

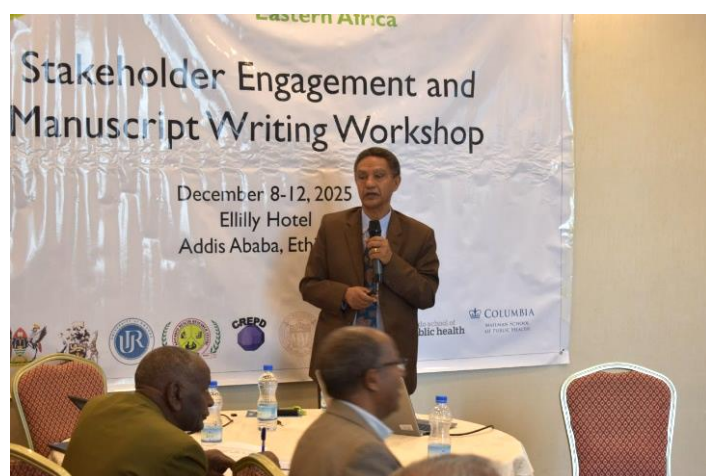


The Global Environmental and Occupational Health (GEOHealth) Hub for Eastern Africa

Quarterly Report: December 2025 - February 2026

Stakeholder engagement event in Addis Ababa

The GEOHealth Hub – Ethiopia team convened local stakeholders for a half-day engagement event on December 8, 2025. The event was attended by members from the Ethiopia and Addis Ababa EPA, the Ministry of Health, Addis Ababa Health Bureau, Ministry of Transport and Logistics, Addis Ababa Transport Bureau, and the Ministry of Urban and Infrastructure. The convening opened with welcome remarks from the Executive Vice Dean of the School of Public Health at Addis Ababa University (AAU) and a presentation from Professors Kiros Berhane (CU) and Abera Kumie (AAU) on the Hub training modalities and research studies. The presentations were followed by a panel discussion on three areas: 1) how is air pollution prioritized within each stakeholder institution, 2) how can air quality monitoring be sustained beyond the Hub's funding, and 3) what are future research needs and how can collaborations with the Hub be strengthened? The institutions represented by the stakeholders recognize the need to improve air quality and highlighted efforts undertaken, such as the 10-year national air quality roadmap developed to guide long-term air quality management efforts, a Health Adaptation Plan and a national guideline on air pollution and health aimed at reducing pollution-related health risks, and awareness-creation activities on household air pollution that were implemented alongside the promotion of improved cookstoves and green technologies. To ensure sustainability in air quality monitoring, strengthening dialogue between the Hub and government entities as well as capacity-building activities to establish institutional ownership of the air quality monitoring campaign will be key. There was also emphasis on the need for strong evidence to inform the development of policies and guidelines as well as the importance of organizing workshops with senior officials to facilitate evidence uptake.



Manuscript writing workshop

A four-day workshop on manuscript writing was organized in Addis Ababa, Ethiopia in December 2025. Sessions over the four days focused on topics of the manuscripts currently underway, some of which are written by each country team (hospital-based time series and respiratory health outcomes) and others that are combined into a multi-country analysis (hospital data collection process and implementation science). Discussions included data analysis plans, challenges, manuscript structure, and plans for writing.

In addition to working on the manuscripts, Dr. Samet Professor presented on the health effects of air pollution, drawing on evidence from various published studies. He highlighted historical events such as the London Fog of 1952, during which, severe air pollution led to a significant increase in mortality. He also discussed the development of air pollution monitoring networks in cities starting in 1953, illustrating the early efforts to track and understand urban air quality and its impacts on public health.



Conference on Clean Energy and Sustainable Clean Cooking Solutions

Dire Dawa University Institute of Technology, in collaboration with the Ethiopian Clean Cooking Alliance and SNV Ethiopia, hosted their Third Annual National Conference on December 18, 2026. The theme of the conference was "Clean Energy and Sustainable Clean Cooking Solutions". The Ministry of Water and Energy gave a presentation of the National Clean Cooking Roadmap, which charted national priorities, strategies, and targets for 2030 and 2035. Mr. Molla Mekashaw, staff member from the GEOHealth Hub – Ethiopia team, attended the conference and gave a presentation on "Public School Attending Students' Households Black Carbon Diurnal Pattern Analysis in Addis Ababa, Ethiopia."

Distinguished public lecture series at Addis Ababa University

Addis Ababa University celebrated its 75th anniversary in December 2025. As part of a series of events organized in commemoration, Drs. Kiros Berhane (CU) and Jonathan Samet (CSPH) were invited to give a talk at the Distinguished Public Lecture Series, with a theme of 'Breathless Futures: Air Pollution, Health, and Policy in a Changing Climate.' Dr. Samet presented on "Air Pollution, Climate Change, and Health: What We Know and What We Need to Know," providing a global perspective on current knowledge and research gaps. Dr. Berhane discussed major challenges in climate and environmental exposures, while highlighting emerging opportunities for research and intervention. Their talk was followed by a panel discussion, moderated by Professor Belay Simane (AAU).



Publication

Food Security Outlook for Eastern Africa by 2050: Climate Change Impacts and Population-Driven Demand Gaps.

Abstract: This review examines the future of food availability in Ethiopia, Kenya, and Uganda in the context of rapid population growth and accelerating climate change. It aims to assess the implications of projected climate-induced yield declines and demographic trends for food security by 2050, with a focus on cereal demand and supply under IPCC RCP 4.5 and 8.5 scenarios. Projections indicate that regional temperatures will rise by 1.8–3.0 °C by mid-century, leading to cereal yield reductions ranging from 13% to 22%. Uganda is projected to face the largest yield losses, while Ethiopia is expected to warm most rapidly. Concurrently, population growth will dramatically increase food demand, with Ethiopia, Kenya, and Uganda reaching populations of 230, 93, and 109 million, respectively, by 2050. Cereal requirements will grow to 50.6 million tons for Ethiopia, and 23 million tons each for Kenya and Uganda. Despite modest assumptions of 1.5% annual productivity gains, projected cereal deficits remain high—21% in Ethiopia, 71% in Kenya, and 60% in Uganda. Without urgent and transformative action, the region is likely to face deepening food insecurity, rising malnutrition, and increased dependence on food imports. Strategic investments in climate-resilient agriculture—including drought-tolerant crop varieties, improved water management, early warning systems, and diversified livelihoods—are essential. Coupling these with nutrition-sensitive interventions and regional cooperation can enhance food system resilience and safeguard vulnerable populations against mounting climate and demographic pressures.

Simane B, Berhane K, Samet J, Oguge O, Atuyambe L, Shah M, Kumie A, Jack D. Food Security Outlook for Eastern Africa by 2050: Climate Change Impacts and Population-Driven Demand Gaps. *Current Environmental Health Reports*. 2026 Dec;13(1):8.

Collaborations with the Uganda Bureau of Statistics

The GEOHealth Hub – Uganda team attended two meetings hosted by the Uganda Bureau of Statistics (UBOS) to discuss the data and methodology for the Sustainable Development Goals (SDGs) indicator 3.9.1 on mortality attributed to household and ambient air pollution. During the first meeting in October 2025, the Hub was recognized as a member of the Health SDG Technical Working Group. The Uganda team attended a follow-up meeting in January 2026, where they



presented available data and metadata for Kampala to support indicator compilation, and UBOS shared complementary data on SDG indicators 7.1.2 and 11.6.2. The Uganda team was also tasked with nominating a focal person to the technical team, engaging WHO experts to agree on the most appropriate method for computing the indicator, and collaborating with the Health SDG Technical Working Group to expand the air quality monitoring network for improved national coverage and data accuracy.



Update on GEOHealth-sponsored graduate students

Training opportunities for Cycle II include those at the graduate degree level (both Master's and Doctoral) at each of the three partner institutions in Eastern Africa. Training progress of the current students is detailed below.

UGANDA

Andrew Mubiru (MPH student)

- Thesis title: Assessing the Impact of PM_{2.5} Air Pollution on the Burden of Respiratory Infections: A Case of COVID-19, Tuberculosis, and Severe Acute Respiratory Infections in Kampala City, Uganda
- Andrew successfully defended his research proposal in November 2025 and has received IRB approval letters and will commence data collection and abstraction in March

Stephen Kwajja (MPH student)

- Thesis title: The Influence of Seasonal Variation and Meteorological Factors on PM_{2.5} Concentrations and their Association with Upper Respiratory Infections (URIs) in Kampala, Uganda
- Stephen obtained IRB approval for his proposal in February. He is currently in the data abstraction phase of the study. So far, he has obtained under-five population data from the Uganda Bureau of Statistics (UBOS), URI surveillance data from the Ministry of Health (DHIS2), and PM_{2.5} air quality data from AirQo. He is awaiting meteorological data from the Ministry of Water and Environment to complete the dataset. In the meantime, he has begun preliminary data visualization and exploration of the datasets obtained so far in preparation for the final analysis.

KENYA

Noah Adera (PhD student)

- Dissertation title: Time Series Analysis of Ambient Air Quality and Cause-Specific Hospitalization and Mortality in Nairobi County
- Noah continued to work on data cleaning and analysis

Joshua Nyamondo (MPH student)

- Thesis title: Characterization, Seasonal Variation and Health Risk Assessment of Black Carbon in Nairobi City
- Joshua is continuing data collection by analyzing the BAM filter tapes

Beldine Okoth (MPH student)

- Thesis title: Source Apportionment and the Influence of Urban Heat Island and Meteorological Conditions on Ambient Air Quality in Nairobi City, Kenya
- Beldine is working on finishing her research proposal for submission soon

Odiver Dancan (MPH student)

- Thesis title: TBD
- Odiver completed his first year, first semester exams and will begin his second semester in April

Maurice Kawai (MPH student)

- Thesis title: Monitoring of Particulate Matter (PM_{2.5} and PM₁₀) in Selected Early Childhood Education Centers, Nairobi City County, Kenya
- Maurice continued to collect air quality data using installed monitors across selected Early Childhood Education centers in Nairobi City County

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Update on GEOHealth-sponsored graduate students

ETHIOPIA

Sisay Shine (PhD student)

- Dissertation title: Examining Maternal Exposure to Fine Particulate Matter (PM_{2.5}) and Pregnancy Outcomes in Rural Butajira, Ethiopia
- Sisay submitted all three of his manuscripts for publication to different international journals, and they are currently under review

Dawit Siraw (PhD student)

- Dissertation title: Occupational Heat Stress in the Sugar Estates, Exposure and Health Risks in Ethiopia
- Dawit completed heat stress data collection for both wet and dry seasons from all three sugar estates. The remaining questionnaire data collection at Metehara and Wonji estates will commence in March following refresher trainings provided to the data collectors

Gezehagn Gutema (MPH student)

- Thesis title: Prediction and Comparative Analysis of Heat Stress in Four Sugar Estates of Ethiopia Using Machine Learning
- Gezehagn defended his thesis in January 2026

Feedback

Please email the Program Coordinator, Haruka Morita, at hm2487@cumc.columbia.edu with questions. For more information on the GEOHealth Hub, please visit our website: <https://geohealth-hub.org/>