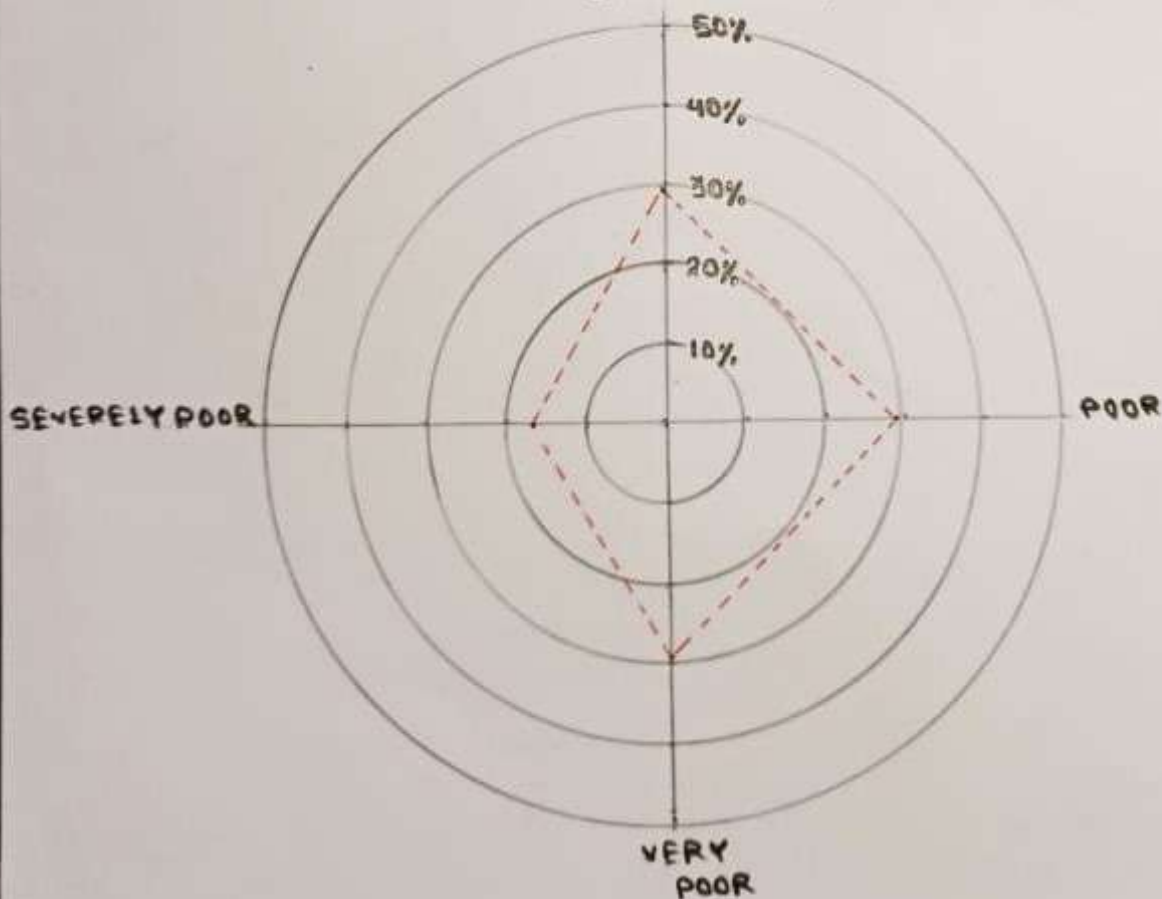


FIGURE : 5

B. G. Ghosh  
14.5.2017

## Project Report on

### ***‘Flood character of Lower Ajoy River and its preparedness plan’***,

---- Prepared by the students of semester-VI, Geography Honours -2022, under the guidance of

**Dr. Hasibur Rahaman Molla.**

**Name of the students:**

1. Manshi Gupta
2. Piu Das
3. Sayantika Halder
4. Nikita Das
5. Nabanita Karpa
6. Swastika Naskar
7. Piya Banik
8. Riya Mondal

#### **1. Introduction**

Flood forms the major domain among all the natural disasters to take a heavy toll of lives and properties. In India, typical behavioural pattern of monsoon makes the country most vulnerable to flood. Lower Ajoy River Basin is a well known flood prone area in West Bengal. Flood is the most common attribute of the hydrological cycle particularly in this part of the Subtropical areas where variability rainfall exceeds 25 per cent. The flood hazard comprises many aspects including structural and erosional damage, loss of life and other materials, disruption of socio-economic activities including transport and communication system and spoiling of agricultural land and so on (Hewitt and Burton, 1971).

#### **2. The Study Area**

Ajoy River is one of the most important rivers of West Bengal. It is a right bank tributary of river Bhagirathi. River Ajoy with a length of about 299 km is originated from the eastern part of Chhotanagpur plateau, near Chakai hill, under the administrative jurisdiction of Monghyer district in Bihar and flowing down through Jharkhand state and it mixes up with Bhagirathi at Katwa of Burdwan district in West Bengal. Geographically, the Ajoy basin extends from 23°30' N. to 24°35' N. latitudes and from 86°15' E. to 88°20' E. longitudes. The total Ajoy river basin area is about 6221 square kilometres out of which only 43 % lies in West Bengal. In West Bengal this basin has a common water divide with Mayurakshi to the north & Damodar to the south.

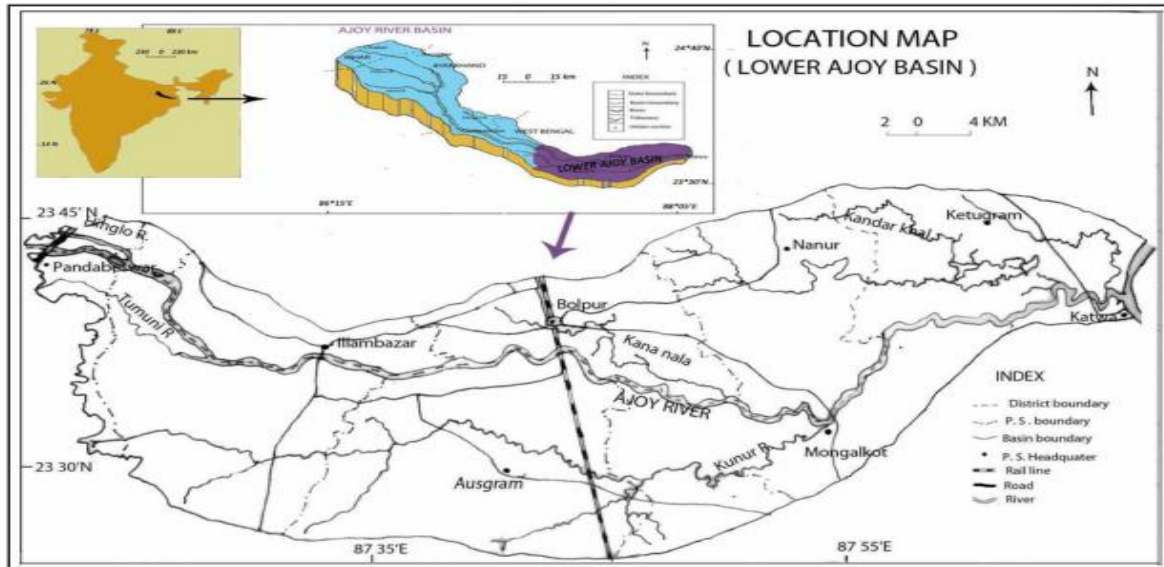


Figure: 1.1

### 3. Objectives

The major objectives of the study are

- To analyze the present flood character of the study area.
- To provide clarity on roles and responsibilities for all stakeholders concerned with disaster management so that disasters can be managed more effectively.
- To create awareness and preparedness and provide advice and training to the agencies involved in disaster management and to the community
- To propose some justified remedial measures.

### 4. Methodology

The entire field work has been carried out through following stages:

- i. Pre-field work
- ii. Post field work

#### **Pre-field work:**

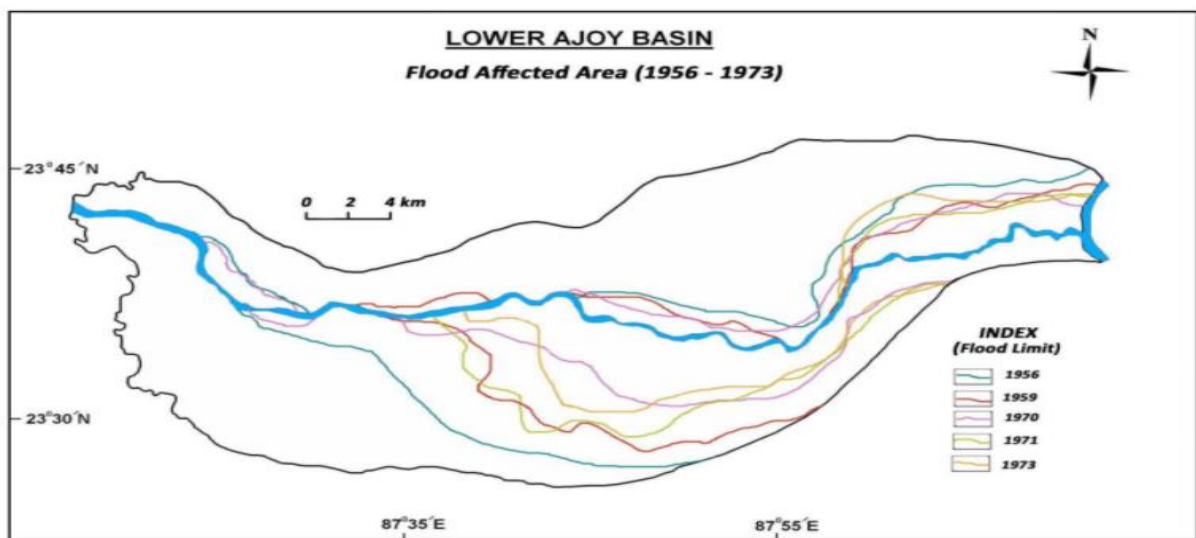
In the pre-field work stage, different literatures, reports, articles, previous works related to this research have been studied intensively. Survey of India toposheets, district planning maps consulted for preparing the required base maps.

#### **Post field work:**

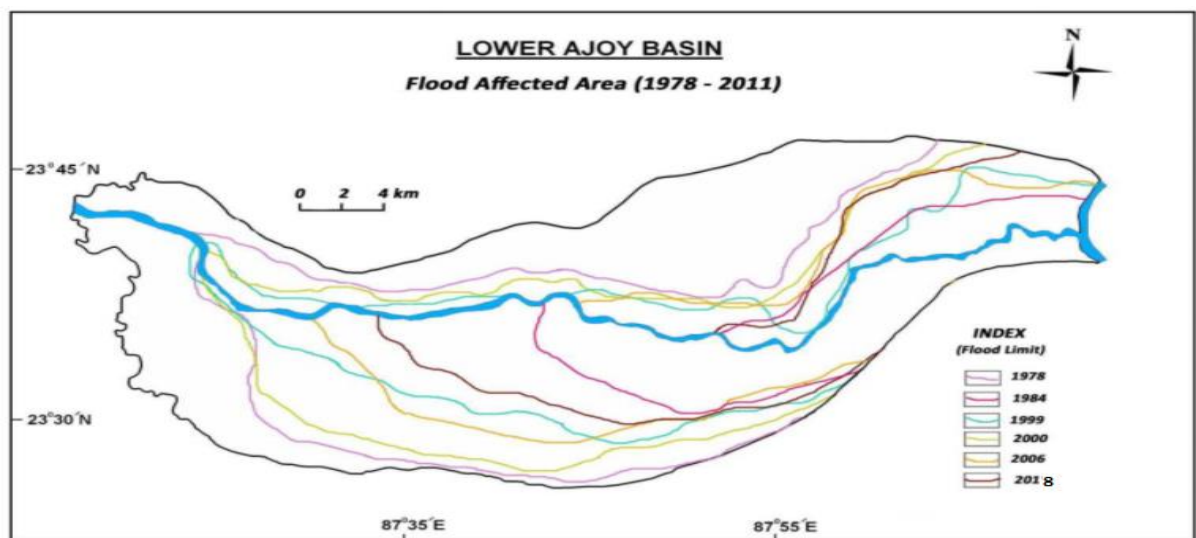
In the post field work stage, various cartographic and statistical techniques have been implied for compiling and representing the secondary data. For handling the raw data, some sophisticated softwares like Ms Excel, Photoshop, Q-GIS have been used.

## 5. Flood character in Lower Ajoy Basin

Lower Ajoy River Basin is a well-known flood prone area in West Bengal. From the records of Irrigation and Waterways Department, Government of West Bengal, it is evident that the major floods occurred in the river basin in the year of 1956, 1959, 1970, 1971, 1973, 1978, 1984, 1999, 2000, 2006 and 2011. In 20th century before Independence, high floods occurred in this basin in 1913, 1916, 1938, 1942, and 1946. Some of the earlier recorded major flood years of 19th century are 1876, 1877, 1885, and 1896.



Source: Directorate of Irrigation & Waterways Dept. W.B. Figure: 1.2



Source: Directorate of Irrigation & Waterways Dept. W.B. Figure: 1.3



## 6. Flood Preparedness Plan

Excessive rain, a ruptured dam or levee are all examples of ways in which a waterway can be overwhelmed and produce a flooding event. Some floods can take hours or even days to mature allowing ample time to prepare and evacuate, others can advance quickly with little warning allowing little or no time to prepare and evacuate. There are mitigation approaches entities can take to minimize the impacts resulting from flooding events. Thoughtful planning for flooding events that may put an entity at risk can pay large dividends when the floods occur; thereby reducing bodily injury, property damage, business disruption, and associated insurable losses.

Below are some strategies an entity can take prior to a flooding event to safeguard its properties and individuals for which it is responsible for:

- ✓ Identification and knowledge of whether or not facilities under your supervision are located in a flood plain, history of flooding in such areas, and elevation of facilities in relation to streams, rivers, and dams;
- ✓ Identification and knowledge of local community emergency plans, warning signals, evacuation routes, and location of emergency shelters;
- ✓ Communication with local emergency management officials regarding special need populations under your organization's supervision and ensure affective emergency evacuation plans are practiced and maintained for use, if needed;
- ✓ Ensure routine monitoring of a National Weather Service Radio (NOAA Weather Radio) and establish procedures for facility shutdown and early release of associated personnel/individuals;
- ✓ Identification of and knowledge of where and how to shut off critical facility utilities, such as, but not limited to electric power, gas, water, hydraulics, compressed air, sewer systems, etc.
- ✓ Remove as much property and equipment as possible to higher elevation/ground for storage.
- ✓ Property of high value should be a priority;
- ✓ Move all vehicles and/or mobile equipment to higher elevation/ground;
- ✓ Construct flood barriers with sandbags or other materials;
- ✓ De-energize all electrical system components and ensure that all switches, sockets, circuit breakers, wiring and associated equipment is at least 12" above facilities projected flood elevation;
- ✓ Identification and securing of potential facility hazards prior to a flooding event;
- ✓ Ensure routine inspection/cleaning out of facilities associated drainage systems such as , but not limited to culverts, gutters, down spouts, and associated piping;
- ✓ Access to and/or installation of sump pumps at identified facilities for damage mitigation in the event of a heavy rain or flooding;

- ✓ Access to and/or installation of backflow valves or plugs at identified facilities for damage mitigation in the event of a heavy rain or flooding.

## 7. Conclusion:

As flood cannot be totally controlled and it is not possible to provide protection against all magnitude of flood, we have to adjust with the flood and implementation of proper flood management programmes become very much necessary. Preparation of floodplain zoning map is an important non-structural measure to mitigate flood hazard. Degree of vulnerability of flood can be identified by demarcating the high, medium, and low flood prone zone and proper planning of land-use of the individual zone can be made accordingly. Government should launch different insurance packages for the people living in different flood prone zone. Thus the traditional sectoral planning approach for complete flood control should be changed to sustainable flood plain development policy (Haque et al., 1993). A change of flood protection paradigms is utmost necessary. Instead of making trifling attempts to control floods by embankment, flood management policies should be implemented holistically to adjust with floods.

## REFERENCES

1. Chakraborty, P.G. (2006): Welcome Address Presented at the South Asian Policy Dialogue on Regional Risk Reduction, Vigyan Bhavan, New Delhi, 21 – 23 August.
2. Haque, C. Emdad and Zaman, M.Q (1993): “Human Response to Riverine Hazard in Bangladesh, A Proposal for Sustainable Flood Plain Development”, World Development, vol-21, No. 1, pp. 103 – 121
3. Hewitt, K. and Burton, I. (1971): The Hazardness of place: A Regional Ecology of Damaging Events, University of Jorants, Dept. of Geography, Research publication 5. p. 154.
4. Molla, H.R. (2010): “Delineation and Zonation of Flood Prone Area of Lower Ajoy River Basin”. ‘Practising Geographer’, Journal of the Indian Geographical Foundation, Kolkata. Vol. 14. No. 2. pp. 63 – 70.
5. Technical Report-Ajoy Project. (1985): Geological Survey of India (G.S.I.) -1985. UNDP. (2003): UNDP-Project on Brick Industry in Bangladesh -
6. <http://www.undp.org.bd/projects/prodocs/BrickKiln/IKEMBI%20Project%20Brochure.pdf>
7. Mukherjee, M. (2002): “Flood of Lower Ajoy basin: A Spatio-Temporal Analysis Since Independence.” Unpublished Thesis. Dept. of Geography, Visva-Bharati University, Santiniketan. pp. 250.

# IMPACTS AND MITIGATION OF COVID-19 PANDEMIC IN KOLKATA, WEST BENGAL: A CASE STUDY

## ANALYSIS

Prepared by the students of semester-VI, Geography Honours -2022, under the guidance of Shri Pradip Chandra Patra.

### Name of the students:

1. Tahsin Jabeen
2. AshaboriSengupta
3. Sanjana Shaw
4. Shrobona Naskar
5. Sukanya De
6. Ayesha Khatoon
7. Anwasha Mondal
8. Saba Naaz

### 1.0 Introduction:

The Noble Coronavirus, officially being recognised as a pandemic by WHO in March, 2020, is at present the most serious environmental catastrophe caused by the upsurge of an acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (Lai et al., 2020) and has the ability to multiply and mutate in a very rapid way with symptoms similar to cold, seasonal allergies and flu.

The first known infections from SARS-CoV-2 were discovered in Wuhan, China. India's first Covid case though being reported in Kerala on 30<sup>th</sup> January, 2020, the COVID-19 pandemic was first confirmed in the West Bengal on 17<sup>th</sup> March 2020 in Kolkata. The city showed a rapid rise of Covid cases in the pandemic era since then.

### 2.0. Location of study area

Kolkata (22.5726 N, 88.3639 E) is an Indian metropolitan city with an area of 728.45 sq. kilometre which is situated along the eastern bank of river Hooghly of West Bengal. The city of Kolkata, under the Kolkata Municipal Corporation (KMC) constitutes 141 wards with a total population of 4.5 million (Census, 2011).

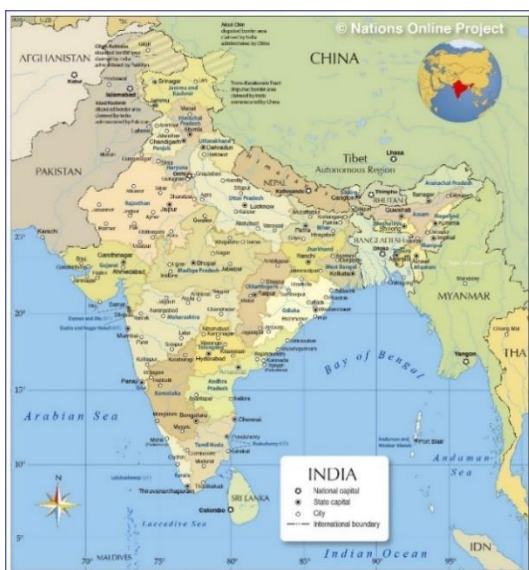


Fig.1. Location of West Bengal in India

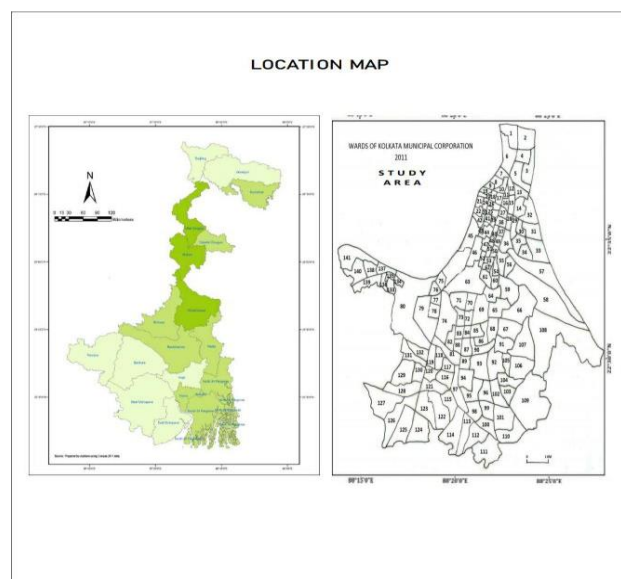


Fig.2. Location of Kolkata in West Bengal

### 3.0 Objectives:

The prime objectives of this case study analysis are

- a. to assess the rapid spread of covid-19 in a densely populated city like Kolkata and disrupting the daily life, economy, work and social interaction.
- b. to gain insight into the effects of Covid's first, second, and third waves on the variability of risk and vulnerability in everyday human life.
- c. to facilitate the management of corona viruses in the future, to impart knowledge about various mitigating ways.

### 4.0 Methodology:

Here, different aspects of Covid-19 Pandemic have been represented with different cartograms based on *secondary data sources*.

Simple Line Graph has been used to show the Covid-19 cases, death cases, and recoveries in India, divided Proportional Circle for proportion of vaccinated population of West Bengal, stacked Bar Diagram for Vaccination Doses taken by the Citizens of West Bengal district-wise and choropleth mapping technique for showing West Bengal district divisions and KMC ward map and maps on Covid-19 risks and containment zones.

### 5.0 Results and discussions:

As per analysis it has been seen that over 40 million people are tested positive for covid-19 in the span of 2 years. On the other hand, over number of recoveries, it has been observed that in first 4 months total number of recoveries are comparatively low nearly 10 thousand whereas it increased to over 1 lakh in June'21. Covid-19 had spread in a rapid rate with various mutations spread primarily because of the migration of citizens from other states, making the conditions even worse. The variants of coronavirus are: Alpha, Beta, Gamma, Delta and Omicron. Three waves of Covid hit Kolkata from 2020 to 2022 and the infection curve steadily dropped after January 21, 2022.

In West Bengal, 72,764,499 people are vaccinated with 1st Dose; 63,414,216 people are safely vaccinated with 2<sup>nd</sup> Dose and only 2,683,141 people have taken precaution dose. Highest number of persons are vaccinated in North 24 Parganas (nearly 120,000,000) whereas lowest people are vaccinated in the Kalimpong district of West Bengal. Over 80 lakh people are vaccinated in Kolkata. In Kolkata, most of the containment zone, as per government norms, were allocated in south. The list of containment zones included 2 Justice Madhab Chandra Road, 11 Elgin Road, Maratha Ditch Sarani, Maratha Ditch Lane, 1/1 to 8/48 Pandittiya Road, P 12 Cit Scheme VII M, Motilal Basak Lane, Satyam Tower, 3 Alipore road, 58 Judges courtroad, 25A and 19A Sarat Bose road, 49 Band 12A Chakraberia road, Golf Club Road, Arif road, Aadhar Chandra Das Lane, 6A NSC Bose road (Tolly Park apartment), Purbalok Mukundapur Dover Terrace and Dover Lane, 55A Dr Sarat Banerjee Road.

The standard methods for diagnosis of COVID-19 were: (1) RT-PCR test (Reverse Transcription Polymerase Chain Reaction) \* (2) Antigen test\* (3) Nucleic Acid test\* (4) Chest CT scan (5) Serological test. Problems and issues faced during the pandemic regarding the COVID-19 test kits are lack of provision of COVID-19 kits overall the country, social biasness against economically weaker groups, incorrect results of test reports from well renowned labs and institutes, increase in anxiety among the masses which lead to ostracism of testing, misleading diagnosis and information by radiological departments regarding CT scans and MRIs.

Healthcare professionals dealing with COVID-19 were under increased psychological pressure experiencing high rates of psychiatric morbidity, depression, stress, tension, anxiety, fear, insomnia and guilt. This led them to lack of concentration, poor vigilance, short term memory loss, reduced retention capacity, impaired motor skills and clinical judgement, backache, fatigue, headache eye strain etc. Co-morbidities including diabetes, hypertension or chronic respiratory diseases make them more vulnerable to corona-related complications. Besides, COVID-19 lockdown affected the following: **(A)** the income of migrants and low-wage workers, marginal labourers and daily workers in Kolkata and its suburbs **(B)** Many of the small-scale businesses and medium scale businesses **(C)** the real estate sector under the construction industry **(D)** The Tourism and Transport sector **(E)** Other emergency patients since, many hospitals turned into only covid hospital or wards were converted into covid ward **(F)** Festivals like Durga Puja, Kali Puja etc. **(G)**total education sector schools, colleges, Universities, hostels etc.

Many pharmaceutical companies, medicine shops and groceries owners were tremendously benefited due to black marketing and price rise of medicines like Hydroxychloroquine, Remdesivir oxygen cylinders, pulse oximeters, even sanitizer masks etc. However, West Bengal and Kolkata hit slightly positive GDP Growth (+1.2%), and became the highest GDP growth.

A vaccination policy was being introduced by the government with a minimal target of 800 million people belonging to different occupations and age groups. Within an estimated time of six months by August 2021. Vaccinations in Kolkata was supposed to be carried out in four phases: PHASE 1 aimed at vaccinating the health care professionals, PHASE 2 aims at vaccinating police, armed forces, and volunteers of disaster management, PHASE 3 aimed at vaccinating people belonging to age groups 45-60 and above 60 with comorbidities, PHASE 4 aimed to vaccinate adults (all age groups above 18 years).

The rate of infections caused by novel corona virus (Covid-19) since 2019 has gone up by leaps and bounds. Several preventive measures were initiated by the government which included safe physical distancing, avoiding face to face meeting with people, avoiding travel by any medium, mandatory wearing face mask, washing hands by soap or hand sanitizer, avoiding marketplace, office and several institutions thereby avoiding any sort of social gatherings.

The first nationwide lockdown was declared by the central government on 24<sup>th</sup> March, 2019 and several lockdowns were being initiated since then. The West Bengal government issued a notification regarding the suspension of classes in all government and private schools, madrasas, universities as well as colleges since 16<sup>th</sup> March in order to combat Covid-19 infections.

## **6.0 CONCLUSION**

From the present report it has been observed that situations in Kolkata seemed to worsen from the third and fourth week of May, 2020. With its 141 wards and 4.5 million inhabitants, the city soon reported about 120,000 infections along with a total death of 9,700 (COVID-19 India, 2020). Strategies were initiated by The West Bengal State Government for the identification and containment of worst affected areas (West Bengal State Government, 2020). Lack of proper health infrastructure, lack of sanity, lack of awareness was supposed to be the prime cause of the rapid spread of this disease over Kolkata. The health consequences both physical as well as psychological turned out to be worse.