



Research Report 17

An Institutional Assessment of the Cotton and Sugarcane Commodities in Ethiopia: The climate change perspective

By

**Alebel Bayrau, Firew Bekele,
Berihu Assefa, and Mezgebe Mihiretu**

Ethiopian Development Research Institute

**Addis Ababa, Ethiopia
October 2014**

This research report is part of the research project on ‘Strategy options for a climate resilient production of cotton and sugarcane in Ethiopia’. The project is financed by the SCIP Fund, which is financed by the governments of the United Kingdom (UK), Norway and Denmark.

THE ETHIOPIAN DEVELOPMENT RESEARCH INSTITUTE RESEARCH REPORTS

About EDRI

Founded in August 1999 as a semi-autonomous government development research institute, EDRI's primary mission is to conduct quality research on the development of the Ethiopian economy and disseminate the results to key stakeholders within and outside of Ethiopia. EDRI is sponsored by the Ethiopian government, ACBF, UNDP, IDRC-TTI and IFPRI/ESSP. For more information, as well as other publications by EDRI staff and its affiliates, go to <http://www.edri.org.et>

Ethiopian Development Research Institute (EDRI)

P.O.Box 2479

Tel: 251115506068

Fax: 251115505588

Email: info@edri.org.et

Website: <http://www.edri.org.et>

ABOUT THESE RESEARCH REPORTS

The Ethiopian Development Research Institute (EDRI) Research Reports contain research materials from EDRI and/or its partners. They are circulated in order to stimulate discussion and critical comment. The opinions are those of the authors and do not necessarily reflect that of EDRI's, their home institutions' or supporting organizations'. Comments may be forwarded directly to the author(s) respective addresses.

Report citation:

Alebel Bayrau, Firew Bekele, Berihu Assefa, and Mezgebe Mihiretu. An Institutional Assessment of the Cotton and Sugarcane Commodities in Ethiopia: the Climate Change Perspective. 2014. EDRI Research Report 17. Addis Ababa: Ethiopian Development Research Institute.

About the Author(s)

Alebel Bayrau, Research Fellow, EDRI, alebel_b@yahoo.com

Firew Bekele, Associate Researcher, EDRI, w.firew@gmail.com

Berihu Assefa, Associate Researcher, EDRI, berihuua@yahoo.com

Mezgebe Mihiretu, Governance specialist, EDRI, arisema2001@yahoo.com

An Institutional Assessment of the Cotton and Sugarcane Commodities in Ethiopia: The Climate Change Perspective

**Alebel Bayrau, Firew Bekele,
Berihu Assefa, and Mezgebe Mihiretu**

**Ethiopian Development Research Institute
(EDRI)**

Copyright © 2014 Ethiopian Development Research Institute. All rights reserved. Sections of this material may be reproduced for personal and not-for-profit use without the express written permission of but with acknowledgment to EDRI. To reproduce the material contained herein for profit or commercial use requires express written permission. To obtain permission, please contact Eden Fitsum via eden.fitsum@edri.org.et

Contents

Executive Summary.....	1
1. Project background.....	2
1.1. Introduction.....	2
1.2. Project rationale.....	2
1.3. Project outcome and output.....	4
1.4. Organization of the report.....	5
2. Climate Change – Agricultural Export Commodity Nexus.....	6
2.1. Introduction.....	6
2.2. Concepts of resilience.....	6
2.3. Conceptualizing agricultural adaptation.....	9
3. Profile of Cotton commodity.....	10
3.1. Cotton Production.....	10
3.2. Cotton Consumption.....	12
3.3. Economic Value of Cotton.....	13
3.4. Employment.....	14
3.5. Plan and Policy for cotton.....	14
4. Profile of Sugarcane commodity.....	14
4.1. Sugar Production.....	15
4.2. Sugar Consumption.....	17
4.3. Other contributions of sugar.....	17
4.4. Plan and policy for sugar.....	18
5. Stakeholder Assessment of Cotton and Sugarcane.....	19
5.1. Introduction.....	19
5.2. Conceptual framework.....	20
5.3. Stakeholders in the Cotton value chain.....	21
5.3.1. Input Suppliers.....	21

5.3.2.	Cotton Production	23
5.3.3.	Cotton processing	24
5.3.4.	Marketing	24
5.3.5.	Regulatory Frameworks	24
5.4.	Stakeholders in the Sugarcane value chain and their respective roles	26
5.4.1.	Input supplier	26
5.4.2.	Production	27
5.4.3.	Sugar market	28
5.4.4.	Regulatory frameworks and actors	28
5.4.5.	Consumers	29
6	Governance System of the Cotton and sugarcane Value chain	30
6.1.	Conceptual framework	30
6.2.	Governance System of the Cotton Value chain	32
6.3.	Governance System in the sugarcane Value	33
	References	34

Executive Summary

Ethiopia's vision is to become a middle income economy by 2025 by achieving an average annual economic growth of 10% through building a modern and productive agricultural sector, strengthening the industrial base and growing exports. However, evidences show that the country is most vulnerable to CC impacts. As a result, it envisaged to achieve its vision through economic growth that is resilient to CC and in line with the global shift towards low carbon society that results in no increase in emissions. Towards this, it has launched the green economy strategy in 2011 (EPA, 211).

Even though the agriculture sector as a whole is vulnerable to adverse effects of CC including flood and drought, CC poses a particular threat to certain agricultural commodities and social groups. Given the methodological challenges and the dependence of the country on few major agricultural commodities for its export sector, there is a pressing need for early action on key agricultural commodities so as to prepare for the effects of CC on its export market and on the livelihoods of Ethiopians. The question is then, which agricultural commodities need urgent action for climate resilient development that result in minimum economy wide effects of CC and enhance the achievement of the country's vision. In this respect, in addition to coffee, the Agricultural Development Led Industrialization (ADLI) strategy and the Growth and Transformation Plan (GTP) clearly stipulated that sugar and textile are strategic export commodities in the industrial development of Ethiopia. They are labour intensive, have broad linkages with the rest of the economy, use agricultural products as inputs, are export-oriented and import substituting, and contribute to rapid technological transfer (MoFED, 2010). They are strategic commodities because they are crucial in transforming the country's economy from the agriculture – led into industry - led economy within the GTP period of 2011 - 2015. Sugarcane and cotton are the key inputs for the sugar and textile commodities respectively.

Accordingly, a project is designed to study the impact of climate change on sugarcane and cotton along their value chain including production, processing, distribution, trading and policy making by the Ethiopian Development Research Institute. The project aims to identify adaptation options for enhancing the resilience of the two commodities to climate change impact. It seeks to strengthen the support for decision makers to address the impacts of climate change, its implications for women and vulnerable groups using specific scenarios of development. The process will actively involve the different actors along the value chain of the two commodities, in a science-based interactive dialogue which will allow stakeholders to discuss the consequences and develop the strategies at various levels to respond to the changing situation. The project has different components including climate modelling, agronomic study, value chain analyses and welfare and economy wide impact of climate change on the two commodities.

As part of the project activity, this report contains an institutional assessment of sugarcane and cotton. The aim of the assessment is to provide inputs for conducting the key components of the project outline above. The report gives insights about the different actors, their roles and governance systems along the two commodities from the perspective of addressing the impact of climate change.

1. Project background

1.1. Introduction

Ethiopia's vision is to become a middle income economy by 2025 by achieving an average annual economic growth of 10% through building a modern and productive agricultural sector, strengthening the industrial base and growing exports (MoFED, 2010). However, evidences show that the country is most vulnerable to the impacts of climate change (CC). The current climate variability (CV) already leads to hazards such as flood, drought and soil erosion, and these impacts will be exacerbated by CC. The evidences show that CC, if not well addressed, poses risk to achieving the country's vision. As a result, Ethiopia has outlined a strategy for a Climate Resilient Green Economy (CRGE), which envisions achieving fast economic growth while increasing resilience to CC and keeping emissions at 2010 levels. This is in line with the global shift towards low carbon society that results in no increase in emissions. However, the preparation of a national strategy for a resilient economy is not as simple for a low carbon development strategy for the following reasons. Unlike low carbon development (as in CRGE strategy), which can be a response to the global burden, resilience is a response to a local, regional and national levels impacts. Thus, any benefits from resilience are sector, location and risk specific, and the objectives for resilience are wider than a single goal as in CO₂ reduction in GE strategy. These features and the absence of universally agreed standards to appraise options for building resilience create challenge to identify adaptation options for the agriculture sector from a particular agricultural commodity or livelihood strategy. However, it is possible to address these issues and develop adaptation options for resilience from analysis made at individual project levels.

1.2. Project rationale

Even though the agricultural sector as a whole is characterized by low-capital and vulnerable to adverse effects of CC including flood and drought, CC poses a particular threat to certain agricultural commodities and social groups. Available information from CC risk analyses for one of the key agricultural commodities, coffee, explicitly indicated that CC impacts on this commodity is not only a threat to achieving a middle-income vision but it also falls on the most vulnerable society. Hence, given the methodological challenges described above and the dependence of the country on few major agricultural commodities for its export sector, there is a pressing need for early action on these key agricultural commodities so as to prepare for effects of CC on its export market and the livelihoods of Ethiopians. The question is then, which agricultural commodities need urgent action for climate resilience development that results in minimum economy wide effects of CC and enhance the achievement of the country's vision.

In this respect, in addition to coffee, the Agricultural Development Led Industrialization (ADLI) strategy and the Growth and Transformation Plan (GTP) clearly stipulate that sugar, and textile are strategic export commodities in the industrial development of Ethiopia. They are labour intensive, have broad linkages with the rest of the economy, use agricultural products as inputs, are export-oriented and import substituting, and contribute to rapid technological transfer (MoFED, 2010). They are strategic commodities because they are crucial in transforming the country's economy from the agriculture – led into industry - led economy within the GTP period of 2011 – 2015 and beyond.

Based on the GTP, in addition to the existing three sugar factories, the country will have 10 additional sugar factories at the end of the plan period. This indicates that the sugar industry is one of the priority industries that are expected to contribute considerably to export diversification and foreign exchange earnings through greater value addition and productivity improvement (FDRE, 2010). The economic benefit of the sector can easily be seen from its main produce, sugar, which is an essential commodity that is consumed by everyone. Moreover, in addition to its benefits as a source of employment for many Ethiopians particularly for low and medium skilled labourers in the production process, sugar is the source of income for many small and middle traders that participate along its value chain. Ethiopia plans to raise annual production of sugar to 2.25 million tones by developing additional 200,000 hectares of land for sugarcane; generate USD 661.7 Million foreign exchange earnings and create additional direct employment opportunities for more than 200,000 citizens by the end of the GTP period. Sugarcane, a major raw material for the industry in the production of sugar, is currently growing using irrigation. Large scale irrigation schemes are also under construction in the ten sugar factories. It is produced by large scale state farms and smallholder out-growers.

Similarly, the textile sector is the other strategic sector that plays key role in the economic growth and poverty reduction in Ethiopia. It is one of the major sources of foreign exchange earnings and employment generation. The sector is expected to earn US\$ 1.0 Billion, generate 40,000 new direct employments and raise its gross value of production to US\$2.5 Billion at the end of the GTP period (MoFED, 2010). The sector uses Cotton as raw input. Available information shows that more than 850,000 quintals of cotton is produced per year from 40,000 ha of land in Ethiopia (CSA, 2010/11). Anecdotal evidence indicated that 40% and 60% of the total production comes from smallholder and private commercial farms, respectively. Afar is the major production region, followed by SNNP and Gambela regions.

Overall, in addition to their contributions as sources of foreign exchange earnings for the country, these commodities are major sources of livelihood for many poor Ethiopians. Higher proportions of rural and urban poor depend on these commodities for their livelihoods through the production, consumption and labor linkages to these commodities.

Owing to low institutional capacity and the absence of adaptation strategy, the production of sugarcane & cotton is exposed to CC. This current situation poses challenges to the country's economic growth and poverty reduction efforts. Evidences elsewhere indicated that current CV is already affecting the production and productivity of these agricultural commodities. Besides, CC poses future risks due to the change in mean temperature and precipitation that causes extreme events such as drought and flood. CC has potential effects in yield that may induce change in breed, growing season, shift in growing areas and reduction in water availability for irrigation. Additional risk may also be anticipated from possible changes in incidence and prevalence of pests and diseases. In case of sugarcane and cotton, risk of lock-in of large irrigated land to unsustainable water futures may also be anticipated.

On the other hand, there is huge capacity gap to design appropriate adaptation strategies for climate resilient production of these commodities. There are no clear roles and responsibilities for the different actors involved along the value chain of the commodities. Besides, there is weak institutional arrangements that coordinate the different stakeholders and to work towards achieving a common goal. Despite their immense economic and social benefits, empirical evidences are not available on the magnitude and likelihood of the current and future impacts of CC and the extent of the vulnerability of these major export agricultural commodities and the welfare impact on people including women and girls whose livelihood largely lie along the different value chains of these commodities in Ethiopia. As a result of the absence of adaptation strategy, existing capacity problem and limited evidence based information and unclear interaction among stakeholders, these commodities are severely vulnerable to CC risk and it is not clear 'which adaptation measures work and which do not' to deal with the CC risks.

1.3. Project outcome and output

Therefore, urgent action is imperative to build a climate resilient development for these two agricultural commodities so as to reduce the negative impacts of CC on the country's economic growth and also to reduce the impacts on vulnerable social groups. By elaborating strategic actions for a resilient agricultural production of the commodities, the proposed research project will address the vulnerability of the commodities to the existing & future anticipated CC risks. Its overall impact will be to increase climate resilient agricultural production of export commodities. The expected outcome of the project will be to strengthen institutional capacity for developing adaptation intervention that minimize CC risk on major agricultural export commodities. Table 1 shows the detailed project activities and expected outputs.

Table 1: Expected Project Outputs and Activities

Project output	Project Activities	Activity Objectives
Adaptation options for building a climate resilient sugarcane & cotton productions.	1. Climate modelling, scenario mapping and agronomic study	<ul style="list-style-type: none"> - Understand the past trends in climate variability, future projection and identification of extreme events and their anticipated impacts - Agronomic implications of the impacts including impact on yield, crop variety, water requirements, etc.
	2. Value chain analyses of commodities	<ul style="list-style-type: none"> - Identify and Understand the actors involved across the value chains including production, processing and trading and - Estimate the length and share of each actors
	3. Economic Analyses of the impacts of CC on Sugarcane/cotton production	<ul style="list-style-type: none"> - Analyse the extent of vulnerability and the most vulnerable groups of society. - Analyse the welfare impacts of CC on key actors along the value chain including smallholder farmers, labourers and consumers; - Estimate the economic wide impacts of CC on the two commodities
	4. Adaptation strategy options for climate resilient production of Sugarcane and cotton	<ul style="list-style-type: none"> - To identify adaptation options that consider the different actors to build a climate resilient production of sugarcane and cotton

1.4. Organization of the report

This report focuses on the institutional assessment of the two commodities. It is made based on the conceptual framework outlined in section two below. Its aim is to assess the institutional aspects of the cotton and sugarcane commodities in-light of building the resilience of the production of the two commodities and understand the impact on their final commodities: textile and sugar, respectively. Specifically, the aim is to provide basic information for further works of the project, whose goal is to identify options for a climate resilient production of the two commodities. In this regard, the adaptation options that will be suggested for a climate resilient of the two commodities should consider all actors along the value chain of the two commodities, meaning actors that involve in the production, consumption, distribution and trading as well as policy making and implementation. Accordingly, the rest of the report is organized as follow. The next section presents the conceptual framework adopted by the project. It discusses the nexus between climate change and trading of agricultural export commodities as well as some concepts of resilience in the project context. Sections three and four discuss the profile of the cotton and sugarcane commodities in terms of their production, consumption and trading, respectively. Section five presents the assessment made on the stakeholders and their role along the value chain of the cotton and sugarcane commodities. The last section discusses the governance system in the value chain of the two commodities.

2. Climate Change – Agricultural Export Commodity Nexus

2.1. Introduction

Climate change poses significant challenges for the Fair Trade movement. There is mounting evidence that smallholder farmers in developing countries are experiencing increased climate variability and climatic change. It is expected that climate change will include more extreme events and slow onset impacts, such as changes in precipitation and temperature. Climate change is thought likely to have mainly negative impacts upon agricultural production, food security and economic development, especially in developing countries. Besides, it poses significant challenges for trading commodities whose production is sensitive to climate variability and change, and thereby affecting the livelihood of the smallholder farmers who produce exportable commodities and the national economy by jeopardizing the export sector. Significant investment will therefore be required to reduce the adverse impacts of climate change on the poorest and the rural poor more generally. Strengthening the adaptive capacity and promoting specific agricultural adaptations along the value chain of the commodities will enhance their ability to respond to climate change impacts.

Export crops, such as cotton and sugarcane, will respond in different ways to the impacts of climate change; yields may increase or decrease and the places where crops can be cultivated may change. Assessing or predicting these changes, however, is difficult though not impossible. For example, yields may be affected (possibly positively and negatively over different time frames and in different locations). To deal with current patterns of climate variability and increased extreme events and to prepare for climate change, it is imperative to explore how to build resilience (the ability to cope with shocks and stresses) and improve community access to climate-related information (e.g. weather forecasts, seasonal forecasts and climate change models).

This section explains the key concepts underpinning the Export market and agricultural adaptation in light of climate change. We begin with a brief concept of vulnerability, adaptation and resilience. A conceptual framework is then presented for understanding how climate change may affect smallholder agriculture.

2.2. Concepts of resilience

Resilience is commonly defined as the ability to resist, cope with or recover from shocks and stresses at a system level in a more dynamic sense. This can apply to individuals, communities, ecosystems, organizations etc. Building up the resilience of individual farmers and communities has to be a critical objective of climate change adaptation and a characteristic of the efforts made. Otherwise, there is a risk that new adaptation options could leave farmers and communities more vulnerable to climate and other shocks and stresses. Building resilience requires understanding ‘Why and how do systems change?’, ‘What is the capacity to respond to change?’ And ‘What are the underlying processes that control the ability to adapt?’ (Eakins and Luers, 2006). It requires understanding vulnerability. So whilst the concept

of vulnerability has long been used in disaster risk reduction and international development, in reference to social groups, communities and even nations that are considered particularly at risk from environmental or other phenomenon and may be in need of external support, in the context of climate change, the term ‘vulnerability’ has gained even greater currency. However, definitions tend to be loose and analysis of the causes of vulnerability should be emphasized to give greater precision (Cannon, 2008, after Blaikie, 1994). Vulnerability is commonly broken down into three key elements: exposure, sensitivity and adaptive capacity. The following box describes each of these three concepts.

Since the impacts of climate change will not be felt evenly, vulnerability is socially determined, with the dimensions of gender, age, ethnicity, caste and class playing a key role in social differentiation – disasters can affect whole populations, but are most lethal when they hit an already poor and vulnerable population – i.e. groups of people without adequate livelihood resources to prepare, cope and recover. Reducing vulnerability to a particular hazard may thus need to involve ‘no-regrets’ actions which meet short-term needs whilst addressing potential longer term climate change adaptation needs (Ensor and Berger, 2009).

Exposure to specific climate risks: This refers to the geographical nature of climate risks, but social exclusion also operates on spatial terms with the poorest of the poor often forced to live on the steepest, fragile slopes and to cultivate in areas with poor quality soils etc.

Climate-sensitivity: Poor people’s livelihoods and poorer countries are disproportionately reliant on climate-sensitive activities, including farming, fishing and collecting wild produce and woodfuel. Women are disproportionately affected because of their traditional gender roles (e.g. responsibility for the collection of water, edible wild plant and medicinal plant collection, crop cultivation etc) all of which may be negatively affected by climate change. In hard times in many areas of Sub-Saharan Africa labour migration intensifies, conducted mainly by men and leaving women and children to cultivate the fields and wait for remittances.

Adaptive capacity: The ability of individuals and communities to actively engage in processes of adaptation to climate change (by shaping, creating or responding to change) is contingent on livelihood resource entitlements (e.g. access to and control over credit, savings, land, water, information, social networks, political influence etc). Agricultural adaptation efforts should thus aim to build the adaptive capacity of farmers and other stakeholders by helping them to actively create or respond to change. Resource entitlements (i.e. bundles of rights to resources which are claimed by a social group) are shaped by social identity, cultural norms, wealth and hierarchies. The poorest groups often have weak, ill-defined property rights. Inequality and poverty thus undermine adaptive capacity and should be challenged.

Some policies and development interventions could undermine resilience (e.g. solely focusing on cash cropping at the expense of food crops or on using expensive pesticides etc). Climate change imperatives are forcing greater consideration in development thinking of longer-time scales, but also encouraging renewed emphasis on how change occurs in complex socio-ecological systems across scales. Shocks and stresses (disturbances) can be ecological, social or economic and unsustainable socio-ecological systems can be changed fundamentally and irreversibly by such disturbances.

Building up resilience reduces vulnerability to a wide range of hazards and in this way helps farmers and communities prepare for the uncertainties ahead. All forms of resilience are important: tackling inequality is a key part of building social resilience, including supporting participation of disadvantaged groups in decision making. Environmentally-friendly farming and promoting agrobiodiversity will increase resilience to climate shocks and stresses and builds ecological resilience. Economic resilience means diversifying the income sources and livelihood activities and access to assets. This could mean diversifying the crops grown, but could also involve more non-farm activities which are playing an increasingly important role in rural household budgets (e.g. working locally or at a distance when less work is required on farm). It is necessary to strike a balance between diversifying and building up assets (e.g. stocks and savings) as the latter also increases a household's ability to cope with shocks and stresses.

Beyond the uncertainty related to climate change, there are also variable levels of access to and interpretations of this climate information by different stakeholders. Moreover, at the local level different individuals and communities will have diverse experiences of climate, different worldviews that shape their ideas of what the climate is and what might drive changes in it and different sets of resources to respond to climate information and to take action.

Analysis of the levels of clarity about climate knowledge and vulnerability of social groups or communities to a particular hazard or set of climate change trends is therefore a good starting point for a situation analysis and for identifying entry points for action in the 'adaptation space' (Ensor and Berger, 2009). In this aspect, two issues are worth considering. First, an assessment revealing low clarity of climate knowledge might focus efforts on improving understanding and increasing investment in climate modelling, or on building the capacity of networks to demand access to more relevant climate knowledge from existing knowledge holders. Generally speaking, building adaptive capacity and resilience can help provide a buffer to a lack of knowledge. Second, High levels of clarity of climate knowledge and high vulnerability to a particular hazard can inform adaptation responses, and implementation on the ground or scaling up may be the priority. Low vulnerability demands little action to respond to a hazard, but high vulnerability requires urgent action. High vulnerability requires action shaped by the key issues identified in the starting-point vulnerability analysis.

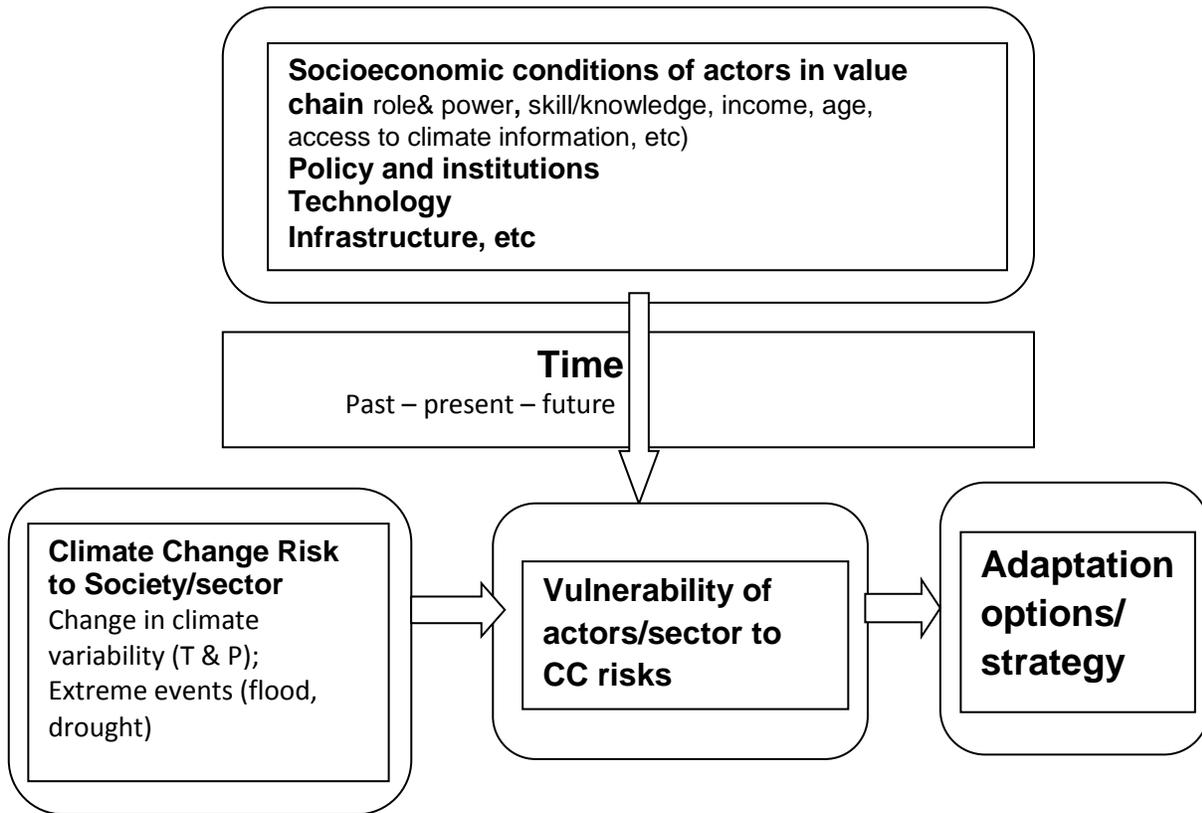
2.3. Conceptualizing agricultural adaptation

Howden et al. (2007), for example, divide adaptation into two: farm level changes in farming practices to maintain existing systems and wider institutional and policy changes which may be more significant and systemic in nature. Agricultural adaptation can thus be thought of as modifications to an existing system or a wider set of changes, but in fact both will be required, alongside new approaches and social learning to respond to climate change (Howden et al. 2007). Farm level changes could include changes in varieties, planting times and use of conservation tillage. These changes are made at the management unit decision level in cropping, livestock, forestry and marine systems. Broader scale changes might involve redistribution of resources, changes in land use, support for new livelihood options etc. These broader changes involve changes in the decision environment e.g. policy changes to encourage behavioral and institutional change amongst enterprises and farmers.

Finally, in thinking about and trying to understand agricultural adaptation processes, it is necessary to look across scales, time and types of decision. Risbey et al. (1999) suggest that adaptations oriented towards short-term modifications in the farming environment (e.g. droughts, market fluctuations) may be limited in their efficacy by constraints imposed by broad changes in the soil, water and economic environment occurring over longer-time scales – and that different actors will be involved depending upon whether decisions are tactical, strategic or structural. Thus tactical decisions about practices in the next season or year may involve farmers, insurance agencies, markets, and regional agricultural agencies. Strategic decisions, which cover multiple years (1-5 years), may involve farmers and regional agricultural agencies. Finally, structural decisions (concerning multiple decades) are more likely to be in the domain of national governments and regional agricultural agencies (Risbey, et al., 1999).

Moreover, adaptations are undertaken in light of specific normative goals, raising the question of ‘adaptation and resilience for whom?’. Figure 1 visualizes the key elements of the trade-climate change-agriculture nexus. It shows how multiple stresses including climate change affect trading farmers and workers. Trading farmers and workers (that are part of both the value chain but also wider agricultural innovation systems) have different levels of vulnerability, adaptive capacity and resilience to these pressures and shocks. All the actors adapting to climate change face uncertainties in the climate change science and impact modelling (although some locations and crops more than others) but there are also differences in access to information and interpretations of climate. Adaptations are already being undertaken by farmers at the farm level but more external support may be required to support these and to achieve broader changes in the decision environment (e.g. in policies).

Figure 1: Conceptual Framework for Climate Change - Export commodity nexus



3. Profile of Cotton commodity

This section presents the profile of the cotton commodity in terms of production structure, demand, their economic contribution as well as the policy and medium term plan of the government of Ethiopia.

3.1. Cotton Production

Given its excellent growing conditions, abundance of raw materials and availability of land, Ethiopia has a great potential for cotton production. Cotton chiefly grows in low-to-mid-altitude areas (i.e., sea level to about 1000m). According to the Ministry of Agriculture, Ethiopia possesses 3 million hectares of land suitable for growing cotton - an area that equals the cotton land in Pakistan, the world's 4th largest producer. Ethiopia's major potential cotton growing areas include Omo-Ghibe, WabiShebele, Awash, Baro-Akobo, Blue Nile, and Tekeze river basins. There are three major groups of cotton producers, i.e., the small holder farms, large state farms and private commercial farms – accounting for approximately 27, 31 and 42% of total area cultivated and production respectively.

However, although Ethiopia has a great potential in cotton production, it only uses 111,886 hectares, which is 3 percent of the total land available for cotton and produces about 80,000 metric tons annually.

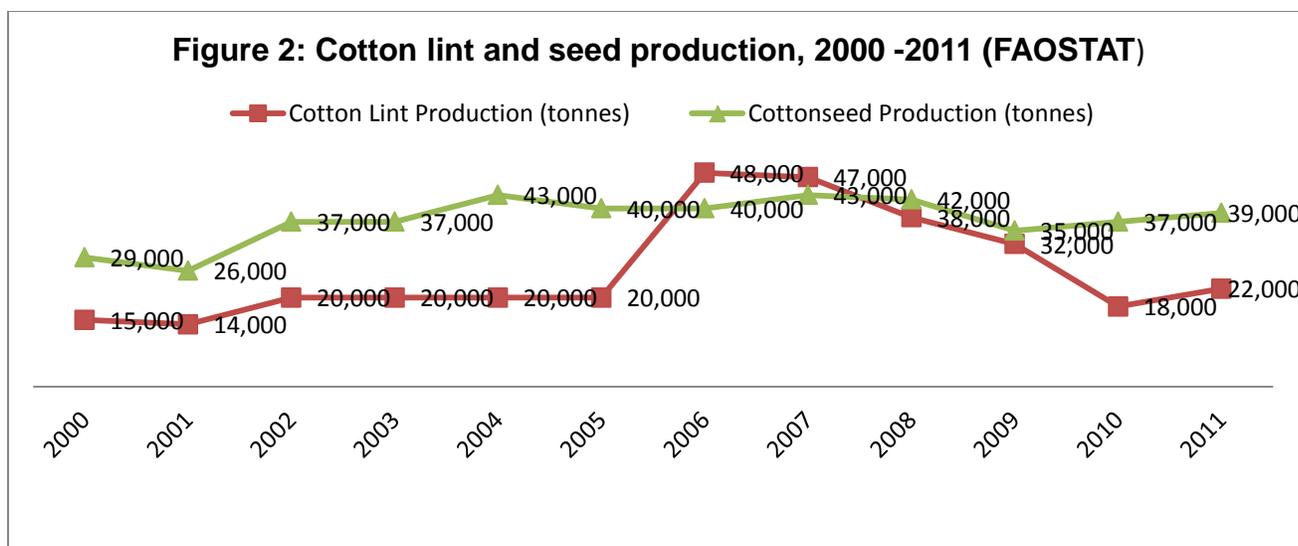
While cotton produced by the state farms and private commercial farms is mainly used in the modern textile manufacturing sector and to some extent exported to foreign countries, cotton produced by peasant farms is for the large part used by the hand loom sector.

Table 2 shows crop land area, crop production and productivity for commercial farms for the year 2010/2011. For cotton, the total cropland area cultivated by commercial farms in the year 2010/2011 is 40,366.71 hectares. The cotton production and productivity are 824,702.44 quintals and 20.43 respectively for the same year. While cottonseed production has been steady over the period 2000 to 2011, cotton lint has shown some variation (see figure 2 below). Cotton lint production increased significantly in the 2005 to 2007 period and has shown a decline between 2008 and 2011.

Table 2: Estimates of cotton land and Production for Commercial Farms in Ethiopia, 2010/2011 (2003 E.C.), Meher Season

Crop types	Cropland area		Production in		Crop productivity/yield	
	hectare	%	Quintals	%		
Cash	Chat	25.21	-	528.43	-	20.96
crops	Coffee	75,048.83	12.17	906,885.74	1.95	12.08
	Tea	3,801.89	0.62	308,952.86	0.67	81.26
	Hops/gesho	-	-	-	-	-
	Enset	35.64	0.01	990	-	27.78
	Sugar cane	21,099.79	3.42	30,459,650.37	65.6	1443.60
				3		
	Cotton	40,366.71	6.55	824,702.44	1.78	20.43

Figure 2: Cotton lint and seed production, 2000 -2011 (FAOSTAT)



3.2. Cotton Consumption

Annual cotton consumption of spinning plants in Ethiopia is about 59,876 tonnes when operating at 100% rated capacity (Chemonics International INC, 1996).

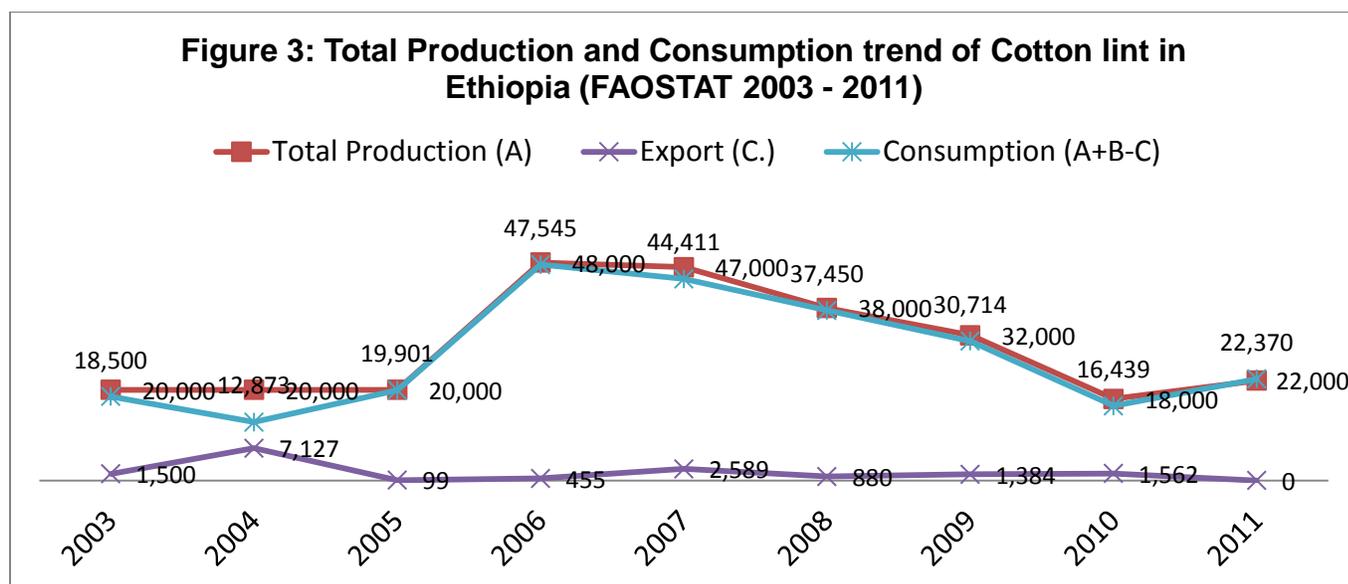
Table 3: Cotton Consumption, 2009/2010 or 2002 E.C.

Industrial group	Description	unit	Quantity of major raw materials		
			Local	Imported	Total
Textiles	Raw cotton	tons	31,485	226	31,711
	Cotton yarn	tons	3,392	-	3,392
	Fabrics	('000' M)	4	271	275
	Fiber (polyester)	tons	711	1324	2035
	Fiber (Acrylic)	tons	-	19	19
	Jute (fibre)	tons	-	-	-
	Sisal (Leaves)	CUB. M.	1	-	1
	Wool (Waste)	tons	-	-	-
	Acrylic (yarn)	tons	8	18	26
	Cotton (lint)	tons	3,549	-	3,549
	Nylon yarn	tons	17	4	21
	Chemical dyestuff	tons	111	331	442

Source: CSA (2009/2010 or 2002 E.C)

However, the actual consumption is 31, 711 as shown in table 3, which is much lower owing to under capacity operation by the textile factories, which is usually about 50%.

According to figure 3, which depicts the production and consumption trend of cotton in Ethiopia, there is not much disparity between production and consumption. This shows that Ethiopia satisfies only its domestic market although its potential shows it can be a major cotton exporter.



3.3. Economic Value of Cotton

Industrial input

Cotton is a major industrial input for textile firms. Currently, Ethiopia has about 14 textile factories and 50 medium-to-large garment manufacturers. There is a relatively better FDI flow in the textile and garment sector; especially many Turkish textile firms are relocating to Ethiopia. Hence, the demand for raw cotton and fabric continues to expand as existing textile firms expand and new domestic and FDI firms join the sector.

Table 4: Value of cotton Export for the period 2006/2007 – 2010/2011

Commodity	Export Periods				
	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011
Cotton export (in million USD)	14.3	19.2	5.8	10.6	0.5

Source: Ethiopian revenue and custom authority

Ethiopia banned exports of cotton in 2010 because of high international cotton prices and because the government anticipated an increased demand from the local textile and garment industry. To compensate cotton growers, the government promised that cotton would be sold in local markets at international prices, adjusted for freight and transportation costs. After about two years, the ban was lifted in April 2012. However, export did not pick up. As indicated in table 4, export dramatically declined from 10.6 to 0.5 million USD between 2009/2010 and 2010/2011. In order to export, cotton exporters must first get permission from three separate government agencies (MOA, MOT, and NBE) (e.g., see GAIN, 2012). This burdensome procedure might have discouraged exporters. Another possible explanation is that cotton producers might have shifted to other cash crops such as sesame because of the price disincentive created as a result of policy intervention.

3.4. Employment

The textile and garment sectors are relatively labor-intensive. For example, the cotton sector employs about 52, 754 smallholder farmers. Similarly, huge employment opportunities are also generated from both private commercial and state farms that are engaged in cotton production.

3.5. Plan and Policy for cotton

Cotton production is a government priority. The five-year Growth and Transformation Plan (GTP) gives special emphasis to export industries, including the textile and garment sector. Therefore, it is planned in the GTP to increase the current production level to more than twofold, to 193,000 tons, by 2015. By the same time, plans are to increase export earnings from the textile industry to \$100 million, a dramatic threefold increase from the 2011 level of \$23 million. To achieve these goals, the government is leasing large plots of land to investors at low prices. Of the 3 million hectares of land that the government has targeted for cotton production, 2.6 million hectares have been identified and made available to private investors for long-term leasing, specifically for cotton. MOA also encourages small-scale farmers to shift from sesame, which grows in many of the areas suitable for cotton, to cotton production, and has a special \$20 million credit line which cotton growers can access by producing a contract with a domestic textile and garment firm that will export its product.

4. Profile of Sugarcane commodity

This section presents the profile of the sugarcane commodity in terms of production structure, demand, their economic contribution as well as the policy and medium term plan of the government of Ethiopia.

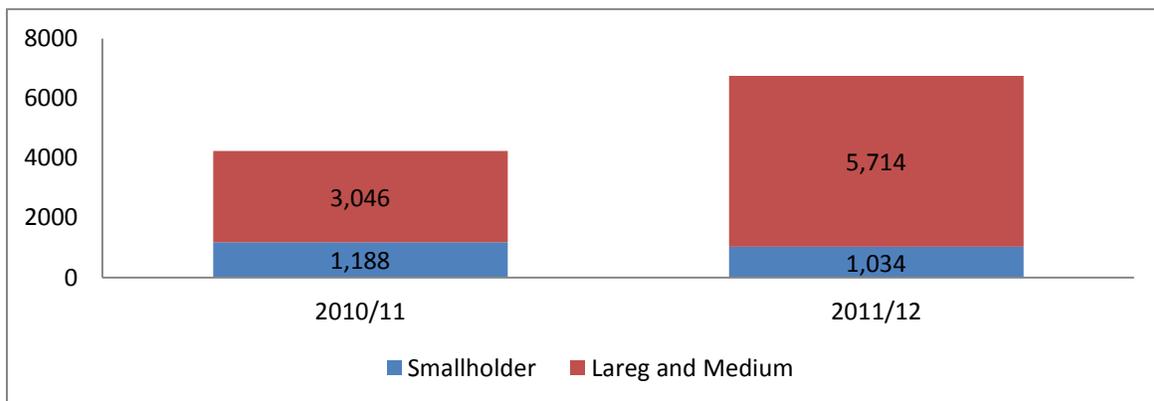
4.1. Sugar Production

Either sugarcane or sugar beet can be used to produce sugar with sugarcane taking the larger share. Sugarcane, on average, accounts for 75 to 80 percent of global production per year, and developing countries produce about 70 percent of total global output (World Bank, 2008). Approximately 10% of sugarcane can be processed to commercial sugar. Africa as a whole is a net sugar importer. However, five African countries – Swaziland, Zimbabwe, Zambia, Malawi and South Africa - are consistently ranked amongst the lowest cost sugar producers in the world (after Brazil and on a par with Australia) (World Bank, 2008).

In Ethiopia, sugarcane is used for the production of sugar. Ethiopia has suitable agro ecology zones for the production of sugarcane that is the primary input in the production of sugar. The production of sugar started in Ethiopia in 1951 with a joint venture between a Dutch company and the Ethiopian government to establish Wonji sugar factory. Ethiopia is most suitable for water-intensive sugar production and Ethiopian sugarcane yields are among the highest in the world (Berkum, Roza, and Tongeren, 2005). Sugar sector is important not only for the linkage that it would create between agriculture and industry and the suitable environment for the sector, but also because it is also a source of renewable energy and will play a role in the countries climate resilient green economy strategy.

Sugarcane is also produced for direct consumption by smallholder farmers. According to the Central Statistical Agency (CSA), sugarcane produced by smallholders is a small fraction of total sugarcane production. Figure 4 below shows total sugarcane production from both smallholder agriculture and large and medium scale commercial farms. Over 6.7 thousand metric tons of sugarcane produced in the year 2011/12, only 15% is produced by smallholders.

Figure 4: Total Sugarcane production in Ethiopia in '000 Metric Ton



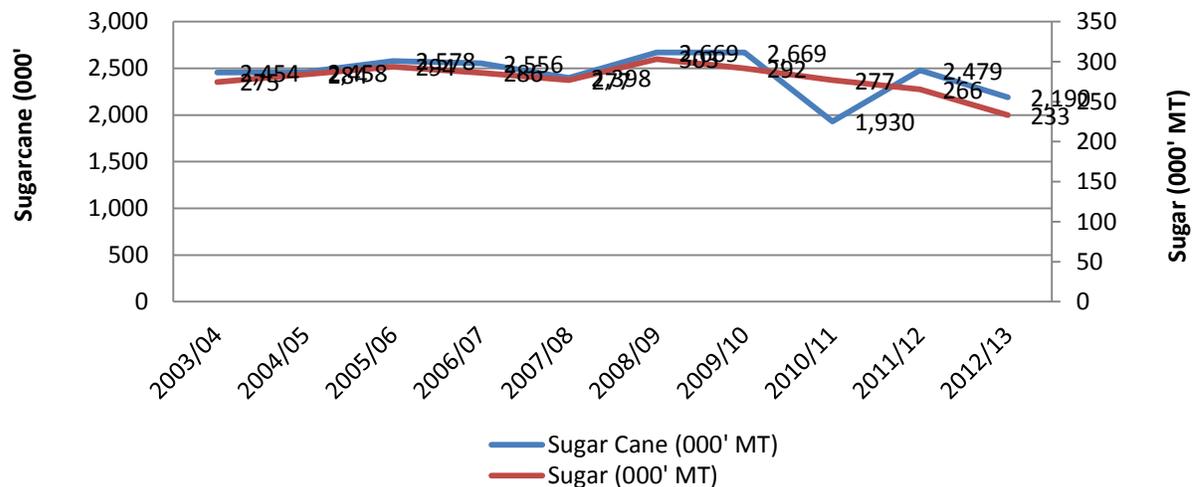
Source: CSA Survey Report

Sugar production in Ethiopia is dominated by large factories supplied by large farms as in many other African countries. Currently, there are three sugar factories in the country. The factories use sugarcane produced by state farms and out-growers from the areas surrounding the factories. Sugarcane used for production of sugar comes from either state farms or out growers around Wonji sugar factory. The out grower scheme can be described as integrated schemes where inputs (including technology) are provided and farmers supply their labor. The payment made to out growers will deduct the input costs. Figure 5 shows sugarcane and sugar production from the three factories, namely, Metahara, Wonji and Fincha. Sugarcane production from CSA is larger than sugarcane production used for sugar production as some of the sugarcane produced are not used for sugar production. Despite plans to increase sugar production, the plan has not materialized. Some of the possible explanations are:

- Delays in planned projects
- The need to carryout maintenance on existing factories
- Low sugarcane productivity
- Poor planning of sugarcane production

Current development shows that this is about to change and Tendaho sugar factory will start operation soon.

Figure 5: Sugarcane for Sugar Production in '000 Metric Ton



Source: Sugar Corporation

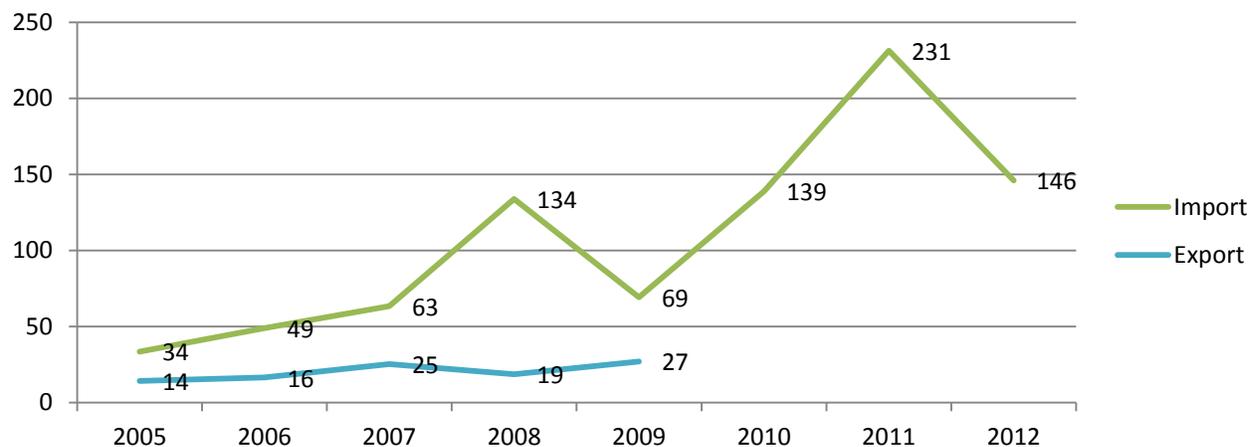
Metahara and Finicha factories are based on state farms and there are no out growers whereas there are out growers in Wonji. The total area cultivated in Wonji is 10573.8 hectares and of this 5929.36 hectare is from state plantation and the remainder 44% is cultivated by out growers.

4.2. Sugar Consumption

As shown in section 4.1, the production of sugar has been on average 279 thousand Metric tons per annum between 2003/04 to 2012/13 and has not shown significant change over the years. We look at international trade data (import and export) on sugar to get a picture in order to understand consumption patterns. Although domestic production is stagnant, import has been growing signifying growth in consumption. In fact import has more than doubled in 2008.

The increase in import can be attributed to increased demand for sugar domestically because of increased per capita consumption. The opening of the EU sugar market which has granted Ethiopia a preferential access to EU sugar market where sugar had been sold above world price has led to an increase in export. In 2009, export of sugar has stopped as shown in the data (figure 6).

Figure 6: Sugar Export and Import in '000 Metric Ton for the period 2005 - 2012



Source: ERCA (Ethiopian Revenue and Customs Authority)

4.3. Other contributions of sugar

One of the objectives of the plan to expand the sugar sector is to create employment opportunities and according to the information obtained from Sugar Corporation, the number of people employed in the industry in 2012/13 is over 20,000. Moreover, the CIF value of imported sugar in 2012 was 84 million USD. As will be discussed in next sub-section, the plan is to satisfy domestic demand and start exporting sugar. Needless to say moving from net importer to net exporter will have macroeconomic implications. In addition, the sugar industry produces Ethanol as a by-product. Since 2009, Ethiopia has started blending ethanol with benzene. Ethanol is produced in Fincha and more recently Metahara sugar factories (figure 7). Finally, the sector is expected to contribute to electricity generation.

4.4. Plan and policy for sugar

The existing three sugar factories are state owned. Accordingly, the government sets the price of sugarcane for out growers. The out growers are integrated into the factory which means most of the planning and input comes from the factory and the out growers provide their labor and land. The Growth and Transformation plan (2010/11-2014/15) has clearly outlined the targets from the industry. Accordingly, demand for sugar is expected to be fulfilled by domestic production during the five year period. In addition, it is expected to support power generation and create employment opportunities. The specific targets for the sugar industry during the GTP period are summarized in Table 5.

Figure 7: Ethanol Production (Kilo liter) for the period 2004/5 - 2012/13

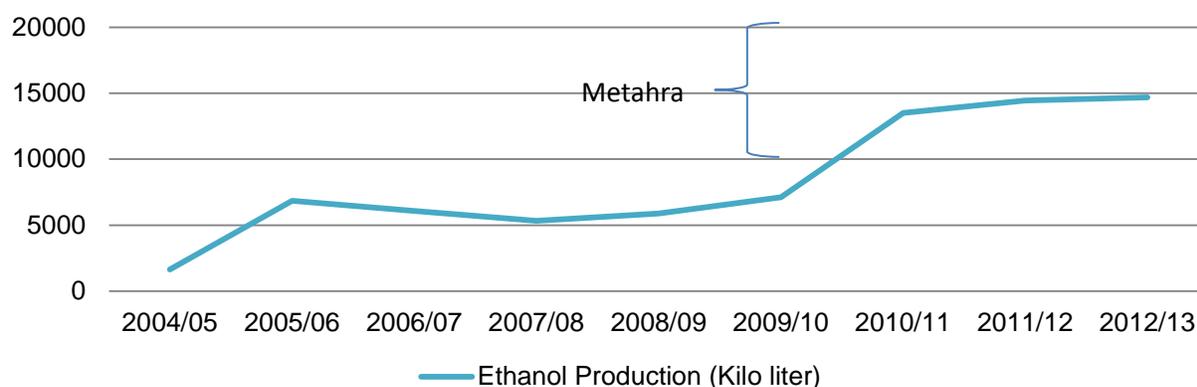


Table 5: Growth and Transformation Plan for the Sugar Industry

Goals	Measure	2012/13 Actual	2013/14 Plan	2014/15 Plan	2007 (GTP-Target)
Sugar Production (Million MT)	Million Metric Ton	0.23	0.49	1.59	2.25
Ethanol Production	'000 M ³	14.68	41.20	134.60	30
Electric power generation	Mega Watt	0	30	197	101
Sugar export	Thousand Metric Tons	0	0	658.2	1246.3
Foreign Exchange earnings	Million USD	0	0	376.8	661.7
Employment	Number	34262	24,886	67200	112610

Source (Sugar Corporation)

While the plan for 2011/12 is 0.74 million metric tons, domestic production lags further behind at 0.27 million metric tons. However, this year domestic production is expected to increase to meet domestic

demand (reaching .5 million metric tons) and start exporting sugar next year. The revised plan for the sugar industry is provided in table 5.

5. Stakeholder Assessment of Cotton and Sugarcane

5.1. Introduction

Cotton and sugar commodities as international tradable products are being directly affected by the international competition and environmental regulations. Cotton and sugarcane value chains are directly aligned to the low income groups in general and to the women and children as well as micro and small enterprises in particular along the value chain especially in developing countries. Like in other countries, cotton and sugarcane in Ethiopia operate along value chains encompassing different stakeholders with different roles.

Climate change issues have become the major challenges in the contemporary business world by affecting the different stakeholders that play key roles along the value chains of the two commodities. As a result, price of commodities increase. National and international legislation standards and requirements in relation to the climate change in general and environmentally health consumer products also become the major barriers for value chains in the global trade competition (UNIDO, 2009). According to Sussman & Freed (2008), there are three types of climate change risks that can affect businesses: risks to core operations, risks to the value chain and risks that arise from broader changes in the economy and infrastructure. Besides, climate change mitigation and adaptation policies may further affect business operations in a rather indirect way. According to the literature all these affect the value chain development in developing countries which is based on low capacity of factors of production and information technology as well as depleted natural and environmental resources more than the developed ones makes the risks more challenging.

It is in light of this introductory remark that the assessment of the different actors and their role along the value chain of the two commodities will be made. The study tries:

- to assess the type and the features of the stakeholders for each of the two products' value chains and their respective roles, and the nature of the governance system prevailing in each of the two value chains of the commodities
- to examine what climate change means to the stakeholders in general and to the more vulnerable women and smallholder farmers and children.

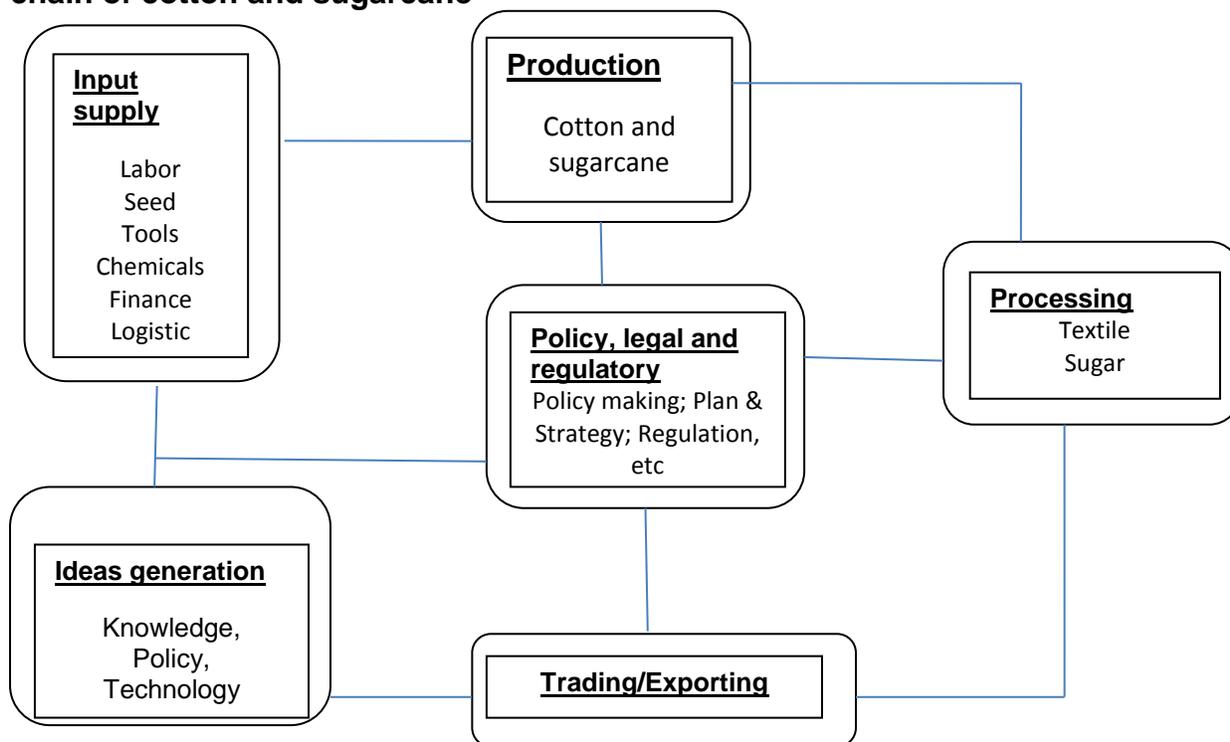
- to explore the response of the stakeholders to the climate change challenges and what their respective roles can play along the value chain in strengthening the vulnerable to adapt and mitigate and ultimately become resilient to the risks of climate.

The study uses qualitative data by way of discussion with a sample of the stakeholders and secondary data such as literature, policy, and relevant legal and regulatory documents related to the two commodities.

5.2. Conceptual framework

A value chain is a network of value-creating activities (Porter, 1985 and 1988). Value chain comprises different supplies, production and marketing stakeholders that are actively engaged within their respective businesses to pursue one or more shared end-markets (World Bank, 2009). Value chain also encompasses various other stakeholders that may influence the chain permanently or non-permanently. Literature distinguishes two generic value chains namely: those who possess direct active role in the chain and those who possess support role but without which the chain couldn't be in existence or at least be effective. The latter can further be divided into service providers, government, non-government, international agencies and policy, legal and regulatory frameworks (UNIDO, 2009). Generally value chain harnesses all of the factors of production (labor, capital, and technology), logistics, agencies, legal and regulatory environments, and cross border business mechanisms necessary for the proper delivery of products and services to the final market in front of the international competition. Accordingly, this study identifies key actors and assesses their role along the value chain of the two commodities using the conceptual framework depicted in figure 8.

Figure 8: conceptual framework for assessment of key actors along the value chain of cotton and sugarcane



5.3. Stakeholders in the Cotton value chain

Cotton passes across a number of facets through several hands inbound of a country and cross many borders. It originates from the cotton seed and ultimately ends up on retailers' shelves ready for use by the final consumers. In between, there are a number of actors in the value chain that contribute to the value addition each with varying degree. The actors in the value chain can be broken into six major segments namely: input suppliers, cotton production, cotton seed processors, textile manufacturing, garment producers, and trading. Besides, under each of the chain, there are more key players that involve in the processes sometimes permanently and sometimes non-permanently. The major actors in the value chain and their respective roles are described below.

5.3.1. Input Suppliers

Cotton uses five key inputs to cotton production namely: Seeds, chemicals, machinery & tools, and labor. There are various actors in the input supplying process as described below.

Seed Companies

Seeds are supplied mainly by commercial cotton farms, ginning companies and private traders. In Ethiopia, commercial seeds are supplied by commercial farms including, Hiwot Agricultural

Mechanization, Lucy Agricultural Development Plc and Amibara Agricultural Development Plc. whereas parent seeds are rarely supplied by the Research Center (Melkawere National Cotton Seed). However, in Ethiopia cotton farms suffer from lack of availability of the parent seeds. There are no firms whose business is specialized in cotton seed supplying. There are also no research institutions that can experiment a variety of seeds varying with geography such as soil and weather conditions.

Agricultural Chemical Suppliers

Agricultural Chemicals include Pesticides, herbicides, fungicides, and fertilizers. The major actors in the supply chain are multinational global companies such as DuPont, Cargill, BASF, Bayer etc. In Ethiopia, cotton farms get chemical inputs from Adamitulu Pesticide Processing S. C. and private import trading agents.

Agricultural Machinery & Tools Suppliers

Cotton farms use agricultural machinery tools for farm development, planting, pesticide and herbicide spray, and harvesting. Besides, Amibara General Aviation Service provides chemical spray service to different commercial cotton farms.

Manpower

Cotton farms are the major employers during harvesting for non-skilled contractual labor forces. Commercial farms employ highlander labor forces mainly males instead of females due to the working conditions though the latter are more productive than the former. Besides, individual household uses self and relatives as workforces. Recently micro and small enterprises facilitate the availability of workforces to the industry when there are requests from the commercial farms. Cotton producers face challenges of contractual temporary laborer supply, wages, sheltering, and food items supply. Though, cotton producers prefer female workforces for cotton picking efficiency, it cannot be feasible to deploy women in such areas due to poor sheltering safety.

Regional Administrations

Administrative organs avail land for cotton farms especially for private investors. In some parts of the country until very recently land lords of the respective vicinities had more power and influence over the availability of land. As a result, investors face shortage of financing as financial institutions could not be at ease to provide bank loan facilities attached to collateral guarantee issues.

Agricultural extension services

Government institutions give some technical and extension supports both to the private farms and individual household farmers. The extension services may include: organizing farmers for discussion on direction and target defining and awareness creation, on-job (site) training of farmers, land development and input usage, pest control mechanism and many other agricultural activities. Agricultural officers help farmers in sharing knowledge or experience and monitoring performances on a regular basis. As cotton is part of the agricultural husbandry, farmers can get such services free of charge from a Ministry.

Financing institutions

Financial institutions include commercial banks, insurance companies and micro finance institutions. Commercial banks and micro finance institutions provide financial inputs to the commercial farms and individual household farmers respectively. Some commercial farms suffer from shortage of working capital due to the reticence of the commercial banks to finance rain-fed farms. Until recently, commercial farmers were only financing irrigation-fed commercial farms. Recently, however, commercial banks have started revising their policies on the financing of commercial farms.

Transport and Logistics

Both traditional means of transport like donkeys and mules and the modern ones are used to transport raw cotton to storage. Trucks are used to transport raw cotton to ginning and the ginned products to textile factories and warehouses. During export, trucks and other logistics institutions and institutions like marine, customs and financial institutions are involved.

Infrastructure and Utilities suppliers

Infrastructure including roads, telecommunications and health centers are the basic inputs for the productivity of cotton production and further processing.

5.3.2. Cotton Production

Cotton production includes five main activities before shipment to textile mills takes place. These are cotton growing processes including plantation, harvesting, storage of raw cotton, ginning (process of seed removal before the marketing process), and warehousing of the ginned cotton. The actors in the process include cotton cooperatives, commercial farms (private and public), and smallholder household farmers.

5.3.3. Cotton processing

Textile

Textile manufacturing refers to the transformation of cotton lint to yarn and fabrics and ultimately to clothing. Textile manufacturing include: yarn spinners, fabric and garment producers. These actors are heavily influenced by global retailers and branded markets. Textile manufacturing machineries are on a continuous change. The ever turbulent in designs of garment product not only attracts high quality standards in the cotton production but also calls upon the need for state of the art textile machinery and tools.

Cotton Seed Processing

Processing of cotton seed is the valuable segment of the industry in terms of the products it delivers such as oil, animal feed, employment and foreign exchange gaining or saving. The process encompasses: delinting, hulling (protective hull of the cotton seed is separated from the seed itself), and oil extraction (the kernel is pressed for oil). The product is further chained to the following sectors:

- Edible Oil markets (wholesale and retailers, and various Institutions)
- Agricultural feed industry including dairy, lawns, gardens, etc
- Chemical industries: Uses linters (by-product of cotton seeds) for pulp & paper products)
- Household furniture producers,
- pharmaceuticals

The mode of relations among these actors has important implication for building the resilience of the cotton commodity to climate change impact. The actors in the process are vertically aligned industries, oil producing industries, cooperatives, private and public cotton farms.

5.3.4. Marketing

Actors related to the marketing of cotton and cotton products include those who involve in wholesale and retail marketing of the cotton and textile products, textile designers, multinational textile distribution channels, Rapid Logistics Management (Supplier, Production and Distribution Net-work- ICT and integrated supply chain).

5.3.5. Regulatory Frameworks

Policies, legal and regulatory frameworks shape the role of the actors in the value chain. Among others the legal and regulatory frameworks relevant to the value chain include: GTP, Agriculture led Industrialization, Land management and certification, the Proclamation to provide for the establishment of cooperative societies, Ethiopian Labor Law, AGOA (A global scheme provided by USA for tax free access

to US market for African countries. Investment proclamations and different directives related to the production and trading of cotton and its products.

There are a number of industry-wide institutional actors, legal and regulatory factors that contribute politically, in governance, advocacy and marketing related activities without which the successfulness of the industry may not be possible.

- Ministry of Agriculture and Rural Development (MoARD): is responsible for developing policies and strategies and supervising the performance in the development of the sector. Agricultural bureaus and the ministry give valuable services including extension services by way of deploying agricultural extension workers.
- Ministry of Industry (Mol): develops policies and strategies for the industrialization of the country in general and textile industry in particular.
- Textile Industry Development Institute (TIDI): supervises the performance of both the cotton production and textile manufacturing industries. TIDI is accountable to MOI.
- Ministry of Environment Protection Agency (EPA): is responsible for the sustainability and Health Environment.
- Cooperatives and Unions: are significantly important for the close and active engagement of individual household farmers on the cotton production process.
- Research Institutions: introducing and disseminating productive, environment friendly and pest resistant seeds. Research institutions are crucial in the cotton value chain process. The role of research institutions in the process of breeding, succession of improved varieties, testing agro-chemicals, developing tolerant varieties to drought vulnerabilities.
- Standard Agency (Regulation No.193/2010): rationalizing, selecting and fixing in terms of aspects, sizes, and methods etc.
- Ethiopian National Accreditation Office (Established by regulatory 279/2010): tests and issues accreditation certification for the quality of products
- Ethiopian-Conformity Assessment Enterprise (Established by Regulation No. 196(2010): provides certificate with respect to the country's export products by assessing their conformity to the relevant national and international standards or standards of other countries
- Health and safety institutions:
- Associations (Cotton, Ginning and Export Association, & Textile Association):

ECPGEA and Textile Associations, are established in line with Proclamation No. 341/2003 article no.23 to 28 of the Chamber of commerce and Sectorial Association. Such associations are established by the members of the producers in seeking support by way of training members, promoting products and creating market links on the one hand and advocacy works for a better policy and working environment on the other. The associations generally focus on marketing, information linkage with their respective

members, trainings to some extent and advocacy works. The association's secretariat office reports to the Board of Directors and to the General Assembly.

5.4. Stakeholders in the Sugarcane value chain and their respective roles

Unlike the cotton industry the sugar industry operates in a less complex manner in terms of the number of operators in the sugarcane production. The principal stakeholder operators are a few legal personal entities (companies and farmer unions basically due to the nature of the industry. The industry is more technological and capital intensive compared to the cotton production. The major operator or investor in the industry is the Ethiopian Sugar Corporation established as per the Regulation No.192/2010. Like that of the cotton industry, stakeholders of the industry can be generically distinguished as principal actors, government support agencies and regulatory frameworks.

5.4.1. Input supplier

Sugarcane suppliers

Usually there are initial sugarcane and sugarcane seeds. The suppliers are known as sugarcanners. The former is supplied usually by foreign partners used as a parent seed. The latter is supplied by domestic partners and by own sugar factory farms.

Agro chemical Suppliers

These include fertilizers and agro chemicals. There are brand fertilizer and other chemical suppliers.

Agricultural Machinery, equipment and parts

Before the plantation of sugarcane land has to be developed. The land for plantation is usually developed by third party way of contract managements.

Energy (fuel and lubricant) Supplies

For the land preparations and plantations it requires the supply of fuel and lubricants. Fuel is supplied by the Ethiopian Petroleum Enterprise.

Infrastructure and Water supply

Sugarcane is planted and grown using irrigations. Water is supplied from the Ministry of Water and Energy which requires building dams and canals. Further extension of lines may be executed by the sugar farms. Infrastructure like roads, telecommunications, and health centers are the basic inputs and partners for the successful operation of the industry. Electric power from an electric company may be essential at the project phase of the industry. When operation starts, sugar factories not only use own electric power but can be a good source for the central electric grid generated from steams produced to crush or mill the sugarcane.

Manpower

Manpower is one of the basic inputs for the industry. The industry is one of the major employment creators in an economy temporarily and on permanent basis. Usually the farm is male sex oriented due to the environment and work situations.

Financing Institutions

Foreign banks (bilateral and multilateral) and domestic banks are the sources of finance.

Project sites and land provision

Regional administrative bodies provide land necessary for sugarcane plantation and factory and dam sites. Administrations, at several levels, work for the successful relocation of displaced dwellers along with the necessary utilities and facilities.

5.4.2. Production**Sugarcane Farms (Plantation)**

Plantation (farms) can be undertaken at own farm and at out-growers. Cooperatives and unions along the administrations at all levels play crucial role for the successful operation of plantation at out-growers' farms. Plantation may be taken on leasing basis with partners.

Harvesting

Harvesting of sugarcane includes clearing of leaves with fire, cutting, weighing and trucking to temporary storage at chosen center. During harvesting, labor is used intensively. Then, final haulage to mill follows.

Crushing Sugarcane

Mainly two products emerge during crushing: steam energy and sugar juice or molasses. Steam energy can be sold to the energy grid and the rest can be used for the factories' own activities including processing the sugar juice further. The output of a mill depends on the volume of the supply of sugarcane and capital goods employed. When molasses is further processed or filtered, sugar and bagasse is produced. Further

processing of bagasse by the mill produces: ethanol, alcohol, and vinasse (used fertilizer) and filter cake (animal feed). Then the next chain follows.

Power and energy

The Ethiopian Electric Power and Petroleum Enterprises would be the major stakeholders in the industry where the former gets good quantity of electric power to its national grid and the latter gets high volume of ethanol. As a result, the Ethiopian Electric Power increases its supply of power and the Petroleum Enterprise can minimize the outflow of hard currency in addition to the green energy production and building the resilience of the production of sugarcane to climate change impact.

5.4.3. Sugar market

Actors involved in sugar marketing include those who mainly involve in wholesale and retailers and consumers associations¹. The country is currently importing sugar, which is distributed through wholesaler, small-shop retailer as well as consumer associations.

5.4.4. Regulatory frameworks and actors

Regulatory framework

Policies, legal and regulatory frameworks shape the role of the actors in the value chain. A broad range of policies can facilitate or hinder the productivity of a given value chain. In Ethiopia, a number of policies and legal and regulatory issues were issued. Among others, the legal and regulatory documents relevant to the value chain of the two commodities include: the Growth and Transformation Plan, Sugar Corporation Establishment, Climate Resilience Green Economy strategy, Cooperative proclamations, Investment proclamations, Directive in relation to sugar distributions and Ethiopian labor law are among the major policy documents.

Actors

There are a number of industry-wide institutional actors and legal and regulatory factors that contribute politically, in governance, advocacy and marketing related activities without which the successfulness of the industry may not be possible. These include:

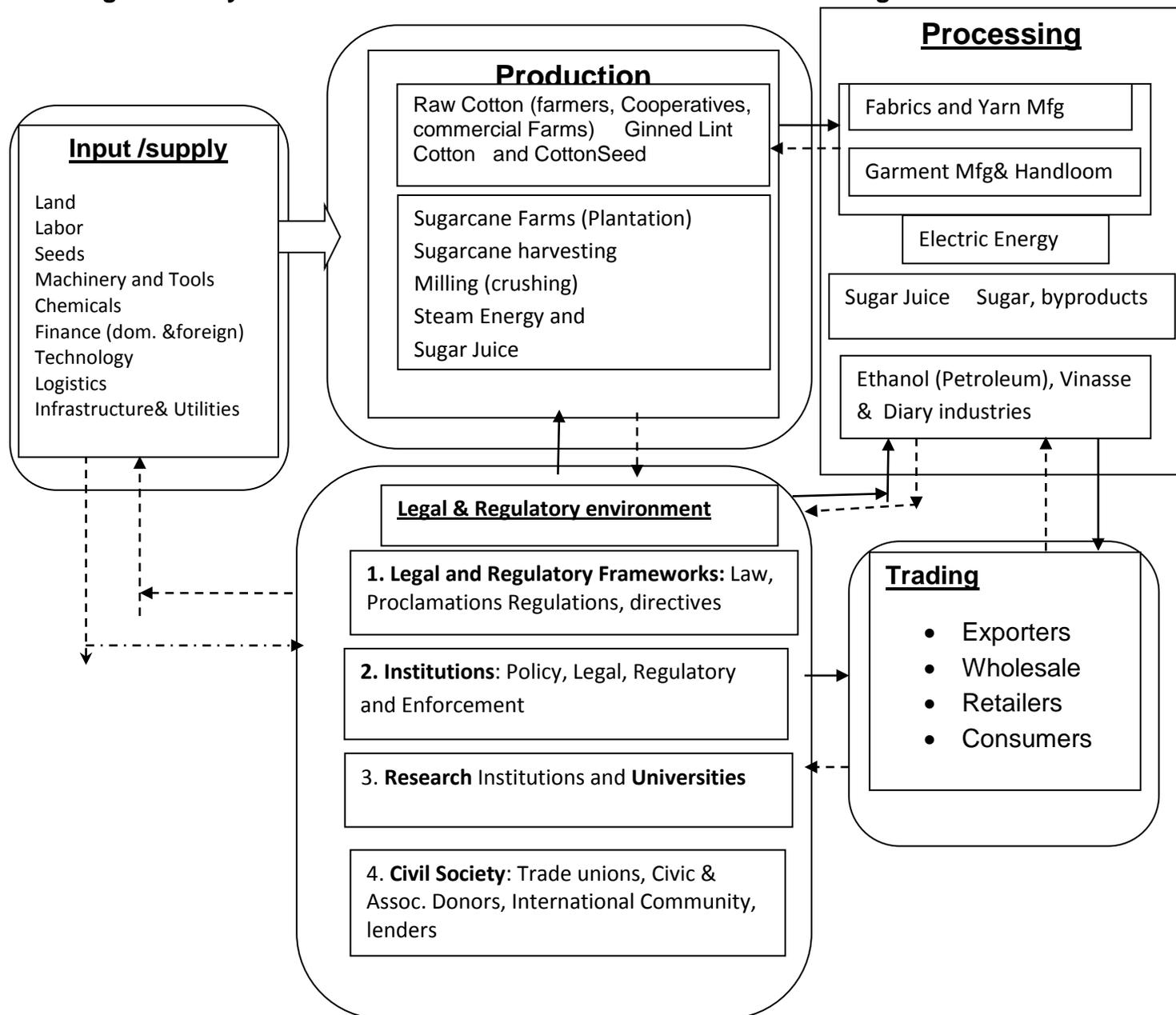
¹ Research report on the value chain of sugarcane from its production to consumption of its product (sugar) is forthcoming in the institute's research report.

- Ministry of Agriculture and Rural Development (MoARD): is responsible for the developing of policies and strategies and supervising the performance in to the development of the sector.
- Ministry of Finance and Economic Development (MoFED): for the settlement of foreign loan and interest.
- Ministry of Industry (Mol): develops policies and strategies for the expansion of sugar industry.
- Sugar Corporation established by Proclamation 192/2010, with the necessary judiciary mainly to process and sell sugar and sugar products.
- Ministry of Trade (MoT): responsible for the fair distribution of sugar
- Environment Protection Agency (EPA): responsible for the sustainability and Health Environment
- Regional Administrations: regional administrative bodies closely works with both the sugar corporation and Ministry of Water and Energy by way of not only providing the necessary areas but also by way of creating awareness and mobilization the necessary resources for the relocation of dwellers.
- Cooperatives and Unions: these institutions are significantly important for the close and actively engagement of individual household farmers on the Sugarcane production process
- Research Institutions: the role of research institution in the process of breeding, succession of improved varieties.
- Standard Agency (Regulation No.193/2010): rationalization, selecting and fixing in terms of aspects, sizes, and methods etc.
- Ethiopian National Accreditation Office (Established by regulatory 279/2010): test and accreditation certification for the quality of products
- Ethiopian-Conformity Assessment Enterprise (Established by Regulation No. 196(2010): provides certificate with respect to the country's export, products, by assessing their conformity to the relevant national and international standards or standards of other countries

5.4.5. Consumers

Sugar is used for different purpose, of which its use for direct consumption by households is one. This study will focus on households as they are one of the major consumers of sugar and are thus affected as a result of the impact of climate change on the production of sugarcane. Figure 9 summarizes the different stakeholders described in this section, their role as well as their inter-linkages.

Figure 9: Key Stakeholders/actors in Value chain of cotton and sugarcane



6. Governance System of the Cotton and sugarcane Value chain

6.1. Conceptual framework

Governance relates to the authority and power relationships on the allocation of resources, the exercise of control, influencing others on the value chain, and setting the modes and rules of interaction along the

value chain (Gereffi, 1994). Governance system describes the interaction between the actors along the value chain (World Bank, 2009). According to the study by the World Bank, actors across all value chains establish relations with each other through contracts, vertical integration, alliance and or jurisdictionally, and through power influence. These relations can address multitudinous formal and informal arrangements for activities and across the value chain: processing, distribution and logistics. According to the Bank, stakeholders in a value chain governance structure, establish relations between each other through contracts, vertical integration, alliances, and other forms of coordination while carrying out their respective business roles (Gereffi 1994). While pursuing along the chain there is always bargaining balance of power for economic incentives determined by the trade-off between the level of relationships and the cost of losing independence (Grant, 2008).

The study has described three dimensions of governance:

- Chain organization: describes the way the actors (primary stakeholders) are aligned in the value chain (either horizontally or vertically). It indicates how information and services flow along the value chain and the degree of strength of their inner linkages.
- Institutions: Such as agencies, research institutions and associations that serve as links between actors in the chain, participants and outsiders. These stakeholders are neither completely internal nor external to the chain. The effectiveness of these institutions can affect the performance and wellbeing of the value chain in a business environment.
- Legislation and regulation: may affect the way the actors operate in the value chain. These encompass legal and regulatory frameworks as well as public and non-public interventions relevant to the development of the value chains.

Gereffi, Humphrey & Sturgeon's (2005) theory generates five basic types of value chain governance namely: Market, Captive, Relational, Modular, and Hierarchical. In addition, the literature explains that value chain structure and governance system can, to a large extent, be shaped or determined by the complexity of transactions, codifications, supply-base, level of technology and product processes, level of tacit knowledge on spatial and interdependent geographically clustered firms, local, national as well as the internal structure of institutions and legal and regulatory frameworks, and political pressure on both developing and developed countries. Humphrey and Schmitz (2001) assert the importance of governance for market access, fast track of acquisition of production capabilities, distribution of gains along the chain, leverage points for policy initiatives, and funnel for technical assistance.

According to the World Bank (2007), the stronger the linkage and influence of one actor over the other, the higher is the benefit from improved inputs, ICT, market and capital. Hence, the competitive advantage within the value can be attained by the trade-off-between the economic incentives and the cost of losing independence. For example, chains established vertically and supported jurisdictionally and with power

influence, decisions and communications on production, logistics and marketing are made through hierarchies. Whereas chains established through contracts, alliances may emerge due to common interest between the parties. The extent of influence however mainly depends on the trade-off benefits and costs and on the strength of enforcement of the legal and regulatory frameworks.

6.2. Governance System of the Cotton Value chain

As indicated on the stakeholders analysis, the value consist of different cotton producers namely household farmers, cooperatives, commercial private farms and commercial public farms. All these do have their respective legal entity and ownership with respect to the production of cotton. In Ethiopia, the share of the smallholder farmers constitutes 30% of the cotton production whereas commercial farms constitute 70% of the share.

Farmers' cooperatives have legal personality as per Proclamation 147/1998, and amendment Proclamation 402/2004. Farmers' cooperatives formed by voluntary individuals who have similar needs for creating savings and mutual assistance among themselves by pooling their resources, knowledge and property. Cooperative governance is structured under five layers: individual smallholder cooperative members, Primary cooperative society, Cooperative Union, Cooperative Federation, and Confederation. Cooperatives are accountable to the general assembly. The role of each layers and the relationship among the different layers has important implications to build the resilience of the cotton commodity to climate change impact. These will be analysed in detail in the value chain components of the study.

A few of the commercial farms in Ethiopia have vertically integrated with the ginning processing. Small holder farmers interact along the value chain with market types which are typically of spot markets. The majority of the cotton producers and the textile industry in general are however, being aligned horizontally in the value chain by the relational type of chain governance by way of contracts. This means the degree of influence among the stakeholders is governed by the terms and conditions of the contract, by the modality of legal and regulatory environment which is subject to the

internal and external factors. These shall be further analyzed from the CC vulnerability aspects and CRGE perspectives.

6.3. Governance System in the sugarcane Value

The Sugar Corporation is established as per the “Sugar Corporation Council of Ministers Regulation No. 192/2010” as a public enterprise. The Corporation is governed by the Public Enterprises Proclamation No.25/1992. Private sugar factories are established as per the commercial code, the “Commercial Code Proclamation, 1960” where shareholders enter into the ownership and accountabilities as per their respective Articles of Association and Memorandum of Associations. The two documents of association define the number of shares authorized, the amount of capital paid, the board of directors, accountability and responsibilities of the leaders, board of directors and the general assembly, among others.

The governance system in sugar producers in general is based on the hierarchically characterized by vertical integration. Each area management at the industry reports to the supervising division or department. In turn, each department reports to the executive officer (s). The executive officers in turn report to the board of directors or shareholders of the respective companies. Regarding marketing, sugar producers interact with stakeholders along the value chain contractually. The value chain of the sugarcane is therefore a combination of both hierarchical and relational type of governance system. The merit and demerit of these types of value chain interaction shall be investigated and analyzed against the literature findings and world practices.

By way of summary, the interactions and the roles and the governing systems of the two industries is so complex. Each of the industries’ value chain entertains a number of stakeholders; some are active actors, others mandatory for the proper operation of the value chain; some are permanent, others non-permanent. The power of influence also depends on the type of relationship and the bargaining power capacity.

The implications of such governance system along the value chain of the two commodities to build the resilience of the two commodities to climate change impacts will be analysed in detail in the value chain study.

References

Berkum, S., Roza, P. and Tongeren, F. (2005). 'Impacts of the EU Sugar Policy Reforms on Developing Countries'. Agricultural Economics Research Institute (LEI). The Hague.

Central Statistical Agency (2011/2011). "Large and Medium Scale Commercial Farms Sample Survey, Statistical Bulletin 505. Addis Ababa, Ethiopia

Chenomix International Inc (1996). "Ethiopia Textile Sector Study: Final Report Submitted to USAID", Addis Ababa.

Cannon, T (2008) "Reducing People's Vulnerability to Natural Hazards. Communities and Resilience", Research Paper No. 2008/34, United Nations University, UNU-WIDER. World Institute for Development Economics Research

Eakin, H. and Luers, A. L. (2006) "Assessing the vulnerability of social-environmental systems", *Annu. Rev. Environ. Resour.* 31:365–94

Ensor, J. and Berger, R. (2009) "Understanding Climate Change Adaptation: Lessons from community-based approaches". Practical Action Publishing

Global Agricultural Information Network, GAIN (2012), “Ban on Cotton Exports Lifted,” GAIN Report Number: ET 1204, Addis Ababa

Gereffi, G. (1994). “The Organization of Buyer-Driven Global Commodity Chains: How U.S. Retailers Shape Overseas Production Networks.” In Gereffi and Korzeniewicz (eds.). *Commodity Chains and Global Capitalism*. Praeger, London.

Gereffi, G., Humphrey, J. and Sturgeon, T. (2005). “The governance of global value chains.” *Review of International Political Economy*, 12(1), 78-104.

Howden, S.M., oisSoussana, J-F., Tubiello, F.N., Chhetri, N., Dunlop, M. and Meinke, H (2007) ‘Adapting agriculture to climate change’ in www.pnas.org/content/104/50/19691.full.pdf+html

Humphrey, J and Schmitz, H. (2001). “Governance in Global Value Chains” , *IDS, Bulletin*, 32(3).

MoFED (2010), “Growth and Transformation Plan, GTP,” Addis Ababa.

MoFED (2013). Federal Democratic Republic of Ethiopia Annual Progress Report for F.Y. 2011/12 Growth and Transformation Plan

Michael E. Porter (1985,1998). “Competitive Advantage: Creating and Sustaining Superior Performance, The Free Press, a Division of Simon & Schuster Adult Publishing Group.

Risbey, J., Milindkandlikar, Hadidowlatabadi (1999). “Scale, context and decision-making in agricultural adaptation to climate variability and change.” *Mitigation and Adaptation Strategies for Global Change*, 4: 137–165,. Kluwer Academic Publishers, Belgium.

Sugar corporation (2013), GTP Road MAP for the sugar and related products.

Sussman, F., & Freed, J. (2008). ‘Adapting to climate change: A business approach.Pew Center on Global Climate Change’.Retrieved October 12, 2012 from: <http://www.pewclimate.org/docUploads/Business-Adaptation.pdf>

UNIDO (2009).Value Chain Diagnostics for Industrial Development, Building blocks for a holistic and rapid analytical tool, Working Paper, UNIDO, Vienna.

World Bank, (2009). Zambia- Commercial Value Chains in Zambian Agriculture: Do smallholders Benefit? Agriculture and Rural Development (AFTAR), Sustainable Development Department, Africa Region. Report No. 48774-ZM. World Bank, Washington DC.

World Bank (2007). "Using Value Chain Approaches in Agribusiness and Agriculture in Sub-Saharan Africa". World Bank, Washington DC.

World Bank (2008). All-Africa Review of Experiences with Commercial Agriculture: Lessons from Success and Failure

World Bank (2008). Background paper for the Competitive Commercial Agriculture in Sub-Saharan Africa (CCAA) Study

World Bank (1998). Pollution Prevention and Abatement Handbook.