

# Climate, Food, Trade

Where is the Policy Nexus?

## Uganda



## **About the Book**

The East African Community has seen climate change, through the increasing intensity and frequency of extreme weather events, altering its agricultural and trade patterns that play a crucial role in ensuring food security for millions of East Africans. This trend shows the complex interrelationship existing between trade, climate change and food security; a three-dimensional relationship that seems to lack representation in the various policies addressing these issues. Yet, the absence of such important policy linkages, coherence and coordination might cause additional large-scale hunger in the region. Harnessing the potential of trade and putting in place appropriate policies to ensure affordable food for millions of people in the face of climate change has therefore become the need of the hour.

This research study, undertaken by a multi-disciplinary team of three Ugandan experts, aims to fill the current knowledge gaps on this three-dimensional relationship and to provide recommendations for more holistic policy responses to the challenge of climate-related hunger, including through trade. To do so, the authors reviewed the existing literature and relevant policies in place in all three areas of food security, trade and climate change, before examining existing and missing links between them. This work was supported by field visits and interviews of relevant stakeholders who helped understand the actual situation at the grassroots level.

The field studies clearly indicate that there are strong intricate relationships between trade, climate change and food security. Various policies and legislations are in place in the three areas but the linkages among them have not been fully acknowledged. This is largely due to the already complex nature of any of the three issue areas on their own, which further complicates coherent policy-making and coordination among the relevant ministries and institutions.

This research study was undertaken as part of CUTS International Geneva's "Promoting Agriculture-Climate-Trade Linkages in the East African Community" (PACT EAC) project, under which it will carry out a number of networking, training and advocacy activities. The study itself immensely benefitted from the insights of a variety of stakeholders from the government, farmer, academic, media and civil society representatives through dialogues and other activities of the PACT EAC project.

# Climate, Food, Trade

*Where is the Policy Nexus?*

Uganda

# Climate, Food, Trade

## *Where is the Policy Nexus?*

### Uganda

*Published by:*



**CUTS International, Geneva**

37-39, Rue de Vermont

1202 Geneva, Switzerland

Ph: +41.22.734.6080 | Fax: +41.22.734.3914

Email: [geneva@cuts.org](mailto:geneva@cuts.org) | Web: [www.cuts-geneva.org](http://www.cuts-geneva.org)

*Authors:*

Davis Ddamulira

Jane Nalunga

Paul Isabirye

*In Partnership with:*



**Southern and Eastern African Trade, Information and Negotiations  
Institute (SEATINI), Uganda**

*Supported by:*



**Swedish International Development Cooperation Agency (SIDA)**

*Printed by:* Jaipur Printers Private Limited, Jaipur, India

*Cover Photos:* TheHumanitarianCoalition.ca, Y. Wachira, Laura Darby

ISBN: 978-81-8257-180-8

The material in this publication may be reproduced in whole or in part and in any form for education or non-profit uses, without special permission from the copyright holders, provided acknowledgment of the source is made. The publishers would appreciate receiving a copy of any publication, which uses this publication as a source. No use of this publication may be made for resale or other commercial purposes without prior written permission of CUTS.

© CUTS International 2013

#1305

# Contents

Foreword.....	i
Preface.....	iii
Acknowledgements .....	v
Note on Authors.....	vii
Acronyms .....	ix
1. Introduction .....	1
1.1 Socio-economic Profile .....	1
1.2 The Structure of Uganda’s Economy .....	3
2. Setting the Scene: <i>Climate Change, Food Security and Trade in Uganda</i> .....	6
2.1 Climate Change .....	6
2.1.1 Understanding Climate Change: Causes and Scenarios .....	6
2.1.2 The Policy Framework on Climate Change .....	11
2.1.3 Uganda in International Protocols on Climate Change .....	12
2.2 Trade .....	13
2.2.1 Policy Framework .....	13
2.2.2 State of Trade in Uganda .....	14
2.3 Food Security .....	16
2.3.1 Policy Framework .....	17
2.3.2 State of Food Security in Uganda .....	18
3. Missing Links, Real Impacts: <i>Interface between Climate Change, Food Security and Trade</i> .....	21
3.1 Climate Change and Food Security .....	21
3.1.1 Climate Change Impacts on Food Security: Experience from Selected Districts ..	22
3.1.2 Climate Change and National Water Systems .....	27
3.1.3 Climate Change and Food Security Linkages in the Policy Framework .....	30
3.2 Trade and Climate Change .....	33
3.2.1 Trade and Climate Change: A Conceptual Framework .....	33
3.2.2 Institutional and Policy Linkages in Uganda .....	34
3.2.3 Regional Trade and Climate Change Policies in the EAC .....	36
3.2.4 International Framework on Trade and Climate Change .....	37
3.2.5 Trade-related Activities and their Effects on Climate Change .....	39
3.2.6 Balancing Trade and Climate Change Concerns: A Win-Win Situation? .....	43

3.3 Food Security and Trade .....	45
3.3.1 Attaining Food Security at Household Level: Self-Sufficiency <i>vis-a-vis</i> the Market .....	46
3.3.2 Experience from the Luwero District .....	47
3.4 Linkages between Trade, Food Security and Climate Change .....	48
4. Conclusion and Recommendations .....	52
4.1 Conclusion .....	52
4.2 Recommendations .....	52
References .....	54
Glossary .....	56
Endnotes .....	57
Appendix 1: Field Study Methodology .....	58

## *List of Figures*

Figure 1:	World Population Growth in Historical Perspective .....	7
Figure 2:	Melting of Ice Caps on Mountain Rwenzori and Kilimanjaro .....	9
Figure 3:	The Rate of Melting of Glaciers on Rwenzori Mountains .....	10
Figure 4:	Uganda Total Trade with other EAC Member States .....	15
Figure 5:	Uganda's Trade Flows, 2005-2010 (US\$mn) .....	16
Figure 6:	Uganda's Trends in Food Trade by Value (US\$ '000) .....	20
Figure 7:	Level of Awareness of Famine and Food Security .....	23
Figure 8:	Uganda's Water Resources .....	28
Figure 9:	An Abandoned Dry Borehole in Masaka in 2005 .....	28
Figure 10:	Flooding and Blockage of Lake Kyoga, 1998-2000 .....	29
Figure 11:	Basic Relationship between Trade and Climate Change .....	33
Figure 12:	Decline in Uganda's Forest Cover (1990-2010) .....	40
Figure 13:	Projected Upland Rice Production in Volumes (2008-2018) .....	41
Figure 14:	Theoretical Framework Illustrating Trade-Food Security Linkages .....	46
Figure 15:	A Theoretical Framework of the Relationship between Trade, Climate Change and Food Security within the Uganda Context .....	49

## *List of Tables*

Table 1:	Poverty Trends and Population in Uganda .....	1
Table 2:	Share in Public Funding of Selected Sectors Relative to the Cost of Climate Change Damage/Wastage in Uganda .....	2
Table 3:	Structure of Uganda Economy from 2006-2010 (% share of GDP at current prices) .....	4
Table 4:	Geographic distribution of Uganda's Exports and Imports, 2005-2010 .....	14
Table 5:	Share of Traditional and Non-Traditional Exports in Total Exports, 2005-2010 ....	15
Table 6:	Food Deprivation and Consumption Indicators for Uganda .....	18
Table 7:	Area Planted, Production ('000 Tonnes) of Some Selected crops .....	19
Table 8:	Other Food Production ('000 tonnes) .....	19
Table 9:	Major Food Commodities Consumed (Share in Dietary Energy Supply-DES) .....	20
Table 10:	Vulnerability of Food Systems in Uganda .....	23
Box 1:	Uganda's Proposed Climate Change Policy .....	12





# Foreword

Climate change and its effects are already being experienced not only in Uganda and the East African region, but in many parts of the world. Frequent extreme weather events are affecting agricultural production structures and competitiveness. In Uganda the limited infrastructure is also being affected by these events, a situation that has direct implications for food security and trade. Climate change, therefore, has the potential to adversely affect the core elements of food security, which are availability of food; access to food; and stability of availability and access over time. By disrupting food production and thereby availability, livelihoods would be exposed to food insecurity.

Admittedly the impact of climate change will go beyond food security and should be assessed in its various dimensions. However, the issue of food security stands out and requires urgent attention considering that a significant proportion of the population in Uganda and the East African region are already food insecure, a situation that will only get worse unless comprehensive and coordinated actions are implemented.

Trade can and should be an important part of the response agenda. In the negative scenario, trade can further aggravate the situation, say through carbon emissions associated with production and transportation related to trade. On the positive side, with the right policies and measures, trade can be a vehicle through which adaptation to climate change may be achieved and thereby food security. This can only be attained if linkages between the three issues of climate change, food security and trade are well understood in order to arrive at appropriate and holistic policies that in the case of Uganda will help attain the national Vision 2025 of poverty reduction through environmentally sustainable development. This study underscores this point by calling for enhancement of the capacity of policy makers and technocrats to appreciate and understand the nexus between climate change, food security, and trade, and how their inter-linkages can be translated into policies and negotiating positions in various forums such as UNFCCC and WTO.

I must congratulate CUTS International, Geneva and its partners undertaking the PACT EAC project, for undertaking this important study which will be a basis for enhancing capacity at the national level to deal with the challenges occasioned by climate change on food security, and to leverage trade for this purpose. At a personal level, I am glad to have participated in some of the project events such as the Regional Annual Meeting in Kigali, Rwanda in September 2012 that brought together a wide spectrum of stakeholders to deliberate on these critical issues and from which inputs on the way forward were derived for this study.



**Hon. Flavia Munaaba Nabugere**  
Minister of State for Water and Environment (Environment)  
Ministry of Water and Environment, Uganda



# Preface

The importance of tackling the impacts of climate change on food security cannot be overstated, and here the role that trade can play in redressing these impacts becomes critical. With this in mind, CUTS International, Geneva, with funding support from the Swedish International Development Cooperation Agency (SIDA), conceived the project “Promoting Climate Change-Food Security-Trade linkages in the East African Community” (PACT EAC).

This 3-year project was launched on 1 October 2011 and builds on CUTS’ previous work in Africa including in the five EAC member countries of Burundi, Kenya, Rwanda, Tanzania, and Uganda. Among previous projects that were successfully implemented issues, such as, inclusiveness in trade policy formulation and implementation; trade and food security; equitable agriculture development; and inclusive regional integration processes were addressed.

PACT EAC seeks to attain the following objectives:

- Identify the negative and positive elements of climate change that hamper or enhance food security in the project countries
- Identify the negative and positive elements of trade in goods and services that hamper or enhance adaptation to climate change
- Identify the positive linkages where trade can minimise the negative impacts of climate change on food security
- Investigate interactions of climate change-trade-food security policies with a view to further develop and implement relevant short and long term holistic policies at the national and regional level
- Increase understanding and capacity of a wide spectrum of stakeholders on these issues, and
- Arrive at policy recommendations that will lead to adaptation and mitigation of climate change caused challenges through trade.

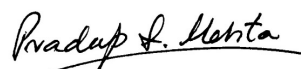
In implementing the PACT EAC project, the CUTS’ tried and tested RAN (holistic Research-Advocacy-Networking activities) model is applied. The inclusive and grassroots-linked methodology for research has facilitated sustained capacity building of stakeholders and ensured ownership of the outcomes.

The five country research studies under this project have been undertaken by teams of country experts in the three areas of climate change, food security, and trade. In fact this was the first time that the experts from the three areas came together to undertake these studies. Creating sustainable capacities of local researchers has been the leitmotif of CUTS working philosophy; thus creating stronger local ownership.

The research process commenced with desktop research, outcomes of which were presented at National Reference Group (NRG) meetings, which brought together all the relevant stakeholders including policy makers, academics, farmers' representatives, CSOs, media, among others. Thereafter field research was undertaken and incorporated into revised and complete drafts that were presented and discussed at the second NRG meetings, as well as at a Regional Meeting held in Kigali, Rwanda. The regional meeting brought together both national and regional stakeholders including high level participation by the EAC Secretariat. In addition, the drafts of research studies were reviewed by the members of the PACT EAC Project Advisory Committee, external country reviewers, and CUTS team. These processes have greatly enriched the research studies and ensured both national and regional ownership as well as high quality.

I trust that through these studies policy makers at the national and regional level will be better prepared in formulating targeted and holistic policies to tackle climate change impacts on the region's food security, particularly through trade. I am also confident this research will generate the necessary awareness among critical stakeholders on the linkages between climate change, food security, and trade thus facilitating them in undertaking their respective tasks.

I take this opportunity to thank all those who are associated with this very important project including the funding partner Swedish International Development Cooperation Agency, country researchers, partner organizations in the project countries, and members of the Project Advisory Committee (PAC) and National Reference Groups (NRGs). I am also thankful to my colleagues in CUTS Jaipur, Geneva and Nairobi for successfully organising the research component. I am sure they will continue with the same zeal and commitment to implement all project activities.



Pradeep S Mehta  
Secretary General CUTS  
Jaipur, India

# Acknowledgements

Through this acknowledgement, the research team would like to express their gratitude to all the people that have been helpful in making this research possible and worthwhile. We are thankful to the former Director Ramamurti Badrinath who initiated this project, to the current Director of CUTS International in Geneva, Rashid S. Kaukab who has provided his much appreciated guidance, and to current and former PACT EAC project management team members in Geneva, Nairobi, and Jaipur, Clement Onyango, Julian Mukiibi, Rijit Sengupta, Julien Grollier, Krista Joosep, Grace N. Muriithi, Munu M. Luther, Victor O. Ogalo, and Frederick Njehu. We are equally grateful for the direction and management provided by the Southern and Eastern African Trade Information and Negotiations Institute (SEATINI) in Uganda.

We are also thankful to the experts, colleagues, and friends who have contributed to the success of this study. In particular we would like to acknowledge the PACT EAC project National Reference Group members in Uganda for providing comments during various phases of the study as well as the Project Advisory Committee members Jamie Morrison, Peter Kiuluku, Christophe Bouvier, Ambassador Joakim Reiter, Moses Marwa, Timothy Wesonga, and Dr Matern Lumbanga.

The study has also benefitted from the valuable editorial assistance by interns Emma Esyrat and Hannah Cho; editorial work by Purity Njeru and peer-review by Dr Martin Kaggwa. We thank Manbar Khadka and Suresh P Singh (colleagues at CUTS Centre for International Trade, Economics & Environment) for providing valuable inputs to the study; and CUTS International Publications Team at Jaipur for carrying out the process of editing, formatting and printing.



# Note on Authors

**Davis Ddamulira** is a Development Economist with speciality in Trade Policy. He has been highly engaged in trade negotiations and trade policy reforms in Uganda and the East African region for more than 10 years. He was part of Uganda's official trade negotiations team in several WTO Ministerial trade negotiations, regional trade negotiations and trade reviews. He has also been very active in trade justice campaigns and global social movements on trade and development. He has conducted and published several researches in the areas of agricultural trade, trade liberalisation and structural adjustment policies, food security and rural livelihoods and intellectual property rights. He is currently the Executive Director of the Independent Development Fund in Uganda.

**Jane Seruwagi Nalunga** is an expert on trade related issues in general and the multilateral, bilateral, regional and national trade policies and agreements in particular. She has more than 15 years experience of policy research, analysis and advocacy and has authored a number of policy-oriented studies and articles. Jane sits on a number of national policy making bodies; and advises the government and parliament on trade matters. She holds an Honours Bachelor of Arts degree in History and English Language (Makerere University); a Diploma in Education from Makerere University; and a Masters of Arts (M.A) in African History from the University of London. She is an Associate of the Institute of Chartered Secretaries and Administrators (ACIS). She is currently the Country Director of SEATINI- Uganda.

**Paul Isabirye** is a Forester with an Agrometeorological and Extension background. He has a Master of Science degree in Agricultural Extension/Education and a Bachelor of Science Degree in Forestry of Makerere University, Kampala. He has a World Meteorological Organisation Class-1 Certificate in Agricultural Meteorology from Pune-India. He has acquired knowledge and skills through short courses in; Project Planning and Management, Agrometeorological database management, Remote sensing in early warning for food security, Decision Support Systems for Crop Modelling and Climate Change. He is currently heading the Data Processing and Applied Meteorology in the Uganda Meteorological Services as well as doubling as the Coordinator, Climate Change Unit and UNFCCC National Focal Point for Uganda.





# Acronyms

ACP	African Caribbean and Pacific
AGL	Land and Water Development Division
AGOA	African Growth & Opportunity Act
AU	African Union
CARITAS	Catholic Relief Development and Social Services Organisations
CCD	Convention to Combat Desertification
CDM	Clean Development Mechanisms
CGIAR	Consultative Group on International Agriculture Research
COMESA	Common Market for Eastern and Southern Africa
COP	Conference of the Parties
CSO	Civil Society Organisation
DES	Dietary Energy Supply
DRC	Democratic Republic of Congo
DRR	Disaster Risk Reduction
EAC	East African Community
EACCCP	East African Community Climate Change Policy
EPA	Economic Partnership Agreement
EU	European Union
FAO	Food and Agriculture Organisation
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GHG	Green House Gas
GWP	Global Water Partnership
IFPRI	International Food Policy Research Institute
IGAD	Intergovernmental Authority on Development
IPCC	Intergovernmental Panel on Climate Change
IPR	Intellectual Property Right
IUCN	International Union for Conservation of Nature
IWRM	Integrated Water Resources Management
KP	Kyoto Protocol
LC	Local Council (Decentralised administrative structures in Uganda)
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MEAs	Multilateral Environment Agreements
MFPED	Ministry of Finance, Planning and Economic Development

MoH	Ministry of Health
MT	Metric Tonnes
MTTI	Ministry of Tourism, Trade and Industry
MWE	Ministry of Water and Environment
NAADS	National Agricultural Advisory Services
NAPA	National Adaptation Programmes of Action
NARO	National Agricultural Research Organisation
NDP	National Development Plan
NEMA	National Environment Management Authority
NEPAD	New Partnership for Africa's Development
NFA	National Forestry Authority
NRDS	National Rice Development Strategy
NTBs	Non-tariff Barriers
NTE	Non-Traditional Exports
PEAP	Poverty Eradication Action Plan
PMA	Plan for Modernisation of Agriculture
TRIPs	Trade Related Aspects of Intellectual Property Rights
UBOS	Uganda Bureau of Statistics
UDHS	Uganda Demographic and Household Survey
UIA	Uganda Investment Authority
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UTL	Uganda Telecom Limited
UWA	Uganda Wildlife Authority
WMD	Wetlands Management Division
WMO	World Meteorological Organisation
WSSD	World Summit on Sustainable Development
WTO	World Trade Organisation

## Chapter 1

# Introduction

The link between trade, climate change and food security is very complex and not straightforward given the interplay between these three variables. The linkages may be positive or negative depending on factors at play. For countries like Uganda, which depend on agriculture for trade and food security, climate change is critical as it can impact both agricultural production and trade volumes. Increased economic activities, in the country, using fossil fuel can lead to increased emissions of greenhouse gases (GHGs) which contribute to adverse climate change with dire consequences on agriculture. In addition, attempts to increase land under cultivation for agricultural production tends to destroy forest cover, which is an important carbon sink.

On the other hand, linking trade, especially trade in clean technology, with climate change can have a positive impact, as trade can help countries to acquire clean technologies that can be used for purposes of climate change mitigation and adaptation. Trade can also help in addressing the

issue of food security, as food can flow from the surplus to deficit regions. All these scenarios require appropriate and targeted policies and regulatory frameworks at national, regional and global level. The biggest challenge facing policy makers is to appreciate these inter-linkages and to design appropriate policies.

### 1.1 Socio-economic Profile

Uganda is experiencing one of the highest population growths in the world. In 2011, the growth rate was at 3.2 percent per annum with a population of 32.9 million people<sup>1</sup> and 85.2 percent of them live in rural areas. Uganda's population is predominantly young with 49 percent under the age of 15 years, yet the fertility rate is still one of the highest at 6.7 births per woman.<sup>2</sup> However, the performance of Uganda with regards to poverty reduction has been commendable, with those living below the poverty line declining from 56.4 percent in 1992, to 38.8 percent in 2002 and down to 24.5 percent in 2009. There are regional imbalances

Table 1: Poverty Trends and Population in Uganda

	Poverty (%)					Population (%)		
	1992-1993	1999-2000	2002-2003	2005-2006	2009-2010	2002-2003	2005-2006	2010 <sup>†</sup>
National	56.4	33.8	38.8	31.1	24.5	24.2	27.4 <sup>*</sup>	31.8 <sup>*</sup>
Rural	60.4	37.4	42.7	34.2	27.2	86.2	84.6	85.2
Urban	28.8	9.6	14.4	13.7	9.1	13.8	15.4	14.8
Regional statistics								
Central	45.6	19.8	22.3	16.4	10.7	29.6	29.2	25.9
Eastern	58.8	34.9	46.0	35.9	24.3	27.4	25.2	26.1
Northern	73.5	63.7	63.0	60.7	46.2	18.2	19.7	22.9
Western	52.7	26.2	32.9	20.5	21.8	24.7	25.9	25.1

Source: Uganda Poverty Status Report, 2012 and Statistical Abstract, 2010

<sup>†</sup>These were mid-year figures for 2010, while <sup>\*</sup>are absolute figures in millions

with the northern part of the country experiencing highest levels of poverty across the years due to limited economic activities as a result of civil war for more than 20 years.

With per capita income of approximately US\$465, Uganda is still among the poor countries in the world and the level of inequality, measured by the Gini coefficient, has remained high and even deteriorated from 0.365 in 1992-1993 to 0.366 in 1995-1996 and later 0.426 in 2009-2010.<sup>3</sup>

There are still many challenges facing the country, including the need to accelerate economic growth, eradicate poverty and reduce inequality. Unfortunately, past efforts have not taken climate and climate change among the major constraints to be considered in achieving the economic and social development goals identified in the National Development Frameworks like the Poverty Eradication Action Plan (PEAP) and the National Development Plan (NDP). Even with new development assistance models such as the Strategic Framework for Assistance to Africa, the AU/NEPAD Africa Action Plan and the Paris Declaration on Aid Effectiveness, the development objectives (particularly, increasing household incomes and promoting equity as well as enhancing the availability and quality of gainful employment) identified in the PEAP and NDP may not be realised without factoring climate change in the planning and operational processes.

The productivity and the profitability of agriculture enterprises are constrained by a range of broader development challenges facing the country. The 2<sup>nd</sup> World Water Development Report (UNESCO, 2006: 515) assesses that climate change-related disasters such as droughts, floods, landslides, windstorms and hailstorms contribute well over 70 percent of the natural disasters and destroy an average of 800,000 ha annually of crops, making economic losses in excess of US\$65mn. The increasing intensity and frequency of climate change disasters has escalated

farmer's risks and losses, and is now one of the major reasons for the apparent escalation of rural poverty at household level and the raise in food prices, which are affecting food security especially for the urban poor.

While the economic strategies pursued by Uganda during the past two decades have been remarkably pro-poor, the number of people who live with inadequate calorie consumption has actually increased from 19 percent in 1990-2002 to 22 percent in 2006-2008<sup>4</sup> due to population growth and also increased the incidence of climate change disasters that continue to disrupt food production and incomes.

Besides, there are additional losses in other sectors such as health which are due to emergency responses resulting from water-related epidemics such as cholera and malaria. Table 2 summarises the estimated share of climate change damage<sup>5</sup> relative to the share of selected sectors in Uganda's public funding. The budgetary allocations used for this illustration are of 2007-2008 fiscal year. It can be observed that climate change damages are equivalent to 4.4 percent of the national budget. The cost of the damage actually exceeds each budget allocation for the four sectors including water and environment whose budget share is 3.3 percent.

<b>Selected sectors</b>	<b>Sector share (%) of national budget</b>
Agriculture	4.3
Education	16.1
Health	9.0
Water & Environment	3.3
Works & Transport	13.2
Energy & Mineral Development	9.4
Tourism, Trade & Industry	0.9
Lands, Housing & Urban Development	0.2
Social Development	0.5
Security	9.3
<b>Climate Change Damage</b>	<b>4.4</b>

*Source: National Environment Management Authority, 2008*

The year 2007 witnessed a widespread occurrence of extreme weather and climate events with floods being the most widespread all over the world. In Uganda, the most affected areas by the 2007 floods were eastern and northern areas, clearly demonstrating Uganda's vulnerability to impacts of adverse effects of climate change.

These floods destroyed infrastructure (roads, bridges, buildings), killed human beings whose value cannot be ascertained, destroyed crops and threatened food security in the area. The small and newly created district of Amuria was hardest-hit by the rain, the heaviest in 35 years, which also destroyed 18 bridges (Daily Monitor, September 2007).

In most African countries, farming depends almost entirely on rain-fed irrigation, poor soils and old technology farming methods. Increased droughts, as predicted, could seriously impact the availability of food, as it was in the horn of Africa and southern Africa during the 1980s and 1990s. The Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report indicates that by 2020, yields from rain-fed agriculture in a number of African countries could be reduced by up to 50 percent. Approximately 20-30 percent of plant and animal species are likely to be at increased risk of extinction, if increases in global average temperatures exceed 1.5-2.5° C.

Productivity of freshwater fisheries may increase, although the mix of fish species could be altered. Changes in ocean dynamics could lead to changes in the migratory patterns of fish and possibly to reduced fish landings, especially in coastal artisanal fisheries leading to increased food insecurity.

The increase in human population has also led to increased demand for food, resulting in higher pressure on natural ecosystems. Climate change puts additional pressure on the world food supply system. The system, which has yielded an increasing food per capita over the past four decades, has shown signs of faltering over the past decade.

Uganda's agriculture is subsistence-based, rain-fed and therefore vulnerable to climate variability. Although the Uganda Vulnerability and Adaptation Assessment Report (1995) predicted that climate change will lead to increased rainfall in Uganda, its distribution during a season is critical to agricultural production. Erratic rain seasons have been observed in the last few years. Floods lead to waterlogged fields or washing away of crops. Poor people frequently settle in or close to wetlands and during floods such families are vulnerable because their source of livelihood is no longer accessible for agricultural production.

Prolonged droughts can have serious impacts on agricultural production. Even long dry spells during the rainy season are sufficient to reduce agricultural production, thus seriously impacting on rural livelihoods of the rural. Poor agricultural production has direct negative effects on the:

- National economy; increases in food prices leading to an unstable macro economy resulting to inflation, which discourages foreign investment;
- Poor feeding leading to frequent health breakdowns, thus affecting production;
- Low incomes leading to poor health and decreased standard of living; and
- Poor seasons and occurrences of droughts, hence exacerbated poverty.

## 1.2 The Structure of Uganda's Economy

As indicated in table 3, the agricultural sector though declining still remains the dominant sector contributing 21.1 percent to GDP. The agricultural sector is followed by the services sector at 20.9 percent. Although the manufacturing sector has steadily increased from 6.9 percent in 2006 to 7.9 percent, it is mainly dominated by non-agricultural value addition products such as metal and steel. The services sector has also registered a steady increase almost outstripping the agricultural sector.

The importance and profile of different sectors for the national economy is as follows:

Economic Activity/Year	2006	2007	2008	2009	2010
Agriculture, Forestry and Fishing	22.6	20.7	21.6	23.6	21.1
Mining & Quarrying	0.3	0.3	0.3	0.3	0.3
Manufacturing	6.9	6.9	7.2	7.7	7.9
Electricity and Water	3.8	4.5	4.2	3.7	3.9
Construction	11.2	12.2	12.3	12.1	12.6
Wholesale & Retail Trade	13.6	14.1	14.7	15.3	13.2
Hotels & Restaurants	4.1	4.1	4.1	4.4	4.5
Transport & Communication	6	6.3	6.3	6.3	9.2
Community Service	25.4	24.5	22.9	20.2	20.9
Adjustments	6.1	6.4	6.4	6.4	6.4

Source: Ministry of Finance, Planning and Economic Development, Background to the Budget (various years)

**Agriculture:** As indicated in table three, agriculture has been a major contributor to Uganda's GDP. The table also indicates that the contribution of agriculture has been generally declining. This could be attributed to both internal and external factors. The cash crops are mainly for export and some food crops are also being grown for export as non-traditional exports (NTE). The traditional cash crops include coffee, cotton, tea and tobacco; while the non-traditional cash crops include food crops such as potatoes, cassava, yams, maize, millet, sorghum and legumes like beans. Other non-traditional cash crops include oil seeds (sesame, sunflower), fruits (pineapples, passion fruits, papaya, apples, avocados, mangoes and oranges), vegetable (beans, okra), spices (vanilla, cardamom, and pepper) and flowers (rose and carnations).

Uganda is also a livestock producer. Livestock produced include cattle, goats, sheep, poultry, and pigs. The livestock products thereof include live animals, meat, hides and skins and bones and horns. In addition, Uganda is a producer of apiculture such as honey and its by-products. It should be noted that most of the agricultural production is done at subsistence level by small-scale farmers.

Agriculture accounts for around 21 percent of real GDP and 60 percent of employment; coffee is the main export (over 17 percent of total merchandise exports in value). Agriculture, dominated by subsistence farmers and food

crops, provides the bulk of the raw materials for the largely agri-based industrial sector. Coffee still dominates agriculture; it affects the livelihood of a large portion of the population. Cotton is the second most important cash crop and offers significant potential. The third significant export is fish and fish products. Recent growth in exports of fruit, vegetables and flowers is attributable to agricultural reforms, including diversification of agricultural exports toward non-traditional crops.

**Forestry:** Forestry accounts for about six percent of Uganda's GDP. In terms of coverage, total forest cover is about 15 percent of Uganda's land area, of which state forest represents 50 percent of the total. Domestic supplies constitute about 95 percent of Uganda's timber requirements. The major timber products for export include veneers, lumber, poles and furniture items made of *mahogany* and other hardwoods such as Mvule, Elgon olive and *Nkoba*. As part of the government's strategy to encourage value-added products, the exportation of raw timber is prohibited. However, Uganda has been losing its forest cover at a very high rate. Between 1990 and 2005, Uganda lost 1.3 million ha of forest cover.<sup>6</sup>

**Livestock:** Livestock accounts for nine percent of agricultural, forestry and fishing production and contributed about 1.6 percent of Uganda's GDP in 2010. It has expanded steadily, growing at an estimated rate of 2.2 percent per annum. Dairy cattle contribute most of the growth, with

potential in beef cattle, poultry, sheep, goats and pigs remaining largely unexploited.

**Fisheries:** Uganda is endowed with plenty of freshwater bodies comprising of natural lakes and rivers, which cover about 15.3 percent of Uganda's surface areas. The largest and most productive water bodies are Lakes Victoria, Kyoga, Albert, Edward and George. The major fish produced is Nile Perch. The average fish harvest totals 370,960 tonnes annually. Fish exports contributed 19.9 percent of the total value of Uganda's non-traditional exports by the end of 2010. It is notable that given the country's economic structure that is highly dependent on agriculture, forestry and fisheries, the economy is highly climate change-sensitive.

**Manufacturing:** Manufacturing is characterised by the production of simple basic consumer goods. Capital goods industries are still few in number. Most of the industries are working at below capacity, which hampers the competitiveness of Uganda's manufactured products, already negatively affected by the landlocked position of the country and high price of utilities like water and electricity. Incentive schemes are in place to attract investment into the sector. Textiles and apparel, and agri-processing are seen as promising industries. Overall though, the manufacturing sector is still in its infancy.

**Services:** Services constitute a promising sector for Uganda. The government is divesting its ownership in financial services where there are currently no nationality-based ownership restrictions. The reforms undertaken in telecommunications services, including the sale of 51 percent of the Uganda Telecom Limited (UTL) to a German-led consortium, have contributed to growth in the sub-sector.

## Chapter 2

# Setting the Scene: *Climate Change, Food Security and Trade in Uganda*

---

### 2.1 Climate Change

#### 2.1.1 Understanding Climate Change: Causes and Scenarios

Climate is changing all over the world, with the average global temperatures rising. The 20<sup>th</sup> century was the warmest the world has seen in 1,000 years, with 1980s and 1990s being the warmest decades on record. The Third Assessment Report (2001) of the Intergovernmental Panel on Climate Change (IPCC) concluded that global warming has accelerated in recent decades and there are new outstanding evidences that most of the warming over the past 50 years is attributable to the increase in GHG emissions associated with human activities. During the past century, global surface temperatures have increased at a rate of nearly 0.06° C/decade, but this trend has increased to a rate approximate of 0.18° C/decade during the past 25 to 30 years (Stephen and Kevin, 2007). According to recent studies supported by UNDP and DFID, the temperatures are likely to increase in Uganda by up to 1.5° C in the next 20 years and by up to 4.3 ° C by the 2080s.<sup>7</sup>

##### *a) Causes of Climate Change*

There are both natural and anthropogenic causes of climate change. The natural causes are explained using three theories; the earth movement–tilt, the continental drift and the geological (plate tectonics) theory. These natural phenomena are believed to be cyclic, defining more of natural climate variability and are not influenced by man, therefore nothing can be done

to manage them. For instance, with respect to the earth movement-tilt theory, the earth's orbit is elliptical/egg shaped, that is:

- The distance between the earth and the sun varies;
- The earth spins around an axis that is tilted;
- The tilt angle varies between 22° and 24.5° on a cycle of 41,000 years; and
- Currently, the earth is tilted at an angle of 23.5° making one annual full orbit around the sun.

Therefore, without tilting, there can be no seasons and the changes in degree of tilts affects seasons. More tilts towards the sun mean warmer summers and colder winters, while less tilts mean cooler summers and milder winters. Since man cannot easily determine the natural changes, the focus of climate change is always put on the anthropogenic causes, which are over and above the natural variability and can be controlled by man. The production of GHG emissions (mostly carbon dioxide) from human activities including agricultural production, industrialisation, burning of fuels and deforestation among others (Stern, 2006) is the major cause of climate change. Developed and some emerging economies are the largest producers of these emissions, hence the largest contributors to climate change (Praveen, 2005).

However, developing countries also contribute to carbon dioxide emissions through deforestation, exhaust fumes from old vehicles and industrialisation albeit to a very small extent.



For example in Uganda, the rate of deforestation is very high. Some of the causes of deforestation include conversion for agriculture, settlement and urbanisation. In addition, majority of Ugandans depend on fuel wood as a source of energy at household levels, hence forest trees are cut for production of charcoal. This trend is likely to increase unless other livelihood opportunities are provided as alternatives. The main socio-economic factors and activities predisposing Uganda's (micro) climate to changes include:

- Excessive land use for agriculture, extensive grazing, industrialisation and urbanisation at the expense of trees and forest cover;
- Inefficient technologies in the energy, production, construction and transport sectors ;
- Deforestation and dependence on biomass, especially for energy and housing; and
- Wild/bush fires.

These are however aggravated by the rapidly growing world population, in which case Uganda's population growth is ranked as the third worldwide at 3.2 percent. In Uganda and

indeed most African societies, population explosion is viewed as security and an insurance against poverty. Statistics show that every woman in Uganda, on average, gives birth to seven children leading to doubling of country's population almost every twenty years.

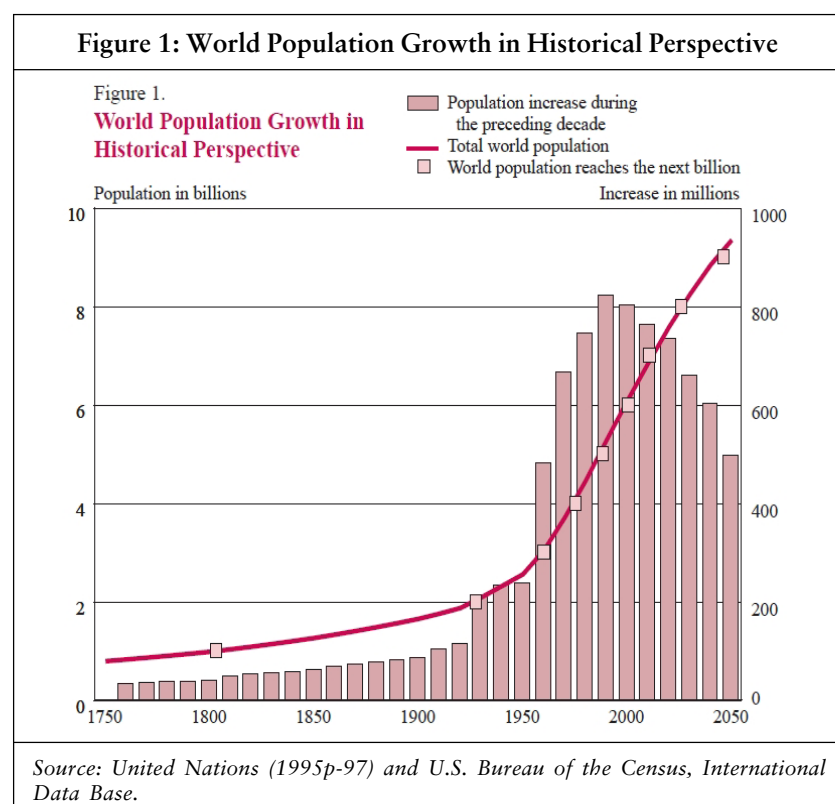
The increasing population, besides other needs, demands more food, hence more food production. This makes productivity, profitability, and continued expansion of the agriculture sector critical to the well-being and sustainability of millions of Ugandan households. Unfortunately, productivity growth in Ugandan agriculture has resulted primarily from area expansion and not from intensification of production to result in higher yields.

According to the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) estimated average yields in recent years have been between 1.5 and 1.8 MT/ha for maize, between 5.5 and 6.0 MT/ha for cooking banana, and less than 1.0 MT/ha for most pulses. The yield gap between average farm yields and research yields indicates there is immense potential for improvements in crop productivity. All this has led to opening up of more land and the destruction of natural

ecosystems (including forests and wetlands), which permanently hold 20 to 100 times more CO<sub>2</sub>/unit area for very long time periods (as carbon sinks) than the agricultural systems. Worse still, more agricultural crops are harvested; hence a lot more carbon dioxide is released back into the atmosphere.

#### *b) Scenarios for Uganda and the EAC Region*

East Africa has seen a warming trend of about 0.5 °C. It has also become wetter, on average, by around 10-20 percent over the past 100 years.<sup>8</sup> The exceptionally wet years at the beginning of the 1960s may be largely responsible for this



increase, and the changes cannot be attributed to human-induced global warming with any certainty. Uganda's National Adaptation Programme (NAPA 2007) suggests that the trend of increasing frequency of drought events and rainfall variability in recent years is related to climate change.

Uganda's temperature is likely to increase by up to 1.5° C in the next twenty years and by up to 4.3° C by the 2080s. Changes in rainfall patterns and total annual rainfall amounts are also expected, but these are less certain than changes in temperature (Uganda NAPA, 2007). Regardless of changes in rainfall, changes in temperature are likely to have significant implications for water resources, food security, natural resource management, and human health as follows:

**Health sector:** Climate change has already had a direct impact on people's health in Uganda. Heavy rains such as *El Niño* in 1997-1998, triggered water-borne diseases including typhoid, cholera and dysentery among others. Malaria has escalated in south western Uganda, particularly in highland districts of Kabale, Rukungiri, Kanungu, Kisoro and Kibaale, especially attributed to warming of the high altitudes among others (Uganda NAPA 2007).

**Water resources:** Water bodies which are for household and community socio-economic activities and production, cover up to 15.3 percent (including swamps) of Uganda's total area. Uganda's population derive considerable economic benefits from water resources in the form of fishing, water supply, transport, hydro-energy and tourism, among others. However, the distribution of water resources is not even such that large parts of Uganda (especially North East) are partly semi-arid and face severe water crisis, especially during drought periods.

Therefore, the currently increasing frequent periods of drought have had an adverse effect on both the quantity and quality of water resources. The problems of flooding from flashy mountain streams are common particularly in Mbale, Sironko and Kasese districts, where cholera associated with flooding is common.

According to Uganda's NAPA (2007), problems of flooding, droughts, soil erosion and siltation are expected to become more frequent and severe with the continued climate change trends and that water demand may not be met, especially in the semi-arid regions.

**Forests:** Forests play a very important role in the social and economic development of Uganda because of their products (timber, poles, medicine and firewood) and services (habitat for other diversity, moderating of micro climate, shade and enhancing productivity), plus providing a sustainable source of power.

Dry conditions and prolonged droughts create conditions for spread of wild fires, thus destroying forests with serious consequences. Increased population growth has also led to increased deforestation because of increased demand for food and fuel. Also, farmers are encroaching on gazetted forests for crop production (A Pelum Uganda study, 2010). The degazettment of forest reserves would have far reaching implications both in the short and long term ecology of destroyed forests and overall sustainable agriculture, as confirmed by several studies on changing the land use of parts of Mabira forest. This leads to increased soil erosion, damage to vital watersheds, flooding and silting of rivers and lakes.

The Fourth IPCC Assessment Report predicts that in East Africa, reduced precipitation or increased evapo-transpiration may threaten wetlands. African nature reserves will also become less effective because the vegetation and animals they seek to protect will no longer be living in their preferred bio-climatic region. Uganda's ecosystems and biodiversity is likely to succumb to the same scenario.

**Agriculture:** The increase in human population has increased the demand for food, increasing pressure on natural ecosystems. Climate change puts additional pressure on the world food supply system. The system, which has yielded an increasing food per capita over the past four decades, has shown signs of faltering over the past decade.

Uganda's agriculture is subsistent, rain fed and, therefore, vulnerable to climate variability and climate change. Although it is predicted that climate change will lead to increased rainfall in Uganda, its distribution during a season is critical to agricultural production. Erratic rain seasons have been observed in the past few years. Floods lead to waterlogged fields or washing away of crops. Poor people frequently settle in close to wetlands and during floods, such families are vulnerable because their source of livelihood is no longer accessible for agricultural production.

Prolonged droughts can have serious impacts on agricultural production. Even long dry spells during the rainy season are sufficient to reduce agricultural production (Uganda NAPA, 2007), thus seriously impacting on livelihoods of the rural communities. Poor agricultural production has direct negative effects on the national economy and food security among others.

**Wildlife, mountains and rivers:** Global warming is causing retreating of glaciers, particularly in the tropics. In East Africa, the ice caps on Kilimanjaro and Rwenzori mountains are retreating. About 82 percent of the 1912 ice cap on Kilimanjaro has already melted. By 1990, glaciers on the Rwenzori mountains had receded to about 40 percent of their 1955 recorded cover (Uganda NAPA, 2007).

The melting of the ice cap on tropical mountains has a negative effect on both the water catchments and eco-tourism, as well as on the overall economy. The melting of ice caps on Rwenzori mountains has increased the erosive power of river Semliki. This erosive power and associated siltation downstream, compounded by the intensive cultivation along the river course, has led Semliki to disproportionately erode the Ugandan side and literally block its original course, resulting into the on-going border disputes between the

Democratic Republic of Congo and Uganda. This is a clear example that climate change is also a potential source of regional conflict and war.

The mountains provide vital water catchments for humans and wildlife. Climate change is expected to drastically affect wildlife species such as the mountain gorilla of which half of the world's population is found in Uganda. The Rwenzori Mountains are a habitat for important endemic and restricted species that are influenced by the unique climate, among other factors. Among the alpine (high altitude) and sub-alpine (medium altitude) species are the Giant Lobelia and Tree Senecio (plants), as well as the Rwenzori Leopard and Rwenzori Red Duiker (animals). Unique species of chameleons such as the three-horned chameleon are also found in the mountains. As the warming continues, the Alpine species, which adapt to very cool temperatures, are threatened to extinction, while the sub-alpine species migrate further up the mountain. This explains why the three-horned chameleon is becoming more rare species in the sub-alpine areas.

Figure 2 shows the melting of ice on Kilimanjaro and Rwenzori. The ice cap on the Rwenzori Mountains is also retreating. Figure 3 shows the

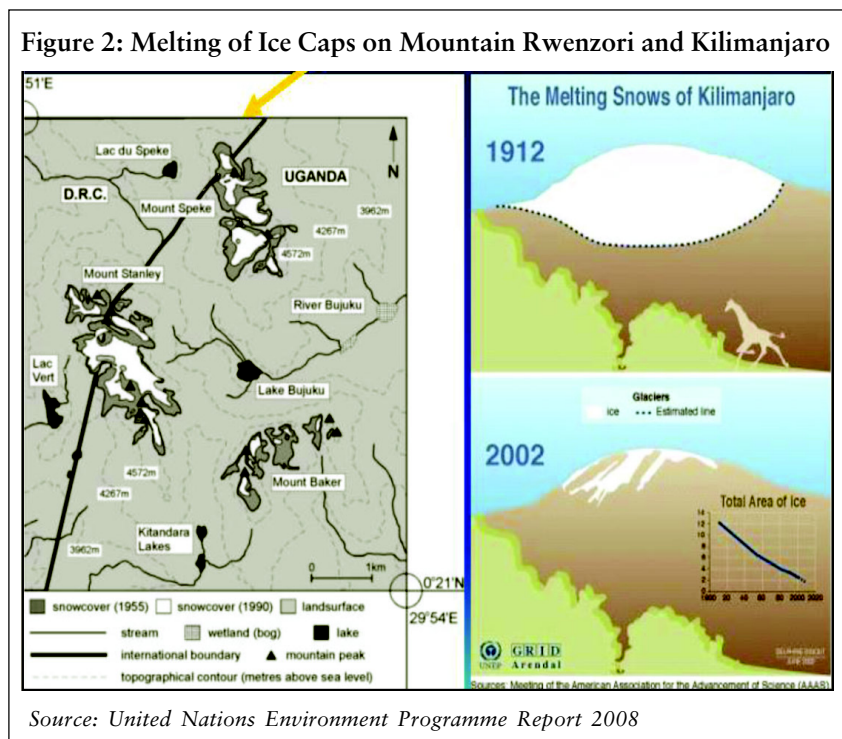
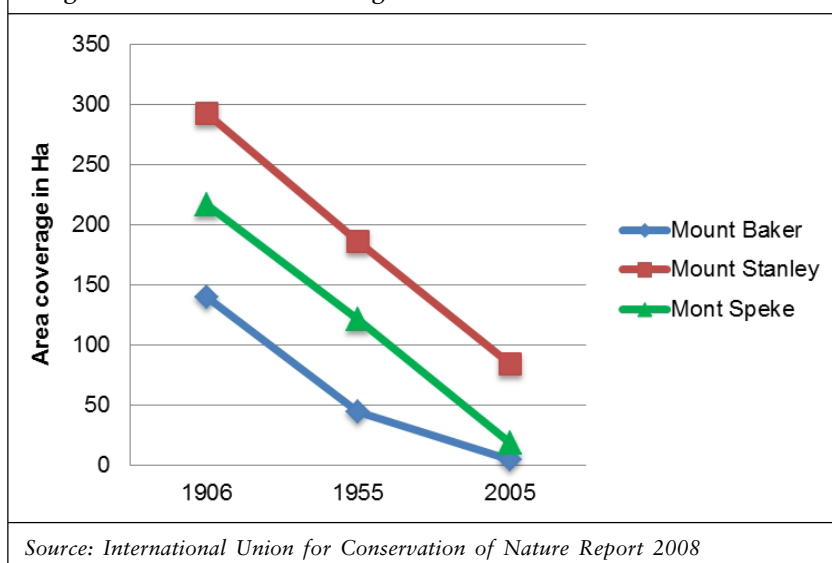


Figure 3: The Rate of Melting of Glaciers on Rwenzori Mountains



extent of the disappearance of the ice cap on Rwenzori Mountains. The rate of ice loss is highest on Baker (96 percent), followed by Speke (91 percent). Stanley has the lowest rate of ice lost (68 percent). The melting of the ice cap on tropical mountains has a negative effect on both water catchments downstream and eco-tourism as well as on the overall economy. The cultural loss due to melting of the ice caps cannot be measured. The glaciers of Rwenzori Mountains supply clean water to over 1,000,000 people in Democratic Republic of Congo (DRC) and Uganda.

Wildlife-based tourism is a central source of foreign exchange for Uganda, and in 2004, tourism was recorded for the first time after so many years, as the leading foreign exchange earner for the country, bringing in over US\$300mn. It accounted for about 64.1 percent of the service export receipts for the country. Any losses to wildlife due to climate change and other factors would therefore be negatively affecting the social and economic development of Uganda (Uganda NAPA, 2007). Besides, the loss of the ice cap on the Rwenzori mountain has serious social and economic consequences and indeed can impact on the social development of the country.

### c) The Uncertainty Issue

Whereas global studies and reports of the IPCC have indicated that climate change is real, care must be taken in assessing trends where data is incomplete or only available for a few years. It is a common challenge to use inadequate data to do comprehensive trend analysis in Uganda and most of the East African countries. This explains the limited published literature on recent trends in Uganda and East Africa in general, which create challenges of disassociating climate change

from climate variability trends in the region.

However, the IPCC has confirmed that:

- Africa is one of the most vulnerable continents to climate change;<sup>9</sup>
- All of Africa is very likely to warm during this century. The warming is very likely to be larger than the global, annual mean warming throughout the continent and in all seasons;<sup>10</sup> and
- In all four regions and in all seasons, the median temperature increase lies roughly 1.5 times the global mean response.<sup>11</sup>

Related to the above, according to the World Meteorological Organization regarding the status of the world's climate in 2010:

- Temperature average for Africa was 1.29° C above the long term average, breaking the previous record by 0.35° C. The Saharan/Arabian region was 2.22° C above normal, the largest annual anomaly ever recorded for any sub-region outside the Arctic; and
- East Africa, which had never had a year as much as 1° C above normal prior to 2003, has now reached this threshold in eight successive years.<sup>12</sup>

Therefore, although there is limited data and analyses on climate change in Uganda and the EAC, there is the entire basis to talk of climate change even in Uganda and East Africa, because of the non-boundary nature of the climate resource, as well as the evidence in the IPCC third and fourth assessment reports. This region cannot be an exception within the global climate system context. It is therefore important to try and build the climate data base for Uganda and the EAC region as a basis for more comprehensive analyses to detect, attribute and project climate change.

### 2.1.2 The Policy Framework on Climate Change

The East African Community developed an EAC Climate Change Policy in May 2010 to address the adverse impacts of climate change on the region's development. Under adaptation, the policy aims at strengthening meteorological services, increasing preparedness for disaster risk management, scaling up of efficient use of water and energy resources, irrigation, crop and livestock production, protection of wildlife and key vulnerable ecosystems such as wetlands and forestry ecosystems, improving land use, soil protection, tourism, infrastructure and human settlement; and intensifying diseases, vectors, and pests control.

This is also being backed up with a costed climate change master plan for the region to guide and provide medium to long term direction for action. All these are consistent with the provisions of the East African treaty, the EAC protocol on environment and natural resources, the protocol on sustainable development of Lake Victoria basin as well as the United Nations Framework Convention on Climate Change (UNFCCC).

Although the EAC region has insignificant contribution to global emissions, it is important to contribute to global efforts to undertake mitigation actions. And it further opens space for prioritised mitigation measures such as afforestation, reforestation, promotion of energy efficiency, efficient crop and livestock production systems and efficient transport systems, waste management while capturing

opportunities in emission reductions in the region.

The policy also takes note of the following principles:

- Climate change adaptation measures are primary, while mitigation measures are secondary;
- Prioritisation of regions, sectors and communities that are more vulnerable to climate change impacts in the policy implementation;
- Mainstreaming climate change issues into national development plans;
- Climate change adaptation and mitigation actions be carried out without compromising social and economic development; and
- Partnership, collaboration and synergies among various stakeholders involved in climate change issues.

Each partner state is urged to develop a national policy, strategies and institutional arrangements to operationalise the provisions made to enable measures on financing, capacity building, technology development, monitoring and evaluation.

The proposed national climate change policy of Uganda and its development process is cognizant of the regional frameworks and efforts to customise them in the national documents are being made for purposes of harmonised regional climate change response.

Considering the increasing challenges of accessing external finances especially for climate change adaptation, Uganda is also in the process of developing an investment framework with support from Common Market for Eastern and Southern Africa (COMESA) as one way of ensuring that when the policy document is finalised, it will be implemented. Based on lessons learnt from the delayed implementation of the NAPAs, the investment framework is focusing mainly on internal sources of financing climate change prioritised actions as opposed to the traditional concept of sourcing from the multilateral processes.

### Box 1: Uganda's Proposed Climate Change Policy

Uganda is in the process of drafting and developing a climate change policy. The policy formulation process is highly consultative and participatory in nature, involving public, private, academia and civil society stakeholders. Very comprehensive terms of reference agreed upon at various levels are the guide to a set of consultants (both national and international) to facilitate the development of a robust policy document and a costed implementation strategy by end of 2012. The policy will define countrywide accepted adaptation and mitigation options, while also addressing the climate change related action gaps in already developed key policies and frameworks. It will also address the issues on institutional coordination and capacity as well as finance mobilisation to ensure implementation of the policy options. In order to ensure maximum community input into the policy, civil society organisations (CSOs) are also undertaking more countrywide grassroots consultations to generate more views to enrich the process.

#### 2.1.3 Uganda in International Protocols on Climate Change

Climate change, other than in the past, is now a global issue and therefore requires international action, cooperation and collaboration at all levels. Due to the different levels of contribution to the problem, the international community in the spirit of the United Nations Charter and strong belief in multilateralism, responded by adopting the UNFCCC which provides an international framework for mitigating causes of climate change and its effects at both international and national levels, committing countries to integrate climate change issues into their national planning process, sub-regional or regional programmes/interventions. However, in achieving the convention's objective, it requires political will and commitment by adopting the Kyoto Protocol.

Uganda is a signatory to some of the international protocols such as: the UNFCCC, Convention to Combat Desertification (CCD), Kyoto Protocol and the Millennium Development Goals (MDGs), under the United Nations Charter which provides for a number of multilateral agreements and guides as well as influences international actions on development and environment protection (Hepworth, 2010). Therefore, Uganda ratified the UNFCCC in 1993 and in response to commitments under Articles 4 and 12, submitted its first National Communication on Climate Change in 2002.

Uganda has actively participated in international programmes on climate change, including as Vice

President of the Conference of the Parties (COP) Bureau and as a member of the Clean Development Mechanisms (CDM) Executive Board. Negotiations are led by the Climate Change Unit where technical understanding is strong but workload exceeds resource allocation. They complain of under-representation in international negotiations, where sometimes one or two representatives from Uganda compare to nearly one hundred equivalent delegates from the UK or US.

Uganda further developed National Adaptation Programmes of Action (NAPA, 2007) so as to meet the concern that was addressed during the Seventh Conference of the Parties (COP7), held in Marrakech, Morocco, by adopting the National Adaptation Programmes of Action (NAPAs) to respond to their urgent and immediate needs to adapt to climate change.

The Uganda NAPA of 2007 further identified the main human vulnerabilities and livelihood impacts including but not limited to reduced agricultural production, water shortage and/or groundwater, depletion, increased disease, food security, loss of forest area or production, and loss of land or degradation. Therefore, it came up with Community Tree Growing Project to cost US\$5.5mn, Land Degradation Management Project (US\$4.7mn), Strengthening Meteorological Services (US\$6.5mn), Community Water and Sanitation Project (US\$4.7mn), Water for Production Project (US\$5mn), Drought Adaptation Project (US\$3mn), Vectors, Pests and Disease Control

Project (US\$8mn), Indigenous Knowledge (IK) and Natural Resources Management (US\$1.2mn) and Climate Change and Development Planning Project (US\$1.2mn).

The development of a NDP is an opportunity to review the gains, and act on the challenges, constraints and emerging issues facing Uganda's development. Stakeholders consider that the way climate change is handled in the new NDP is a critical factor in how well prepared the country is to deal with climate change, because the plan guides the work of government at all levels (Hepworth, 2010).

## 2.2 Trade

Trade is an important tool to address a country's development challenges and to promote growth and sustainable and equitable development. Trade can create new employment and business opportunities. It can increase agricultural production and productivity, ensure food security, and enhance the earning capacities at household and national level. As such, trade can play a significant role in improving peoples' livelihoods. For this to happen, however, trade policies/arrangements have to be geared to achieving these objectives as negative impact of inadequate trade rules can exasperate the already vulnerable position of a country or groups of people, leading to further marginalisation. Negative impacts of trade rules can also lead to environmental degradation.

### 2.2.1 Policy Framework

Uganda recognised the importance of trade as a tool for development and has put in place an enabling environment to ensure that trade activities flourish. In 2004, Uganda put in place a national trade policy whose vision is to '... transform Uganda into a dynamic and competitive economy in which the trade sector stimulates the productive sectors; and to trade the country out of poverty, into wealth and prosperity'.

The overall mission of the Trade Policy is to 'develop and nurture private sector competitiveness, and to support the productive sectors of the economy to trade at both domestic

and international levels' with the ultimate objective of creating wealth, employment, enhancing social welfare and transforming Uganda from a poor peasant society into a modern and prosperous society.

Uganda has also put in place institutions to provide support services to the trade sector; these include a full-fledged Ministry of Tourism, Trade and Industry (MTTI) which is responsible for trade policy formulation and implementation. Other ministries, particularly Finance and Agriculture are also involved both in formulation and implementation of trade policy. There are also other support institutions such as the Uganda Export Promotion Board, and the Uganda National Bureau of Standards. Since agriculture is the key sector, the government has also put in place measures to increase agricultural production and productivity through initiatives like the Plan for Modernisation of Agriculture (PMA) with the main objectives of increasing incomes and improving the quality of life for poor subsistence farmers and household food security, providing gainful employment, and promoting sustainable use and management of natural resources.

In order to stimulate trade, Uganda since 1987, has been implementing trade and structural policy reforms, embracing liberalised systems for input and output markets, trade, investments and tax regimes. These reforms included liberalisation of domestic and export produce marketing and processing, removal of restrictive tariff and non-tariff barriers (NTBs) and abolition of taxes on exports. Uganda has substantially simplified the structure of its tariff and narrowed the gap between applied and bound rates in order to enhance the transparency and predictability of its trade regime. However, this reduction has exposed Uganda's economy to cheaper imports leading to the collapse of some industries and the discouragement of value addition and industrialisation.

The reforms have to a large extent contributed to continued economic growth. Uganda's real GDP has grown at around six percent per annum on average, but the global economic crisis of

2008 greatly affected the economy leading to declining growth. However, this economic growth has not been translated into development as evidenced by the persistent high levels of poverty of about 24.5 percent of the population being below the poverty line. Rural poverty levels are higher at 27.2 percent, while in Northern Uganda, the prevalence of poverty is even higher at 46.2 percent.

Uganda encourages foreign investment. The Uganda Investment Authority (UIA) is intended to be a one-stop shop to promote and facilitate investment in Uganda. In order to ensure a sufficiently large market for her commodities as well as the development of her industries, Uganda has entered into multilateral, regional and preferential trade arrangements, that is WTO, Common Market for Eastern and Southern Africa (COMESA), East African Community (EAC), Intergovernmental Authority on Development (IGAD), US African Growth Opportunity Act (AGOA) and EU-ACP Cotonou Agreement. Uganda as part of the EAC is also negotiating the Economic Partnership Agreement (EPA) with the EU in order to strengthen its position in the EU market.

## 2.2.2 State of Trade in Uganda

Uganda's exports are mainly dominated by primary products accounting for over 90 percent of the total exports. They include agricultural, fisheries, livestock and forestry products.<sup>13</sup> The exports to the EU market declined from 24.9 percent in 2005 to 18.9 percent in 2011. In the same period, exports to the EAC market were relatively stable averaging 25.7 percent of Uganda's total exports. Exports to other COMESA countries excluding EAC have been fluctuating between 20.0 percent in 2005 and 39.7 percent in 2009. The COMESA region is still Uganda's major export destination accounting for 29.6 percent of the total exports as of 2011.

As table 4 indicates, in terms of imports, Asia has become a major partner moving from 25.5 percent of total imports in 2005, to top the list at 45.4 percent in 2011. Within this group, the major countries include India, China and Japan.

Figure 4 shows that among the East African countries, Kenya is Uganda's leading trading partner, followed by Rwanda, Tanzania and lastly Burundi. The total trade with the EAC

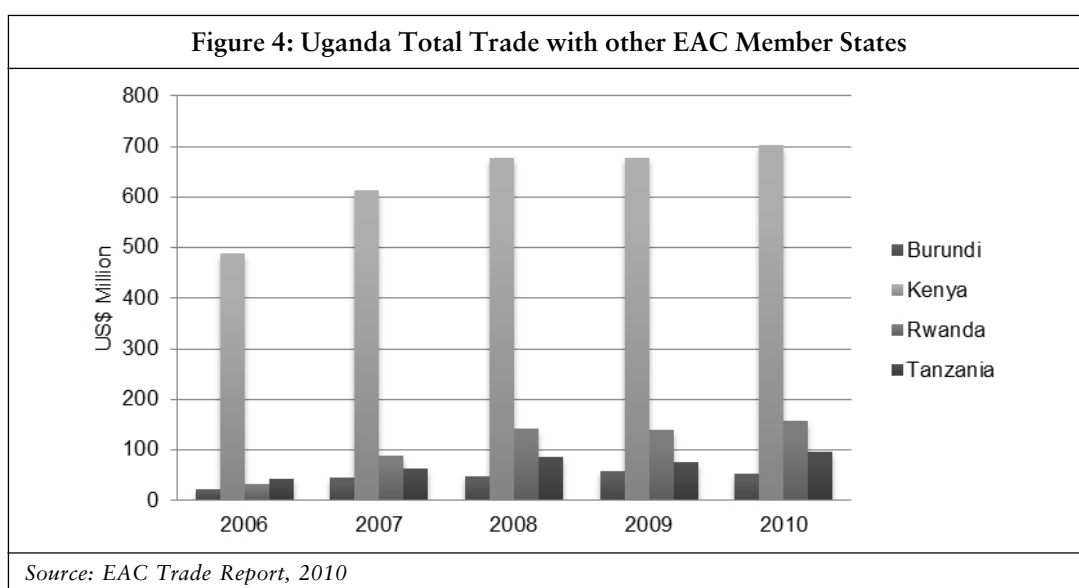
**Table 4: Geographic distribution of Uganda's Exports and Imports, 2005-2010**

Region/Country		2005	2006	2007	2008	2009	2010	2011
Exports	COMESA (Excl EAC)	20.0	15.6	33.7	38.2	39.7	34.5	29.6
	EAC (Incl. Tanzania)	25.9	19.9	25.6	25.8	28.2	28.7	25.8
	European Union	24.9	17.7	17.4	18.2	14.6	17.0	18.9
	Other Europe	8.1	3.3	4.9	4.1	6.3	3.0	4.9
	North America	1.8	1.1	1.3	0.8	1.6	1.1	1.6
	Middle East	8.7	13.3	10.2	5.5	4.1	6.1	6.4
	Asia	6.0	5.0	3.9	3.9	4.4	5.0	7.3
	Rest of the World	4.6	24.1	3.0	3.5	1.1	4.6	5.5
Imports	COMESA (Excl EAC)	3.0	2.4	2.5	2.4	2.5	2.4	2.0
	EAC (Incl. Tanzania)*	28.1	18.8	15.7	13.4	13.8	13.1	12.7
	European Union	18.3	18.2	20.2	19.1	17.3	15.4	12.6
	Other Europe	1.0	2.6	1.9	3.3	2.3	2.0	1.6
	North America	5.0	3.7	3.6	3.1	3.2	2.6	3.5
	Middle East	9.8	18.5	15.9	16.1	15.9	15.8	14.8
	Asia	25.5	28.4	32.9	34.2	37.2	41.8	45.4
	Rest of the World	9.3	7.4	7.3	8.4	7.8	6.9	7.4

Source: Uganda Bureau of Statistics Statistical Abstracts, 2010 and 2011

\* Data on imports from Burundi was not available





countries shows that over the years and probably in the near future, Kenya will remain a very important trade partner in the EAC more than all the other countries combined, therefore strengthening this trade relationship would be of strategic significance to Uganda.

#### a) Export Diversification

Uganda's exports can be divided into traditional and non-traditional agricultural products. The traditional exports include coffee, cotton, tea and tobacco. Coffee remained Uganda's top export product fetching US\$283.9mn in 2010, although this was a tremendous decline from

what it earned in 2008 at US\$403.1mn.<sup>14</sup> Uganda also exports a range of non-traditional agricultural commodities such as fish, cut flowers, fruits, vegetables, vanilla, sesame seeds, beans and other legumes, as well as skins and hides. As indicated in table 5, the contribution of non-traditional exports (NTEs) to the total export earnings increased to 72.8 percent in 2010 from 69.3 percent in 2008. Fish and fish products remained the main foreign exchange earner in the category of NTEs at US\$127.7mn in 2010. However, their contribution to total export earnings continued to decline to 6.6 percent and 7.9 percent in 2009 and 2010, respectively.<sup>15</sup> The

Commodity	2005	2006	2007	2008	2009	2010
<b>Total Traditional</b>	<b>32.9</b>	<b>29.9</b>	<b>29.9</b>	<b>30.7</b>	<b>26.8</b>	<b>27.2</b>
Coffee	21.3	19.7	19.9	23.4	17.9	17.5
Cotton	3.5	2.1	1.5	0.8	1.5	1.2
Tea	4.2	5.3	3.6	2.7	3.8	4.2
Tobacco	3.9	2.8	5.0	3.9	3.6	4.2
<b>Total Non-Traditional</b>	<b>67.1</b>	<b>70.1</b>	<b>70.1</b>	<b>69.3</b>	<b>73.2</b>	<b>72.8</b>
Maize	2.6	2.5	1.8	1.1	1.9	2.4
Beans & other legumes	1.1	0.8	0.8	1	0.9	0.6
Fish & fish products	17.6	15.2	9.3	7.2	6.6	7.9
Cattle hides	0.9	0.8	1.4	0.7	0.4	1.1
Electric currents	0.9	0.6	1.1	1	0.7	0.8
Fruits	0.1	0.1	0.1	0.3	0.1	0.0
Roses and cut flowers	3.0	2.2	1.7	1.7	1.7	1.4
Gold and gold compounds	9.0	12.7	4.9	2.9	1.5	1.9

Source: Uganda Bureau of Statistics, 2010

other NTEs that contributed significantly to the total export earnings were maize with 2.4 percent, roses and cut flowers (1.4 percent), beans and other legumes at 0.6 percent.

The increase in the export of non-traditional agricultural products has implications not only for food security, but it also makes the protection of the agricultural sector more urgent, given its key role in export earnings.

#### b) Import Diversification

Uganda's main imports include machinery and transport equipment, food products, fuels and chemicals. As a result of regional integration, Uganda's trade with the other sub-Saharan African countries has increased. Kenya is the largest single supplier, accounting for nearly one fourth of total merchandise imports to Uganda.

The importation of agricultural products has also been increasing, especially in cereals and products thereof dairy products, vegetables and fruits, beverages, tobacco and oil seeds. Over the years, imports of processed agricultural items have been increasing, with mixed results as regards trade and agricultural production at national level.

#### c) Uganda's Balance of Payments

Figure 5 shows trends in both formal and informal trade, with a steadily worsening trade balance over the years. Between 2005 and 2010,

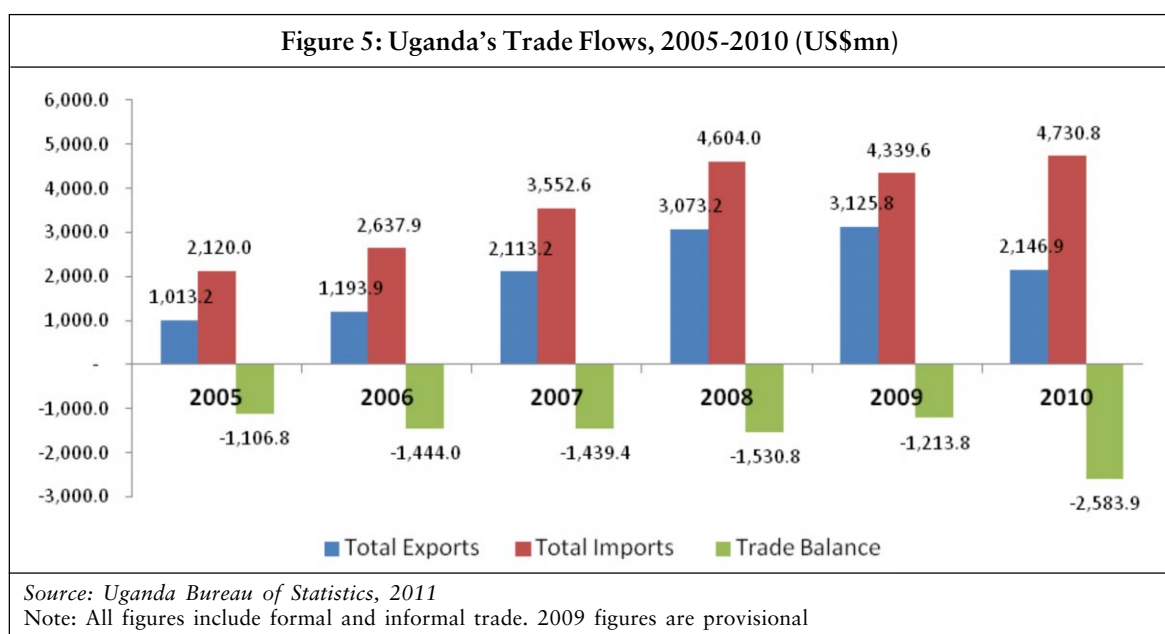
Uganda's trade deficit more than doubled from US\$1,106.8mn to US\$2,583.9mn.<sup>16</sup>

This is as a result of the decline in world prices of most of Uganda's traditional exports (coffee, cotton, tea and tobacco) over the last few years, which contributed to a fall in export earnings, despite the upward trend in the share of non-traditional exports (for example floricultural products, fruit, vegetables, fish and fish products) resulting from the diversification efforts. Overall, agriculture still accounts for the bulk of Uganda's exports (around 90 percent of the value of total merchandise). Yet, at the same time, Uganda is importing more processed goods.

For Uganda to succeed in its poverty alleviation effort through increased trade, in particular of agricultural products, the country needs to come up with creative means to increase local value addition of agricultural products exported and also to increase general productivity of the agricultural sector.

### 2.3 Food Security

Food security can be defined and interpreted in different ways and its linkage to trade provides an opportunity to locate it within the global trends and factors beyond the national and household outlook. Over the years, the food security definition, at least from the public policy



perspective, has been highly discussed and modified, which is a recognition that different scenarios call for its application to take into consideration particular socio-economic situations of specific communities. To date, there is a general agreement that whatever definition of food security, at least three key elements of food availability, access and stability need to be factored in.

*Availability of food:* This refers to the ready availability of the nutritionally adequate and safe food. This can be determined by domestic production, import capacity, existence of food stocks and in some situations, food aid. However, even when food is available, it is not a guarantee that everyone will have access to it that is why access to food is equally critical.

*Access to food:* Access refers to an ability to acquire acceptable foods in socially acceptable ways. The ability will mainly depend on the income or purchasing power especially for a household, while other infrastructural support like transportation, market structures or food distribution systems are also key in realising this access.

This concept was expounded by Sen (1981) when he used the term entitlement to emphasise aspects of consumption, the demand side and the issues of access by vulnerable people to food which introduced an ethical and human rights dimension to food security.

*Stability or sustainability:* Food security systems need to ensure that access is not only guaranteed at present or for the immediate future, but for the long term as well. In the short and medium term, stability can be affected by weather, price fluctuations, policies, fluctuations in incomes, human-induced disasters like war or political instability among other things, while in the long run, wider issues like environmental disasters as a result of deforestation affect household food stability.

Sometimes long term stability of supply and access can be affected by wider issues like use or misuse of natural resources such as land,

forests and water, which have potential devastating effects on the household's future food security. Other elements that do affect food security include, food safety and quality, cultural sensitivity to some foods, the level of vulnerability within different socio-economic groups as well as the international trade, especially in agricultural products.

Food security can therefore be defined at household, national, regional and global levels, but essentially it can be described as a phenomenon relating to individuals. It is the nutritional status of the individual household member that is the ultimate focus, and the risk of adequate status not being achieved or becoming undermined (Food and Agriculture Organisation-FAO, 2003). Given the above considerations, the following definition (FAO, 2005) was found to be appropriate: 'Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life'.

Uganda is an agricultural country with an advantage of rich natural resources, good soils and climate (both equatorial and savannah all year around). There are two rainy seasons in a year with abundant rainfall; fairly even temperatures (mean annual 10-22.4° C and 22.4-32.5° C) and thus the capacity to produce enough food for consumption and some surplus for export. Food crops that are grown, *inter alia*, include cereals like maize, millet, sorghum and other crops like sweet potatoes, cassava, yams and plantain or bananas. It employs a high share of the workforce which is currently estimated at 66 percent (8.8 million people) and contributes to the national economy with a share of 22.5 percent to GDP in 2010-2011. It is a source of livelihood to many people and its contribution to food security is enormous.

### 2.3.1 Policy Framework

The Uganda national policy on food security<sup>17</sup> does not provide a specific definition for food security, but it is generally based on the above elements with specific emphasis on a household

as the basic unit for targeting and nutrition status as the ultimate result. However, the analysis of trade and food security will be at national level and beyond since achievement of national food security does ensure that there is sufficient food for all households within the country. Food availability at national level is the total production of food within a country, plus the amount of food imported, minus the amount of food exported.

The National Development Plan is the overall policy that provides the framework through which all sector policies are aligned. It also devised strategies for other key areas and for improving per capita incomes, economic growth and general investment, agriculture, infrastructural development and access to market among others. Indirectly, all these improve the different components of food security but there are also some policies and action plans that are more precious on the subject. For instance, the Uganda Food and Nutrition Policy 2003, Uganda Food and Nutrition Strategy and Investment Plan 2004, Uganda Nutrition Action Plan 2011-2016, and the Agriculture Sector Development Strategy and Investment Plan 2010/2011-2014/2015 are some of the public policy reference documents that are explicit on food security. They provide the overall policy objectives on food security, targets for various food security and related indicators, but also align themselves on the overall National Development Plan (NDP) framework.

### 2.3.2 State of Food Security in Uganda

Over the years, Uganda's food security status has been below the recommended WHO standard. Using the average calorie intake per person per day as a key measure of food security, this indicates improved intake from 1,494 Kcal in 1992 to 2,193 Kcal in 1999, but declined to 2,066 Kcal in 2002 and to 1,970 Kcal in 2005, which are all less than WHO recommended intake of 2,300 Kcal per adult per day (NDP April, 2010). However, if the targets stipulated in the Uganda Nutritional Action Plan are to be achieved, the recommended global standard of 2,300 Kcal per adult per day is to be realised by 2013 (2,332 Kcal) and later 2,500 Kcal by 2016.

Table 6 shows that over the years, the number of people that get into the bracket of undernourished is increasing in Uganda. According to MDG No. 1 (eradicate extreme poverty and hunger) target, the proportion of population below the minimum level of dietary energy consumption by 1990 is supposed to be halved by 2015. This proportion seems to be increasing even with the gains in improving poverty levels. Given the current trend, it is therefore unlikely that Uganda will be able to meet this target.

#### a) Food Production

Broadly, countries may follow two strategies in order to achieve adequate levels of food security, i.e. food self-sufficiency and food self-reliance or a mixture of the two. Food self-sufficiency is

**Table 6: Food Deprivation and Consumption Indicators for Uganda**

Specific indicators	1990-02	1995-97	2000-02	2006-08	Target 2016
Number of people undernourished (millions)	3.5	4.9	4.8	6.7	
Proportion of undernourishment (%)	19%	23%	19%	22%	
Dietary energy supply (Kcal/person/day)	2,280	2,200	2,280	2,220	2,500
Total protein consumption (g/person/day)	53.4	48.0	49.8	49.4	
Animal protein consumption (g/person/day)	10.9	9.1	8.8	10.2	
Fat consumption (g/person/day)	36.0	37.5	33.4	42.5	
<i>Source: The State of Food Security in the World, 2011</i>					
Note: 2016 Target is according to Uganda Nutrition Action Plan 2011-2016					

Crop	2008		2009		2010	
	Area ('000 ha)	Prod ('000 tonnes)	Area ('000 ha)	Prod ('000 tonnes)	Area ('000 ha)	Prod ('000 tonnes)
Bananas	916	4,300	942	4,522	978	4,594
Cereals	1,739	3,173	1,560	3,184	1,642	3,250
Root crops	1,344	4,867	1,275	5,057	1,271	5,171
Pulses	715	966	718	965	717	990
Others	557	361	605	400	637	422
<b>Total</b>		<b>13,667</b>		<b>14,128</b>		<b>14,427</b>

*Source: Statistical Abstract, 2011*

where a country ensures that there is sufficient domestic food production to meet a substantial part of food requirements, while self-reliance reflects a set of policies where sources of food are determined by international trade patterns, i.e. food is imported and paid for with money that is generated from exports. Normally, the choice of any of these strategies is determined by the nature of the food system in the country or how strong their share in international trade is.

Countries like Uganda that are blessed with natural resources and whose economies are mainly agricultural but are not very competitive in non-agricultural trade tend to opt for self-sufficiency as the dominant model in guaranteeing their food security. This strategy has also been found to be more acceptable given that Uganda's role in international trade is minimal and thus heavy reliance on food imports or agricultural trade would render it more vulnerable to fluctuating international trade prices. Uganda's policies do stress this strategy through increased agricultural production to meet domestic food requirements, while boosting exports to earn foreign exchange is the other objective. However, it is not clear how the recent discovery of oil will impact the agriculture sector. Depending on how both these sectors are managed, it is likely that a mixture

of self-sufficiency and self-reliance will be pursued in the long term.

Table 7 shows that over the three years, roots crops were the most produced food crops in Uganda, followed by plantain bananas, cereals, pulses and others, respectively. Overall, food crop production grew with an average of 2.5 percent over this period, with a slightly higher increase from 2008 to 2009. A lot of land is used to produce cereals especially maize which has increasingly become a main staple food in urban areas as well as among many rural families.

Overall, there has not been much change in total food production in the last three years to match the increasing population.

*b) Shares of major food crops in the dietary needs*  
In Uganda, the major crops that make up most of the food consumed include plantain bananas,

	2008 Production (‘000 tonnes)	2009 Production (‘000 tonnes)	2010 Production (‘000 tonnes)
Fish catch	364.8	366.6	381.9
Beef	220,179	226,785	233,588
Chicken and eggs	24,040	24,761	25,504
<b>Total others</b>	<b>244,584</b>	<b>251,913</b>	<b>259,474</b>
<b>Total Food†</b>	<b>258,251</b>	<b>266,041</b>	<b>273,901</b>

*Source: Statistical Abstract and Agricultural Statistical Abstract, 2011*

†Total food is total production in ‘000 tonnes of food crops, fish, beef, chicken and eggs, but excluding milk.

Major food commodities consumed (share in DES)	1990-2002	1995-1997	2000-2002	2006-2008
1. Plantain bananas	18.0	21.5	19.0	15.6
2. Cassava	14.9	9.3	12.7	12.7
3. Flour of maize	8.0	11.2	10.9	9.4
4. Sweet potatoes	9.6	8.9	9.7	8.8
5. Flour of millet	7.3	6.6	5.3	5.3
Share of cereals and roots and tubers in DES	44.3	41.2	45.1	45.8
Share of oils and fats in DES	4.2	5.6	4.8	7.9

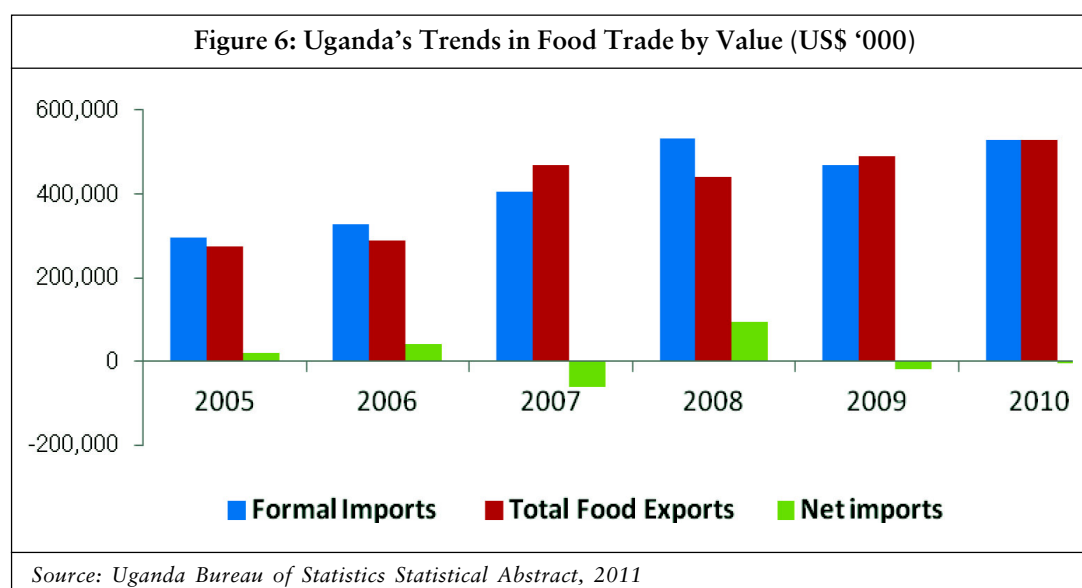
*Source: Food and Agriculture Organisation, 2010*

millet, maize, tubers like sweet potatoes and cassava. These are also the key food crops that are produced, while those that supplement them like rice and wheat are mainly imported. Table 9 shows several indicators to this effect.

### c) Food Trade

Most of Uganda's exports are agricultural and food items. Exports like fish have become a dominant item, especially to the region and European markets and they fetch a substantial amount of foreign exchange for Uganda. Figure 6 provides an overview of Uganda's agricultural trade, specifically in food trade.

Since the onset of trade liberalisation in early 1980s, Uganda's export base was diversified to include non-traditional exports like fish, cereals and other agricultural food products. Locally, there has been increased domestic food trade as a result of earlier policy emphasis of securing household food security through the market. Farmers found themselves growing more food for sale and in most cases, use the money earned to buy the food they need from the market.



## Chapter 3

# Missing Links, Real Impacts

## *Interface between Climate Change, Food Security and Trade*

---

### 3.1 Climate Change and Food Security

Most of the country's population lies below the minimum poverty line, yet they are at the core of agricultural production, which is still the backbone of the country's economy. Therefore, with the escalating rates of occurrence of the various adverse climate change impacts related to extreme weather events, the rate of return from agricultural production has decreased over time. In fact, the changing temperatures and amounts of rainfall received over a given area determine the level of agriculture output, thus the level of incomes.

Food production in Uganda is predominantly nature-dependent, influenced so much by the prevailing weather conditions (especially rainfall, temperature and humidity). These determine the soil water moisture at any given time, the evapotranspiration rate as well as the favourable conditions for the pathogens and diseases that can affect the crops and animals.

Uganda as the rest of the global community must operate within three limits: the quantity of food that can be produced under a given climate, the quantity needed by a growing and changing population, and the effect of food production on the climate. At present, the country operates outside that safe space, as witnessed by the enormous number of people who are undernourished. If current trends in population growth, diets, crop yields and climate change continue, the country will still be outside this

'safe operating space' by 2050. The situation will be unsustainable and there will be very little room to manoeuvre.

With climate change and increasing climate variability, seasons are becoming more erratic, making it difficult for the farmers to plan their farm activities. Secondly, the distribution of the rains across the season is also becoming very unreliable. These changes from the known cycles tend to change the growing calendar and also distort the marketing systems for particular products.

The desktop study reveals the direct and indirect linkages between food security and climate change. The climate change-related phenomena of the increasing intensity and frequency of extreme weather/climate events (including high and/or low temperatures, prolonged droughts, heavy rains/storms, strong winds and hailstorms) and their associated impacts such as water-logging/ flooding, prolonged soil moisture stress, and landslides, have varying impacts on the food systems within Uganda and the EAC.

In the short term, socio-economic factors such as those linked with market forces may dominate food security. However, in the long term, stability and sustainability of food production and food supply, as well as environmental factors become crucial. Climate change will continue to stress the poor communities and reduce their range of livelihoods, leaving a limited survival

range with limited alternatives. This will result into putting all the agricultural products into markets for survival, thus unavailable, unstable and inaccessible food, and in the long term lead to poor nutrition habits among the poor communities.

Food availability will be reduced by a drop in food production caused by extreme events, changes in the suitability or availability of arable land and water, and the unavailability or lack of access to crops, crop varieties and animal breeds that can be productive in conditions that have led to changes in pests and diseases. The accessibility of food will also be worsened by climate change events that lead to damages in infrastructure and losses of livelihood assets as well as loss of income and employment opportunities.

Food supply could also be influenced by food price fluctuations and a higher dependency on imports and food aid. In fact, in 2007-2008, the increase in food prices shocked many policy makers from the belief that stable or declining food prices and assured supplies could not be taken for granted. The utilisation of food can moreover be affected indirectly by food safety hazards associated with pests and animal diseases as well as the increased presence of human diseases such as malaria and diarrhea.

There are various changes the country can make to either enlarge the safe space or move itself into the safe space (Beddington, 2011). For example, the global demand for food increases with population growth, but the amount of food per person that needs to be produced can be brought down by eliminating waste in supply chains, ensuring more equitable access to food and moving to more resource-efficient, vegetable-rich diets. Agricultural innovation, including genetic improvements and careful matching of crops to environments, can help adapt food systems to climate change, but not if the world warms excessively.

In a much warmer world, it will be impossible to even produce current levels of food. Mitigating emissions of greenhouse gases from

activities related to agriculture will allow people to be fed, while keeping the global climate within a tolerable range. Therefore, as climate change amplifies the environmental and socio-economic drivers of food insecurity, it is imperative that we prioritise where, how and when to act.

Unfortunately, some of the documented information is not very current, while gaps especially with respect to policy frameworks depict the linkages. As such, a field exercise for purposes of validating and updating the desktop information as well as gathering new information was undertaken in the districts of Kotido, Kabong Nakasongola Lira, Kampala, Lyantonde, Kiruhura and Mbarara. These represent areas within the cattle/drought corridor, the north and urban centres that predominantly depend on commercial food. These areas are highly vulnerable to food and water scarcity. The results from this field study are provided in the sections below and the methodology adopted is provided in Annex 1.

### **3.1.1 Climate Change Impacts on Food Security: Experience from Selected Districts**

#### *a) Rural Households' Perceptions: Food Security in the Face of Climate Change*

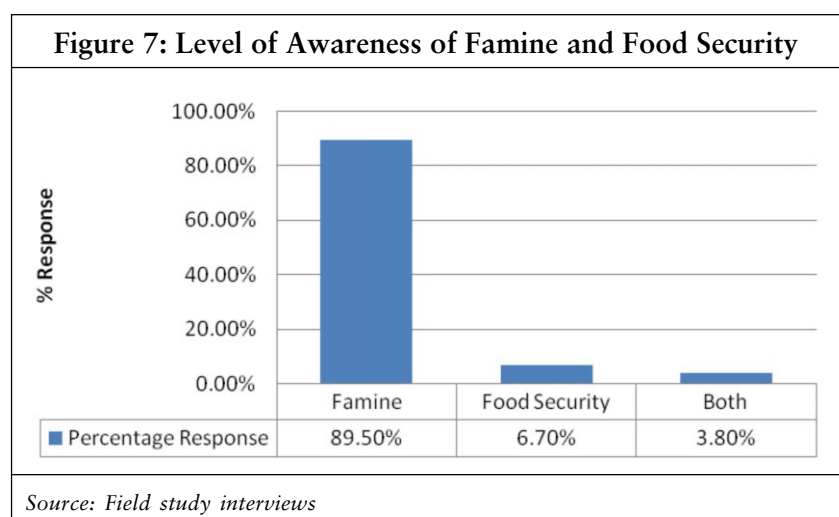
The analysis of the field survey responses revealed that all food systems are affected by climate change but impacted differently. Among the food systems, which include production, processing, preparation, distribution and consumption, production is reported to be the most affected. A few farmers suggested that all the food systems could be protected through appropriate adaptive measures in order to reduce their levels of vulnerability to climatic variations. Table 10 shows that the production aspect is the most affected, while consumption is the least affected.

Approximately 90 percent (94 out of the 105 respondents) of the respondents in the selected districts are aware of famine, but not necessarily food security concerns and its dynamics. With 6.7 percent (07 out of the 105 respondents) are aware of food security, while 3.8 percent (04 out of the 105 respondents) are aware of both food security and famine.



Food system	Effects from climate change	Vulnerability rank
Production	Affected by weather distribution patterns such as temperature variation which favours the pests and diseases	5
Processing	Crop damage due to continuous rainfall with less sunshine necessary for drying crops	4
Preparation	High cost of production	2
Distribution	Infrastructures damage like roads and bridges which succumb to heavy rains and collapse	3
Consumption	High food prices	1

Note: 5=severely (very high), 4=high, 3=moderate, 2=low, 1=very low



The frequent occurrences of the prolonged droughts in conjunction with the changing seasons in terms of onset, cessation and the unreliable erratic rains are some of the major causes of social instability, which at times culminate into displacement of people.

Farmers generally fail to plan their agricultural-related activities amidst the severe weather phenomena, limited land in the face of the increasing population pressure with very small percentage being involved in serious food production. The issue of the available land over the increasing population growth has resulted into small-sized farm lands, thus affecting food security.

The impacts of a changing climate are compounded with poor farming practices including overgrazing, which result into soil and

land degradation leading to low and poor crop and animal yields, thus threatening food security. In 2000 for example, a crop farmer in Bunenero, Rubaya sub-county, Mbarara district (Aruhara Justine) harvested 100 kg (1 bag) of maize from a garden of one acre which she used to get 7-11 bags (700-1,100 kg) of maize in a season.

Besides, there are also social factors, which are underlying traditional drivers of food insecurity. For instance, the men abandon all the farming work to only women with mostly unskilled labour, yet they already have the burden of looking for water and food for the family. It was reported that there are cases when men forcefully sell off stored food by the women, because of their different conflicting domestic interests.

All these lead to food insecurity, but more so during prolonged droughts and some other climate change phenomena. The following are some of the different farmers' perspectives on some of the underlying factors hindering food security in their communities:

- High prevalence of crop and livestock pests and diseases such as the Banana Bacterial Wilt and Cassava Mosaic;
- Poor farming and post-harvest handling practices;

- Inadequate extension services, thus farmers lack guidance on good food storage (post-harvest handling), agricultural in-puts such as fertilisers (organic and inorganic), and planting materials such as seeds, seedlings and cultivars; and
- Lack of efficient food marketing systems: The high market prices are mainly attributed to the opening-up of the neighbouring markets leading to high demand from the neighbouring countries like South Sudan and Somalia. But on the other hand, there are no measures for regulated marketing systems with farmer protective farm gate price arrangements. The farmers end up being exploited, which reduces their production incentives and capabilities, hence affecting food security.

*b) The Cattle Corridor: Effects of Droughts on Cattle Keeping*

Climate change has aggravated the problem of limited water sources, particularly in the Uganda 'cattle corridor', making it difficult to sustain larger numbers of cattle in the face of increasing human population, thereby increasing food insecurity. The cattle keepers/farmers within the selected districts revealed a number of challenges they faced during the previous drought periods of 1983, 1984, 1986, 1989, 1990, 1994, 1995, 1999, 2001, 2002, 2004, 2005, 2006, 2008, 2009, 2010, 2011 and early 2012.

According to the Kiruhura District Production Officer, Mugisha Francis, the most severe droughts occur in a sequence of ten years, but with prolonged dry episodes occurring in the month of January to February, June to August every year, while the rains occur in March, April, May, October and December.

A cattle keeper (Sam Tafungwa from Kyabazala village in Lyantonde sub-county, Lyantonde district), revealed that during the drought seasons, there is scarcity of water and pasture specifically for animals and other livestock, leading to movement of more than 20 km each day in search of pasture and water. In the process, they encounter diseases, ticks and fire setting

problems. During prolonged droughts, the animal stocks drastically reduce as a result of animal sale offs, at a cheap price, thus reducing income levels in the communities. The Chairperson of Kasambya village Local Council-1 (LC I), Lyantonde district (Mr Tendo Nathan) revealed that during the rainy season there is a lot of new, young and fresh pastures, but again animals die due to diarrhoea, ticks and foot and mouth disease (FMD). Animals also interact with the wild animals from Lake Mburu National Park which act as catalyst for the spread of animal pests and diseases. This forces the wild animals to destroy the farmers' crops, which affects production and ultimately food security.

With the above challenges coupled with the present limited veterinary data at District Veterinary Offices, poor service delivery of government programmes such as National Adaptation Programmes of Action (NARO), National Agricultural Advisory Services (NAADS) and Ministry of Agriculture Animal Industry and Fisheries (MAAIF), the contribution of the livestock industry to food security is being jeopardised. Veterinary care services should be improved through recruiting more trained veterinary doctors so as to improve veterinary services. Government should also open-up government-owned veterinary drug shops instead of privatisation since it has led to over-exploitation of farmers over drug prices and usage.

Droughts often result in the drying of water wells, animal death and reduced milk production. During the rainy season for instance, an indigenous cow gives an average of 10 litres of milk a day compared to 1-2 litres of milk a day during the drought periods (Kagwenza Charles from Kabule county). The price of a litre of milk is at Ush 600 during the drought season and at Ush. 150-200 during the rainy periods.

The drought of 1999 forced approximately 80 percent of the cattle farmers in Mbarara to migrate to other distant localities looking for water and pasture. In 2002, cattle farmers in Kinuuka sub-county, Lyantonde district, lost their animals. Lubuuka Stephen had a 66.7

percent (60 out of the herd of 90 heads of cattle died, he sold the rest at a cheap price) of livestock loss. On top of this, there is always a high disease morbidity affecting the county of Kabule comprising of Mpumudde, Kasagama and Kinuuka sub-counties (present Lyantonde district). In 2004, the drought led to approximately an average loss of five percent of livestock per cattle farmer in the districts of Lyantonde, Kiruhura and Mbarara.

According to Kiruhura District Production Officer, it is important to note that sizeable animal deaths also occur immediately after the prolonged droughts when the rains start. However, livestock numbers and milk production increase. To cope with these challenges, farmers require a lot of sensitisation on the proper cattle keeping practices and management for water and pasture conservation, including silos and other storage facilities.

It is noteworthy that the cattle corridor areas, mostly in the western part of Uganda, are hilly. Therefore, the government should emphasise the channelling of surface water run-off from the hill tops to specific collection sites (Rock embankment technology). This would serve as water point sources during the periods of water scarcity, thus preventing farmers and their animals from walking longer distance in search of water, which may also lead to better productivity of the animals in terms of milk. The government could also provide tree seedlings at subsidised prices or if possible, for free, which can result into a number of services and products, in line with the preservation of natural resources such as forests and wetlands.

Farmers within the selected Districts of Kiruhura, Lyantonde and Mbarara also suggest that there is increasing need for the construction of more dams and wells in each village, given the geographical landscape and high cattle population in the region. Government should provide excavators, tractors, storage tanks and irrigation scheme systems to farmers at a subsidised cost. The farmers are willing to take responsibility of meeting the fuel costs for the tractors. This would ensure proper management

of the dam for better outcomes. However, according to Mr Barahire of Kiruhura II, an average dam should be a minimum of 60 ft by 30 ft by 16 ft.

### *c) Key lessons*

Increasing variability especially in the seasonal rainfall amounts since the early 1990s has distorted the activity calendar for food production, with heavy rains falling in the months expected to be dry, while the months that are normally wet and cold experience persistent desiccating sunshine. Since Uganda's agriculture is heavily dependent on rainfall, the erratic swings in season have caused an increase in frequency of food and water shortages in the country, with the worst hit area being the dry cattle corridor that stretches from the Uganda-Tanzania border to Karamoja region. Death of livestock from lack of water in the corridor has been common and has forced traditional pastoralists to migrate with their herds during hard times to neighbouring districts or game reserves.

In Karamoja and Teso regions, several deaths from starvation have been recorded in recent years. Therefore, the onset and cessation of growing seasons are becoming more erratic, making it difficult for the farmers to plan their farm activities. Secondly, the distribution of the rains across the season is also becoming very unreliable. These changes from the known cycles tend to change the growing calendar and also distort the marketing systems for particular products.

The intensity and frequency of climate change extremes is also on the increase. As a result, there are more flooding and drought episodes, which destroy crops and livestock, thus reducing production. The damage caused by floods to infrastructure also disrupts operations and exposes communities to socio-economic breakdowns. For instance, markets are cut off, which facilitates exploitation by middle men leading to less revenue by the primary producers.

Such conditions have increased losses and costs of production, making agri-business less

attractive and discouraging agricultural entrepreneurship. This is causing especially the most able bodied youths to shift to urban areas for odd jobs to earn a living, leaving the less enterprising and elderly people to engage in agricultural production. This has led to the disparity in the growth of food production, thus threatening food security.

The changing climate leads to changing ecological conditions, which define new belts for sustained survival of the various species and in some instances, leading to the extinction of some species. There are a number of wild fruits that used to contribute to the nutrition of communities, especially among children, but due to ecological changes, many have become extinct or shifted to other locations, which may not even be easily accessible. This is a food security concern, which is reflected even in deficiency symptoms especially amongst children.

Land degradation has also been a consequence of climate change as frequent droughts and floods have led to nutrient loss through desiccation, increased erosion and leaching. This affects the regeneration potential of ecosystems, thus deterioration of ecosystem services and loss of soil productivity, which affects crop yields and food security.

These impacts of climate change on Uganda's agriculture are in addition to other well-documented challenges in the sector. The poor nature of Uganda's land tenure system makes agricultural production practices difficult since the land which is a basic factor for agricultural production is becoming heavily fragmented due to population increases. This is leading to the reduction of land size for agricultural production and less food production on a small scale coupled with poor farming practices (especially non-furrow mono cropping) that are resulting into soil exhaustion, thus less food production levels.

As a result, there are increasing food prices, coupled with high poverty levels that make it increasingly difficult for many to have access to food, hence fostering food insecurity. Moreover, limited awareness, education and training are

also leading to inadequate knowledge, skills and technology, which have both direct and indirect influence to food production, hence food security.

The transition to a national food system that satisfies human needs, calls for a reduction in its carbon footprint and adaptation to climate change. Therefore, the following are recommended actions to achieve food security in the face of climate change:

- Pro-food production land reforms: The western region is commonly known for pastoralist practices so the biggest chunk of land is communally owned, which makes it difficult to engage in crop farming for fear of the crop destruction by animals. It is just recently that a pastoralist can freely acquire a lease for a given piece of land (in square miles), thus leaving the biggest population with limited land for food crop production. This is being aggravated by the frequent land grabbing practices. There is need to reinforce good management of agricultural practices for land and water systems that reduce land degradation and increase farm profitability leading to higher productivity, hence ensuring food security and overall environment protection and sustainability.
- Encouraging the intensification of agricultural modernisation: The farmers are interested in the introduction of appropriate technology use such as the green house technology, improved planting materials, appropriate irrigation technology and post-harvest handling techniques. Modern storage and processing facilities including the establishment of central granary facilities that would act as food sources during food scarcity periods are advocated. In his regard, farmers call on government to provide agricultural inputs such as tractor, fertilisers, and pesticides among others. This would create an incentive to engage in more food production beyond the family requirements.
- Food trade liberalisation with safety nets: this would help protect the primary

producer, thus incentivising them for more production. Trade liberalisation should include some level of control and regulation to ensure that there is access to affordable food during off peak periods, especially by the low income earners. The government should also institute price mechanisms designed to serve the interest of producers (incentive to produce more food) and consumers (to facilitate access to food). There is also a need for regional specialisation (EAC) in food production for regional trade, hence lowering production costs and food prices thereby improving access to food and income. Trade liberalisation in food systems should be encouraged, while protecting the vulnerability groups (poor and semi illiterate) from negative impacts through the implementation of safety nets, for example by placing threshold prices and tax on food items and GHG emitters/producers.

- Promoting and investing in sustainable practices: In all sustainable agriculture development programmes, include research and investment components focusing on reducing waste, from production to consumption (Consultative Group on International Agriculture Research, 2011), by improving harvest and post-harvest management, food storage, transport and household habits. For instance, good food preservation and preparation practices such as powdered cassava flour and banana crisps should be promoted. This is alongside promotion of agro-forestry, irrigation, fast-maturing and drought/pest resistant varieties, and storage facilities. There should be a clear policy to reduce global warming, all development programmes should have disaster risks reduction integrated to improve food security, and agricultural tool manufacturers should make tools which are environmentally friendly.
- Create comprehensive, shared, integrated information systems that encompass human and ecological dimensions.

### 3.1.2 Climate Change and National Water Systems

It has been observed that water is a principal medium through which people, ecosystems and economies will experience climate change impacts (LA Obeng Chair of the Global Water Partnership (GWP), 2009). There is no alternative to water and therefore, there is need for adaptation to climate change for a water secure future. In countries like Uganda where livelihoods and much of the economy is dependent on nature (especially rainfall and temperature), it has always been argued that water security equals food security, economic growth, healthy ecosystems and a healthy population.

Scarcity of water resources and its inadequacy is leading to increased food insecurity resulting in malnutrition. Children are particularly vulnerable to food insecurity and are the most affected in poorer countries like Uganda. Increased water scarcity will also lead to increased conflicts over natural resources causing social unrest, particularly in the dry land areas of the country. This too will disrupt food production, which ultimately is a threat to food security for the growing population.

Although Uganda has abundant water resources, their distribution is not even. The semi-arid areas of the country experience water stress. The severe drought of 2004-2005 contributed to the reduction of the lake and Nile river levels with serious impacts on power generation, leading to power rationing in the domestic and commercial sectors, thus resulting in the interruption of economic activities and a decline in manufacturing outputs, including from the agro-based industries.

The cattle corridor, a fragile ecosystem, is dependent on rain water for human consumption and production. The rural poor depend on streams and swamps. These sources dry up during severe droughts resulting in diversion of resources to emergency operations. Climate change will exacerbate water scarcity problems, particularly in the semi-arid areas as well as

Figure 8: Uganda's Water Resources



Source: Map in the Directorate of Water Resources Management, Ministry of Water and Environment, Uganda (2012).

pollution of water supplies, particularly in urban centres. The prolonged and severe drought of 1999-2000 caused severe water shortage leading to loss of animals, low production of milk, food insecurity, increased food prices, thus negatively affecting the economy.

Floods and droughts have negative effects on water resources. A large proportion of the rural poor do not have pit latrines. Floods may pollute sources of drinking water and lead to outbreaks of waterborne diseases such as cholera, typhoid and dysentery. The poor are the most affected by outbreaks of such diseases.

Changes in climate are always amplified in the water environment (small temperature increases will translate into increase in river flows by 10-40 percent in some regions, while in others they will decrease by 10-30 percent). One impact of temperature rise has been the melting of ice and glaciers on mountain tops. The Rwenzoris in western Uganda are one of the few permanently ice-capped mountains in Africa.

Recent studies have shown that the glaciers and ice fields on this mountain have decreased markedly both in number and size and that the rate of shrinking has been greatest after 1990.

Figure 9: An Abandoned Dry Borehole in Masaka in 2005



Source: Uganda NAPA, 2007

The Rwenzori Mountains presently have 37 small glaciers and ice fields covering an area of less than 64 km<sup>2</sup>. This has affected the river flows, which have been a source of water for the communities around the mountain ranges for both domestic and agricultural production. Many of the rivers are now misfits, while others have dried up affecting both water and food security in the area.

Although it is predicted (IPCC Assessment Reports 1995-2007) that precipitation will increase in some areas of East Africa as a result of climate change, evapo-transpiration will also increase due to a rise in temperatures, thus reducing the benefit of the increase. Prolonged and severe droughts can lead to low water levels in rivers, underground aquifers and reservoirs, impacting on the hydrology, biodiversity and water supply. Low reservoir levels can also reduce the potential for hydropower generation leading to power rationing in the domestic and commercial sectors, thus interrupting economic activities and decline in manufacturing output. Droughts have resulted in lowering of water table, and drying of boreholes as indicated in figure 9.

Climate in Uganda, particularly rainfall, has been erratic since early 1990s. The incidence, duration and amount of rainfall have all exhibited abnormal departures from long term means. While rainfall in some years has been far short of long term means thereby causing droughts, in

Figure 10: Flooding and Blockage of Lake Kyoga, 1998-2000



Source: Map in the Directorate of Water Resources Management, Ministry of Water and Environment, Uganda (2012)

other years it has been excessive and produced catastrophic floods.

The heaviest rains in recent years were recorded in 1997-1998 and were associated with the *el niño* phenomenon. The rains led to sharp rises in lake levels, widespread flooding, washing away of roads and bridges, extensive soil erosion and landslides.

In Lake Kyoga, rising water levels caused detachment of previously firmly anchored floating papyrus swamps. The freed swamps drifted downstream and collected at the outlet of the Nile from the lake, causing a near total blockage there. The blockage caused a further rise in lake levels and led to partial inundation of marginal homesteads and farmlands, the spread of water borne diseases and disruption of economic activities around the lakeshores. As water levels above the blockage continued to rise, levels (in the Nile) below the blockage dropped significantly. The blockage was cleared in 2001 through dredging with equipment provided by Egypt, a Nile riparian. The government in 2000 set up a programme 'The Mitigation of Lake Kyoga Floods' aimed at alleviating the economic hardships brought upon the local communities in Kyoga basin by the floods and lake level rise.

In this case, much as crops and homesteads were destroyed, communities were able to access fish from the flood plains, which was a nutritional plus for them. With such disruptions in the water systems and the impact on society and food

security, climate change adaptation strategy elements for the water sector in the country are urgently needed. The following proposals exist in the Water Resources Management Department of the Ministry of Water and Environment:

- Strengthening institutional, legal and policy framework for water and environmental resources management;
- Improving water and climate monitoring, assessment, information management, planning and allocation;
- Enhancing water infrastructure for multi-purpose use;
- Strengthening transboundary cooperation and cross-sectoral linkages for improved human health, energy production, water supply and sanitation, fisheries etc; and
- Improving participatory water conservation and catchment management practices.

Considering the impact of climate change on the country's water resources, the concept of Integrated Water Resources Management (IWRM) has been adopted to ensure climate change adaptation. In a situation of water stress, IWRM possible management measures include: seasonal water rationing during times of shortage; adaptation of industrial and agricultural production to reduce water wastage; increasing capture and storage of surface run-off; reusing or recycling waste water after treatment; better use of groundwater resources; rainwater harvesting; and water pricing.

To ensure successful adaptation, there is need for treaties and agreements at the regional level; laws, policies, plans, strategies and institutions at the national level; and at the catchment/basin level. The issue calls for an effective water resources management policy and its implementation, which should consider the following adaptation measures:

- **Protection:** (i) Protection of catchment and watersheds through for example afforestation to create protected forest areas; and (ii) protection of coastal freshwater resources and supplies from salt water intrusion, e.g. through

desalination of sea-water in coastal regions;

- **Sustainable management:** (i) Promotion of water resource economics focusing on water use efficiency including water conservation and recycling; (ii) sustainable use of wetlands; and (iii) promotion of domestic rain water harvesting (roof, rock etc.);
- **Investment:** (i) Investment in ground water exploration, abstraction and pollution control. Ground water is currently underutilised in spite of the fact that aquifers provide high quality water. The main obstacles to greater utilisation of these water sources include lack of data that would inform more effective exploitation and management of these regional resources; (ii) investment in water supply and sanitation infrastructure; and (iii) Investment in more water capture and storage facilities including state schemes as well as small dams/pans; and
- Other interventions such as Artificial recharge of dried-up aquifers, inter-basin transfers and creation of early warning systems for floods and droughts.

### 3.1.3 Climate Change and Food Security Linkages in the Policy Framework

Though without a specific climate change policy in place yet, Uganda has in place a number of relevant policies and measures which can, to a great deal, address issues of climate change. The major goal of these policies is to achieve poverty reduction through environmentally sustainable development as enshrined in the country's Constitution and Vision 2025.

**The Constitution of the Republic of Uganda** places a lot of emphasis on attaining food security and adequate nutrition for its citizens and the government is committed to fulfilling this goal so that all Ugandans can attain good health, social and economic well-being. The Ministries of Health (MOH) and that of Agriculture, Animal Industries and Fisheries (MAAIF), which are the lead ministries in food security and nutrition issues, are mandated by the

Constitution to set minimum standards, assure quality and develop relevant policies.

The specific mandate of the MOH is to improve the quality of health services and to ensure equity in accessing essential health services with the overall goal of reducing morbidity and mortality. Nutrition is one of the priority components of National Minimum Health Care Package being implemented under the Health Sector Strategic Plan (HSSP). The mandate of MAAIF is to support, promote and guide the production of crops, livestock and fish so as to ensure the improved quality and quantity of agricultural produce and products for domestic consumption, nutrition, food security and exports. MAAIF and MOH are also promoting diet diversification as well as other food-based strategies for a healthy and productive population.

**Uganda's Vision 2025** constitutes a strategic framework for national development in the long term. The vision includes a highly productive and modernised agricultural sector, widely distributed, technological proficient, innovative and competitive industries, maximum utilisation of information technology, expanded research capacity, an adequate well trained number of scientists and technologists in all fields of production and other human activities.

**Uganda Food and Nutrition Policy, 2003:** The overall objective of the policy is to promote the nutritional status of all the people of Uganda through multi-sectoral and coordinated interventions that focus on food security, improved nutrition and increased incomes. Uganda's national obligation and commitment are to address issues of food security and nutrition and to promote development. Food security promotes good nutrition which is the key to good health and the socio-economic well-being of a population. Food security and nutrition are mutually reinforcing; social and economic factors have overriding influences on either one or both of them. But the policy does not fully integrate climate change issues into its objectives.



**The Plan for Modernisation of Agriculture (PMA)** is part of the government's broader strategy of poverty eradication contained in the Poverty Eradication Action Plan. It is perceived that modernising agriculture will contribute to increasing incomes of the poor by raising farm productivity, increasing the share of agricultural production that is marketed, and creating on-farm and off-farm employment.

**Population Policy, 1994:** The Population Policy for Uganda was developed with overall goal to influence the future demographic trends and patterns in desirable directions in order to improve the quality of life and standard of living of the people. This policy is for the encouragement of sustainable development through the harmonisation of population growth with the country's natural resources such as water, land, forests and climate.

**Forestry Policy, 2001:** The current trend in Uganda has been one of loss of forest cover and degradation of the remaining forest resource base. The policy goal is to establish an integrated forest sector that achieves sustainable increases in the economic, social and environmental benefits from forests and trees by all the people of Uganda, especially the poor and vulnerable. Forest biodiversity will be conserved and managed in support of local and national socio-economic development and international obligations.

**National Water Policy, 1995:** It sets out water supply and sanitation policies as well as sustainable provision of accessible clean safe water and hygienic sanitation. The policy promotes a new integrated approach to manage the water resources in ways that are sustainable and most beneficial to the people of Uganda. The overall policy objective for the Water Resources Management is to manage and develop the water resources of Uganda in an integrated and sustainable manner so as to secure and provide water of adequate quantity and quality for all social and economic needs of the present and future generations with full participation of all stakeholders.

**Disaster Risk Reduction (DRR) Policy:** The Government of Uganda has demonstrated commitment and implemented Disaster Risk Reduction (DRR) activities. Its policy goal is to establish institutions and mechanisms to reduce Uganda's vulnerability to disasters, effectively manage existing risks and enhance preparedness and response capabilities to likely disasters. Considering that over 70 percent of the disasters are climate change-related, this policy is therefore instrumental in addressing the linkages between climate change adaptation and disaster risk reduction.

**Energy Policy 2002 under the Ministry of Energy and Mineral Development (MEMD):** The main policy goal in the energy sector is to meet the energy needs of the Ugandan population for social and economic development in an environmentally sustainable manner. While the policy recognises the need to address environmental impacts and being compatible with international provisions such as the UNFCCC and taking advantage of the Clean Development Mechanisms (CDM), the New Partnership for Africa's Development (NEPAD) and other regional and international provisions, it mentions climate change, but does not clearly elaborate on how climate change and disaster risk reduction will be addressed. It creates the impression that by addressing issues of CDM, adopting alternative energy sources and by conducting environmental impact assessments whenever an energy project is designed, climate change issues would be addressed automatically.

**The Agriculture Policy under the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF):** The policy is intended to enhance agricultural production in Uganda in an environmentally sustainable manner. The policy provides for enhanced productivity through its Plan for Modernisation of Agriculture (PMA), enhancing farmer access to agricultural information and technology through the National Agriculture Advisory Service (NAADS) and research through the National Agricultural Research Organisation programmes. While the policy promotes the development of plant and

animal varieties that are resilient to climate variability/change and factors in disaster risk reduction to some extent, it does not comprehensively mainstream climate change adaptation and DRR.

**Health Policy (2000-2001) under the Ministry of Health (MoH):** The overall policy goal is a good standard of health for all Ugandans, in order to promote a healthy and productive life. The Health Policy focuses on the provision of health services which are cost effective in reducing mortality and morbidity with emphasis on malaria, HIV/AIDS, tuberculosis, diarrheal disease, acute lower respiratory tract infections, prenatal and maternal conditions attributable to high fertility and poorly spaced births, vaccine preventable childhood illness, malnutrition, injuries, and physical and mental disability. It is important to note that the policy does not have a direct link to climate change adaptation and disaster risk reduction though implied in the current revised Health Sector Strategic Plan.

**Environment Policy (1995) under the Ministry of Water and Environment (MWE):** The Environment Policy (1995) is the umbrella framework that recognises the importance of conservation and restoration of ecosystems, biodiversity and ecological processes, and of enhancing public awareness and local participation in environmental actions (Land and Water Development Vision-FAO, 2006).

It provides for the establishment of supporting institutions from central government to community level such as the National Environment Management Authority (NEMA), Uganda Wildlife Authority (UWA), National Forestry Authority (NFA), Wetlands Management Division (WMD), Water Resources Management Department and Directorate of Water Development (DWD). These Government agencies have structures at district and sub-country levels.

**Gender Policy 2007:** The policy aims to mainstream gender in all levels of planning, resource allocation and implementation of development programmes in the country. The

policy seeks to promote equality between women and men. The government has taken affirmative action in favour of women to enable them participate in decision making processes and improve their socio-economic status. While the gender policy seems to recognise the impact of climate change on gender, it fails to effectively mainstream climate change, its adaptation and disaster risk management into its proposed gender interventions.

It is important to note that women and girls constitute about 80 percent of the labour workforce in the agriculture sector in the country, have limited options/opportunities to work in other sectors, and are most prone to climate change hazards. The government needs to incorporate climate change and disaster risk reduction interventions within the Gender Policy to make it more effective in addressing all gender needs, especially for the women, the girl-child, the disabled and orphans.

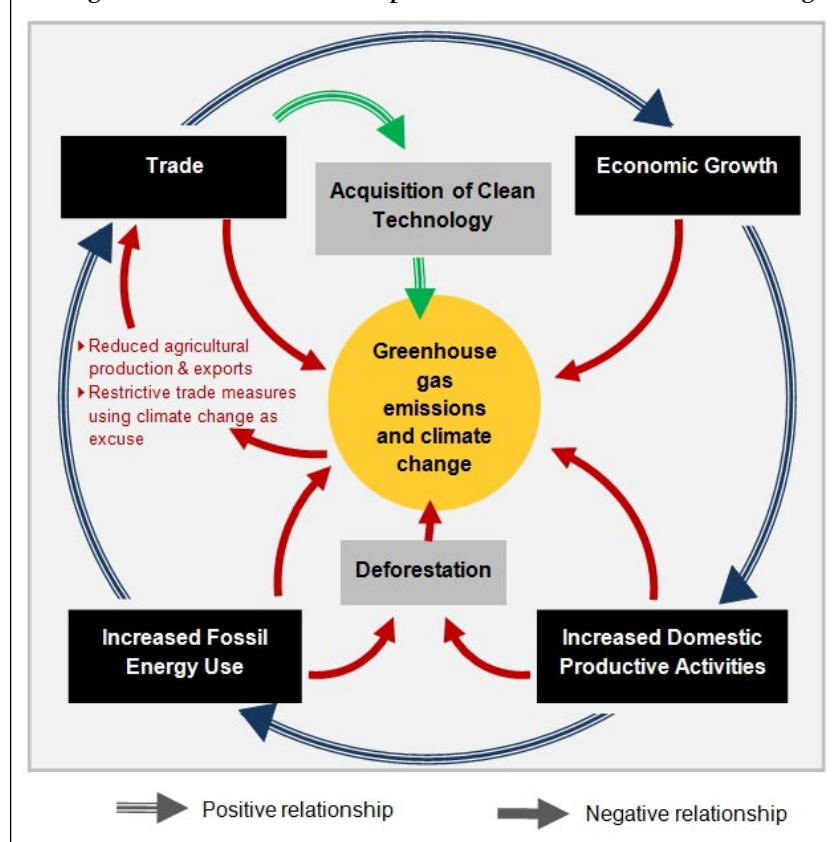
The several gaps identified above show that most of the policies were not designed to address food security issues holistically in linkage with climate change and trade, and fail to integrate climate change, food security and disaster risk reduction into their proposed interventions.

Moreover, there is a lack of proper coordination mechanism for guiding the implementation of the different programmes and there is inadequate awareness about these policies at various levels of the Ugandan society.

Yet, opportunities exist for mutually supportive policies that address effectively the linkages between climate change and food security. For instance:

- There is an opportunity to address climate-related disasters in relation to food security because most disaster-prone communities are the very same that experience food insecurity.
- A diversity of local NGOs involved in rural livelihood enhancement work and gender mainstreaming contribute to food security and at the same time address climate

Figure 11: Basic Relationship between Trade and Climate Change



Although the inter-linkages are not universal, for most of the developing countries, Uganda inclusive, the effect is negative. Economic growth is normally accompanied by pollution which interferes with the environment and subsequently the general climate. Increase in productive activities increases GHG emissions via increased use of fossil energy sources. Increased trade too is supported by increased energy use, for example via increased energy to transport a product, which ultimately exacerbates emissions, and subsequently negatively affects climate. The extent to which this initially assumed negative relationship can be made positive will determine the extent to which trade and climate change mitigation initiative can be

change adaptation (Africa Climate Change Resilience Alliance, 2010).

- Increasing interest of the development partners to partner with government, civil society and the private sector to implement pro-poor programmes.

### 3.2. Trade and Climate Change

#### 3.2.1 Trade and Climate Change: A Conceptual Framework

The conservative articulation of the relationship between trade and climate change is presented in figure 11. First, a causal relationship between trade, economic growth, increase in productive activities and energy use is recognised. This is presented by the outer blue arrows. The logic used is that increased trade results into economic growth. Economic growth in turn increases domestic productive activities which in turn increase the use of fossil energy, at least in many developing countries. Increase in use of fossil energy is an indirect indicator of the intensity of economic functioning, which in turn positively influences trade.

made mutually supportive.

The link between climate change and trade is generally acknowledged but there is no general consensus on its exact effect and direction of causality. At the extreme end is the school of thought that posits that increasing trade and trade-related activities will definitely lead to adverse climate change. These parties argue that to increase trade, countries have to increase their domestic productive activities. In the process of doing so, countries increase their emissions of GHGs which affects the atmosphere and subsequently leads to adverse climatic change. Further still, they argue that all trade-supporting policies necessarily run counter to climate change policies.<sup>18</sup>

An alternative school of thought suggests that the relationship between trade and climate is situation-based and therefore cannot be predetermined. The impact of increase in trade of primary agricultural products on the climate change will for example differ from that of

increase in trade in manufactured industrial products they suggest.

An emerging popular school of thought postulates that although in most cases increased trade has some form of trade off with climate, a win-win situation is possible. According to Meltezer and Sierra (2011: 64-69) who are proponents of this school of thought, the potential conflict between trade and climate change is real but trade can also support mitigation of climate change impacts. For example, dispensation could be included in WTO rules to support trade in products that have low carbon foot print and encourage trade in environmental goods and services. Trade can also enable countries to access climate-friendly technology.

This is based on the premises of the later school of thought that despite inherent trade-offs between trade related activities and undertaking to mitigate climate change, a balance between the two can be achieved. In other words, there are creative ways through which trade policy could be used to supplement climate change mitigating initiatives.

**3.2.2 Institutional and Policy Linkages in Uganda**  
Uganda has specific policies on climate change and trade in place. There are also other policies and frameworks that include these two issues.

*a) Climate Change and Trade in the National Development Plan*

The country's National Development Plan which stipulates the country's medium term strategic direction, development priorities and implementation strategy, addresses both issues. The Plan whose theme is 'Growth, employment and socio-economic transformation for prosperity' recognises the importance of both trade and climate change in delivering this plan. It recognises that sustainable economic and social development of Uganda largely depends on exploitation of its environment and natural resources which has implications on climate change. The plan further recognises the negative impact of climate change on key economic factors such as agricultural production,

employment, food security, durability of infrastructure, and hydropower production.

Against this background, it specifically sets out to achieve the following climate-related objectives among others:

- To develop national capacity for coordination and implementation of climate change adaptation and mitigation activities in the country in support of social welfare and national development;
- To ensure climate proof development planning with the strategy to re-define climate change as a development issue; and
- To promote low carbon economic development path by providing and promoting incentives for clean development, and by building the capacity of the private sector to effectively participate in clean energy development initiatives.

The plan also recognises the need to protect and restore forest cover through reforestation and afforestation, promoting the use of timber and timber products substitute and use of efficient energy saving sources, promoting rural electrification, and promoting carbon credit trade. One key action identified under the climate change component is the promotion of policy synergies. However, the policies identified for mainstreaming are agriculture, women, youth, HIV/AIDS and people with disabilities.

The section on climate change in the NDP does not recognise trade as a tool that can be used by government to mitigate and adapt to climate change through acquisition of clean technology. Neither does it address the implication of promoting a low carbon economic development on the competitiveness of Uganda's trade. The plan addresses the trade sector but only in terms of increasing production, value addition and exports in order to promote trade and value addition. Therefore, the inter linkages between trade and climate change are not specifically addressed. However, the issues of lack of policy, legislation, regulation and guidelines for mainstreaming climate change into development plans at all levels and the weak coordination

mechanisms were recognised in the NDP as some of the constraints facing the performance of the climate change sector.

#### *b) Trade in the Policy Framework on Climate Change*

Uganda is in the process of putting in place a National climate change policy. The draft background papers are already in place but do not address the inter-linkages between trade and climate change. Although trade is recognised as ‘other active institution in climate change’, the reference is to the Uganda Investment Authority that is being called upon to promote projects under the Clean Development Mechanism (CDM). The background papers on adaptation and mitigation do not also refer to the inter linkages between climate change and trade. Since the policy is work in progress, there is still an opportunity for stakeholders to address these gaps.

In Uganda, many sector-based policies also aim at minimising the effects of climate change in the country and mitigating potential adverse effects to the environment of climate change. These include the National Forestry Policy (2001), national environment policy, water policy, national policy for conservation and management of wetlands resources and the national energy policy. In all these climate change-related policies, there is no mention about trade and how it can either be a threat or an instrument for adaptation and mitigation of climate change.

With regard to institutional arrangements, the major institutional actors as regards to climate change policy in Uganda are:

- The National Ministry of Water and the Environment is responsible for all matters pertaining to environment and natural resources in the country. As such, it is the custodian of climate change policy in the country. Its activities are closely linked to agriculture, land, housing, wildlife, health, transport, minerals and education.
- The Climate Change Policy Committee comprises of representatives from different sectors and is supposed to

provide policy guidelines, coordinate climate change policies and ensure proper implementation of climate change policies and programmes in the country.

- The Climate Change Unit (CCU) resides within the office of the Permanent Secretary for Ministry of Water and Environment. Its main objective is to strengthen Uganda’s implementation of the United Nations Framework Convention on Climate Change (UNFCCC) and Kyoto Protocol (KP). The unit is in charge of developing legal and policy framework on climate change. It prepares, reviews and implements climate change policy in the country, undertakes creation of awareness on climate change challenges at policy level and among the general public. In addition, the unit monitors the implementation of mitigation and adaptation activities and updates government. It also ensures Uganda’s effective participation in the climate change negotiations at national, regional and international levels.
- The Parliamentary Forum on Climate Change is a creation of Uganda’s parliament that promotes awareness and action on the effects of climate change and to ensure society-wide resilience against climate change through targeted capacity building activities. The financing of climate change is undertaken by the government via the Ministry of Water and the Environment; though it has to be recognised that part of the funding is from external sources.

Although it is still premature to make a qualified statement on the effectiveness of the national institutional arrangement in mitigating climate change and related environmental degradation issues, the impact of their intervention is not visible. Moreover, the level of community awareness of the potential of the adverse effects of climate change remains low such that the well intentioned interventions for climate change mitigation often face hostile reaction from communities.

Nonetheless, at the national level, Uganda remains committed, at least on the virtue of policy direction, to international protocols on mitigating climate change. It should be noted, however, that the climate change institutional arrangements do not include the Ministry of Trade. Implicitly, it means that the link between climate change and national development via increased trade is not adequately acknowledged.

*c) Climate Change in the National Trade Policy* Uganda has in place a National Trade Policy (2007) with the theme ‘Trading out of poverty into wealth and prosperity’. This is to be achieved through eliminating barriers to trade and providing an enabling environment in which the private sector will thrive and build capacity to produce quality goods and services competitively, reliably and on a sustainable basis. Among the ten listed priority areas for the policy are the exploitation of policy synergies, coherence and complementarities between different policies on the one hand, and trade policy on the other. The complementary policies identified are the productive sectors, that is agriculture and industry.

Thus, the policy includes strategies to modernise and commercialise the agricultural sector and to promote industrialisation. The policy does not refer to climate change in terms of the implication of increased production. Although the policy makes specific reference to promotion of technology transfer, the technology referred to may not necessarily be clean technology.

The Ministry of Water and Environment which is in charge of climate change is not one of the key institutions for trade policy making and implementation. Key institutions for trade policy making and implementation in Uganda are: Ministry of Tourism; Trade and Cooperatives; Ministry of Foreign Affairs; Ministry of Finance, Planning and Economic Development; Ministry of Local Government; Ministry of Agriculture, Animal Industry and Fisheries and Ministry of Justice and Constitutional affairs. Other government agencies include the Uganda Investment Authority, Uganda Export Promotion Board and the Uganda Bureau of Statistics. All

these bodies have no single reference to climate change. By implication, climate change is peripheral to trade policy making and implementation in Uganda.

### **3.2.3 Regional Trade and Climate Change Policies in the EAC**

The EAC Climate Change Policy (EACCCP) 2011 urges member states to develop country specific policies and harmonise them with the EAC regional policy. The overall objective of the EACCCP is to guide member states and stakeholders on the preparation and implementation of collective measures to address climate change within the region, while sustaining economic and social growth. The EACCC policy is informed by the EAC treaty, the EAC Protocol on Environment and Natural Resources, the Protocol on Sustainable Development of Lake Victoria Basin as well as the UNFCCC.

The policy recognises that Africa is the most vulnerable continent to climate change because its economy is generally dependent on climate-sensitive environmental and natural resources. Therefore, these economies are highly vulnerable to climate variability and change. The policy was developed against the background of documented and visible climate change impacts, that is changes in temperatures resulting in very high rainfalls and droughts and other adverse effects such as floods and droughts, and decrease of the ice field on Kilimanjaro. The policy recognises that climate change has had far-reaching negative impacts on the region in agricultural production, tourism, livestock production and wildlife.

It is against this background that the EAC has put in place a climate change policy with the objective of assisting the region to engage in a more strategic and cooperative approach to respond to the impacts of climate change. The policy recognises the climate change mitigation potential in the region through harnessing geothermal power, wind energy, hydro power, solar energy and natural gas to ensure availability and affordability of clean energy.

The major objective of the EACCCP is to assist the region engage in a more strategic and cooperative approach to responding to the impacts of climate change. The policy recognises the regions' unsustainable dependency on fossil oil in industries and transport systems and the importance of forests and tree cover as carbon sinks. The policy therefore sets out measures to promote clean and renewable energy technology (hydroelectric power, solar and wind) development and transfer by addressing barriers to technology access, intellectual property and eco-labelling.

### 3.2.4 International Framework on Trade and Climate Change

#### *a) The WTO and Multilateral Environment Agreements (MEAs)*

The potential for conflict between the rules of the international trading system, as dictated by the WTO, and rules designed to protect the environment has been an issue of concern among developing countries. In 1971, delegates of the WTO-GATT meeting discussed the issue of industrial pollution control and international trade. In 1981 GATT member countries undertook an exercise aimed at preventing the unannounced export to unsuspecting countries of goods that were prohibited for sale on the domestic markets of the exporting countries (Stoler, 2004).

Consequently, the ministerial committee suggested and put in place a special committee on trade and environment in the WTO. The mandate of this committee was broadly defined as: (i) to explore the relationship between the provisions of the multilateral trading system and trade measures for environmental purposes, including those pursuant to Multilateral Environmental Agreements (MEAs); and (ii) to examine the relationship between environmental policies relevant to trade and environmental measures with significant trade effects and the provisions of the multilateral trading system with the view of advising on how to deal with potential conflicts therein.

In order to save the environment and limit adverse effects on the climate, MEAs can use the following instruments:

- Trade bans, that is banning the sale or trade of particular goods or products, the production of which is considered detrimental to the environment, for example the trading in endangered species;
- Export and/or import licensing procedures that may constitute a non-tariff trade barrier; and
- Impose notification requirements and packaging and labelling requirements which limit free flow of goods and services between countries, hence contestable under the WTO regulations.

Any country whose trade may happen to be constrained by a MEA may opt to contest it under the WTO regulation. In fact for many developing countries, implementation of MEAs, in the name of climate change mitigation, could create trade barrier and affect trade prospects as they lack the appropriate technologies to meet the standards prescribed by the MEAs.

#### *b) The United Nations Framework Convention on Climate Change (UNFCCC)*

The UNFCCC is a multilateral environmental agreement that was concluded at the Earth Summit held in Rio de Janeiro in 1992 and came into force in 1994. The ultimate objective of the convention is to stabilise greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system.<sup>19</sup>

As of May 2011, the UNFCCC had 194 member countries<sup>20</sup> indicating a universal consensus that there is a problem and that action is required to address climate change. The treaty is not legally binding as it does not set mandatory limits on greenhouse gas emissions for individual countries and does not contain any enforcement mechanisms. However, in 1997 the convention was complemented by a legally binding mechanism known as the Kyoto Protocol which was signed by 192 countries. Under this treaty

thirty seven industrialised countries and the European Community committed to reducing their emissions by an average of five percent by 2012 against 1990 levels.

The parties to the convention meet each year in the Conferences of the Parties (COP) to assess progress in dealing with climate change. The COP therefore is the convention's supreme body. The COP is responsible for keeping international efforts to address climate change on track. It reviews the implementation of the convention and examines the commitments of parties in light of the convention's objective, new scientific findings and experience gained in implementing climate change policies. A key task for the COP is to review the national communications and emission inventories submitted by parties.

The interaction between trade and the climate change negotiations in the UNFCCC and COP have manifested themselves in four ways:

- The resistance by developed countries to make binding emission reduction commitments as had been agreed upon in the Kyoto Protocol. The resistance emanates in part from relationship between emission control and competitiveness, since emission reduction entails either using clean technologies which are more expensive or reducing economic activities. Thus, developed countries are insisting that emerging countries, that is Brazil, India, China and South Africa should also make binding commitments to reduce emissions.
- The Kyoto Protocol allowed industrialised countries to either make emission reductions domestically or abroad in other countries through new market-based mechanisms which include carbon trading and carbon offsets through the Clean Development Mechanisms (CDM). Proponents of carbon trading argue that the new market based mechanisms can repair what existing markets broke.<sup>21</sup> This argument assumes that climate change occurred because no price was put on carbon with the result that it was not valued when economic decisions were

made. Opponents of the mechanism argue that climate change requires fundamental structural changes in key areas like agriculture and industry. The world must chart a new path away from dependence on fossil fuels.<sup>22</sup>

- Technology transfer is important if developing countries are to access climate related technologies. In the COP negotiations, the developed countries are insisting on the primacy of the Intellectual Property Rights (IPRs). Developed countries have thus rejected the developing countries' proposal to use the IPR flexibilities provided for in the Trade Related Intellectual Property Rights (TRIPs) agreement in the WTO to access clean technology.
- There have been proposals from developed countries to use trade measures, that is border tax measures imposed on imports on grounds of climate change action. Although Article 3.5 of the convention states that 'measures to combat climate change should not constitute a means of arbitrary or unjustifiable discrimination or disguised restriction to trade', developing countries have expressed the opinion that this article is inadequate to fight against climate related protectionism.

### *c) RIO+20 - Sustainable Development and the Green Economy*

In the United Nations Conference on Sustainable Development in 1992 in RIO+20, the relationship between trade and climate change was considered within the broader theme of sustainable development and the green economy. The interest in sustainable development precedes the green economy, although at the moment there is more interest and policy debates on the green economy.

The shift of focus from sustainable development to green economy has reignited the debate of whether the move to the green economy is the new term for sustainable development or whether the two are different and if so what is the difference.



Although the definition of sustainable development is still ambiguous, the concept was made clear by stating explicitly sustainable development objectives. The objectives of sustainable development at the World Summit on Sustainable Development (WSSD) 2002 were broadly stated as: Poverty eradication; Sustainable management and conservation of natural resources; Making globalisation work for sustainable development; Improving governance at all levels; Financing for sustainable development; and Education, science and technology for decision making.

The concept of green economy has gained currency largely because it provides a response to the multiple crises of climate change, food and economic crises that the world has been facing. However, there is still some confusion about this concept which has been exacerbated by the commercialisation of the prefix 'green'. It is not uncommon to hear people talking about green tea, green buildings or green transactions. To some people, green economy is about trees and therefore, an economy in which so many trees are being planted is a green economy.

One way to define green economy is to take a step back and reflect on what started the general interest in the move towards the green economy. Transition to the green has been motivated, in part, by the recognition that the world production systems cannot continue to sustain increased economic activities intended to meet the socio-economic needs of the world indefinitely. In other words, the current means through which the world is using available resources in order to meet human needs is not sustainable. The available resources are limited, many of them are not renewable and most important, these resources are not only depleted through their direct utilisation in the production undertaken, but the processes used affect the environment which in turn negatively affect the threshold of available resources.

So the definition of the green economy entail a number of aspects, including resources endowment, production systems or processes, meeting socio-economic aspiration of citizenry, climate and the environment and the recognition

that all these aspects are interrelated. Nhlamo (2010) defines the move towards a green economy as the growing of national economies, while improving the environment. Based on this, green economy is an economic system organised in such a way that effects of the environment and the ecosystem are taken into consideration and include internal remedial measures to mitigate the effects of these, while undertaking economic activities.

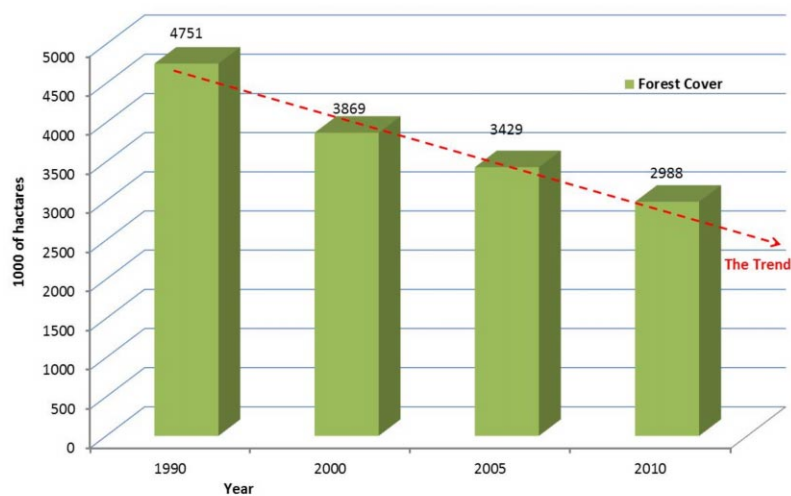
UNEP has also developed a working definition of green economy as one that results to improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. In its simplest expression, a green economy can be thought of as one which is low carbon, resource efficient and socially inclusive.<sup>23</sup> The green economy should therefore be able to ensure sustainable economic growth and subsequent reduction in poverty.

### **3.2.5 Trade-related Activities and their Effects on Climate Change**

The fundamental relationship between trade and the climate emanates from the fact that increased trade often depends on increased economic activities, which in turn increase trade through a multiplier process holding other factors constant. For many developing countries, increase in productive activities often has a negative effect on environment commonly via deforestation. For predominantly agricultural countries, because of limited technology and resources, increase in production of cash crops take the form of expansion of cultivated land. This expansion targets forests that naturally have fertile soils. In this case, agricultural production and increase in trade of agricultural produce has a trade-off in terms of forest cover, which in turn affects climate conditions.

In the last two decades, Uganda has experienced rapid increase in both internal and external trade of non-traditional tradable agricultural products. Increasing urbanisation has led to drastic increase in the production of food products, especially maize in rural areas to be sold in urban areas. Most of the forests countryside has been encroached on for the purpose of maize production for commercial purposes.

Figure 12: Decline in Uganda's Forest Cover (1990-2010)



Data source: Agricultural Organisation of United Nation's Global Forest Resources Assessment

As regards external trade, non-traditional agricultural exports from Uganda have been on the increase since 2003, in terms of volume and percentage of the country's total exports. For example, export of maize increased from 115,259 tonnes in 2006 to 166,251 tonnes in 2010, while that of beans increased from 27,087 tonnes to 38,140 in 2009 before declining to 24,417 tonnes in 2010.<sup>24</sup>

Trade in non-traditional agricultural products has largely been responsible for the forest cover reduction, which has inevitably affected climate conditions in the country. One of the ways through which climate change has manifested itself in Uganda has been a general increase in temperature and inconsistency in agricultural/rainy seasons as a direct result of deforestation.

It is approximated that in the twenty years period between 1990 and 2010, the country lost 1,763 million ha of forest cover, representing a cover loss of 37.1 percent (UN FAO report of 2011). Details of the forest cover decline in Uganda are shown in figure 12.

Additional support of the link between increase in trade of agricultural products and climate change come from Uganda's National Development Plan master document where the importance of forest covers in climate and

ecosystem stability in the country are underscored. In this regard, it states that the country needs a forest cover of 30 percent to mitigate climate change. The loss of forest cover is attributed to mainly increased demand for agricultural land and wood and wood products, timber and charcoal for the increasing population of the country.

Although the change in forest cover cannot be attributed to increase in trade for agricultural products alone, it

is evident that most of the forest land has been cleared and replaced by commercial agricultural production. Specific data to correlate forestry cover loss and trade in agriculture products is not available, but Uganda Bureau of Statistic data of 2010 showed that overall, the agricultural sector economic activities within the country and related trade has been increasing by an average of five percent per annum since 2000. This period coincides with rapid increase in deforestation and resultant climate change indicators.

#### *a) Impact of Trade Related Activities on Forest Cover: A Case Study of Rice Production In Uganda*

In 2002, Uganda government introduced the production of upland rice to promote food security and increase exports, thus eradicating poverty at household levels. Uganda sought a strain of rice that was suited to be grown outside flooded rice fields and paddies, which undermines wetland conservation and requires farmers to work in pest and disease ridden swamps. The UN's declaration of 2004 as the International Year of Rice boosted government's moral support for rice cultivation. Thus, NERICA 4, a disease tolerant, early maturing with high-yielding capacity upland rice strain was promoted throughout the country, to provide farmers with added opportunity to produce enough rice to meet the domestic demand and

even for export, while relieving pressure on the wetlands.

According to Uganda's Agricultural Market and Marketing Exchange Information, records show that in 2004 when NERICA was introduced, only 4,000 farmers were growing rice, but by 2005, over 35,000 farmers grew rice. In 2007, 65 out of 80 districts were growing rice, representing 82 percent of the country.

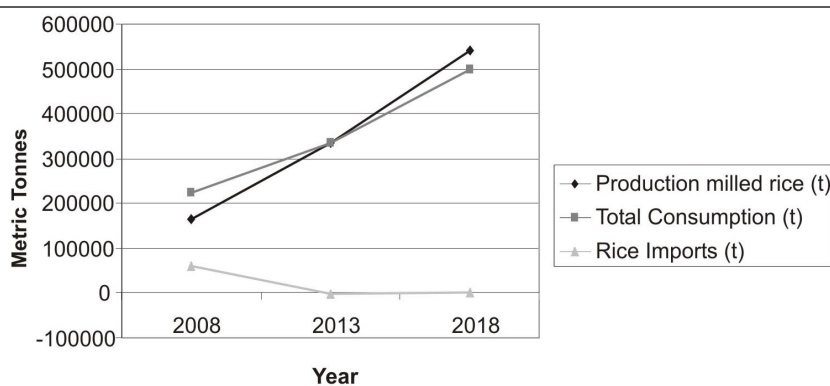
In order to further promote rice growing, in 2008 Uganda government put in place the Uganda National Rice Development Strategy (NRDS) that lays out Uganda's strategy for promoting rice production between 2009-2010 to 2017-2018 with the aim of increasing household food security and reduce household poverty through increased production of high quality rice.

As a result of these efforts, upland rice is becoming an important enterprise and is being regarded as a strategic crop for food security and income generation. Rice exports have also increased. According to the Commissioner of crop production and marketing, Mr Okassai Opolot, the Ministry of Agriculture mobilised 200 MT of upland rice seeds for export to Benin, 500 MT to Ethiopia and 3,000 MT to Mali.<sup>25</sup>

According to Uganda National Farmers Federation, upland rice production has increased by more than 400 percent in a decade, effectively positioning Uganda in a potential rice basket. Since Uganda imposed a 75 percent duty on rice imports as a way of boosting local rice production, the Ministry of Trade estimates that rice output has increased from 123,000 MT in 2003 to 160,000 MT in 2007, and is expected to increase to more than 500,000 MT by 2018.<sup>26</sup>

Therefore, domestic rice production is increasing and local and regional demand is also increasing.

**Figure 13: Projected Upland Rice Production in Volumes (2008-2018)**



Source: National Agricultural Research Organisation, 2010

By 2009, demand for rice in Uganda was over 225,000 MT of which only 165,000 MT were locally produced creating a deficit of 60,000 MT. The East African countries (Rwanda, Kenya, Tanzania, Uganda and Burundi) also have an annual import of over 700,000 MT. Rice production would therefore provide an import substitution of about US\$150mn worth of rice every year to Uganda. This covers for only 15 percent of rice imports in East Africa.<sup>27</sup>

The Ministry of Agriculture, Animal Industry and Fisheries in Uganda, is very optimistic that upland rice production will increase enabling Ugandans get food worth US\$400mn annually, while reducing on the current foreign exchange spent on rice importation worth over US\$60mn.<sup>28</sup>

For many small scale farmers, rice is a dream come true. John Magezi, a rice producer with an average of two acres, says 'for a long time, after experimenting with many new wonder crops like *Moringa* and *Vanilla* that promised to bail us out of poverty but did not, rice is finally delivering the promise.'

### Upland Rice Production and Implications on Climate Change

Rice production like the rest of agricultural production in Uganda is also still predominantly rain-fed, non-market oriented, and based on rudimentary technologies and environmentally unsound practices.

According to the National Environment Management Authority (NEMA), the environmental concerns for growing upland rice are far greater than that of other annual crops. The main upland rice cropping system is slash and burn shifting cultivation with an ideal bush fallow of 3-5 years. Therefore, rice is grown either as the first crop after virgin forest or after long term fallow. Due to limited land holdings, the fallow periods have been shortened or eliminated, which have made arable land prone to soil erosion and destroyed the environment due to disappearing forest cover. Growing more rice means opening up more land and cutting more trees in fragile ecosystems already suffering population pressure.

According to *Sasakawa Global 2000*, an international NGO working with agribusiness, forests are cleared by burning, in order to create new fertile land for rice cultivation. This undoubtedly contributes to building up of carbon in the atmosphere, part of the greenhouse gas effect. Forests act as a sponge sheltering fragile soils from the extremes of torrential rain in the wet seasons and searing heat in the dry seasons. There is ample evidence that the removal of trees enhances flooding and is often followed by drought. In short, tree removal intensifies the extremes of the tropical climate, initiating a flood/drought cycle, which is proving disastrous for agriculture in Uganda.

Guludene who has been growing upland rice since 2006 shared that since upland rice often needs a higher level of fertilisation than lowland rice, and since most rice small-scale farmers cannot afford to use the very expensive fertilisers, farmers go for forests to ensure increased yields. Another challenge facing rice small-scale farmers are pests like birds. Most of the rice farmers interviewed believe that killing birds is the only way they can be able to harvest some rice, otherwise the birds will feed on all the 'milk' as soon as the rice flowers, leaving them to harvest empty unfilled husks.

According to Sesakawa 2000 if not controlled, birds are believed to be able to cause up to 100 percent loss in the yield. Birds like the wattled

crane, globally threatened species have become the first victims due to bird poisoning done within rice growing communities. Sometimes farmers use carbon furum, a chemical which according to Sesakawa 2000 is not good for the environment since it kills birds and contaminates water and soil. This practice has a devastating effect on natural ecosystems and biodiversity because of the migratory nature of birds.

Upland rice cultivation therefore raises a lot of environmental concerns, because it involves destruction of forest fauna and flora, and also permits soil erosion in the process of shifting cultivation, all which have detrimental effect on the environment and biodiversity.

### **Initiatives Undertaken to Address these Challenges**

According to Susan Nanduddu, a volunteer with Uganda Family Resource Link, an organisation which is mobilising the local community to plant one million trees in Namutumba district, there is limited knowledge about rice production and climate change and biodiversity among local communities. For example, some farmers view trees as providing a habitat to birds that they are trying to get rid of. Nonetheless, a number of NGOs are encouraging rice farmers to plant trees on the border of their gardens and to use traditional means of scaring birds like using scare crows. Government is also researching into varieties that resist birds and rodents. These strategies are meant to maintain tree population, protect birds and at the same time increase upland rice yields.

According to Africa 2000 Network, conservation agricultural methods such as zero tillage, planting fallows with legumes, and crop rotation are being encouraged among farmers to reduce soil erosion, conserve soil moisture, improve soil fertility and to promote sustainable upland rice production. This is meant to ensure high upland rice yields, while protecting the environment. In 2010, Africa 2000 Network, trained 1,000 small-scale farmers about sustainable (environmental friendly) upland rice production methods.

Volunteer Efforts for Development Concerns (VEDCO), an NGO, has also been lobbying government to subsidise fertilisers and other rice inputs like seeds, to enable rice farmers to access them. In this way, farmers can achieve higher yields and will stop cutting down forests to increase area under cultivation in order to access virgin fertile soils.

According to Sesakawa 2000, rural radio programmes, trade fairs and exhibitions and newspapers have been used to disseminate sustainable upland rice production in Uganda, which has reduced unsustainable upland rice production methods.

Mr Guludene confirms that a number of NGOs like VEDCO, Africa 2000 Network and Sesakawa 2000 have been training them on sustainable rice production methods like planting trees and using fertilisers instead of cutting down forests, and chasing away birds instead of poisoning them. A number of farmers have been also been using the proceeds from rice sales to buy fertilisers. This indicates that trade can help in mitigating climate change.

The much anticipated reduction of the destruction of wetlands by introducing upland rice which does not grow in lowlands has worked, but nonetheless, the impact of upland rice production on climate change is still felt in Uganda. Given the high demand of rice at local, national and regional level, government and NGOs working with rice farmers should continue promoting sustainable rice production methods. NGOs working in areas of climate change and trade should sensitise government on the linkages between trade and climate change and the urgent need to put in place appropriate policies and policy implementation strategies that recognise these linkages.

### 3.2.6 Balancing Trade and Climate Change Concerns: A Win-Win Situation?

Addressing climate change in the context of trade promotion requires no less than a fundamental transformation in the way in which energy is sourced and used. However, such a change can impact the competitiveness of a country's trade.

The challenge for poor and developing countries like Uganda is how to manage climate change concerns without compromising competitiveness and growth prospects.

#### *a) Addressing National Competitiveness*

Competitiveness is critical in sustaining trade in the long term. One cannot, however, talk about competitiveness without technology. Technology is a key determinant of production efficiency and subsequently for competitiveness. Technological advances, innovation and competitive advantage are connected in multidimensional relationships.<sup>29</sup> Competitiveness depends on average production costs. Production costs are a function of price and non-price factors, some of which are the ability to adopt and use new technologies. Sustainable competitiveness depends on the ability of a region or production units within a region to offer comparative products to its competitors at lower prices on an open market. It requires that a region or industry is able to lower its production costs without sacrificing quality. Technology innovation offers one of the most practical ways to reduce production costs, while at the same time maintaining or even increasing product quality, and mitigating against climate change.

Competitiveness, technology and trade are intertwined. Without competitiveness, trade cannot be sustained, and without technology, long term competitiveness is unlikely. Trade is an implicit indicator of competitiveness, while technological progress is a subtle indicator of progress towards competitiveness.<sup>30</sup>

Acquisition of technology to attain and maintain competitiveness depends on rules pertaining to IPR and investment in trade agreements. For instance, the WTO Trade Related Aspects of Intellectual Property Rights (TRIPs) Agreement restricts rather than encourages technology transfer. It is important that all ongoing bilateral and multilateral trade negotiation particularly between developed and developing countries, take cognisance of the need to ease acquisition of environmentally friendly technology and attract required investment in the domestic economies.

### *b) Promoting Trade in Environmental Goods*

If WTO rules give special dispensation to encourage trade in environmentally friendly goods, it will encourage their production unlike those that are carbon intensive. This will contribute to efforts to mitigate climate change. According to Meyer-Ohlendorf and Gerstetter (2009), liberalisation in trade of these environmental goods and services has a big potential to promote innovation and deployment all over the world.

Although these goods and services have been once on the agenda of the WTO, a position on their promotion was not finalised. In particular, consensus could not be reached on what constituted an environmental good or service. As a way forward, the WTO needs to come up with workable definitions and come up with a list of such environmental goods and service in which developing countries would compete too.

### *c) Harnessing Renewable Energy Resources*

Energy is a key driver of economic and social development, whether in developed or developing countries. Modern energy is needed to light homes, schools, hospitals, businesses and streets. It can also be utilised to irrigate crops, power industries and commerce and subsequently support trade. Simply put, there is a positive correlation between energy use, economic and social development as well as trade.

From a strictly trade perspective, the nature and cost of energy are important determinants of competitiveness and subsequently sustained trade. Increased energy use is inevitable in promoting trade among developing countries. Given that the hitherto widely used fossil energy is an intensive carbon emitter, focus should turn to renewable energies and trade.

A key factor in Africa's effort to migrate from the predominant use of fossil energy to renewable energies in its trade-related productive activities is the cost of harnessing energy from its vast Renewable Energy (RE) resources compared to the cost of energy types from fossil resources. Conversion technologies for RE resources are a major determinant of this

cost. These technologies will play a major role in determining the continent's envisaged energy migration.<sup>31</sup>

Thus, the cost of harnessing energy from many RE resources exceeds that of fossil fuels on the market due, in part, to the expenses associated with RE conversion technologies. But renewable energy resources in Africa can meet the continent's energy demand, but for this to happen, the right energy conversion technologies have to be matched with the right RE resources, and cost efficiency relative to fossil energy prices, has to be achieved.

Performance and costs of conversion technologies largely determine the competitiveness of renewable energies<sup>32</sup>. As such, RE conversion technologies have to be part of overall energy strategy of Africa, in its quest to achieve development goals. A useful advantage of RE technologies is that many of such technologies are suitable for rural areas and therefore can play an important role in poverty alleviation efforts in many countries in Africa.

Hence, acquisition of technologies related to renewable energy should form part of Uganda's multilateral negotiation on trade, if synergies are to be created between trade and climate policy. This would enable the country to increase domestic production and subsequently increase trade without significantly affecting the environment and triggering climate change.

### *d) Towards a Win-Win Situation: Key Lessons*

In order to meet their socio-economic aspirations, economic growth accompanied by improved standards of living of their citizens, while keeping adverse climate change in check, developing countries like Uganda will need a lot of money to change their energy use from fossil to renewable and acquire environmental friendly technology. International trade agreement can either support or constraint this process. Hence, it is imperative that mitigating adverse climate change effects while stimulating trade should, among other factors, inform the position of developing countries in multilateral trade agreements negotiations.

Since Uganda's economy is very sensitive to climate change given its predominant dependence on agriculture, the country needs to exploit and use natural resources in order to increase domestic economic activities and to reduce poverty via increased trade. Inherently, poverty reduction efforts in the country will have a bearing on the environment and by implication, on climate change. Uganda will require bold, integrated and innovative policies; and enabling regulatory frameworks to support them. National development policies need to creatively recognise and address the important link between climate change and trade and minimise the trade-offs.

From an operational perspective, there is a general lack of recognition that trade and the Ministry of Trade, for that matter, are important elements of climate change mitigation and sustainable development and poverty alleviation in the country. This manifests itself in the fact that in institutional framework to implement the climate change policy, the Ministry of Trade is not included. It is recommended therefore that the ministry be brought into the mainstream institutional framework for climate change mitigation in Uganda. Likewise, the Ministry of Environment which is in charge of climate change issues should be included in the Ministry of Trade's implementing frameworks. However, this will require capacity building for the ministries officials as both trade and climate change are highly technical and their inter linkages very complex.

In summary, to achieve a win-win situation on trade and climate change issues, it is recommended that:

- Liberalisation in trade of environmental goods and services should be encouraged. The WTO should finalise the process of defining goods and services to be classified as environmental.
- Flexibilities should be introduced in WTO TRIPs Agreement to facilitate countries, particularly developing countries, acquire and use climate friendly technologies. Countries should be protected from adopting climate-friendly measures, in IPR

law for example. National policy efforts to support migration from fossil to renewable energy use should be allowed even in cases where they may counter conventional WTO regulations.

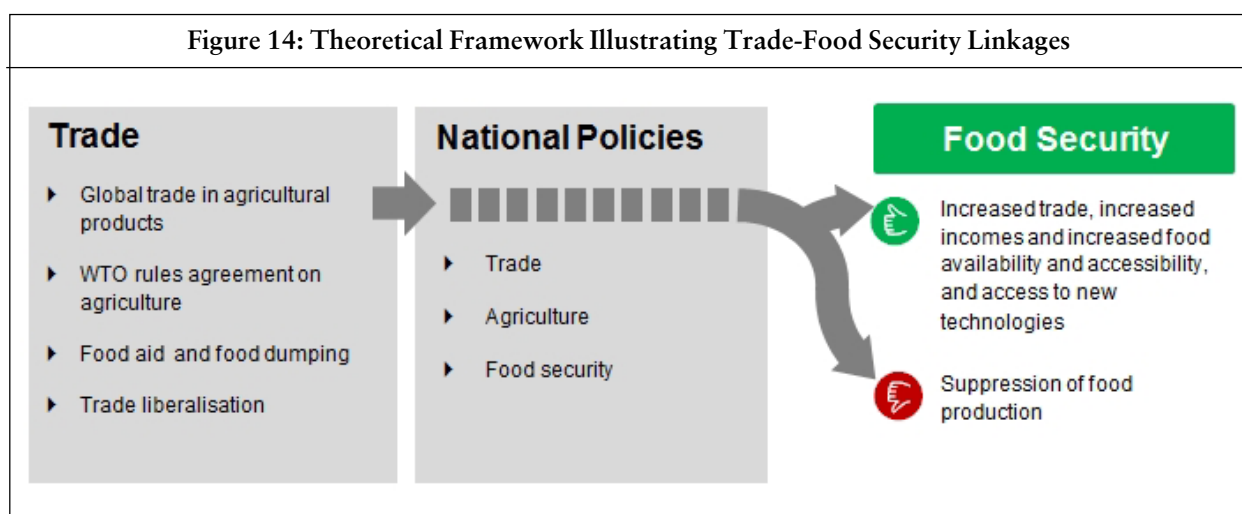
- Subsidies to local firms operating in the renewable energy sector should be promoted.
- Border adjustment measures (BAM) to take into account environmental cost of products being imported or exported should be operationalised. These can take the form of taxes or charges, obligation to purchase emission allowances upon importation, quotas or technical standards or regulations. BAM should however be considered as a last resort when all other means have been exhausted as it can be used to restrict trade.

### 3.3. Food Security and Trade

Over the last few decades, there have been dramatic changes in the way and why food is produced in households. Farmers used to produce cash crops like cotton, coffee, tea and tobacco which are commonly known as traditional cash crops and these contributed a high percentage of Uganda's exports becoming a major source of foreign exchange. Food crops like maize, beans and groundnuts were mainly grown for food security purposes. However, since the liberalisation process in 1980s, food crops are increasingly being traded in local and international markets due to the increasing demands in urban areas and the desire to diversify exportable crops.

At the international level, the world economy has also been adjusting to the new wave of integration and thus international trade has defined the nature and rules through which countries can trade with each other. There has been pressure to developing countries like Uganda to reduce trade barriers, attract foreign investments, and take advantages of new technologies especially those that would boost agricultural productivity as well as conform to the new order of multilateral trading rules. The theoretical framework (Figure 14) illustrates the

Figure 14: Theoretical Framework Illustrating Trade-Food Security Linkages



linkages between food security and trade. It highlights the relationship between trade and food security in the Ugandan context and provides a basis against which Uganda trade policy has an impact on efforts that facilitate improvement of food security.

Since the onset of major policy reforms in 1980s under the Structural Adjustment Programmes (SAPs), the government liberalised the agricultural sector as part of the general measures of supporting a free market economy. Government reduced public investment in the agricultural areas like production, marketing and distribution including privatisation of agricultural inputs like seeds. This had an effect on the level of food production, limiting the amount of food that was available to meet full food security needs.

### 3.3.1 Attaining Food Security at Household Level: Self-sufficiency *vis-à-vis* the Market

Uganda's policy emphasis on food security at household level is through the market and that is why agriculture has always been promoted as a business. Farmers are normally encouraged to produce for the market and use the income generated to buy what they need for an acceptable living including food security. The recently developed Agriculture Sector Development Strategy and Investment Plan 2010-2011 to 2014-2015 further emphasises that the agriculture sector should be directed towards increasing the purchasing power of farmers especially the poor, through income-

earning on-farm. This policy emphasis therefore builds on the idea that producing for the market can be an incentive to increase food production, which in turn increases food availability and contributes to food security.

The IFPRI study<sup>33</sup> indicates that 66 percent of households in Uganda are net buyers of food and rely on the market for more than 25 percent of the value of the food they consume. The same report indicates that in rural areas, over 60 percent of households purchase more food, by value than they sell, while in urban areas more than 98 percent purchase all the food they need for their food security needs. It is this growing reliance on the market by the populations that provides the basis for government policy towards promoting the market approach as regards food security at household level against the self-sufficiency approach.

However, prices of food items are normally unstable, yet incomes of majority of Ugandans, especially the 85 percent population that lives in the rural areas, has unreliable incomes or lack the ability to access food from the market given their poverty. Recent increases in food prices in Uganda and globally affected poor households by increasing their share on food expenditure. This stressed many households to an extent that probably some had to go without food on several occasions. This reduction in purchasing power, especially in the rural areas, has prompted a new thinking among the farmers of not relying on the



market, but mainly being self-sufficient for their food security.

The field case therefore investigated whether households' food security through the market can be a sustainable approach within the current reality of unstable food prices or the thrust of farmers' food production, thus food security should be anchored on self-sufficiency.

### 3.3.2 Experience from the Luwero District

A case study by the authors targeted forty rural farmers in Luwero district and information was collected on the key features of the two approaches. Through key informant interviews and focus group discussions, below is a summary of the major findings:

#### *a) Scope of Food Security*

Most people interviewed reported that the key crops that make up their food security basket include cassava, sweet potatoes, bananas, maize, irish potatoes, yams, rice, and pulses like beans, groundnuts and soya bean. They too supplement these crops with other food products like leafy vegetables, milk and fruits. Most of these crops are generally grown within the districts and apart from maize and beans, other crops are of local varieties.

However, for most households, there is wide variance between the culturally preferred foods for food security needs and those that are available (grown or bought from the market) and actually consumed. This is because most culturally preferred crops are local varieties that are no longer grown in enough quantities. Most local food varieties cannot be grown on a commercial scale and government has not promoted them like maize and beans which are normally of improved varieties. Respondents indicated that the erosion of the wide food variety base is partly due to such varieties being lost due to changes in the weather patterns (which most respondents attribute to climate change), high reliance on the improved varieties and diminishing knowledge and practices of local seed saving systems.

#### *b) Food Self-sufficiency vs. Reliance on the Market*

Food self-sufficiency generally emphasises the production of various food items at household level. Consequently, this principle rules out reliance on the market as a major source of food supplies. Households that use this approach generally rely on production of food from local varieties which make up diets that are simple and natural. On the other hand, food security through the market focuses more on households purchasing food from wherever source it is cheapest. In Luweero district, most farmers reported that household food security is the prime intention and purpose in their production, and therefore they would always have some food stock for that purpose. However, this tends to remain an intention rather than a reality. Farmers reported that, in most situations, there is no stability in food availability throughout the farming seasons because when they are financially constrained, they sell food that has been reserved for food security purposes. This consequently erodes their food stock making them more vulnerable especially in terms of need. Food prices are normally high before harvest and the temptation to sell food during this period is high.

#### *c) Gender Dimensions*

Gender dimensions contribute a lot to food security dynamics in the household. Men are mainly in charge of food production for commercial purposes, while women are responsible for producing food for the household's food security. However, men always sell all the food they produce and it is only on rare occasions that they allow the family to access food that has been produced from their gardens. What is availed to the household is normally that which has not been sold in the market due to poor quality or standards. In situations where the woman has particular needs that require financing and she cannot access money from the husband, she also opts to sell some of her food that is meant to cater for family food security needs. This too diminishes food availability in the home.

In other situations, women who produce food for household food security have no financial means to buy fertilisers or improved seeds and therefore their farm productivity is low. Other women have no access to land and they resort to renting from neighbours. These kind of farmers have no interest in improving soil fertility, especially through better farming methods and they too produce less food which, at times, is not enough for the household's food security needs.

#### *d) Changes in the Economic Situation*

Another main factor in the increasing food security instability in most households is the change in their economic status over the years. In the 1960s until early 1980s, most farmers earned their income from cash crops like coffee, cotton and tobacco. However, the commodity price crisis that led to low prices, economic reforms requiring withdrawal of government support to cooperatives, elimination of extension services and reduction of public agricultural research funding led to most farmers reducing or abandoning farming in most of these crops. Their income levels were thus affected and instead, government encouraged diversifying into other crops mainly food crops like maize, beans, rice and soya for commercial purposes.

#### *e) Impact of Climate Change on Food Security in Luwero District*

Over the years, soil fertility is reported to have declined in most parts of Luweero and food productivity has been affected. Farmers did also report that farming seasons are changing due to climate change variability and they are not in a position to rely on the earlier rain patterns. Most of the farmers are poor and therefore cannot afford commercial farming, while others do not have access to land.

Over the years, a lot of forest cover has been depleted to make way for new areas of cultivation due to the increasing population pressure and increased activities on the existing land, rendering it less and less productive. In search of more fertile land which was under the forest cover, more trees have been cut down and

it is believed by the farmers that this could have contributed a lot to the changing weather patterns.

For instance, the farmers reported that the March-June rainy season was interrupted and they had to grow some of the crops again. The first batch was sun scotched just a few months after being planted. Rains resumed after two months and this meant that most of the crops which were planted thereafter are still in the fields and not yet dry for harvesting, yet the new rain season is on. This means that most farmers who have not been able to harvest on time will lose most of their farm produce due to the likely post-harvest problems, while some will have delayed planting.

A few have therefore resorted to use of improved seeds, fertilisers, and basic irrigation methods in order to boost their food productivity. Some of these agricultural inputs are imported and in the long run, they have eased pressure on new areas of forest cover that would have been cleared for fertile areas.

#### *f) Lessons Learnt*

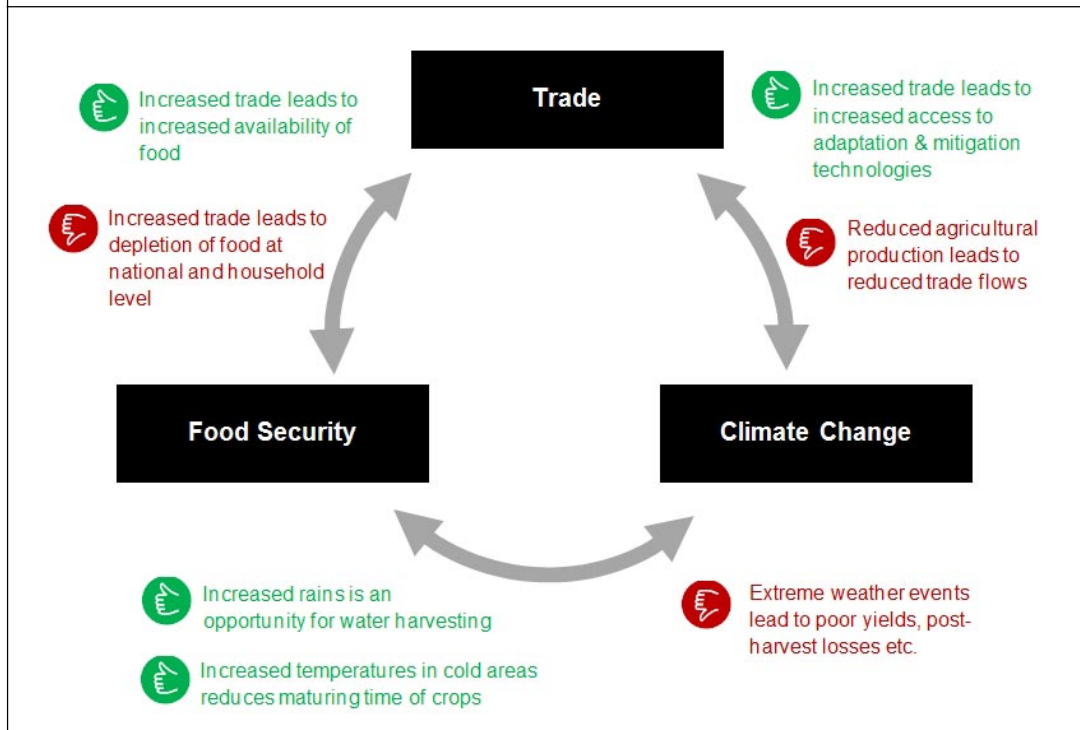
The concept of meeting food security needs through the market was found to be based on good analysis. For markets to function well and serve this purpose, most of the people need to have high incomes, yet majority of Ugandans in rural areas are poor. Most of them have an ultimate intention of producing for the market, and this production is not sufficient to support the concept. A lot of farmers or rural populations still grow most of the food they need for their food security, therefore they have a long way to be firmly reliant on the market.

### **3.4 Linkages between Trade, Food Security and Climate Change**

The inter-linkages between trade, food security and climate change may be best understood through the following conceptual framework:

- More trade leading to more economic growth which leads to more GHGs, thus aggravating climate change;

Figure 15: A Theoretical Framework of the Relationship between Trade, Climate Change and Food Security within the Uganda Context<sup>34</sup>



- Climate change affects agricultural production, thus impacting on food availability, triggering high food prices leading to restrictive trade policies;
- Climate change can lead to reduced agricultural production exacerbating poverty levels leading to increased exploitation of natural resources; and
- Climate change can be used as an excuse to apply restrictive trade measures, for example Border Adjustment Measures leading to less food available at the market.

Rain-fed agriculture production is highly vulnerable to the increased frequency, severity and unpredictability of extreme weather-related events caused by climate change. Therefore, considering the fact that Uganda's agriculture is nature dependent, increased temperatures and changes in rainfall patterns will affect agricultural production, which has a negative bearing on the country's food security. Climate change will, therefore, affect all the dimensions of food security including availability, accessibility, utilisation and stability.

Food availability is already being affected through reduced production, lack or poor storage, inefficient processing and distribution, and limited exchange. The limited exchange affects local, sub-national, national, regional and global trade, which in turn influences the food prices.

Food accessibility, which depends both on market and non-market distribution mechanisms, is also at risk. Therefore, as food prices rise, the capacity of individuals and households to buy food, especially the rural and urban poor, may be further reduced. Since income for most farmers in the country depends mostly on the capacity to sell surplus production, climate change that affects the availability of certain food products will also change the prices they can charge. The small-scale farmers, who are the majority, may suffer from changes in market prices because when the prices are too high, they may not be able to sell their products. This affects their income and also their capacity to buy other foods that they lack for purposes of meeting their dietary requirements.

Food utilisation will be mainly affected by the effects of climate change on availability and accessibility. Low incomes translate into the inability of households to diversify their diets, generating situations of chronic malnutrition. This in turn affects the productivity of the population and economic activities; ultimately increasing the poverty levels, creating a vicious cycle for less production, food insecurity, high food prices and engaging in activities that exacerbate climate change, that is charcoal burning.

Food stability will be more difficult to achieve as vulnerability to increased frequency and intensity of droughts and floods may bring chronic or periodic food insecurity. Guaranteeing the stability of food supplies will be affected by the changing patterns in crop cycles that will be impacted by increased climate variability and climate change.

Therefore, policies to adapt to and mitigate the effects of climate change are essential to prevent disastrous effects on food security and the livelihoods of the rural poor. Efforts in this direction need to be intensified at both the national and regional levels.

Agricultural trade is a fundamental factor for guaranteeing adequate food availability, generating income and ensuring socio-economic stability. The total food supply of a country depends on production capacity, imports, and exports that generate income and foreign exchange to buy food. In this context, changes in the availability of food worldwide will affect prices, generating more or less capacity for a country to obtain food on the global markets.

The ‘panic’ reaction to the food price crisis in recent times is an example of how trade measures can be used in ways that further aggravate the food security problem. Some countries rush to adopt protective measures to try to ensure domestic availability of food. Within the EAC region, Tanzania had to restrict movement of maize grain to the neighbouring countries, to avoid a crisis in its own food reserve

mechanisms, a measure that was not good for regional trade.

Economic growth (GDP) and per capita income are arguably the main indicators used for assessing progress in development, which is also fundamental to guarantee increased food security. However, fossil fuels, which generate greenhouse gas emissions, are still necessary inputs in sustaining industrialisation and economic growth, particularly if one considers the poor developing countries that are attempting to achieve high economic development performances. Therefore, if economic growth propelled by trade is associated with greater GHG emissions that greatly influence climate change, we may conclude that there could be a trade-off between supporting economic development and promoting environmental integrity, which, however, is also vital for ensuring food security in both the short and long term.

Free trade agreements, besides stimulating export oriented growth, can also directly benefit a country’s ability to deal with climate change, if they ensure greater access to green technologies and liberalise trade in environmental goods and services. However, it is important to highlight how climate change, trade and agriculture are connected in a multiple series of complex relations. These need to be fully understood and subsequently addressed in a holistic manner by policy makers both at the national and regional levels, if the problem of food security is to be addressed effectively in the long term.

In Uganda, it is recognised that farmers face a number of constraints, ranging from high dependency on rain-fed production to rising rates of landless population, high production risks, low crop yields, difficulties in accessing credit and lack of crop diversification. Livestock suffers from a high mortality rate, and food availability from forests and fisheries is limited by the degradation of resources as a result of commercialisation and limited access due to the enclosure of many areas by private interests.

Specifically, trade can positively impact on climate change and food security in the following ways:

- Increased trade can lead to availability of agricultural inputs (fertilisers and seeds) and technology, boosting agricultural production and productivity thus reducing pressure on the land;
- Increased trade in climate change technologies (solar and wind power) can reduce usage of fossil energy, thus promoting eco-stability and predictable seasons leading to increased agricultural production and food security; and
- Increased food imports lead to availability of food at national level, thus reducing the necessity of local food production and the pressure on land and forest cover.

## Chapter 4

# Conclusion and Recommendations

---

### 4.1 Conclusion

There is little doubt that trade and climate change factors have, and will continue to have, important implications for food security at the national and regional levels in the EAC region. Evidence from the field work carried out shows that production could be a good entry point in understanding the relationship between the three issues. The examples below from the case studies provide highlights of this nexus:

- The frequent droughts in Uganda's cattle corridor have contributed to the reduction in milk and beef production which normally trigger high prices. This makes it difficult, especially for the poor, to access these products in the quantities required, thus contributing to food insecurity. Traders normally seize the opportunity to import milk and beef products to benefit from the high prices.
- The second case study indicates that Uganda promoted rice production in order to reduce its food import bill and also take advantage of the regional market. Although this increased rice production, which was necessary for national food security, it led to the encroachment on virgin forests, reducing the carbon sinks and aggravating climate change.
- In the third case study, the commercialisation of food crops in order to diversify household incomes has created a necessity for increased production which requires opening up more land, especially the sensitive ecosystems like wetlands and forests which are important carbon sinks. Commercialisation of food has been a double edged knife as it has on the one

hand led to increased food availability on the market, while on the other it has led to increased food insecurity, especially among poor families.

Therefore, this study clearly indicates that there is a strong and intricate relationship between trade, climate change and food security. It is further evident from the study that policy makers have recognised the importance of each of these areas and put in place various policies and legislations to address the challenges therein. However, the relationship and inter-linkages between the three issues has not been fully acknowledged as evidenced by the limited coordination and inter-institutional collaboration among the core relevant ministries.

From the study findings, it is also clear that these issues in their individual capacity are complicated and not straight-forward, making it even more difficult for policy makers to appreciate their inter-linkages and make the right choices, especially when it comes to putting policy frameworks in place. This may explain why policies in place do not recognise the intricate inter-linkages. The anomaly may be attributed to the limited capacity and awareness to appreciate and understand the importance of the inter-linkages and their implications on sustainable development and people's livelihoods.

### 4.2 Recommendations

- The capacity of policy makers and technocrats at both national and EAC levels should be enhanced, for appreciation and clear understanding of the nexus

between climate change, food security and trade, and how these inter-linkages can be translated into policies and negotiating positions in the various fora such as UNFCCC and the WTO.

- The National Planning Authority should ensure that the National Development Plan provides for a clear framework that strengthens the inter-linkages between the three issues and inter-institutional coordination mechanisms that support its implementation.
- The relevant ministries/sectors should put in place or enhance appropriate mechanisms that address the implementation of the inter-linkages.
- Non-state actors especially CSOs and private sector, should take relevant steps to increase their capacity to understand, mainstream the inter-linkages in their work and advocate for appropriate policies. They should also form/strengthen coalitions that enhance the positive aspects of the inter-linkages.
- Further research or policy reviews need to be carried out to realign the existing policies to take into account the inter-linkages between the three issues.
- Research should be conducted at national and regional level to generate clear recommendations on holistic positions to be taken in the relevant negotiating fora such as WTO and UNFCCC.

# References

---

- Agricultural Organisation of United Nation's Global Forest Resources Assessment 2010
- Bamikole A, J.K Musango, & W. Stafford 2011: "Biofuels and Sustainability in Africa" Journal: Renewable and Sustainable Energy Review Vo. 15, No.2 PP 1360-1372
- Beddington J. 2011: 'Achieving food security in the face of climate change'. Summary for policy makers from the commission on sustainable agriculture and climate change; CGIAR Research Programme
- Benson T, S. Mugarura & K. Wanda 2008: 'An assessment of the likely impact on the Ugandan households of rising global food prices.' A report to the Uganda Offices of the World Food Programme, UNICEF and the Food and Agriculture Organisation
- CGIAR (2011): A strategy and Results Framework for the Consultative Group on International Agriculture Research – A submission to the CGIAR Funders Forum.
- Consultative Group on International Agriculture Research 2011
- FAO-AGL (2006): Trans-boundary Agro-ecosystem Management Programme for the Kagera River Basin: Strategies and Policies – Uganda. FAO Land and Water Division
- Hepworth, N. D. 2010: *Climate change vulnerability and adaptation preparedness in Uganda*. Nairobi: Heinrich Böll Foundation.
- IPCC (1995, 2001, 2007): Intergovernmental Panel on Climate Change 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> Assessment Reports
- International Union for Conservation of Nature 2008 Report
- Kaggwa, M. 2011: 'The role of technology policy in leveraging Africa growth act benefits to the Common Market of Eastern and Southern African market'. Paper written for COMESA Secretariat
- Lengnick-Hall, C. 1992: 'Innovation and competitive advantage: What we know and what we need to know'. *Journal of Management* Vol. 18, No. 2, pp. 399-429.
- Meltzer, J. and Sierra, K. 2011. 'Trade and climate change: Mutually supportive policy'. *Harvard International Review*, Fall pp. 64-69.
- Meyer-Ohlendorf, N. and Gerstetter, C. 2009: 'Trade and climate change: Triggers or barriers for climate friendly technology transfer and development?' Occasional paper, Berlin: Friedrich-Ebert-Stiftung.
- Ministry of Water and Environment 2007: National adaptation programme of actions. Government of Uganda



National Development Plan; Government of Uganda 2010/2011-2014/2015

National Planning Authority November 2011 Thematic working paper, National Agricultural Research Organisation (NARO) Report 2010

Nhamo, G. 2010: *Green economy and climate mitigation: Topics relevant to Africa*. Pretoria: AISA.

PEAP revision/Preparation of the 5 year National Development Plan: Government of Uganda 2007.

PELUM Uganda Study 2010: ‘Towards enhancing small-scale farmers’ livelihoods and food security through indigenous climate change adaptation’.

Praveen, J. 2005: *Climate change and its implications: Which way now?* New Delhi: Centre for Economic Studies and Planning, Jawaharlal Nehru University.

Stephen, C., Kevin, V. 2007: ‘Global warming’, in Cutler J. C. (ed). *Encyclopaedia of Earth*. Environmental Information

Stern, Nicholas (2006): *The Stern review report on the economics of climate change*. Cambridge University Press, Cambridge, UK

Stephen Devereux 2001: “Sen’s Entitlement Approach: Critiques & Counter Critiques” Oxford Development Studies Vol. 29, No. 3, 2001

Glibetson T. and Oscar R. 2006: *Carbon trading: How it works and why it fails*.

Tamra G. & Oscar R. 2009. ‘Carbon Trading, How It works and why it fails’. *Critical currents* 7. November 2009

The Uganda National Policy on Food Security

The State of Food Security in the World 2011

Turkenburg, W. C. 2000. ‘Renewable energy technologies’, in Goldemberg, J. (ed). *World Energy Assessment*. New York, US: United Nations Development Programme.

Uganda Bureau of Statistics and Statistical Abstracts 2009 2010 2011

Uganda Demographic and Household Survey, 2006

Uganda Poverty Status Report, 2012

UN FAO Reports 2003, 2005, 2010 & 2011

UNEP website: Frequently Asked Questions

United Nations Framework Convention on Climate Change (UNFCCC) Hand Book

US Bureau of the Census; US Agency for International Development, International Development Centre (US) 1998

# Glossary

---

**Adaptation:** Adjustment in natural or human systems in response to actual or expected changes in climatic conditions. It entails a process by which measures and behaviour to prevent, moderate, cope with and take advantage of the consequences of climate events are planned, enhanced, developed and implemented.

**Carbon Footprint:** Is an estimate of the total climate impact of an activity.

**Carbon Sink:** Is a natural or artificial reservoir that accumulates and stores some carbon-containing chemical compound for an indefinite period. A *carbon sink* is anything that absorbs more carbon than it releases.

**Climate Change:** Change in climate attributed directly or indirectly to human activity that alters the composition of the global atmosphere (UNFCCC).

**Food Security:** Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life (FAO, 2006)

**Fossil Fuel:** These are fuels formed by natural processes such as anaerobic decomposition of buried dead organisms. They include hydrocarbons such as coal, fuel, oil and natural gas.

**Global Warming:** This is the rising average temperature of the earth's atmosphere and oceans when the earth heats up as a result of the green house gases (GHG) trapping heat and light from the atmosphere causing the temperature to rise up.

**Mitigation:** Any intervention to reduce GHG emissions or enhance GHG sinks.

# Endnotes

---

- 1 Uganda Bureau of Statistics, 2011
- 2 Uganda Demographic and Household Survey, 2006
- 3 Statistical Abstract, 2011
- 4 The state of food security in the world, 2011
- 5 Climate change damage refers to the monetised value of destruction to infrastructure and property, caused by climate change extreme phenomena.
- 6 Food and Agricultural Organisations of the United Nations, 2011
- 7 Climate change in Uganda: Understanding the implications and appraising the response, Scoping Mission for DFID-Uganda, July 2008.
- 8 Intergovernmental Panel on Climate Change 4th Assessment Report
- 9 Contribution of Working Group II to the 4th IPCC Assessment Report, Chapter 9, Africa, pp 435.
- 10 Contribution of Working Group I to the 4th IPCC Assessment Report, Chapter 11, Regional Climate Projections, pp 866-867.
- 11 Contribution of Working Group I to the 4th IPCC Assessment Report, Chapter 11, Regional Climate Projections, pp 866-867.
- 12 World Meteorological Organisation statement on the status of the global climate in 2010.
- 13 National Development Plan, 2010/11-2014/15, pp 11, 32.
- 14 Uganda Bureau of Statistics, 2011
- 15 Ibid
- 16 Uganda Bureau of Statistics, 2011
- 17 The Uganda Food and Nutrition Policy, 2003
- 18 Nhamo, 2011
- 19 Article 2: UNFCCC
- 20 UNFCCC website
- 21 Stern, 2006
- 22 Gilbertson and Reys, 2006.
- 23 UNEP website: Frequently Asked Questions.
- 24 UBOS Statistical Abstract: 2011
- 25 From interview
- 26 Ibid
- 27 Ibid
- 28 Interview during field research
- 29 Lengnick Hall, 1992
- 30 Kaggwa M., 2012
- 31 Bamikole *et al.*, 2011
- 32 Turkenburg, 2000
- 33 Benson, *et al.*: An assessment of the likely impact on the Ugandan households of rising global food prices”, A report to the Uganda Offices of the World Food Programme, UNICEF and the Food and Agriculture Organisation, June 2008
- 34 By the authorsa

# Appendix 1

## Field Study Methodology

---

Ministries/institutions that were interviewed included: Ministry of Water and Environment; Ministry of Agriculture, Animal Industry and Fisheries; Ministry of Finance and Economic Planning; Ministry of Local Government; Uganda Bureau of Statistics; Makerere University; Uganda Management Institute; National Adaptation Programmes of Action (NARO); FAO; UNDP; Environmental Alert; CARITAS; and Grassroot Initiative for Development (GID) in Lira.

An instrument was designed to guide the field survey which the research assistants used as an interview schedule, while in some cases, it was sent as a self-administered questionnaire. Institutions, categories of stakeholders and individuals were objectively identified on the basis of their involvement and/or impact by the food security issue.

Considering the importance of both crop and livestock in food security, a case study on the impact of climate change on the livestock and crop sub-sectors was investigated further, with practical examples on how they had been affected by climate change and how this directly or indirectly affected food security and possibly trade in the related products within the country and the EAC. The worst hit areas were within the dry cattle corridor that stretches from the Uganda-Tanzania border to Karamoja region. Death of livestock from lack of water in the corridor is common and has forced traditional pastoralists to migrate with their herds during hard times to neighbouring districts or game reserves.

This section explains where and how the study was carried out; with the methods the researchers used and the procedures that were taken in data collection and analysis. Considering the field study was not a basic undertaking, but more of a validation exercise for the desktop study which was done within a limited time schedule, a purposive sampling method was adopted where various data sources were selected within the prioritized districts, ministries and institutions. Households identified by the help of local authorities were consulted in each district.

Whereas a questionnaire was developed for institutions (ministries, local governments, civil societies and the academia) that were expected to be dealing with the relevant data and information, the response was initially not adequate, with only 12 responses realised besides the 20 interviews conducted. The instrument was then used as an interview schedule whereby additional districts of Lyantonde, Kiruhura and Mbarara were visited, and another sixty five grass root farmers were interviewed. Eight additional filled questionnaires were also received, giving a total of 105 respondents.

## PACT EAC Project and CUTS International

In East Africa, where about 40 million people are undernourished, food security is further challenged by extreme weather conditions. In the next decades, the situation is expected to aggravate as climate change worsens in a region where as much as 80 percent of people rely on agriculture for their living. If sub-Saharan Africa is not to become the home of an additional 600 million hungry people, early action and adoption of sound and coherent policies, and harnessing the potential role of trade is a must. From October 2011 to September 2014, with funding support from the Swedish International Development Cooperation Agency (SIDA), CUTS International, Geneva and its partners in each East African Community (EAC) partner state will contribute to this process through a project entitled "Promoting Agriculture-Climate-Trade Linkages in the East African Community" (PACT EAC).

The PACT EAC project focuses on human and institutional capacity building of East African Community (EAC) stakeholders to take better advantage of trade for their food security, growth and development, particularly in the context of climate change. The two-tiered project focuses on issues related to trade-climate change-food security linkages in the EAC and on enhanced participation of the EAC WTO negotiators in the WTO discussions and negotiations in Geneva. Through research-based advocacy, training, networking and by linking grassroots with Geneva, the project is in a position to assist EAC stakeholders in better understanding and dealing with the critical challenges regarding the interlinking of the three issues.

CUTS International, Geneva, as part of the CUTS family of organisations, represents a pro-trade, pro-equity southern NGO voice in the multilateral, regional, and national processes on trade, development and related issues. It aims to contribute to the achievement of development and poverty reduction through trade in its economic, environmental, social and political dimensions. Prior to the PACT EAC project, and in collaboration with CUTS Nairobi and Lusaka offices, CUTS International, Geneva has implemented several projects in the East African Community.

<http://www.cuts-geneva.org/pacteac>



**CUTS**  
International

**CUTS International, Geneva**

37-39, Rue de Vermont, 1202 Geneva, Switzerland

Ph: +41.22.734.6080, Fax:+41.22.734.3914

Email: [geneva@cuts.org](mailto:geneva@cuts.org), Web: <http://www.cuts-geneva.org>