



THE UNITED REPUBLIC OF TANZANIA
VICE PRESIDENT'S OFFICE



GUIDELINES FOR INTEGRATING CLIMATE CHANGE ADAPTATION INTO NATIONAL SECTORAL POLICIES, PLANS AND PROGRAMMES OF TANZANIA

DIVISION OF ENVIRONMENT SEPTEMBER, 2012

Human-wildlife conflicts are a common occurrence in wildlife areas, especially in years with drought. The main reason for these conflicts was reported to be crop raiding while wild animals roam around in search for pastures and water. The animals commonly involved in these conflicts are hippopotamus, elephants and buffaloes. This may be aggravated with changing climate.

In spite of the numerous benefits and their contribution to socio-economic development, wetlands are facing increasing challenges of climate change, particularly frequent droughts. Furthermore, with increasing evapo-transpiration because of increased temperature, wetland water characteristics will change with catastrophic consequences for the biodiversity within (for example increased pH levels in Lake Natron is affecting the breeding sites of flamingos). The change in pH is associated with increased temperature and changed rainfall regime in the Lake Natron catchment areas. It is most likely that there will be increased encroachment on wetlands due increased drought and desertification as result of climate change.

3.1.8 Human Health

The tropical African climate is favourable to most major vector-borne diseases, including malaria, schistosomiasis, onchocerciasis, trypanosomiasis, filariasis, leishmaniasis, plague, Rift Valley fever, yellow fever and tick-borne haemorrhagic fevers. The continent has a high diversity of vector-species complexes that have the potential to redistribute themselves to new climate-driven habitats leading to new disease patterns.

These organisms have different sensitivities to temperature and precipitation.

Vectors, pathogens and hosts reproduce within certain optimal climate conditions and changes in these conditions can modify greatly properties of disease transmission. The most influential climatic factors for vector borne diseases include temperature and precipitation. Extreme temperatures are often lethal to the survival of disease causing pathogens but incremental changes in temperature may exert varying effects. Where a vector lives in an environment where mean temperatures approach the limit of physiological tolerance for the pathogen, a small increase in temperature may be lethal to the pathogen. Alternatively, where a vector lives in an environment of low mean temperature, a small increase in temperature may result in increased development, incubation and replication of the pathogen.

Variability in precipitation may have direct consequences in infectious disease outbreaks. Increased precipitation may increase the presence of disease vectors by expanding the size of existent larval habitat and creating new breeding grounds. In addition, increased precipitation may support growth in food supplies, which in turn support a greater population of vertebrate reservoirs. Alternatively, flooding may force insect or rodent vectors into houses and increase the likelihood of vector-human contact. From a different dimension, heavy rains can contaminate water systems by transporting human and animal faecal products and other wastes in the surface and ground water which are associated with diarrhoeal disease outbreaks.

IPCC (2001) indicates that many vector, food and water-borne diseases are sensitive to changes in climatic conditions. Results of predictive models have shown that under climate change scenarios, there would be a net increase in the geographical range of potential transmission of malaria and dengue fever (Tonnang et al., 2010). IPCC states further that while climate change is unequivocal the impacts will fall disproportionately upon developing countries and the poor persons within all countries, thereby exacerbating inequities in health status and access to adequate food, clean water and other resources. Climate change is likely to also seriously undermine the health-related Millennium Development Goals to reduce child mortality, improve maternal health and combat HIV/AIDS, malaria and other diseases.

In Tanzania there are already reported incidences of epidemic malaria especially in highland areas that were traditionally free from mosquitoes and malaria (Yanda et al., 2006; URT, 2009; Wandiga et al., 2010). Malaria has been common in high temperature and humid lowland areas especially during and after rainy seasons but with changes in temperature and rainfall regimes, the disease has been observed in non-traditional malaria areas such as highland areas of Tanga, Kilimanjaro, Iringa, Kagera and Mbeya, among others, where it was not prevalent before (where the disease is currently limited by temperature). The epidemics in these areas are mostly linked with El Niño events. This is a significantly dramatic increase in malaria spread in a place it was not such prevalent. Whilst indicative, it is estimated that the potential costs to address the increased disease burden in Tanzania could be \$20-100 million /year by 2030, rising to \$25-160 million/year by 2050 – the range reflecting different climate and

development assumptions (Global Climate Adaptation Partnership and Partners, 2011).

Studies undertaken in the Lake Victoria basin indicate that incidences of other diseases such as cholera have increased as a result of climate change (Yanda et al., 2006; Wandiga et al., 2010). Other experiences (Figure 4) show that prevalence of cholera, has over the past few decades coincided with El Nino events, which are associated with unusually high temperatures. The first cholera outbreak were reported in 1974 and since 1977, cases were reported each year with a case fatality rate (CFR) averaging 10.5% between 1977 and 1992 (WHO, 2008). Prevalence elevates in rainy seasons and becomes even higher during floods (URT, 2006).

Humidity has also been blamed for increased risk of upper and lower respiratory infections in many parts of the country. In dry areas of the country, prolonged dry spells have caused increased outbreaks of respiratory diseases and eye infections. Incidences of food-borne and water-borne diseases such as dysentery, diarrhoea, cholera and typhoid fever are also on the increase due to extreme weather events which affect water quality and make it difficult for people to practice proper personal hygiene.

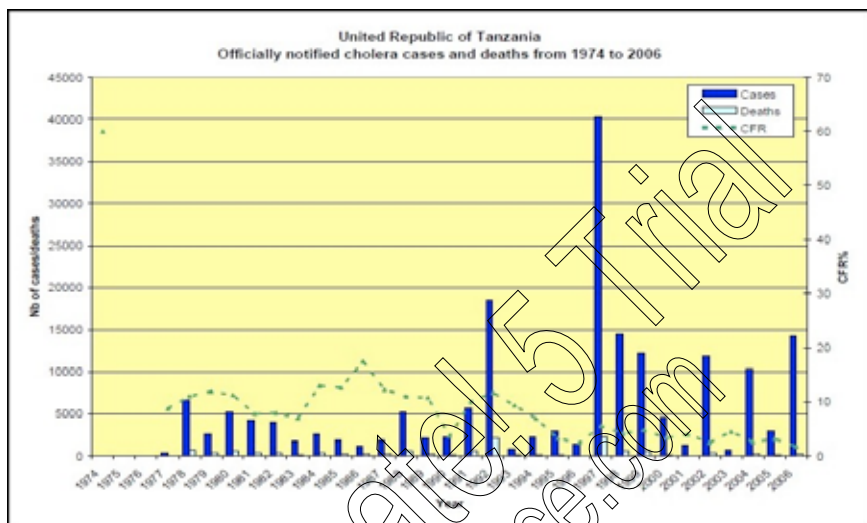


Figure 4: Officially notified cholera cases and deaths in the United Republic of Tanzania from 1974 to 2006. Source: WHO (2008)

There are also a wider set of indirect impacts from climate change on health, which are linked to other sectors such as food security and malnutrition through reduced agricultural productivity as a result of changes in soil quality, increased crop and livestock pests and diseases, prolonged drought and water scarcity. Reduced agricultural productivity associated with climate change/variability exposes communities to other health risk factors such as HIV/AIDS. Generally, increased disease incidences due to climate change reduce labour productivity in various development undertakings. Climate change is likely to also increase occupational health risks particularly associated with increasing temperatures at work places.

3.1.9 Infrastructure

Increased rainfall due to climate change may cause flood damage to infrastructures such as transport, communications and buildings. In December 2009 and January 2010, unusually heavy rainfall associated with El Niño event saw widespread flooding in Morogoro (Kilosa) and Dodoma (Mpwapwa and Kongwa) Regions which led to severe damage on road, bridges, water dams, railway, electricity poles, drainage networks, water supply, and human settlements. In April 2011 also in Morogoro (Kilombero) region heavy rains caused flood which destroyed six bridges, several roads and several human settlements. In all these cases the costs of addressing the flood situation were enormous.

Sea level rise, coastal inundation can force modification to port facilities with high cost to the government. For example, the Tanzania's Initial National Communication to UNFCCC (URT, 2003) reported that for the Dar es Salaam coastline the estimated loss of important structures is estimated to cost TShs 49.83 billion for a sea level rise of 0.5m and TShs 85.97 billion for a sea level rise of 1.0m. Similar costs are likely to be incurred by other coastal cities of Tanzania. Despite aesthetic value and other unique natural resources which have attracted populations, coastal areas are most vulnerable to climate change due to the anticipated rise in sea level, floods and other consequences. Unfortunately, the impact of sea level rise is already being experienced in Coast Region. In Bagamoyo District, for instance, sea level rise has already resulted into inundation of some traditional water sources (URT, 2007). This indicates how the country will be forced to transfer

a significant amount of annual expenditures to offset the effects of climate change on various infrastructures. The overall impact could be economic loss and growth volatility, reduced reliability of and hydroelectric power.

3.1.10 Human settlements

Cities and other human settlements are at the forefront of climate change. Simultaneously, due to their concentration of population and infrastructure, cities are especially vulnerable to the impacts of climate change. In Tanzania, the majority of the settlements in urban and semi urban areas are not planned. In Dar es Salaam City, for instance, the unplanned and unserviced settlements accommodate about 70-75% of the city's population while the planned settlements occupy an area of 25-30% (URT, 2002; UN-HABITAT 2009:11; URT, 2011). Similar situations exist in other urban areas in the country. In addition, these urban areas are exposed to a wide range of threats related to climate change including sea-level rise and coastal erosion, flooding, drought and water scarcity, and the disruption of hydro-electricity generation. These are exacerbated by poor socio-economic and environmental conditions caused by low levels of economic growth, mismanagement of the process of urbanization, and inadequate social services.

Given the level of economy of the country, the poor are the ones residing in most of these unplanned, hazardous areas. Most of the houses are built without proper arrangement, which make it even difficult to do informal settlement upgrading; this enhances residents' vulnerability to disease, environmental degradation and poor sanitation facilities.

