

State of Air Quality in Purba Bardhaman



National Clean Air Action Programme

The central government formulated and launched the National Clean Air Programme on 10 January 2019 to reduce particulate matter concentration in cities that do not match the National Ambient Air Quality Standards (NAAQS) set by the World Health Organization (WHO). This tracker aims to control air pollution across the country through a collaborative approach involving ministers, state governments, local bodies, and stakeholders for the agenda (NCAP, WBPCB).

Background

The United Nations Environment Programme (UNEP) suggests that approximately 1.1 billion people suffer from breathing problems worldwide due to detrimental air conditions. Major industrial activities are agglomerated in various districts of West Bengal, especially in Bardhaman. Paschim or West Bardhaman inhabits the industrial ADDA (Asansol-Durgapur Development Authority) zone of West Bengal (Annual Report 2020-21, WBPCB).

Bardhaman district is the 7th most populous district in India with a population size of 86.30 lakhs in 2023 (Census of India estimated population, 2023), whereas the total population of the district in Census 2011 was 77.2 lakhs. The district is mainly divided into two parts, one part has industrial dominance (Paschim Bardhaman) and the other is more inclined towards agriculture (Purba Bardhaman). In the district, the number of registered motor vehicles is increasing exponentially from 282,126 in 2008 to 587,658 in 2015, as per the 2015 statistical abstract data (Molla, 2018). Purba Bardhaman currently has one manual Semi-automatic Air Quality Monitoring System in Bardhaman town that only monitors PM10, SO₂, and NO₂ (Annual Report 2020-21, WBPCB).

Perhaps the lack of industrial activities in the East division of Bardhaman district has compelled policymakers and government to overlook the rising trends of air pollution in the East. However, the sub-district has seen a rise in automobile purchases and usage, rapid urbanization, and upcoming industries that are readily contributing to air pollution.

The Honourable National Green Tribunal, in 2018 announced that six cities in West Bengal [Kolkata, Howrah, Barrackpore, Haldia, Durgapur, and Asansol (including Raniganj)] are “non-attainment” cities (NAC), not meeting the requirements of National Ambient Air Quality standards. The Hon'ble Tribunal also mandated the development of action plans to improve air quality in these NACs. As per the Honourable Tribunal order, the West Bengal Government has prepared a Comprehensive Aviation Action Plan for the 6 NACs which has been approved by the CPCB (WBPCB, 2022). Cities in Purba Bardhaman district are yet to be recognised as NACs.

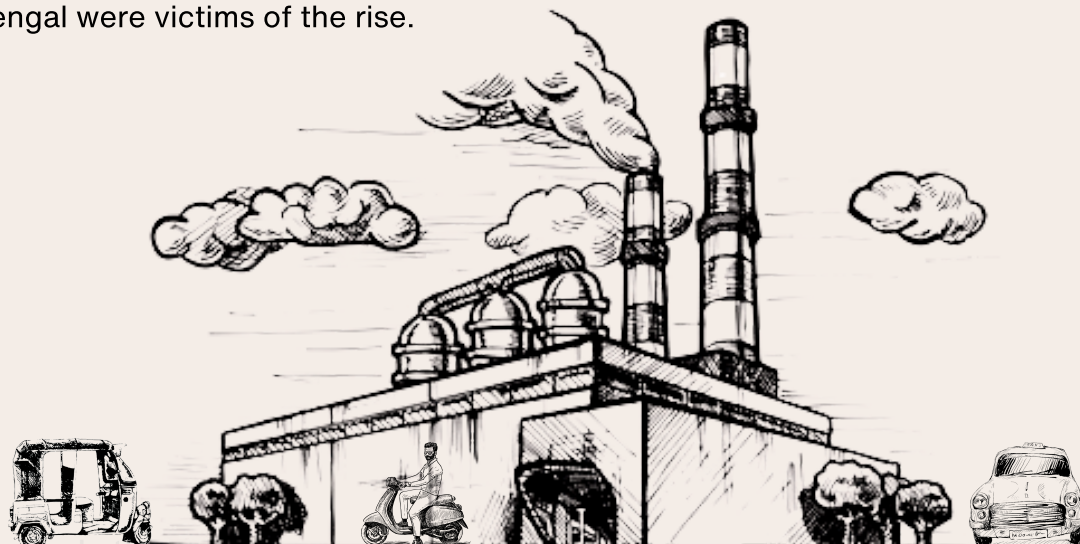
The major pollutants that cause air pollution are Sulphur Oxides (SO_x), Nitrogen Oxides (NO_x), Carbon Oxides (CO, CO₂), Hydrocarbons (HCs), Polycyclic Aromatic Hydrocarbons (PAHs), and Particulate matter (PM_{2.5}, PM₁₀, PM₁) (Das et al., 2022). These pollutants adversely affect human, plant, and animal health. A number of advanced technologies are developed to check the air quality over any state on a real-time basis, these methods are often expensive and require sophisticated methods of maintenance.

Global studies on atmospheric air quality (Center for Ecology and Hydrology, UK and NASA, USA) suggest that the Indo-Gangetic plane has become a thriving hotspot for pollutants like ammonia (NH₃), due to which it is experiencing ‘alkaline air’. The states of West Bengal, Jharkhand, Orissa, Bihar, and all that line up next to the Indo-Gangetic plane are facing significant challenges in aid to combat the substantial rise of air pollution (Chatterjee et al. 2022).



With the augmentation of indoor and outdoor pollution imposing detrimental effects on the urban ambient air quality, the challenges are rising daily. Real-time AQI detection is a novel way of rendering air pollution hostile in major cities and towns. With no proper tools to eradicate the negative effects of the rising toxicity of the atmosphere, a proper study of variations related to seasonality, temporality, nature of dominant pollutants, and meteorology of a particular terrain is necessary.

On the basis of a combined investigation of the aforementioned parameters, a proper and subjective air pollution control plan is to be devised for Purba Bardhaman that requires equal contribution from both the government and the common people. In 2019, the second-highest number of deaths (20.8%) due to air pollution was seen in West Bengal. The average annual PM10 pollutant level in the ambient air has grown exponentially since 2017 in West Bengal and since 2016 in Purba Bardhaman. Strangely, districts away from the capital city of West Bengal were victims of the rise.

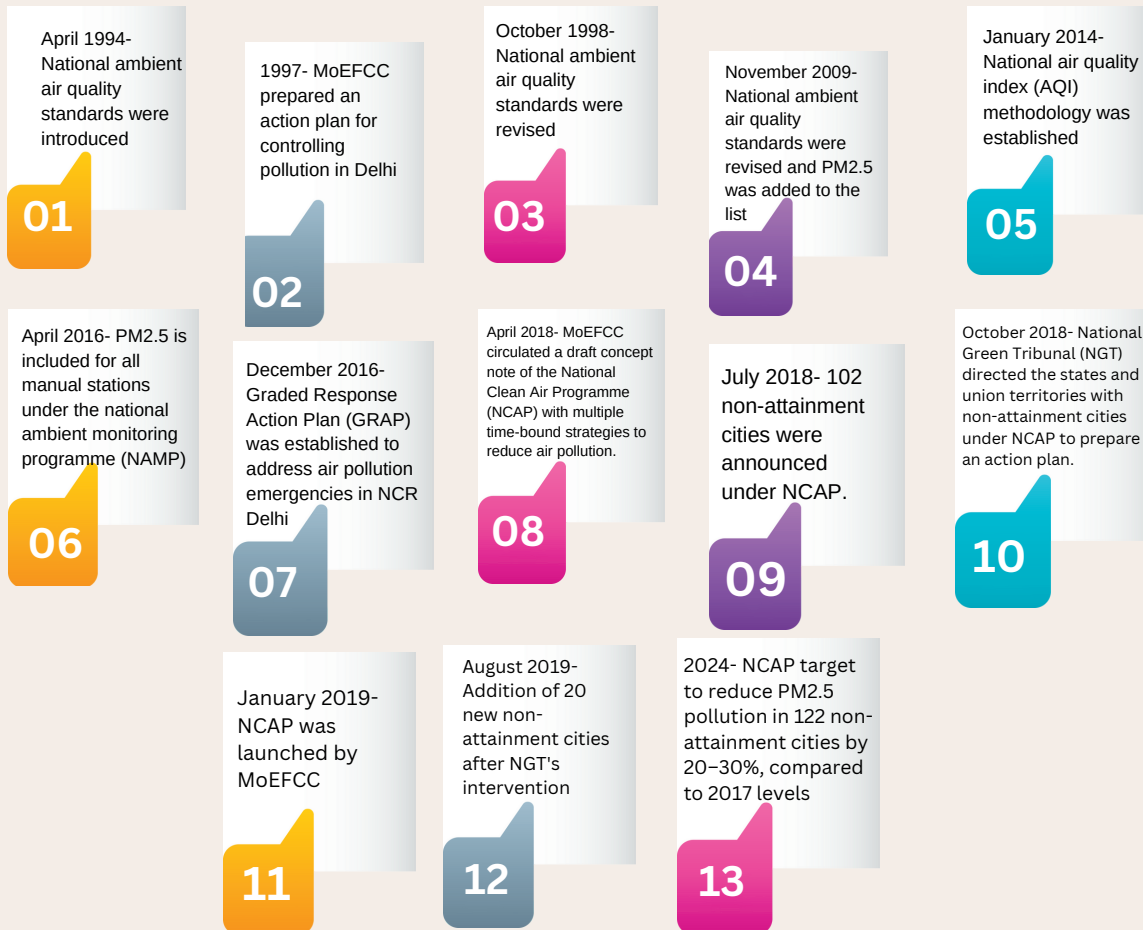


NCAP Key Priorities:

Each city under NCAP had developed its Action Plan to meet the targets. These could be understood based on the following key priorities:

- Monitoring AQI- NCAP focuses on Monitoring and understanding of air pollution/emission and its sources led by the PCBs.
- Action to Clean-up Pollution - Cities have taken steps to address the problem once the source has emitted the pollution/emission.
- Mitigating Air Pollution - Cities undertaking steps to ensure the elimination of pollution/emission at the source.
- Public Engagement and Awareness - Action is undertaken with the objective of engaging the public and creating awareness.

Timeline of NCAP



Air Quality of Purba Bardhaman

According to the data from the Central Pollution Control Board (CPCB), the air quality in East Bardhaman has been consistently poor over the past few years. The Air Quality Index (AQI) has been recorded in the "Satisfactory" to "Unhealthy" and "Very Unhealthy" categories, which indicates a high level of air pollution in the region. In 2020, the average annual AQI in East Bardhaman was recorded at 212, which is categorized as "Very Unhealthy." The primary pollutants in the air were PM10, PM2.5, and SO2. One of the main sources of air pollution in Purba Bardhaman is industrial emissions from the factories and power plants in the region. Additionally, vehicular emissions and open burning of waste also contribute to the high level of air pollution.

According to a study conducted by researchers from the Indian Institute of Technology, Kharagpur, air pollution in Purba Bardhaman has a severe impact on public health. The study found that the high level of air pollution in the region has led to an increase in respiratory illnesses, cardiovascular diseases, and premature deaths. To address the issue of air pollution in Purba Bardhaman, there is a need for strict enforcement of pollution control measures and the implementation of cleaner technologies in industries. Additionally, promoting the use of public transportation and encouraging waste segregation and composting can also help to reduce air pollution in the region. From April 2020 to March 2021, the air quality of the Purba Bardhaman district was monitored through single stations.



Drawbacks of NCAP

Although the National Clean Air Programme (NCAP) is India's flagship program for better air quality in 122 cities, it certainly faces a few challenges (Ganguly et al., 2020):

- NCAP only takes the 122 non-attainment cities into consideration, whereas many other cities are under the 'Hazardous' air quality radar.
- Only 102 Clean Air Action Plans are publicly available.
- Domestic cooking and heating or indoor air pollution are mentioned as a source only in 42 plans for a total of 2% of the action points.
- The institutional nature of the interventions is observed in 74% of the action points, using the language "Monitor, plan, advise, organise, research, analyze, secure, develop, train, research and participate".
- Only 25% of programmes integrate programme data to develop management strategies.
- Smaller plans indicate the financial need to complete the plan.
- The organization and management plan provides for the coordination of the impact to prevent pollution of the impact and air zone.

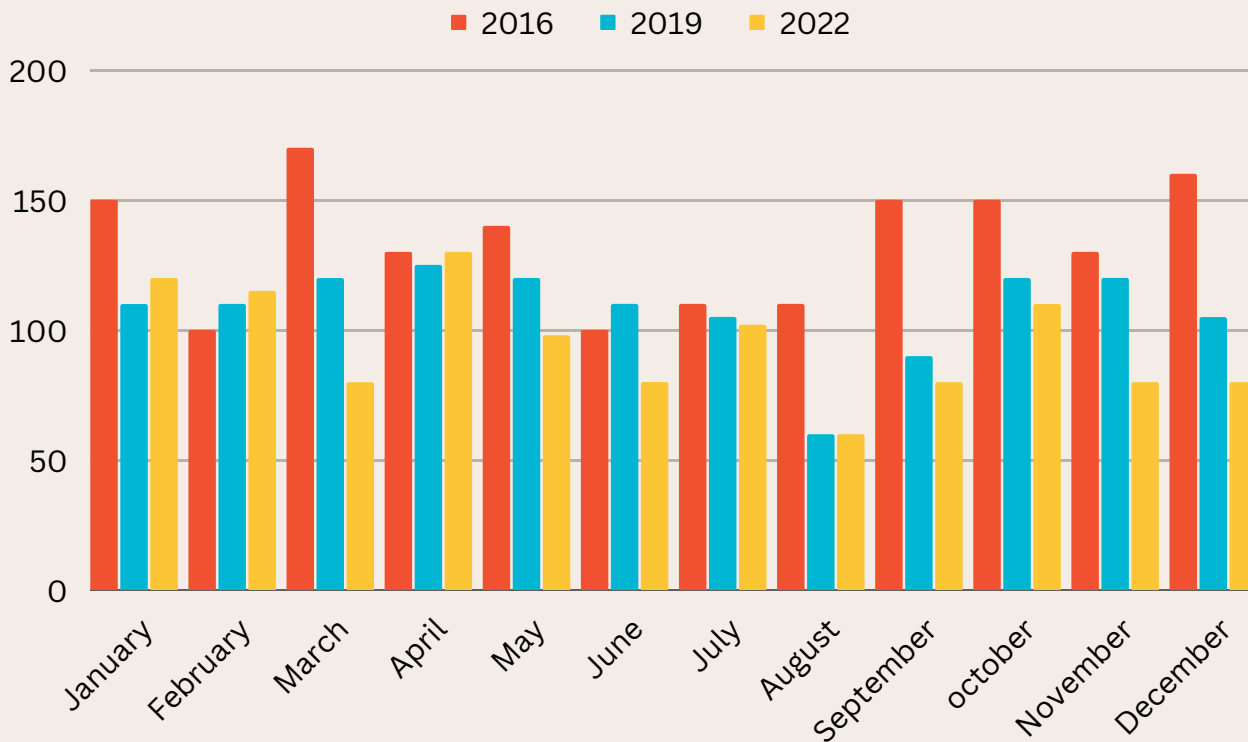
BARDHAMAN TOWN

(h)

MONTH	CONCENTRATION				2.5 CONCENTRATION IN PM ₁₀			
	PM ₁₀ (ug/m ³)	PM _{2.5} (ug/m ³)	SO ₂ (ug/m ³)	NO ₂ (ug/m ³)	B(a)P (ng/m ³)	AS (ng/m ³)	PB (ng/m ³)	NI (ng/m ³)
APR'20								
MAY'20								
JUN'20	66.50		2.00	14.19				
JULY'20	77.21		2.00	13.67				
AUG'20	69.23		2.00	12.40				
SEP'20	68.84		2.00	14.01				
OCT'20	76.82		2.00	15.30				
NOV'20	89.42		2.00	17.43				
DEC'20	85.35		2.00	15.39				
JAN'21	87.33		2.00	15.77				
FEB'21	88.64		2.00	16.38				
MAR'21	90.35		2.00	16.47				

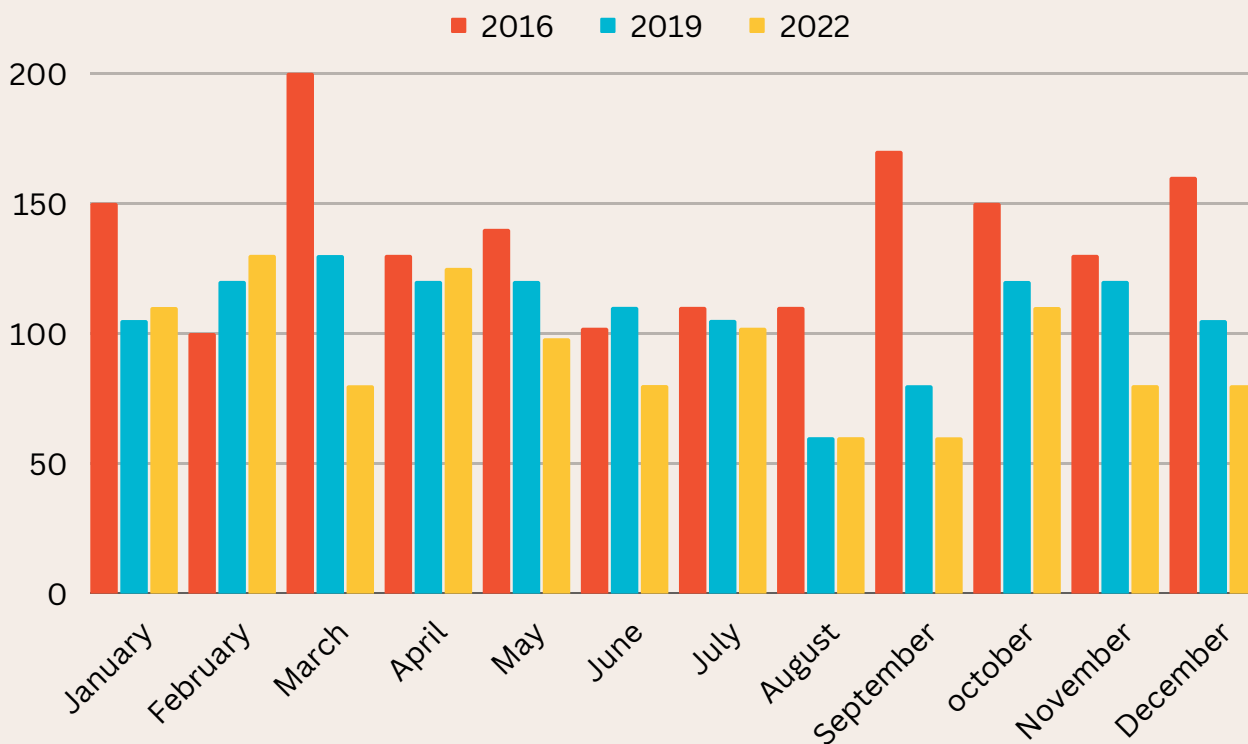
Figure: Air Quality of Purba Bardhaman district

Source- Annual Report 2020-21 of West Bengal, CPCB



Source of Data: West Bengal Pollution Control Board, Air Quality Information System http://emis.wbpcb.gov.in/airquality/filter_for_aqi.jsp

The data on the Air Quality Index of Purba Bardhaman is very limited. Since 2016, the available data indicate that the AQI in the district has remained between 'satisfactory' and 'unhealthy' where the prominent pollutant is PM10, the highest being in March of 2016. The PM10 levels have been above average (60 micrograms per cubic meter).



Source of Data: West Bengal Pollution Control Board, Air Quality Information System http://emis.wbpcb.gov.in/airquality/filter_for_aqi.jsp



CONCLUSION

35 Indian cities out of the 50 most polluted cities of the world come within this subcontinent's boundaries. Due to increased industrialization and urbanization, ambient air pollution is increasing at a steady rate, imposing health hazards on the population. Air pollution affects all social and cultural groups, and has been a significant cause of the drop in Indian GDP annually. The government is taking up various initiatives to combat the detrimental impact of air pollution as the challenges are increasing every day. The government needs to adopt more policies that need to be cross-sectional, cross-boundaries, and cross-governmental to adopt an airshed approach towards air pollution abatement.

Air quality management plans have proven to be a viable solution to help prevent health hazards from air pollution. The public can access it at any time to understand the dimensionless AQI for a specific region and day. The AQI measures overall air quality status, taking into account the number of pollutants (preferably PM_{2.5}) worldwide. It can be seen that air pollution is influenced by various factors such as seasonality, temporality, pandemics, meteorological factors, and types of airborne particles. India has seen varying ranges of air quality over the years, but all data and research averages show a significant rise toward 'hazardous' air quality. However, taking into consideration new districts, sub-districts, cities, and towns which are facing a major air quality crisis is becoming more and more important with the passing of time.

West Bengal has been one of those Indian states that have undergone rapid industrialization and urbanization. The state harbours many industries, metropolitan cities, towns, operational roads and highways, power plants, and sources for the consumption of fuels that readily contribute to air pollution that lead to health hazards. Rising mortality rates attributed to environmental particulate pollution reflect rising pollutant emissions due to increased energy use, accelerated urbanization, rapid industrialization, and an increase in oil-fueled vehicles. Climate Impact Air pollution can be caused by atmospheric stagnation, temperature-related increases in PM_{2.5} concentrations, and ground-level ozone formation, and in India, it can be particularly serious.

Purba Bardhaman is predominantly an agricultural district, and extensive studies and research work are yet to be done on the air quality of the cities or towns. Source apportionment of Purba Bardhaman is necessary to gauge the rising trend of air pollution, perhaps cross-border pollution, and automobile pollution is a leading cause in this sub-district, however, we cannot be affirmative. The trend of air pollution as recorded by the one SAAQM station in BurdwanBardhaman town paints an uncomfortable picture. The AQI has been 'unhealthy' since 2016. This is a call to the government and policy-makers to retrospect on the rising air pollution in these districts and build prospects of their revival.

Recommendations

- Cities of Purba Bardhaman need to be studied extensively to comprehend the trend of air pollution in the district.
- NCAP needs to be promoted on a larger scale to rise awareness about the boons of the programme.
- Modification of policies and setting up of new CAAQMS monitoring stations are necessary for Purba BurdwanBardhaman.
- Non-government bodies and stakeholders need to be motivated to join hands with NCAP.
- The government needs to focus more on the implementation and application of the Clean Air Action plans in these regions.
- Development of stringent policies for air pollution causing industrial sectors and reprimanding the defaulters.
- The common public and the government need to work in synergy to construct a 'zero-emission' India.

