

Q&A | Community Catalysts: Closing the Global Air Quality Data Gaps Locally

On January 17, 2024 EPIC's Clean Air Program hosted a webinar to discuss the challenges and opportunities associated with global air quality gaps. Following the recent release of a report, 'The Case for Closing Global Air Quality Data Gaps with Local Actors: A Golden Opportunity for the Philanthropic Community,' the webinar served as a platform for select local actors and experts to share their experiences through insightful case studies, highlighting effective strategies in addressing air pollution. This Q&A document has been specially compiled recognizing that many individuals may have similar questions and may find this useful. Our speakers actively engaged with participants, responding to a wide array of questions and comments submitted through the Q&A box on ZOOM. This document aims to capture the essence of that dynamic exchange for your benefit.

Q1. Lack of official AQ monitoring, leaves Africa depending on a network of low-cost sensors. Those out-of-the-box sensors are not reliable in the African context - what are some of the challenges that low-cost sensors face? And what can we do to ensure people and governments can trust low-cost sensors?

A1. Deo Okure: The LCS challenges in the African context are two-fold. (1) infrastructure and logistics such as limited internet connectivity for data streaming, unreliable/non-existent electricity supply, infrastructure for data management. (2). Reliability of the data as these sensors cannot work on their own but should be calibrated against a standard monitor and yet these standard monitors are very scarce on the continent.

How can these be addressed: Building contextual infrastructure that insulates against the challenges e.g. using alternative power configurations, GSM/sim-card as opposed to wireless internet. But we still need to have some reference monitors to support localised calibration for local sensor networks.

A1.1. Dr. Pallavi Pant: The only thing I'll add is that some of the African cities have been much more receptive of low-cost sensors as a means to measure air quality. It would be excellent to connect policymakers from cities where low-cost sensors are being used, with cities where they may be some skepticism or concerns. Particularly in the South-South context, there is a lot of opportunity for knowledge exchange.

Q2. Is there a way we can partner to drive the local conversation of air quality in west Africa and more specifically Ghana?

A2. Christa Hasenkopf: Others can chime in, but I will share our public registry, where folks across the world - including in West Africa and Ghana have put their information about their work and contact info. This may be a good place to start: <https://epic.uchicago.edu/air-quality-registry/>

Q3. Most modern automotive emissions are from brake and tire particulate. This is increasingly being linked to health conditions and water quality degradation. What is currently underway to include tire particulate in air quality monitoring efforts?

A3. Dr. Pallavi Pant: Indeed, emissions from brake and tire wear are becoming important in the context of urban air quality. Measurement of tire and brake wear in the air has largely been done through specialized monitoring campaigns so far.

Q4. The first speaker (Christa Hasenkopf) showed a graph of improving air quality due to the installation of monitoring equipment. Monitoring alone cannot improve concentrations. What actions were implemented which would have led to this improvement?

The second speaker (Deo Okure) - Just to say well done for the AirQo initiative which I found about recently from a WhatsApp group as someone shared that there was an alert in Lagos about high air pollution a few days. Out of interest, what type of technique (light scatter, particle counter, gravimetric) does the AirQo monitors use, are they electric or solar powered, any problems with security of these monitors, are they certified to MCERTS monitoring systems?

A4. Christa Hasenkopf: To answer your question on the first part - it was a variety of things - and no single answer. Essentially, the data that was generated - and shared in a fully open way so others in the community could build off of it - catalyzed interest/action. This included tweeting the information. Definitely agree with you that monitoring alone - and done in isolation - won't affect concentrations of pollutants. Among other items, it takes having a community of folks who will take that data and run via media, policy and activism. I think it is interesting that the bottleneck - in the places these monitors were deployed/where data were made open/shared in a public way, wasn't a community to engage, but data itself (again, specifically in these locations). Here is the paper: <https://www.pnas.org/doi/full/10.1073/pnas.2201092119>

A4.1. Deo Okure: The AirQo sensors use light scattering technique and have flexible power options (solar or main depending on the circumstances.) You can read more about the AirQo sensor in this recent publication about the AirQo sensor kit: <https://www.sciencedirect.com/science/article/pii/S2468067223000895>

Q5. While urban areas in India demonstrate effective air quality monitoring, the spatial coverage of such monitoring is notably insufficient in rural areas. Could you elaborate on the availability and public access to satellite-derived air quality models, which utilize comprehensive spatial data? How can these complex datasets be translated into simpler formats for the common public? Furthermore, are these datasets currently in the public domain. If not are there any efforts being made in that direction?

A5. Dr. Pallavi Pant: Indeed, air quality monitoring is still scant in rural parts of the country. Estimates of air pollutants such as PM2.5 and NO2 using satellite data is available from India, both from global datasets and from work done by Indian researchers. However, such estimates are best used for highlighting long-term trends in air quality. Such data is not very useful for daily updates, but can be relevant for messaging around hotspots of air pollution or areas where progress may have been made. We can also use maps derived from such data to highlight the extent of air pollution across not just cities like Delhi, Mumbai and Bengaluru, but many parts of the country, including small towns and rural areas.

Yes, satellite-derived estimates for air quality are available publicly. Estimates for countries and cities around the world are also available on our website: <https://www.stateofglobalair.org/data/#/air/plot>

For India, maps and illustrations are available at: <https://urbanemissions.info/publications/infographs/>

Q6. How you can link air pollution with hospital visits to respiratory problems, or with medicine selling? (Alex from Romania)

A6. Dr. Sunkaru Touray: In The Gambia, health centers keep records of number of visits, and reason for visits. By accessing that data and linking it to PM2.5 data you can look at the trends. The idea is for forecasting exposure to ensure that vulnerable populations are given health advisories, and that the health care system can anticipate an uptick in resource utilization and respond appropriately.

A6.1. Dr. Pallavi Pant: Indeed, there are several methods to study the association between air pollution and hospital visits. You will need both the air quality and health data in order to conduct the assessment. For reference, such studies from Southeastern Europe are listed in this interactive database: <https://www.healtheffects.org/global/spatial-bibliography>

Q7. Dr Pallavi's and Dr Touray's presentations and stories show the intersections of air quality, health, gender, and culture are. As a researcher from the Philippines, a low-resource country, are there endeavors in addressing air quality holistically that we can emulate? Specifically, are there strategies that acknowledge and address the myriad of factors influencing air quality like livelihood and culture (e.g. grilling, smoking food). Additionally, how can we simplify and communicate complex air quality data to the general public, and sustain these initiatives beyond the duration of philanthropic funding?

A7. Dr. Pallavi Pant: There are some good examples from different places that may be useful:

1. Art installations in community settings: <https://www.purpose.com/art-exhibit-of-indias-air-pollution-will-leave-you-breathless/>
2. Installing lung billboards for a visual representation of air pollution: <https://www.purpose.com/poland-air-pollution-campaign/>
3. Organizing community air quality walks i.e., walking around a specific route with an air quality monitor so you can highlight areas with high exposures.

Q8. My conversations with individuals from diverse occupational backgrounds, including a construction site laborer, an autorickshaw driver and a farmer made me think that immediate livelihood concerns often overshadow awareness of air pollution. This underscores a challenge in current campaigns, compounded by the perception that air pollution lacks an immediate threat. How can we reshape awareness strategies to prompt timely action and elevate the prioritization of air pollution amidst the myriad challenges individuals face daily?

A8. Dr. Sunkaru Touray: We need to engage all the stakeholders. Most countries lack occupational and health safety regulations specifically addressing air quality. I think using a data driven approach; can licensure to perform certain occupational exposure be linked to some form of education on how to protect yourself during work. There are examples from other parts of the world where these have been implemented. In Gambia for example, we are targeting high schools, and tertiary institutions as well as local community groups (local women groups involved in fish processing) to provide basic education.

A8.1. Dr. Pallavi Pant: I agree with Dr. Touray. We need to think about intersectional opportunities for highlighting air pollution and its impact on people's health. There are some interesting examples. In Kampala, there's an ongoing program to raise awareness among auto mechanics regarding vehicular emissions (<https://www.autosafety-ug.org/>)

In India, a group of women construction workers were engaged on air pollution and became changemakers within their community and beyond (<https://www.mahilahousingtrust.org/>).

Q9. Thank you Dr. Sunkaru Touray, for sharing the example of The Gambia about hospital records. Is this published, if yes, can you share the link?

A9. Dr. Sunkaru Touray: This is not published yet. You will need permission from the health ministry to do that.

Q10. Pallavi, your website mentions a question on use of vacuum cleaner in reducing ambient air pollution. I have a question on similar line about exhaust fans - How much reduction is achieved using exhaust fans to reduce indoor air pollution?

A10. Dr. Pallavi Pant: There are some considerations, but yes, adequate ventilation (exhaust fans in kitchen, windows etc.) can help reduce exposure to air pollution in an indoor environment.

Q11. The AirQo platform provides only Air Quality Index (AQI) information, but does not provide raw data. How can we get access to the raw data on this platform?

A11. You can apply to access data using the AirQo platform <https://platform.airqo.net/>