

Climate, Food, Trade

Where is the Policy Nexus?

Burundi



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 two Burundian 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 study strongly suggests that currently climate change might be the biggest threat to food security in the EAC due to the devastating impact droughts and heavy rains have on agricultural products. Trade in Burundi is highly concentrated on few agricultural products subject to internal and external risks. However, there have been a few new initiatives towards diversification. The study further recommends creation of a permanent technical committee overseeing the monitoring and planning of food security related projects in Burundi.

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?

Burundi

Climate, Food, Trade

Where is the Policy Nexus?

Burundi

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 | Web: www.cuts-geneva.org

Authors:

Adelin Ntungumburanye

Valérie Siniremera

In Partnership with:



Action Développement et Intégration Régionale

Supported by:



Swedish International Development Cooperation Agency (SIDA)

Printed by: Jaipur Printers Private Limited, Jaipur, India

Cover Photos: Dave Jackson, homebodyhubby/Flickr, Mireia Miralles Lamazares

ISBN: 978-81-8257-176-1

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

#1301

Contents

Foreword.....	i
Preface.....	iii
Acknowledgements	v
Note on Authors.....	ix
Acronyms	vii
1. Introduction	1
1.1 Brief Profile of Burundi	1
1.2 Ecosystems	1
1.3 Economic Overview	2
2. Setting the Scene: <i>Climate Change, Food Security and Trade in Burundi</i>	3
2.1 Climate Change in Burundi.....	3
2.1.1. The Policy Framework of Climate Change.....	4
2.2. State of Food Security and Agricultural Production in Burundi	4
2.2.1. Food Production and Consumption Needs	5
2.2.2. State of Food Security in Burundi	7
2.2.3. Analysis of the Supply and Demand for Selected Crops	10
2.2.4. The Potential for Value-addition: The Case of Sunflower Processing in the Bugesera Region	11
2.3. Trade	11
2.3.1. Exports	11
2.3.2. Imports	12
2.3.3. Trade Concentration	13
3. Missing Links, Real Impacts: <i>Interface between Climate Change, Food Security and Trade</i>	14
3.1. Climate Change and Food Security Linkages	14
3.1.1. Impact of Droughts on the Busoni Commune in Bugesera Region	15
3.1.2. Existing Adaptation Measures in Burundi	16
3.2. Trade and Climate Change	17
3.2.1. Climate Change Impacts on Trade: A Case Study of Beans and Sorghum	18
3.2.2. The Implications of Implementing Climate Change Policies	18
3.2.3. The Policy Interface between Trade and Climate Change	19

3.3.	Food Security and Trade	19
3.3.1.	Importance of Food Imports in Burundi	19
3.3.2.	Implications of Multilateral and Regional Trade Policies on Food Security in Burundi	20
3.4.	Enhancing Climate Change, Food Security and Trade Linkages	20
3.4.1.	Governance	20
3.4.2.	Policy Implementation	21
3.4.3.	Resources	21
4.	Way Forward and Recommendations	22
4.1.	Awareness-raising	22
4.2.	Creation of a Permanent Technical Commission	22
4.3.	Other Actions by the Government	23
4.4.	Development Finance	23
	References	24
	Endnotes	26

List of Figures

Figure 1: Comparison between Production and Food Needs Per Inhabitant from 2001 to 2011 for Season B and 2001 to 2012 for Season A (Kg EC)	6
Figure 2: Comparison of Evolution of the Cumulative Increase in Production, Season B From 2001 to 2011 Compared with the Population	6
Figure 3: Trends in Production of Main Crops (2001-2010), in tons	8
Figure 4: Prices of the Main Production Crops in Burundi (Francs per Kg)	8
Figure 5: Trend of Main Export Products (in millions of Burundian francs), 2007 to 2011	12
Figure 6: Trend in Share of Top 5 Import Products in Total Imports (2006-2011)	12
Figure 7: Rainfall Records in Murehe and Kirundo Stations (1980-2004, in mm).....	14

List of Tables

Table 1: Comparison of Production of 2012 Season A Compared to 2011 Season A in Thousands of Tonnes EC	6
Table 2: Comparison of Food Production in 2012 A to the Average Production of Five Years Pre-Political Crisis (1988 A-1993 A) and those of 2011 A in Thousands of Tonnes of Equivalent Cereals	7
Table 3: Comparison of Food Supply and Demand from July to December 2011 (After Season 2011 B) and January to June 2012 (After Season 2012 A) in Thousands T EC	10
Table 4: Intra-regional Trade (US\$mn)	12
Table 5: Relationship Rainfall Harvest Expected	15
Table 6: Variations of Prices Observed	18
Table 7: Comparison between Import Needs and Import Capacity in '000 tonnes EC	19

List of Maps

Map 1: Emergency Needs Assistance, 2012 Season A	9
Map 2: Needs for Food and Agriculture Support for the 2012 Season B	9

List of Pictures

Picture 1: Family Sun Flower Plantation	11
Picture 2: Agricultural Trade Diversification as a Survival Mechanism	18
Picture 3: A Corn Flour Mill in Action at the Bishisha Village	19

Foreword

In the 1990's Burundi underwent a period of internal conflict that derailed the country from its development path. Infrastructure was destroyed and the economy declined. In the aftermath of this civil conflict, the country has embarked on reconstruction through several development initiatives aimed at improving the livelihoods of its people. This has, for example, included integration in the East African Community. However, challenges still remain and among the main ones is climate change and its negative impact on agriculture.


Agriculture is the source of livelihood for the majority of the population in Burundi. It is also largely practiced on a small scale and dependent on climatic conditions. In the recent past the country has faced extreme weather conditions, such as droughts in the Bugesera region that devastated crops and livestock and displaced the population there, resulting in food insecurity. This is where the CUTS International, Geneva initiative on “Promoting Agriculture-Climate-Trade Linkages in the East African Community” under which this publication was commissioned in collaboration with *Action Développement et Intégration Régionale (ADIR)*, its partner on the ground, makes an important contribution to the country's efforts in dealing with these challenges.

The linkages between climate change, food security, and trade require understanding given their effects on each other. With the right set of policies, trade could play an important role in mitigating damages from climate change and ensure food security. In the case of Burundi, this would require overcoming various challenges and taking advantage of all available opportunities as elucidated in this study.

This publication offers evidence-based policy recommendations supported by ground research, and will be critical in ensuring that the national and regional policies adopted are not only relevant, but also that they are implementable in synergy with other existing policies at the national and regional levels.

CUTS International, Geneva must be applauded for this initiative that will facilitate a better understanding on how to deal with the challenges of climate change on food security from our country's perspective. This knowledge will inform other processes including negotiations in relevant forums at the regional and international levels.

Victoire NDIKUMANA
Minister of Commerce, Industry, Posts et du Tourisme



The image shows a circular official seal of the Ministry of Commerce, Industry, Posts and Tourism of Burundi. The seal contains the text 'REPUBLIQUE DU BURUNDI' at the top, 'Ministre du Commerce, de l'Industrie, des Postes et du Tourisme' around the perimeter, and 'B.P. 452 Bujumbura' in the center. A handwritten signature in black ink is written across the seal.

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.

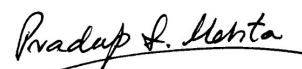
In implementing the PACT EAC project, the CUTS’ tried and tested RAN (holistic Research-Advocacy-Networking activities) model is applied. The inclusive and grassroots-linked methodology for research has facilitated sustained capacity building of stakeholders and ensured ownership of the outcomes.

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 *Action Développement et Intégration Régionale* (ADIR) in Burundi.

We are also thankful to the experts, colleagues, and friends that have contributed to the success of this study. In particular we would like to acknowledge the PACT EAC project National Reference Group members in Burundi 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 Syrat and Hannah Cho; editorial work by Purity Njeru and peer-review by Jérôme Karimumuryango. 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

Adelin Ntungumurany is an Agronomist graduated since 1985 with qualification in project planning, development research and coffee tasting. He has been a coffee researcher for five years, a macadamia researcher for two years in the Agronomic Sciences Institute of Burundi (ISABU), and is in charge of Research Monitoring and Evaluation in the same institute. In the past, he held several high level positions in the government of Burundi, including as Chief of Cabinet and Provincial Director of Agriculture and Livestock Agriculture and Livestock Ministry, and Director General of the Nature conservation and Environment Institute (INECN) of the Environment Ministry. He also supervised the planning and implementation of a number of projects related to food security, environment protection and climate change. He also realised consultancies on projects elaboration and food security speech defence.

Valerie Siniremera was born in Burundi and holds MBA degrees from University of Burundi and Binghamton University in New York State. She joined the Ministry of Commerce and Industry where she worked for 11 years as an Advisor and a Deputy Director in the Department of Industry, and as a Director of the Industrial Studies and Documentation. She also served in a Private Sector Development Project with the support of World Bank as an expert and then a Director for eight years. For more than seven years, she was a National Coordinator of a UNIDO Integrated Programme for Burundi and a National Specialist in Capacity reinforcement for Producers Organisations, SMES and in charge of Gender in the Burundi Agro-Business Project funded by USAID and executed by DAI Inc. She has been a consultant for several organisations, including International Labour Organisation, The United Nations Development Programme, and the World Bank.

Acronyms

ACVE	Action Ceinture Verte pour l'Environnement
AFOLU	Agriculture Forestry and Other Land Uses
ALT	Lake Tanganyika Authority
APA	Accès et Partage des Avantages
BAD	Banque Africaine de Développement
BNA	Burundi Nature Action
CC	Climate Change
CCNUCC	Convention Cadre des Nations Unies pour le Changement Climatique
CDB	Convention sur la Diversité Biologique
CEEAC	Communauté Economique des Etats de l'Afrique Centrale
CEPGL	Communauté Economique des Pays des Grands Lacs
CFSVA	Comprehensive Food Security and Vulnerability Analysis
UNCTAD	United Nations Conference on Trade and Development
COMESA	Common Market for Eastern and Southern Africa
COMMIFAC	Commission des Forêts de l'Afrique Centrale
CTB	Coopération Technique Belge
DCNCC	Deuxième Communication Nationale sur les Changements Climatiques
DRC	Democratic Republic of Congo
EAC	East African Community
EC	Equivalent Céréales (Cereals Equivalent)
ECCAS	Economic Community of Central African States
ECOBANK	Economic Bank
FAO	Food and Agriculture Organisation
FS	Food Security
FSCCT	Food Security Climate Change Trade
IFAD	International Fund for Agricultural Development
GDP	Gross Domestic Product
GHG	Green House Gas (emission)
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
IBN	Initiative du Bassin du Nil
IGEBU	Institut Géographique du Burundi
INECN	Institut National pour l'Environnement et la Conservation de la Nature
IPCC	Intergovernmental Panel on Climate Change
IPC	Cadre Intégré de Classification de la Sécurité Alimentaire

ISABU	Institut des Sciences Agronomiques du Burundi
KCB	Kenya Commercial Bank
LULUCF	Land Use, Land Use and Change and Forestry
CDM	Cleaned Development Mecanisms
MEEATU	Ministère de l'Eau, de l'Environnement, de l'Aménagement du Territoire et de l'Urbanisme
MINAGRIE	Ministère de l'Agriculture et de l'Elevage
OAG	Observatoire de l'Action du Gouvernement
ODEB	Organisation pour la Défense de l'Environnement
OMC (WTO)	Organisation Mondiale du Commerce (World Trade Organisation)
OMPI	Organisation Mondiale pour la Protection Intellectuelle
OMS	Organisation Mondiale pour la Santé
PAIVA B	Projet d'Appui à l'Intensification et à la Valorisation Agricoles au Burundi
PAM (WFP)	Programme Alimentaire Mondial
PANA	Plan National d'Adaptation aux Changements Climatiques
PARSE	Projet d'Appui à la Reconstruction du Secteur de l'Elevage
PDR1	Plan Directeur de la Recherche Agronomique
PIB	Produit Intérieur Brut
PNF	Programme National Foncier
PNSA	Programme National de Sécurité Alimentaire
PNUD	Programme des Nations unies pour le Développement
PRODEFI	Projet de Développement des Filières
PRODEMA	Projet de Développement des Marchés
PRSP	Poverty Reduction Strategy Paper
PTRPC	Projets des Travaux de Reconstruction Post-Conflict
REDD	Réduction des Emissions liées à la Déforestation et à la Dégradation des Forêts
SAN	Stratégie Agricole Nationale
UE	Union Européenne
WCS	Wild Conservation Society

Chapter 1

Introduction

1.1. Brief Profile of Burundi

Burundi is located in Central Africa and has a highly varied landscape. It covers an area of 27,834 km² of which 25,200 km² is land¹ and 23,500 km² is potentially arable land.² Lakes and rivers cover an area of about 2,700 km².³ The natural and artificial forests that are of great importance in maintaining ecological and hydrological equilibrium cover roughly 200,000 ha.⁴ It stretches between the meridians 29° 00' and 30° 54' east and the parallels 2° 20' and 4° 28' south.⁵ It is a predominantly agricultural country, with an average density of 310 inhabitants per km².⁶ It borders Rwanda in the North, Tanzania in the East and South, and the Democratic Republic of Congo (DRC) in the west.

The landscape of Burundi is characterised by the Great Rift Valley of East Africa that led to the formation of Lake Tanganyika in a subsidence ditch in the west and to a set of plateau strongly embossed in the East. All these form a complex of five diversified geomorphologic zones including:

- The Western plain located between 775 m and 1,000 m of altitude;
- The Western Highlands forming the Congo Nile crest and located between 1,000 m and over 2,600 m altitude;
- The Central Plateau covering most of the country and located between 1,400 and 2,000 altitude;
- The Eastern depression of Kumoso located between 1,200 m and 1,400 m altitude; and
- The depression of Bugesera located in the North-Eastern Burundi, between 1,200 m and 1,500 m altitude.

The country is divided into two major river basins: the Nile basin which includes on one side, the Ruvubu and its tributaries, and on the other side, Kanyaru, tributary of the Kagera River; and the Congo Basin made up of two sub-basins, the sub-basin located in the West of the Congo Nile crest formed by the Rusizi and its tributaries and Lake Tanganyika, and the sub-basin of Kumoso located in the East, including the Malagarazi and its tributaries.

From the pedological point of view, the soils, generally ferralsols or ferrisols, are low in altitude. There are tropical brown soils and lithosols on the slopes and crests. Organic and peaty soils characterise the bottom of swampy valleys.

1.2. Ecosystems⁷

The ecosystems in Burundi are divided into two major groups: land ecosystems, and aquatic and semi-aquatic ecosystems. The land ecosystems consist of four categories, namely:

- Forest ecosystem (consisting of mountain rain forests in the highlands of Burundi located between 1,600 m and 2,600 m of altitude; forests of average altitude appearing in the form of clear forests and gallery forests located between 1,000 m and 1,600 m of altitude; and lowland forests located between 775 m and 1,000 m of altitude);
- Savannas (occupying a part of the East, North and the Rusizi plain);
- Groves (in the North of Burundi in Bugesera and in the Rusizi plain); and
- Lawns and steppes (vegetation forming mainly the pastures of Bututsi and a part of Mugamba and Kirimiro).

Aquatic and semi-aquatic ecosystems, on the other hand, include swamps, lakes (Lake Tanganyika and Bugesera lakes called Northern lakes), ponds and water courses.

It is noted that floristic natural species exist in protected areas almost exclusively and there is a direct relationship between natural ecosystems, geomorphology and climate. So, the main rain forest protected area, Kibira national park is located in Congo Nile crest (1,600 m to 2,600 m of altitude), about 40,000 ha, 80 km length and 8 km wide, is considered to be the ecological lung of Burundi. The flore and the high altitude of Kibira national park are the basis of the highest rain in its influence area composed of the highland crest Congo Nile and the central plateau. This area is recognised to lodge a diversified species of crop, the soil is fertile, but it is exposed to erosion and demographic pressure. Furthermore, the arable land is reduced to 25-50 acres with low fertilty that leads to limited production by inhabitant.

Lawns and steppes also exist in this area. They are characterised by acid soil that needs calcareous amendment. Savannas and groves are located at low altitude in Bugesera, Imbo and Moso and characterised by low rainfall. Furthermore, these regions are subject to a low crop production and consequently low food security due to a recurrent drought.

Acquatic ecosystems, especially the lake Tanganyika, contain a big number of fish. Two Tanganyika fish species *Solotrissa Tanganikae* and *Liciolates Sappersii* are subject to a high commercial traffic throughout the whole country and contribute to food security. Swamps are cultivated during the drought season and their contribution to food security is up to 5 percent.

1.3. Economic Overview

Burundi is a landlocked country with an economy mainly based on agriculture and an embryonic industry. Subsistence agriculture is the dominant activity of the primary sector. It employs over 90 percent⁸ of Burundi's population. Its share of GDP was 34.1 percent in 2010 and its contribution to economic growth

was 0.7 percent. Three export crops (coffee, tea and cotton) constitute the main source of foreign currency to the country. They contribute more than 93 percent of the export revenue and therefore play a predominant role in the country's economy.

Production of major crops in the primary sector has not experienced a significant growth during the last decade (2001-2011), and this has led to persistent food insecurity. Local production could not satisfy demand resulting in increased agricultural imports such as rice, beans, cassava flour and potatoes from countries in the sub-region.

With regard to regional and international trade, Burundi's exports are mainly constituted by primary products, green coffee being the most important, followed by products such as tea, and skins and hides. Vegetables and fruits showed growth in export except in the year 2009, when they plummeted by about 55 percent.

Of the total exports, the manufacturing sector's contribution is significantly low and was recorded at 5.4 percent in 2007 and 1 percent in 2011. In comparison, the contribution of the primary sector was observed at 94.2 percent in 2007 and 91.1 percent in 2011.⁹

In the 1990s, Burundi underwent political upheavals that culminated in a civil war, which heavily affected the economy including the destruction and negligence of critical infrastructure, a situation that set back development and well-being of Burundians.

Chapter 2

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

2.1. Climate Change in Burundi

On the global level, the 4th report of the Intergovernmental Panel on Climate Change (IPCC, 2007) states that the current climate change is caused by the increase of greenhouse gas (GHG) in the atmosphere resulting from anthropic activities. The same report states that the rise in temperature by 0.74° C has been the highest in the last century from 1906 to 2005, and especially the last ten years have exhibited the highest average temperature since 1850. The mean sea level increased by 17 cm during the twentieth century.

It has been projected that in the twenty-first century, the temperature would rise at about 0.2° C per decade. The earth will experience rather extreme meteorological phenomenon such as gravity and the frequency of the droughts, heat waves and other climatic events. The rising temperature will start melting the glaciers, raising the sea level by 18~59 cm by the end of 21st century, and by 7 m in several centuries. If nothing is done to stop it, Greenland's ice would have melted away completely. Climate change will also disrupt the ecosystem and the cycle/ currents of water, causing floods and harsh droughts. The ecosystem's capacity will be strained, leading to the risk of extinction of certain species. Poor people are likely to suffer more from the consequences. Africa is identified as the most vulnerable continent, as it is already faced with problems and challenges associated with natural phenomena.

Food security is highly threatened by climate change. Indeed, the number of people threatened by hunger will increase by 600 million by 2080. In the sub-Saharan region, arid spaces and semi-arid areas will increase by 60 to 90 million ha. The agricultural outputs which depend on the cycle of the rains will be reduced by up to 50 percent.¹⁰

In Burundi, the Ministry of Water, Environment, Territory Development and Town-Planning mentioned in its first communication on climatic change a continuous rise in temperature ranging from 0.7° C to 0.9° C since the 1930s. According to the forecasts, average temperatures are likely to increase by 0.4 °C every ten years, which means a rise of almost 1.9 °C from 2000 to 2050.¹¹

The average annual precipitation ranges from 900 mm in low lying areas to more than 1,600 mm in high altitude areas. Since the late 1990s, there has been a significant variability in rainfall, with a trend of an extended dry season (from May to October) and some low altitude outlying areas experiencing extreme dryness. Analysis of meteorological data over a period of 50 years (2000-2050) shows more or less a ten year cyclic character of surplus and deficit alternation. According to forecasts, the total rise of rainfall is likely to vary from 3 percent to 10 percent by 2050. However, rainfall in May and October is likely to decrease by 4 percent to 15 percent for the same period.¹²

The same analysis was commissioned within the framework of the second national communication on climate change in 2010, on the evolution of the rainfall and temperature over 30 years, from 1974 to 2003, in the stations of Bujumbura (region of Imbo), Gisozi (high altitude), Musasa (depression of East in Moso) and Kirundo (depression of the North East Bugesera). The results confirm that the rainfall follows a certain pattern, approximately ten years with a strong tendency to decline in Bujumbura and Musasa stations and slightly in Gisozi and Kirundo. Annual average temperature was analysed over the period from 1975 to 2003 and the results show that it has risen from 1990 with acceleration in all observation stations. Minimum temperature of Gisozi has been escalating more dramatically, signifying that high altitude zones get hotter than others zones in a given time.

Projections from 2010-2050 with and without climate change using the model Maggic Schengen, show that rainfall fluctuations will continue and even amplify. The monthly rainfall will vary remarkably from November to October and from February to April in Imbo and Bugesera and throughout the year in the high altitude and depressions of the east.

As for the temperatures, they are likely to increase by 0.5° C to 3.2° C for all studied regions, with a larger increase expected in Kirundo (Bugesera). The analysis concludes that rainfall will be more frequent but over a short period of time, and that dry seasons will be longer (with premature ending and delayed resumption of the rains) and more aggressive.

Burundi has experienced a lot of climate related disasters throughout its history: dryness, hail, torrential rains (causing floods and landslides), and violent winds. Consequently, it is necessary to act now, act together and act differently.¹³

2.1.1. The Policy Framework of Climate Change
At the policy level, a number of codes have been enacted. These include the code of the environment, forestry, water, mining and petroleum, and health. Strategies to adapt to and mitigate climate change effects have been

elaborated and some propositions are being implemented such as UNFCC and the Kyoto Protocol, environmental impact study process, National Adaptation Programme of Action (PANA) 2008, first and second national communication on climate change, 2001 and 2010, and protected areas law.

The National Agricultural Strategy (SAN) 2008-2015 takes into account the preservation and sustainable management of the environment and natural resources in its main goal 'Sustainable increase in productivity and agricultural production.' It deals with the empowerment of production tools and rational management of natural resources and restoration, especially improvement and conservation of land fertility and natural resources in general.

On the regional level, member states of the EAC adopted the following laws: EAC Climate Change Policy (EACCCP), 2011; EAC Position on Climate Change Negotiations; EAC Regional Environment Impact Assessment Guidelines for Shared Ecosystems; EAC Agriculture and Development Policy; and EAC Food Security Action Plan, 2011-2015.

They have also implemented a study on planning and monitoring structures of environment management. The main obstacle in Burundi remains financing the implementation of these strategies and increasing awareness of its citizenry on the impact of climate change.

Internationally, Burundi is party to the Convention on Biodiversity (CBD), United Nations for Climate Change Convention (UNFCCC), and the Kyoto Protocol, Convention on International Trade in Endangered Species (CITES) and Ozone Layer Protection and Wetlands. Burundi has signed but not ratified the Law of the Sea. Implementation strategies of CBD and UNFCCC have been elaborated.

2.2. State of Food Security and Agricultural Production in Burundi

In the rural areas, a great part of the population (49.5 percent)¹⁴ depends on agricultural production to ensure food security. They grow

food crops and breed cattle for food and cash crops such as coffee, tea and cotton to generate revenues. A certain part of the rural population (8.8 percent)¹⁵ combines agriculture with informal trade. Others practice craftsmen activities such as joinery, masonry and sewing. People without land depend on food for work or cash for work. Some are employed as workers in various public services such as sentries and cleaners. So the main determinant of food security in the rural areas is dependent on rainfall in terms of its quantity and distribution.

Regarding the urban area, there is a big rural exodus of youth (this is not yet rated), due to the Burundi crisis and the scarcity of land. This situation makes it difficult to ensure food security. Urban dwellers depend on salaries (which are very low), trade, transport service and other diverse activities to secure food needs. Even here, it is very difficult to have equilibrated nutrients in the urban area.

Evaluation reports of crops, food supply and nutritional status developed by the Ministry of Agriculture and Livestock (MINAGRIE) in collaboration with the Food and Agriculture Organisation (FAO), World Food Programme (WFP) and the United Nations for Education and Children's Fund (UNICEF) at the end of the first and second growing season, show that the level of food security has deteriorated every year since 1994, with regard to the level of availability, access, utilisation and stability.

2.2.1. Food Production and Consumption Needs

In Burundi, food availability is a combined result of production, imports and food aid. The level of food security in the country is characterised by variability of total production and a gradual deterioration of the level of production per inhabitant. Soaring food prices have made food virtually inaccessible to the most vulnerable groups of the population. This situation results in chronic malnutrition, which currently exceeds the critical threshold of 40 percent of the population (WHO standards).

Burundians produce various foods rich in different nutrients such as cassava, potatoes,

maize, rice, wheat, sorghum for energy; beans, cow peas, soja and peanuts, palm oil for proteins and oil; and diverse fruits and vegetables for vitamins and minerals that could be mixed to provide a balanced diet. However, they have food preferences (tubers, roots and bananas) which are rich in energy but lacking in proteins, lipids and other trace elements.

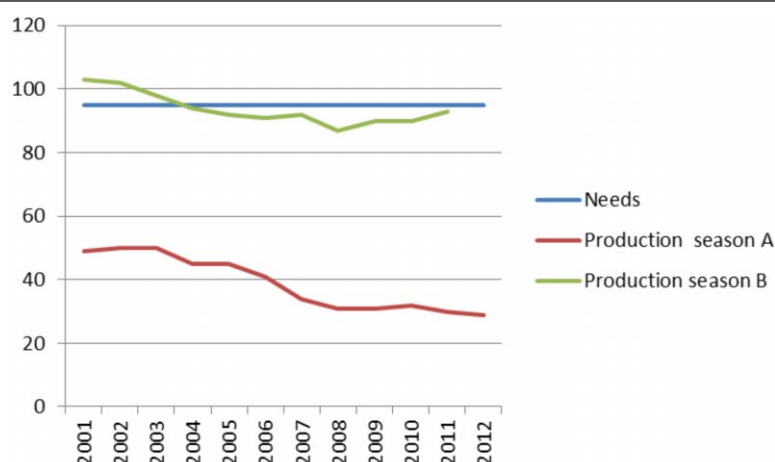
Regarding food balance, the energy provided covers 75 percent, the one in protein covers 40 percent and lipid 22 percent.¹⁶ It is estimated that 75 percent of Burundian households routinely face food insecurity.¹⁷ To have a ration totalling an average of 2,150 kcal, 50 g of proteins and 48 g of lipids per day, one should have 190 kg EC (47 kg of cereals, 52 kg of vegetables, 72 kg EC of roots and tubers and 19 kg EC of bananas) per person per year.¹⁸

From 1994, the socio-political crisis combined with climate change made food production fall drastically. The comparison between food production of season 2012 A and the average food production of the five years before the crisis (1987-1993), show a variation of about -47 percent, while for season 2011 B, the variation is -5 percent. Seasons A are showing more shortage than seasons B.¹⁹

As shown in Figure 1, from 2001 to 2011 for season B and from 2001-2012 for the season A, food availability continues to decline, falling below needs from 2004 season B, whereas it remains very deficient for season A. Season A displays production shortfalls more pronounced than seasons B up to 65 kg EC/inhabitant (60.9 percent) in season 2011 A and to 66 EC kg/inhabitant (63.8 percent) at the end of the season 2012 A.

This continuous deficit is related to the exponential demographic growth rate against a very slow or sometimes non-existent production growth. For example, with a production growth rate of three percent from the 2010 and 2011 season B, the deficit remains the same (39 percent). Figure 2 shows the phase difference between the evolution of the population and that of production.

Figure 1: Comparison between Production and Food Needs Per Inhabitant from 2001 to 2011 for Season B and 2001 to 2012 for Season A (Kg EC)

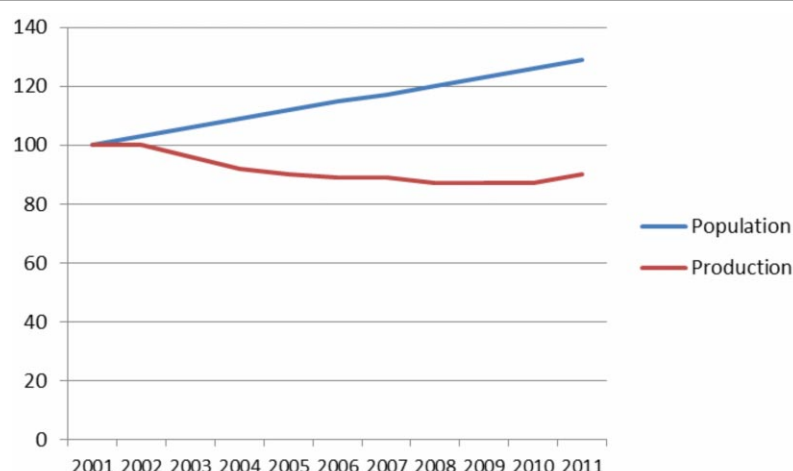


Source: MINAGRIE, FAO, UNICEF and WFP, 2011 B and 2012 A

From the perspective of production volume, the 2012 season A shows a decline of 11 percent compared to the 2011 season A which had decreased by 3 percent in comparison to the 2010 season A as shown in table 1.

It should be noted that the group of roots and that of cereals are the most affected. The fall of the cereals production group is due to the torrential rains often accompanied by hail storms during this season (main cereal), while cassava mosaic and cassava brown streak significantly affect roots and tubers.

Figure 2: Comparison of Evolution of the Cumulative Increase in Production, Season B from 2001 to 2011 Compared with the Population



Source: MINAGRIE, FAO, UNICEF and WFP, 2011 season B

Compared to the last five years before the socio-political crisis, the production in 2012 season A fell by 47 percent, while the 2011 season A production was down by 41 percent. Table 2 illustrates this situation.

Table 1: Comparison of Production of 2012 Season A Compared to 2011 Season A in Thousands of Tonnes EC

Group of crops	Production		Change in %
	2011 A	2012 A	
Cereals	82	70	-15
Leguminous	28	26	-7
Roots and tubers	112	100	-11
Bananas and plantains	33	32	-3
TOTAL	255	228	-11

Source: MINAGRIE, FAO, UNICEF and WFP, 2012 season A

The problem of food insecurity appears to be seasonal in nature and varies in proportion from one season to another. This calls for a seasonal approach in providing food aid. This approach could make food aid more timely especially in the first half, and also help limit hunger by preparing for the next growing season.

Table 2: Comparison of Food Production in 2012 A to the Average Production of Five Years Pre-political crisis (1988 A-1993 A) and those of 2011 A in Thousands of Tonnes of Equivalent Cereals

Groups of crops	Average production 1988-1993 Season A	Production 2011 A	Production 2012 A	Change 2011/ 88-93 (%)	Change 2012/ 88-93 (%)
Cereals	104	82	70	-21	-35
Leguminous	129	28	26	-78	-80
Roots and tubers	158	112	100	-29	-37
Bananas and plantains	39	33	32	-15	-18
Total	430	255	228	-41	-47

Source: MINAGRIE, FAO, UNICEF and WFP, 2012 season A

The deficit should ideally be filled by the productions of season C such as livestock, fisheries, imports and aid, but they are still insufficient. In terms of production volume, the 2011 season C has seen a decrease of about 13 percent compared to that of 2010 C, from 176,000 tonnes to 153,120 tonnes, mainly due to flooding. Animal products are not yet abundant as Burundi is still in the process of restocking following the civil war. Imports and aid are also very limited. For example, for a deficit of 61,860 TEC for the 2011 season B, import forecasts were 25,000 TEC and those of aid at 13,033 TEC, that is a theoretical unmet short fall of 23,827 TEC. For the 2012 season A, deficit is 588 T EC, against import forecasts of 25,000 TEC and 42,03 TEC of aid, an uncovered deficit of 520.970 TEC.²⁰

It is difficult to quantify the level of production according to natural or ecoclimatic zones because they are not geographically delineated. In fact, a big number of provinces or communes can appertain to two or three natural or ecoclimatic zones. For example, Cibitoke and Bubanza provinces appertain to Imbo, Mumirwa and Mugamba natural zones, whereas their communes Buganda, Rugombo, Mpanda and Rugazi have some of their collines in Imbo and others in Mumirwa natural zones. The results of production estimations can be globally interpreted by natural and ecoclimatic zones, in addition to surveys on nutrition status.

2.2.2. State of Food Security in Burundi

a) Factors Influencing Food Security in Burundi²¹

There are various factors that negatively impact food security in Burundi. The first of them is climate change that has further aggravated food insecurity. Since 2000, Burundi has been facing recurrent droughts, floods, crop diseases like severe cassava mosaic and lake pollution. It is also noted that the issue of reintegration of returnees, the expelled and the demobilised, increase the pressure on available resources. This work force is not being used to produce food, but there is an imperative need to feed them.

According to the 2008 Burundi population census, total population in Burundi is 8,038,618 inhabitants, for a density of 310 inhab/km². As 94.3 percent depend on subsistence agriculture, there is a high pressure on arable land estimated at 25-50 acres of crop land/household. Other problems related to demography include the high proportion of inactive population estimated at 41.7 percent overall and 14 percent in rural areas. Moreover, households without land represent 16.55 percent, and households with land for imbo region represent 33 percent. In addition, farmers have poor accessibility to all categories of seeds (15-20 percent), lack of access to fertilisers (59 percent do not have cattle) and no access to credit due to lack of mortgage guarantee for farmers.

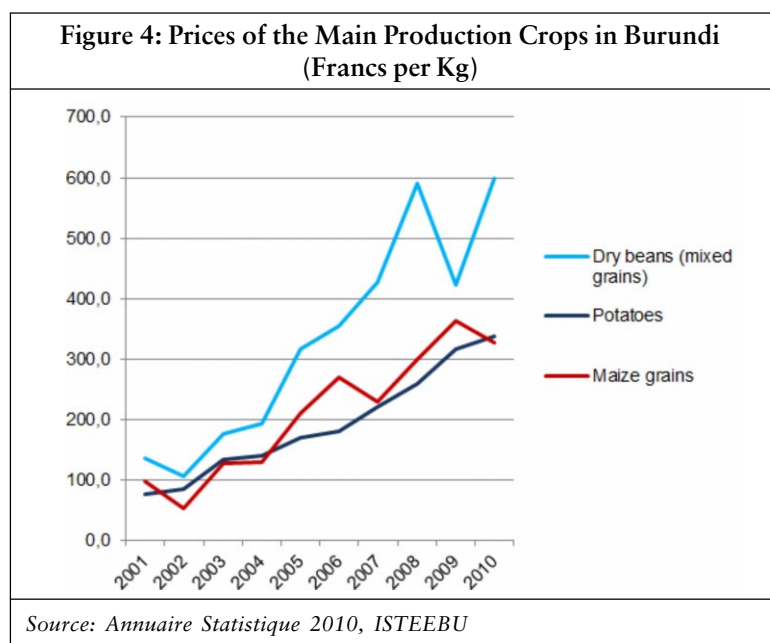
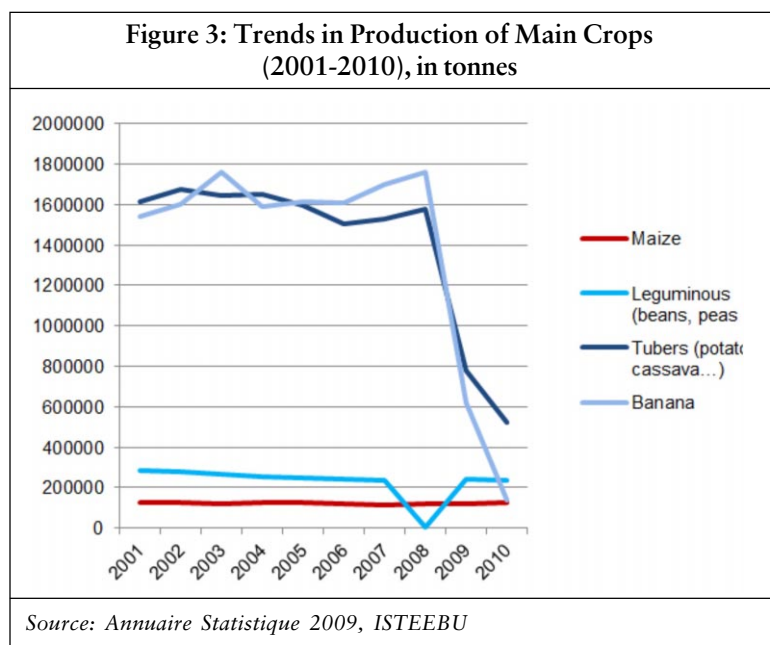
Burundi also has a problem of illiteracy and ignorance. This means that the illiterate population has difficulties when it comes to reinforcing its capacities in new agriculture techniques. Due to the lack of statistics in many sectors, strategies and programmes are often inadequate. They do not respond to the needs of the population.

The logical consequence of this drastic degradation in the level of food security is chronic malnutrition exceeding the critical level of 40 percent (58 percent in 2010).²² The

situation reduces the quantity and quality of work and the cycle becomes vicious.

b) Access to Food

The emerging trend shows an increase in the prices of goods over time, but stagnant level of production. This is illustrated in figure 3 where for instance, legumes and tubers are decreasing in production volume, while maize shows static production over the period of 2001-2010. Figure 4 shows a reverse tendency to production. While the latter is decreasing or is unchanged, the prices in 2010 are at least three times those of 2001.



Once production decreases, food prices become excessively high. In the season 2011 B compared to season 2010 B, the price of beans rose by 37 percent, rice by 15 percent, sweet potato by 17 percent, cassava flour by 5 percent and banana by 11 percent.²³ In fact, production decreased in the seasons of 2011 because of the hail storm which affected Musinga, Bujumbura, Mwaro, Ngozi, Cankuzo, and Ruyigi provinces; the prolongation of rain in June and July which affected rice, beans, sweet potatoes, and bananas harvest; insufficient inputs such as manure, good seeds and the elimination of diseases such as cassava mosaic and banana bacterial wilt (BXW).²⁴

Therefore, access to food becomes very restricted for the most vulnerable populations (households without land -16.5 percent, unemployed rural population -14 percent, population returned from exile, internally displaced, demobilised, the young and old people, among others). The end result is that 75 percent of the population suffer permanently from food insecurity and 7.7 percent are dependent on aid.

c) Stability of Food Supply

Food availability, accessibility and utilisation fluctuate considerably season by season. In fact, the production per inhabitant is progressively decreasing every year, which causes the price to rise while hurting farmers' revenue. On the other hand, food importation and aid are not enough to cover the difference between production and food needs. So the balance between food demand and food supply still shows a deficit and the food security situation is persistently grave.

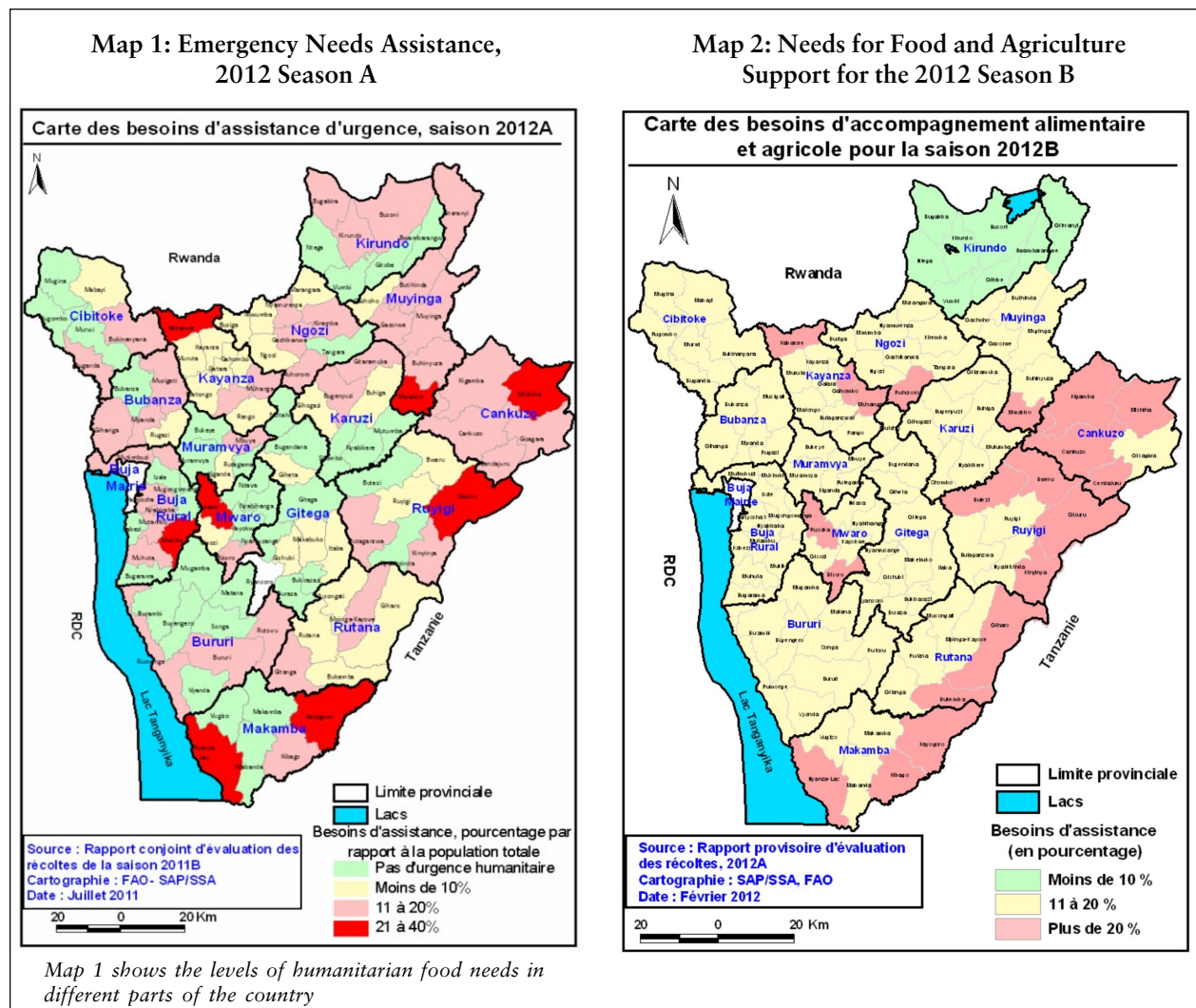
It is also observed that rainfall patterns create great differences in food availability from region to region. This leads to changes in commercial flows by season and by year. The other factor that affects the stability of food availability and accessibility is the gap in the post-harvesting conservation and in production treatment and transformation. Harvests such as potatoes, bananas, beans, maize, vegetables and fruits, are

subject to quick decay. So when the production increases, it has to be immediately sold at very low prices.

In conclusion, the general situation of food security at the end of the 2011 season B is characterised by:

- Very high food insecurity: Moso, Imbo, Bugesera and Bweru;
- High food insecurity: Kirimiro, Buyenzi, Buyogoma, and Buragane Mumirwa; and
- Moderate food insecurity: Bututsi and Mugamba.

While analysing the 2012 A season, the following observations emerge: the Bugesera, which was experiencing acute food insecurity in 2006, does not need food aid for the 2012 season B, except for a few vulnerable groups (repatriates and Batwa). Buragane, Buyogoma and Bweru regions were faced with very high food insecurity, while



the communes of Buyenzi and Kirimiro, Moso and Imbo regions faced moderate food insecurity (Map 2).

2.2.3. Analysis of the Supply and Demand for Selected Crops

The analysis of food balance of season 2011 B and 2012 A, shows a shortage of food even with imports and donations taken into consideration. This situation is more pronounced in season A than in season B (Table 3).

Whereas the domestic availability of food in the 2011 season B could cover 93.18 percent of total needs, the 2012 season A contributed only 29.90 percent. The share of imports contribution to food was very low due to limited finances: 2.75 percent in 2011 season B against 3.06 percent in 2012 season A. The estimated quantities of imports are the same for the two seasons, yet the variance in the need for food is quite big between the two seasons. Aid is also insufficient to meet the needs. Whereas the country needed aid of 10.13 percent in 2011 season B, only 1.43 percent was met and 5.15 percent of needs were satisfied in 2012 season A out of 68.99 percent

that was required. The uncovered deficit in 2011 season B is 26.24 percent, and 63.84 percent in 2012 season A.

According to the ecological stations, season 2012 A was characterised by great varying perturbations in rainfall. With reference to the normal rain, some stations registered a delay in rainfall starting during the seedling period, they were followed by torrential rain sometimes accompanied by hails and strong wind with a margin of 24 percent to 500 percent (in Bujumbura climatologic station for example). Others, such as Cankuzo station which represents the Buyogoma region, registered excessive rain followed by drastic deficit rain. The Musasa station which represents the Moso region registered a deficit rain during the entire season.

In addition to these rain perturbations, crops faced disease recrudescence such as cassava mosaic, banana BXW and the cassava brown streak virus which can destroy 100 percent of the harvest. Insufficient manure and quality seeds have also had a negative impact on the

Table 3: Comparison of Food Supply and Demand from July to December 2011 (after season 2011 B) and January to June 2012 (after season 2012 A) in thousands T EC

Description	Cereals		Legumes		Roots and tubers		Bananas and plantains		Total	
	2011 B	2012 A	2011 B	2012 A	2011 B	2012 A	2011 B	2012 A	2011 B	2012 A
A. Internal availability =supply (1)+(2)	224	70	178	26	321	100	68	32	846 (93.18 %)	244 (29.90 %)
Estimated production of 2011 B (1)	224	70	178	26	321	100	68	32	791	228
Various production contributions (2)									55	16
B. Total needs (demand)=(3) +(4)	228.87	203	253.04	221	339.035	310	86.91	82	907.9 (100 %)	816 (100 %)
Food uses (3)	199.75	198	221	219	306.935	305	80.11	80	807.8	802
Seeds and other uses (4)	29.12	5	32.04	2	32.1	5	6.8	2	100.1	14
C. Export needs =B-A	4.87	133	75.04	195	18.035	210	18.91	50	117,036 (12.89 %)	588 (72.06 %)
Forecasted imports needs (5)	4.87	10	20.13	15	0	0	0	0	25 (2.75 %)	25 (3.06)
D. Needs for food aid = C-(5)	0	123	54.91	180	18.035	210	18.91	50	92,036 (10.13 %)	563 (68.99 %)
Covered needs (6)	0	22,03	13.03	20	0	0	0	0	13,033 (1.43 %)	42,03 (5.15)
E. Total shortfall not covered	0	100.97	41.87	160	18.035	210	18.91	50	23,827 (26.24 %)	520.97 (63.84 %)

Source: MINAGRIE, FAO, UNICEF and WFP, 2011 B and 2012 A

2012 season A. This situation is very alarming and deserves quick and concerted actions.

2.2.4. The Potential for Value-addition: The Case of Sunflower Processing in the Bugesera Region

Value addition of agricultural products marketed in Burundi is very limited. There is a small amount of processing in the fruit and oil sectors. Some small production units of juice and oil exist but they are of marginal quantities. Their impact on the market is negligible. It cannot support the sufficient job creation and cannot lead to an increase of export earnings due to its low quantity.

Coffee and tea, which represent the bulk of exports of the country, are sold in nearly raw state. Processed coffee and tea have the potential to generate more profit through branding, and thereby create more local jobs. For fruits and vegetables, ensuring conservation and processing constitute a motivation for raw material producers. If there is demand, the producers will increase the production because they would have confidence in the market. They can also contribute to improving the export earnings and trade balance.

Sunflower is another sector that has high potential for value addition. For the purpose of this study, the authors visited a sunflower processing facility in the Bugesera region, an area that has been suffering from recurrent droughts since 2000. Sunflower is more drought resistant than other crops such as beans and maize, soybeans and groundnuts. It is also more resistant to insects and fungus, and demands little manure. Sunflower is a species of Asteracea family cultivated for its oil. This oil is very popular due to its high levels of non-saturated fatty acids. It is also rich in Vitamin E. Some varieties can yield around 40-45 percent of oil. Sun flower oil is used for food, cosmetics and biofuel (classified as the most ecological option). In Bugesera region, sunflower is consumed as a sauce for cassava or maize pastry during hard periods of famine or hunger. Sun flower seeds are also eaten grilled.

There is a sun flower processing unit at Mutwenzi Agropast Centre that transforms sun flower seeds into oil and services in the Bugesera region. The variety cultivated in Bugesera has an oil yield of 17-18 percent only. However, sunflower producers in the region are not organised, and therefore are not able to fully exploit their potential. For instance, there are no research facilities that could help improve crop variety to suit the climatic conditions in the region.

The Bugesera region and other sub-dry regions such as Moso and Imbo are suitable for sunflower production, and have the potential to specialise in its production. If edible oil is to be extensively produced, it would provide employment opportunities and ultimately improve food security. The following photo shows sun flower plantation in Rwabikara colline in Busoni commune.

Picture 1: Family Sun Flower Plantation



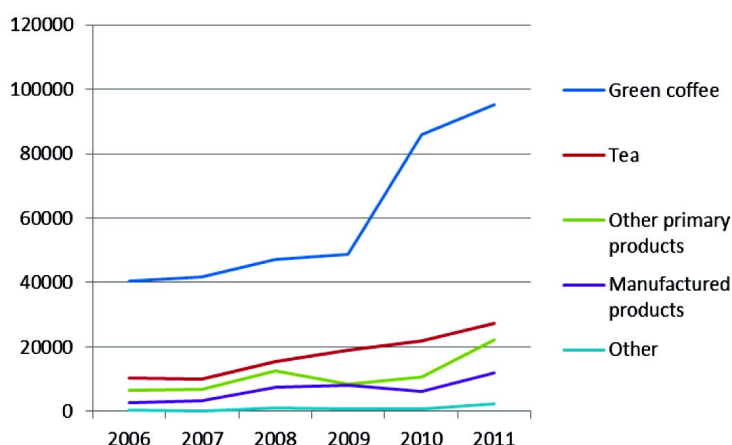
2.3. Trade

Burundi is highly dependent on agricultural trade, which constitutes a major part of its export products. Given that agriculture is dependent on climatic conditions, the country's trade is vulnerable to weather vagaries, hence the need for coherence in trade and agricultural policies.

2.3.1. Exports

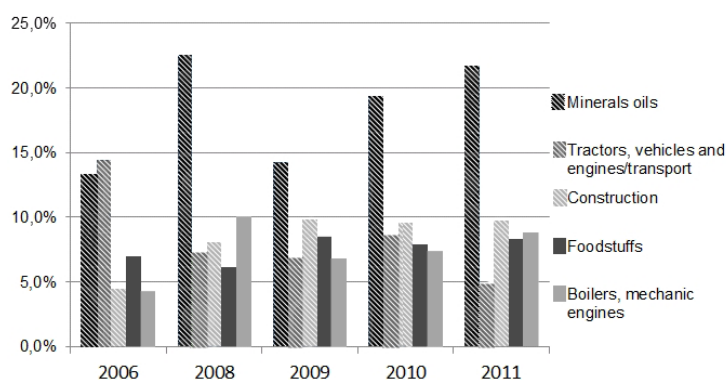
As demonstrated in Figure 5, Burundi's exports are dominated by agricultural products, and mostly in primary form. The country is

Figure 5: Trend of Main Export Products (in millions of Burundian francs), 2007-2011



Data Source: Annual report 2010 of the Banque de la Republique du Burundi (BRB) and monthly report, December 2011

Figure 6: Trend in Share of Top 5 Import Products in Total Imports (2006-2011)



Data Source: Annual report 2010 of the BRB and monthly report, December 2011

dependent on imports of processed and finished products, including food stuff, whose imports have been increasing over a period of time. The main destinations are Europe, the EAC and Asia, and are dominated by coffee. However, it is experiencing persistent cyclical status, and the country cannot control the prices of this vital product, which provides over 77 percent of export earnings. This cyclical trend in production combined with the uncontrolled prices make the exports earnings very vulnerable.

Tea and cotton are the next largest exports that contribute significantly to the country's external trade. The fruit and vegetable sectors have shown notable growth, increasing from 0.04 percent of the total of exports in 2007 to 0.18 percent in 2011.

2.3.2. Imports

Figure 6 indicates that foodstuffs represented 7 percent of total imports in 2006, 8.5 percent in 2009 and 8.3 percent in 2011. Combined with the food stuff in production of

Table 4: Intra-regional Trade (US\$mn)

country		2004	2005	2006	2007	2008	2009	2010
Kenya	Imports	27.5	34	35.5	29.4	30.3	23.3	31.0
	Exports	0.4	0.4	1.2	2.2	1.5	0.4	1.5
	Balance	(27.1)	(33.6)	(34.2)	(27.2)	(28.8)	(22.9)	(29.5)
Tanzanie	Imports	14.9	12.8	7.6	9.8	16.8	34.1	27.0
	Exports	0.2	0	0	0.1	0	0.6	0.3
	Balance	(14.7)	(12.8)	(7.6)	(9.7)	(16.8)	(33.5)	(26.7)
Rwanda	Imports	0.7	0.9	1.0	1.7	3.1	2.6	2.5
	Exports	4.2	2.7	3.1	2.2	3.5	3.1	8.6
	Balance	3.5	1.8	2.1	0.5	0.4	0.5	6.1
Uganda	Imports	11	11.4	16.9	38.7	34.5	69.1	28.9
	Exports	0.7	0.9	1.2	1.0	1.6	1.9	2.2
	Balance	(10.3)	(10.5)	(15.7)	(37.7)	(32.9)	(67.2)	(26.7)

Source: Annual Report 2010 of the BRB and monthly report, December 2011

goods, it is noted that food products represent 10.4 percent in 2006, 17.14 percent in 2009 and 13.6 percent in 2011. Compared to the exports structure, another observation is that the trade balance is in deficit throughout the whole period.

2.3.3. Trade Concentration

Trade in Burundi is highly concentrated on a few agricultural products. There's need for diversification in order to reduce the country's dependence on a few products for trade. The sun flower scheme is a positive step towards efforts to diversify.

Intra-regional trade is important for the country. In the EAC, Burundi is the smallest trading partner, showing a positive trade balance with only Rwanda. Table 4 indicates trade flows in the EAC.

Chapter 3

Missing Links, Real Impacts

Interface between Climate Change, Food Security and Trade

3.1. Climate Change and Food Security Linkages

The linkages between climate change and food security are intertwined. While the agricultural sector from which food security is derived is quite vulnerable to climate change impacts, it is among the major contributors of GHG emissions.

It is estimated that 33 percent of man-made GHG emissions stem from agriculture. Methane and nitrous oxide produced respectively by cattle and rice paddies, and by use of synthetic fertilisers is 14 percent, and the carbon dioxide production resulting from shifts in land use, deforestation for pastures or crop cultivation is 19 percent.²⁵ It is also confirmed that greater concentration of carbon dioxide in the atmosphere makes oceans more acidic, which contributes to reduction in fish stock. In certain coastal areas, the rise of sea levels is causing salinisation of water, which makes it unsuitable for agriculture.²⁶

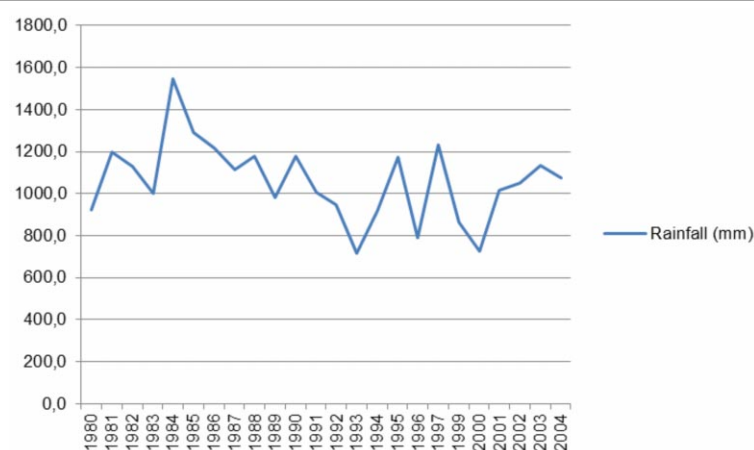
Projections made for most developing countries show reductions of about 5 to 10 percent in the yields of major cereal crops. This rate may go up to 50 percent by 2020, with net incomes from crop falling as much as 90 percent by 2080.²⁷ World Bank (2008) indicates that in developing countries reduced

rainfall or rainfall variations (changes in seasonal timing and intensity) would have direct implications on farmers' income and livelihoods.

Climate change is also reflected in seasonal cycles. Shortened rainy seasons and extended dry seasons are more and more commonly observed, while certain locations are experiencing reduced rainfall and one drought after another (MEEATU, 2009: 77).

In the case of Burundi, analysis of rainfall deviation as measured from Murehe and Kirundo stations for over 25 years (1980-2004) indicates years of excessive or deficient rain without confirming the cyclicality indicated above.²⁸ If deviation is $> +20$ percent, rain is

Figure 7: Rainfall Records in Murehe and Kirundo Stations (1980-2004, in mm)



Source: INECN; *Plan d'aménagement du paysage protégé du Bugesera*, 2010

excessive; if deviation is between -19 percent and +20 percent, rain is normal; if deviation is between -20 percent and -59 percent, rain is insufficient; and if deviation is <-60 percent, rain is very scarce. In Burundi, the predicted weather variations are yet to be manifested significantly as indicated in Figure 7.

However, from 2006, there have been great crop damages caused by inundations, droughts, hail and wind; the most destructive being the recurrent droughts in Moso, Bugesera and Imbo regions. The type of rainfall has a direct impact on harvests, as has been confirmed by the Ministry of Agriculture, FAO, WFP and UNICEF reports.²⁹ Table 5 is an illustration of the stated situation.

Abundant rainfall causes inundations, which destroy crops and induce erosion and landslides. It also fosters fungi related diseases. On the other hand, drought is equally devastating. In addition to the destruction of crops, drought destroys grazing land and dries up water sources, affecting livestock. Moreover, harmful insects tend to flourish, and there is a higher chance of forest/bush fires. The Busoni region case study illustrates the vulnerability of the poor to climate change. Their livelihood mostly depends on working on the fields, which is difficult to undertake during periods of drought.

3.1.1. Impact of Droughts on the Busoni Commune in Bugesera Region

The Busoni commune, like that of Bugabira, has experienced recurrent droughts since 2006 that devastated the fields resulting in unfortunate consequences such as the sale of livestock and property, and desertion of homes. The number of internally displaced persons is not officially documented, but it has been confirmed as substantial through informal interviews.

During this recurrent drought period, farmers were pushed to cultivate along lakes and rivers, which prompted the government to pass legislation protecting the beaches and river banks. For instance, 50 m of surrounding areas near the lakes are protected and 15 m for rivers. This situation presents a conflict between public administration and farmers' needs.

In fact, growing crops along lakes and rivers reduces the laying area for the fish and drastically decreases the quantity of fish. Lakes, rivers and also the entire swampy areas face the danger of drying up. This aggravates the effects of climate change. An ideal scenario would be for the government to design and implement an irrigation system that also preserves the protected areas.

Table 5: Relationship Rainfall Harvest Expected

Natural regions	Characterisation of rainfall observed	Characterisation of production observed	Average production change (%) of the total average estimated production 2011B/2010B
Bweru	Mediocre	Mediocre	-4
Bugesera	Very good	Good	13
Buyenzi	Good	Good	2.5
Mugamba	Very good	Very good	3
Bututsi	Very good	Very good	4
Kirimiro	Bad	Bad	0.5
Buyogoma	Bad	Bad	1.3
Mumirwa	Data not available	Very good	6.6
Buragane	Bad	Good	10
Imbo	Very good	Good	6.6
Moso	Bad	Bad	1.3

Source: MINAGRIE, FAO, UNICEF and WFP, 2011 season B

3.1.2. Existing Adaptation Measures in Burundi

a) Government and Development Partners' Responses

Burundi has taken several initiatives to reduce the adverse impacts of climate change. These include laws and other initiatives as reflected by its strategy on addressing the challenges emerging from climate change.

Burundi's strategy to mitigate climate change includes laws that have been adopted such as the environmental code, code of water, forest code, mining code and law on protected areas. The Ministry of Water, Environment, Territory Development and Town Planning has prepared strategies for mitigation and adaptation to climate change in agriculture, health, energy and terrestrial and aquatic ecosystems. These include first communication on climate change in 2001; the National Adaptation Programme of Action (NAPA) in 2008; and the Second National Communication on Climate Change (DCNCC 2010).

These strategies initiated projects such as the national reforestation programme funded at US\$ 2 billion in 2009 and BIF 4 billion in 2010, 2011 and 2012; the National Land Programme (PNF) which will register the properties for their safety; and provincial development plans that show land use.

Furthermore, the Ministry of Agriculture has also adopted strategies for the development of agriculture and animal husbandry in relation to environmental preservation. These include the National Agricultural Strategy (SAN) 2008-2015 that pursues sustainable increase of agricultural production and productivity; the Vision 2020-2025 of the Institute of Agricultural Sciences of Burundi, titled 'Exploring the relationship between Agriculture and the Environment' as part of the Master Plan of Agricultural Research; and the National Food Security Programme (NFSP). The latter was the basis for the implementation of a number of important programmes and projects, including:

- The first NFSP sub-programme titled 'Rational management of natural resources' (2009-2015);

- Several IFAD-funded projects including the Project of sectors' development (PRODEFI), Project for the Reconstruction of the livestock sector (PARSE); Agricultural Products Valorisation and Intensification Project support (PAIVA B); and Post-Conflict Reconstruction Transitory Programme (PTRPC).
- Several projects by the Belgian Technical Cooperation (CTB), including the Project of institutional support to Ministry of Agriculture and Livestock; Project of institutional support to ISABU; Project of institutional support and organisation of the agricultural sector (PAIOSA); Project of support to agricultural development of Kirundo; Project (Kirundo PADAP) in Bugesera; PADFAP CIBITOKI; and Project of support of the vulnerable population of the Ruyigi province.
- With funding from FAO, project contribution to relief from soaring food prices by improving the capacity of farmers' associations cultivating irrigated areas of Imbo.

In addition, the budget allocated to agriculture has been increasing since 2010 from 3.7 percent to 7.4 percent in 2011, with the goal of reaching at least 10 percent in accordance with the declaration made by the Heads of State of the African Union in Maputo in 2003.³⁰

Despite the increase in the budget given to the agricultural sector, it remains by far insufficient for the actual implementation of these strategies, making the government depend on external funding that tends to be very irregular. Thus, the effects of these different strategies are not yet noticeable.

At the regional level, the EAC has already adopted the Action Plan on Food Security and the Protocol of the 2011-2015 Sanitary and Phytosanitary Standards (SPS) of EAC arising from the Rural Agricultural Development Strategy 2005-2030. There are other important projects under way for the improvement of agricultural productivity and trade such as:

hydroelectric dam on “Rusumo-falls” for the production of electricity and irrigation; and railway connecting Tanzania-Rwanda-Burundi. More time is needed to truly evaluate the effectiveness of these policies and strategies, as they have not all been sufficiently implemented.

b) Adaptation Challenges Faced and Possible Opportunities

There is lack of proper and sustainable funding mechanisms. The above strategies rely too much on external funding. It is recognised that Burundi is very poor and consequently needs more financial aid. The country should make a plan based on what it can perform with its own resources and identify actions that need external financial support. Sustainable financial mechanisms based on savings have to be initiated and implemented mainly in the rural areas.

Stakeholders, especially farmers, are not involved enough in these policy elaborations. The inclusion of all stakeholders in the elaboration process will facilitate implementation. Before the implementation, there is also need for dissemination and sensitisation to make sure that all partners understand and make these policies and strategies theirs. Moreover, a well prepared mechanism of coordination of these policies and strategies is necessary to avoid overlapping and a waste of time and resources.

Burundi is now relatively more integrated with the regional economies. There are various existing opportunities at the regional level that can help Burundi to address issues related to climate change impacts. Some of these are:

- Regional integration – EAC, Common Market for Eastern and Southern Africa (COMESA), Economic Community of Central African States (ECCAS), Economic Community of the Great Lakes Countries (CEPGL), Lake Tanganyika Authority and Nile Basin Initiative (NBI) reduces the consequences of isolation. Burundi can take advantage of this vast market and seize the opportunity to exchange experience.
- Some support to Burundi in the form of Technical and Financial Partners (TFP) are

now becoming more visible. Burundi can immensely gain from TFP by providing well-structured and concerted programmes.

- Burundi can also benefit from the emergence of civil society organisations and organisations of producers engaged in agricultural development.
- Various mechanisms for mitigation and adaptations are now in place. There also exists the mechanisms for financing activities of adaptation and mitigation of climate change in the form of Proper Development Mechanism (MDP); Reducing Emission by avoiding Deforestation and Forest Degradation (REDD); Land Use, Land Use Change and Forestry (LULUCF); Agriculture, Forestry and Other Land Uses (AFOLU/REDD).

3.2. Trade and Climate Change

Trade and climate change have a two-way relationship that is both negative and positive. For instance, the transport sector, on which trade is highly dependent, aggravates climate change as it produces the most GHG. On the other hand, trade can also serve as a channel for spreading technologies for mitigation of climate change.

Climate change may alter trade relationships as it can increase the vulnerability of the supply, transportation, and distribution chains on which international trade depends. It could also change the composition of comparative advantage that a country has either for the better or worse.

In the context of Burundi, the scarcity of land and lack of modern agricultural technology in a country highly dependent on agricultural trade, makes the links between trade and climate change quite important. The case study on beans and sorghum illustrates the importance of these links.

3.2.1. Climate Change Impacts on Trade: A Case Study of Beans and Sorghum

A case study was undertaken in the Kirundo area of the Bugesera region. This area was reknowned as the source for production and

Table 6: Variations of Prices Observed			
Product	Price/kg retail in Fbu		Variation rate (%)
	Before 2000	In 2012	
Ordinary beans	150 to 200	600	300
Yellow beans	500	1100	220
Sorghum	150 to 200	700	350
Cassava	150	400	267
Maize	200	500	250
Cassava flour	-	750	-
Maize flour	-	700	-

Source: Data collected by the researcher in Kirundo province

trade of beans and sorghum on which other regions such as Bujumbura, Gitega, Mwaro, Ngozi and Rumonge were dependent. However, with the onset of recurrent droughts, this has since changed.

Absence of statistical data makes it difficult to quantify the extent of the drought's effects on the production and marketing of the beans and sorghum in the region. However, price increases are indicative of the decrease in production arising from climate related reasons (Table 6).

The main reason for price changes is due to insufficient local production and importation of goods from the neighbouring countries like Tanzania and Rwanda. Traders in the region have diversified from trade in beans and sorghum to other produce. The new items introduced include beer, coffee and others. In fact, some of the warehouses that were originally used for

storage of beans and sorghum, which were plenty, have been transformed to accommodate the new market for coffee beans.

The case of beans and sorghum production in Kirundo, which is no longer the key producer of these products, is a clear example of the negative effects of climate change repercussions that need to be addressed for the country to become food secured.

3.2.2. The Implications of Implementing Climate Change Policies

Implementation of the policy on climate change may actually have positive effects on domestic trade. Indeed, the policy of adaptation and mitigation of climate change concerns key sectors of commerce and human life such as agriculture, energy, transportation, health, natural resource management in general (water, forests), and industries.

Picture 2: Agricultural Trade Diversification as a Survival Mechanism



Picture 3: A Corn Flour Mill in Action at the Bishisha Village



The policies encourage the creation of new ventures aimed at mitigating and adapting to the impacts of climate change. These include investment and improvement of infrastructure and equipment and job creation. Diversification may also be realised as a result.

3.2.3. The Policy Interface between Trade and Climate Change

There are numerous laws in which one or two elements related to climate change are raised (used water, protected areas and utilisation of pesticides). These include the environmental code, forest code and water code. There is a commerce code which regulates trade in Burundi. There is need to elaborate one law governing climate change taking into account the various elements stated in the different codes. This law will be specific to this very important issue. The management of one law on climate change will

be easier than referring to four codes and other related documents. This law should also refer and harmonise the EAC's climate change law.

3.3. Food Security and Trade

From around 2004, Burundi has been experiencing food insecurity whose magnitude has been growing each year. Its food imports from Rwanda, Uganda and Tanzania have sustained a large number of the population. All major markets and those located near borders deal in food products, such as rice, maize, and cassava from Tanzania and Uganda; beans from Tanzania; and potatoes from Rwanda.

Since the borders are highly permeable, informal trade occurs almost daily among neighbouring countries. However, despite the importation of food in such manner, there is still food shortage that has caused food insecurity for the vulnerable persons. The latter are mainly assisted by international organisations such as FAO and World Food Programme (WFP), but their needs remain unsatisfied.

3.3.1. Importance of Food Imports in Burundi

Imported food stuff that contributes to food security are mainly rice, maize, cassava, beans and potatoes. Their level of contribution to food security should ideally keep pace with declining production. They should increase based on individual requirements. Unfortunately, the import capacity is very limited due to lack of financial resources and low purchasing power

Table 7: Comparison between Import Needs and Import Capacity in '000 tonnes EC

Description	Cereals		Leguminous		Roots and tubers		Bananas and plantains		Total	
	2011 B	2012 A	2011 B	2012 A	2011 B	2012 A	2011 B	2012 A	2011 B	2012 A
B. Total needs (demand)	228.87	203	253.04	221	339.035	310	86.91	82	907.9 (100 %)	816 (100 %)
C. import needs	4.87	133	75.04	195	18.035	210	18.91	50	117,036 (12.89 %)	588 (72.06 %)
Commercial Imports predicted	4.87	10	20.13	15	0	0	0	0	25	25
Import rate compared to import needs	(100 %)	(7.52 %)	(20.82 %)	(7.7 %)	0 %	0 %	0 %	0 %	21.36 %	4.25 %
Import rates compared to total needs	2.12 %	4.92 %	7.95	6.78	0 %	0 %	0 %	0 %	2.75 %	3.06 %

Source: MINAGRIE, FAO, UNICEF and WFP, season 2011 B and 2012 A

of the vulnerable and poorest people. This is illustrated by the level of imports that were constant in the 2011-2012 seasons, despite the greater need for food products, that is 25,000 T EC for the needs of 117,036 T EC after the season 2011 B against 588,000 T EC after the 2012 season A. Table 7 shows the comparison between import needs and import capacity by category of food products (cereals, leguminous, roots and tubers, bananas and plantains).

In fact, the data is underestimated because of undeclared importers who take advantage of porous borders between neighbouring countries of the EAC. For example, roots and tubers would not be imported according to the information in this table, but potatoes from Rwanda and cassava from Tanzania and Uganda are present in Burundi markets.

3.3.2. Implications of Multilateral and Regional Trade Policies on Food Security in Burundi

In general, regional and multilateral trade policies facilitate easier and freer trade and help reducing taxes, while maintaining strict quality control of the goods. Ideally, these measures should lead to benefits such as decrease in prices and increase in access to markets. However, for the benefits to be reaped there is need for production of sufficient quantities of goods and services of the desired quality. It would also entail focused marketing efforts to address the inevitable competition that comes with the opening of markets.

Certainly, Burundi can take advantage of trade liberalisation by engaging itself with other countries in the region, to improve its agriculture which remains backward compared to its neighbours and partner countries. Such cooperation and engagements can help Burundi in tapping its potential to offer a variety of products that exist, thanks to varied climate and favourable and sufficient water resources suitable for irrigation schemes.

The impact of regional trade policy is becoming more visible in Burundi through the increased presence of goods from Uganda, Kenya and Rwanda on the Burundi market. These include

corn flour, cassava flour, potatoes, milk and rice. The imports of such food items complement the local food deficit and are critical in promoting food security.

Investors from the EAC and Economic Community of Central African States (ECCAS) have started coming in to establish businesses in Burundi. Examples include Ecobank, KCB and flour mills which were set up by companies from neighbouring countries. From these banks, farmers should expect to receive agricultural credit and increase their production. Regarding the flour unit, it could stimulate production if the price offered to producers of maize is attractive. The standard of living would rise if Burundi prepares to tap into the regional market.

3.4. Enhancing Climate Change, Food Security and Trade Linkages

The linkages between climate change, food security and trade are such that they should be addressed holistically and coherently given their effects on each other. With the right set of policies, trade could play an important role in mitigating the damages of climate change and ensuring food security. In the case of Burundi, this would require overcoming various challenges and taking advantage of all available opportunities.

3.4.1. Governance

In the 1990s, Burundi experienced a socio-political crisis, essentially a civil war that led to subsequent governance problems. This period is partly responsible for the food insecurity challenges that the country faces today. Both domestic and international trade were undermined as a result of these challenges. However, with the signing of the Arusha Peace Accord, the country is on track to recovery, and with the adoption of requisite policies, the challenges are to be overcome.

3.4.2. Policy Implementation

Climate change, trade and food security issues are dealt with by different institutions that do not always result in coordinated policies or modes of addressing the challenges therein. This

often results in conflicting strategies that could have been avoided through well-coordinated institutional framework.

The other challenge lies in the lack of implementation of agreed strategies. This has been mostly due to lack of resources. An example is the Diagnostic Trade Integration Study (DTIS) of 2004 that included an action plan pointing out programmes that needed to be undertaken, but have largely remained undone.

The horticulture was one of the sectors in the DTIS Action Plan which promoted non-traditional export products. However, this sector requires specific skills that producers and exporters do not have. For example, there is insufficient knowledge of international norms and standards, processing and market access. Lending to finance building capacities or exploring markets is not easy because these activities do not generate immediate revenues. The producers are not well organised and do not have enough resources to increase the production and this is combined with the fact that horticulture products are perishable, and need to be stored in a cool facility which is not available to the producer. The limited access to credit also has an impact on the availability of agricultural inputs for the horticulture sector. These are very expensive for a rural producer who has neither guarantee for a good production due to climate change nor good prices to recover his investment.

The low volume of horticulture products to export constitutes an insufficient business plan to air cargo. This implies high transportation costs on regular air flights, hence discouraging the small and new exporters.

3.4.3. Resources

Land ownership and distribution in Burundi is a big challenge that has largely affected its optimal utilisation of arable land. This has been aggravated by several political crises that the country has experienced since its independence in 1962. A majority of the population has been displaced and their land reallocated arbitrarily.

As a result, there is a sizable number of people without land, exposing them to food insecurity.

Overpopulation adds another layer of complexity to the land distribution issue. Currently, the population growth rate is high, but the amount of cultivable land has not expanded significantly. Increased competition for land, coupled with increasing demand for food, has exerted much pressure on land, leading to intensification of agricultural activities and over exploitation of the scarce land.

Inadequate and poor infrastructure in Burundi remains a challenge to trade. This is manifested in failure to move food products from areas of surplus to those of deficit. Furthermore, Burundi is a landlocked country, and faces the challenges such as lack of direct access to sea ports, making international trade expensive.

Burundi has an important hydrographic network suitable for irrigation and drinking water. However, this requires controlled management of waterways and national strategies to ensure sustainable use of water, which is still lacking.

Given that majority of farmers are small holders, access to credit remains a challenge since they do not often have the required collateral. Due to high risks associated with small scale farmers, the banks are reluctant to extend credit, preferring more lucrative sectors such as coffee. This limits the farmers' ability to adopt modern farming techniques.

Chapter 4

Way Forward and Recommendations

Climate change has posed the biggest threat to food security in the EAC, given that the resulting extreme weather conditions such as drought and heavy rains which have destroyed much of the crops. Food prices soared, making it impossible for most of the population to afford food. The poor or even lack of infrastructure that could have facilitated trade between the surplus and deficit areas worsened the crisis.

At the same time, Burundi recognises this situation as a window of opportunity for improving the agricultural sector and achieving food security. Climate change can be taken advantage of, and so is trade; case studies have demonstrated both sides of the coin. Based on the existing policy framework, the observed implications of the inter-relationship between trade, climate change and food security and the mitigation challenges identified in this study, the authors propose the following recommendations:

4.1. Awareness-raising

The key activity that should be carried out on a national level is raising awareness, especially through education. The farmers and the private enterprises must be informed of the impacts of climate change so that they can better adapt. For example, they should be advised to adopt eco-friendly farming practices in order to prevent soil degradation and to refrain from contributing to negative impacts of climate change. Moreover, they should be cognizant of the opportunities that trade creates in achieving food security.

The civil society organisations and NGOs should launch advocacy campaigns for this purpose.

Schools should also be encouraged to adopt curriculums that deal with TFSCC. All stakeholders should actively participate in the dialogue about the TFSCC relations so that they have a stake in the matter.

In order for education and advocacy to be effective, there must also be action. Farmers should be supported to cooperate with the government and other organisations in implementing eco-friendly approaches to farming. More importantly, development partners and other donor agencies must secure the finances so that the projects are not stalled mid-way.

4.2. Creation of a Permanent Technical Commission

Although there is the National Environment Commission (made up of several ministries including agriculture, environment, finance, education, interior and security) that is charged with dealing with environmental issues, it does not always effectively carry out its mandate. It is therefore proposed that this mandate be transferred to a permanent Technical Commission on Food Security, Climate Change and Trade (FSCCT). Such a commission would be charged with designing holistic policies and overseeing their implementation.

The Commission should be autonomous and well-endowed with necessary resources, provided by the government and development partners. The Commission should begin by providing a careful assessment of laws, policies and administrative measures on the national scale, on-going programmes, and a systematic

identification of existing constraints and available resources. Based on the result, it should fill any gaps and generate solutions. Their policies should also address capacity building in FSCCT issues of all stakeholders, launching advocacy campaigns, monitoring mechanisms overseeing adopted policies and encouraging direct participation of farmers and other stakeholders.

4.3. Other Actions by the Government

- The government would also need to put in place initiatives that encourage and promote diversification in order to decrease over reliance on the agriculture sector. Initiatives such as the sun flower project should be promoted for the country to adapt to the climatic challenges.
- Value addition and processing of primary products such as branding of Burundi coffee and tea as well as processing and packaging of fruits and vegetables should be prioritised, if the country is to reap from regional and international trade opportunities, by trading on better terms.
- The government and its development partners should also put in place viable irrigation schemes to counter the weather vagaries, and prevent encroachment of cultivation on lake shores and river banks. This is critical in preserving natural ecology and limiting degradation of the environment.
- The government should employ sustainable measures that limit deforestation and through the implementation of the NAPA and quick adherence to REDD+ and Clearing Development Mechanisms (CDM).
- Burundi should ratify the Nagoya Protocole on Access and Benefit Sharing (ABS) of the convention on biodiversity and then take advantage of the available budget for biodiversity protection and poverty fighting projects.
- There is also an urgent need to address the current low levels of agricultural and especially food productivity, in order to reduce reliance on imports and aid during the poor seasons. This would include the

establishment of storage facilities and processing of agricultural products such that surpluses from good seasons are carried over to the bad seasons.

4.4. Development Finance

As all actions require financing, it is proposed to create a sustainable funding mechanism such as an environmental and agricultural fiduciary fund. This fund should be supported by the government budget, industrial beneficiaries of environmental goods such as the Water and Power Distribution Company (REGIDESO), the Burundi Breweries Company (BRARUDI), the Soap Production Company (SAVONOR), the Moso Sugar-Refinery Company (SOSUMO), the Burundi Textile Complex (COTEBU), the Oil-Refinery Company (RAFINA), mining and transportation sectors, bilateral and multilateral partners.

References

- Burundi. 2012. Second National Poverty Reduction Strategy - PRSP II. Bujumbura.
- Burundi Economics Studies and Statistics Institute (ISTEEBU). 2010 and 2011. Statistics Annual 2009 and 2010. Bujumbura.
- East African Community Secretariat. October 2011. East African Community Facts and Figures. Arusha.
- FAO. 1983. 'World food security: A reappraisal of the concepts and approaches'. General Managers report. Rome.
- Françoise C. P., Alain C. P., Albert L. 1979. Géographie du Burundi: Le pays et Les hommes. Strasbourg: EDICEF.
- Intergovernmental Panel Group on Climate Change -IPCC. 2007. 'Climate change 2007', Synthesis report, pp 104. Geneva.
- Ministry of Communal Development and Planning, Macroeconomic Planning Service. August 2011 Burundi Economy 2010. Bujumbura.
- Ministry of Environment and Territory Development. August 2001. Convention Framework on Climate Changes. First National Communication. Bujumbura.
- Ministry of Finance. December 2010, 2011. Budget laws 2010 and 2011. Bujumbura.
- Ministry of Livestock and Agriculture. July 2008 : National Agricultural Strategy 2008-2015. Bujumbura.
- Ministry of Livestock and Agriculture, FAO. 2009. Food Security National Programme 2009 - 2012. Bujumbura.
- Ministry of Livestock and Agriculture, FAO, WFP, UNICEF. 2010. 'Assessment of the crops, the food supply and the nutrition situation for season 2010B .' Bujumbura.
- Ministry of Livestock and Agriculture, FAO, WFP, UNICEF. 2011 and 2012. 'Assessment of the crops, the food supply and the nutrition situation for season 2011 B and season 2012 A.' Bujumbura.
- Ministry of Livestock and Agriculture, FAO, WFP and UNICEF. 2011. 'Assessment of the crops, the food supply and the nutrition situation for 2011 season B.' Bujumbura.

Ministry of Water, Environment, Territory Development and Town-Planning. 2009. Second National Communication on Climate Changes, pp 147. Bujumbura.

Ministry of Water, Environment, Territory Development and Town-Planning. January 2007. National Adaptation Plan of Actions on Climate Changes. Bujumbura.

National Institute for Nature Conservancy and Environment «INEC». 2010. Development Plan for Bugesera protected landscape du paysage protégé du Bugesera. Gitega.

Republic of Burundi, FAO. December 2008. 'Food Security National Programme (PNSA) 2009-2015.' Bujumbura.

Republic of Burundi, Central Bank. 2011. Annual Report 2010 and the December bulletin 2011. Bujumbura.

Republic of Burundi/Enhanced Integrated Framework (EIF). July 2012. Burundi Diagnostic Trade Integration Study (DTIS) Update. Volume 1, Main report. Bujumbura.

World Bank. 2008. 'MDGs and the environment: Agenda for inclusive and sustainable development'. Global monitoring report, pp 290. Washington DC.

World Bank. 2010. 'Climate Change and Development.' Report on Development. Washington, D.C.

Endnotes

1. Ministry of Livestock and Agriculture : National Agricultural Strategy 2008-2015
2. Burundi. Second National Poverty Reduction Strategy – PRSPII. January, 2012.
3. Ministry of Territory Development, Tourism and Environment : National Adaptation Plan of Actions on Climate Changes. January 2007.
4. Ministry of Livestock and Agriculture, FAO: Food Security National Programme 2009 - 2012.
5. Françoise Cazenave Piarrot, Alain Cazanave Piarrot, Albert Lopez: ‘Géographie du Burundi : Le pays et les hommes,’ EDICEF, Strasbourg, 1979.
6. Burundi. Second National Poverty Reduction Strategy – PRSPII. January, 2012.
7. bi.chm-cbd.net/biodiversity/biodiversite...burundi/biodiversite.../doc303367/: Burundi Ecosystems , 2007.
8. Food Security National Programme (PNSA), 2009-2015.
9. Economie Burundaise 2010, Aout 2011.
10. Olivier De Schutter, Special Rapporteur on the right to food, climate change and the human right to adequate food; Contribution to the meeting convened by the Friedrich-Ebert-Stiftung with the Committee on Economic, Social and Cultural Rights.
11. Ministry of Environment and Territory Development. Convention Framework on Climate Changes. First National Communication. 2001.
12. *Ibid.*
13. World Bank: Climate change and Development. Report on Development, 2010.
14. Household survey of WFP, June 2011.
15. *Ibid.*
16. Ministry of Agriculture and Livestock, FAO: ‘Food Security National Programme 2009-2015.’
17. Ministry of Agriculture and Livestock, FAO: ‘Food Security National Programme.’
18. World Health Organisation technic data used in Health Ministry.
19. Ministry of Livestock and Agriculture, FAO, WFP, UNICEF. 2010. Assessment of crops, food supply and nutrition situation for season 2011B .
20. Ministry of Livestock and Agriculture, FAO, WFP, UNICEF. Assessment of crops, food supply and nutrition situation for season 2011 B and season 2012 A.
21. Ministry of Livestock and Agriculture, FAO, WFP, UNICEF. 2010. Assessment of crops, food supply and nutrition situation for season 2010B .
22. Ministry of Livestock and Agriculture, FAO, WFP, UNICEF. 2010. Assessment of the crops, the food supply and the nutrition situation for season 2011B .
23. *Ibid.*
24. *Ibid.*
25. Mr Olivier De Schutter, Special Rapporteur on the right to food; Contribution on climate change and the human right to adequate food to the meeting convened by the Friedrich-Ebert-Stiftung with the Committee on Economic, Social and Cultural Rights; Geneva, May 13 2010.
26. *Ibid*
27. *Ibid*
28. INECN: ‘Management plan for protected area of Bugesera,’ 2010
29. MINAGRIE, AOF, WFP and UNICEF: ‘Harvest report; Agriculture season B, 2011.’
30. Budget laws 2010 and 2011

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, Web: <http://www.cuts-geneva.org>