



HEAT ADAPTION PROJECT IN TANZANIA (KISHADE)

The challenge

Climate change is an escalating threat to public health, the economy, and the environment. In Tanzania, where more than 70% of the workforce depends on outdoor farming, millions are becoming increasingly vulnerable to heat-related illnesses. Dehydration, fatigue, kidney damage, and cardiovascular stress are already impacting livelihoods with long-term effects. Many global heat-health models fail to consider the real-world conditions people face in their working environments. The ongoing research under the KISHADE (Kisiki Hai Sustainable Heat Adaptation Development) project aims to address this gap.

Our approach

Quantifying the impact of trees on health

KISHADE explores the potential of on-farm trees, regenerated through the indigenous Kisiki Hai approach (Farmer Managed Natural Regeneration FMNR), to alleviate heat stress and protect human health. As the most in-depth study of its kind in Tanzania and one of the first globally it integrates biometric data, microclimate analysis, and community-led research to advance nature-based strategies for adapting to extreme heat. The project builds on a strong foundation: over 23 million native trees restored, more than 260,000 households involved, and work across 638 villages in Central Tanzania.

Project name: KISHADE: trees in croplands to alleviate heat stress on farm workers

Project region: Africa, Tanzania

Financed by: Wellcome

Implemented by: MetaMeta

Duration: June 2023 – May 2028

Partners: Lead Foundation, University of Dar Es Salaam, The University of Dodoma, London School of Hygiene and Tropical Medicine

The goal

KISHADE aims to reduce heat-related health risks among smallholder farmers in low-income settings by evaluating the role of trees in shaping local microclimates and providing natural protection from heat exposure. Building on successful land restoration efforts in central Tanzania where local farmers are regenerating native trees the project seeks to generate evidence that informs scalable, nature-based solutions for climate resilience in agriculture. As KISHADE moves forward, it also strives to raise awareness, foster collaboration, and build momentum around one of the most urgent and underexplored health challenges of our time: heat stress in vulnerable farming communities.

Voices from the field

"Farmers report thermal comfort and reduced heat exhaustion under tree cover, affirming the perceived benefits of natural shade for outdoor work."

Workers at the farm

Key highlights

KISHADE is active in four districts of the Dodoma Region, using a quasi-experimental design to compare health and environmental outcomes across matched tree-covered and non-tree sites.



Biometric monitoring of farmers (markers of physiological heat strain, cardiovascular strain, dehydration and kidney injury)

Fine-scale microclimate mapping and monitoring of temperature, relative humidity, wind, etc. with drones, loggers, and sensors

Ethnographic fieldwork in eight Villages to capture lived experience and adaptation practices: using participant observation, in-depth interviews and focus group discussions

Remote sensing for landscape-scale analysis on vegetation and tree cover

Examples of our success

Within 2 years of the project, we achieved the following:



Successfully deployed environmental sensors on farms to continuously monitor microclimate conditions in real-world settings.



Collected high-resolution drone imagery across studied farms, enabling precise spatial analysis of land use and shade coverage.



Microclimate mapping for one farm is created and for the rest is underway, with detailed data being collected using sensors on farms enrolled in the intervention and those not enrolled.



Collection of physiological and environmental data is ongoing: participants are monitoring devices that collect continuous data and generating rare, real-time physiological and environmental data.

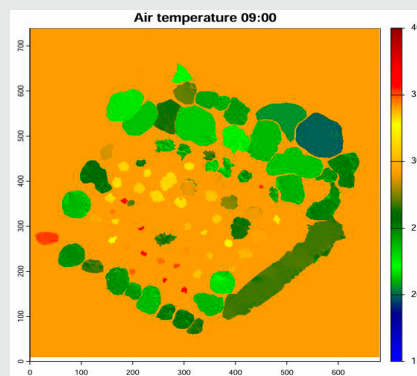


Access to drinking water remains a challenge, **reinforcing the need to integrate tree-based shade with other solutions.**



Community engagement is strong: local advisory boards and interviews with community members and leaders confirm high demand for practical, low-cost greening strategies like FMNR.

Impact story



Temperature map by microclim model at 9 a.m. of one of the studied farms to show how temperature is reduced near the trees. (source: MetaMeta)



Recorded climatological data on the field (source: MetaMeta)

In central Tanzania, rising temperatures are making it harder and more dangerous for farmers to work. Long hours under direct sun led to exhaustion, dehydration, and long-term health problems. The KISHADE project is working with communities to explore a simple but powerful idea: that growing and protecting trees in croplands can help reduce this heat and protect people's health. The project focuses on farms in four districts in the Dodoma Region.

Trees restored using the local Kisiki Hai method are bringing shade back to fields. Farmers working under tree covers have already said they feel less tired and more comfortable. Early data from sensors also supports this, showing lower heat strain for people working in shaded areas. Community support is strong, and local leaders are asking for more of these trees-based approaches. Now, with three years left in the project, KISHADE is starting to expand. More data is being collected, and larger-scale modeling is underway. The early signs are promising, and the team is working closely with farmers, researchers, and local institutions to build on this progress.

