

# TDR-IDRC RESEARCH INITIATIVE: POPULATION HEALTH VULNERABILITIES TO VECTOR-BORNE DISEASES: INCREASING RESILIENCE UNDER CLIMATE CHANGE CONDITIONS IN AFRICA

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## RATIONALE:

Lack of knowledge on the possible impacts of climate change on vector-borne diseases (VBD) in Africa remains a serious obstacle to evidence-based health policy change. Thus, the importance of research in the area of transmission dynamics and the disease burden of VBDs along with an understanding of the complex interaction of a plurality of factors within a socio-ecological system that is under pressure from climate change.

## OVERALL GOAL:

To generate evidence through research projects that will enable the development of innovative strategies to reduce VBD-related human vulnerability and to increase resilience of African populations to such VBD-related health threats. In addition, it will result in knowledge, research capacity, collaboration and policy advice products that can be used throughout Africa and other regions. Capacity will be built to ensure that researchers and communities will have the know-how to generate and use the evidence necessary to reduce population health vulnerabilities in a sustainable manner.

## RESEARCH PROJECTS

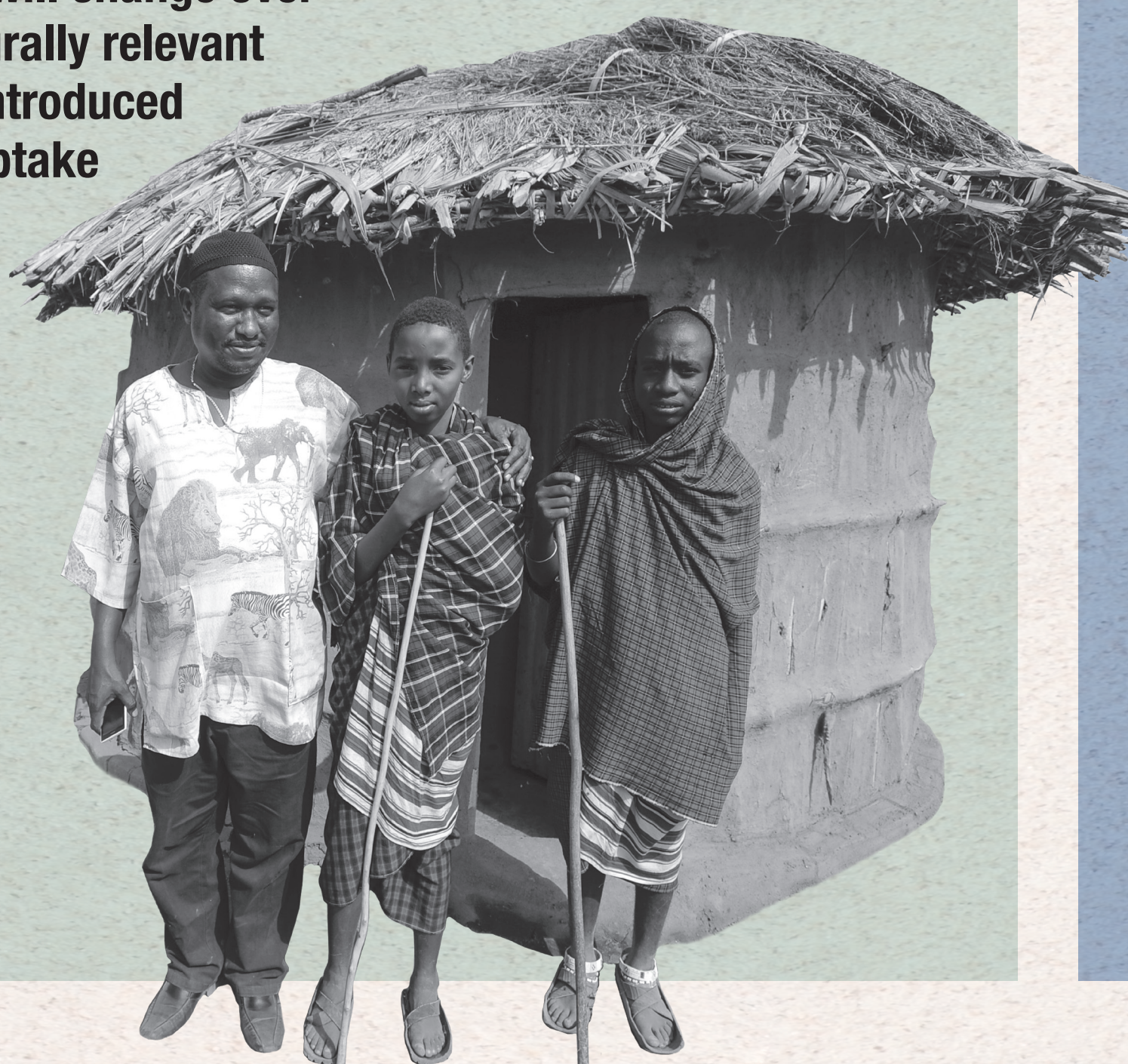
**Social, environmental and climate change impact of vector-borne diseases (malaria and schistosomiasis) in arid areas of Southern Africa (Botswana, Zimbabwe and South Africa)**



This project is assessing the impact of social and environmental determinants and climate change on malaria and schistosomiasis in Botswana, South Africa, and Zimbabwe. It is focusing on dryland ecologies and water systems (rivers, lakes, rain-fed systems, irrigation schemes) for developing adaptation strategies for reducing population health vulnerabilities to these diseases. The work uses a trans-disciplinary approach and community participation to address gender equity and knowledge for action. Policy-making stakeholders in the ministries of health and environment and custodians of country national adaptation plans are involved for policy formulation and uptake of findings.

**Predicting vulnerability and improving resilience of the Maasai communities to vector-borne infections (trypanosomiasis): an ecohealth approach in the Maasai Steppe ecosystem (Tanzania)**

Agricultural encroachment and changes in water availability are forcing the Maasai to change their traditional movement patterns. This leads, in some instances, to them becoming sedentary and more vulnerable to infection from diseases like trypanosomiasis and malaria. This research uses modeling to predict where the hotspots of infection currently occur and how they will change over time and place. Culturally relevant innovations will be introduced for adaptation and uptake by communities. The result should be new control measures and a cohort of East Africans trained in these trans-disciplinary approaches.



**Human African trypanosomiasis: alleviating the effects of climate change through understanding human-vector-parasite interactions (Tanzania, Zimbabwe)**

Marginalised people in remote areas are the focus of this research conducted by institutions from South Africa, Zimbabwe, and Tanzania, which looks at the impact of expanding agricultural development, climate change, and tsetse fly distribution. The researchers combine work in sociology, climatology, parasitology, entomology and data analysis and modeling to identify affordable, effective, and sustainable means to address the issues. A limited application of insecticide to cattle will be tested, as well as attitudes of rural communities to this and other methods of trypanosomiasis control. Local expertise will be developed in all topics studied.



**Early warning systems for improved human health and resilience to climate sensitive vector-borne diseases (malaria and Rift Valley fever) in Kenya**

In Kenya, changes in climate are likely to result in an increase in temperatures with a decline in precipitation. This, in turn, may lead to an increase in the prevalence of the climate sensitive vector-borne diseases (VBDs). The effect of this change on VBDs is considered greatest in the dryland areas where women and children are particularly more vulnerable. This study is looking at the role played by temperature, precipitation, humidity, and landscape cover in Kenya, and the potential effect of climate change on diseases such as malaria and Rift Valley Fever. It is expected to come up with early warning techniques for improving the management and control of climate sensitive vector-borne diseases in Kenya.



**Vulnerability and resilience to malaria and schistosomiasis in northern and southern fringes of the Sahelian belt in the context of climate change (Cote d'Ivoire and Mauritania)**

This project is assessing the impact of climate changes resulting from developmental projects such as the dams which were built to irrigate land in areas of drought on the river Bandaman in Korhogo (Northern Côte d'Ivoire) and on the river Senegal, near the city of Kaédi (Southern Mauritania). These dams increased agricultural production but have also led to an increased risk of vector-borne diseases such as malaria and schistosomiasis. The research is using a participatory approach that includes engagement of communities, local leaders, and decision makers in working with researchers to identify the socio-economic determinants and health effects of vulnerabilities to disease. This research project is expected to contribute to the development and/or improvement of a community participation approach, relevant tools and appropriate coping strategies to the aggravating effects of climate change on the transmission of malaria and schistosomiasis in the cities of Korhogo (in Côte d'Ivoire) and Kaédi (in Mauritania).

