

## TANZANIA CLIMATE CHANGE FACTSHEET



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### BACKGROUND and DEFINITIONS

NIDOS members requested information sheets on the impact of climate change on a number of countries where NIDOS members work. This factsheet is one of these and, as with the others, covers the key climate impacts in the country, what the government there is trying to do in terms of climate adaptation measures and what other agencies including NGOs and NIDOS members are also doing. The following outlines briefly the current international approach to supporting Southern governments with Climate Adaptation programmes and the international context for climate change campaigns.



**The United Nations Framework Convention on Climate Change (UNFCCC)**, which came into force in 1994, established the first intergovernmental framework aiming to tackle climate change. This treaty ensures that member states work collaboratively in order to develop initiatives that not only reduce negative impacts associated with climate change, but also build capacity to cope with effects of increasing temperatures. The *Kyoto Protocol*, enforced in 2005, enshrined this commitment in legislation and presented legally binding targets which imposed requirements for ratified member states to reduce green house gas (GHG) emissions. The commitment period for the Kyoto Protocol ends in 2012. <http://unfccc.int/2860.php>

**National Adaptation Programmes of Action (NAPA)** <http://www.napa-pana.org>

In order to help developing nations plan for tackling the effects of climate change, the UN established NAPAs. NAPAs build the capacity of developing nations to identify priority actions required for effective adaptation to climate change. The aim of NAPAs is to decrease developing nation's climate change adaptation costs and climate change vulnerability more generally.

#### **Next steps – Copenhagen**

At a UN Conference of Parties in Bali 2007, ratified member states made the crucial decision to begin new negotiations aiming to establish tougher targets on reducing GHG emissions and ensure that ratified member states fulfil obligations. Negotiations were reviewed in Poznan, Poland, in 2008 and will conclude in **Copenhagen, Denmark, on December 7<sup>th</sup> – 18<sup>th</sup> 2009** and should strengthen global ambitions and commitments to cut GHG emissions and also include mechanisms enabling developing countries to have low carbon development that does not undermine efforts to tackle poverty. Many NGOs are currently campaigning to ensure that Government commitments represent more than just fine words, but instead represent firm action.

## CLIMATE CHANGE IN TANZANIA

EXTRACT FROM:

### **NATIONAL ADAPTATION PROGRAMME OF ACTION (NAPA) FOR TANZANIA**

[www.napa-pana.org/private/modules/knowledgebox/io/file.php?entry=681&field=22](http://www.napa-pana.org/private/modules/knowledgebox/io/file.php?entry=681&field=22)

#### **2.4 Vulnerability and sectoral analysis**

Tanzania is considered one of the poorest countries due to its inherent vulnerability to disasters and external economic trade developments for which it has no control. The disasters include periods of drought and floods (See [http://www.tyndall.ac.uk/publications/working\\_papers/wp63.pdf](http://www.tyndall.ac.uk/publications/working_papers/wp63.pdf)) in some parts of the country (tropical hazards; vulnerable to flooding on the central plateau during the rainy season) and sudden outbreaks of diseases.

##### **2.4.1. Agriculture**

Tanzania has about 88.6 million hectares of land suitable for agricultural production, including 60 million hectares of rangelands suitable for livestock grazing. Based on altitude, precipitation pattern, dependable growing seasons and average water holding capacity of the soils and physiographic features, Tanzania has 7 agro-ecological zones.

Studies undertaken during INC (Initial National Communication) indicate that increase in temperature by 2 °C -4 °C would alter the distribution of the agro ecological zones. Consequently, areas that used to grow perennial crops would be suitable for annual crops. In addition, global warming would tend to accelerate plant growth and hence reduce the length of growing seasons.

Among the vulnerability in the agricultural sector include decreased crop production of different crops exacerbated by climatic variability and unpredictability of seasonality, erosion of natural resource base and environmental degradation. The following list shows the percentage of decrease of two selected crops; maize and coffee:-

**Maize:** with increase in temperature and reduced rainfall as well as change in rainfall patterns, average yield will decrease by 33% country wide. Furthermore, yield of the same crop will decrease by up to 84% in the central regions, 22% in Northeastern highlands, 17% in the Lake Victoria region, and 10 – 15% in the Southern highland;

**Coffee and Cotton:** As a result of temperature increase of 2-4 °C, coffee production is projected to increase by 18% in bimodal rainfall areas and 16% in unimodal rainfall areas. Furthermore, climate change is expected to further shrink the rangelands which are important for livestock keeping communities. Currently, it is estimated that about 60% of the total rangeland is infested by tsetse fly making it unsuitable for livestock pastures and human settlements. Shrinkage of rangelands is likely to exacerbate conflicts between farmers and agriculturalists in many areas. Surveys show that existing number of cattle in Tanzania has already surpassed the normal carrying capacity in most of the areas. As a result, most livestock keepers are shifting their herd towards southern Tanzania in search for pastures.

##### **2.4.2. Water**

Tanzania is endowed with many river basins which are economically important. Among these, the major ones are Rufiji, Pangani, Ruvu, Great Ruaha, Malagarasi, Kagera, Mara, Ruvuma, and Ugalla River Basins. Apart from being economically significant, these river basins also form an important part in sustaining the daily livelihood of the local communities through fishing and traditional farming irrigation systems.

The INC shows that rainfall pattern and soil moisture will vary due to changes in mean temperature hence affecting the runoff of these rivers. For instance the increase in temperature between 1.8 °C - to 3.6 °C in the catchments areas of River Pangani in the North and North East of the country, hence

decrease in rainfall, will lead to a decrease of 6-9% of the annual flow of the river. Rufuji River, which houses Mtera and Kidatu hydropower stations, is expected to experience an increase in river flow by 5-11% due to low temperature fluctuation of between 3.3 °C to 4.6 °C and hence increase in rainfall. Floods on Rufiji and Pangani Rivers would cause damage to major hydropower stations and human settlements found along these river basins in the country.

Furthermore, the second Vulnerability Assessment Report (V.A.R II) on the other hand reveals that majority of households use more than one source of water supply, although (62%) depend on traditional sources of water supply. By ranking the values are wells (26%), rivers (24%) rain harvest (9%) and lakes (6%). Two thirds depend on wells, rain water and Lakes for water supply while only one third is served by piped water. Change in the precipitation will automatically affect each source and the consequences might be devastating depending on the magnitude. V.A.R I indicates that civil conflicts have been occurring between livestock keepers and farmers over grass and water for the animals in Morogoro, Mara and Kilimanjaro regions. Similarly due to mass exodus of cattle keepers in search of animal feeds school attendance has gone down. On more commercial basis, crop and animal production has been affected negatively in areas with decreasing rainfall and vice versa.

### **2.4.3 Health**

Malaria, prenatal mortality and AIDS are the three largest causes of loss of lives in the country. Under the current trend in both rainfall and temperature, the frequency of occurrences and impacts of the diseases will further rise. For example, malaria alone accounted for 16.67% of all reported deaths in Tanzania while prenatal deaths accounted for 13.34% of all deaths in 1997. Malaria is also one of the leading causes of morbidity in many regions of Tanzania ranging from 24% in Rukwa to 48.9% in Dar es Salaam. The V.A.R study further reveals among four major health hazards reported at village, district and national level, Malaria is one of them.

Other major diseases in Tanzania are: Dysentery, Cholera, and Meningitis. An increase or prolonged rainfall and temperature will lead to increased epidemics of these diseases. Similarly there is increased outbreak of air borne diseases such as meningitis during hot seasons. Areas mostly affected are those getting high temperatures and less rainfall. Malaria transmission is said to be at its peak during high temperatures and humidity, after the rain season. Recently malaria has been observed to occur in non traditional areas found in high altitudes such as Kilimanjaro and Arusha as a pointer to climatic changes impacts. As more areas receive more rains, it will in turn attract more malaria vectors, leading to increased incidences of malaria diseases across the country.

Furthermore, the study conducted by Kangalawe and Yanda (2004) indicate that malaria is endemic in the lowlands but unstable in the highlands of the Lake Victoria region, there is creeping-up of the disease towards the highlands. The study further indicates that women and children are more vulnerable to malaria than men due the roles they play in the society, and that poverty influence adaptation to malaria/cholera in the area.

### **2.4.4 Forestry and Wetlands**

Tanzania is well endowed with forest resources such that by 2002, 38.8 million hectares, (35% of the total land) were covered by forests and woodlands. However, all forest areas and types are under major threat of deforestation. The deforestation rate was estimated to be 91, 276 hectares per year in 2002. The main reasons for deforestation include clearing for agriculture and settlement, overgrazing, wildfires, charcoal burning and overexploitation of wood resources for commercial purposes. All these activities contribute a great share to the increase of CO<sub>2</sub> in the atmosphere as the carbon sink is progressively reduced. Predictions show that the mean daily temperature will rise by 3 °C – 5 °C throughout the country and the mean annual temperature by 2 °C – 4 °C. There will also be an increase in rainfall in some parts while other parts will experience decreased rainfall.

Predictions further show that areas with bimodal rainfall pattern will experience increased rainfall of 5% – 45% and those with unimodal rainfall pattern will experience decreased rainfall of 5%– 15%.

The expected change of vegetation types in the forest zones due to increase in temperature are summarized below:

TYPE OF VEGETATION	EXPECTED CHANGE
Sub tropical dry forest and subtropical moist forest life zone	Change to tropical; very dry forest, tropical dry forest and tropical moist forest
Subtropical thorn woodland	Completely be replaced/ disappear
Subtropical dry forest	Decline by 61.4%
Subtropical moist forest	Decline by 64.3%;

Species that will be more vulnerable are those with: limited geographical range and drought/heat intolerant; low germination rates; low survival rate of seedlings; and limited seed dispersal/migration capabilities.

Furthermore, recurrent forest fires have contributed to the diminishing of forests and forest resources in various parts of the country and ecosystems. More ecosystems and natural agro ecological zones are vulnerable as a result of bushfires emanating from impact of climate change. Among the chronic areas where bush fires have caused negative rampart effects include Mountains Uluguru and Kilimanjaro. At Mount Kilimanjaro vegetation cover has not only changed but has also been diminishing year after year due to frequent occurrence of fires, such that the Montane type of forest disappeared in year 2000. As of result of these changes the ecological system and the catchment forests has been disturbed along the slopes of Mount Kilimanjaro.

#### 2.4.5 Energy

Tanzania has a good number of energy sources including solar, wind, biogas, coal reserves, natural gas, hydropower, biofuel, wood fuel, and geothermal power. Of all these, the most exploited source is wood fuel because it is considered both cheap and accessible to the poor majority in rural and urban areas. Petroleum, hydropower and coal are the major source of commercial energy in the country. The biomass energy resource, which comprises of fuel-wood and charcoal from both natural forest and plantations, accounts for 93 per cent of total energy consumption.

Tanzania installed Hydro electricity generation capacity of 561 MW. It is reported that Tanzania has an estimated 4800 MW of economic hydro potential capacity which accounts for 90 percent. However, not all these hydro-potential has been taped. In addition, due to drought, the highest water levels in most of the hydropower stations have progressively been declining in recent years. For example, data from the Ministry of Energy and Minerals show that the highest water level in Mtera Dam declined from 695.8m asl in 2003 to 690.5m asl in 2004 689.5m asl in 2005 and 688m asl in march 2006.

This has affected hydro power production such that the share of hydropower has fallen to about 40% versus thermal generated electricity. Blackouts and power rationing as a result of low water levels in the hydro power dams have forced Tanzania Electric Supply Company (TANESCO) to rely on gas-powered generators and to look increasingly at thermal projects for future capacity increases. Power rationing for both domestic and industrial use makes Tanzania's economy more vulnerable to climate change related disasters; and leads to inefficiency in service provision to the public.

Tanzania has 1,200 million metric tons of coal, which could provide energy for paper mills, cement factories, agriculture and household consumption as well as generation of power. The current coal generated electricity capacity is 6MW. As an adaptive strategy, Tanzania plans to increase this capacity to 200MW in the short term and up to 600MW in the long term as adaptation to the drought situation of HEP dams. Wind and solar energy is another source of energy. However, very little attempt has been made to utilize this source of energy which could be a viable alternative sources to reduce the dependency on wood and oil for heating purposes, hence reduction of CO2 emissions. Solar Photovoltaic Market Transformation pilot project for off-grid areas in Mwanza region is an attempt to

utilize the widely available solar potential for the production of energy. Moreover, other indigenous alternative sources of energy, which can be exploited to enhance Tanzania's energy sector so as to boost economic growth are being promoted at various levels.

#### **2.4.6 Coastal and Marine resources**

The coast of Tanzania is characterized by a wide diversity of biotopes and species, typical of the tropical Indowest Pacific oceans and the peoples living there utilize a variety of its natural resources. These coastal and marine resources of Tanzania have for generations had profound influences on the socio-economic well being and health status of not only the immediate communities but also those far removed from them. They constitute a significant component of the country's rich heritage, and the highly productive ecosystems play a substantial role in the economic and social development of the country. Coral reefs are an important coastal resource. In addition to being complex ecosystems and habitat to a wide diversity of marine flora and fauna, they are also important for the tourism and fisheries industries with the former industry serving as one of the main markets for fish products.

Rise in temperature as a result of climate change is expected to cause various impacts including rise in sea level which in the final analysis will lead to coastal resources and infrastructure destruction such as houses. This will in turn further impoverish the local communities which depend on these resources.

Wetland habitats are important integral parts of the coastal fisheries industry and provide critical spawning and nursery grounds for many marine and freshwater organisms. Estuarine and lagoon fisheries are therefore major resources of a livelihood for many communities. The mangroves, in addition to providing physical protection for the coast against erosion, are used as firewood, building poles, boat building, fish smoking, and in making several domestic appliances (beds, drums, carts, etc.). Due to the importance of the sea and coastline, the welfare of the population living by the coast and the socio-economic value to the country, the coastline has to be protected against any effect of climate change.

#### **2.4.7 Wildlife**

The wildlife of Tanzania is one of the richest and most diversified in Africa. Approximately 19 % of the country is protected as national parks or game and forest reserves. The country has a diverse spectrum of fauna and flora including a wide variety of endemic species and sub-species. The biological diversity and degree of endemism consist of primates, (20 species and 4 endemic), antelopes (34 species and 2 endemic) fish (with many endemic in Lake Victoria, Tanganyika and Nyasa and other small lakes and rivers), reptiles (290 species and 75 endemic), amphibians (40 endemic), invertebrates and plants (around 11,000 species including many endemic).

Tanzania's great reservoir of wildlife and biological diversity is increasingly under threat as a result of ecosystem fragmentation, over utilization of resources and conflicts between agriculture and wildlife. Persistent drought due to increase in temperature and unreliable rainfall pattern in the country is expected to affect the lifestyles of most of the migratory wild species, in particular the wildebeest and some bird species. The wildlife forms an important source of food and income for some local communities in Tanzania. Change in ecological systems will lead to disappearance of some wild animal species.

#### **2.4.8. Tourism**

With a vast land area covered by forests as well as various species of flora and fauna, Tanzania is considered to be one of the premier tourism destinations in Africa. The country has beautiful natural resources including extensive tracts of wilderness and a rich diversity of scenery. Among the tourist attraction is 12 National Parks, including the famous Serengeti, 34 Game Reserves, and 38 Game Controlled Areas. Among many tourism sites, the prime tourist attractions include Mount Kilimanjaro, Zanzibar's historic Stone Town, the Olduvai Gorge archaeological site and clean white sand beaches fringed by palm trees.

However, due to increase in temperature some of these attractions such as the ice cap of Mount Kilimanjaro are under threat of smelting. Studies undertaken show that the ice cap of Mt. Kilimanjaro

has decreased between 50-80%. It is estimated that about 80% of the snow at Mt. Kilimanjaro has disappeared leading to reduced water flow at the feet of the mountain where the local community live.

#### 2.4.9 Industry

Manufacturing activities in Tanzania are relatively small and at an infancy stage. Its contribution to GDP has averaged 8% over the last decade, with most activities concentrated on manufacture of simple consumer goods - food, beverages, tobacco, textiles and furniture and wood allied products. However, the growth of industrial sectors is threatened by unavailability of sustainable and cheap energy source. Coping strategies in the energy sector are important for the growth of the economy in Tanzania.

#### 2.4.10 Other Assessment of Vulnerability and Adaptation in Tanzania

Assessment of vulnerability and adaptation to climate change in various sectors also form part of the Initial National Communication (INC). In addition, there are two disaster vulnerability assessments reports conducted in 2002 and 2003 by the Prime Minister's Office (PMO) and University College of Lands and Architectural Studies (UCLAS) which reveal the situation at the grassroots. All of these assessments contain very valuable information which contributes to an increased understanding of Tanzania's vulnerability to Climate Change.

Furthermore, there are two Food Assessment Reports conducted by Food Situation Investigation Team (FSIT) which shows that North Eastern and coastal regions received very little or no rains in Vuli season, a situation which led to food relief distribution to more than 56 districts out of 120. Kilimanjaro is now one of the hardest-hit regions although it used to be a heavy rain area in the past two decades.

The major causes of these vulnerabilities at village, district and national levels is climate change associated with prolonged heavy rainfall or drought. According to the V.A.R, the top four hazards in the country are: epidemics (43%), drought (47%), pest/vermin/plant diseases (50%) and floods (13%). These high ranked hazards have also been observed as commonly occurring in a period of less than five years, and have a positive correlation with the climate change observed throughout the country within the same time period. During the survey, the perception recorded from the local communities regarding the occurrence of these extreme weather events are:

- a. Drought:** At household level drought was reported as a problem and 83% mentioned prolonged low rainfall to be the cause, followed by climatic variability in terms of onset of rainfall for cropping seasons 60% and increased deforestation 53%.
- b. Pests:** Out of 995 respondents at village level who mentioned pest as a problematic hazard (37%) mentioned climate change to be a cause of increased and new pests and diseases and prolonged rainfall/dryness (31%) and poverty 14%.
- c. Epidemics:** Out of 852 respondents who were affected by diseases outbreak, 42% reported prolonged rainfall and drought to be the cause, climatic variability 30% health related 41% and poverty 10%.
- d. Floods:** Was mentioned as been caused by prolonged rainfall (83%) while climate change scored (19%).

## GOVERNMENT OF TANZANIA INFORMATION

### GOVERNMENT OF TANZANIA INITIATIVES ON CLIMATE CHANGE

#### Tanzania NAPA Project Profile

[http://unfccc.int/files/adaptation/napas/application/pdf/34\\_tanz\\_pp.pdf](http://unfccc.int/files/adaptation/napas/application/pdf/34_tanz_pp.pdf)

(See also: <http://napa-pana.org/?q=en/node/6>)

### GOVERNMENT PORTAL FOR UNITED REPUBLIC OF TANZANIA

#### Development and Climate Change in Tanzania: Focus on Mount Kilimanjaro

<http://www.oecd.org/dataoecd/47/0/21058838.pdf>

## INFORMATION FROM UK BASED NGOS

Oxfam's recent report *The Right to Survive* has revealed a 54 per cent increase in people affected by climate disasters by 2015, a staggering 375 million people, unless action is taken now. With Bangladesh already struggling to cope, this increase could overwhelm emergency responses and dwarf the international community's ability to respond quickly and effectively.

Flooding, cyclones and droughts are already hitting poor communities in Asia hard, together with hotter temperatures, erratic rains and disrupted planting seasons. In Bangladesh, frequent flooding has been aggravated above normal levels, last year alone affecting over nine million people. In India floods have waterlogged acres of land, destroying crops and overwhelming drainage and irrigation systems. Likewise, communities in the South Punjab in Pakistan are facing increasing problems due to flooding and aid groups in the region are predicting increasing losses of land and safe water.

<http://www.oxfam.org/en/policy/right-to-survive-report>

## ADAPTATION

### ADAPTATION STRATEGIES

(See [http://www.aiaccproject.org/working\\_papers/Working%20Papers/AIACC\\_WP48\\_Leary\\_etal.pdf](http://www.aiaccproject.org/working_papers/Working%20Papers/AIACC_WP48_Leary_etal.pdf))

### **Oxfam's National Change Strategy for Tanzania 2007 - 2017**

<http://www.oxfam.org.uk/resources/downloads/tanzanianatichangepublic.pdf>

### **Freshwater conservation and climate change adaptation – a case study of the Great Ruaha River Catchment in Tanzania** Institute of Physics conf. series 2009

<http://tinyurl.com/lkeuue>

### ADAPTATION TOOLS AND CASE STUDIES

#### **Climate Change adaptation by design, A guide for sustainable communities**

[http://www.tcpa.org.uk/downloads/20070523\\_CCA\\_lowres.pdf](http://www.tcpa.org.uk/downloads/20070523_CCA_lowres.pdf)

#### **Climate Change adaptation**

This dossier is intended to provide a summary of current thinking on climate adaptation issues with access to relevant and up to date resources and publications for researchers, practitioners, and policy formers. The guide is divided into four sections:

- An introduction to climate change adaptation
- Organisations working on climate adaptation issues
- Documents and publications related to seven themes in climate adaptation
- Adaptation resources organised by region of focus

<http://www.eldis.org/climate/index.htm>

#### **Livelihoods, Vulnerability and Adaptation to Climate Change in the Morogoro Region, Tanzania**

This paper examines livelihood responses to climate variability and other stressors in the Morogoro region in south-eastern Tanzania, with an aim to understand the implications of these responses to adapting to changing climate in the region in the future. The paper indicates how farmers have responded to droughts by expanding cultivations, reducing fallows, switching crops and engaging in wage employment or in charcoal, timber and brick production

[http://www.uea.ac.uk/env/cserge/pub/wp/edm/edm\\_2004\\_12.htm](http://www.uea.ac.uk/env/cserge/pub/wp/edm/edm_2004_12.htm)

## NIDOS MEMBERS WORKING ON CLIMATE CHANGE IN TANZANIA

### Organisation

### Contact email address

IIED	simon.anderson@iied.org
Mission Aviation Fellowship	max.gove@maf-europe.org
Save the Children in Scotland	d.hamilton@savethechildren.org.uk
IVS GB	info@ivs.gb.org
Concern Worldwide	mhairi.owens@concern.net
Books Abroad	booksabroad@aol.com
VSO	sally.halsey@vso.org.uk
VetAid	jennifer@vetaid.org
Tearfund	peter.chirnside@tearfund.org
Children of Songea Trust	neil@childrenofsongea.org.uk
Christian Aid	ubartley@christian-aid.org.uk
IACD	debi.fry@iacdglobal.org
The Leprosy Mission Scotland	fundraising@tlmscotland.org.uk
Oxfam GB	khopper@oxfam.org.uk
Christian Engineers in Development	mail@rainkinarchitect.co.uk