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PRESS RELEASE

TANZANIAN SCIENTISTS LAUNCH EARLY WARNING SYSTEM FOR CLIMATE-DRIVEN MOSQUITO-BORNE DISEASES AND EMERGING THREATS

27th November 2025, Jambiani- Zanzibar

A consortium of Tanzanian researchers unveiled a ground-breaking Early Warning System (EWAS) designed to predict the risk of outbreaks of malaria and other mosquito-borne diseases (MBDs) driven by climate variability. It is confirmed that climatic variability, including rising temperatures, rainfall, and humidity, alters the transmission dynamics and risk of MBDs such as malaria and arboviral infections such as dengue fever and chikungunya. These shifting patterns in MBDs transmission patterns pose a serious threat to national disease control and elimination efforts. To address this risk, the Predicting Vector Borne Diseases (Pre-VBD) project funded by DANIDA (Denmark) directly tackled this threat by leveraging local scientific expertise to create a sustainable solution. The findings and the MBDs forecasting prototype were presented at a recent dissemination workshop held in Jambiani Zanzibar. The event was officiated by Dr. Salim Slim, Director of Preventive Services and Health Education at the Zanzibar Ministry of Health, on November 27th, and brought together key stakeholders from both mainland Tanzania and Zanzibar.

To develop MBDs forecasting tool, a study was conducted across multiple sites in Mainland Tanzania (Tanga) and Zanzibar (Unguja), which revealed an expanding risk of MBDs linked to changing climate patterns. The consortium has developed and is integrating the forecasting model directly into Tanzania National District Health Information System 2 (DHIS2). This integration enables health officials at the national and council/district levels to forecast the impending risk of MBDs for proactive and targeted epidemic preparedness and response.

The pre-VBD consortium unites local research expertise with close collaboration with Ministries of Health through the National Malaria Control Programme (NMCP) and the Zanzibar Malaria Elimination Programme (ZAMEP). “This partnership represents a strong multisectoral and multidisciplinary collaboration against persistent health threats posed by malaria and emerging arboviral diseases,” said Dr. Fatma Saleh, a Senior Lecturer at SUZA, Zanzibar. “By combining research excellence with the implementation capacity of our

national control programmes, we are ensuring that scientific evidence directly informs policy and practice, benefit communities, and strengthens the resilience of our health systems."

The PreVBD consortium pooled diverse expertise to analyse climatic, entomological, and epidemiological data to develop a forecasting tool. The data directly informs predictive models for forecasting disease outbreaks and provides critical, actionable insights to strengthen national health resilience against climate change threats.

To ensure long-term sustainability, the project is building national capacity through long-term training in modelling and genomics tools (PhD training) and offering tailored short courses in modelling and surveillance for scientists and public health professionals. This potentially allows the vector and disease risk forecasts alongside routine health data, enabling proactive interventions such as targeted vector control and community early warning systems ahead of outbreaks or epidemics.

"The fight against malaria and arboviruses like dengue demands innovation," said Anna David, acting program manager from the National Malaria Control Programme (NMCP). "Integrating a climate-based early warning system into our DHIS2 platform could be a game changer in address diseases affected by climate change. This platform allows us to move from a reactive to a proactive approach, strategically and effectively deploying the resources to protect the most vulnerable communities."

A Manager from the Zanzibar Malaria Elimination Programme (ZAMEP) Mr Shija J. Shija added, "For Zanzibar, where our goal is complete elimination of malaria as public health problem in Unguja and Pemba, therefore, understanding and predicting climate driven threats is crucial to ensure accelerated elimination and reduce risk of potential epidemics. We need this forecasting tools to prevent outbreaks and safeguard our many years of investment and malaria elimination gains achieved so far.

Dr. Vito Baraka, a Principal Research Scientist at NIMR, issued a call to action, "The climate-health crisis is escalating, threatening our communities and economy. This early warning system is our critical defense, shifting our strategy from reacting to outbreaks to preventing them. This proactive stance is essential to save lives, protect healthcare resources, and build a climate-resilient health system for Tanzania."Dr. Wilfred Senyoni, a Senior Lecturer from the CoICT, University of Dar es Salaam (UDSM), whose team led the predictive model development, stated, "Our role was to ensure academic excellence translates into solving a real societal problem. The successful integration of our forecasting algorithm into DHIS2 is a proof of concept. Our next step is to explore its usability and scale-up in a public health context, ensuring this tool has a tangible impact on the health of our nation." The ultimate goal of the Pre-VBD project is to create a scalable, sustainable model that enhances Tanzania's resilience to climate-sensitive health threats, safeguarding communities and supporting the nation's public health infrastructure against the escalating challenges of

climate change. As climate change alters the environment, mosquitoes are able to inhabit new areas, breed more frequently, and extend their transmission seasons, leading to a wider distribution of mosquito-borne diseases (MBDs). To effectively address this issue, accurate forecasting of mosquito population abundance, combined with a thorough understanding of mosquito ecology, behavior and the spread of invasive mosquito species, is crucial for developing targeted control strategies," according to Dr. Yahya Derua, an expert entomologist from NIMR. The next step is to explore its full usability and scale-up in public health context, ensuring this tool has a tangible impact on the health of our nation.

About the Pre-VBD Consortium:

The Pre-VBD project is a DANIDA-funded initiative that brought together Tanzania's leading research experts and implementation bodies: the National Institute for Medical Research (NIMR), the State University of Zanzibar (SUZA), the University of Dar es Salaam (UDSM), the Kilimanjaro Clinical Research Institute (KCRI), and the National Malaria Control Programme (NMCP), the Ministry of Health Zanzibar and the Zanzibar Malaria Elimination Programme (ZAMEP). International academic partners include University of Copenhagen and Technical University of Denmark (DTU), Denmark and University of Gothenburg, Sweden

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