

between diseases, climate change and variability. In addition, technical groups should be formed that assimilate research findings to inform policy formulation in climate change adaptation.

3. The policy space should be expanded by including major stakeholders and increasing capacities in evaluating the risks posed by climate change, proposing interventions and allocating resources for implementation.

#### Recommended Reading

Adam Corner, Panos Eastern Africa Communicating climate change in Uganda: Challenges and Opportunities 2011 [http://psych.cf.ac.uk/understandingrisk/docs/hidden\\_heat.pdf](http://psych.cf.ac.uk/understandingrisk/docs/hidden_heat.pdf)

Chen, H., Githeko, A. K., Zhou, G., Githure, J. I. & Yan, G. (2006) New records of *Anopheles arabiensis* breeding on the Mount Kenya highlands indicate indigenous malaria transmission. *Malaria Journal*, 5, 17.

Gonzalez-Moreno, O., Hernandez-Aguilar, R. A., Piel, A. K., Stewart, F. A., Gracenea, M. & Moore, J. (2013) Prevalence and climatic associated factors of *Cryptosporidium* sp. infections in savanna chimpanzees from Ugalla, Western Tanzania. *Parasitology research*, 1-7.

East African Community, EAC Climate Change Policy (EACCCP) April 2011

United Republic of Tanzania, Review of Current and Planned Adaptation Action: East Africa November 2011 <http://www.cakex.org/virtual-library/review-current-and-planned-adaptation-action-east-africa>

WeADAPT Climate changes in East Africa 30th March 2011 <http://weadapt.org/knowledge-base/national-adaptation-planning/climate-changes-in-east-africa>

<http://www.sei-international.org/weadapt>

WHO Climate change and human health RISKS AND RESPONSES 2003 <http://www.one.org/c/international/issue/954>

**About AfricaInteract** : AfricaInteract is a platform enabling research-to-policy dialogue for adaptation to climate change among a broad range of African stakeholders in sub-Saharan Africa. These include civil society, researchers, policy-makers, donors, and the private sector working on adaptation to climate change in the agriculture and health sectors as well as urban areas with water and gender as cross cutting issues. The overall objective of AfricaInteract is to develop a platform for the effective and efficient transfer of information to policy makers, with the ultimate aim of enhancing the resilience of vulnerable populations. AfricaInteract is funded by the International Development Research Centre (IDRC) and coordinated by the West and Central African Council for Agricultural Research and Development (CORAF/WECARD) under the auspices of the Forum for Agricultural Research in Africa (FARA). The regional focus of AfricaInteract is based on the Regional Economic Communities in the four sub regions of sub-Saharan Africa. Focal organizations coordinating regional activities are as follows: The Association for Strengthening Agricultural Research in East and Central Africa (ASARECA) – East Africa; Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN) – Southern Africa; Commission des Forets d’Afrique Centrale (COMIFAC) – Central Africa; and Energie-Environnement et Developpement (Enda) – West Africa.



# Enabling research-to-policy dialogue for adaptation to climate change in Africa

## Research and Policies for Climate Change Adaptation in the East Africa Health Sector

### Context and Importance of Climate Change in East Africa Health Sector

Most of the health conditions in the East Africa region are rooted in the environment and poverty, with climate variability and change playing a major role in increased risk of exposure and transmission of diseases (Yanda et al. 2005; Morse 1995).

Table 1 presents variations in the basic health indicators for three East African countries in the last demographic and health survey. The data shows that compared to the survey carried out 10 years ago; there has been an overall improvement in health in the region. There are also differences in the indicators among the countries. Climate change may affect

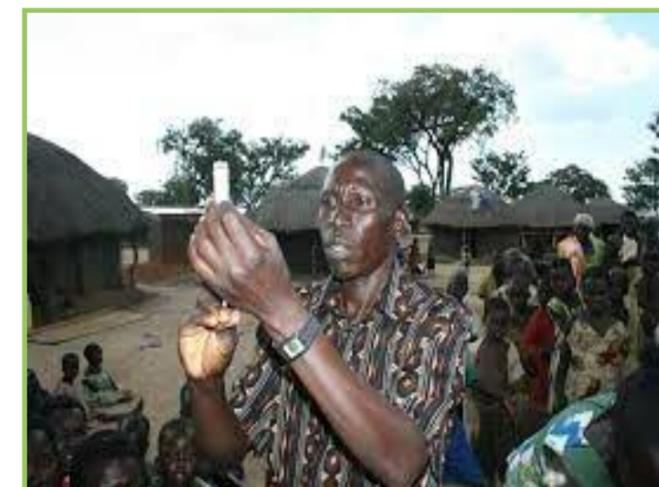


Table 1 Variations in key indicators within the region

Indicator	2009	2010	2010
	Kenya	Tanzania	Uganda
Crude birth rate"	34.8	38.1	45.2
Crude death rate"	Unknown	10.5	12.3
Inter-censal growth rate"	2.8		
Total fertility rate"	4.6	5.4	6.2
Infant mortality rate (per 1000 births)"	52.0	51	61.2
Life expectancy at birth	58.9	57	50.4



many health parameters while ongoing health interventions may modify current disease trends. Increasing temperatures are associated with increased altitudinal range of malaria and schistosomiasis, particularly in the highlands of East Africa. Malaria epidemics have occurred in the highlands of Kenya, Tanzania, Uganda, Rwanda, Burundi and Ethiopia. During one epidemic in Rwanda, the disease prevalence increased by more than 500 percent (Loevinsohn 1994).

Climate change may be responsible for new maize diseases such as the Maize Lethal Necrosis which spread from Kenya to Tanzania and Uganda in 2011. This disease destroyed 30-100 percent of the crop in Kenya. Excessive rainfall has been associated with poor drying of the harvested maize crop and its contamination with aflatoxins. According to the UN Food and Agriculture Organization (FAO), mycotoxins contaminate up to 25 percent of agricultural crops, and aflatoxicosis can be a lethal disease (Lewis et al. 2005). Scientists in the region are developing new maize strains that are disease resistant and that can adapt to climate change.

As countries strive to meet the Millennium Development Goals, health statistics in the region will change. There is an urgent need to formulate national policies to address adaptation to climate change and variability through evidence based research. An important issue is whether such research informs the formulation of climate change adaptation policies in the health sector in the East African region. The current situation in the region clearly justifies paying greater priority attention to the formulation of policies on climate change adaptation in the East Africa health sector.

### **Regional Policies related to Climate Change Adaptation in East Africa Health Sector**

Currently climate change adaptation in East Africa has been driven by the National Adaptation Programmes of Action (NAPA) and the disaster preparedness and management framework. The NAPAs are a requirement of the United Nations Framework Convention on Climate Change (UNFCCC) for the Least Developed Countries (LDCs) that could

benefit from adaptation funds. The East Africa Community, (EAC) policy statement pays special attention to the health sector. The policy also identifies climate change adaptation as a key and critical sector in health development programmes. The policy is in line with the new WHO climate change programme for Africa, which emphasises early warning systems and early response to disease outbreaks and epidemics.

On 20 November 2009 the Heads of State directed the East African Community to develop the Climate Change Policy (EACCCP), a regional climate change policy and strategy. The policy is consistent with the fundamental principles of the Treaty establishing the EAC and principles of international environmental law according to the EAC Protocol on Environment and Natural Resources, the Protocol on Sustainable Development of Lake Victoria Basin and the UNFCCC. The policy aims to implement priorities identified in the National Adaptation Plans of Action. In order to implement the regional policy, each EAC state is required to develop national policies and strategies.

The Kenyan government developed a National Climate Change Response Strategy (NCCRS) which was published in 2010 to guide formulation of the national climate change policy. Uganda had not developed a national climate change policy as of November 2012 (Musoke 2012). However, a Climate Change Unit has been approved by the Cabinet and it is expected to start work on the national climate change policy. Tanzania has focused on developing its NAPA. It has been recommended that Tanzania should be supported to develop a new National Climate Change Policy and Strategy or 'new' NAPA which includes the screening of current and future sector initiatives. While these three East African countries in collaboration with WHO have developed guidelines and policies for disease prevention and control, there is need to address the following new risks posed by climate change: epidemics and outbreaks; changes in disease seasonality and intensity of transmission; changes in geographic range of disease epidemiology; and emerging and re-emerging infections.

Climate change is a dynamic process that needs continuous monitoring and response. National health policies should therefore be designed to address the challenges of climate change adaptation. The adaptation policies must also include support for research and capacity building. The policies should also address the ability to anticipate health outcomes and to undertake preventative measures. Such an approach will be much more cost effective than any attempt to control disease epidemics.

### **Key research findings to be considered for informed decision making in Climate Change Adaptation in the East Africa Health Sector**

Two major cholera epidemics have occurred in East Africa, during 1983 and the 1997 events that were associated with El Niño events (Nkoko et al. 2011; Emch et al. 2008; Yanda et al. 2006). In Zambia a 1°C rise in temperature 6 weeks before the onset of the outbreak explained 5.2 percent of the increase in the number of cholera cases from 2003 to 2006. In addition, a 50mm increase in rainfall 3 weeks before explained an increase of 2.5 percent (Luque Fernández et al. 2009). In Kenya stable malaria transmission started in the early 1990s when the mean annual temperature in the central Kenyan highlands permanently rose above 18°C, the threshold temperature for malaria transmission (Githeko 2009). Furthermore, the malaria vector *Anopheles arabiensis* had established itself in the high altitude area (Chen et al. 2006).

Cryptosporidiosis infection in East Africa is commonly found in people who are HIV positive. *Cryptosporidium* species were found in 8.9 percent of chimpanzees in Tanzania and prevalence of the parasites was 3 times greater during the rainy season compared to in the dry season. Furthermore, the prevalence of the parasites declined at temperatures above 28°C (Gonzalez-Moreno et al. 2013). In Kenya it was confirmed that the peak of the *Cryptosporidium* species in surface water occurred at the end of the rainy season coinciding with infections in human populations.

Chikungunya is another viral disease transmitted by *Ae. aegypti* and *Ae. albopictus* (Lahariya and Pradhan 2006). The disease has been largely absent in East Africa since its discovery in Tanzania in 1952 (Pialoux et al. 2007). However, there have been large chikungunya epidemics in the Indian Ocean Islands of the East African coast (Murithi et al. 2011) and coastal Kenya. Investigation in coastal Kenya indicated that the outbreak was associated with drought (Chretien et al. 2007).

Rift Valley fever is mainly a zoonotic disease affecting livestock but it is also infectious to humans. The disease causes hemorrhagic fevers in humans and can cause fatalities. The major routes of infections are through bites by infected mosquitoes and by direct contact with fluids from infected animals (Hoch et al. 1985). The warming of the western Indian Ocean, a phenomenon known as the Indian Ocean Dipole Oscillation, during El Niño events can increase rainfall and lead to extensive flooding (Anyamba et al. 2002). According to IPCC assessment (Christensen et al. 2007) rainfall is likely to increase in the Horn of Africa and this will increase the frequency and intensity of Rift Valley fever epidemics (Martin et al. 2008).

### **Policy Options for consideration in the Health Sector of the East Africa Region**

Policy options which should be considered for climate change adaptation in the health sector of the East Africa region include the following :

1. Integration of the biology of transmission and mathematical models should be developed to accumulate a reliable corpus of information and knowledge to describe the relationships between disease epidemiology, climate change and variability. Such relationships will be used in determining future trends in the risk of disease transmission and thus the actions that need to be taken to prevent the potential impacts of diseases.
2. Local capacity should be strengthened in all the relevant fields in the health sector to handle issues of climate change and human health. Skills should be acquired in health sciences, statistics and meteorology to enhance understanding of the relationship