Air Quality Surveillance Project in Dhaka North City Corporation (DNCC)

Vital Strategies

GLOBAL AIR POLLUTION

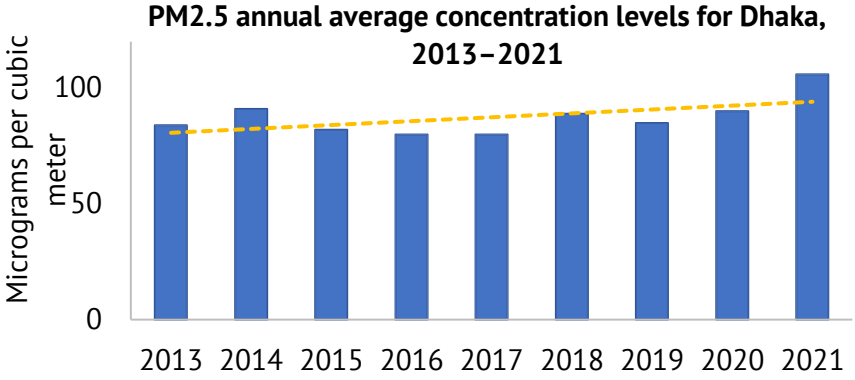
In 2019, an estimated **6.4 million people worldwide died prematurely** due to exposure to fine particulate matter, known as $PM_{2.5}$ (World Bank, 2022). Ambient (outdoor) air pollution was responsible for **more than 4.2 million premature deaths** due to pulmonary and heart diseases, lung cancer, and respiratory infections worldwide in 2019 (WHO, 2022). WHO report states that air pollution causes **13 deaths per minute** worldwide. The burden of outdoor air pollution falls disproportionately on people in **low- and middle-income countries**, where **89% of the 4.2 million premature deaths** occur due to ambient air pollution (WHO, 2022). The global cost of health damages from exposure to polluted air was estimated to be $8.1 trillion, equivalent to 6.1 percent of the global gross product, in 2019, according to a World Bank report.

AIR POLLUTION IN BANGLADESH

Air pollution is responsible for about **20% of the total premature deaths** in Bangladesh. In 2019, Bangladesh experienced **78,145 to 88,229 deaths** and **1.0 billion to 1.1 billion days of illness** due to ambient air pollution (World Bank, 2022). Bangladesh ranked first in terms of annual average $PM_{2.5}$ concentrations weighted by population (IQAir, 2021)

Transboundary air pollution is also a source of ambient air pollution in Bangladesh. Around **40% of the pollution** in Bangladesh comes from neighboring countries like India, Nepal, and Bhutan.

South Asia is home to **9 of the world's 10 cities** with the worst air pollution, and **Dhaka** is one of them (World Bank, 2023). Dhaka has been ranked as the **top-most polluted city** in the world for the last few years (IQAir, 2024). Brick kilns and vehicles are **two major sources** of air pollution, contributing about **70%** of the air pollution in Dhaka (Department of Environment, 2019).



LEGAL FRAMEWORKS IN BANGLADESH

- Environmental Conservation Rules 2023
- Air Pollution Control Rules, 2022
- 8th Five-Year Plan (2020-2025)
- National Environment Policy 2018
- Country Action Plan for Clean Cookstoves, 2013
- Brick Manufacturing and Kiln Installation Act, 2013 (Amended 2019)
- Renewable Energy Policy 2009
- Bangladesh Environment Conservation Act 1995, (Updated in 2010)
- Brick Burning (Regulation) Act 1989 (amended twice in 1992 and 2001)
- Motor vehicle ordinance, 1983

REGULATORY BODIES FOR AIR POLLUTION CONTROL

Department of Environment

- The **Ministry of Environment, Forests and Climate Change (MoEFCC)** is the focal ministry to control environmental pollution in the country
- The Department of Environment (DoE) is the regulatory body under the MoEFCC, responsible for implementing environmental laws related to air pollution in Bangladesh.
- DoE launched **16 Continuous Air Quality Monitoring Systems** (CAMS) to control air pollution by continuously monitoring six air pollutants - PM_{10}, $PM_{2.5}$, ozone, sulfur dioxide, nitrogen oxides, and carbon monoxide across Bangladesh

HEALTH IMPACTS OF AIR POLLUTION

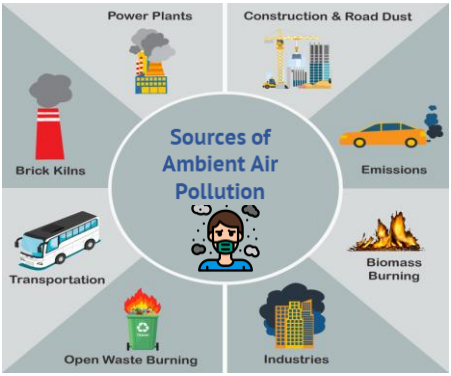
- **Citizens of Dhaka** city are **losing** more than **8 years of life expectancy** on average due to air pollution

- Air pollution was the second-largest risk factor for deaths and disability in the country (World Bank, 2022)
- **4 of the top 5** causes leading to deaths between 2009 and 2019 in Bangladesh were directly associated with air pollution (World Bank, 2022)

- Chronic obstructive pulmonary disease, ischemic heart disease, stroke, lower respiratory tract infection, breathing difficulties, cough, and depression are related to air pollution

- The elderly (65+ years), children (0 to 5 years), and people with people with comorbidities are most **vulnerable to the effects of air pollution**

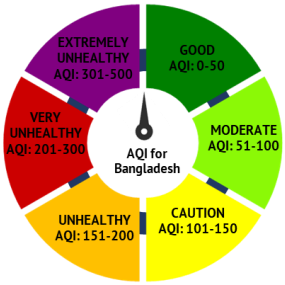
SOURCES OF AIR POLLUTION



In the **Dhaka division**, up to **one-fifth of the total $PM_{2.5}$** concentration comes from **transboundary sources**

AIR POLLUTANTS

- Carbon Monoxide (CO), Sulphur Dioxide (SO2), Nitrogen Oxide (NOx), Ozone (O3), Methane (CH4)
- Fine and Coarse particulate matter ($PM_{2.5}$ and PM_{10}), including Sulphate, Nitrates, Ammonia, Sodium Chloride, Black Carbon, and minerals
- **Criteria air pollutants (PM, Pb, SO2, CO, NOx and O3)**
- Air pollutants, such as methane and black carbon, are powerful short-lived climate pollutants (SLCPs), contributing to climate change



LIMIT VALUES FOR THE CRITERIA AIR POLLUTANTS

POLLUTANTS	BANGLADESH'S NATIONAL LIMITS 2005 (Mg/M3)	WHO AIR QUALITY GUIDELINES 2021 (Mg/M3)
Carbon monoxide (CO)	8-hour: 10	24-hour: 4
Nitrogen dioxide (NO2)	Annual: 100	Annual: 10 & 24-hour: 25
Ozone (O3)	8-hour: 157	Peak season: 60 & 8-hour: 100
Fine PM ($PM_{2.5}$)	Annual: 15 24-hour: 65	Annual: 524 24-hour: 15
Coarse PM (PM_{10})	Annual: 50 24-hour: 150	Annual: 15 24-hour: 45
Sulfur dioxide (SO2)	24-hour: 365	24-hour: 40

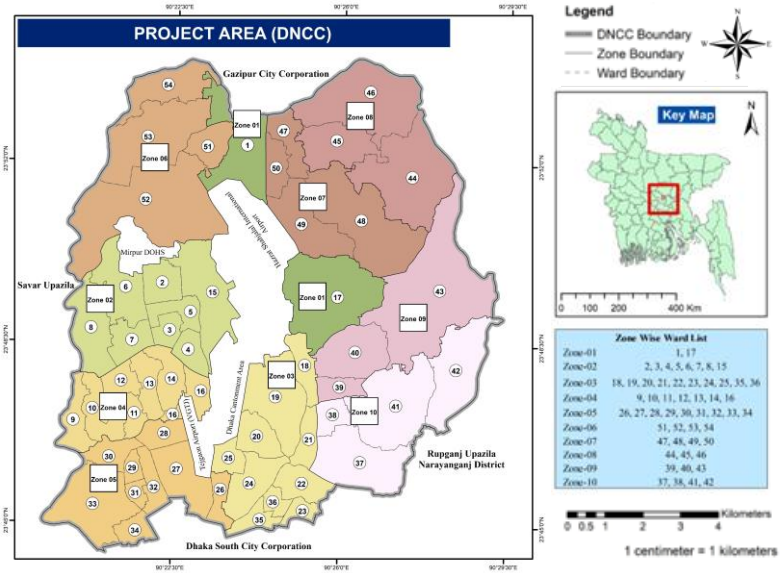
Air Quality Surveillance Project in Dhaka North City Corporation (DNCC)

PROJECT PARTNERS

- Dhaka North City Corporation (DNCC)
- Vital Strategies
- Nature Conservation Management (NACOM)

OBJECTIVES

1. To quantify air quality across DNCC, including potential identification of hotspots in the DNCC area, and create GIS maps for targeted interventions and resource allocation.
2. To install low-cost sensors throughout the DNCC area for real-time data collection on major pollutants ($PM_{2.5}$, O_3, NO2, SO2).
3. To collect and analyze data (using various platforms and channels) on major pollutants in the DNCC area to identify patterns, trends, and correlations, revealing pollution sources and dynamics.
4. To consult with DNCC, government agencies, environmental organizations, community representatives, and residents to exchange knowledge, raise awareness, and foster collaboration for pollution control measures.
5. To develop policy and programmatic recommendations based on data, analysis, and stakeholder consultations to mitigate pollution sources, implement effective control measures, and enhance air quality management in the DNCC area.



Population
5,990,723

Area
196.22 sq km

Population Density
30,530 people per sq km

PROJECT TIMELINE

PROJECT ACTIVITIES

ACTIVITY 01
Development of Project Implementation Plan

DELIVERABLES

The Project Implementation Plan will include

- Project objective and summary
- Technical assistance and engagement
- Communication
- Budget and fiscal mechanisms

ACTIVITY 02
Development of plan for siting, installation of 10 low-cost sensors and data management, reporting, and communication

DELIVERABLES

- Preparation of a detailed plan specifying the locations, quantity, and installation process of the low-cost sensors.
- Preparation of the outline of data management protocols, including data collection, QA/QC (including calibration), storage, and analysis procedures.
- Define reporting formats and frequencies for sharing the collected air quality data with DNCC and other stakeholders.

ACTIVITY 03
Installation, Maintenance, and Management of Sensors

DELIVERABLES

- Execute the installation of low-cost sensors in identified locations within the DNCC area according to the approved plan.
- Establish a maintenance schedule to ensure the proper functioning of the sensors.
- Implement a management system to monitor the sensors' performance, address technical issues, and ensure data accuracy.

PROJECT ACTIVITIES

ACTIVITY 04

Periodic Data Reporting to DNCC and Other Relevant Stakeholders

DELIVERABLES

- Develop a reporting mechanism to regularly share air quality data collected from the sensors with DNCC and other identified stakeholders.
- Determine the reporting frequency, format, and channels for efficient communication of data.
- Ensure timely submission of accurate reports to facilitate informed decision-making and actions.

ACTIVITY 05

Stakeholders' Meetings, Reviews, and Consultation

DELIVERABLES

- Organize meetings with relevant stakeholders, including government agencies, environmental organizations, community representatives, and residents.
- Conduct periodic reviews to assess project progress, address concerns, and make necessary adjustments.
- Facilitate consultations to exchange knowledge, raise awareness, and foster collaboration among stakeholders..

ACTIVITY 06

Public Advisory and Appeals from the Mayor's Office

DELIVERABLES

- Prepare public advisories and appeals related to air quality improvement initiatives, endorsed by the mayor's office.
- Disseminate the advisories through appropriate communication channels to reach a wider audience.
- Encourage public participation and cooperation in implementing pollution control measures.

ACTIVITY 07

Air Quality Surveillance Data Report (with Recommendations and Patterns of Air Quality) and Final Project Completion Report

DELIVERABLES

- Prepare a comprehensive report on air quality surveillance data, including an analysis of patterns, trends, and correlations among different pollutants.
- Present recommendations based on the data analysis and stakeholder consultations for pollution mitigation and control measures.
- Create a final project completion report summarizing the project activities, achievements, challenges, and lessons learned.

The Air Quality Surveillance Project is taken to study the air pollution characteristics of Dhaka North City areas to prepare a comprehensive action plan to address air pollution. This project will help Dhaka North City Corporation (DNCC) establish its own real-time air quality monitoring network to facilitate policy-making and evidence-based decision-making.

CONTACT

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