

Climate and health V&A support

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1 Introduction

Over the past several years, TNO has built a broad and strategic portfolio of activities at the intersection of climate, air quality and health in Kenya, closely aligned with the Government-to-Government (G2G) relationship between the Netherlands and Kenya. Through these activities, TNO contributes to strengthening evidence-based policy making in Kenya while simultaneously supporting knowledge transfer, innovation and valorisation of Dutch and European expertise in climate and health applications. Within the G2G framework, the Dutch Ministry of Health, Welfare and Sports (VWS) has contracted Amref Health Africa to support the Kenyan Ministry of Health (MoH) in coordinating the national Climate and Health Vulnerability and Adaptation Assessment (CHVA), including the appointment of a local consultant responsible for executing the assessment. Building on earlier Seed Money collaboration and supported through a follow-up grant, VWS engaged TNO to provide specialised quantitative expertise to MoH, Amref Health Africa and the local consultant, with a particular focus on heat stress, air pollution and data-driven risk assessment.

TNO's contribution to the CHVA funded by VWS was structured around five complementary technical workstreams:

1. the development of a quantitative framework for heat-related vulnerability and adaptation, demonstrated through a use case on heat-attributable preterm birth and stillbirth
2. identification of missing anthropogenic emission sources in Kenyan emission inventories, with recommendations for improvement
3. validation of air pollution exposure data using initial measurements from the Nairobi metropolitan area
4. quantitative analysis of climate-related health risks
5. continuous technical support to the local consultant to strengthen the methodological robustness of the CHVA

This report summarizes the results of these efforts, with full technical outputs provided in the accompanying deliverables.

In parallel, TNO has significantly expanded its engagement in Kenya beyond the CHVA. During the reporting period, TNO launched the SAMSA (Sustainable Atmospheric Monitoring Service for Africa) initiative at the Pan-African Conference on Environment, Climate Change and Health and formally endorsed a joint action agenda with African partners. TNO also contributed to and co-created sessions at international platforms such as SANKALP, KASH, and is working on a session for I4C26, where a Nairobi prototype on climate-responsive urban health solutions will be demonstrated. In addition, TNO secured a Wellcome Trust grant, submitted multiple joint funding proposals, and is working on strategic Memoranda of Understanding with Nairobi City County and NEMA.

Together, these activities reflect TNO's long-term commitment to building climate-and-health data infrastructure, strengthening local capacity, and translating European knowledge on air quality monitoring and climate analytics into practical, locally owned solutions in Kenya.

2 Results and deliverables

Heat stress for vulnerable groups

TNO conducted a case study estimating the burden of preterm birth and stillbirth attributable to heat stress during the final week of pregnancy as an example of how to make the CHVA input quantitative. The use-case showed a substantial geographical burden variation and showed that even small temperature changes can meaningfully shift the distribution of heat-related disease burden. It also underscored the clear need to integrate maternal health into heat-health planning. Further research into country specific exposure-response relationships is needed.

Emission sources

An initial comparison of four emission data sources was performed. Fossil fuel CO₂ emissions were relatively consistent across sources, however, biomass emissions showed large uncertainties. Discrepancies were found in the residential combustion and transport sectors, both of which are critical to improving urban air quality. Particulate matter (PM) emissions are insufficiently represented in some regional inventories, and improving these estimates, alongside better key sectors representation, are important key recommendations for future work.

Exposure measurements

A first analysis of the observational PM data was conducted. Data consistency was found to be low and will need to improve for more robust assessment. It is recommended that consistent metadata be provided alongside observational data, and that sensor collocation be used to evaluate data quality.

Quantitative analysis on CHVA

TNO organized a session on quantifying a CHVA on the Pan-African Conference on Environment, Climate Change and Health 2025. During the session, participants provided input on needs and gaps in quantifying CHVA. There was broad agreement on the need to have quantitative input data, while stressing that qualitative input remains valuable. Participants also agreed that the CHVA should be treated as a continuous process instead of a one-off assessment.

Input to local consultant

TNO supported Reinit Research, the local consultant chosen to deliver a CHVA for Kenya. A technical review of the methodology is provided by TNO, as well as discussions on how TNO can contribute valuable quantitative input data on air pollution and heat stress exposure. The potential use of the SAMSA initiative as input to the CHVA platform was also explored.

3 Conclusion and way forward

TNO has supported Amref Health Africa, the Kenyan MoH and its partners in advising on and quantifying the CHVA. Currently, TNO is working closely with the Kenyan MoH and its ecosystem on several initiatives to build up a digital infrastructure for climate and health data.

The results of this support clearly demonstrate that:

- › climate-related health risks such as heat stress and air pollution have significant and geographically differentiated impacts, including on vulnerable groups such as pregnant women;
- › critical data gaps exist in emission inventories, exposure measurements and exposure–response relationships;
- › an effective CHVA should be treated as a continuous, system-based process, embedded in national governance, digital infrastructure and local capacity, rather than as a one-off study.

Based on these insights, the Kenyan MoH and its partners have expressed continued interest in TNO's contribution to:

1. expanding quantitative CHVA analysis to additional vulnerable populations;
2. strengthening Kenyan emission inventories, particularly on air pollutants in concert with greenhouse gasses;
3. improving and validating air quality and exposure data together with Kenyan ecosystem;
4. supporting the transition towards a sustainable digital climate-and-health data infrastructure with SAMSA as a backbone for atmospheric modelling.

Funding request

To enable this next phase, TNO requests:

1. Project funding for 2026–2027 of €150,000 per year

This funding is required to maintain continuity after the current V&A phase and to deliver concrete, policy relevant outputs within the ongoing G2G Kenya–Netherlands programme (running until 2030). With lower funding, it is difficult for TNO to sustainably keep up the support at the required level and additional funding is required to carry out the above activities at the required depth and scale.

2. A shared perspective on progression to programatic funding after 2027

Beyond 2027, a more structural, programmatic approach will be essential to sustainably embed climate-and-health infrastructure under Kenyan leadership and scale to the region. We therefore request early alignment with VWS on a pathway towards programatic funding, including exploration of synergies with instruments such as the EU Global Gateway, and clarification of where VWS support and strategic endorsement can facilitate this transition.

This two-step approach—project funding in 2026–2027, followed by programatic financing—allows VWS to safeguard continuity, deliver near-term impact, and strategically strengthen Dutch contributions to climate and health within its Global Health Strategy and the broader G2G partnership with Kenya.

Energy & Materials Transition

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