

# Tanzania Country Climate Change Risk Assessment Report



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*Cover photo; Aisha Hussein of Meru District in Arusha explains how she has diversified her crops based on climate variability*

*Photo credit; Julian Dalika, CARE Tanzania*

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## List of Acronyms

AfDB	African Development Bank
AFOLU	Agriculture, Forestry and other Land Use
COFs	Climate Outlook Forums
DFID	The Department for International Development –United Kingdom
DJF	December, January and February
DNA	Designated National Entity
DoE	Division of Environment
DPG	Development Partners Group
DRR	Disaster Risk Reduction
EAC	East African Co-operation
ENRM	Environment and Natural Resource Management
ENSO	El Niño Southern Oscillation
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
GCF	Global Climate change Fund
GCM	General Circulation Models
GDP	Gross Domestic Product
GHGs	Green House Gases
HDI	Human Development Index
IIED	International Institute for Environment and Development
INDC	Intended Nationally Determined Contribution
IPCC	Inter-governmental Panel in Climate change
ITCZ	Inter-tropical Convergence Zone
LDCF	Least Developed Countries Fund
LGAs	Local Government Authorities
LUCF	Land use Change and Forestry
M&E	Monitoring and Evaluation
MAM	March, April & May
MPI	Multi-dimensional Poverty Index
NAMAs	Nationally Appropriate Mitigation Actions (NAMAs).
NAP	National Adaptation Plan
NAPA	The National Adaptation Programme of Action
NCCFP	National Climate Change Focal Point
NCCMP	National Climate Change Management Policy
NCCS	National Climate Change Strategy
NCCSC	National Climate Change Steering Committee
NCCTC	National Climate Change Technical Committee
NDC	Nationally Determined Contribution
ND-GAIN	The Notre Dame Global Adaptation Initiative
NIE	National Implementing Entity
NOAA	National Oceanic and Atmospheric Administration
ODA	Official Development Assistance
ODI	Overseas Development Institute
OECD	Organisation for Economic Co-operation and Development
PMO-RALG	Prime-Minister’s Office-Regional Administration and Local government
PO-RALG	President’s Office Regional Administration and Local Government
SADC	Southern African Development Community
SP	Social Protection
TMA	Tanzania Meteorological Agency
UNDP	United Nations Development Programme
UNFCCC	United nations Framework Convention on Climate Change
USAID	United States Agency for International Development
VPO	Vice President’s Office
WMO	World Meteorological Organization
WRI	World Resource Institute’s
ZCCS	Zanzibar Climate Change Strategy

## Executive Summary

Tanzania like other African countries has been experiencing impacts of climate change including frequent and prolonged droughts, severe floods and sea level rise. The impacts of extreme weather events have had significant impact to both people and the economy with negative consequences on vulnerable sectors including agriculture, forestry, fisheries, energy, health, water, industry, business, trade, tourism and services. The livelihoods of about 80% of Tanzanians depend on the agriculture, forestry and fisheries resources, with small-scale farmers especially women more vulnerable as they are highly dependent upon rain fed agriculture.

Tanzania is currently focusing on Industrialization which to date is focused on processing of agricultural products. The Tanzania vision 2025 aims at having at least 40% of the GDP contributed by the manufacturing sector by 2025. Tanzania's macroeconomic performance over the recent past has been strong, with steady growth in GDP since the late 1980s. The contribution of the agricultural sector to the economic growth and the development of Tanzanians has continued to increase. In 2015, the agricultural sector contributed 29% of the GDP. The sector has potential to contribute to reduction and alleviation of poverty. However, without addressing climate change vulnerability and impacts, the projected growth will be reversed.

The current climate analysis indicates that annual rainfall has decreased at an average rate of 2.8mm per month (3.3%) per decade. The greatest annual decreases have occurred in the southern most parts of Tanzania. Future projections of mean rainfall indicate increases in annual rainfall. The models also consistently project overall increases in the proportion of rainfall that falls in heavy events. This implies that episodes of floods are likely to increase. The average annual temperature in Tanzania has increased by 1.0°C since 1960 and the mean annual temperature is projected to increase by 1.0 to 2.7°C by the 2060s, and 1.5 to 4.5°C by the 2090s. These projections have implications for the growth and development of Tanzania, unless adaptation and mitigation measures are put in place to increase the resilience of the country and citizens to climate impacts

The Global framework for Climate Services and other multilateral and bilateral agencies are supporting the Tanzania Meteorology Agency to strengthen the capacity of both national and subnational authorities to monitor climate change, generate reliable hydro-meteorological data and produce early warnings. However there are still challenges, including timely dissemination of seasonal forecasts which affects planning; Accuracy and reliability is low due to social and physical infrastructure. The size of the country, with highly remote areas affect access and utilisation of the weather forecasts.

Weather and Climate information services will continue playing a huge role in climate risk management due to increasing uncertainties of climate change that are impacting a cross section of sectors, thus economic growth. Tanzania is ranked as high risk with physical exposure to floods, droughts and earthquakes. These are projected to negatively affect development, increase deprivation and inequality. The study on the economic impacts of climate change estimates that the cost of building adaptive capacity and enhancing resilience against future climate change in Tanzania is USD (\$) 100 to 150 million per year. The report further states that aggregate models indicate that net economic costs could be equivalent to a further 1 to 2% of

GDP per year by 2030. This scenario, coupled with high population growth and an urbanisation rate of 30%, will result in increased consumer and credit demand and will also trigger increased demand for social amenities and infrastructure.

Tanzania's overall development policy is outlined in Vision 2025, which sets future development objectives for the country. This vision is operationalized through the medium-term plans. There are other climate relevant policies and strategies focusing on adaptation and mitigation, as well as an institutional coordination framework. However, the process of coordinating climate change actions across sectors and levels of government remains a challenge. The technical capacity is low in several sectors, compounded by the meagre financial resources allocated to climate portfolios. Climate change has not been adequately mainstreamed or integrated in sector specific plans and strategies and at local government level, there is limited capacity as well as funding gaps to respond to climate change;

The Irish Aid Tanzania Country Strategy for 2017-2021 supports climate change through bilateral aid and civil society programmes. The focus of the new strategy is promoting equity and prosperity through a particular focus on poor women and girls realising their rights, including climate justice. The mission intends to address climate change through supporting interventions that take care of appropriate adaptation and mitigation measures that address challenges of climate change, based on specific climate change vulnerability assessments. The strategy also commits to address issues relating to climate change and nutrition ensuring that they are mainstreamed across the Embassy's value chain work. Ireland's social protection strategy 2017 also commits to integrate natural disaster and climate change risk management and vulnerability assessments when planning and implementing bilateral country programmes.

**Key recommendations to strengthen integration of climate change onto development planning include;**

- Integrating climate change in development planning as well as strengthening government structures to respond to adaptation, resilience building and sustainable development
- There is need therefore to focus on a low carbon development path, while addressing climate risks and focusing on inclusive economic models that can increase incomes for the poor, especially women and the youth.
- Climate risk management and strengthening of food systems approaches will be important across all development programmes to improve food security, nutrition, but also enhance economic development for the poor through value chains and industrialisation processes.
- Programmes should consolidate gains and improve climate resilient approaches for high emission sectors including agriculture, energy, Land use change and forestry to reduce emissions but also strengthen the adaptation and mitigation co- benefits.
- Capacity building and strengthening of Government structures at national and sub national levels will be key to improve sustainable development, planning for uncertainties, managing risks and reducing vulnerabilities resulting from climate change and disaster impacts.
- Investment in generating and disseminating accurate, timely and reliable weather and climate information will be important to inform different sector adaptation and climate risk management plans and decisions regarding changes in climate.
- Gender analysis should be done at policy and implementation level to design suitable adaptations options that support the different capacities and vulnerabilities of women and men, boys and girls and ensure their vulnerabilities are reduced.

## Summary of key climate change Implications for Tanzania

- Future changes in climate may lead to a change in the frequency or severity of extreme weather events, potentially worsening impacts. 70% of all natural disasters in Tanzania are climate change related and are linked to recurrent droughts and floods.
- Aggregate models indicate that climate change could lead to net economic costs that are equivalent to a loss of almost 2% of GDP each year by 2030. The cost of building adaptive capacity and enhancing resilience against future climate change in Tanzania is estimated at USD (\$) 100 to 150 million per year.
- More vulnerable people will be at risk of sliding into chronic poverty or being put at increased risk during the hazardous times of the year. According to the Multi-dimensional Poverty Index (MPI)<sup>1</sup> for Tanzania 66.4 percent of the population is multi-dimensionally poor while an additional 21.5 percent live near multidimensional poverty.
- Tanzania's population is estimated to grow at an annual rate of 3%. This coupled with an urbanisation rate of 30%, will continuously result in increased consumer and credit demand as well as stress on resources.
- The agriculture sector will be highly impacted. The economic losses from climate change impacts on agriculture are estimated at US\$200 million every year (Arce, Carlos, et al 2015).
- It is projected that due to increasing population growth and increased consumption, by 2025, Tanzania will be facing water stress. Climate change will make the projections worse. In 2015, only 55% of the population had access to an improved water source.
- The prevalence of malnutrition in children under the age of five is likely to increase. The estimates are at 13.0% (2013)<sup>2</sup> and general prevalence of undernourishment is at 32.1% (Food Security Index, 2017). FAO described Tanzania as having a very high level of undernourishment, with 43% of the population being undernourished directly because of drought related food shortages (Shemsanga et al 2010)
- There will be slow progress towards achieving food security targets due to climate impacts. Tanzania is ranked 95th out of 113 countries in the Global Food Security Index 2017<sup>3</sup>, which shows slow advancement.
- By 2070, under both high and low emissions scenarios over 114 million people are projected to be at risk of malaria above the estimated baseline of about 25 million. Population growth can cause increases in the population at risk in areas where malaria presence is static in the future
- In Tanzania, by 2030, an estimated 6,100 annual premature deaths per year due to outdoor air pollution is anticipated<sup>4</sup>

Climate change impacts, if not addressed with worsen conditions across all sectors increasing development pressures across the board.

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<sup>1</sup> The MPI Identifies multiple overlapping deprivations suffered by households in 3 dimensions: education, health and living standards

<sup>2</sup> WHO & UNFCCC, 2015

<sup>3</sup> <http://foodsecurityindex.eiu.com/Country/Details#Tanzania> accessed on 10/11/017

<sup>4</sup> WHO and UNFCCC, 2015

## 1.0. Country Context

Tanzania is the largest country in East Africa, covering an area of 945,200 km<sup>2</sup>, 60,000 of which is inland water. Tanzania lies close to the equator in the East Coast of Africa between parallel 10S and 120S and meridians 300E and 400E. Tanzania's area includes island areas of Pemba, Zanzibar, Mafia and a narrow coastal line strip. Proportionally, Tanzania has larger protected land comprising national parks, game reserves, the Ngorongoro conservation area, game-controlled areas, and forest reserves. About 42% of the land is under some form of cultivation whilst 26% of the land is infected by tsetse flies thus rendered unusable for livestock and agricultural activities. As a result of its geographic position and geological features, Tanzania has a mixture of climatic conditions



from tropical (coastal areas) to temperate and alpine deserts (on slopes of Mount Kilimanjaro).<sup>5</sup>

According to the population and housing census of 2012,<sup>6</sup> Tanzania had a population of 44,928,923 people living in the country. Of this total population, 1.3 million reside on the islands of Zanzibar. This equates to a population density of 47.5 people per square kilometer (123.1 people per square mile). According to the World Population review<sup>7</sup>, the current

population<sup>8</sup> is estimated at 57,429,389 million people. Tanzania has one of the highest birth rates in the world and more than 44% of the population is under the age of 15. The total fertility rate is 5.01 children born per woman, which makes it the 17<sup>th</sup> highest. Tanzania has a very uneven population distribution. In the arid regions, population density is as low as 1 person per square kilometer, about 53 people per square kilometer in the water-rich mainland highlands and up to 134 people per square kilometer in the capital city of Zanzibar. About 80% of the population live in rural areas.

According to the Human Development Report, 2016, Tanzania's HDI value for 2015 is 0.531 which put the country in the low human development category, positioning it at 151 out of 188 countries and territories. Though it is above the average of 0.497 for countries in the low human development group and above the average of 0.523 for countries in Sub-Saharan Africa. Poverty rate fell from 60% in 2007 to an estimated 47% in 2016, based on the \$1.90 per day global poverty line, about 12 million Tanzanians still live in extreme poverty earning less than US\$ 0.60 per day. Many hover just over the poverty line and risk falling back into poverty in the event of socio-economic shocks. According to the Multi-dimensional Poverty Index (MPI)<sup>9</sup> for Tanzania 66.4 percent of the population is multi-dimensionally poor while an additional 21.5 percent live near

<sup>5</sup> Shemsanga, C, et al, 2010. The Cost of Climate Change in Tanzania: Impacts and Adaptations

<sup>6</sup> The United Republic of Tanzania, (2013). 2012 Population and Housing Census

<sup>7</sup> <http://worldpopulationreview.com/countries/tanzania-population/> accessed on 16/11/2017

<sup>8</sup> Population estimated based on interpolation of World Population Prospects data.

<sup>9</sup> The MPI Identifies multiple overlapping deprivations suffered by households in 3 dimensions: education, health and living standards



multidimensional poverty. The breadth of deprivation (intensity) in Tanzania which is the average deprivation score experienced by people in multidimensional poverty, is 50.4 percent.<sup>10</sup>

Tanzania's macroeconomic performance over the recent past has been strong, with steady growth in GDP since the late 1980s. According to the Tanzania economic Review 2016, quoting the 2016/17 budget, real Gross Domestic Product (GDP) is forecast to grow by 7.2% in 2016 as compared to 7% in 2015; driven by rising private consumption and strong growth in the telecommunications, construction, port and service sectors. Services contribute almost 50% of GDP and spurred by private-sector activity in telecommunications and financial services. Tanzania's economy has changed from one dominated by agriculture to one where services and industry comprise a substantial proportion of growth. Climate change may therefore have less effect on GDP figures in the years ahead due to the higher growth within sectors that are less climate-sensitive, but it will continue to have a significant impact on the livelihoods of smallholder farmers and therefore on national poverty reduction efforts.

Tanzania like other African countries has been experiencing impacts of climate change which include frequent and prolonged droughts, declining crop yields, loss of livestock, lower water availability and quality, severe floods, sea level rise, and an increase in vector and water-borne diseases. All of these have resulted in severe socio-economic impacts; for instance, the drought which occurred in the year 2005/06 caused famine and led to loss of livestock in semi-arid areas; and water shortage for hydropower generation leading to power rationing and unpredicted black outs. In addition, serious floods of 2009 and 2010 in Kilosa and the floods of 2011 in Dar es Salaam led to displacement of thousands of people, loss of life, destruction of properties and infrastructure such as railways, roads and bridges.<sup>11</sup> These challenges will further be exacerbated by a decline in the natural resource base as population growth exerts pressure on available resources, as well as a volatile global economy<sup>12</sup>. Climate change will thus be an additional pressure on development especially if measures to reduce the underlying vulnerabilities are not introduced in time.

Tanzania has put in place several policies to address climate change adaptation and mitigation. The Tanzania National Development plan (2016/17- 2020/21) led by the President's Office Planning Commission (POPC), aims to unleash Tanzania's economic growth potential and transform Tanzania into a middle-income country. The plan however recognises that climate change has the potential to reverse this growth and has prioritised to address Food security and nutrition, Sustainable Water and Land Use Management There are also plans to support mainstreaming of resilience to address climate variability/change and natural disasters. Research, marketing, reduction of loss and damage due to natural disasters, and support to social protection schemes are also prioritised. Natural resources management and governance is a focus for growth and development, with climate smart initiatives and value Chains.

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<sup>10</sup> UNDP, 2016; Human Development Report 2015

<sup>11</sup> Tanzania Agriculture Climate Resilience Plan, 2014–2019

<sup>12</sup> Shayo, 2013

## 2.0. Current and future climate scenarios for Tanzania

According to a study by the climate systems analysis group of the University of Cape Town, Tanzania experiences bimodal and unimodal conditions in different parts of the country. The ocean coastline is warm and generally wet with Dar es Salaam experiencing a mean of over 1000mm/year of rainfall and daily maximum temperatures ranging between 29°C and 32°C. Cooler locations such as Mbeya and Mwanza show almost no exceedence throughout the year.<sup>13</sup>

Seasonal rainfall in Tanzania is driven mainly by the migration of the Inter-Tropical Convergence Zone (ITCZ), a relatively narrow belt of very low pressure and heavy precipitation that forms near the earth's equator. The exact position of the ITCZ changes over the course of the year, migrating southwards through Tanzania in October to December, reaching the south of the country in January and February, and returning northwards in March, April and May. This causes the north and east of Tanzania to experience two distinct wet periods – the 'short' rains in October to December and the 'long' rains in March to May, whilst the southern, western and central parts of the country experience one wet season that continues from October through to April or May. The amount of rainfall falling in these seasons is usually 50-200mm per month but varies greatly between regions, and can be as much as 300mm per month in the wettest regions and seasons<sup>14</sup>.

### 2.1. Current Climate Trends

#### Precipitation

Observations of rainfall over Tanzania show statistically significant decreasing trends in annual, and JJAS and MAM rainfall. Annual rainfall has decreased at an average rate of 2.8mm per month (3.3%) per decade. The greatest annual decreases have occurred in the southern most parts of Tanzania. MAM and JJAS rainfalls have decreased by 4.0 and 0.8 mm per month per decade, respectively (3.0% and 6.0%). Trends in the extreme indices based on daily rainfall data are mixed. There is no statistically significant trend in the proportion of rainfall occurring in heavy<sup>15</sup> events.

#### Temperature

The average annual temperature in Tanzania has increased by 1.0°C since 1960. This increase in temperature has been most rapid in JF and slowest in JJAS. Daily temperature observations show only small increasing trends in the frequency hot days<sup>16</sup>, but much larger increasing trends in the frequency of hot nights. The average number of 'hot' nights<sup>17</sup> per year increased by 50 (an additional 13.6% of nights) between 1960 and 2003. The frequency of cold days has not changed discernibly, despite the observed increases in mean temperature. The frequency of cold nights has, however, decreased significantly in all seasons. The average number of 'cold' nights per year has decreased by 34 (9.3% of days).

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<sup>13</sup> Chris, J. Climate Projections for United Republic of Tanzania; Climate Systems Analysis Group, University of Cape Town

<sup>14</sup> McSweeney, C. et al, 2010. UNDP Climate Change Country Profiles

<sup>15</sup> 'Heavy' event is defined as a daily rainfall total which exceeds the threshold that is exceeded on 5% of rainy days in the current climate of that region and season

<sup>16</sup> 'Hot' day or 'hot' night is defined by the temperature exceeded on 10% of days or nights in current climate of that region and season

## **2.2. Future Climate projections**

### **Precipitation**

Despite the current climate trends which show a decreasing trend in annual rainfall, future projections of mean rainfall are broadly consistent in indicating increases in annual rainfall. The annual increases in rainfall are similar across the whole country, but the seasonal patterns of change are more complex. Increases in JF rainfall affect most of the country but particularly the south, whilst the increases in MAM and SON rainfall are greatest in the northern regions of the country. In JJAS, rainfall increases in the very north of the country, but decreases in central and southern Tanzania. This pattern suggests that rainfall generally increases in the wet-season(s) of each region. The models also consistently project overall increases in the proportion of rainfall that falls in heavy events. The increases range from 1 to 14% in annual rainfall by the 2090s. Increases affect most of the country in the seasons JF, MAM and SON. The models consistently project increases in 1- and 5-day rainfall maxima by the 2090s of up to 24mm in 1-day events, and 4 to 37mm in 5-day events. The largest increases are seen in MAM. The far future projections (2081-2100) do not show significant wetting compared to the near future projections (2046-2065) suggesting that some limit on precipitation is being reached.<sup>18</sup>

### **Temperature**

The mean annual temperature is projected to increase by 1.0 to 2.7°C by the 2060s, and 1.5 to 4.5°C by the 2090s. The range of projections by the 2090s under any one emissions scenario is 1.5-2.0°C. All projections indicate increases in the frequency of days and nights that are considered 'hot' in current climate. Nights that are considered 'hot' for the annual climate of 1970-99 are projected to increase more quickly than hot days. All projections indicate decreases in the frequency of days and nights that are considered 'cold'<sup>19</sup> in current climate. These events are expected to become exceedingly rare, with cold days occurring on 0-4% of days and cold nights occurring on a maximum of 1% of days, and not at all under the two higher emissions scenarios, by the 2090s.

## **2.3. Green House Gas (GHG) Emissions for Tanzania**

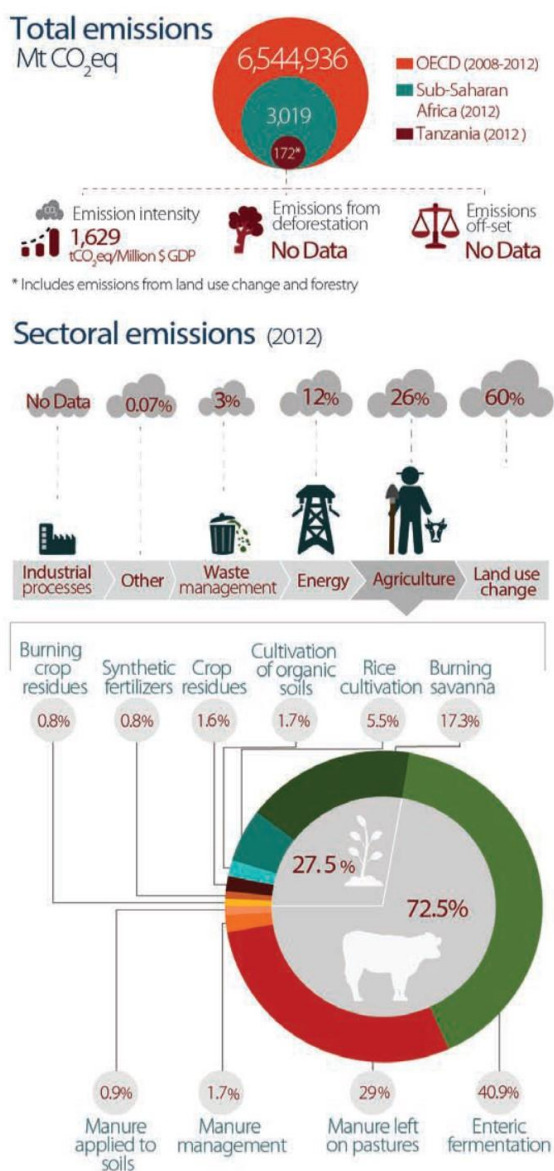
According to Tanzania's Intended Nationally Determined Contributions (INDC) 2015, the country has negligible emissions of greenhouse gases (total and per capita), whereby per capita emissions are estimated at 0.2 tCO<sub>2</sub>e. On the other hand, the country has a total of 88 million hectares of land areas, of which 48.1 million are forested land and under different management regimes, with a current estimated total of 9.032 Trillion tons of carbon stock. The estimates are based on the present stocks from limited studies. This implies that Tanzania is a net sink.

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<sup>18</sup> Chris, J. Climate Projections for United Republic of Tanzania; Climate Systems Analysis Group, University of Cape Town

<sup>19</sup> Cold' days or 'cold' nights are defined as the temperature below which 10% of days or nights are recorded in current climate of that region or season.

## Greenhouse gas emissions for Tanzania



Source; CIAT and World Bank, 2017

However, according to the WRI CAIT climate data explorer for Tanzania for the years 1990-2013, latest emission values excluding Land Use Change and Forestry (LUCF) were 77.95 with per capita GHG emissions of 1.55tCO<sub>2</sub>e presenting 86.84% absolute Change from earliest to latest value. Total emissions values including LUCF were at 287.12 with per capita emissions of 5.72tCO<sub>2</sub>e and 3.48% as absolute change from earliest to latest value. The highest emission contributions are from LUCF, agriculture, Energy and other fuel combustion respectively<sup>20</sup>.

Beyond enhancing carbon sinks through forest conservation, afforestation and reforestation, Tanzania is embarking on enhanced use of natural gas with 53.28 trillion cubic feet discovered reserves of which to-date over 100 million cubic feet are exploited to produce 501 MW. There is also expanded use of renewable energy sources such as geothermal (with a potential of 5 GW); solar with average sunshine of more than 9 hours per day; hydro with a potential of 4.7 GW (while the installed capacity is 561 MW); and wind with speed of 0.9 – 9.9 m/s across many parts of the country. It is estimated that the country will reduce greenhouse gas emissions economy wide between 10-20% by 2030 relative to the Business as Usual (BAU) scenario of 138 - 153 Million tons of carbon dioxide equivalent (MtCO<sub>2</sub>e)- gross emissions, depending on the baseline efficiency improvements, consistent with its sustainable development agenda. The emissions reduction is subject to review after the first Biennial Update Report.<sup>21</sup>

## 2.4. Climate and Weather information generation and management

Tanzania Meteorological Agency (TMA) is a Government Agency established by the Government Executive and responsible for the provision of Meteorological services; weather forecasts, climate services and warnings and advisories information for the country. TMA is currently operating under the Ministry of Works, Transport and Communications of the United Republic of Tanzania. The agency participates in the activities of and receives information from international organizations and programs, in particular the World Meteorological Organization (WMO), World Weather Watch (WWW), International Civil Aviation Organization (ICAO), Global Climate Observing System (GCOS), the Global Atmospheric Watch (GAW), International Research

<sup>20</sup> <http://cait.wri.org/profile/Tanzania>

<sup>21</sup> Republic of Tanzania, INDC 2015

Institute for Climate and Society at Columbia University in the United States, for seasonal, El Niño forecasts, and climate change projections for coming decades.

In the region, the agency engages in activities of regional bodies including Southern African development Community (SADC) Climate Services Centre and East African Co-operation (EAC) and Inter Governmental Authority on Development (IGAD) Climate Prediction and Application Centre (ICPAC). Others include the World Agro Meteorological Information Service (Tanzania), Climate Systems Analysis Group at the University of Cape Town in South Africa, Council for Scientific and Industrial Research (CSIR) in South Africa – seasonal and El Niño forecasts.

The Tanzania Meteorological Agency (TMA) issues extreme weather warnings and advisories. These alerts are issued for the attention of both the general public and/or other key sectors such as aviation, agriculture, water resource management, disaster management, health and the construction industry. Short range weather forecasts covering the next 24 to 48 hours, and medium range forecasts that extend up to 10 days ahead are also issued. They contain information on temperature, precipitation and wind speeds. These are broadcast through television, radio, the TMA website ([www.meteo.go.tz/](http://www.meteo.go.tz/)) and via mobile phone alerts. Users are most familiar with these short- and medium-range forecasts. The bulletins target the agricultural sector with additional interpretation on observed agro-meteorological and hydrological conditions. Much of the information about the potential risks and impacts of climate change for Tanzania comes from targeted research carried out by universities, in particular Sokoine University of Agriculture, and the University of Dar es Salaam.<sup>22</sup>

Weather information is disseminated through official channels including the Prime Minister's office, which in turn disseminates it to the regional and district levels. Different sectors have specific uses for this information, such as the energy sector, which requires the forecasts to manage dam releases for optimal hydropower generation, the district governments build the seasonal forecasts into their plans and the agriculture sector uses advisories to provide farmers with information for planning and decision making on farming activities.

There are several projects supporting weather and climate services in Tanzania which among others include;

- The Climate Services for Action Africa Project in Tanzania and Malawi is part of the Global Framework for Climate Service (GFCS). It is a multi-partner pilot to provide improved weather and climate information to help better manage the climate risks to health and food security. It is jointly implemented by the World Food Programme (WFP), the World Meteorological Organization (WMO), the World Health Organization (WHO), the International Federation of Red Cross and Red Crescent Societies (IFRC), and several research institutions including CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) among others. Through the use of radio, cell phones and extension workers, among other means, the project is providing tailored weather and climate information to smallholder farmers and pastoralists to help them enhance their agricultural or livestock production. The pilots in Malawi and Tanzania will serve as models for how different organizations can work together to design and implement comprehensive climate services in the humanitarian and development sectors.

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<sup>22</sup> UMFULA, 2016 and <http://www.meteo.go.tz/pages/research-and-applied-meteorology>

- Climate Information and Early Warning Systems Project (CI/EWS) implemented by UNDP is strengthening the capacity of both national and subnational authorities to monitor climate change, generate reliable hydro-meteorological data, produce early warnings and compare this information with other environmental and socio-economic data to improve evidence-based decision-making. The project aims to increase the national coverage of the hydro-meteorological network from 50 to 75 percent. The project is also investing in upgrading weather, climate, hydrological and environmental monitoring infrastructure, and integrating climate information into development plans and early warning systems.

## Key Challenges

Timely dissemination of seasonal forecast information is a challenge and affects planning. District governments interviewed by Uncertainty Reduction in Models for Understanding Development (UMFULA)<sup>23</sup>, for example, noted that whilst they regard this information as useful, they struggle to include it because they have already prepared their plans and activities for the season. While seasonal forecasts and climate change projections are produced by TMA, they are not distributed automatically – instead they must be requested.

Accuracy and reliability is low due to infrastructure and dissemination times which sometimes distort messages affecting trust from the users. Tanzania comprises eight distinct climate zones, and their differences are currently not well represented in climate models. This introduces a great deal of uncertainty in the results. Since the country does not have many weather stations, the lack of data makes it hard to refine these models. Besides the districts, seasonal forecasts are not spread as widely as the daily and 10-day forecasts. Among government and NGO staff there is a sense that such the longer-range forecasts are less easily available and often require a request to TMA.<sup>24</sup>

Although Sub-Saharan Africa (SSA) is responsible for only 4% of annual global greenhouse gas emissions, it is the region most susceptible to the dangerous impacts of climate change, some of which are already being experienced. Of particular concern is the relationship between climate change, food production and food prices, and extreme weather conditions, which collectively threaten food security. Indeed, the largest projected increases of people living in poverty because of climate change are expected in Africa, mainly due to the continent's heavily agriculture-dependent economy

(FAO, 2016).

Tanzania is large, with highly remote areas that are difficult to access for a weather service that has logistical and resource challenges. Efforts are in place to install more automatic stations that send the information to a central point, but transporting these into the field and then making them operational, as well as ensuring they are effectively maintained, is expensive. Producing reliable forecasts without such observations is a challenge as it is therefore difficult to predict the effects of different weather systems on the diverse climate and ecological zones.

Another challenge is interpreting information and knowing what it means for planning in the different sectors. Those involved in planning and decision-making in different departments are not used to including long-term climate information in their planning. They often feel that climate

<sup>23</sup> UNDP, 2016, UMFULA 2016. Challenges reviewed from UNDP reports and UMFULA interviews with government and other stakeholders

<sup>24</sup> UMFULA ("river" in Zulu) is a global consortium of 15 institutions working on climate science, impact modelling and socio-economic research in central and southern Africa, with a particular focus on Tanzania and Malawi.

change, as a relatively new topic on the national agenda, is not well understood and the implications can be difficult to determine from the sparse availability of technical information and data.

Communication issues challenge the effective dissemination of information between meteorological services and farmers. Literacy rates and language barriers mean that not everyone can read written advisories. Farmers also have a tendency to place their trust in local advisors or someone within the community, rather than with agents from outside organizations<sup>25</sup>

Tanzania has limited resources to address the key challenges of developing climate information, and is therefore focussing efforts on the seasonal forecasts. TMA already analyses the performance of the seasonal forecasts, in order to refine and improve them. Some new automated monitoring stations are also being installed across the country to improve weather data collection. Projects and research being carried by the key national universities (Sokoine University of Agriculture, and the University of Dar es Salaam) and other partners, continue to support the development of enhanced climate information and insights into what this means for long-term planning.

### 3.0. Climate change vulnerability, hazards and Impacts

#### Social Economic Statistics

Population 2017<sup>26</sup>: 56,886,179

Total Fertility Rate 2015<sup>27</sup>; 5.0 (no. of children per woman)

GDP per capita, PPP<sup>28</sup> (international \$) 2016: 2,787.7

HDI 2015: 151 out of 188 countries<sup>29</sup>

Gender Inequality Index 2015; 129 of 159 countries<sup>30</sup>

Vulnerability Rank 2015; 143 out of 178 countries<sup>31</sup>

Climate Risk Index (CRI)<sup>32</sup> 2015; 116 out of 187 countries

Tanzania is experiencing the impacts of extreme weather events, such as drought and flood that have had significant impact to both the people and the economy. Severe droughts are increasingly being felt in many parts of the country with negative consequences on, among others, food production and water scarcity. Droughts have seriously affected most vulnerable sectors including agriculture, forestry, fisheries, energy, health, water, industry, business, trade, tourism and services. The livelihoods of about 80% of Tanzanians depend on the agriculture, forestry and fisheries resources. Small-scale farmers are more vulnerable as they are highly dependent upon rain fed

<sup>25</sup> CGIAR, 2015

<sup>26</sup> World Population review - <http://worldpopulationreview.com/countries/tanzania-population/> accessed 11/07/2017

<sup>27</sup> <http://data.worldbank.org/indicator/SP.DYN.TFRT.IN>

<sup>28</sup> World Bank Data – GDP per capita, PPP <http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD>

<sup>29</sup> UNDP 2016; Human development Index report

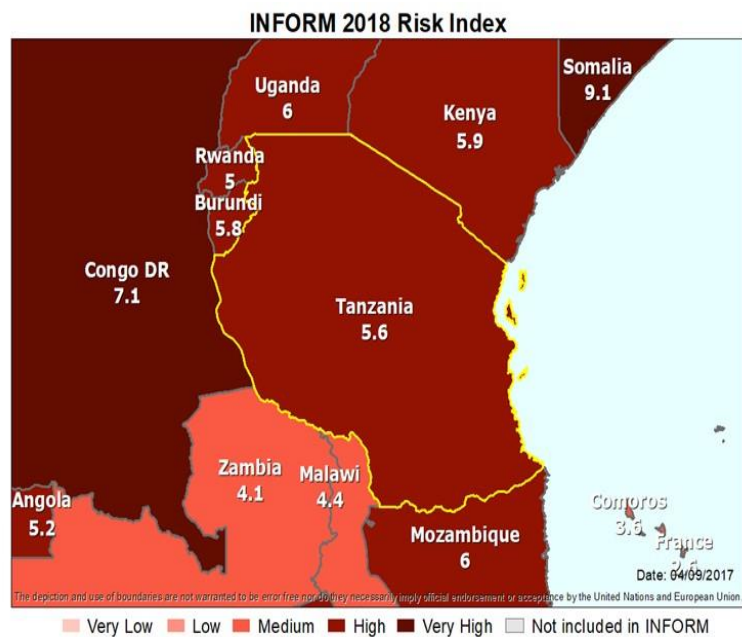
<sup>30</sup> <http://hdr.undp.org/en/composite/GII>

<sup>31</sup> ND GAIN country index - <http://index.gain.org/country/tanzania> accessed 11/07/2017

<sup>32</sup> Global climate risk Index 2016

production. In addition to the effects of prolonged dry spells or droughts on crops and livestock, periods of increased rainfall (with associated increase in pests and diseases) will negatively affect agricultural output. (Shayo, C., M, 2013). The extreme weather events in Tanzania are projected to be more intense, frequent and unpredictable. In terms of impacts to the society heavy socio-economic losses widespread infrastructural, human settlements, livelihood and other property damages are projected (Drakenberg, Goran, and Fernqvist, 2016).

According to the United Nations Office for Disaster Risk Reduction (UNISDR) Index for Risk Management (INFORM)<sup>33</sup> statistics for 2018<sup>34</sup>, out of 191 countries Tanzania ranks as the 25<sup>th</sup> most at risk country, the 53<sup>rd</sup> in terms of hazard and exposure, the 32<sup>nd</sup> in terms of vulnerability and the 40<sup>th</sup> in terms of lack of coping capacity. The INFORM model adopts the three aspects of vulnerability reflected in the UNISDR definition. The aspects of physical exposure and physical vulnerability are integrated in the hazard & exposure dimension, the aspect of fragility of the socio-economic system becomes INFORM's vulnerability dimension while lack of resilience to cope and recover is treated under the lack of coping capacity dimension. The highest risk factors include; physical exposure to floods, droughts, earthquakes and projected conflict risk. These are projected to increase development deprivation, inequality and Aid dependency. The areas that will be affected include access to health care services, food insecurity, impacts on infrastructure, communication and Governance.



The ND-GAIN index score for 2015 shows that Tanzania is highly vulnerability with low readiness to cope with climate risks and shocks. The ND-GAIN Country Index summarizes a country's vulnerability to climate change and other global challenges in combination with its readiness to improve resilience. It aims to help governments, businesses and communities better prioritize investments for a more efficient response to the immediate global challenges ahead. Tanzania is the 34th most vulnerable country and the 54th least ready country. It has both a great need for investment and innovations to improve readiness and a great urgency for action. The ND-GAIN Country Index summarizes a country's vulnerability to climate change and other global challenges in combination with its readiness to improve resilience. It aims to help businesses and the public sector better prioritize investments for a more efficient response to the immediate global challenges ahead.

More vulnerable people will be at risk of sliding into chronic poverty or being put at increased risk during the hazardous times of the year. Climatic changes may also increase the number of people

<sup>33</sup> INFORM is a collaborative project of the [Inter-Agency Standing Committee \(IASC\)](#) and the [European Commission](#)  
<sup>34</sup> <http://www.inform-index.org>



vulnerable to poverty and leading to an increased dependency on aid. Efforts should be aimed at reducing beneficiaries' vulnerability to shock and stressors, which will lead to poverty reduction as well as reduced climate change vulnerability. Different studies have already been done in Tanzania to understand the vulnerability of communities to the impacts of climate change, below is a summary of the vulnerability of the key sectors;

### Summary of Climate Change Hazards and Impacts

High temperatures	Drought	Floods	Sea level rise
<ul style="list-style-type: none"> <li>• Shifts in disease vectors or disease pathogens</li> <li>• increased incidences of malaria</li> <li>• Air and water pollution leading to respiratory problems</li> <li>• Shift in the viable areas for coffee and other cash crops;</li> <li>• Crop loss leading to poor incomes</li> <li>• Increase in crop pests and animal diseases</li> <li>• Biodiversity loss</li> <li>• Changing ecosystem dynamics and uses</li> </ul>	<ul style="list-style-type: none"> <li>• Rift Valley Fever epidemic</li> <li>• Food shortage leading to acute and chronic nutritional problems</li> <li>• Increase in water and vector -borne diseases with high consequences on women and children</li> <li>• Crop failure</li> <li>• Reduction in grazing lands and stock loss</li> <li>• Loss of livelihoods and assets</li> <li>• Additional pressure on natural resource use (forests &amp; fisheries)</li> <li>• Change in human and animal migration patterns</li> <li>• Water related conflicts</li> <li>• Wild fires</li> </ul>	<ul style="list-style-type: none"> <li>• Increased risk of waterborne disease;</li> <li>• Floods – destruction of health infrastructure</li> <li>• Landslide risks leading to death</li> <li>• Low productivity leading to malnutrition</li> <li>• Cholera influx</li> <li>• Soil erosion due to flash floods</li> <li>• Land degradation</li> <li>• Crop loss</li> <li>• Change in crop yields (quality and quantity)</li> <li>• Increased crop pests</li> <li>• Food shortage</li> <li>• Population displacement</li> </ul>	<ul style="list-style-type: none"> <li>• Coastal flooding leading to increase in vector and water-borne diseases and increased disease transmissions</li> <li>• Limited to potential impacts on marine coastal fisheries</li> <li>• Loss of coastal wetlands</li> <li>• Increased rates of shoreline erosion</li> <li>• saltwater intrusion</li> <li>• Higher water tables and higher extreme water levels leading to coastal flooding</li> <li>• Forced migration</li> </ul>

### 3.1. Economic Impacts of Climate change

According to the World Bank, Tanzania's population is estimated to grow at an annual rate of 3%. This coupled with an urbanisation rate of 30%, has resulted in increased consumer and credit demand. An increased population will also trigger increased demand for social amenities and infrastructure. The growth is underpinned by infrastructure development and a growing consumer base. Tanzania's is expected to experience robust economic growth underpinned by infrastructure development and a strengthening consumer base. Economic growth is expected to average 6.2% between 2017 and 2026<sup>35</sup>. The Economic Intelligence Unit (EIU) forecasts the annual average headline inflation to rise to 7.2% in 2017 from 5.2% in 2016. This was expected to be spurred by higher international prices for oil and industrial materials and drought-related food shortages in the early part of 2017.

<sup>35</sup> Deloitte and Touche, 2017.

The study on the economic impacts of climate change<sup>36</sup> estimates that the cost of building adaptive capacity and enhancing resilience against future climate change in Tanzania is USD (\$) 100 to 150 million per year. The Stockholm Environment Institute report projects that an additional USD (\$) 500 million per year (but probably more) is required to address current climate risks, in reducing future impacts and building resilience to future climate change. The report further states that aggregate models indicate that net economic costs could be equivalent to a further 1 to 2% of GDP per year by 2030<sup>37</sup>. The economic losses from climate change impacts on agriculture are estimated at US\$200 million every year (Arce, Carlos, et al 2015). A much greater sum than is required for building resilience of the sector, estimated at US\$ 100-150 million per year.<sup>38</sup> The cost of adaptation is estimated to rise and by 2030 cost US\$1 billion per year. The increase in extreme weather events alone has large impacts, it has been estimated that the cost of a drought year is around 1% or more of GDP<sup>39</sup>.

The cost of climate change is correlated with the cost of a decrease in productivity of sectors such as agriculture and also to the cost of adaptation and mitigation. Given Tanzania's high reliance on agriculture, a 15% decrease in rainfall might mean as much as a 16% decrease in yields by 2030 (1 million tonnes/year) which would impact on food security and economic growth. As an example, coffee exports are expected to be severely affected by higher temperatures where yields per hectare are expected to drop from 225 per hectare to about 145 by 2060. This will have large impacts on more than 2 million Tanzanians who rely on coffee production (CIAT and World Bank, 2017.)

Tanzania is currently focusing on Industrialization which to date is exploring processing of agricultural foods. The Tanzania vision 2025 aims at having at least 40% of the GDP contributed by the manufacturing sector by 2025. According to Tanzania Invest, so far the manufacturing sector contributes 13.25% to the country's GDP, with constant growth over the past few years. Initiatives to improve the manufacturing industry have already begun. In July 2016, the Chinese Government agreed to invest US\$100m to build a tile plant in Mkiu village. The plant is set to directly employ 1,500 Tanzanians and 3,000 indirectly. Additionally, in September 2016, the pension fund NSSF disbursed US\$2.1m to the Tanzania Biotech Product Limited. Through the ministry of agriculture, livestock and fisheries, the Government plans to spend Tshs 150.2bn to finance agricultural development projects (Deloitte and Touche, 2017). However, support to a green and resilient economy is key, because climate change will indirectly affect the manufacturing sector as well as other sectors across the board.

### 3.2. Climate change Impacts on Agriculture

According to the World Bank 2016 world development indicators, the agriculture sector contributed approximately 32% to the country's National Gross Domestic Product (GDP) in 2015, mostly through food crop production, which accounted for approximately 65% of the agricultural GDP. However for 2016 and 2017, it has dropped to 29.0 and 29.1 respectively.<sup>40</sup> Agriculture accounts for a third of Tanzania's exports. The sector employs approximately 13

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<sup>36</sup> SEI 2010: The Economics of Climate Change in the United Republic of Tanzania

<sup>37</sup> Republic of Tanzania, 2012: National Climate Change Strategy

<sup>38</sup> Watkiss, Downing, et al, 2011. Tanzania: Agricultural Sector Risk Assessment

<sup>39</sup> Tanzania Economic Outlook 2017; Joining the dots

<sup>40</sup> Tanzania's Economic Outlook 2017

million people, the equivalent of 59% of the economically active population. Women make up roughly half of the workforce and produce more than 70% of the country's food. Approximately 7.2 million youth make a living from agriculture (FAO, 2013). Climate change projections indicate that the sector is likely to be affected by climate change impacts if adaptation and mitigation measures are not implemented

Agriculture in the country largely depends on rainfall which is increasingly becoming unpredictable and unreliable with worsening climate change impacts. Food insecurity will render working populations weak and unable to work in the fields for the next harvests hence any food shortage outbreak could have long term effects. There is a threat to livestock productivity, survival and distribution through reduced quantity and quality of range-land and prevalence of vector-borne livestock diseases (Shemsanga et al 2010, quoting IPCC, 2001, URT, 2003). Deaths of large numbers of livestock could happen due to lack of water and pasture which is already a repeated occurrence in Tanzania in recent years, hence threatening livelihood of pastoralists in the country. Estimates indicate that the livestock sub-sector contributes the most to agricultural greenhouse gas (GHG) emissions. An increased focus on the development and scale-out of livestock based Climate Smart Agriculture (CSA) programmes are required in order to support the country to achieve a low emissions development pathway.

The fisheries sub-sector contributes around 2.6% of GDP and the fish export contribute around \$223M. Since the majority of the fishing is artisanal, it is however difficult to estimate the exact contribution but it is estimated that the sector employs more than 177,527 people directly and as much as 4,000,000 people indirectly (Arce, Caballero and Jorge 2015). It is estimated that 70% of the national protein intake comes from fish and that close to 5 million people are dependent on fishing for their livelihoods. Between 2007 and 2012 there was a decline in the contributions from the fish sector with 0.3% caused by decreases in fish catches linked with climatic impacts on lake ecosystems together with factors such as environmental degradation, over fishing, change of species distribution and increased human population.

According to the National Agriculture Policy 2013, the agricultural sector has experienced a stagnant growth rate of 4.4% over the past years, compared to an expected rate of 6% as outlined in the Comprehensive Africa Agriculture Development Programme (CAADP) Framework. This has been associated with continued soil degradation due to rapid population growth and poor implementation of existing policies, inappropriate use of technologies (such as increased use of fertilisers on mono-cropping systems), soil erosion due to poor livestock rearing practices, and continued use of traditional cropping methods (hand hoes), among others. For livestock in particular, some of the main challenges include inadequate zoning for grazing land, poor infrastructure for livestock products marketing, as well as high incidence of livestock diseases and pests as a result of climate change.

Tanzania has put in place a Climate-Smart Agriculture programme 2015-2025, which focuses on improving productivity and incomes through building resilience, integrating value chains, promoting research for development and Innovations as well as improving agricultural advisory services. The Tanzania Climate Smart Alliance (TCSAA) represents a promising opportunity for improved coordination, dialogue, and information sharing on CSA. However, all this requires financial, and technical support for effective implementation. In addition the Agriculture Markets Development Trust (AMDT) established by the Governments of Denmark, Ireland, Sweden and Switzerland, as a long term facility to increase incomes and employment opportunities for poor

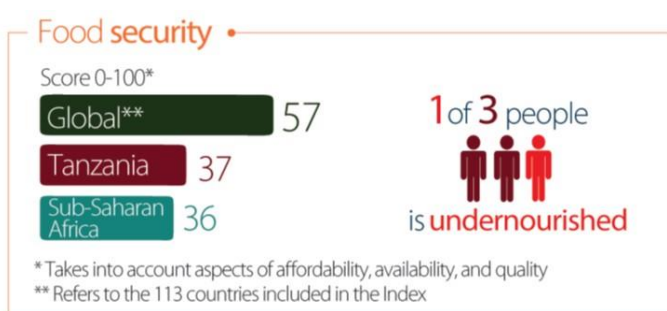
women, men, and young people in Tanzania<sup>41</sup> also provides an opportunity to address inclusive agriculture economy, focusing on small, medium and large scale enterprises. The Trust works with the private sector, Government and Civil Society Organisations to promote the Making Markets Work for the Poor (M4P) approach to stimulate changes to market systems that provide for those living in poverty ensuring that development of inclusive, competitive, and resilient agricultural market systems are in place, leading to sustained benefits and impacts for the poor. Climate change mainstreaming at each node of the value chain can strengthen resilience of producers, retailers, manufacturers, exporters and others engaged.

### 3.3. Climate change Impacts on Food Security and Nutrition

Climate change, through higher temperatures, land and water scarcity, flooding, drought and displacement, negatively impacts agricultural production and causes breakdown in food systems. Climate change affects the four dimensions of food security; food availability, food accessibility, food utilization and food systems stability. Tanzania ranked 95th out of 113 countries in the Global Food Security Index 2017<sup>42</sup>, indicating overall slow progress towards achieving food security targets. One third of the population is undernourished, while underweight and wasting rates among children under the age of five remain high.<sup>43</sup> Without considerable efforts made to improve climate resilience, it has been estimated that the risk of hunger and malnutrition globally could increase by up to 20 percent by 2050. In Tanzania, the prevalence of child malnutrition in children under the age of five is 13.0% (2013)<sup>44</sup> and general prevalence of undernourishment is at 32.1% (Food Security Index, 2017)

Food insecurity is prevalent in low-income and vulnerable households particularly among people living below the poverty line, where there is high reliance on agriculture for subsistence and where climate shocks including droughts and rainfall changes are more severe. High food prices, pests and diseases that affect crop production, and low use of farm inputs, are other factors affecting the population's food security (FAO, 2013). Previous research has revealed that, while the quantity of food consumed by the population decreased (measured through calorie intake in the households), the diversity of the diets (referring to micronutrient intake) increased. Middle and high income groups of the population are transitioning towards energy-dense diets, while people belonging to the low-income group, particularly those located in rural areas, remain highly food energy deficient (CIAT and World Bank, 2017).

#### Food security, nutrition, and health in Tanzania



Source; CIAT, World Bank, 2017

Malnutrition from food shortage, which is already seen as a direct consequence of climate change in the country, decreases immunity and exposes the affected populations to opportunistic diseases that would otherwise be resisted. FAO described Tanzania as having a very high level of

<sup>41</sup> AMDT establishment Plan: 2014

<sup>42</sup> <http://foodsecurityindex.eiu.com/Country/Details#Tanzania> accessed on 10/11/017

<sup>43</sup> WFP, 2013. Comprehensive food security and vulnerability analysis, Tanzania.

<sup>44</sup> WHO & UNFCCC, 2015

undernourishment, with 43% of the population being under nourished directly because of drought related food shortages (Shemsanga et al 2010)

The Tanzania National Multi-sectoral Nutrition Action Plan (NMNAP) 2016 -2021 has focus on climate change and environment, though the activities are not very explicit. Under the nutrition sensitive outcome results, there is focus on increasing coverage of nutrition sensitive interventions from key development sectors; Agriculture and Food Security; Health and HIV; Water, Sanitation and Hygiene; Education; Social Protection and Environment and Climate Change. One of the outputs is to ensure vulnerable communities are able to cope with drought and climate change to avoid shortage of nutritious food during shocks. Under the actions, the plan recommends implementation of concrete adaptation measures to reduce vulnerability of livelihoods and the economy and developing a nutrition contingency plan for addressing nutrition needs of populations that are prone to climate change hazards. It should however be noted that updated information on the status of food security and nutrition in Tanzania is scarce and existing reports rely on data collected more than five years ago. This reiterates the need for strengthening national information systems in order to improve decision-making on targeted economic, development, and agricultural investments.

### 3.4. Climate Change Impacts on Health

The prevalence of some of the tropical diseases and other threats to human health depend largely on local climate. According to the Intergovernmental Panel on Climate Change (IPCC, 2007), extreme temperatures can lead directly to loss of life, while climate-related disturbances in ecological systems can indirectly impact the incidence of infectious diseases. On the other hand, warm temperatures can increase air and water pollution, which in turn harm human health. Extreme weather can destroy shelter, contaminate water supplies, cripple crop and livestock production, tear apart existing health and other service infrastructure. This will ultimately increase the existing burden of disease and other non-health need of vulnerable human population

An increase in temperature or rainfall increases the number of cholera cases (IPCC, 2014). The combination of higher temperatures, prolonged droughts and floods coupled with scarce water resources and poor sanitation make Tanzania vulnerable to outbreaks

of cholera and other waterborne diarrhoeal diseases. A study has already shown that during the 1997-98 El Niño, rise in sea surface temperature coupled with excessive flooding emerged as two

#### Climate change and Health Impacts

- By 2070, under both high and low emissions scenarios over 114 million people are projected to be at risk of malaria above the estimated baseline of about 25 million. Population growth can cause increases in the population at risk in areas where malaria presence is static in the future
- In Tanzania, by 2030, an estimated 6,100 annual premature deaths per year due to outdoor air pollution is anticipated
- The elderly, children, the chronically ill, the socially isolated and at-risk occupational groups are particularly vulnerable to heat-related conditions
- In Tanzania, 63% percent of an estimated 14,700 child deaths due to acute lower respiratory infections is attributable to household air pollution

WHO and UNFCCC, 2015

significant factors in cholera epidemics in Djibouti, Somalia, Kenya, Tanzania, and Mozambique (Wandiga, et al, 2006). Studies undertaken in the Lake Victoria basin also indicate that incidences of cholera have increased as a result of climate change. 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. (Constantine and Shayo, 2013). Water-borne viral and bacterial infections can cause severe diarrhoea in children, often locking them into a vicious cycle of undernourishment, susceptibility to other infectious diseases, and eventually death.

There are already reported incidences of epidemic malaria especially in highland areas that were traditionally free from mosquitoes and malaria such as highland areas of Tanga, Kilimanjaro, Iringa, Kagera and Mbeya, among others. Malaria is by far the most important vector-borne disease causing high morbidity and mortality in Tanzania. The prevalence and pattern of malaria transmission is focal and varies from place to place depending on climate and topography. Until recently, malaria has been a common disease in low altitude rural areas of Tanzania. Malaria has been common in high temperature and humid lowland areas especially during and after rainy seasons. Rift Valley fever is also 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 *Aedes* and *Culex* mosquitoes<sup>45</sup>.

It is also estimated that as much as one fifth on diseases in low-income countries could be attributed to various environmental risk-factors. Women are the ones engaging in tasks such as fetching heavy loads of water and firewood, together with indoor cooking exposing them to indoor air pollution, and are as such more affected by environmentally induced health problems than men. Air pollution in and around the home is largely a result of the burning of solid fuels (biomass or coal) for cooking. Women and children are at a greater risk for disease from household air pollution. Consequently, household air pollution is responsible for a larger proportion of the total number of deaths from ischaemic heart disease, stroke and lung cancer in women compared to men. In Tanzania, 63% percent of an estimated 14,700 child deaths due to acute lower respiratory infections is attributable to household air pollution<sup>46</sup>

### **3.5. Climate change Impacts on Natural resources**

Tanzania is richly endowed with natural resources and a large majority of the population derive their livelihoods from natural resources, such as minerals, forests, land and gas, among others. If well sustained, they can contribute to economic development and poverty reduction. In addition sustainable management of Tanzania's wildlife is key for the development of a thriving tourism industry. The key environmental problem in Tanzania is the degradation of natural resources such as land, forests, water and biodiversity. Increasingly, however, other problems such as waste, water scarcity and air pollution are growing in importance, and Climate change adds to existing stresses.

Biodiversity is key for the resilience of ecosystems and their services and a loss in biodiversity can thus have ramifications beyond the loss of individual species. The main drivers of biodiversity loss are habitat change through resource exploitation, pollution, including the use of pesticides, invasive species and climate change. It is the poor who are particularly vulnerable to climate change, environmental degradation and pollution. They disproportionately face problems of access to assets

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<sup>45</sup> Ibid

<sup>46</sup> WHO and UNFCCC, 2015. Climate and Health Country Profile, Tanzania

on which they depend, this can relate to land and water of good quality and quantity but also fisheries and grazing lands. Poor farmers are also more exposed to pollution from polluted water, indoor air pollution, waste, agro chemicals and outdoor air pollution.

Environment and climate has been relatively integrated in previous National Development plans and the first five year development plan, however, implementation is the main challenge. Implementation capacity hinges on issues like administrative capacity, societal awareness, political will and financial resources. There are problems with coordination within government with insufficient attention to the means of implementation and responsibilities for various ministries, weak monitoring and inadequate use of decision making tools like environmental impact assessments etc. The capacity of local government (human and financial) to carry out their task is very limited which hinders implementation of existing laws.<sup>47</sup>

## Water resources

Water is a critical input into Tanzania's economy. It underpins the performance of the agricultural sector, which employs 80% of the workforce and accounts for 45% of the country's GDP and 55% of foreign exchange earnings. River basins provide drinking water for the workforce and supports industrial production and hydropower provides 55% of the country's power generation (Noel, 2010). Uncertainty regarding future rainfall patterns and river flows, combined with ambiguity in projected population growth and urbanization rates will complicate planning for adaptation in Tanzania's domestic water supply sector.

Tanzania has eight river basins and three large fresh water lakes that annually amount to 2,291 m<sup>3</sup> of renewable water sources per capita. Seen from this perspective Tanzania has abundant water resources. The high degree of water resource variability across the nation however means that the majority of the rural population suffer severe water shortage. Tanzania did not meet the MDG target of a 78% access to water by 2015. The World Bank reports that in 2015 only 55.6% of the population had access to an improved water source. It is projected that due to increasing population growth and increased consumption, by 2025, Tanzania will be facing water stress (defined as average per capita water resource being below 1500m<sup>3</sup>). The water sector estimates to spend Tshs 623.6 billion in its efforts to continue proper management and development of water resources, services for quality and clean water, accessibility of water in rural areas and in cities. Salt water intrusion and sea level rise will disrupt water supplies, further damage ecosystems, accelerate loss of land and undermine agriculture among others (Shemsanga et al 2010, quoting Mwandosya, et, al., 1998). Worth noting, these effects are already being felt in many places in the country.

According the Agricultural Sector Development Programme II, 2016, water is used most of all in the agricultural sector that stands for 89% of the total fresh water withdrawal in the country. Water is vital in other sectors such as industries and mining operations but also in the tourism sector. Currently, population growth, intensified agriculture including use of pesticides, deforestation, increased urbanisation, industrialisation, lack of proper sanitation and climate change has the potential to negatively affect the quality and availability of water in the country. Low water levels

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<sup>47</sup> Drakenberg, Göran and Fernqvist, 2016

in dams have greatly contributed to the current electricity crisis.<sup>48</sup> In urban areas over abstraction of water flows upstream and degradation of water catchment areas are a challenge<sup>49</sup>.

## Energy

Tanzania has abundant energy resources such as hydro (estimated at 4.7 GW<sup>87</sup>), natural gas (proven reserves at 53.28 TCF<sup>88</sup>), solar radiation (187 W/m<sup>2</sup>), wind 100 MW, coal reserves (estimated to 1,200 million tonnes), uranium, biomass, and geothermal which is estimated to generate about 650 MWe<sup>89</sup>. Energy consumption in rural areas accounts for about 85% of the total primary national energy consumption (Drakenberg, et al, 2016).

The energy access situation report 2016 survey results indicate that 16.9 percent of the rural households in Tanzania Mainland were connected to electricity of any form compared to 65.3 percent of their counterparts in urban areas. The use of firewood as the source of energy for cooking is still predominant in Tanzania Mainland as 71.2 percent of households use firewood as one among the sources of energy for cooking, followed by charcoal (37.0 percent) and kerosene (5.0 percent). The use of firewood is more dominant to rural households (92.0 percent) compared to urban households (28.4 percent). On the other hand, the use of modern source of energy for cooking (electricity, bio and industrial gas, and solar) by households accounts for only one percent.

Energy related impacts due to periods of low rainfall and drought have resulted in lower economic growth in Tanzania. The Central Bank of Tanzania has estimated that in 2007 the economy grew 1.1% slower than expected due to electricity shortages. Similarly, in 1997 growth dropped to 3.3% from the previous year's 4.2%, also due to power shortages and in 1994, industrial growth declined by 3.8%, attributed mainly to electricity shortages and load shedding (World Bank, 2010). As a result of increasing climate variability, over the last years, power rationing and black outs have become a common phenomenon. This has affected individuals, household and industrial income generating activities. Consequently, additional resources which are committed for other development programmes are sometimes being reallocated for thermal electricity generation. This undermines national poverty reduction efforts. On the other hand, insufficient electricity generation result in increased utilization of forest resources for energy (Shayo, 2013)

The World Bank analysed the economic cost of power shortages by quantifying the cost of running backup generators and the losses from foregone production; for Tanzania, it estimates this has resulted in a loss of over 4% of GDP annually, adding that power shortages act as a drag on economic growth in the long term. It has also been noted that inadequate electricity supply was one of the major constraints confronting Tanzanian industry and a major obstacle to the start-up of new businesses in the country. Surface water evaporation, reduced water runoff due to drought, increased run off due to flooding and siltation deposits are the main impacts on hydroelectric installations caused by temperature and rainfall changes.

Tanzania has put in place an energy policy, 2015 which recognises that the main thrust has to be based on private sector initiatives and investments for exploitation of local energy sources. The new approach is to modernise energy in rural areas of Tanzania and the government has committed itself to develop and implement the new strategy to address modern energy needs of over 85 percent of Tanzanians living in rural areas. However, challenges of changing rainfall patterns and recent droughts that have dramatically reduced large hydropower output have to be addressed.

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<sup>48</sup> URT, 2012, National climate change strategy

<sup>49</sup> Noel, 2001, The Economics of Climate Change in Tanzania: Water Resources



Health risks and environmental degradation from household reliance on biomass energy needs to be reduced. The incomplete combustion of fuel wood in traditional biomass stoves results in indoor air pollution, which is linked to respiratory and other diseases. The loss of forest cover from charcoal production, with nearly 1 million tons consumed annually, is estimated at about 100,000-125,000 hectares. Deforestation also contributes to land degradation, soil erosion which also negatively impacts on storage capacity of hydropower dams<sup>50</sup>.

## Forestry and Biodiversity

Tanzania is endowed with diverse forestry ecosystems and is globally known as a major repository of significant biodiversity, ranking amongst the top countries in tropical Africa in terms of the representation of ecoregions. Forestry and biodiversity conservation is key for the country in terms of employment and livelihoods. Forestry resources can be used for multiple purposes ranging from the supply of wood for fuel and timber, to ecosystem and ecological functions and services (UNDP, 2016). Forestry related activities currently support the employment of the rural communities, and the sector generates approximately 10-15% of exports and 10% of foreign exchange earnings. In Tanzania, the annual per capita value of subsistence use of forest products in rural areas has been estimated as USD 25–50, with forests providing 90% of energy supplies, 75% of building materials and 100% of traditional medicines.

Tanzania has strong policies in place to support forestry governance, and has integrated Reduced Emissions from Deforestation and Forest Degradation (REDD) with Participatory Forest Management (PFM) to ensure that benefits from REDD reach forest-adjacent communities, and that local incentives are aligned with national and global interests in conserving forests to reduce carbon emissions. Despite the positive contributions of the sector to socio-economic development, high poverty levels and rapid population growth have exacerbated environmental problems. Some of these include deforestation, loss of biodiversity, and the deterioration of aquatic systems including water supplies and catchment areas (Tanzania State of the Environment Report, 2014).

While the country's PFM programme without doubt forms a strong foundation for Tanzania to sustainably manage its forests, the country still has a long way to go towards addressing the complex and challenging drivers of deforestation and degradation. This is because PFM only covers about 11% of the forest estate, with state protected areas covering a further 45% (with varying levels of efficacy), leaving some 44% of forests in Tanzania largely under open access exploitation. As a result Tanzania has a substantial deforestation rate of 1.1%, one of the 10 highest rates of net national forest area loss in the world<sup>51</sup>. The unsustainable use of resources leads to reduced sources of livelihood and production in the long run, which in turn leads to food insecurity and increased poverty. The heavy dependency on agriculture and the rapid population growth increase pressure on the environment and natural resources, and increase climate change risks especially in water stressed regions.(UNDP, 2016)

Forests provide valuable ecosystem services, such as purification and regulation of water, climate regulation, and carbon sequestration which means that deforestation is contributing to global climate change, through emissions of greenhouse gases. Furthermore it causes land degradation and erosion, siltation and affects water run-off. The main drivers of deforestation are population

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<sup>50</sup> Report on Forests, Rangelands and Climate Change Adaptation in Tanzania

<sup>51</sup> Mpingo Conservation & Development Initiative, 2015. Combining REDD, PFM and FSC certification in South-Eastern Tanzania

growth, urbanisation, trade, agriculture, and the use of forest products as a source of energy. Current Government efforts in the Agricultural Sector and Big Results Now (BRN) together with recent discoveries of minerals and related infrastructure developments, accelerates the already high deforestation rate<sup>52</sup>.

In Tanzania, the marine and coastal environment contributes to the country's high biological diversity with its coastal forests (70,000 hectares), coral reefs (3,580 km<sup>2</sup>), sea grass beds, mangroves, and beaches. The coastal environment contributes with a vast amount of ecosystem services and serve as habitat for fish and birds but also function as buffer zone against wave action. The marine environment provides possibility for a number of economic activities such as fishery and tourism, and the major development priorities for the coastal area are exploration and exploitation of natural gas and petroleum, infrastructural (e.g. ports, or the gas pipeline from Mtwara to Dar es Salaam), Mari culture and tourism. The marine and coastal environment is threatened by extensive human and economic activities such as over harvesting of mangroves and coastal forests (for agriculture, firewood and tourism), overfishing, destruction of coral reefs, pollution: (e.g. fertilizers, pesticides) while at the same time facing threats of climate change in terms of increased water temperatures, weather variability, changing rainfall patterns and rising sea levels (Shayo, 2013).

Overall, there is need to support policy implementation and reduce the social, economic and environmental factors that are increasing loss of forestry cover and biodiversity in the country.

### 3.6. Climate change, gender inequality and poverty

Gender inequality and vulnerability of women and girls will be more pronounced in Tanzania due to impacts of climate change but also due to the deep rooted Socio-economical and historical barriers to gender equality and power relations between men and women, boys and girls. Furthermore, women are often excluded from decision-making on access to and the use of land and resources critical to their livelihoods which makes adaptation hard for them amidst limited resources<sup>53</sup>. It is important therefore that the rights of women and girls as well as vulnerable men and boys are ensured in regards to food security, non-discriminatory access to resources, including income, and equitable participation in decision-making processes which will increase their adaptive capacity and improve livelihood resilience

In the field of agriculture, women are more affected by the adverse impacts of climate change in Tanzania due to the gender roles, social and cultural norms, and limited access to training, decision making and resources. With regard to education and training, for example it is reported that between 2006/2007, 223 women and 538 men graduated at Certificate and Diploma levels from eight Agricultural training institutes<sup>54</sup>. Rural women lack technological support and skills which leads to decreasing efficiency on productivity, storage and preservation leading loss of harvests. According to the FAO, yield gap between men and women averages around 20–30 percent, and most research findings reveal that the gap is due to differences in resource use. Despite women being the main producers of cash and food crops, their socio-cultural environment does not allow

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<sup>52</sup> Devisscher, T., 2010. Ecosystem-based Adaptation in Tanzania; The Role of Ecosystem Services for Human Well-Being and Climate Adaptation

<sup>53</sup> Shemsanga, C, et al. 2010. The Cost of Climate Change in Tanzania: Impacts and Adaptations. Journal of American Science

<sup>54</sup> United Republic of Tanzania, 2007

them to build their own wealth due to cultural and social norms that prevent women from owning land in many parts of the country<sup>55</sup>

Furthermore, access to credit for investment in adaptation is difficult for women. Male headed households are more likely to access credit than female headed households (86.7% versus 13.2%). In addition, women face additional stresses that increase their vulnerability. During prolonged drought or floods resulting in decrease of food security, men migrate to other areas leaving women and their children behind with household and agricultural responsibilities in addition to care and support roles<sup>56</sup>. Women's capacity in managing risks and disasters should be strengthened to cope with climate impacts through supporting them with capacity and skills, technology, information, voice in decision making, financing for adaptation.

Climate change impacts on water resources will continue having direct implications on women and girls. In most Tanzanian communities, the role of fetching water for domestic use is assigned to women and girls who spend on average 2 or more hours travelling to collect water. The increased scarcity of water as a result of climate change increases women and girls' workload, reducing time spent by women in productive activities and impacting on school girl's attendance and education. Moreover, water insecurity caused by climate change leads to poorer sanitation, and leads to heavier workload for women. On the other side among pastoralist communities in Tanzania water shortages resulting from climate change forces boys to travel long distance in search for water for their livestock as herding role is assigned to the boys hence affecting their attendance in schools. Likewise, water shortage in schools leads to absenteeism and dropping out of school among adolescent female students, leading to gender disparities in performance and retention as a consequence.<sup>57</sup>

Women must take an active role in developing climate change policies due to their knowledge and expertise, which can be used to build on current mitigation, adaptation, and disaster reduction plans. The challenges that women face in managing their resources give them a unique advantage to make substantial contributions to livelihood strategies that are resilient to the impacts of climate change.

CCAFS, 2016

Tanzania has achieved significant steps towards achieving gender equality including issues of representation in parliament, access to land policies, enrolments rates, and has also put in place gender relevant policies and strategies including the gender and climate change strategy and guidelines for mainstreaming gender and climate change. Despite the achievements made so far, there are still challenges in implementing these policies to cause change in the lives of the vulnerable women and men, boys and girls. While gender constraints are identified by a number of policies, the policy solutions are often not aligned with these issues. Clearer strategies would allow policy-makers to move past the simple recognition that climate change will affect men and women differently and push for policy solutions that substantially close gender gaps<sup>58</sup>.

<sup>55</sup> Mascarenhas, O. 2007. Gender Profile of Tanzania. Tanzanian Gender Networking

<sup>56</sup> National guidelines for mainstreaming gender into climate change

<sup>57</sup> Gender CC. 2011. The Role of Women in Adapting to Climate Change in Tanzania

<sup>58</sup> CCAFS, 2016. Climate Change Adaptation in Agriculture and Natural Resource Management in Tanzania: A Gender Policy Review

In the CCAFS review 2016 of the gender gaps, it was found out in the Tanzanian context (possibly in many other contexts world over), there is a tendency to see gender analysis as a “women’s issue” which, not only marginalizes the role of gender considerations in policy, but stifles discussions and policy provisions that take into account the unique roles and vulnerabilities that men face. Additionally, gender considerations are often deferred to the NGO sector for implementation. There is need to institutionalise implementation and coordination on gender equitable outcomes at all levels. Several of the reviewed documents relegate the achievement of these gender considerations to the NGO sector. There is need for an enhanced institutional arrangement and to mainstream gender throughout all sections of the policy documents for an improved performance.

Ensuring gender equity in policy reviews, design, implementation, monitoring and evaluation of programmes will contribute to increased resilience of the population. Research on the gendered impacts of climate change as well as the appropriateness and adaptation interventions technologies and practices by gender, is a good starting point in ensuring that identified practices benefit and can be easily adopted by both women and men.

## 4.0. Climate change policy Framework

Tanzania’s overall development policy is outlined in Vision 2025, which sets future development objectives for the country. This vision is operationalized through the medium-term plans, including the National Strategy for Poverty Reduction and the Five Year Development Plan (FYDP) for 2011/12 to 2015/16. The five year development plan, led by the President’s Office Planning Commission (POPC), aims to unleash Tanzania’s economic growth potential and transform Tanzania into a middle-income country. The Government of Tanzania, recognizing the adverse impacts of natural disasters and climate change has put in place relevant legislation to address the challenges. The key climate relevant policy documents include; the National Adaptation Programme of Action (NAPA 2007), National climate change strategy 2012, Zanzibar Climate Change Strategy (2014), National REDD+ Strategy and Action Plan (2013), Environmental Management Act, 2004, The disaster Management Act 1990, The National Energy Policy 2003, National Environmental Policy, 1997 and the Intended Nationally Determined Contribution (INDC), 2015. There are also climate relevant sector specific strategies and guidelines which include; Guidelines for integrating climate change into national sector policies, plans and guidelines 2013, Tanzania Agriculture Climate Resilience Plan, 2014–2019 among others.

### 4.1. Key Climate change policies and priority sectors

#### **Tanzania National Development plan (2016/17- 2020/21)**

Key priority areas related to climate change include; Food security and nutrition, Sustainable Water & Land Use Management, Mainstreaming resilience for climate variability/change and natural disasters, the involvement of stakeholders in the acquisition of inputs, research and market information, Increased community resilience and capacity to manage climate risks, Reduction on Damage and loss due to natural disasters, Resilient natural resources management for growth, Private Forestry and Value Chain in Tanzania and enhancing low cost credit to women/youth, implement universal social pension scheme to eligible elders

#### **National Environment Policy (2016) – Draft**

The policy aims to provide a national framework for guiding harmonized and coordinated environmental management for the improvement of the welfare of present and future generations.

The policy aims to enhance early warning and response systems, improve climate change capacity and strengthen the implementation of the National Climate Change Strategy and Action Plan – which responds to climate change implementation

#### **Intended Nationally Determined Contribution (INDC), 2015**

The INDC focuses on adaptation contributions reducing climate related disasters from 70% to 50%. The INDC included both mitigation and adaptation strategies. Mitigation efforts will focus on four sectors: energy, transport, waste, and forestry, while adaptation strategies will include Agriculture, Livestock, forestry, energy, coastal marines, fisheries, water resources, tourism, health and human settlement.

#### **Zanzibar Climate Change Strategy (2014)**

The focus is to build a climate resilient and sustainable Zanzibar by 2030. It provides a response framework for addressing vulnerability, impacts and adaptation for current climate variability and future climate change

#### **National REDD+ Strategy and Action Plan (2013)**

The goal of the strategy is to facilitate effective and coordinated implementation of REDD+ related policies, processes and activities so as to contribute to climate change agenda and overall sustainable development.

#### **National climate change strategy 2012;**

The goal of the strategy is to enable Tanzania to effectively adapt to and participate in global efforts to mitigate to climate change. Under adaptation, the strategy has defined strategies and interventions for the following sectors; Agriculture and food security, Livestock, forestry, energy, coastal marines, fisheries, water resources, tourism, human health and human settlement, wild life, industry, infrastructure and land use.

Under mitigation, the following sectors are prioritised; Agriculture, Livestock, forestry, energy, industry, Mining and waste management.

A number of cross cutting issues are also highlighted with strategic interventions, and they include; Gender and vulnerable groups, research and development, disaster risk reduction, technology transfer, capacity building, systematic observation, early warning among others

In addition to the priority sectors, the strategy also focuses on putting in place mechanisms to build effective and efficient system for planning, mobilization and management of climate change funds, mainstream climate change issues into development planning at all levels, enhance coordination and management of climate change funds and ensure equitable flow of climate change opportunities to the public

#### **The National Adaptation Programme of Action (NAPA), 2007**

The NAPA did an assessment of climate change vulnerabilities for different sectors, including forestry, health, human settlements, marine, agriculture, and fresh water resources before recommending a number of key interventions. A total of 72 adaptation activities were proposed from all sectors; these were reduced to 14 project activities and from these activities five costed project profiles were developed. The NAPA also ranked sectors in order of their priority for adaptation activities. High ranked priority areas included; Agriculture and Food Security, water, energy, and Forestry. However, many of the projects and programmes implemented have yielded little results due to lack of financing, technological problems and poor governance-related constraints.

#### **Environmental Management Act, 2004**

Empowers the minister, in consultation with relevant sectors to take measures to address climate change, particularly the impacts of climate change and adaptation measures and to issue guidelines periodically to ministries and any other institutions in order to address climate change and its impacts as a result of global warming. The minister is also charged with putting in place strategies and action plans to deal with climate change as well as include CC issues in schools and higher learning institution in their curriculum; also review and approve any measures undertaken to address climate change by all stakeholders and project national positions at global level on how to deal with the problem of climate change in the context of the United Nations Framework Convention on Climate Change, and its related Protocols

#### **The National Energy Policy, 2003**

Aims at addressing energy needs but one of the policy statements focuses on Climate Change ie Promoting efficient biomass conversion and end-use technologies in order to save resources; reduce the rate of deforestation and land degradation; and minimise threats of climate change. Efficient use of energy overall will lead to mitigation of greenhouse gases thus reducing impacts of climate change in future

### 4.1.1. NDC Implementation progress

The republic of Tanzania has signed the Paris Agreement but has not ratified the Paris Agreement yet, but they have however submitted their INDC to the UNFCCC. There has been no progress on the NDC but GIZ and UNDP are supporting processes to develop possible support programme with the Government of Tanzania. The Government has also not applied to be a member of the NDC partnership, which supports countries to implement their NDCs, which would be a lost opportunity if not pursued.

According to the INDC 2015, effectively implementing mitigation and adaptation contributions will require timely access to adequate and predictable financial resources; access to appropriate technologies; access to appropriate knowledge and skills; and institutional capacity building. Tanzania's capacity to undertake strong adaptation and mitigation actions beyond national efforts depend on support for implementation. In addition, enhancing capacity in early warning systems across sectors, improved research and systematic observations, improved climate change institutional capacity and coordination as well as awareness will be critical in addressing climate change.

The total amount of financial resources needed for implementation of the identified adaptation contributions is about USD 500million to 1billion per annum, and a total of USD 60 billion for mitigation contributions. Therefore, implementation of the identified INDCs will strongly depend on how the international community meets its commitments in terms of financial and technological support.

### 4.1.2. Progress on National Adaption Plan (NAP)

The Government of Tanzania is being supported by GIZ in undertaking a comprehensive stocktaking at all local councils in mainland and Zanzibar as well as with ministries and government agencies. NAP stock taking workshops have been taking place. Tanzania has also applied for GCF NAP readiness funds with support from UNDP, but the application has not yet been approved.

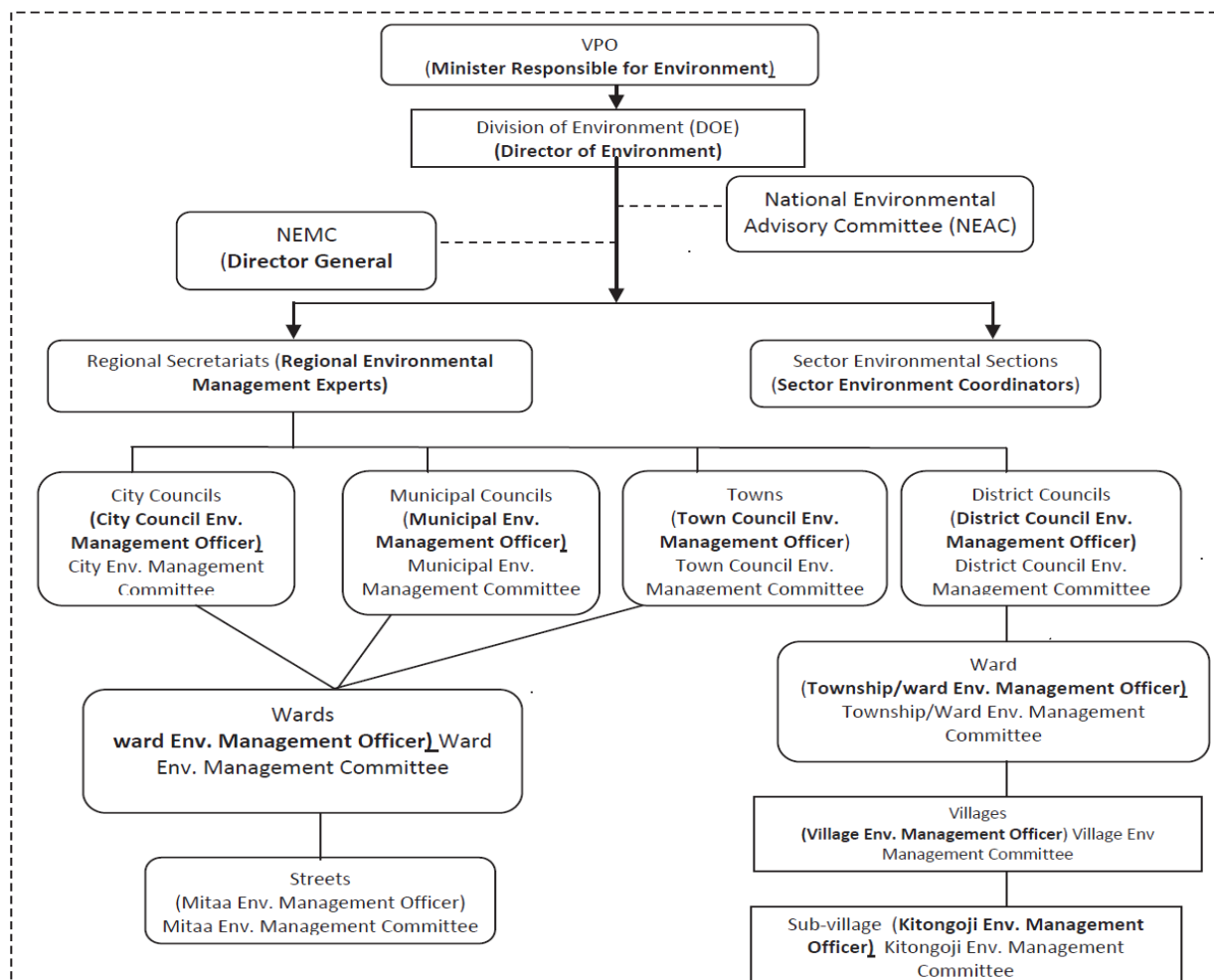
## 4.2. Institutional Coordination for climate change in Tanzania

The Department of Environment (DoE) in the Vice President's Office (VPO) is the government co-ordinating agency for climate change and the National Focal Point for the UNFCCC. Implementation of climate change actions in Tanzania is done within the context of the National Environmental Policy and the Environmental Management Act (EMA) 2004 since there is no climate change policy in place yet. The Act mandates the Vice President's Office (VPO), Division of Environment (DoE) to be the designated lead agency for environment and climate change-related activities in the country. The DoE is both the National Climate Change Focal Point (NCCFP) and the Designated National Authority (DNA) for the Clean Development Mechanism under the Kyoto Protocol.

The Act also provides for the establishment of various committees at both national and local levels. With regard to responding to climate change, the lead coordination committee is intended to be the National Climate Change Steering Committee (NCCSC), chaired by the Permanent Secretary in the VPO. The NCCSC is an inter-ministerial committee comprised of the Permanent Secretaries from sector ministries responsible for Energy, Finance, Industry, Natural Resources, Justice and Constitutional Affairs, Land, Agriculture, Livestock Development, Foreign Affairs, and

International Cooperation. This model developed from an earlier 12 member National Climate Change Committee that oversaw the 2003 Initial National Communication under the UNFCCC. The NCCSC has the role of providing policy guidance to the NCCFP to ensure coordinated actions and participation within various sectors and institutions. At the sub-national level, the Prime-Minister’s Office-Regional Administration and Local government (PMO-RALG) is expected to work in collaboration with sector ministries to implement strategic interventions involving Local Government Authorities (LGAs).<sup>59</sup>

**Diagrammatic representation of existing institutional arrangement for environmental management<sup>60</sup>**



Institutional arrangements provided by the Environmental Management Act underpin the implementation of all public climate change initiatives. The overall coordination of climate change actions is the responsibility of the NCCFP. The NCCFP is also tasked with preparing national

<sup>59</sup> ODI, 2013. Tanzania National Climate Change Finance Analysis

<sup>60</sup> National climate change strategy, 2002

climate change frameworks such as National Adaptation Plans (NAPs), Nationally Appropriate Mitigation Actions (NAMAs), guidelines and other relevant national documents, and for monitoring and evaluating the implementation of climate change-related strategies.

### 4.3. Policy and Institutional Gaps for Climate Change Mainstreaming

Whereas Tanzania has put in place several climate relevant policies and strategies, there are still challenges related to operationalization, coordination and financing of the policies. The national climate change coordination committees have been established, but they do not appear to meet on a regular basis, and lack a supporting secretariat beyond the National Climate Change Focal Point (NCCFP). So, in practice, the process of coordinating climate change actions across sectors and levels of government remains a challenge. Ministries have established 'desks' to mainstream climate change in their respective sectors. However, the current capacity of these climate change desks is restricted by limited knowledge on climate change, compounded by the meagre financial resources allocated to the desks. More generally, throughout the government service knowledgeable human resources on climate change-related issues is a major constraint. Further efforts are required to link science, research, innovation and policy formulation on climate change. (Yanda et al., 2013)

Climate change has not been adequately mainstreamed or integrated in sector specific plans and strategies and institutional coordination is weak. The Division of Environment (DoE) of the Vice-President Office (VPO), which is responsible for coordinating climate action has been unable to play its role to the full due to limited capacity, budget and convening power and this has affected the operationalization of the NCCS as a whole of government strategy. At local government level, there is limited capacity as well as funding gaps to respond to climate change. Districts where NGOs are active on climate change issues are better placed in terms of planning and implementing climate change programmes and projects than those without. Dependency on external financing mechanisms and implementation does not enhance climate change mainstreaming and is not sustainable in the long term (Yanda et al., 2013; Ampaire et al., 2016).

The National Climate Change Strategy of 2012 recognizes that there is limited institutional capacity to addressing the impacts of climate change in Tanzania and has put in place strategies to address institutional capacity strengthening at all levels recognising that national efforts towards climate change adaptation and mitigation need to be addressed across a range of sectors in a coordinated manner. Despite the strategic interventions being identified, the strategy lacks a comprehensive financing plan that highlights the strategy's budgeted costs and expected sources of funding to implement its climate change agenda.

Inadequate coordination of climate change actions from the national level to the local level remains a challenge. There is a disconnection between national and local governments, which will hinder effective integration of climate change into development planning across sectors and Local Governments. In terms of institutional coordination, the planning commission of Tanzania has a limited role in the climate change coordination and implementation mechanisms, which makes it delinked from the integration process. The use of the Environment structures poses a problem for integration of climate change in other sectors and risks being treated as an environmental issue yet its impacts and responses are beyond environment.

The national policy documents drafted in the late 1990s and early 2000s did not recognise climate change concerns. These policies include: National Land Policy of 1995, National Forest Policy of



1998, National fisheries Policy of 1998 and National Water Policy of 2002. The National Environment Policy of 1997 focused more on environmental issues and missed an opportunity to incorporate plans for climate change adaptation. Even the climate relevant policies in place do not contain clear timelines for implementation of climate actions nor do they have costed adaptation or mitigation interventions (ODI, 2013; Ampaire, et al, 2016)

## 5.0. Climate change financing for Tanzania

The Five Year Development Plan II 2016/17 – 2020/21 identifies climate change as a cross-cutting impediment to human development, economic transformation and industrialization. The plan identifies climate finance as an innovative new source of financing in Tanzania. To ensure resource availability for different climate change initiatives, the government is working on establishing the National Climate Change Fund with separate funding windows for climate change adaptation and mitigation. According to the Government of Tanzania INDC, (2015), an initial estimate of immediate and start-up financing needs for enhancing adaptive capacity is about USD 150 million. In addition, about USD 500 million per year is needed to address climate change adaptation and building resilience up to 2020, increasing up to USD 1 billion per year by 2030. These costs are likely to increase further depending on global mitigation efforts. Estimated costs are up to US\$ 60 billion by 2030 in mitigation investments in Tanzania.

Current funding is from national sources, including public funding from the government budget, private sector investments and international sources. However, there is no integrated approach to secure a coordinated working system so that funds to address climate change are used to achieve the objectives presented in the various initiatives. According to ODI study, climate change-relevant expenditure has increased steadily as a proportion of the total budget from 4.2% in 2009/10 to 6.5% in 2012/13. This growth is driven by an increase in donor funding that is on-budget. Domestically sourced finance declined by 4 per cent over the period while foreign financing grew by 61 per cent, reflecting considerable development partner support<sup>61</sup>. Unfortunately, the absence of an effective tracking system may make it difficult for the Tanzania government to effectively track expenditures for climate change actions (ODI, 2013; World Bank, 2015; CCAFS, 2016).

Tanzania has been one of the top 10 recipients of aid from OECD countries. Its biggest bilateral partners are the United States, the United Kingdom, the EU, Japan and Canada. The Nordic countries also have a strong presence in Tanzania. Among the multilaterals, the World Bank, the African Development Bank and UN agencies also provide strong support. As aid from many OECD donors has tended to decline, the involvement of non-OECD actors has been on the rise. China and India in particular have long-standing ties with Tanzania. In addition to the bi- and multilateral donors there are several other civil society organisations that are active in the field of climate change<sup>62</sup>.

Tanzania has mobilized climate finance, but results have been limited. Between 2003 and 2014, Tanzania secured over US\$200 million in international climate finance commitments, with an additional US\$400 million in the pipeline. Although financing is substantial, there is a significant shortfall given the resources needed to adapt to climate change. More than 80 percent of existing resources are from local development partners, with modest access to United Nations Framework Convention on Climate Change (UNFCCC) funds. The Ministry of Finance has been selected by the government to become the National Implementing Entity and it is currently seeking support for the accreditation process. The International Institute for Environment and Development

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<sup>61</sup> ODI (2014) Climate Finance in Tanzania - <https://www.cbd.int/financial/climatechange/tanzania-climate.pdf>

<sup>62</sup> Finland Country Strategy for Development Cooperation, Tanzania (2016–2019)

(IIED) and United Nations Capital Development Fund (UNCDF) with funding from DFID are supporting implementation of the Decentralised Climate Finance Project (DCFP), which is a 5-year project aiming at facilitating investments in improving responses to climate change across 15 test District Councils in Tanzania and 3 Districts in Zanzibar. The project will build resilience to climate change at local level through facilitating flows of finance to Local Government Authorities, the spending of which can be prioritised by communities. This project is currently being implemented as a pilot in three District Council of Monduli, Longido and Ngorongoro. IIED is supporting the accreditation process of the President's Office Regional Administration and Local Government (PO-RALG). The approach to climate change adaptation has been largely project-based, fragmented, and donor-driven and results have gone largely unmeasured<sup>63</sup>

Zanzibar is also in the process of setting up a climate change financing mechanism; it has no existing finance allocations, economic and financial instruments or finance planning system targeted at climate change. Over the past four years, the government has received US\$7.1 million in grants for climate-resilient and low-carbon investments in coastal areas. These funds are for projects covering 14 years and amount to just over US\$500,000 per year. Zanzibar mobilises climate finance from public sources both multilateral, such as the Least Developed Country Fund and bilateral, including the EU, Norway, Finland and Japan through the United Republic of Tanzania.<sup>64</sup>

### Overview of internationally funded climate change projects<sup>65</sup>

Dispersed to	Disbursed by	Amount approved (USD mn)	Amount dispersed (USD mn)	Activity Focus
National Adaptation Plan (NAPA) for United Republic of Tanzania	Least Developed Countries Fund	0.20	0.20	Adaptation
FA with the Ministry of Finance and Economic Affairs +TA	Global Climate Change Alliance	1.33	0.78	Multiple foci
Mainstreaming Climate Change in Integrated Water Resources Management in Pangani River Basin	Special Climate Change Fund	1.00	1.00	Adaptation
Developing Core Capacity to Address Adaptation to Climate Change in Productive Coastal Zones	Least Developed Countries Fund	3.10	3.10	Adaptation
Combined mitigation total (including REDD)		17.38	17.38	Mitigation

*Note: Projects operating across many countries are not included in the table*

There are key gaps in understanding how climate finance can best link with strategic plans, as well as tracking climate finance in general. Although much analysis has been done to investigate current access to climate change finance and expenditures, there has been no analysis of, nor targets for, climate resilience or low-carbon growth; neither has there been an analysis of how related outcomes could be measured to meet targets. This is already a challenge given the lack of climate

<sup>63</sup> World Bank, 2015

<sup>64</sup> IIED 2014

<sup>65</sup> AfDB Country Strategy Paper 2016-2020

finance tracking and the ad hoc nature of projects and programs, which the NCCS and ZCCS hope to overcome. Additionally, there has been no comprehensive analysis linking the strategic priorities in the NCCS and ZCCS to current finance for climate change activities, to identify where activities are currently resourced and where financing gaps may exist.

## 5.1. Ireland’s Contribution to Climate Finance

The mapping exercise identified a total of €35,201,946 in bilateral climate finance disbursements in 2016, an increase of 8.43% on the 2015 total of €32,464,410. Under adaptation, the mapping exercise identified €26,771,296 in bilateral climate finance for adaptation activities in 2016 representing over 18% increase over adaptation expenditure in 2015 and €1,254,725 in bilateral support for mitigation activities in 2016 (36% reduction on 2015 expenditure on mitigation).

Ireland will continue to support climate mitigation and adaptation in developing countries in line with our commitments under the UNFCCC. Ireland’s public climate finance will be predominantly provided through bilateral grants to Key Partner Countries through Irish Aid, Ireland’s overseas development assistance programme, together with direct grant contributions to various multilateral institutions or funds, such as the GEF, GCF and LDCF. Ireland is currently exploring ways to mobilise private climate finance to support mitigation and adaptation in developing countries. A cross-departmental working group is being established to progress this work.

### 5.1.2 Overview of Ireland Climate Finance in Tanzania

In 2016, Ireland provided a total of €2,875,000 to Tanzania in climate finance through its bilateral aid programme. In addition, Ireland provided €263,982 in climate finance to projects through its civil society programme. Climate relevant expenditure provided by Irish Aid to civil society organizations in 2016 was Rio marked and accounted for systematically for the first time, in cooperation with the project partners. Projects funded directly by Irish Aid under the bilateral aid programme include improving cocoa and oil seed value chains, improving milk production and marketing, strengthening farmers networks, and fostering more equitable land governance. Civil Society partners Oxfam, World Vision, and Help Age are helping to build resilience to climate change by promoting economic empowerment of marginalized communities, strengthening coping mechanisms of pastoralist communities, promoting sustainable approaches to improved nutrition, and targeted actions that deliver social protection to older people. Climate finance expenditure for 2016<sup>66</sup> is listed below;

	<b>Bilateral €</b>	<b>Civil Society</b>
Climate Finance Adaptation (UNFCCC)	1,875,000	263,982
Climate Finance Mitigation (UNFCCC)	0	0
Climate Finance Cross-cutting (UNFCCC)	1,000,000	0
Biodiversity (UNCBD)	450,000	17,605
Desertification (UNCDD)	1,350,000	68,647
Disaster Risk Reduction (DRR)	1,400,000	N/A
<b>Total Climate Finance</b>	<b>2,875,000</b>	<b>263,982</b>

<sup>66</sup> Irish Aid, 2017. Tanzania Climate Action report

## 6.0. Donor Coordination and support in Tanzania

Tanzania's aid coordination architecture is well-established to facilitate dialogue. The development cooperation landscape comprises 4 multilaterals, 17 United Nations agencies, and 18 bilateral donors. Infrastructure development and governance are funded by both multilateral and bilateral development partners (DPs) and the other sectors, such as human development. The dialogue structure consists of more than 20 thematic working groups, and 7 sector working groups.<sup>67</sup>

The Environmental Working Group, chaired by Vice President's Office (VPO) is the government led forum for dialogue with development partners on environmental and climate related issues. VPO is the National Climate Change Focal Point (NCCFP) and designated National Entity. The Government has established National Climate Change Steering Committee to provide guidance to National Climate Change focal persons and ensure coordinated actions and participation within various sectors and institutions. A National implementing entity is chaired by the Ministry of Finance and is responsible for managing adaptation funds. In response to the changing financing environment, the Government is proposing to revise how it engages with partners. A national investment platform is proposed which will include Government, development partners, civil society and the private sector.

Harmonization has improved, development partners are progressively adopting national frameworks to monitor development assistance interventions. National frameworks such as the Public Expenditure and Financial Accountability (PEFA) reviews and periodic independent aid delivery assessments, such as the 2013 General Budget Support independent evaluation, are increasingly being used by DPs to inform their programming and Monitoring and Evaluation (M&E) of activities. Active engagement in the main Development Partners Group (DPG) allows donors to maintain formalized mechanisms for coordination, information sharing, harmonization and development of joint positions and inputs to Government processes. The DPG has positively contributed to improvements in harmonization of indicators, but there is still room for improvement particularly in enforcing the donor division of labour. Government of Tanzania has a strong control of the policy process, and effective donors have shifted to a supporting position, pursuing a high level of donor harmonisation and alignment.

There is a working group on environment and climate change and development partners are supporting a wide range of climate change actions going from upstream policy and institutional development to downstream community based projects. Germany, UK and Norway are also engaged in energy sector programming. Plans are underway to incorporate climate change considerations within Tanzania's social safety net programme. In particular, the inclusion of sustainable land management within the public works component. With new proliferation of climate change funds and more money in this field, issues of ownership, alignment and donor harmonisation are becoming more important.

On the negative side, domestic pressures and shrinking budgets have made donors more risk averse and forced them to focus on quick and measurable results. This has precipitated the fragmentation of aid with focus on small projects instead of joint efforts. Within the EU there are aspirations for joint programming, but otherwise application of the Paris principles on aid efficiency is challenging.

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<sup>67</sup> AfDB CSP 2016-20202

## 7.0. Ireland's Approach to Climate Change Adaptation

Ireland's policy for International Development, 'One World, One Future', and the Foreign Policy, 'The Global Island', prioritises action to address climate change for the poorest people in developing countries. Ireland places particular attention on reducing vulnerability to climate change in Least Developed Countries, recognising the importance of community based and local adaptation to climate change.

Ireland is investing in building capacity of staff in Irish Aid and in partner countries (both government and civil society organisations), to integrate climate change into development programmes and projects and to improve tracking and accountability on climate finance at the programme planning and appraisal stage. A Climate Change and Development Learning Platform was launched with the assistance of the International Institute for Environment and

Building resilience empowers countries, communities, institutions, women and men to anticipate, absorb, adapt to, or transform, shocks and stresses

*Irish Aid Policy Brief, 2016*

Development (IIED) to facilitate the sharing of information and lessons between Irish Aid staff, climate and development experts, and partners in developing countries. The Climate Learning Platform documents local experiences and uses the learning to inform countries decisions when designing programmes to address climate change, with a particular focus on integrating climate change into development planning, adopting climate-smart technologies particularly in agriculture, better targeting social protection systems to address climate vulnerability, developing smallholder household sustainable energy systems and addressing gender equality. The Climate Learning Platform can be accessed through the Irish Aid website and via [www.climatelearningplatform.org](http://www.climatelearningplatform.org)

### The Climate Change and Development Learning Platform

Irish Aid in partnership with International Institute for Environment and Development (IIED) host an organised Climate Change and Development Learning Platform which focuses on research and capacity building. The initiative provides evidence and capacity for key partner countries to mainstream climate change into Irish Aid country programmes as well as publishing guidance notes and briefs on priority Irish Aid focus areas. The platform also links country level experiences to international policy frameworks. Details of the climate change work in Ethiopia can be accessed on <https://www.climatelearningplatform.org/key-partner-countries/Tanzania>

### Case Study on Approaches for Supporting Pastoralist groups facing climate change effects in Tanzania<sup>68</sup>

The Irish Aid learning platform seeks to generate evidence from case studies on effective methods of mainstreaming climate risk management into development planning. This case study research

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<sup>68</sup> Greene, S., 2015

built on the experience of programmes implemented by Care, Oxfam and IIED to identify effective methods of climate mainstreaming.

In Tanzania, Irish Aid has been funding projects that focus specifically on pastoralists or areas in which pastoralism dominates local economies;

1. The “Pastoralist Program”, funded by Irish Aid and managed jointly by Care International and the Tanzania Natural Resource Forum (TNRF). The program provided capacity building and funding for local community-based organisations to improve their ability to design and run interventions that support pastoralists. Interventions focused on securing resource access through improved local land management, enabling advocacy and communication, gender rights and climate change training and awareness. It also supported civil society organisations to advocate for “pro-pastoralist” policies at national level.
2. Oxfam’s Pastoralism Programme, managed by Oxfam and funded by Irish Aid. The programme funds pastoralist Civil Society Organisations (CSOs) to support planning for disaster risk reduction and efforts to secure equitable rangeland governance and management. Funding was also provided for pro-pastoralist advocacy.

Irish Aid commissioned a study of the above projects in Tanzania that seek to enhance climate risk management. The study used an Appreciative Inquiry approach to draw out the strengths and learning from each project, in order to channel these findings into future programming. The analysis of the study’s findings was guided by the Tracking Adaptation and Measuring Development (TAMD)<sup>69</sup> framework. TAMD provides a method for gauging the quality of climate risk management and the resilience building and development impacts of interventions

### Key findings included;

- The facilitation of land use planning to support access to key resources (grazing land, water etc.) for pastoralists is an effective method of improving natural resource governance.
- Development of village land use plans backed by formal communal rights of ownership offers a stronger legal basis for preventing land grabs or encroachment from both large and small scale investors
- Raising awareness of women’s rights transforms gender dynamics. When communities and village councils in pastoralist areas are trained on women’s rights to own assets such as land, livestock or businesses, these rights are quickly enforced. Consequently, women are empowered to establish or run income generating activities that benefit everyone in a household.
- Advocacy for pastoralist rights has been most successful when representatives of both government and non-governmental institutions are engaged in dialogue. Broad based coalitions of different groups with similar perspectives have opened the potential for constitutional change.
- The district authority is the most effective entry point for climate risk management. The largest strides in mainstreaming climate change and developing climate risk management have been made when the district council has been included. Capacity building of district

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<sup>69</sup> The TAMD framework assesses how adaptation contributes to development and how development interventions enable adaptation to climate effects. <http://www.iied.org/tracking-adaptation-measuring-development-tamd>

officials through training, dialogue, or facilitation of discussions about resource use has enabled district councils to provide improved services to pastoralists

- The community as an entry point offers quicker positive outcomes with less climate integration. Working at the level of the community has delivered modest, positive outcomes regarding gender equity, security of resources, reducing environmental degradation and communal empowerment. However, these quicker outcomes come at the cost of minimal progress on integrating climate risk into planning in the long run.

The detailed case study can be accessed on the learning platform; <https://www.climatelearningplatform.org/case-study-approaches-supporting-pastoralist-groups-facing-climate-change-effects-tanzania>

## 7.1. Irish Aid Tanzania's climate change programming

Irish Aid Tanzania has recently completed the Country Strategy for 2017-2021. The programme goal is a more equitable and prosperous society for all, through a particular focus on poor women and girls realising their rights. Irish Aid (IA) will work with and support the Government's most pro-poor policies and strategies, targeting the poorest and most marginalised including support for Tanzania's social protection programme, health and nutrition, strengthening of primary health care services and the delivery of multi-sectoral gender sensitive nutrition interventions. IA will also utilise experience, networks and standing in the agriculture sector to support stronger connections between agriculture services and social protections beneficiaries, informed by research.

### Climate Change, Agriculture and livelihoods

The Government of Ireland's international development policy statement 'One world one future' puts emphasis on reduced hunger, stronger resilience; sustainable development, inclusive economic growth among others. To reach these goals there are seven priority areas for action for Irish Aid: global hunger, climate change and development, trade and economic growth, which have a bearing on livelihoods and food security. Irish Aid and IIED have developed a brief to guide Climate resilience and smallholder farming. Which can be accessed here; <https://www.climatelearningplatform.org/guidance-note-promoting-climate-resilient-agriculture-smallholder-farming>

To strengthen the livelihoods of poor households, Irish Aid in Tanzania will promote a markets for the poor approach to develop value chains in commodities that are particularly relevant for women in poor households, while ensuring that a focus on commodities does not detract from achieving balanced nutrition. Interventions supported will ensure appropriate adaptation and mitigation measures that address challenges of climate change, based on specific climate change vulnerability assessments.<sup>70</sup>

Climate change scenarios predict increasing shocks and stresses related to agriculture, threatening the long-term benefits of agricultural value chain projects, which are often designed to reduce poverty and improve livelihoods of smallholder farmers. Climate change affects the businesses as well as communities who provide raw materials to the private sector. There is increasing need and demand for the private sector to address climate risks so as to reduce the increasing losses resulting

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<sup>70</sup> Embassy of Ireland, Tanzania Mission strategy 2017-2021

from climate change impacts. Businesses must also build their resilience to unavoidable and ongoing climate change by managing climate-related impacts that threaten their value chains, while planning for emerging market opportunities.

The core objectives of the Tanzania climate smart Agriculture programme 2015-2025 focuses on increasing productivity of the agricultural sector through (appropriate) climate smart agriculture practices that consider gender issues; enhance climate resilience of agricultural and food systems;

“In order to get climate risks into focus and into perspective, relative to other socio-economic factors related to development of Small Holder Farmers (SHF), programming can combine a ‘markets for the poor’ approach mediated by and complemented by a ‘women’s economic empowerment’ strategy to identify interventions. From an inclusive economic growth perspective it is important to emphasise the integration of women’s economic empowerment aligned to climate resilient agricultural technology development. Such a combined approach could culminate in poor women and men accessing improved livelihood opportunities through climate resilient agricultural value chains.”

**Irish Aid, 2017**

improve infrastructure to support value addition, marketing, trade and post-harvest management and developing financing mechanisms to solicit resources through national, international and public private partnerships to support climate smart agriculture.<sup>71</sup> This fits well with the Irish Aid programming in the country and creates opportunities for collaboration and strategic partnerships with other actors.

The mission strategy commits to promote learning on the constraints preventing poor

farmers, particularly women, from benefiting from, engaging in and having more control within improved value chains and ensure cross-cutting issues such as climate change, gender-based violence and financial inclusion are effectively integrated into value chains.

## Social protection and Climate Change

Irish Aid focuses on social protection as an important policy instrument in partner countries to reduce extreme poverty. Social protection shelters the poorest and most vulnerable from natural and man-made disasters, it increases and improves the involvement of poor women and men in economic activity, and it contributes to equity and social accountability. In particular Irish Aid recognises that social protection can contribute to building resilience, improving access to essential services, unlocking productive capacity, and promoting social cohesion. Social protection programmes are affordable, even in the poorest countries, and – as a direct transfer from State to citizen – represent good value for money.

Ireland’s Policy for International Development, “One World, One Future” and its associated Framework for Action, underlines the importance of social protection, and commits to supporting it as a key instrument for reducing poverty and inequality while achieving inclusive growth. Emphasis is on improving access to quality essential social services such as health, education, services related to HIV and AIDS, and social protection is key to the realisation of human rights, the reduction of poverty, hunger and inequality and the promotion of inclusive economic growth. Priority is also given to appropriate and sustainable social protection programmes that address

<sup>71</sup> Tanzania Climate Smart Agriculture Program 2015 - 2025



inequality by focusing on the very poorest households, women and children in particular, and improving their access to basic services.<sup>72</sup>

### **Why Focus on Social Protection?**

Builds and prevents eroding of assets and capacities at individual, community and national levels by stresses and inequalities.

Relevant social protection tools, in particular well designed, delivered and targeted social cash transfers, can support poor people in building their resilience to stresses and develop less risky coping mechanisms

Social protection is relevant for humanitarian crises; the countries most in need of humanitarian assistance are often the same as those with most pressing needs for social protection.

An increase in social protection spending, through easing the income constraint, can have the knock-on effect of making spending in other sectors, such as health and education, more efficient

#### ***Irish Aid, 2017. Social Protection strategy***

Ireland's social protection strategy 2017 commits to integrate natural disaster and climate change risk management and vulnerability assessments when planning and implementing bilateral country programmes. This will include increasing investment in multi-hazard risk analyses, early warning systems, preparedness and disaster risk reduction across our portfolio, with measures to ensure that the specific needs and capacities of women and children are considered.

Irish Aid Tanzania will provide technical and financial support to the Tanzania's Social Safety Net programme with a focus on livelihoods enhancement to strengthen poor households' productive potential and gradually generate a foundation for self-reliance and graduation from social protection into sustainable resilient livelihoods. Technical support will be provided through partnerships with expert NGOs and/or through UN agencies.

In collaboration with other stakeholders including the International Labour Organisation, Irish Aid will work to foster strong policy coalitions to advocate for a comprehensive national social protection policy, under-pinned by a strong political economy analysis jointly undertaken with civil society and other development partners. Integration of social protection into the policy dialogue and programme design of other social, economic and governance interventions will be promoted. Irish Aid will support ongoing efforts to integrate climate resilience, nutrition and health in social protection interventions.

## **Climate Change, Health and Nutrition**

The mission strategy commits to work with Government and other partners to design and implement community based nutrition programmes which take a gender transformative approach with strong systems for monitoring, documentation, research and evaluation to ensure that learning can be extracted and disseminated. Poverty targeting will be strengthened for nutrition programmes, utilising the registry of social protection beneficiaries to ensure that the poorest households are included in nutrition interventions.

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<sup>72</sup> Irish Aid, 2017. Social Protection Strategy

The Irish Aid strategy commits to address issues relating to climate change, and nutrition ensuring that they are mainstreamed across the Embassy's value chain work. The programme will also support and promote a learning agenda which will focus on climate change, health and nutrition through supporting climate smart and nutrition sensitive value chains. This work will be supported through the Irish Aid Climate change and development learning platform <https://www.climatelearningplatform.org/>

## Climate Change and Gender Programming

The specific focus on poor women and girls in the Tanzania Irish Aid strategy will be mainstreamed across all programmes. This is consistent with Ireland's One World, One Future, and the approach seeks to promote transformative change through addressing the unequal power relations which prevent women and girls from participating in decision-making and from contributing to and benefiting from sustainable development. Gender sensitive indicators will be included in the performance management framework. The strategy also recognises gender-based violence as a fundamental abuse of human rights, which serves as a driver of poverty and which undermines the health, well-being and livelihoods of millions of women in Tanzania. Building on Irish Aid's internationally recognised role on combating gender-based violence, the strategy addresses violence as both a standalone component and as a cross-cutting issue.

Climate change affects women and men, boys and girls differently based on their gender roles and the resources available to them. Furthermore, they face social, economic and political barriers that limit their coping capacity (participation, decision making, access and control over resources, benefit sharing, representation etc); dependency on local natural resources for their livelihood. The Government of Tanzania developed a climate change Gender Action Plan to ensure that Tanzania mainstreams gender considerations into policies, programs and strategies related to climate change so that both women and men can have access to, participate in, contribute to, and hence benefit from, climate change initiatives and efforts, taking into account the diverse needs, roles, and contributions of both men and women in sustainable development endeavours. The climate change strategy (2012) also emphasises that gender and vulnerability should be considered in all interventions including climate change ones and there should be equitable representation of women and vulnerable groups at all levels in planning, decision making and implementation of adaptation and mitigation initiatives, among other priorities

The Irish Aid Mission strategy commits to support Partners to undertake climate risk assessments as appropriate and through the engagement in agricultural value chains and social protection (in particular public works and livelihoods components), Irish Aid will advocate for adaptation and mitigation strategies to be included in programme designs and will undertake a case study research on the link between climate change and gender, and use learning for programming interventions, and also contribute and engage with the Irish Aid <https://www.climatelearningplatform.org/> supported by HQ. The Mission's focal person for climate change will continue to monitor national developments and synergies with Irish Aid programming.

## 8.0. Climate change implications for country development programming

- The predicted decrease in annual rainfall affecting all seasons, as well as the temperature rise will affect the agriculture sector specifically among others. Climate change uncertainty will most likely increase the intensity and frequency of disasters (droughts, floods etc). Integrating climate change in development planning will be very important as well as strengthening government structures to respond to adaptation, resilience building and sustainable development, given vulnerability to climate change impacts
- Climate change can cause GDP losses especially to the agriculture sector contribution of 29% if adaptation actions are not integrated into development planning and budgeting. The economic impacts of climate change study refers to aggregate models which indicate that net economic costs for Tanzania could be equivalent to a further 1 to 2% of GDP per year by 2030. Even if the economy is doing well now, climate change can reverse the progress under the BAU scenarios. There is need therefore to focus on a low carbon development path, while addressing climate risks and focusing on inclusive economic models that can increase incomes for the poor, especially women and the youth.
- Tanzania's economy relies heavily on climate sensitive sectors as a result, the country is highly vulnerable to climate change/ variability and needs to develop a holistic climate change framework separate from the environment agenda, which highlights the cross cutting nature of climate change and its impact across sectors. This holistic Climate Change framework can therefore support a low carbon development strategy across all sectors to guide the green growth strategy. A climate change policy and bill to operationalise the above are key.
- Decrease in agriculture production and productivity with serious negative impacts on food security and nutrition is highly likely. According to World Bank (2015) report, agricultural productivity already suffers at least US\$200 million in annual losses as a result of weather-related risks, largely drought. Climate risk management and strengthening of food systems approaches will be important across all development programmes to improve food security, nutrition, but also enhance economic development for the poor.
- Energy, Agriculture and forestry sectors are the main causes of increase in greenhouse gas emissions for Tanzania but they are also vulnerable to climate change. Programmes therefore should consolidate gains and improve climate resilient approaches for agriculture, energy and LUCF sectors to reduce emissions but also strengthen the adaptation and mitigation co-benefits.
- Capacity building and strengthening of Government structures at national and sub national levels will be key to improve sustainable development, planning for uncertainties, managing risks and reducing vulnerabilities resulting from climate change and disaster impacts.
- Investment in generating and disseminating accurate, timely and reliable weather and climate information will be important to inform different sector adaptation and climate risk management plans and decisions regarding changes in climate.
- Gender analysis should be done across all climate change adaptation programmes to understand the different capacities and vulnerabilities of women and men, boys and girls and ensure they are participating in climate decision making and that their vulnerabilities are reduced.
- Development programmes should integrate climate change adaptation and support complementary livelihood and adaptation goals as well as promote environmental protection measures such as soil and water conservation among others. This could be achieved through investing in livelihood options that are less sensitive to climate variations or support climate smart interventions and therefore build resilience to changing stresses and shocks.

## References

- Acosta, M., Ampaire, E., Okolo, W., Twyman, J. Jassogne, L., 2016. Climate Change Adaptation in Agriculture and Natural Resource Management in Tanzania: A Gender Policy Review
- Africa Development Bank, 2016. Country Strategy Paper 2016-2020, United Republic of Tanzania
- Amado, J. C & Adams, P. 2010. Value Chain Climate Resilience; a guide to managing climate impacts in companies and communities
- Ampaire, E., Wendy Okolo, W., Acosta, M., Jassogne, L., Twyman, J., Muindi, J. and Mwongera, C. 2016. Barriers to successful climate change policy implementation in Tanzania, findings from a desk review and exploratory studies in Lushoto, Kilolo and Bagamoyo Districts, Tanzania
- Arce, Carlos E.; Caballero, Jorge. 2015. Tanzania: Agricultural Sector Risk Assessment. World Bank, Washington, DC. Available at: <https://openknowledge.worldbank.org/handle/10986/22277> License: CC BY 3.0 IGO.
- Deloitte, 2016; Tanzania Economic Outlook
- Deloitte & Touché, 2017. Tanzania Economic Outlook 2017; joining the dots
- Devisscher, T., 2010. Ecosystem-based Adaptation in Tanzania; The Role of Ecosystem Services for Human Well-Being and Climate Adaptation
- Drakenberg, O.D, Goran, E.K., Fernqvist, KW, 2016. Environmental and Climate Change Policy Brief Tanzania
- Embassy of Ireland in Tanzania, Mission Strategy 2017-2021
- GCCA, 2013. From Integrated Climate Strategies to Climate Finance Effectiveness; Experiences from the Global Climate Change Alliance
- Godlove, S. 2012. Tracking Climate Finance in Tanzania. Prepared for the Climate Change Expert Group (CCXG) Global Forum on the New UNFCCC Market Mechanism and Tracking Climate Finance
- Greene, S., 2015. Case Study on Approaches for Supporting Pastoralist groups facing climate change effects in Tanzania. IIED/Irish Aid Climate Change and Development Learning Platform  
<https://www.climatelearningplatform.org/case-study-approaches-supporting-pastoralist-groups-facing-climate-change-effects-tanzania>
- IDS, 2012. Making Social Protection 'Climate Smart'; **Impact of climate change on human health and health systems in Tanzania.** [www.adaptivesocialprotection.org](http://www.adaptivesocialprotection.org)
- IIED Briefing, 2014. Zanzibar planning and financing systems for climate change initiatives. <http://pubs.iied.org/17225IIED>
- Irish Aid, 2015. Climate Change Action Report for Tanzania
- Kreft, S. Eckstein, D. and Melchior, I., 2017. Global Climate Risk Index 2017; who suffers most from extreme weather events? Weather-related loss events in 2015 and 1996 to 2015

- Mboera, L.E., Mayala, K.B, Kweka, E.J. and Mazigo, D.H, 2016. Climate change, Nutrition and health; building collaborative structures. John Hopkins University
- Mboera L.E, Mayala B.K, Kweka E.J, Mazigo H.D, 2011. Impacts of climate change on human health and health systems in Tanzania: A review.
- McSweeney, C., New, M. & Lizcano, G. 2010. UNDP Climate Change Country Profiles: Afghanistan. Available: <http://country-profiles.geog.ox.ac.uk/>
- McSweeney, C., New, M., Lizcano, G. & Lu, X. 2010. The UNDP Climate Change Country Profiles Improving the Accessibility of Observed and Projected Climate Information for Studies of Climate Change in Developing Countries. *Bulletin of the American Meteorological Society*, 91, 157-166.
- Ministry of agriculture food security and cooperatives and vice president's office, 2015. Tanzania Climate Smart Agriculture Program 2015 – 2025.
- Mpingo Conservation & Development Initiative, 2015. Combining REDD, PFM and FSC certification in South-Eastern Tanzania
- Norrington, G., Thornton, G.D.N, 2011. Climate Change Financing and Aid effectiveness. Tanzania Case Study.
- Republic of Tanzania, 2012. National Climate Change Strategy
- Seballos, F. 2012. Making Social Protection 'Climate Smart'; Adaptive Social Protection Programme, Institute of Development Studies [www.adaptivesocialprotection.org](http://www.adaptivesocialprotection.org)
- Shayo, C., M, 2013. Report on Forests, Rangelands and Climate Change Adaptation in Tanzania
- Shemsang, C. Omambia, N, A. Gu, Y, 2010. The Cost of Climate Change in Tanzania: Impacts and Adaptations. *Journal of American Science* 2010;6(3)
- Tanzania Journal of Health Research, 2011. <http://dx.doi.org/10.4314/thrb.v13i1.10> Volume 13 (Suppl 1), December 2011
- Trujillo, N., Bird, N., Waston, C., Nakhooda, S., Yanda, S., Calland, R. and Rooij, J., 2014. Understanding Climate Finance Readiness Needs in Tanzania
- UMFULA, 2016. Tanzania Country Fact Sheet; Weather and Climate Information for Decision Making
- UNDP, 2016a. Environmental Sustainability, Climate Change and Resilience pillar Strategy Paper (2016-2021)
- UNDP, 2016b. A New Vision for Weather and Climate Services in Africa. <https://www.thegef.org/sites/default/files/publications/WeatherAndClimateServicesAfrica.pdf>
- United Republic of Tanzania (URT) Ministry of Health and AMMP Team. 1997. Policy Implications of Adult Morbidity and Mortality.
- Wandiga, S.O., Opondo, M., Kathuri, J., Olago, D., Apindi, E., Olaka, L., Githeko, A., Githui, F., Opere, A., Ogallo, L., Marshall, M., Downs, T., Yanda, P.Z., Kangalawe, R., Sigalla, R., Kabumbuli, R., Kiramura, E., Mugambi, P., Nanyunja, R., Baguma, T., Achola, P., 2006. Climate Change Induced Vulnerability to Malaria and Cholera in the Lake Victoria Region: Final Report for Project No. AF 91. Published by the Assessments of Impacts and Adaptations to Climate Change (AIACC). The International START Secretariat, Washington, DC.

Watkiss, P; Downing, T; Dyszynski, J; Pye, S; Savage, M., Goodwin, J; and Lynn. 2011. The Economics of Climate Change in the United Republic of Tanzania. Report to Development Partners Group and the UK Department for International Development. Available at: <http://economics-of-cc-in-tanzania.org/>

WHO, 2009. Protecting Health from Climate Change. Connecting Science, Policy and People.

World Bank, 2015. Financing Climate-Resilient Growth in Tanzania. World Bank Group Report Number ACS11581

Yanda, P. Mushi, P. Henku, I.A., Maganga, F. Minde, H. Malik, N. Kateka, A. Bird, A and Tilley, H. 2013. Tanzania National Climate Change Finance Analysis