



From climate data to public health action, a climate service for vector-borne diseases risk: lesson from Belgium and relevance for sub-Saharan Africa

Dr Hamid Y. Hassen

Flemish Institute for Technological Research (Belgium)

Climate strongly influences ecology, distribution, and transmission of vector-borne diseases (VBDs), including malaria, dengue, chikungunya, and Zika. Yet, translating climate information into actionable public health intelligence remains an operational challenge in many settings. To address this, VITO, the Belgian Climate Centre, and Sciensano co-developed a climate service for vector and VBD risk monitoring within the Copernicus Climate Change Service framework. The service provides daily, high-resolution (100 m) maps of temperature and relative humidity across Belgium using two complementary workflows: an AI-based model built on Copernicus ERA5 reanalysis and trained with urban climate simulations, and a regression-based workflow using historical and near real-time observations from automatic weather stations. This hybrid system ensures continuous coverage and overcomes the five-day latency of ERA5 data. A modular Python package supports automated data retrieval, processing, and operational integration. The service enables early warning and risk assessment by generating climate-driven indicators, such as mosquito activity thresholds, to support regional and federal health authorities in decision-making. Although developed for Belgium, the approach is highly transferable to sub-Saharan Africa, where VBD burden is high and climate sensitivity is pronounced. This work offers a practical blueprint for integrated climate–health services, highlighting co-development, hybrid data use, and operational sustainability as key elements for strengthening preparedness and resilience under climate change.

