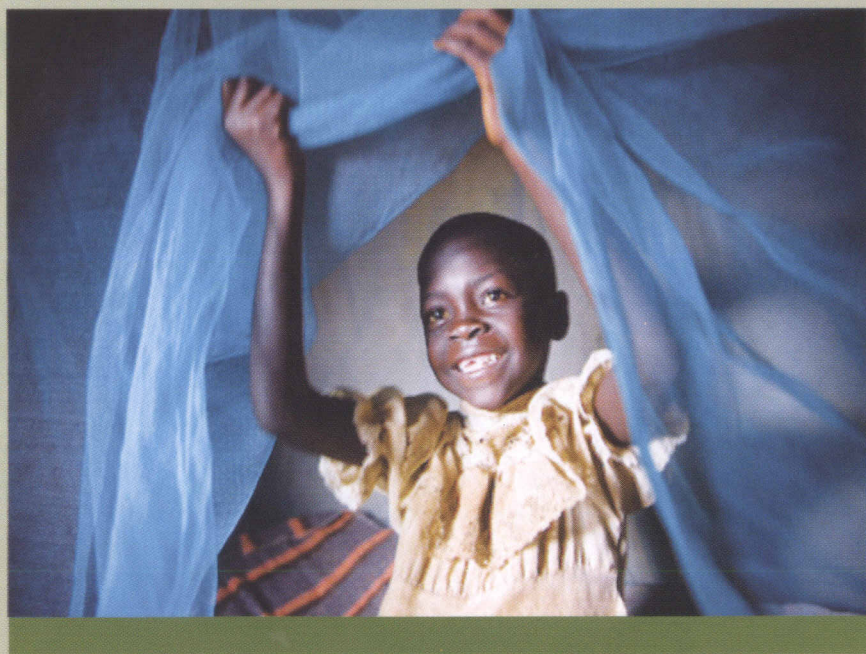




## HUMAN HEALTH AND CLIMATE CHANGE



Mainstreaming Environment and Climate change  
Adaptation in the Implementation of National  
Development Policies and Plans

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## 1 Background

The long-term good health of a population depends on the continued stability and functioning of the ecological and physical systems. Climate change, therefore, is a significant and emerging threat to public health. Effects of climate change on human health are largely based on impacts of climatic events on the physical environment. Climate change (CC) has a number of immediate and long-term impacts on the fundamental determinants of human health.

Climate Change-related impacts on the ecosystems, for example, are likely to affect population by creating favourable conditions for disease vectors or disease pathogens as well as placing the communities at high risk of malnutrition, diarrhoeal diseases and other environmental health effects attributable to Climate Change (Ebi *et al.*, 2007). Changes in the occurrence and spread of infectious diseases are some of the most widely documented potential effects of Climate Change, which have significant consequences for human health as well as economic and societal impacts (Chan *et al.*, 1999).

*Climate Change: Is a change in the state of the climate that can be identified (i.e. through statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period typically decades or longer.*

In Tanzania the impact of climatic change on health is evident in many parts of the country. Currently malaria which was not common in many places is now wide spread inmate, Arusha, Mbeya, Njombe, Makete, Mbinga etc because of the changes in humidity and temperature which favours Mosquito breeding and the development of parasite causing malaria to complete the cycle of man-mosquito-man (Yanda *et al.* 2006)

Other diseases related to climatic change are like Rift Valley Fever, Bilharzia, Plague, Yellow fever, Dengue haemorrhagic fever, Filariasis and Water-borne diseases. Physical displacement of people due to Climate Change related calamities have also impacts on human health.

## 2 Impacts of Climate Change on Human Health

The magnitude and nature of climate change impacts on human health vary by region, by relative vulnerability of population groups, by the extent and duration of exposure to climate change itself and by society's ability to adapt to or cope with the change (IPCC, 2007). For the case of Tanzania the most vulnerable groups are the children, pregnant mothers and older people. There are also evidences that poor people with low adaptive capacity suffer more from health risks associated with climate change.

Specific climate change impacts on health sector in Tanzania include:

## 2.1 Increase in Vector Borne Diseases

Vector-borne diseases are the most important climate-sensitive diseases reported in Tanzania. These diseases include:

### **Malaria**

Malaria is by far the most important vector-borne disease causing high morbidity and mortality in Tanzania. Malaria is estimated to cause nearly 60,000 to 80,000 deaths annually of which the majority are children. Until recently, malaria has been a common disease in low altitude rural areas of Tanzania. However, due to changes in environmental, and vector related factors, the disease is now common in previously malaria-free highland areas (Mboera, 2004). Studies conducted in Mbeya Region (Kangalawe, 2009) and in Muleba district (Kaatano *et al.*, 2009) have demonstrated a clear association between temperature trends and malaria incidences.

In Tanzania mainland, more than 40% of all outpatient attendees are attributable to malaria, resulting in approximately 12-16 million clinical malaria cases. There is likelihood that number of deaths will increase unless effective adaptation measures are put in place as more people are likely to be affected by malaria as a result of Climate Change.

### **Rift Valley Fever**

Rift Valley Fever (RVF) is a climate-related infection and all outbreaks in East Africa have been reported to occur following periods of abnormal drought, followed by abnormal heavy rains and the consequent emergence of large numbers of mosquitoes (*Aedes* and *Culex*) (Hightower *et al.*, 2012]. For instance, in January 2007, an outbreak of RVF was detected among humans starting from northern Tanzania districts, but later spreading southwards and westwards to affect other parts of the country which were previously not prone to RVF. A total of 511 suspect RVF cases were reported in 10 of the 21 regions of Tanzania; of the suspect, 306 were confirmed cases and 134 died (MoHSW, 2007)

### **Bilharzia (Schistosomiasis)**

Bilharzia is the second most prevalent tropical parasitic disease, and is a leading cause of morbidity in endemic areas. Studies have established that ambient temperature is an important determining factor for survival of snails and Bilharzia causing parasites (Iijima & Sugiura, 1962). With Climate change, highland areas with unfavourable conditions to support the host snails are expected to favour their survival in the future due to an increase in temperature.

### **Filariasis**

Occurrence of the disease is influenced by topography, climate, social conditions, and degree of exposure to infective mosquitoes. The incidence is highest in coastal and flat areas in tropical latitudes but low in mountainous areas. Advanced levels of

filial disease are generally found only in areas with very high densities of the vector mosquitoes where the inhabitants have had long exposure to repeated infections. Thus, potential increase in temperature resulting from Climate Change is likely to cause spreading of such mosquitoes in areas which were previously not prone to the disease.

Other vector borne diseases associated with climate change include Plague, Yellow fever Dengue Haemorrhagic Fever and Sleeping Sickness (Human African Trypanosomiasis-HAT).

### **Water-borne diseases**

The combination of higher temperature, prolonged droughts and floods coupled with scarce water resources and poor sanitation make Tanzania vulnerable to outbreaks of cholera and other waterborne diarrhoeal diseases. Warmer surface temperature increases the abundance of phytoplankton, which supports a large population of zooplankton, which serves as a reservoir for cholera bacteria. For a number of years, heavy rainfall in Dar es Salaam has been followed by cholera outbreaks, especially in areas of relatively high water table (Mayala *et al.*, 2003). In recent decades Tanzania experienced rising cholera outbreaks which spread in regions including the city of Dar Es Salaam (MoHSW, 2009). As many as 69,855 cholera cases have been reported in a period less than 10 years (i.e. between 1998 and 2006) leading to loss of 2,045 lives.

## **2.2 Other Climate Change Health-Related Impacts**

Climate change can adversely impact the availability of water supply, the efficiency of local sewerage systems and destruction of crops resulting in food shortages, poor nutrition, and malnutrition (food security). In areas where there is food insecurity there is likelihood of increased illness and death of vulnerable groups including women and children (Shongwe, 2009). Populations in water-scarce regions are currently facing decreased water availability, with implications for the consumption of safe food and drinking water. Population displacement associated with natural hazards like the floods that happened in Dar es Salaam compromises health and threatens lives.

## **2.3 Ongoing Climate Change Initiatives in Health Sector**

The country has taken various initiatives to reduce the effects of climate change on public health. Some of these efforts include implementation of health programmes such as Health Sector Development Programme, Health Sector Programme Support, Establishing the Community Health Fund and Malaria Control Programme. Other ongoing initiatives include;

### **2.4 Malaria control;**

- Vector control through the use of Insecticides Treated Nets (ITNs) has been undertaken to all households in Tanzania including free distribution of Insecticides Treated Nets to risk groups with malaria (pregnant women and Underfives);

- Indoor Residual Spraying (IRS), has also been initiated in the Lake zone and in other Malaria epidemic areas;
- Improved malaria case management, early detection and prompt treatment ;
- Prevention and control of malaria in pregnancy with Intermittent Preventive Treatment in pregnancy (IPTp);
- Epidemic preparedness, prevention and control;
- Larviciding (use of bacteria to control mosquito larvae)
- Using malaria vaccines

*Adaptation refers to the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities*

## 2.5 Other non policy measures

- Promotion of hygiene of households such as boiling water and the program for Households Water Treatment, cleaning surroundings;
- Putting in place the national sanitation campaign program;
- The integrated Tropical Diseases control program, diseases in this group included those of resurgence due to climatic change, Trachoma, Oncoerciasis, Schistosomiasis, Soil Transmitted Helmenths (STH)
- Integrated Diseases Surveillance Response System (IDRS) to prevent, mitigate and respond to any epidemic;
- Infectious Disease Week Ending (IDWE) Reporting mechanism at all hierarchy of the health sector
- Integrated immunization control program in schools to control Soil Transmitted Helmenths and schistosomiasis as well as supply of vitamin A.



*Fig 1. Use of Insecticide Treated Nets, Indoor Residual Spraying and use of anti malaria drugs are some of the adaptation measures*

## 2.6 Policy Measures

On the other hand, there has been some policy intervention to address climate change impacts. These policy interventions include

- Enhanced public health sector capacity, including training of more human resources and improving physical infrastructure;
- Improvement of local capacity to prepare and cope with disasters;

- Enhancing management of water sources to improve sanitation and hygiene;
- Ensuring health equity especially to vulnerable communities;
- Establishment of Emergency Preparedness and Response Unit (EPRU) that coordinates and manages all health related hazards which include epidemics, accidents, drought and floods in the mainland and border posts.

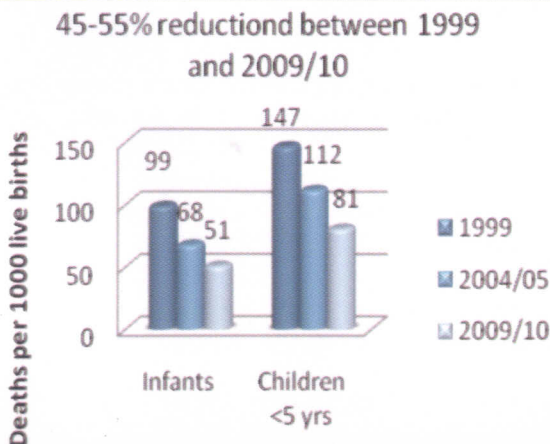
*Climate change has serious implication with regard to human health. Already there are evidences that Tanzania is facing health risks associated with climate change. Adaptation to climate change is a cost-effective option for reducing the climate related diseases, reducing potential impacts significantly at relatively low cost. It is important that climate change adaptation measures are mainstreamed into the existing health sector plans and strategies to enhance resilience capacity at all levels.*

### 2.7 Benefits of Investing in Adaptation Measures

It is estimated that the potential costs to address the increased disease burden in Tanzania due to climate change, could be \$20-100 million /year by 2030, rising to \$25-160 million/year by 2050 as a result of climate change (URT, 2011). Other studies have also estimated total public expenditure on malaria treatment in Tanzania to be around \$25 million in recent years, and in some years in the order of \$100 million (WHO, 2009), .

Adaptation is cost-effective for reducing the threat of malaria and other climate related diseases; reducing potential impacts significantly at relatively low cost.

As result of some interventions there has been a significant reduction in malaria cases in Tanzania. It has been reported that under the Malaria Control Programme, during the period 1999 and 2010, there has been a reduction of between 45- 50 percent of all-cause mortality resulting from malaria in mainland Tanzania (Mandike, 2011).



*Fig. 2. Reduction in malaria all-causes mortality in Tanzania mainland 1999 -2010 on infants and children under five years (Source: Mandike, 2011)*

On the other hand, Indoor Residual Spraying which started in 2009 and early 2010 in Kagera Region has resulted in a 56% reduction in hospital admissions, and a 75% reduction in deaths (President's Malaria Initiative, 2011). Other benefits resulting from investing in climate change adaptation include; reduced cost of treatment, increased productivity as a result of having healthy labour force that can engage in productive undertakings, reduced maternal and child mortality and hence improved life expectancy.

## **2.8 Policy Recommendations**

There are considerable efforts that have been made to address health risks associated with climate change. Impacts of climate change will continue for prolonged time and hence a need for adaptive capacity at both national and community levels. To achieve these objectives the following are recommended:-

- Strengthening of monitoring, surveillance and Early Warning Systems for detection of disease outbreaks;
- Continue with preventative malaria treatment for pregnant women in endemic, low endemic and epidemic areas;
- Scaling up of Indoor Residual Spraying (IRS), e.g. in highland areas, to control malaria in low endemic areas and to prevent epidemics;
- Continue with efforts to distribute bed nets for the additional population at risk and raise awareness on importance of using ITNs;
- Strengthening of inter-sectoral cooperation and collaboration to address issues which are cross-cutting like, control of zoonotic (transmitted to humans from animals) diseases, food security and disaster management;
- Continue investing in health research to develop novel interventions to address health risks associated with climate change;
- Enhance awareness to the general public on health risks associated with climate change; and
- Strengthening of Primary Health Care (PHC) system, for each village to have a dispensary;

## **2.9 Further Reading**

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