



## AQ4Zim: Integrating TROPOMI Satellite Data and Ground Networks for Improved Air Quality Monitoring in Zimbabwe

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# Introduction

Zimbabwe is among the southern African countries severely affected by high air pollution levels.

Air pollution has significant impacts on human health and the environment.

To develop mitigation strategies and sustainable policies, monitoring of air quality (AQ) is essential.

However, development of mitigation strategies is limited by **few air quality monitoring stations**, primarily concentrated in the densely populated industrial area of Harare

This results in significant data gaps, limited assessment of air quality, ineffective health and environmental policies.



# Project Objectives

The project seeks to:

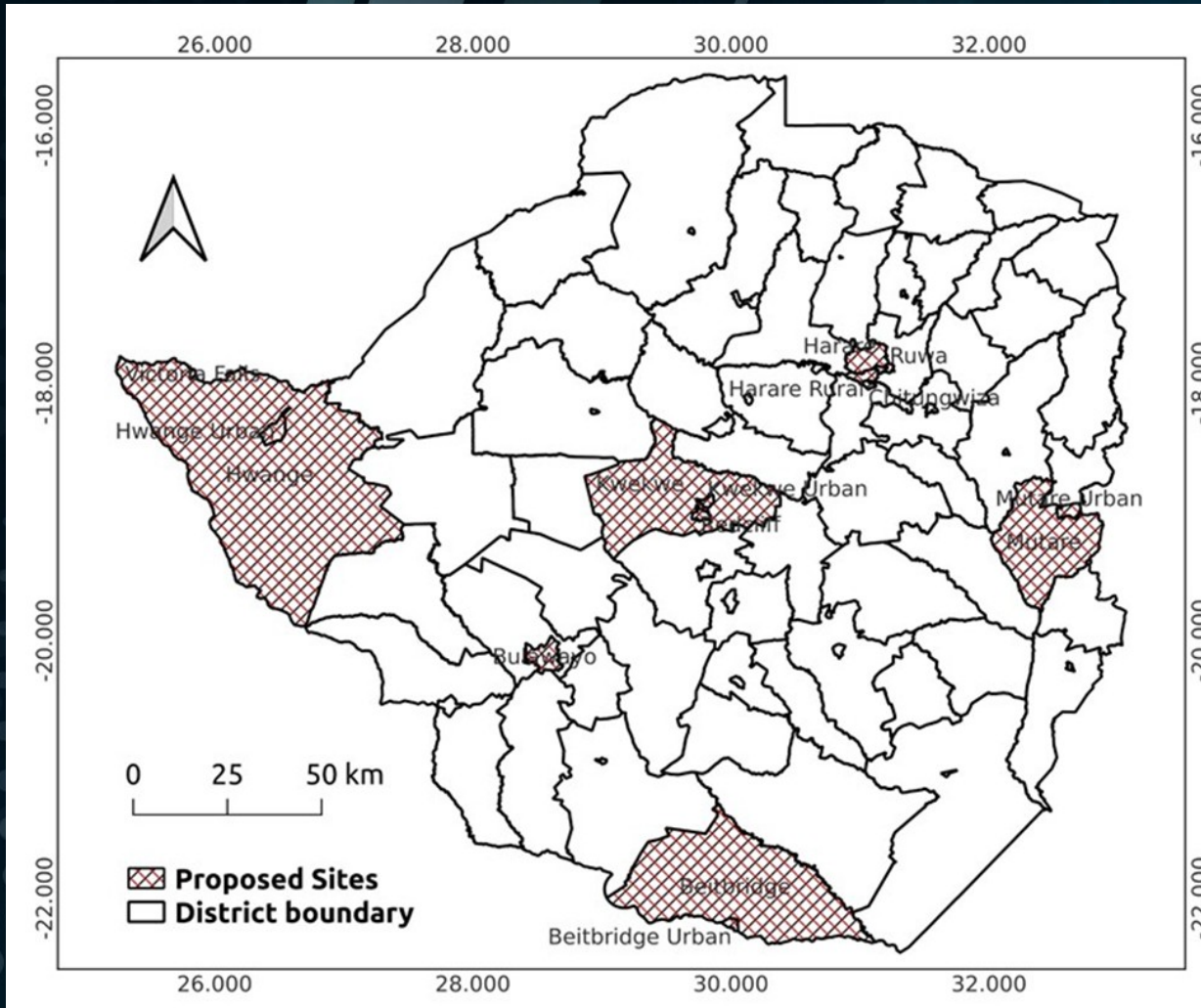
- densify air quality monitoring network through installation of LCAQS ;
- explore the spatial and temporal variations in TROPOMI Aerosol Optical Thickness (AOT) patterns across Zimbabwe and validate AOT products;
- develop and evaluate a smoke-dust discriminator for TROPOMI.

# Progress to Date





# LCAQS Installation sites



10 LCAQS planned for installation spread across 5 selected pollution hotspots

Installation to be conducted by Environmental Management Agency (EMA) and ZINGSA





# Characteristics of LCAQS

Parameter	Range and precision
PM1	0-1,000 $\mu\text{g}/\text{m}^3 \pm 10 \mu\text{g}/\text{m}^3$ / or $\pm 10\%$
PM2.5	0-1,000 $\mu\text{g}/\text{m}^3 \pm 10 \mu\text{g}/\text{m}^3$ / or $\pm 10\%$
PM10	0-1,000 $\mu\text{g}/\text{m}^3$
CO <sub>2</sub>	400 - 10000 ppm
Temperature	-40 to 90 °C
Humidity	0 - 100% RH $\pm 1\%$ ;
Barometric pressure	300 - 1100 hPa $\pm 1$ hPa

## IQAir instruments:

- are manageable & cheap
- can be run on battery power
- can be connected directly to WiFi



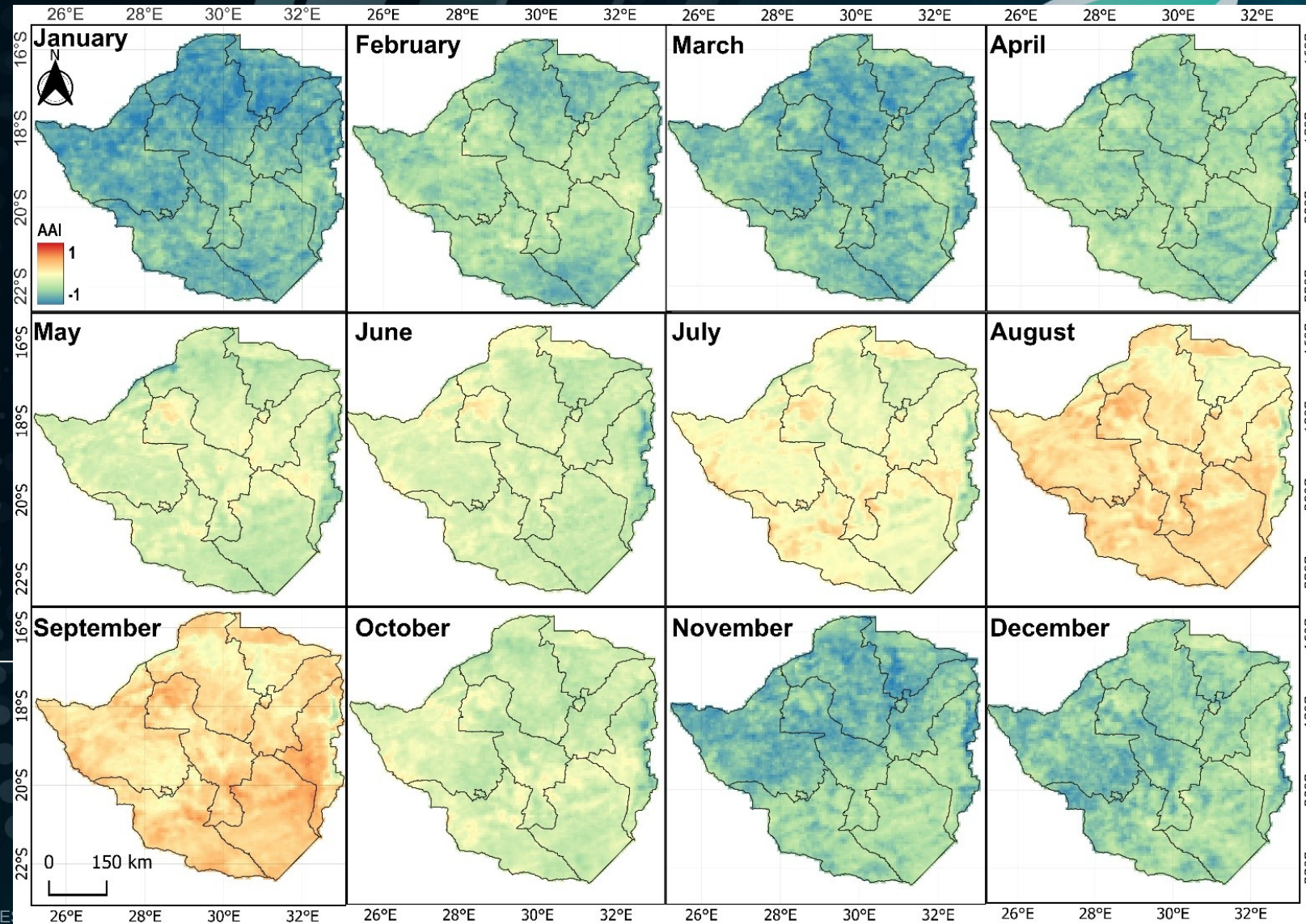
# Installation of Sensors

10 sensors procured but 4 have been delivered

Supplier engaged and efforts underway to establish whereabouts of remaining sensors



# Variations in TROPOMI Aerosol Index



From 2020 to 2024 results show that peak air pollution coincides with the dry season (May to October) when biomass burning is high in the country



# Development of smoke-dust discriminator

Researchers have accessed and utilised the Africa EO Innovation Lab

African researchers have interacted and collaborated with EU scientists

Currently finalising the code to develop a smoke-dust discriminator/index based on Level 1B TROPOMI

# Challenges





# Some Drawbacks

Delays in Procurement of LCAQS & Money Transfers



Failure to get VISA for attending cloud-based computing training Côte d'Ivoire

# Acknowledgements



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