



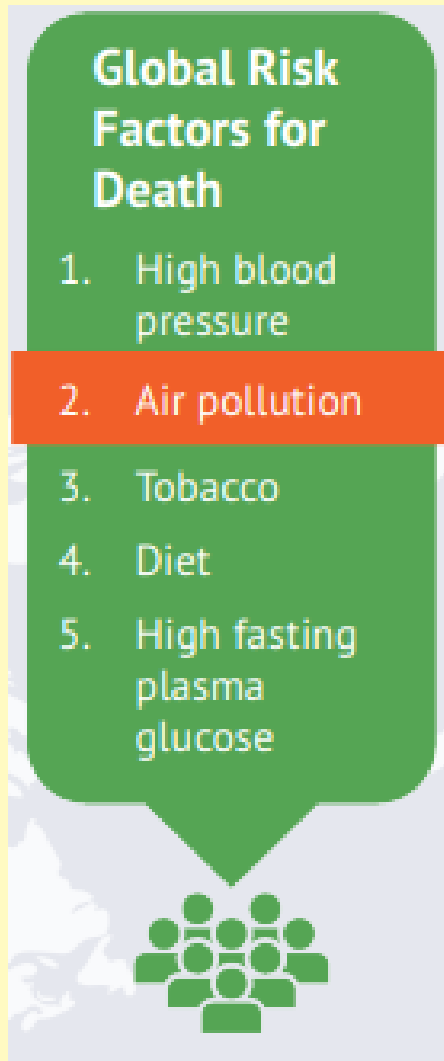
Air quality surveillance

Dr. Alex Ndyabakira

Almost everyone in the world is exposed to air pollution

- **99% of the world's population lives in places with unhealthy levels of PM 2.5 pollution.**
- **34% lives in areas that exceed even the least stringent WHO interim air quality targets.**

The worrying 2nd position



General population



Children

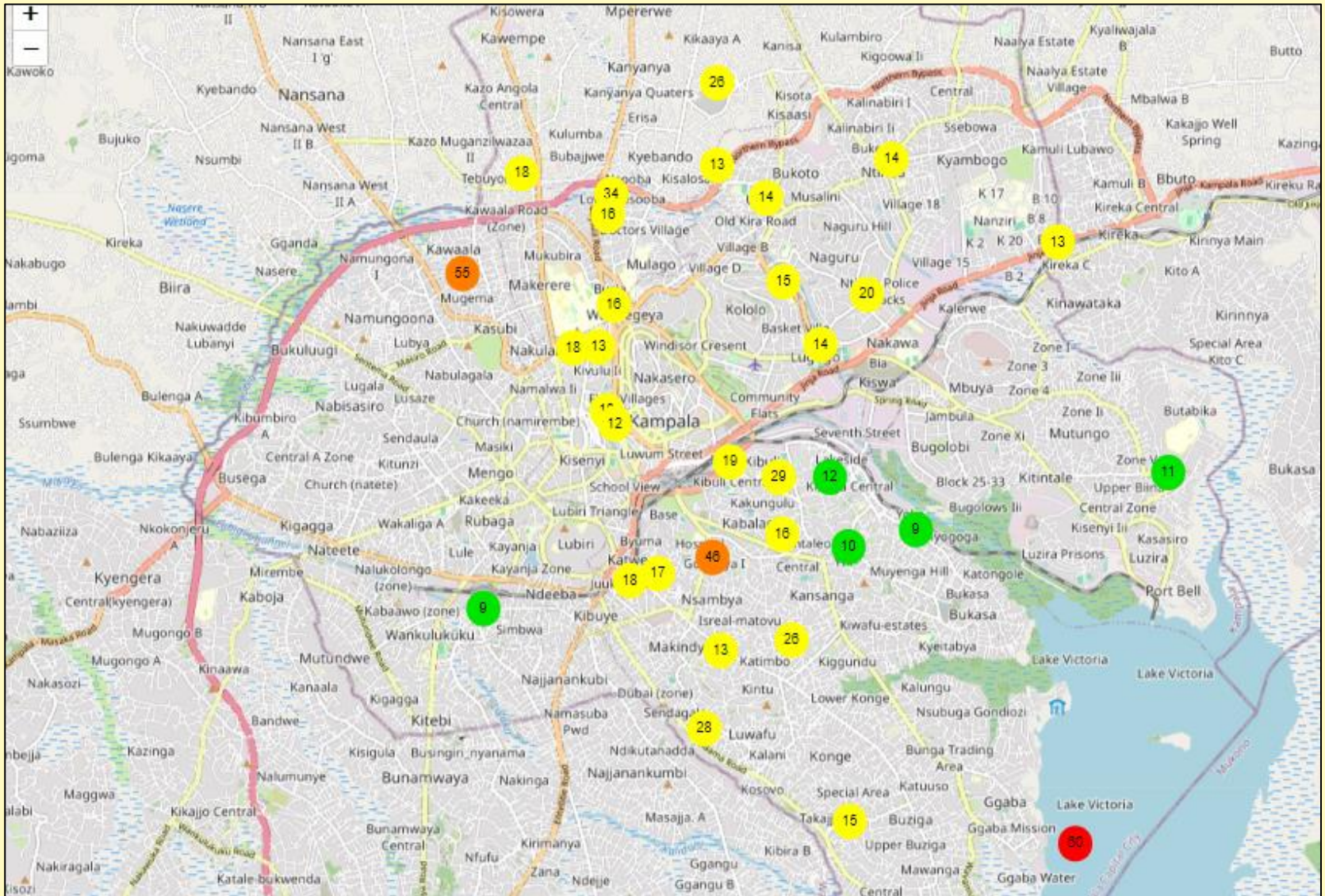
Descriptive overview



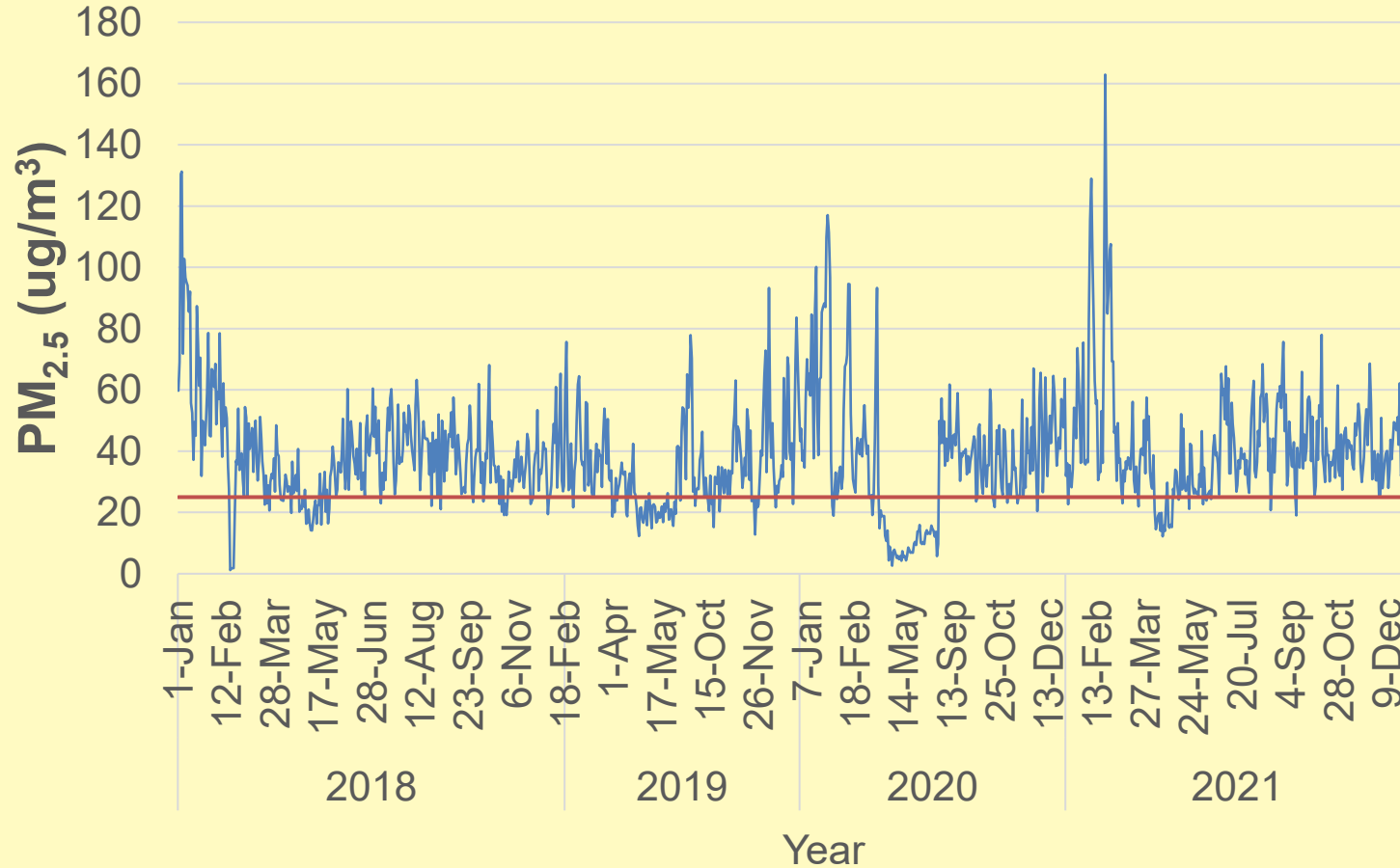
Drivers of air pollution

- **Transport sector**
 - Exhaust emissions
 - Non-exhaust emissions
 - Dusty/unpaved roads
- **Energy and waste Management**
 - Domestic burning
 - Energy choice for cooking
- **Industrial activities**
 - Combustion and processes
 - Indirect contribution from supply chain

Air quality dash board on 10th June 2024



Kampala city Pollution exceeds WHO safe level: Reference grade monitoring station



In Kampala, is it better?

Journal of Exposure Science & Environmental Epidemiology

www.nature.com/jes

ARTICLE OPEN



Air quality and attributable mortality among city dwellers in Kampala, Uganda: results from 4 years of continuous PM_{2.5} concentration monitoring using BAM 1022 reference instrument

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BACKGROUND: Air pollution is a known risk factor for non-communicable diseases that causes substantial premature death globally. Rapid urban growth, burning of biomass and solid waste, unpaved sections of the road network, rising numbers of vehicles, some with highly polluting engines, contribute to the poor air quality in Kampala.

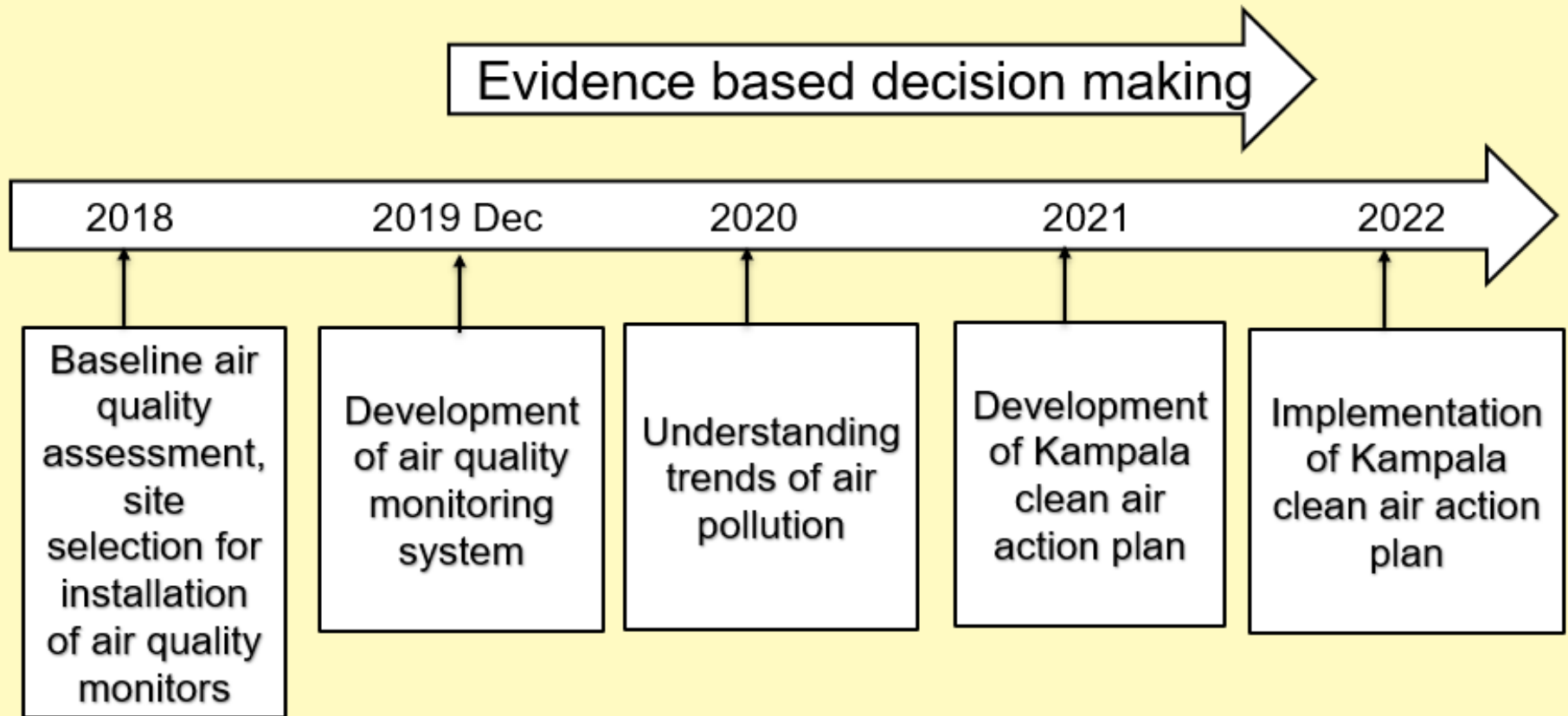
OBJECTIVE: To provide evidence-based estimates of air pollution attributable mortality in Kampala city, with focus on ambient fine particulate matter (PM_{2.5}).

METHODS: We utilized a time series design and prospectively collected data on daily ambient PM_{2.5} concentration levels in

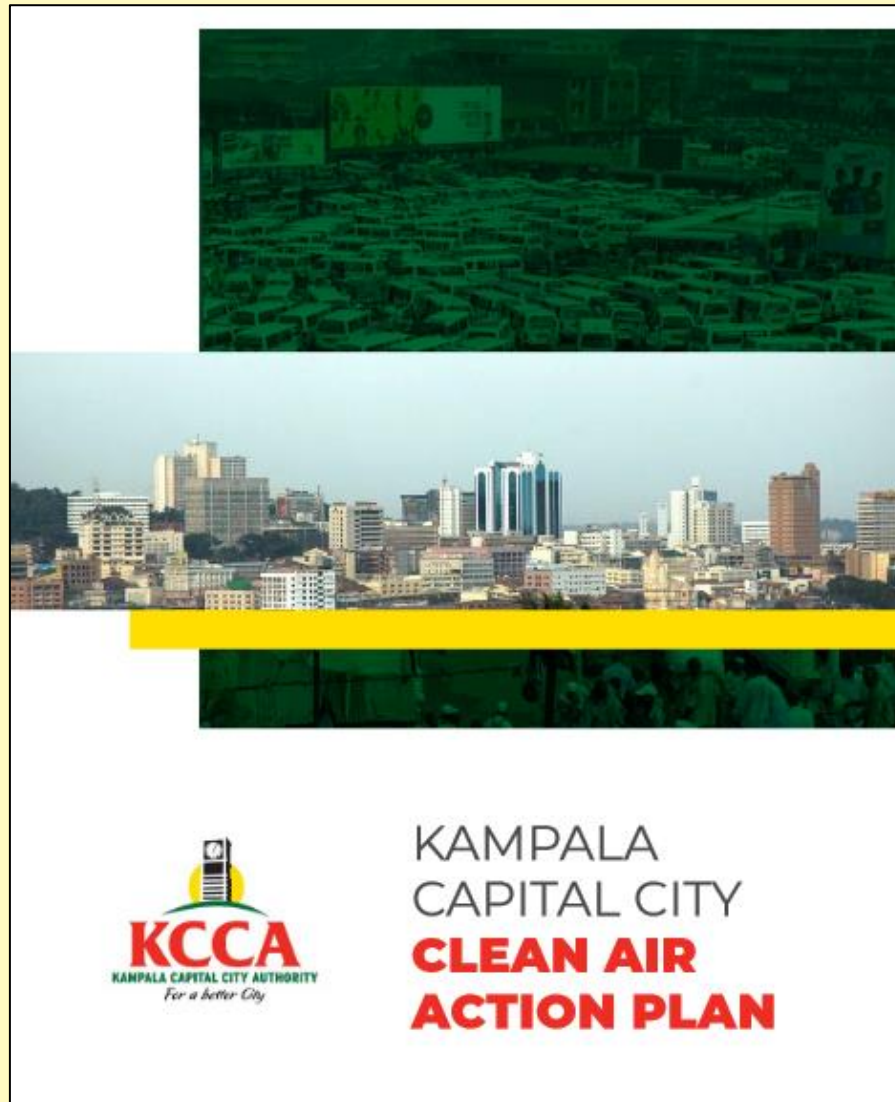
Air pollution attributable mortality in Kampala city

- **Long term exposure leads to death.**
 - **2018: 18% (2,136),**
 - **2019: 19% (2,777),**
 - **2020: 18% (1,282),**
 - **2021: 20% (1,063) of all deaths in KLa city were attributable to air pollution**
- **Over the 4 year period: 7,257 deaths occurred**

The Air quality management journey



Kampala's road map to the desired air quality



Objectives of the Action Plan

1. Develop and maintain a comprehensive monitoring and reporting infrastructure for $\text{PM}_{2.5}$, PM_{10} , NO_2 , O_3 , CO , and SO_2
2. Consolidate infrastructure and framework for public awareness
3. Build and strengthen an effective implementation and enforcement programme for air quality management
4. Design and implement strategies for reducing sectoral contributions to annual ambient pollution ($\text{PM}_{2.5}$ & NO_2) concentrations

Objective 1: Monitoring and reporting infrastructure for pollutants

Action	Required support
Deploy Monitors where monitoring is non-existent	Procurement and installation is ongoing
Deploy infrastructure to monitor parameters not currently monitored	Support to start monitoring of gaseous pollutants
Data quality assurance/control for the low-cost network in Kampala	None
Studies to generate more evidence	-Source attribution for longer duration -Human-centered designs -Associations with health effects, dose response -Periodic Energy access studies

Objective 2: Infrastructure and framework for public awareness

Action	Required
Developed communication plan	Needs funding for full implementation
Air quality working group formation	Financial support to function fully
Consolidate air quality data sharing avenues	Technical assistance
Targeted community engagements	Technical assistance and funding
City-wide air pollution control awareness raising campaign	Funding

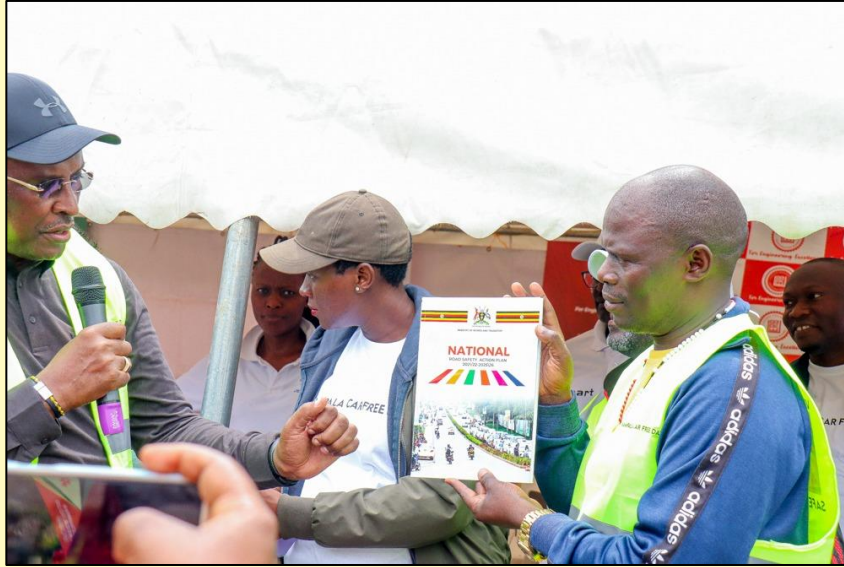
Objective 3: Implementation and enforcement programme for air quality management

- **Development of regional air quality regulations and standards including ordinances**
- **Streamline air quality management within the KCCA**
- **Air quality management incorporated within PTF**
- **Staff capacity building**

Objective 4: strategies for reducing sectoral contributions

- Reduction of exhaust and non-exhaust emissions
- Emissions from other infrastructure-based activities e.g. road construction, and other construction activities
- Implement green mobility initiatives e.g. NMT, electric mobility, mass transit, etc.
- Cleaner energy alternatives for households and institutions
- Active cities: car free days

City leadership is committed to AQM



Current project 1. Participatory air quality management

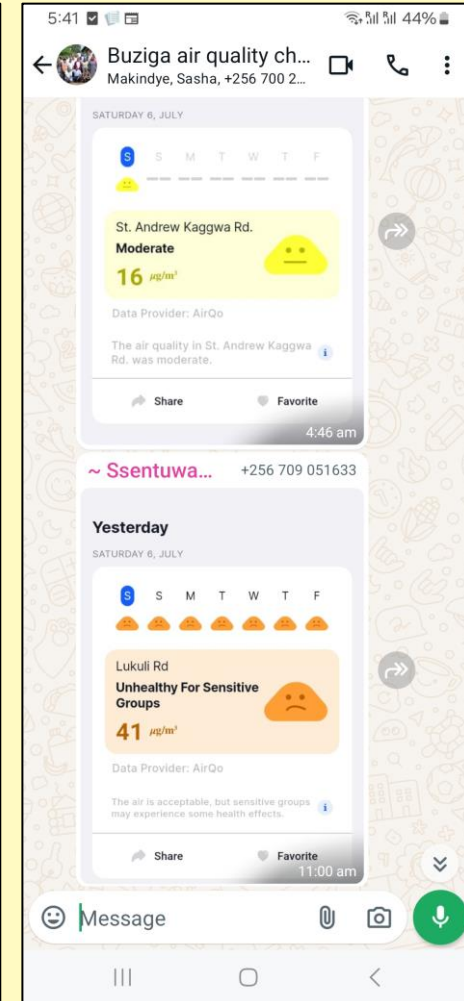
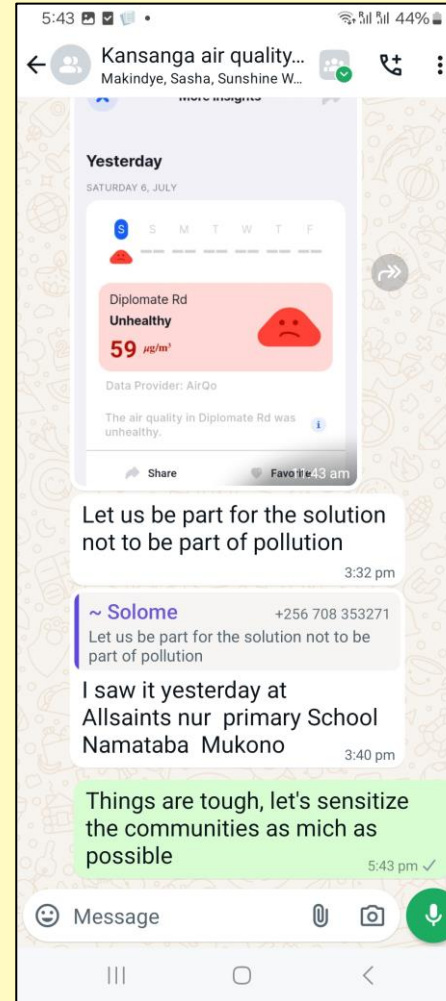
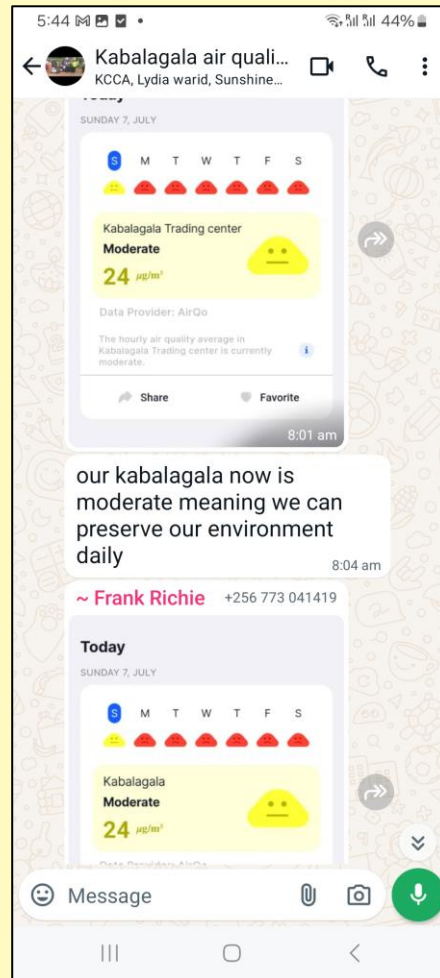
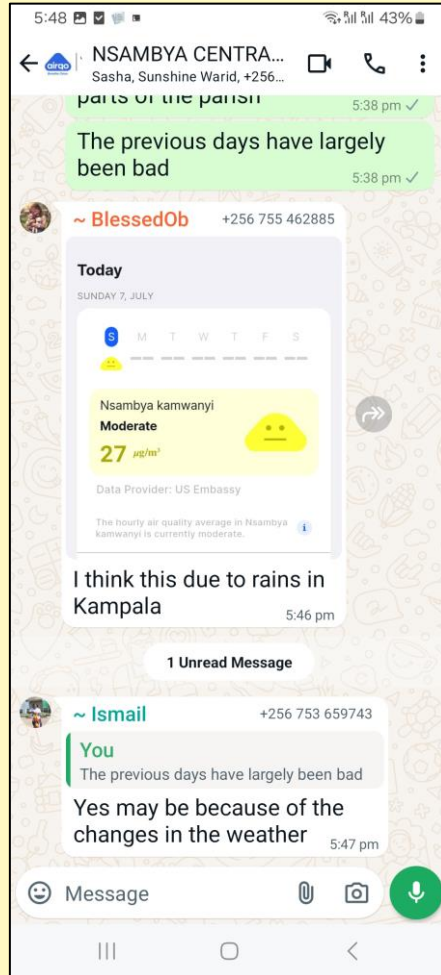
- Clean air champions program
- Makindye, Kawempe and Nakawa completed



Formation and induction of community air quality champions



Community clean air champions whats App groups



Kampala's cleanest air is expected at this site- Kololo



Current project 3: Development of air quality management ordinance

- Initial stakeholder engagements are completed
- Drafting is ongoing



Successful local collaborations

Agency	Area of support
NEMA	Regulation, oversight role
MOH	Health/environmental Effects of air pollution
MUK Airqo project	Development of low cost monitors, data analytics and softwares, monitoring science
Makerere University Lung Institute	Respiratory effects of air pollution
US Embassy in Kampala	Technical assistance across many aspects
Uganda manufacturers association	Regulation of industrial sector
Uganda media	Awareness, sensitization
GeoHealth hub/SPH	Health effects of air pollution

Successful international collaborations

International agency	Area of support
Vital strategies	Awareness and sensitization, policy acceleration
EU/Expertise France/ComSSA	Funding, technical assistance
Environmental Compliance Institute	Capacity building, policy
Health Effects Institute	Health effects of air pollution
University of Chicago	Air quality monitoring, open data access
Columbia University/CAMS-NET	Monitoring science
World Resources Institute	Air quality forecasting, Capacity Building
UNEP	Technical assistance, funding, monitors
Stockholm Environmental Institute	Technical assistance, monitoring science

