

NATIONAL CLIMATE CHANGE ACTION PLAN



REPUBLIC OF KENYA

Republic of Kenya

National Climate Change Action Plan

Adaptation

Technical Report 4

Climate Change and the Private Sector

AUGUST 2012



Reproduction of this publication for educational or non-commercial purposes is authorized without prior written permission from the copyright holders provided the source is fully acknowledged. With the exception of the funders of this publication, reproduction of this publication for resale or other commercial purposes is strictly prohibited without prior written permission of the copyright holder.

Disclaimer

The views expressed in this publication are not necessarily those of the agencies cooperating in the National Climate Change Action Plan process. The designations employed and the presentations do not imply the expression of any opinion whatsoever on the part of the Government of Kenya or cooperating agencies.

Mention of a commercial company or product in this publication does not imply endorsement by the Government of Kenya. The use of information from this publication concerning proprietary products for publicity or advertising is not permitted.



This document is an output from a project funded by the UK Department for International Development (DFID) and the Netherlands Directorate-General for International Cooperation (DGIS) for the benefit of developing countries. However, the views expressed and information contained in it are not necessarily those of or endorsed by DFID, DGIS or the entities managing the delivery of the Climate and Development Knowledge Network*, which can accept no responsibility or liability for such views, completeness or accuracy of the information or for any reliance placed on them.

© 2012, All rights reserved

* The Climate and Development Knowledge Network (“CDKN”) is a project funded by the UK Department for International Development (DFID) and the Netherlands Directorate-General for International Cooperation (DGIS) and is led and administered by PricewaterhouseCoopers LLP. Management of the delivery of CDKN is undertaken by PricewaterhouseCoopers LLP, and an alliance of organisations including Fundación Futuro Latinoamericano, INTRAC, LEAD International, the Overseas Development Institute, and SouthSouthNorth.

Report prepared by:



LTS International
Pentlands Science Park, Bush Loan, Penicuik,
EH26 0PL, UK
Tel: +44.131.440.5500
Fax: +44.131.440.5501
Skype: LTSInternational
Website: www.ltsi.co.uk



Acclimatise
Hexgreave Hall, Farnsfield, Newark,
Nottinghamshire
NG22 8LS, UK
Tel: +44 (0) 1623 884347
Website: www.acclimatise.uk.com

Summary

The Government of Kenya is putting in place mechanisms to enhance the implementation of the National Climate Change Response Strategy (NCCRS) by developing a comprehensive Climate Change Action Plan. Sub-component 3 of the proposed Action Plan is developing a National Adaptation Plan (NAdP). This study, “private sector engagement in climate change adaptation” is part of this action planning under sub-component 3. In this study, the private sector is defined as privately owned or controlled companies, organisations and entities, and includes other private actors, such as households and the subsistence farmer selling surplus food in the market.

This study was conducted in the period October 2011 to May 2012 through reviewing of documents, interviews, a semi-structured questionnaire sent by e-mail, and participation in related workshops organized by the Kenya National Cleaner Production Centre and UNDP in 2011. A main Private Sector Workshop was organized in conjunction with the Ministry of Environment and Mineral Resources (MEMR) on 9th May 2012 in Nairobi to agree on private sector adaptation priorities and to receive input on effective engagement.

The climate change adaptation risks include; operational, supply chain and raw materials risk, water and energy supply priorities, financial and market risks, agriculture, food security and rural development, ecosystem threats, poor infrastructure, unreliable weather information and public health. In addition, technical interpretation of Climate Change issues and in particular, climate change adaptation is not clear to the sector.

While ‘climate proofing’ of private sector investments is important, there are also emerging business opportunities in helping communities to reduce their climate risks such as provision of financial resources for adaptation through investments, financial risk management, and the charitable provision of resources through foundations or corporate social responsibility. Additionally, through their investments in assets such as buildings and agriculture, land and business practices (for instance, insurance, water management and agriculture practices) all which are sensitive to climate change, private sector can also play a role by adapting them to climate change (IFC, 2006).

The private sector is also a supplier of innovative goods and services through innovative technology, design of resilient infrastructure, development and implementation of improved information systems and the management of major projects. Adaptation efforts in Kenya are generating new business opportunities for the private sector especially under Green Economy, with expected increase in demand for water conservation expertise, irrigation technology, water supply, energy, product innovation, land use, insurance and risk management expertise, and water treatment technology. This also serving to shift climate change adaptation from being a public good to being a private risk that businesses can respond to.

Possible ways of ensuring their effective participation include; creating awareness, providing decision-relevant information and building capacity of the private sector to engage and act. Others include stimulating the market for adaptation by scaling up financial and risk reduction incentives, policy and regulatory mechanisms that mainstream climate change in Government and require the internalization of environmental damages with disclosure of climate risks. Generating case studies to show the business case for adaptation will also improve social learning.

Abbreviations

AFK	Amiran Farmers Kit
AfDB	African Development Bank
AGRA	African Green Revolution Alliance
ASAL	Arid and Semi-Arid Lands
BOOT	Build Own Operate and Transfer
CSR	Corporate Social Responsibility
CBO	Community Based Organisations
COP	Conference of Parties
DNA	Designated National Entity
ERPA	Emission Reduction Purchase Agreement
FDS	Financial Deepening Sector
GHG	Green House Gases
IPCC	Intergovernmental Panel on Climate Change
IFC	International Finance Corporation
IBLI	Index-Based Livestock Insurance
KEPSA	Kenya Private Sector Alliance
KNPCPC	Kenya National Cleaner Production
KHDP	Kenya Horticultural Development Programme
KTDA	Kenya Tea Development Authority
MEMR	Ministry of Environment and Mineral Resources
MDGs	Millennium Development Goals
MSF	Ministerial Stakeholders' Forum
MET	Meteorological Department
NAdP	National Adaptation Plan
NDVI	Normalised Data Vegetative Index
NSA	Non-State Actors
NCCRS	National Climate Change Response Strategy
NEMA	National Environment Management Authority
NGO	Non-Governmental Organisation
NSE	Nairobi Securities Exchange
OECD	Organisation for Economic Commission
PPD	Public Private Dialogue
PMRT	Prime Minister's Round Table
PES	Payment for Environment Services

PRESA	Prop-poor Rewards for Environmental Services in Africa
UNEP	United Nations Environment Programme
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
WRUAs	Water Resources Water Association
WBCSD	World Business Council on Sustainable Development
WEF	World Economic Forum

Contents

- Summary iv
- Abbreviations v
- 1.0 Introduction 1
 - 1.1 The Objectives of the Report 1
 - 1.2 Definition of Private Sector 1
 - 1.3 Methodology 1
 - 1.3.1. Desk Research on Climate Change Adaptation 1
 - 1.3.2. Interviews and Consultations 2
- 2.0 Implications Of Climate Change On Private Sector In Kenya 2
 - 2.1 Overview of Climate Change 2
 - 2.2 Climate Change Threats and Impacts 3
- 3.0 Private Sector Climate Change Adaptation Challenges 4
 - 3.1 Operational, Supply Chain and Raw Material Risks 5
 - 3.2 Water and Energy Supply Risks 6
 - 3.3 Financing Priorities 7
 - 3.4 Market Disruption 7
 - 3.5 Agriculture and Food Security 7
 - 3.6 Reliable Weather Information and Understanding of Adaptation 8
 - 3.7 Ecosystem Threats 8
 - 3.8 Poor Infrastructure 8
 - 3.9 Public Health and Social Protection 9
- 4.0 The Role of Private Sector In Climate Change Adaptation 10
 - 4.1 Autonomous Adaptation: Greening of Value Chains 10
 - 4.2 Food Security and Stress-Resilient Crops and Livestock 12
 - 4.2.1 Drought-Resilient Animals and Crops 12
 - 4.2.2 Sustainable Agriculture Land Use Management (SALM) Innovations 12
 - 4.2.3 Diversification of Livelihoods 13
 - 4.3 Providing Risk Management Tools 15
 - 4.3.1 Insurance 15
 - 4.3.2 Risk Guarantee Schemes 16
 - 4.4 Financing Products 17
 - 4.4.1 Venture Capital 17

4.4.2	Bonds for Infrastructure Financing	17
4.5	Resilient Goods and Services	18
4.6	Information Generation and Dissemination	18
5.0	How To Effectively Engage The Private Sector	18
5.1	Information Dissemination and Capacity Building	18
5.1.1.	Data Availability and Providing Decision-Relevant Information	18
5.1.2	Platform for Strengthening Interaction between Private Sector and Government	19
5.1.3	Provide Case Studies on Climate Change Adaptation	21
5.1.4	Analytical Work on Costs and Benefits of Adaptation and Value of Ecosystem Services	21
5.1.5	Building Capacity of Large and Small Businesses to Engage and Act.....	21
5.1.6	Building Adaptive Government Institutions and Climate Proofing Programmes..	22
5.1.7	Improving Infrastructure, Extension Services and Value Addition	23
5.2.8	Capacity to Redefine Corporate Social Responsibility	23
5.2	Policy and Regulatory Mechanisms.....	24
5.2.1	Policy Options.....	24
5.2.2	Scaling-up Financial and Risk Reduction Incentives	24
6.0	Determining Adaptation Costs	30
6.1	Private Sector Adaptation	30
6.2	Cost Estimates from Case Studies	30
6.2.1	Agro-Forestry Extension Costs	30
6.2.2	Industry Allocation.....	31
6.3	Payment for Environmental Services	32
6.3.1	Pro-poor Rewards for Environmental Services	32
6.0	Conclusions.....	34
	Bibliography.....	37

1.0 Introduction

1.1 The Objectives of the Report

According to the UNDP report of 2012, Kenya has made good strides in achieving the Millennium Development Goals (MDGs). These achievements include: reduction of the population below the poverty line from 56% in 2000 to 45.9% in 2006. In 2008-09, the infant mortality rate was 52 deaths per 1,000 live births from 77 in 2003 while the under-five mortality rate was 74 deaths per 1,000 live births in 2008/09 from 115 in 2003. Forest cover that had declined to 1.7% is increasing thanks to the Government's commitment towards the achievement of Goal number 7 target of reversing rate of deforestation and ensuring environmental sustainability. Land owners are being advised to put at least 10% of land acreage under tree cover, while there are aggressive conservation initiatives in the Mau Forest and the Aberdares Range among others. Access to safe drinking water has increased from an average of 57% in 2005/06 to 63.4% in 2008/09. Climate change impacts such as drought, floods and exacerbated health issues have the potential to reverse much of the progress made towards the attainment of these Millennium Development Goals (MDGs) and Vision 2030. Only by putting in place mechanisms to build the country's resilience can these impacts be minimized.

In view of the above, the Government of Kenya is putting in place mechanisms to enhance the implementation of the National Climate Change Response Strategy (NCCRS) by developing a comprehensive Climate Change Action Plan. Sub-component 3 of the proposed Action Plan is developing a National Adaptation Plan (NAdP). The Private Sector study falls under this sub-component and has as its main objective, to identify the role and potential contribution of the various private sector actors in implementing prioritised adaptation actions, paying attention to their capacity. See terms of reference in annex 1.

1.2 Definition of Private Sector

For the purpose of this study, the private sector is defined as the part of the economy that is not state controlled, and is run by individuals and companies for profit. It therefore encompasses all for-profit businesses that are not owned or operated by the government. (<http://www.investopedia.com/terms/p/private-sector.asp>). The NAdP must recognize this and the role that the various elements of the private sector can play in developing resilience to climate change.

1.3 Methodology

To undertake this study, several approaches were used: document analysis, interviews and consultations with key informants, participation in related workshops separately organized by UNDP and the Kenya National Cleaner Production Centre (KNPC) in 2011. A major Private Sector Workshop was organized on 9th May 2012 to agree on climate change adaptation priorities and strategies for their effective engagement.

1.3.1. Desk Research on Climate Change Adaptation

Various documents were studied and reviewed in this study, most of which provided valuable information on private sector and climate change adaptation including case studies. Key to those documents reviewed was the National Climate Change Response Strategy, IFC publication on a

Strategy to Engage the Private Sector in Climate Change Adaptation in Bangladesh, a UNEP publication on Adapting to a Green Economy: Companies, Communities and Climate Change, several Government related policy documents (Water, Agriculture, Forestry, Environment) and OECD Environment Working Paper No. 39 on Private Sector Engagement to Climate Change Adaptation.

1.3.2. Interviews and Consultations

Interviews and consultations were held with members of the private sector from manufacturing, the Kenya Tea Development Authority, the Kenya Flower Council, Kenya Dairy Board, NGOs, insurance, banks, farmers in Narok, Kitale and Naivasha, ranchers in Nanyuki, CBOs, the Ministries of Environment, Finance, Planning, Agriculture, Energy, Industry, Forestry, Health, Northern Kenya and other Arid Lands, Vision 2030 among others (see annex 2). Various private sector fora such as: the UNDP-KEPSA workshop on private sector input into the Kenyan position to COP 17, the Cleaner Production meeting of industry Chief Executive Officers in Eldoret and Kisumu in November and December 2011. The final forum was a Private Sector Workshop organized by the Ministry of Environment and Mineral Resources in Nairobi on 9th May 2012 to present the draft report, agree on climate change adaptation priorities for private sector as well as strategies on how they can be effectively engaged.

2.0 Implications Of Climate Change On Private Sector In Kenya

2.1 Overview of Climate Change

Climate change poses a serious challenge to Kenya's social and economic development. This change will lead to major challenges in the economy, human life and on the environment. Kenya is most vulnerable to climate change since the key drivers of the economy (agriculture, livestock, tourism, forestry, and fisheries) are climate-sensitive. Sub-optimal levels of development of infrastructure, high incidences of poverty levels coupled with endemic diseases such malaria, aggravates the country's vulnerability thus reducing its adaptive capacity to climate change.

The private sector on the other hand, lacks clarity in understanding of the concept of climate change adaptation. Some useful definitions of adaptation as outlined by the IPCC 2007 could be useful:

Adaptation: adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Various types of adaptation can be distinguished, including anticipatory, autonomous and planned adaptation.

Adaptive capacity: the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences.

Vulnerability: the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity.

In order to enhance investment that aims to reduce vulnerability and build resilience of the society, and in line with the provisions of the United Nations Framework Convention on Climate Change (UNFCCC) and its implementing instrument, the Kyoto Protocol, the Government of Kenya launched the National Climate Change Response Strategy (NCCRS). According to the

NCCRS, the combination of severe droughts, high population density, poor infrastructure and low resilience to economic shocks, makes Kenya very vulnerable to climatic risks. The Kenyan people's overreliance on agriculture and natural resources increases their vulnerability to climate change. The most vulnerable sectors include agriculture, tourism, infrastructure, health and biodiversity. Adaptation to the changing climate therefore becomes imperative and covers all actions aimed at coping with climate changes that cannot be avoided and reducing their negative impacts (NCCRS, 2010). These adaptive actions include prevention, tolerance, sharing of losses, changes in land use among others.

Although climate change adaptation is viewed as more of public sector, the private sector is not only unwittingly internalizing adaptation activities but is also increasingly being seen as a supplier of innovative goods and services with a clear need to meet the adaptation priorities of Kenya with expertise in technology and service delivery. The sector can and is making a unique contribution to adaptation, through innovative technology, developing new financial and risk sharing products, design of resilient infrastructure, development and implementation of improved information systems and the management of major projects.

2.2 Climate Change Threats and Impacts

The physical effects of climate change and variability is having serious threats to Kenya including: water shortages and droughts, increased frequency and severity of floods, more unpredictable weather patterns, more frequent and intense storms and weather-related disasters, decreased agricultural productivity and rising food insecurity and public health problems. While there is some uncertainty about the exact nature, timing, location and magnitude of climate change impacts, many of them are already materializing, will get worse and accompanied by new threats (NCCRS, 2010).

Water shortages and droughts

Water is the means of support for communities and a driver of economic health and well-being so much so that in 2010, the UN General Assembly adopted a resolution on the human right to water. Changing rainfall patterns are leading into periods of extreme drought in some regions of the country especially the eastern and northern. Drought reduces agricultural and livestock productivity, increases fire hazard and reduces the amount of water available for human health and economic activity. Climate change hinders current efforts to ensure equitable access to water.

Increased frequency and severity of floods

In Kenya, more frequent heavy precipitation events in some regions is resulting in more frequent and damaging floods. People in low-lying areas such as Nyando, Tana River and others such as Turkana, Chalbi desert, are particularly vulnerable. Flooding causes severe economic damage, erodes natural and human-constructed storm barriers, and results in loss of life as well as agricultural land.

More unpredictable weather patterns

Farmers have noted more erratic rainfall and increasingly unpredictable commencement of rainy seasons; sometimes heavier rains and longer dry spells. Less predictable weather patterns make it difficult for small-scale farmers, who are already living on the edge, to decide when to cultivate, sow and harvest.

Decreased agricultural productivity and rising food insecurity

Crop productivity is decreasing thus increasing the risk of hunger. Smallholders are particularly struggling to maintain food security in the face of declining yields and loss of crops. Climate change's devastating effect on existing food shortages and price spikes is particularly troublesome.

Public health problems

Flooding greatly increases the risk of malaria, malnutrition and diarrheal disease due to poor sanitation. This is aggravated by the fact that Kenya currently faces an adaptation deficit and therefore lacks mechanisms of optimal social wellbeing.

3.0 Private Sector Climate Change Adaptation Challenges

In Kenya, the private sector is relatively new to climate change adaptation, although many companies interviewed such those already participating in Cleaner Production, have a long-standing focus on and commitment to environmental sustainability in broad terms. This commitment is focused more on enhancing resource efficiency, and reducing their greenhouse gas (GHG) emissions to mitigate climate change coupled with some levels of forest and water conservation programmes. These activities although responding to current and evolving climate change adaptation, are generally undertaken as part of business competitiveness and not as a response to climate change.

The challenges that communities in Kenya face as a result of climate change, such as more frequent and intense storms, water scarcity, declining agricultural productivity and poor health, also pose serious issues to businesses. As private sector relies on community members as employees, suppliers, customers and infrastructure to run their businesses, their responses to adaptation also builds the local community. They also depend on local resources, services and infrastructure to be able to operate. Businesses agree that it is difficult to separate community well-being from companies' viability and, in turn, overall economic growth. Businesses that make these connections and adapt to climate change with community needs in mind can gain a competitive edge. Conversely, those that respond to climate change in ways that undermine communities' efforts to adapt may face reputational and brand risks, and they may even lose their ability to operate in certain locations (UNEP, 2011).

Within the private sector there are a wide range of possible business structures, ranging from individual traders to multi-national corporations. Therefore, even within this sector climate change risks on different companies will vary: it can affect the way a business operates, impact profitability, and create opportunities. These risks could be spread throughout the country, sector level or individual company level (Hoffman and Woody, 2008). Beyond these direct business impacts, companies will need to understand how climate change will affect their most vulnerable stakeholders, the communities who will become more at risk to drought, disease vectors, and the perils of migration. These risks comprise the priority actions that need to be addressed:

- i. operational, supply chain and raw material risks
- ii. water and energy supply priorities
- iii. financial risks
- iv. market risks
- v. agriculture, food security and rural development
- vi. reliable weather information
- vii. ecosystem threats
- viii. poor infrastructure
- ix. public health, and social protection

3.1 Operational, Supply Chain and Raw Material Risks

Changing temperatures and precipitation patterns are leading to decreased availability and increased price of critical raw materials in the supply chain, especially agricultural commodities such as tea, coffee and flowers caused by drought. Risks such as frost, occurs in hilly valleys where tea or flowers are grown. According to Kenya Tea Development Authority (KTDA), frost destroyed a lot of crop in late 2011 and early 2012. Factories most affected were those in Nandi, Bomet, Kericho and Nyamira counties, where individual farmers lost up to 50 percent in their earnings; KTDA has over 600,000 small-scale tea farmers with 64 tea factories owned by the growers. In Nandi county alone, 25,000 small scale farmers lost more than Ksh. 0. 5 million between December 2011 and March 2012. According to the KTDA representative at the Private Sector Workshop of 9th May 2012 in Nairobi, ten (10) tea multinational companies in Rift Valley were shut down because of the shortage of tea arising from the frost leading to massive job losses. Factories like Tinderet experienced little damage due to numerous trees around the plantations. The tea and coffee industry also cited poor quality of the leaves and berries respectively due to water stress.

Case Box 1: FARMING/Factories handling low volumes of produce

Ksh. 1.3bn tea lost in frost attacks

Small-scale farmers affiliated to the Kenya Tea Development Authority (KTDA) lost more than Ksh. 1.3 billion due to frost attack, which occurred in December 2011. Affected counties included Nandi, Kiambu, Muranga and Nyeri. In Nandi, Chebut and Kaptumo tea factories suffered 30 percent loss. Kiambu, Muranga and Nyeri suffered 15-20 percent. Nationally, KTDA was expected to receive 204 million kilograms of tea by March 31st 2012 but the crop suffered 10 percent damage (*Private Sector Workshop, 9th May, 2012, Nairobi*).

The dairy industry just like the other sub-sectors in agriculture also experiences shortages of milk due to increased frequency and severity of climate variability.

Case Box 2: Milk output drop with worsening drought

A litre of raw milk sold directly to consumers from farmers went up from Ksh. 40 in January to Ksh. 65 in March 2012 due to drought. Milk production declined by 50 percent in Rift Valley which produces up to 80 percent of the country's output. (*Kenya Dairy Producers Association, 2012*)

The sugar industry as well as flower sector also has been experiencing productivity challenges as cane production is 100 percent is rain fed.

Case Box 3: Sugarcane output loss in Muhoroni due to drought

The drought experienced in the financial year 2009/2010, caused sugarcane yields drop from 70 tons /ha to 45 tons/ha. resulting in farmers incurring Kshs. 200 million direct loss in the company (Muhoroni Sugar Company, 2012).

Storms and floods create costly disruptions in production and transport due to damage to railroads, bridges, power transmission, water supply and other infrastructure. There is an increase in employee absenteeism especially in the tea and flower industry and decreased productivity due to disruption of transport. In many cases, these risks will be of high priority to vulnerable communities as well.

During 2012 long rain season, water supply companies such as the Athi Water Services Board experienced operational challenges due to increased floods that damaged water pipes, pumps and sewer lines. A major pipeline from Sasumua dam supplying parts of Nairobi with 60 million litres of water daily was destroyed by flooding occasioning a lot of revenue loss.

3.2 Water and Energy Supply Risks

Access to other core inputs, including water and energy, is becoming increasingly unreliable, with drought causing rationing as well as a spike in the price of electricity. However, climate change has also been found to bring new opportunities to improve business practices, and to create business value while helping people adapt. For example, the soft drink industry notably Coca-cola company, indicated that prolonged droughts are leading to water scarcity but this is also driving them to be more efficient and therefore saving on water related production costs. The tea industry on the other hand, sees the diminishing wood fuel as both a risk to their business but also as an opportunity to explore alternative energy sources such as solar tea drying, mini-hydros or to working with nearby communities to supply fuel wood on contract.

Case Box 3: Cost of production

High electricity bills and supplementation by diesel generators were straining tea factory budgets and denied farmers opportunity to be paid better. Three (3) tea factories (Chebut, Mudete & Kapsara) in Western region are starting a power plant on river Yala to generate 2.5.MW. This will help each factory save up to Ksh. 100 million. (*Private Sector Workshop, 9th May 2012, Nairobi*)

Thus, issues of efficiency and shift to other renewable sources are becoming a priority issue.

3.3 Financing Priorities

Climate change is also affecting companies' access to capital, as investors become more aware of climate change impacts and the need for adaptation. Debt financing has become harder to attract or more expensive for companies that are seen as "high risk" to climate change impacts especially those in the agricultural field. The Kenya Flower Council (KFC) and Sugar Board of Kenya expressed fear that investors will likely have lower confidence in companies that are failing to analyze climate risks and to take proactive action to adapt and manage such risks, and may increase their demands or expectations for full disclosure in this area.

3.4 Market Disruption

In the face of climate change, certain products and services become irrelevant to customers during dry seasons. This is being witnessed by companies that deal with agricultural and veterinary products such as Syngenta, Osho Chemicals, and Twiga Chemicals. As some regions become hotter, wetter or drier, these companies find that their customer bases undergo dramatic geographic shifts. Demand for these products can in some cases, decrease by 30-40 percent during droughts due to crop failure and death of livestock. This also has the attendant effect of reducing spending power (particularly with respect to non-essential goods and services), thus impacting some companies' profitability.

3.5 Agriculture and Food Security

Agriculture and rural development was cited in the interviews and workshop as a major area of intervention. Increasing the efficiency of water use and enhancing water productivity at all levels in agriculture production chains is a priority. Extreme rainfall and subsequent heavy flooding damage has serious effects on agriculture including the erosion of topsoil and inundation. Improvement of the drainage capacity of farmlands is a priority to reduce the effects of waterlogging on crops.

Vulnerability reduction and food security is especially critical for communities that need to adapt their agriculture, livestock and other forms of livelihood to the changing weather patterns. This is especially critical in the arid and semi-arid areas where alternative land uses are risky except pastoralism, a free-range livestock production system, which seeks to maintain a balance between pastures, livestock and people in uncertain and variable environments. It is practised in all of Kenya's dryland regions, and in some communities it is the main source of food security and income. However, the incidences of severe back-to-back droughts are rising, resulting in deaths of large livestock numbers as pastures and water sources dry out. In addition, human populations and settlements are increasing, taking up traditional grazing areas and competing

for water resources. Pastoralists are also suffering from occasional but severe floods. Therefore, its climate-proofing is a priority.

3.6 Reliable Weather Information and Understanding of Adaptation

Different types of companies need data at varying levels of sophistication and scales. All businesses will need information at a sufficiently small geographic scale and short enough time horizon to be relevant to their decision-making processes, and at larger spatial and temporal scales to enable them to place their local situation in regional and global perspective. Many institutions interviewed including individual farmers in Naivasha and Kitale indicated that experience has taught them not to rely on broadcasts from the Kenya Meteorological Department because of their unreliability. Indeed in 2010, farmers in Narok threatened to sue the agency because of crop failure having relied on the Department's predictions for onset of the planting season.

Climate change is poorly understood but much so adaptation. The workshop of 9th May proposed giving climate change a livelihood dimension in packaging it for dissemination for it to be well recognized and understood. This should include issues such as threatened pastoralism due to diminishing grazing lands and emergence of conflicts, crop failure due to droughts, death of livestock and threats to energy and water supply.

3.7 Ecosystem Threats

Climate change and variability is impacting negatively on ecosystem viability and therefore tourism and wildlife. This is due to gradual disappearance of critical habitats and human-wildlife conflicts. In the workshop, the Ministry of Tourism and Wildlife reported a devastating impact of the 2009 drought on Amboseli National Park and ecosystem where heavy losses occurred in wildebeest, zebra and buffalo populations and many elephant and hippos died. Overall losses to the large migratory herbivores were in excess of 75 percent. Wildebeest losses exceeded 95 percent. The precipitous drop in herbivore numbers soon affected the carnivore populations, causing additional pressure on herbivores and a sharp rise in livestock predation. Livestock losses were reported as 81 percent among cattle and 64 percent among sheep and goat. The losses posed enormous hardship on the pastoral community with the resulting poverty seeing the use of natural resources, including charcoal making, bush meat and trophy hunting, rising.

3.8 Poor Infrastructure

The need for resilient infrastructure was identified as a priority issue. Heavy floods that are occurring disrupt transportation as bridges and roads are destroyed impacting distribution and market access. In the sugar and tea industries for instance, the heavy rains damage feeder roads and bridges making cane transport very expensive to farmers and transporters.

3.9 Public Health and Social Protection

Flood prone areas are also malaria, diarrhea and malnutrition endemic areas due to poor public health and sanitation that emerge. Also human habitation gets inundated or even washed away.

A summary of risks and priorities is contained in Table 1.

Table 1 Summary of Climate Change Risks/Priorities for Private Sector

	Sector	Risks & Priorities
1	Agriculture	<ul style="list-style-type: none"> • Scarcity of water presents the most challenge • Low yields and crop damage due to droughts and frost • Operational challenges due to insufficient raw materials, infrastructure damage • Poor quality of harvests such as tea and coffee due to water stress • Water logging of farms during floods
2	Manufacturing	<ul style="list-style-type: none"> • Higher prices of energy & raw materials increasing production costs • Reduced markets due to diminishing customer purchasing power • Disruption of supply chains
3	Livestock	<ul style="list-style-type: none"> • Prolonged droughts • Loss of grazing land • Loss of animals
4	Forestry	<ul style="list-style-type: none"> • Diminishing forest cover • Forest fires
5	Fisheries	<ul style="list-style-type: none"> • Diminishing fish stocks
6	Finance	<ul style="list-style-type: none"> • More customers in the retail sector defaulting on loans • Uninsured damage to project assets • Exposure to indirect risks through investment portfolio
7	Insurance	<ul style="list-style-type: none"> • Increased risks leading to high claim ratios • Low uptake of insurance covers
8	Health care and pharmaceuticals	<ul style="list-style-type: none"> • Changing disease vectors especially mosquitoes • Increased incidences of waterborne and diarrhea diseases • Higher health insurance costs in endemic areas
9	Energy and utilities	<ul style="list-style-type: none"> • Physical risk arising from collapse of power lines due to weather events • Peak demand outstripping capacity • Prolonged droughts reduce generation levels

10	Wildlife	<ul style="list-style-type: none"> • Diminishing habitats • Wildlife deaths
----	----------	---

4.0 The Role of Private Sector In Climate Change Adaptation

It has been recognized that adaptation to climate change is a critical challenge for communities and business sectors (WBCSD, 2008). Although the Government plays a major role in developing resilience to climate change, the importance of private sector involvement in terms of scaling up or leveraging public sector capital cannot be underestimated. The World Business Council for Sustainable Development (WBCSD) and the World Economic Forum (WEF) argue that “even under the most optimistic scenario of donor commitments, public funds will be nowhere near sufficient to meet the investment requirements of a successful climate change strategy. Therefore, mechanisms that catalyse direct private sector investment in climate change-related activities must be created” (WBCSD and WEF 2008).

Adaptation benefits are often local and private. Private-interest is a powerful driver for companies to manage their exposure to risks and exploit opportunities. This is slowly privatizing adaptation risks as was corroborated by the tea, sugar and other manufacturing subsectors. These industries working together with communities, have set up programmes in land, water, forest and energy conservation including investments in renewable energy. While ‘climate proofing’ of private sector investments is important, there are also emerging business opportunities in helping others to reduce their climate risks such as investments in surrounding communities in ecosystem management and provision of social amenities.

The private sector can provide financial resources for adaptation through investments, financial risk management, the commercial provision of capital and the philanthropic provision of resources through private foundations or corporate social responsibility. Additionally, through their investments in assets such as buildings, roads and agriculture land and business practices (for example, insurance, water management and agriculture practices) all which are sensitive to climate change, private sector can also play a role by adapting them to climate change (IFC, 2010).

Adaptation efforts are generating new business opportunities for the private sector especially under the Greening Kenya Initiative. There is expected increase in demand for water conservation expertise, new medicines, and other major infrastructure, insurance and risk management expertise, and water treatment technology.

The following is what companies can do and are doing to address climate change adaptation:

4.1 Autonomous Adaptation: Greening of Value Chains

Companies are unwittingly slowly adapting to climate change by greening their value chains. This autonomous adaptation by the private sector entails avoiding costs, managing liabilities and building resilience to climate change impacts by addressing climate risks throughout company operations and value chains, while at the same time increasing community resilience on which companies depend for supplies, workforce and customer base. Private sector is already adopting resource efficiency and cleaner production as ways of increasing resilience by incorporating energy efficiency, land and forest conservation, renewable energy and waste reduction to reduce operational costs of a business whilst promoting environmental sustainability.

Consultations under this study for example, revealed that already Kenya Tea Development Authority (KTDA) has invested in mini-hydros in 14 sites at a cost of Ksh. 1 billion each, all financed by farmers, construction of wetlands for wastewater treatment at a cost of Ksh. 33 million per unit and Ksh. 10 million for a compact wastewater treatment facility. In addition, it has made investments in biomass energy. The Authority has also invested in extension and education services through establishment of Farmers Field Schools (FFS) to educate farmers on soil and water conservation, planting of drought resistant tea clones, afforestation and agroforestry to mitigate against frost, establishment of fuel wood growing programme, insurance covers for both tea and tree against frost attack and drought.

Other interventions by other players such as James Finlays include: reducing water foot-print, piloting solar tea drying technology, private power generation, and corporate social responsibility in water catchment protection, provision of seedlings to communities among others.

Following the drought of early 2012, some tea industries such as James Finlays, are constructing water pans and micro-dams to harvest surface runoff. Some other measures include: efficiency improvements through purchasing fuel efficient vehicles, boilers, energy audits, energy saving jikos and so on.

The flower industry on the other hand is generating biogas from bio waste, rain water harvesting, adoption of resource-efficient farming technologies such as the use of hydroponic technology in farming where only the water needed by the crop is fed through drip irrigation. Crop water needs are determined by drip drain percentage calculations, use of evaporation pans, tension meters and soil augers that inform irrigation and chemical dosing cycles. The hydroponic drain water is also recycled.

Local and international market standards for flowers have become more stringent especially on water use during production, with the Water Resources Management Authority (WRMA) becoming more active in implementing water use rules for instance, on water abstraction permits, and installation of water meters by all growers for monitoring purposes. Also, global water and carbon footprint standards have been developed, and others are in the pipeline by Alliance For Water Stewardship, meant to guide the growers to be more environment conscious during production. The standards when embraced will enhance the industry image and profiling, leading to more acceptability by stakeholders and especially the international markets. The flower farms are also undertaking water catchment areas conservation and rehabilitation projects through a Payment For Ecosystem (PES) programme.

The sugar industry on the other hand is generating electricity from bagasse or making briquettes to run their boilers thus, substituting logs of wood or fossils fuels. Other factories such as Muhoroni in partnership with the Kenya Sugar Research Foundation, are planning on irrigating their Nucleus Estate plots using the factory treated wastewater effluent. It has also partnered with the neighboring distillery, Agro Chemical and Food Complex (ACFC) and are working out a formula for supplying steam and electricity to the distillery plant. This programme will maximize the organization's idle steam capacity as well as eliminate the usage of the fossil fuel by the distillery.

The sugar industry as a whole is involved in a programme dubbed "Improved Cane Varieties Programme" that is promoting cane varieties, which are drought and diseases resistant, early maturing and high yielding. In terms of infrastructure, all these agricultural sectors are rehabilitating feeder roads and drainage systems whilst conserving water catchment areas through tree planting. This programme is promoting planting of 15,000 trees along the Nyando River Bank.

The Green Economy therefore, which is now the focus of RIO+20, is poised to become the mother of all markets, the economic opportunity of a life time, because it has become so fundamental. Thus, resources and strategies adopted by Kenyan corporates to tackle climate change in both mitigation and adaptation can be a source of national and company level competitiveness. Example is provided by Denmark that used the energy crisis triggered by a spike in oil prices in the 1970s to move away from the over-reliance on fossil fuels. This in turn created new industries and export capabilities whereby now Danish companies are world leaders in products such as wind turbines (IFC, 2010).

Summary Box 3: Tree planting

The Kenya Tea Development Authority (KTDA), planned to plant ten million trees during the 2012 long rain season to protect the environment and increase forest cover that would counter frost attacks. Each factory has been asked to plant 150,000 seedlings of indigenous trees (KTDA, 2012).

4.2 Food Security and Stress-Resilient Crops and Livestock

Ensuring food security shall require a mix of interventions that include drought-tolerant crops and animals, sustainable agriculture and land use management (SALM) and diversification of livelihoods.

4.2.1 Drought-Resilient Animals and Crops

The private sector can offer enhanced financial and technical support in the provision of animal breeds such as the Zebu and Boran that are adapted to local conditions; drought- and pest-resistant indigenous crops such as yams, cassava, millet and sorghum, potato, pigeon peas and sweet potatoes, faster maturing crops that respond to shorter rainy seasons and providing storage facilities and value addition to stave off post-harvest losses. The KTDA has already introduced drought- and frost-resistant tea, the East African Breweries is providing a market by sub-contracting farmers to grow sorghum in Eastern Kenya as a raw material for its brewing.

4.2.2 Sustainable Agriculture Land Use Management (SALM) Innovations

Sustainable Agriculture land use management (SALM) activities are strategies that simultaneously increase adaptive capacity and reduce vulnerability whilst mitigating climate change. They therefore have co-benefits of mitigation and adaptation to climate change as some adaptation-driven agricultural technologies favour mitigation such as return of residues to fields that improves water-holding capacity, but also sequesters carbon into the soil. Other examples include; increasing soil organic matter content can both improve soil fertility and reduce impact of drought, improving adaptive capacity, making agriculture less vulnerable to climate change, while also sequestering carbon.

Agroforestry includes changing agricultural practices so that food crops are grown together with trees to improve soil fertility, enhance carbon sequestration and shift towards more efficient

agricultural water management. Private sector such as tea companies and NGOs are promoting this.

Case Study on Carbon Finance: SCC-VI Agroforestry project in Kisumu, 2003-2009

This is a project that was undertaken by SCC-Vi Agroforestry, a rural development NGO that facilitates, through participatory methods, the development of technical advisory services in agroforestry, sustainable agriculture production, farm enterprise development, rural financial services and climate change adaptation and mitigation. It piloted in 2003-2009, the Western Kenya Smallholder Agriculture Carbon Finance project under Bio Carbon Fund mechanism of the World Bank (a carbon project sequestering 490,500 tonnes CO₂eq under voluntary certification standard process targeting 40,000 small scale farmers in 6 divisions to the carbon market).

The project involved provision of agricultural extensions services through training and community empowerment services, provision of tree seeds, sensitization, participation in agricultural shows, farmer learning centres and farmer field schools. As a result, farmers became more aware of environmental issues and effects of climate change. Also covered in up-scaling of capacity building were institutions such as churches, schools, urban councils and health centres. This project, a characteristic of SALM activities, was expected within a period of 9 years of Emission Reduction Purchase Agreement (ERPA), to enable small-scale farmers to receive carbon payments (estimated at 1,962,000 USD) for advisory services as well as an economic carbon revenue distribution scheme for livelihood development.

4.2.3 Diversification of Livelihoods

Climate change is making some livelihoods unsustainable, but also creating opportunities for economic diversification to provide the rural population with alternative livelihood perspectives. Diversifying rural economies is being done through farming innovations, value addition to agricultural and livestock products, facilitating and supporting micro projects oriented towards mitigating risks.

Farming Innovations

Amiran Farmer's Kit: The Amiran Farmer's Kit (AFK) was created in 2007 in Kenya with the aim of allowing small-scale farmers affordable access to modern agricultural technologies, methods and inputs of the highest standard to grow greenhouse tomatoes. The kit, which costs between Ksh. 150,000-200,000, was developed by the Kenya Horticulture Development Programme (KHDP), agricultural inputs suppliers Seminis Seeds, Osho Chemical Industries and designed by Amiran Kenya Ltd. The AFK is a tailor made kit designed to meet the needs of the specific farmer or group of farmers by adapting the components of the kit to suit the climate, terrain, and agricultural experience of the farmer. The AFK incorporates innovative agricultural technologies including the Family Drip System (FDS), an easy to use gravity based drip irrigation system, a Farmer's greenhouse and top quality agro-inputs such as seeds, fertilizers and agro-chemicals. At Ksh. 150,000-200,000, the kit is expensive and out of reach of most farmers, calling for development of a cheaper alternative.

Innovating Livestock farming

Livestock farming especially pastoralism, is one of the livelihood activities threatened if innovations in the form of managing pasture and providing alternative fodder are not made.

Grazing management: Grazing areas in pastoral regions of the country are slowly diminishing due to climate change as well as poor management. Through a private-public-partnership, it is possible to develop tools to manage pastures in grazing areas. These tools include: (i) resource maps (ii) seasonal calendars (iii) grazing control.

Grazing management as an adaptation measure is provided by a case study of the NGO Food for the Hungry-Kenya (FH-Kenya) under its Pastoralist Livelihood Programme. Here, it works with community elders, environmental management committees, community leaders and local administrators to develop tools to manage pastures in grazing areas in northern Kenya. The tools they develop are:

- (i) Resource maps-the NGO works with the communities to identify their resource needs and produces resource maps that show where grazing land and water are in their locality. This helps community members to recognize the presence of resources that they did not previously know about.
- (ii) Seasonal calendars-rotational grazing prevents overgrazing as it allows grass cover to re-grow, an important factor in soil conservation. Seasonal grazing calendars explain when and where grazing takes place and for how long. Communities are trained to learn about the best times to graze (in both wet and dry seasons) and the level grass must be for grazing to take place. Therefore, the calendar allows communities to plan where and when to move animals to a particular site and what species of animals can be allowed (for example, browsers or grazers).
- (iii) Grazing control-FH_Kenya supports meetings attended by elders and the District Officer before every wet and dry season to determine how grazing should be managed. Guards are identified to enforce grazing rules to prevent overuse. Violators are fined cash or livestock fines. Those not accepting the orders of the elders' courts are referred to the Government administrators.

The challenges identified in the above arrangement are those related to the local culture that demands that a young man must bring animals from outside his village, often through stealing. The livestock theft results in conflicts which disrupts grazing management plans. There is also the problem of intruders from the surrounding communities. Lack of Government support for conflict resolution has been cited where some defaulters are not punished.

To resolve these issues, it is proposed that women and children should be included in the grazing meetings as young people are involved in grazing but do not attend the meetings. Attendance of meetings by Government administrators should be regular to ensure constant support in law enforcement and conflict resolution. Finally, the Government administrator should ensure all communities work together to plan their livestock movements.

Establishing fodder banks

Another role for the private sector is in developing emergency fodder banks from crop residues for use during the dry season. However, this will require the Government to improve road infrastructure to ease transportation.

Lined and covered water pans

In the ASAL areas, increasing the number of water pans (that is, holes or ponds dug in the ground, used to collect and store surface runoff from uncultivated grounds, roads etc) to provide watering points for animals and for domestic use is an urgent priority. Although this is already being done, the pans are few and far apart. Additionally, unlined pans lose a lot of water to the ground just like the open one also lose through evaporation. Provision of linings and possibly underground tanks can obviate this through public-private partnerships.

Innovating irrigation

The Ministry of Water indicated that there is need for enhancing water economy and productivity such as transforming into more water saving technologies; shift from furrow and basin irrigation into drip irrigation. Designs of new irrigation schemes should have a component of water storage for ninety days to reduce water conflicts during peak water requirements. It was noted that although demand management has been introduced through water pricing, adoption is still low as mechanisms to implement water pricing pose a challenge.

Modernization and rehabilitation of irrigation schemes and capacity building of Irrigation Water Users Associations for improved water management needs to be stepped up. Private sector is playing a role in the introduction of drip systems through greenhouses in the ASALs, catchment rehabilitation through a participatory and consultative processes as well as water harvesting

4.3 Providing Risk Management Tools

The primary example of private sector engagement in adaptation in Kenya is the insurance and finance industries. The global agricultural insurance totals \$7 billion, with Africa commanding a paltry 2 percent. Others are 4 and 3 percent for Asia and Latin America respectively. North America has 58 percent of the market, while Western Europe has 28 percent (IFC, 2010). The sector as a whole has recognized the need for action on adaptation.

The Financial Sector Deepening (FSD) Kenya programme is working to mature the financial-insurance industry with respect to climate change support. The FSD Kenya programme has been supporting an index-based weather insurance (IBWI) project in Kenya since 2008 in which, if a rainfall index, for example, falls below a certain level over a predefined period then an insurance payment is triggered. The project is currently supporting development and piloting of insurance products targeted at both livestock and crops. A number of private-public partnership (PPPs) pilot projects have come up in several sectors that need to be up-scaled. Companies are already developing special livestock and crop insurance schemes for risk-sharing aimed at making access to products and services more universal.

The following are some of the on-going Public-Private Partnerships:

4.3.1 Insurance

Poor or unreliable rainfall not only reduces crop yields, but can also deter farmers from investing in high yielding farm inputs, such as seed and fertilizer. In Kenya, a number of insurance policy products have been developed to cover these risks by a couple of insurance companies such as CIC and UAP. The insurance companies now offer weather-index-based insurance to small-scale farmers. This means that if rains fail, participating farmers can be

refunded what they spent on seed and other inputs and on the earnings they hoped to gain from their crop.

Case study: CIC Crop Insurance

CIC Insurance has a Crop Insurance product under a partnership with the Co-operative Bank of Kenya to finance and insure crops for farmers taking loans from the bank against yield losses as a result of adverse weather perils, such as drought, excessive rains, hail damage and fire.

Case study: UAP Index-Based Livestock Insurance (IBLI)

The weather index-based livestock insurance (IBLI) pilot project is being implemented in Marsabit by the International Livestock Research Institute (ILRI) with support from UK's DFID through the Financial Sector Deepening (FSD). Equity Bank and UAP Insurance are administering the scheme. These insurance products cover pastoralists against livestock mortality due to drought using the normalised data vegetative index (NDVI) innovation developed from satellite images, which determine when payouts occur.

Case study: UAP-Syngenta Kilimo Salama ("Safe Agriculture")

The "Kilimo salama" meaning safe agriculture, is a weather index-based micro insurance policy by UAP launched in 2010 for small-scale farmers in Kenya. The insurance product is designed to be affordable to deliver and administer using modern technology. These two technologies are unmanned weather stations and a mobile phone with unique software developed by a Swiss NGO, Syngenta Foundation, which allows the farmer to easily pay for his insurance premium to UAP using the Safaricom Mpesa service. The weather stations relay information to Syngenta Foundation and UAP that shows the amount of rainfall and detects either excess rainfall or none at all then signaling the need for the insurance company to compensate the registered farmers.

4.3.2 Risk Guarantee Schemes

In Kenya, commercial banks through a government directive are required to allocate 10% of their portfolio to agriculture. However, farming is still viewed as a risky business with very low return on investment. Although, Kenya Commercial Bank, Equity Bank, National Bank of Kenya and Chartered Bank of Kenya among a few, have recently introduced loans and other asset financing facilities to help farmers, this was not without some sort of risk-guarantee scheme. Among the initiatives that have succeeded is that by the African Green Revolution Alliance (AGRA) in conjunction with private banks.

Case study: AGRA's Innovative Financing Initiative

To make smallholder farming a business, farmers need access to affordable finance. Banks normally avoid lending to smallholders as they are considered too risky. AGRA is helping to change this by increasing the risk-appetite by banks through its Innovative Financing Initiative. AGRA's Programme for Rural Outreach of Financial Innovations and Technologies (PROFIT), is working to: lessen the risks of lending to agriculture, develop appropriate financial products for farmers, improve the performance of agricultural markets, and improve farmers' financial literacy. The programme's risk-sharing component is increasing the risk appetite by not only banks but also saccos and micro-finance institutions towards agriculture lending. The programme supports development of a range of innovative financial products such as savings and remittance services, community infrastructure loans, value chain financing, index-based-weather insurance. It aims at facilitating a sustainable basis access to credit by rural agro-based enterprises.

The initiative is helping to unlock millions of money from banks in affordable financing for smallholder-based agriculture. Credit guarantees, put up by AGRA and partners, leverage up to ten times their amount in low-interest loans. In Kenya AGRA is working with national partners to establish loan guarantee funds, which lessen the risk of lending. In 2008, AGRA and the International Fund for Agricultural Development provided US\$2.5 million each as

4.4 Financing Products

4.4.1 Venture Capital

To help fill in the massive deficit in funds for adaptation, private sector can support venture capital investments in new technology, although this is perhaps less of a priority in relation to adaptation since many of the technologies and practices needed to reduce vulnerability to climate impacts are already available.

4.4.2 Bonds for Infrastructure Financing

With climate change impacts, roads and bridges have been swept away cutting off communication to certain parts of the country. Further, floods have also displaced people from their homes every time higher rains than normal are experienced calling for construction of more resilient houses, hydro dykes, canals, and big dams for irrigation. Even with all these negative impacts, the concept of climate-proofing Kenya's infrastructure has not caught on. These type of projects cannot be financed by short-term loans and therefore need long-term financing such as bonds that mature in more than seven years. Initial findings indicate lack of adequate financing but also inadequate knowledge of climate change adaptation issues. Off budgetary financing such as concessions and infrastructure bonds, has therefore become of necessity in order to meet the challenge of the growing road traffic. Private sector participation in financing infrastructure delivery on commercially viable terms has been found to be critical in bridging the financing gap.

Concessioning (Build-Own-Operate and Transfer Framework or BOOT)

Kenya Roads Act (2007) allows for private sector participation in road sector improvement through Concessioning (BOOT Framework). The Government procured a contract for the first Nairobi Urban Toll Road Concessioning Project under private financing (Southern bypass). The Southern bypass (30 km) starts on Mombasa road near the former American Embassy and ends on Naivasha road after Kikuyu town. The other concessioning arrangements are also being implemented.

Infrastructure Bonds

Bonds are sourced from local funds and are therefore non-risky cheap funds since they are not subject to currency fluctuations and are pegged on treasury bill benchmarks. Bonds are being made attractive by allowing investors to redeem periodically so as to give somebody liquidity. The bonds are also tradable in the stock exchange.

Infrastructure Bonds have been successfully issued in Kenya since 2009 when the first bond was issued to raise Ksh. 18.5 billion, to fund specific projects in roads, energy, water, and irrigation sectors. Findings from the Ministry of Finance indicate that four infrastructure bonds amounting to Ksh. 82 billion have been issued so far to fund various projects. The Budget for financial year 2011/12 specified that the Government will raise through domestic borrowing, Ksh. 119.5 billion.

The Bond was listed at the Nairobi Stock Exchange (NSE) and is trading. To make it attractive, investors wishing to redeem their holdings early and are unable to sell them through the NSE,

are allowed to rediscount their Bonds at the Central Bank of Kenya at the rate of 3 percent above the coupon or prevailing market yield, for the respective maturity. Holders of this Infrastructure Bond may pledge it as collateral for credit facilities to a financial institution licensed and operating in Kenya.

4.5 Resilient Goods and Services

Companies are involved in designing, manufacturing and distributing goods and services that can help reduce the vulnerability of individuals and communities to climate change. These include investments in water resources such as, water purification machines, wastewater treatment and recycling, development of irrigation machines, down-scaled weather information to farmers to guide timing of planting dates. Some of these companies include: Ecotech, Davis and Shirtliff, Water Solutions among others.

4.6 Information Generation and Dissemination

Private sector can contribute data and information on risks, exposure, and adaptation solutions and advice on policy and regulatory frameworks. For instance, in terms of information, mobile phones have helped respond to disaster like the Kenya's "Ushahidi" to relay real time information during the year 2007/8 post-election violence hotspots. They are also used to relay information about prices of agricultural commodities and weather information especially by NGOs such as the Red Cross.

5.0 How To Effectively Engage The Private Sector

Companies, Ministries and other support institutions proposed a raft of barrier removal measures that are necessary for private sector to be effectively engaged in climate change adaptation. From the Private Sector Workshop held in Nairobi on 9th May, the individual interviews, and the questionnaire sent out, proposals emerged that include awareness raising and information dissemination, technical capacity building and enabling policies and regulations that incentivize adaptation.

5.1 Information Dissemination and Capacity Building

5.1.1. Data Availability and Providing Decision-Relevant Information

The first priority identified is to fill information gaps and build awareness in each economic sector on climate change adaptation so as to support the efforts of the private sector to implement adaptation priorities. Publicity of these in a form that will encourage business engagement through apex agencies such as the Kenya Private Sector Alliance (KEPSA), and other industry associations such as the Kenya Flower Council, KTDA, Kenya Sugar Board and KAM is necessary. This information should be packaged to best support effective decision-making under climate uncertainty by each sector. Farmers and companies under KEPSA requested for support for community-based informational strategies such as:

- building or enhancing systems for conveying climate information to rural populations through for instance, mobile phone updates
- establishing a climate change platform to share experience on mature and successfully implemented good practices

The Government, in particular the Meteorological Department (MET), can play an important role in generating and aggregating reliable climate change information. Dissemination to the private sector however, may involve close collaboration with Ministries such as Agriculture, Livestock, Transport, and Roads to tailor-make information to specific needs of businesses. This is more so because the MET department's role revolves around weather information production and suffers limited interaction with the public. It forecasts the weather and is not responsible for responding to the effects of its forecasts. The role of dissemination has to be played by others or a purposefully established arm of Government. Non-Governmental Organisations such as Red Cross and Oxfam use this information a lot. Red Cross, the single largest user of Met data, has even gone further and not only made this information available in the internet and in social networking sites, Facebook and Twitter but also has mobile updates. This is giving a challenge to the MET department to package its information in a readily available version as today's consumer prefers.

Other information needs by companies include:

- Anticipated magnitude, frequency and range of variability of climate change impacts.
- Risks that climate change poses to companies' operations and supply chains in various sectors, and potential effective solutions
- The adaptation needs of vulnerable communities for purposes of types of crops to plant, onset of planting seasons, locating grazing land or preparing fodder banks
- The types of private sector adaptation solutions that will benefit sustainable development
- Maladaptation, and how companies can avoid it.
- Public financing options available to companies to support and leverage their strategic adaptation-related investments

The insurance industry indicated that good data, forecasts and modeling capabilities are critical. From the individual consultations, questionnaire and the Private Sector workshop, it became clear that accurate data are not readily available to enable insurers to assess the risks more accurately. The increasing frequency of climate-related events requires new models to interpret data that is available and extrapolate forward. This lack of reliable data affects a number of different elements of the insurance system, including a critical part of indexed insurance products, the calculation of an appropriate level of basis risk. The lack of domestic expertise to understand, model and price insurance products is also a big constraint. Syngenta, which runs the 'Kilimo Salama' insurance programme voiced this serious concern.

Better weather data will reduce basis risk for clients and encourage improved reinsurance rates. Automatic reinsurance is needed to permit greater flexibility in writing new contracts and portfolios. Finally, the government should revise its subsidy policy for yield-insurance products, which undermines the weather insurance market.

5.1.2 Platform for Strengthening Interaction between Private Sector and Government

Interviews and consultations with the Ministry of Finance, Industry, Agriculture, Northern Kenya and ASALs, and Environment and Mineral Resources reveal a perception by Government that private sector is too focused on profits and short-term plans with quick returns on investment. That demands are still very one-sided with private sector not bringing much to the table but asking Government to put down a lot. The private sector on the other hand, cited in this study that the link between them, Government and research institutions is very weak and not effective and that climate change adaptation needs to make business sense.

The sector in Kenya has had limited engagement in adaptation discussions to date despite the fact that its engagement can increase the likelihood of achieving successful, sustainable approaches to addressing climate change, and will give businesses a higher stake and buy-in to the approach. Effective adaptation will require engagement of all types of businesses through an appropriate platform. While on certain issues a periodical sector-by-sector (for example, tea, flower, forestry, infrastructure, housing, water and so on) consultation approach will be appropriate because adaptation needs and solutions can be sector-specific, it will also be important to train the sectoral associations, and to stimulate cross-sector discussions to identify broader adaptation needs and linkages between different parts of the economy and society.

The Government can also engage and build capacities of communities and civil society through multi-stakeholder County Development Committees or the County Environment Committees, increase their understanding of the valuable role the private sector can play in advancing these shared goals, while building their capacity to participate in climate change dialogues and ensuring a 'level playing field'. This shall ensure that community and civil society voices and views are not crowded out by their private sector counterparts. Further, the existing Government-Private Public Dialogue (PPD) platforms in the Ministries, Office of the President and that of the Prime Minister can be used to identify shared adaptation challenges and solutions. The Ministerial Stakeholder Forums (MSFs) comprising of Non State Actors (NSAs) from the private sector, civil society, media as well as religious groups can be used to address issues of climate change, and to stimulate cross-sector discussions to identify broader adaptation needs and linkages between different parts of the economy and society.

In addition to a dedicated platform proposed, the following existing engagement mechanisms can be used to promote climate change agenda:

1. *Presidential Private Sector Working Forum* - a forum where the President meets with select private sector representatives bi-annually to discuss the general economic climate in the country, as well as fast tracking private sector issues that have been agreed upon under various fora.
2. *Prime Minister's Round Table (PMRT)* – The Prime Minister together with several Cabinet Ministers meet with several private sector players on a quarterly basis to discuss the National Business Agenda (NBA); thematic issues and other areas of concern to the private sector and Government, and agree the way forward. This is the main platform for dialogue in the country.
3. *Ministerial Stakeholders Fora (MSFs)* – The line ministries meet with the various sector boards of the private sector. Meetings are held bi-monthly at the ministries, co-chaired by the minister and a member of the private sector.
4. *Speaker's Round Table Meetings* - it is aimed at creating a forum for the private sector to engage with the law makers to mainly participate in law formulation where possible through the Parliamentary Departmental Committees.

However, some ministries have not fully embraced and institutionalized MSF due to lack of a clear institutional framework. The study established that even when these are institutionalized, there will still be need for a platform dedicated to private sector and climate change issues.

An interview with the Kenya Flower Council Chief Executive Officer, also revealed similar challenges in the floriculture industry and advised that any capacity building intervention should take advantage of regular sector platforms so that climate change adaptation is not seen as an extra burden.

5.1.3 Provide Case Studies on Climate Change Adaptation

A process of social learning is required to help inform businesses about what works and what does not. So far, the limited but growing on-the-ground experience of the private sector in climate change adaptation has not been consistently documented or articulated. To support market development, organisations such as the Kenya National Cleaner Production Centre and others in the climate sector should be supported to identify, generate and make widely available case studies of private sector adaptation, through electronic and print media, online database or clearinghouse. 'Success stories' that highlight how companies have adapted in ways that promote the public good and simultaneously gained public esteem and community support will inspire other companies and underscore the fact that adapters have a competitive advantage. Examples of investments that did not pay off as expected may be even more useful. Rewarding excellence in this area with incentives (for example, prizes or competitions) may be an effective way to galvanize additional private sector interest and recognition.

5.1.4 Analytical Work on Costs and Benefits of Adaptation and Value of Ecosystem Services

The Government and particularly the Ministry of Planning, should consider supporting analysis of the economics of climate change adaptation, particularly the costs and benefits of different adaptation options (including co-benefits for the green economy) in specific locales at the sub-national level, with full accounting for environmental costs and benefits. Ultimately, companies will use cost-benefit analysis to determine the return on their adaptation investments. Concurrently, it will be important to refine methodologies for identifying and valuing ecosystem services, which is an essential step in assessing the complete range of costs and benefits of adaptation measures. Ecosystem-based adaptation involving investments in natural systems to build resilience (for example, wetlands and forests to store and naturally filter water), is often cheaper and offers higher and more permanent rates of return than hard infrastructure solutions. Valuation of ecosystem services will be required for the country to introduce incentives for businesses to make decisions that reflect the environmental costs and benefits of their actions.

5.1.5 Building Capacity of Large and Small Businesses to Engage and Act

The study found out that majority of companies more critically, the micro- and small in Kenya have not yet understood and considered both the impact of climate change on their existing activities and new investment opportunities arising therefrom. Technical interpretation of climate change issues and in particular, climate change adaptation is not clear. There has been general disengagement of the private sector from climate change adaptation because of the perception that it involves mainly social issues that loosely fit in their Corporate Social Responsibility (CSR). Programmes being implemented by companies are considered as part of general risk management and competitive positioning.

To overcome this challenge, relevant institutions such as the National Environmental Management Authority (NEMA), Ministry of Environment and Mineral Resources (MEMR) and the Kenya National Cleaner Production Centre (KNCPC) should be brought together to develop and refine information formats and dissemination strategies. Professional staff in these institutions should be trained to function as 'translators' of scientific concepts on climate variability and change into operational activities. This will enable companies to refocus their CSR programmes to address climate change adaptation that include greening their value chains.

Business associations such as KEPSA and sector associations must play an important role in building the climate change adaptation capacity of their members through among others, training. However, the Government shall need to provide businesses particularly, micro and small enterprises and their associations with tools to enable them to participate effectively in climate change dialogues and planning, and to use climate change impact information to make business decisions. These tools include training, extension services, web-based resources, mobile phone-based resources, climate risk assessment and adaptation planning tools, and other resources. Successful models can be replicated.

5.1.6 Building Adaptive Government Institutions and Climate Proofing Programmes

Change in structure and function of many national institutions is necessary to address the decision-making challenges posed by climate change, and to meet the needs of poor and vulnerable populations. This will be best spearheaded by the Coordinator of Government functions, that is, the Office of the President or in the current case, Office of the Prime Minister. For example, it is not enough to have just a 'climate-change desk in every Government Ministry; more restructuring is required for each Ministry to 'climate proof its programmes'. Further, there are concerns that the Designated National Entity (DNA) in the National Environment Authority (NEMA) is not effective. Most institutions therefore, need help to shift incentives, take on new mandates, and build capacity to support the process of integrating climate risks into their day-to-day activities.

The Kenya Meteorological Department is unable to give accurate information due to obsolete equipment, a lack of funds and staff shortages. The agency needs to increase its ground station networks from thirty-nine synoptic (24 hours) stations to ninety four, two for each county. The seventeen agro-meteorological stations and one thousand rainfall stations set up in high potential areas need to be expanded to cover the arid and semi-arid lands (ASAL) of Northern, Eastern and Coastal regions that are prone to disaster. On staffing, a freeze on recruitment has seen a fall from one thousand to seven hundred in 2012. There is a shortage of about forty professional meteorologists and other technical staff (DKMD, May 20, 2012). It is also reported that the only weather radar installed to serve Jomo Kenyatta International Airport stopped functioning twenty years ago. Such a radar is important to capture weather variations in rapidly changing situations like a storm; three radars are required to cover the entire country with the cost of one radar being enough to run the current Government budget levels for three years.

In the financial sector for example, as indicated by the commercial banks and Ministry of Finance, there is a general lack of capacity to identify and evaluate projects in terms of climate change adaptation investment opportunities and their risk profiles. Thus, developing appropriate financial products for such projects as biogas, solar, other alternative energy and wastewater treatment is difficult. In addition, these banks rely majorly on short-term deposits, which limit their ability and willingness to structure financial products with the longer tenure that is typically needed for investments in climate change adaptation. It is therefore important that any financing initiative in terms of a dedicated credit facility for banks is done in conjunction with capacity and knowledge building of climate change project finance/assessment capabilities.

On the demand side, adaptation needs of various sectors must be made more transparent to potential funders and development partners. Thus, it could be useful initially to collaborate with organizations (for example, the partnership between IFAD, AGRA, Equity Bank and Government in the development of innovative financing products) that have considerable experience in development projects and have the networks and relationships needed to connect with adaptation projects. The multilateral and bilateral development banks such as World Bank, IFC, AfDB could play this role, at least until Kenyan private financial institutions themselves

become more familiar with the climate change adaptation markets they are targeting. Over time, these national actors could develop experience and take on this role, as they do for traditional markets.

5.1.7 Improving Infrastructure, Extension Services and Value Addition

Operational issues touching on infrastructure, extension services, affect both agriculture and pastoralism. Farming in Kenya is predominantly subsistent where issues such as weather forecasts, land preparation, crop management, risk mitigation, poor distribution channels and value addition are not well considered. Government technical support in the form of extension services that existed before is lacking. An example is given by a farmer in Naivasha who did not know of Kephis's presence in Naivasha and that they can do a soil mineral profile for his farm. To boost farming and enhance resilience to climate change, the Government needs to revisit the policy on agricultural extension services with a view to strengthening and expanding it. Proper marketing and distribution channels for agricultural produce should be put in place and road transport improved.

Pastoralism upheavals on the other hand, are taking place under an inadequately developed service infrastructure, with poor market linkages and weak ill-prepared institutions. The animal off-take during droughts need to be made regular and be done at the time when animals are healthier. For these communities, Government in conjunction with private sector will need to consider providing alternative water sources plus fodder such as, hay-making and cattle dips, mobile veterinary services and guidance on suitable type of animal breeds for various ecological zones. Further investments need to go into value addition of beef rearing such as sanitary abattoirs, enhancing provision of disease-free zones for export market and quality control.

In other agro-ecological zones, support should be provided to industry to add value to agricultural produce to cushion them during the dry seasons such as coffee, tea, milk. This can be done under the Ministry of Industrialization Framework of 'one product one village' for value addition.

5.2.8 Capacity to Redefine Corporate Social Responsibility

Many companies in Kenya have a long-standing commitment and record of accomplishment in the areas of environmental sustainability and corporate social responsibility (CSR). However, many CSR efforts are little more than public relation campaigns designed to promote corporate brands. Climate change and its resulting impacts will test business' ability to deliver products and services but also substantially impact CSR efforts alike. Some large companies such as those in the tea, sugar, coffee and flower sub- sectors are already working to understand their climate change risks and opportunities. The same is not so for majority of the business particularly, the small- and micro- enterprises.

Companies also need to understand the issues of adaptation at global and operational levels and develop effective systems for governance and decision making on responses to climate change. They have an opportunity to solidify the linkages between their business activities and CSR strategies and to add urgency to existing efforts.

Adaptation activities under CSR may relate either to ensuring the resilience of business operations, or the provision of technologies or services that assist in the adaptation in vulnerable communities such as water, crop, animal husbandry and conservation solutions, providing social amenities, applying finance and technology to build more resilient infrastructure and networks. Thus, productive engagement with vulnerable communities on

climate change adaptation and resilience building and ensuring that business activities do not exacerbate climate vulnerability can be viewed as new components of the evolving definitions of good corporate citizenship and social and environmental accountability.

5.2 Policy and Regulatory Mechanisms

5.2.1 Policy Options

Effective policy and regulatory frameworks to promote private sector engagement in adaptation and discourage maladaptation will necessarily be diverse. A menu of options to be considered, partly brought out at the private sector workshop held on the 9th May 2012 and partly derived from UNEP Finance Initiative (2006) include the following:

- *Technology Innovation:* Developing technology policies that support research and innovation in climate change adaptation, building knowledge-sharing platforms by research institutions as well as by the National Council for Science and Technology
- *Integration:* Integrating explicit recognition of climate risks into government decision-making and existing processes, including project appraisal, environmental impact assessments, public procurement and government contracts
- *Pricing of Natural Resources:* Reviewing and revising policies that may encourage maladaptive economic behaviours (for example, costing of ground water resources that is dismal).
- *Mainstreaming:* Mainstreaming analysis of climate risks and risk mitigation measures across sectoral policies including water, forestry and coastal management; disaster preparedness; land use planning; industrial policy; building codes; and infrastructure development
- *Accounting for Ecosystem Services:* Requiring companies to account for ecosystem degradation within their operations and supply chains and to internalize these costs, particularly in the context of climate change-induced stresses; setting the 'rules of the game' through which payments for ecosystem services can occur (for example, whereby a company might pay a community to conserve an important watershed upon which they both depend). This can be done through the annual environmental audits required by the existing Environmental Regulations for every facility
- *Development of Financial Services:* Ensuring a supportive policy and regulatory environment for the development of financial services such as micro-insurance and micro-finance, which can be deployed to support pro-poor climate resilience using public sector financial commitments and conducive tax regimes as necessary and appropriate
- *Disclosure of Climate Risk:* Encouraging companies to disclose climate risks (that is, the risks climate change poses to their operations and supply chains, as well as the risks their business activities may have on the climate resilience of vulnerable communities) in a standardized, comparable, disaggregated format to their stakeholders; and report on actions being taken to address those risks

5.2.2 Scaling-up Financial and Risk Reduction Incentives

To stimulate business engagement in areas which are new and thus may be subject to additional costs and risks, it may be necessary to have policies that alter projects' risk-reward profile and to introduce schemes designed to 'pay the innovator or simply to share risks.' The need to 'pay the innovator' just like the carbon market provides incentives and rewards for innovation, finding

ways of rewarding private sector actions will enhance adaptation necessary to massively scale up private sector engagement.

Incentives that help demonstrate and build the commercial viability of private sector adaptation efforts can catalyze the inflow of such investments as has been demonstrated by the AGRA risk guarantee scheme. Over the long term, such incentives may be phased out because perceived risks will be reduced and resilient businesses will be more profitable. There is therefore need for a dedicated fund for risk guarantee, awareness and training of communities and farmers as many of them do not understand the concept of insurance and have little or no previous experience, provision of accurate weather data, and improving infrastructure. Poor infrastructure makes it more challenging to access the rural area to provide extension services.

Specific financial and risk mitigation incentives identified that can be applied to the issue of climate change adaptation include:

- Extension of credit lines to commercial financial institutions and loan or credit guarantees to help businesses secure financing for investments in adaptation.
- Concessional loans or matching funds for companies to incentivize adaptation investments
- ‘Green bonds’ to raise socially and environmentally responsible capital for private sector (or public-private) adaptation projects
- Grants or subsidies for research and development of adaptation products and services
- Seed capital for adaptation-focused enterprises or venture capital/equity funds to support adaptation
- Tax credits, say on taxable income for strategic adaptation investments in operations and supply chains, or for investments in development of adaptation technologies
- Innovation competitions and prizes for development of new, adaptation-relevant technologies
- Pricing guarantees or purchase agreements for infrastructure or services

To determine up-front the combination of these tools that will be most effective to leverage private financing, some piloting will be required but also the need for in-depth, sustained engagement with the private sector as a key stakeholder.

The Ministry of Water for example, indicated that consideration should be made for financial assistance to private sector for the development of bulk water supply infrastructure for irrigation alongside the creation of autonomous private water agencies to supply water for irrigation. Also provision of appropriate credit facilities to farmers should be done for up-scaling irrigation technologies.

At sectoral level, stakeholders proposed specific incentives and roles that the Government can play to effectively engage private sector as shown in Table 2 while Table 3 generally clusters actions into information and capacity building, policy and regulatory mechanisms and removal of financial barriers.

Table 2 Proposed Adaptation Government Incentives and Roles at Sectoral Level

Sector	Priority	Government Role
1. Agriculture and Rural Development	<ul style="list-style-type: none"> • Irrigation • Flood protection • Energy scarcity 	<ul style="list-style-type: none"> • Give climate change a livelihood dimensional definition to make it more familiar • Manage conflicts over natural resources • Fast-track finalization of all climate change oriented

		<p>policies</p> <ul style="list-style-type: none"> • In ASAL areas link conservation to enterprise development, provide water and improve road transport • Incentivize design of cheaper versions of greenhouses than Amiran greenhouse kits
2. Tourism and wildlife	Ecosystem viability	<ul style="list-style-type: none"> • Provide incentives to land owners in order to establish wildlife corridors through private or community land • Incorporate climate change into Vision 2030 and not only through Medium Term Plan (MTEP)
3. Insurance & Finance	<ul style="list-style-type: none"> • High risks • High claim ratios due to poor risk estimation • Low awareness on finance and insurance 	<ul style="list-style-type: none"> • Develop incentives for development of more climate change insurance products • Set up a guarantee fund for training Kenyans on financial education and insurance in climate change • Provide correct climate change data and make it a public good to enable accurate risk estimation e.g. river flooding • Incentivize private sector to run rain gauges within a code of conduct • Develop a policy and facilitate private sector to establish more weather stations that are coordinated by the Government
4. Manufacturing	<ul style="list-style-type: none"> • Resource scarcity (energy, water, raw materials) • Technology cost • Poor infrastructure • Scarcity of industrial land • Glut of goods during rains e.g. milk 	<ul style="list-style-type: none"> • Provide incentives for resource efficiency and cleaner production • Set up a fund managed by small banks for cleaner technology access • Improve roads and rail transport • Set aside industrial land and facilitate easy access • Encourage off-season production • Expand alternative energy sources, give remission on import of green energy inputs
5. Water	<ul style="list-style-type: none"> • Water scarcity during droughts 	<ul style="list-style-type: none"> • Provide and implement a policy for bulk engagement of private sector as water suppliers (for instance, Kenya Women Finance Trust gave loans to private sector to supply water to farms in Mt. Kenya. Farmers are paying for the supply) • Engage private sector as trainers in irrigation and water catchment management among others
6. Flower	<ul style="list-style-type: none"> • Water scarcity • Energy scarcity • Poor infrastructure 	<ul style="list-style-type: none"> • Develop a policy and regulatory framework on Payment for Environmental Service (PES) for water catchment protection • Up-scale PES demonstration activities such as

		<p>Imarisha Initiative, Naivasha</p> <ul style="list-style-type: none"> • Provide incentives for alternative energy development and use such as green or cleaner energy
7. Forestry	<ul style="list-style-type: none"> • Deforestation • Wood technology 	<ul style="list-style-type: none"> • Provide incentives for REDD+ in the form of PES in Mau catchment protection • Expand on afforestation programmes • Build private sector capacity on efficient wood technology
8. Tea	<ul style="list-style-type: none"> • Production loss due to frost & drought • Scarcity of energy 	<ul style="list-style-type: none"> • Set up Government agroforestry programmes in tea farms • Support introduction of drought & frost-resistant tea • Stimulate private sector investment in afforestation • Incentivize setting up of mini-hydros for power (already 14 sites are on-going financed by farmers) • Incentivize crop insurance
9. Dairy	<ul style="list-style-type: none"> • Milk glut and scarcity during rainy and dry seasons 	<ul style="list-style-type: none"> • Incentivize off-season production • Incentivize value addition during glut
10. Technology for adaptation	<ul style="list-style-type: none"> • Unavailability of appropriate technology 	<ul style="list-style-type: none"> • Basic research • Incubator stage funding
11. Cross cutting issues	<ul style="list-style-type: none"> • Scarcity of understandable information 	<ul style="list-style-type: none"> • Make information on climate change adaptation readily available and easily understandable • Make partnership with churches, mosques to disseminate climate change information • Invest on climate change market intelligence • Provide popular versions of climate change adaptation plan and private sector engagement reports • Provide a platform on which public-private sector engagement can take place

Source: Private Sector Workshop 9th May 2012

Table 3 A Cluster of Government Action Plan on Climate Change Adaptation

Private Sector Issue	Government Intervention	Timing	Actors
1. Information and Capacity building	Availing climate data and decision relevant information	Immediate	MET, Sectoral Ministries
	-Building capacity of businesses to translate the growing body of science on climate impacts into tools for business management	Immediate	MEMR, NEMA, KNCPC, OPM
	Establishing a climate change platform for strengthening interaction	Immediate	NEMA, OPM
	Developing and providing case studies on climate change adaptation	Immediate	KNCPC, NEMA, MEMR
	Undertaking analytical work on costs and benefits of cc adaptation & value of ecosystem services	Immediate	Min. of Planning
	Building capacity of large and small enterprises to engage and act	Immediate	OPM, Ministries
	Building adaptive Government institutions and climate proofing policies and programmes	Immediate	Ministry of Planning
	Improve transport, revisit agriculture policy on extension services	Medium/ long term	Ministries of Roads, Agriculture
	Develop a policy on good corporate governance to refocus Corporate Social Responsibility towards climate change	Medium term	Ministry of Planning
2. Policy and regulatory	-Develop supportive adaptation technology polices	Long-term	All Ministries
	-Mainstream climate change in Government Ministries and in decision making	Long-term	

mechanism	-Put in place technology innovation policy supportive of climate change adaptation	Long-term	Responsible Ministries
	Incorporate in draft Environment Policy, internalization of environmental costs and disclosure of climate risks by companies	Medium-term	NEMA, OPM
	Mainstream PES into policies: Land Use, Irrigation, Water, Forest, Agriculture and EMCA		
3. Financial barriers	Develop a policy on financial incentives for climate change (credit lines, concessional loans, green bonds, research grants, seed capital for adaptation-focused enterprises	Medium to long-term	Ministry of Finance

6.0 Determining Adaptation Costs

6.1 Private Sector Adaptation

Whereas it is beyond the Terms Of Reference (TOR) of this assignment to establish a priori the costs of private sector adaptation in Kenya, there is a recurrent theme that emerges that will pose challenges for establishing these costs. The fact that adaptation and socio-economic development are issues that need consideration in determining the costs of climate change impacts. It looks imperative that socio-economic growth shall be greatly influenced by climate change in Kenya as already the country is experiencing adaptation deficits i.e. insufficient adaptation to the current climate regime.

It has been argued that, most adaptation costs either by UNFCCC or World Bank are an underestimate. Estimates have tended to ignore overlaps between adaptation and development and focus on incremental adaptation over and above a vaguely defined baseline that includes climate-relevant development programmes (Parry et al, 2009). Incremental adaptation costs for the private sector in Kenya is even less forthcoming. There is therefore a need for a study not only covering national climate change adaptation costs but also estimating the private sector contribution. The choice of study methodology could take a “top-down” approach that projects forward increases on current costs and augmented by “bottom-up” approaches comprising individual processes of adaptation of representative sites, enterprises and adaptation options. The challenge here could be that locally costed case studies are scarce.

Indicating the possible fraction of private sector costs, the study could adopt the top-down UNFCCC approach of 2007 that estimates climate change adaptation up to the year 2030. However, the major problem in the UNFCCC approach is the absence of case studies to test the top-down form of UNFCCC analysis.

An indication of the private sector adaptation costs in various programmes can be derived from case studies that follow.

6.2 Cost Estimates from Case Studies

6.2.1 Agro-Forestry Extension Costs

This case study provides cost estimates of a single adaptation action, agro-forestry extension service. SCC-Vi Agroforestry estimates investment in extension services to farmer households in the rural areas in a year is USD 9,595/household excluding other costs. The investments provided in Table 4 include: staff costs, capacity building, administration and management while part of it is to subsidize service delivery costs to the households.

Table 4: Cost of agricultural extension services

	Item	Annual costs (USD)
1	Implementation costs	17 USD/household per year
2	Capital costs (staff, admin. Management, motorbike)	9,595
3	Training & community empowerment services	3*capital costs
4	Monitoring & evaluation	2-3% of the budget

Source: SCC_Vi Agroforestry, 2010

SCC-Vi Agroforestry provides a case which demonstrates richness in approaches and potential to scale up. However, scaling up of agroforestry and sustainable agriculture land use management (SALM) innovations is far more complex than simply transferring information and planting material; it often entails building institutional capacities in the community for promoting and sustaining the innovation and adoption process. The NGO estimates that the total budget needed to reach all sub-locations in the country up to 2019 is USD 260 million. This approximates to USD 26 million per year for humid to semi-humid areas but if semi arid areas are included, this figure increases to USD 59-73.

The interventions paid for, are based on sustainable agricultural land use management practices that mitigate atmospheric carbon and reduce vulnerability of farmers through enhancing their adaptive and resilience capacities to cope with impacts of climate change. SCC-Vi Agroforestry has been able to upscale the activities that manage land in western Kenya through carbon funds, which eventually mitigate greenhouse gases and enable farmers adapt to effects of climate change. The carbon funds target establishment of soil, tree and agriculture biomass carbon pools for direct and indirect climate change mitigation as well as livelihood values (improved agricultural productivity) or benefits reducing communities’ vulnerability to climate variability risks such as drought, diseases and floods.

The investment cost for scaling up programme like the SALM of SCC-Vic Agroforestry could use Carbon Fund and specifically, the Bio Carbon Fund mechanism by the World Bank. The Bio Carbon funds target establishment of soil, tree and agriculture biomass carbon pools for direct and indirect climate change mitigation as well as livelihood values (improved agricultural productivity) or benefits reducing communities’ vulnerability to climate variability risks such as drought, diseases and floods.

6.2.2 Industry Allocation

Estimate of additional inputs/costs that the company is incurring in dealing with climate risks was given through pilot projects Muhoroni Sugar Company is implementing to adapt to climate change. This estimate is given in Table 5:

Table 5: Costs of Climate Change Adaptation, Muhoroni Sugar Company

Project	Details	Cost/yr (Ksh.)
Agro – Forestry Projects	Planting 15,000.00 tree seedlings along Nyando River Banks	0.60 million
Cane fires Protection Project	Hiring 40 employees to guard the Nucleus Estate cane against accidental fires throughout the year	5.00 million
Soil Conservation Project	Enriching the depleted soil in Nucleus Estate plots with cane filter mud	3.20 million
Land Conservation Projects	Continuous rehabilitation of the feeder roads and drainages within Muhoroni cane catchment region	25.0 million

Source: Muhoroni Sugar Company, 2012

6.3 Payment for Environmental Services

An indicative estimate can also be obtained from the costs incurred in what the private sector pays to enjoy environmental services. Thus, as private sector develop innovative funding mechanisms, other sources of funds to implement adaptation actions could come from the Pro-poor Rewards for Environmental Services.

6.3.1 Pro-poor Rewards for Environmental Services

Payments for Ecosystem/Environmental Services (PES) is a mechanism where rewards are transferred from those who benefit from the environmental service to those who manage it. It aims to change the incentives for land use in order to maintain or restore the desired environmental service.

There is growing interest in payments and rewards for environmental services in ensuring that watersheds and forests continue performing their crucial, life-supporting functions. It is generally agreed that the fate of the environment lies at the hands of smallholder farmers and communities residing around these natural resources. With time, and when accommodated in the country's environment policy, PES schemes will begin getting implemented across the country.

Case Study: Payments for Environmental Services (PES) at the Sasumua watershed

The Pro-poor rewards for environmental services in Africa (PRESA) project at the World Agroforestry Centre, has been instrumental in providing evidence on the effectiveness of the Payment for Environmental Services (PES) initiative which aims at rewarding communities that protect essential environmental services. One of the project sites has been the Sasumua watershed that supplies Nairobi with 20 percent of its water requirements.

At least half of the Sasumua catchment area is under cultivation, hosting a high population growing at 3.5 percent annually. The average farm size is 2.86 acres. Polluted runoff from small towns and farms results in high rates of sedimentation, high bacterial count and high water treatment costs. The major pollutants are biological and soil materials from agricultural fields, bacteria from human and animal waste, and metallic content from roads and garages. Since 2008, the Pro-poor Rewards for Environmental Services in Africa project (PRESA) has been conducting research into possible payments for environmental services (PES) at Sasumua. PRESA is facilitating dialogue between the Sasumua catchment community, who are potential environmental service sellers and the Nairobi Water Company, which is the most likely buyer.

Certain interventions, such as building a grass waterway 20 kilometers long and 3 meters wide are reducing soil sedimentation by 20 percent. Desilting of small upstream dams, is reducing sediments, thereby improving the quality of water flowing into the Sasumua reservoir. Implementing these measures is costly to farmers but, in a PES scheme, the water company could compensate communities for land use measures that reduce sedimentation. With reduced sedimentation, the Nairobi Water Company could incur lower water treatment costs. The savings gained could be the source of funds to compensate farmers.

However, such benefits cannot be realized due to existing policy and institutional gaps within the water sector. For example, community participation in water resource management is provided for through the Water Resource User's Association (WRUAs) but it is not clear whether these communities, majority of who are small-scale farmers, should directly receive payments for improving watershed services. The country's environment policies do not specifically mention PES in natural resource management thus creating a policy limbo as regulators and potential private-sector buyers are not sure about getting involved in PES schemes. Besides, public institutions funded by taxpayers cannot appear to be compensating farmers only in one part of the country without replicating it in all watersheds.

Kenya's new constitution promulgated in August 2010 makes several changes in natural resource management, by delegating some responsibilities from the central government to the counties. The responsibility for watershed management could likewise be affected. In the meeting of Sasumua stakeholders held in September 2011, PRESA was advised to lobby for the inclusion of PES into the National Water Resources Management Strategy. Other relevant policies that could be of interest to PRESA include the Land Use policy, the Irrigation Policy, the Water Policy, the Land Reclamation Policy, Forest Act, Agriculture Act and the Environment Management and Coordination Act.

Payments for Ecosystem/Environmental Services (PES) in River Malewa

The Kenya Flower Council in a written submission indicated that CARE International in Kenya is implementing PES in the upper catchment of River Malewa, the main tributary to Lake Naivasha. The project involves smallholder farmers implementing soil and water conservation on their farms thus reducing soil erosion ultimately leading to less silt into Lake Naivasha. The project has been going on since late 2009. The incentives are provided by the Lake Naivasha Water Resource Users Association (LANAWRUA) that represents 23 member commercial farms around Lake Naivasha drawn from the Lake Naivasha Growers Group (LNGG) and the Lake Naivasha Riparian Association (LNRA).

In 2011, 504 Kenyan farmers received Ksh. 799,724 Kenya Shillings (US\$ 8,886) from industrialists and conservation groups around Lake Naivasha, for land use practices that ensure adequate flow of clean water into the lake through the Malewa River. The first payment in May 2010 was of US\$10,000 from the Lake Naivasha Water Resource Users Association (LANAWRUA) to 470 farmers in the catchment. The cash incentive from LANAWRUA enables land managers to get farm inputs for improved production.

Other immediate, tangible benefits for the farmers include; observed increase in land productivity, reduced surface run-off (soil erosion), increased availability of fodder which has increased milk yields, income from the sale of surplus fodder and lower use of agro-chemicals, which is expected to reduce eutrophication. They have also received training as para-professionals in soil and water conservation. These multiple benefits have motivated upstream farmers to continue with good farm practices.

Equitable Payment for Watershed Services (EPWS) scheme in Naivasha

The World Wide Fund for Nature (WWF) Kenya country office in partnership with CARE Kenya has been piloting the Equitable Payment for Watershed Services (EPWS) scheme in Naivasha since 2008. The objective is to develop a viable mechanism of payments for watershed services

that delivers sustainable natural resource management and improved livelihoods while serving as a learning model for further expansion and replication.

The EPWS scheme involves a mix of land use transformations by upstream farmers. These include: rehabilitation and maintenance of riparian zones, planting of grass strips, building terraces along steep slopes, reducing the use of agro-chemicals, planting indigenous trees, planting high yielding fruit trees, and growing cover crops (potatoes). These measures improve farm productivity and provide both nature and downstream users with quality water as a long-term environmental service.

The Imarisha Naivasha Initiative

The flower growers around Lake Naivasha have been involved in the above programme launched in 2010. It is a collaborative endeavour of Naivasha communities, global corporate leaders, civil societies, international donor community, and the Government of Kenya through the office of the Prime Minister. It is geared towards ensuring the conservation and protection of the greater Naivasha water catchment area for sustainability, and seeks to address the weaknesses of past ventures, with particular attention paid to a multi-stakeholder participatory governance structure that shall ensure effective coordination, good practice and accountability by the local communities, resource users, government agencies and partners.

Majority of growers recognise that taking no action is a business risk and is not an option if the long-term sustainable use of resources is to be achieved. Climate change and variability has brought about a decline in the average annual volume of rainfalls. The increased shortages of agricultural land prompted farmers to cut trees as a source of income and fuel. The resultant deforestation led to reduced flows of rainfalls into River Malewa. The consequent silting of the riverbed further lowered the volume of water flowing into the lake as well as reducing the lake's depth and water volume. Under mean climate conditions, River Malewa accounts for more than 40% of the lake's water intake.

The immediate objective of the programme was to halt and reverse the degradation of Lake Naivasha and the deterioration of economic base of the surrounding areas. The long-term goal of the programme is to restore the lake and its catchment areas to its past glories. Achievements realized so far include; tree-planting in the basin in partnership with the Ministry of Environment and Mineral Resources (MEMR) and local community organizations, restoration of the Naivasha sewerage treatment plant, design of a constructed wetland next to the conventional treatment works, and preparation to undertake a Strategic Environmental Assessment of the Malewa delta as part of the Global Delta Alliance activities in Kenya.

6.0 Conclusions

This study set out to explore how private sector can be effectively engaged in climate change adaptation in Kenya. Publicly available documents were analyzed, personal interviews undertaken, a questionnaire sent out and a private sector consultation workshop held. In addition, other related meetings organized by other institutions were attended to collect views. The study captured the views of diverse stakeholder including; manufacturing industry, horticulture, pastoralists, bilateral and multi-lateral development partners, tea, coffee, dairy, forestry, wildlife, water, insurance, finance, farmers, NGOs and Government Ministries among others from October 2011 to May 2012. It looked at the risks private sector is facing, the role it can play and what the Government needs to do to stimulate their effective participation in climate change adaptation.

The study findings indicate that private sector is facing many challenges. These include the lack of clear understanding of the concept of climate change adaptation that affects their ability to identify risks and opportunities along their value chains. Droughts and floods are also bringing

about operational constraints characterized by raw material unavailability, disruption of distribution and markets. This is exacerbated by low development levels of the communities on which the private sector depends for supplies, labour and markets. Further, it was found out that linkage between Government and the sector is weak with no effective platform on which to dialogue on climate change adaptation issues. On financing and developing products that respond to climate change adaptation, the risks do not allow private sector to sufficiently recover costs.

A number of possible interventions were suggested to overcome these difficulties. Top of this is awareness raising and capacity building. That unless the sector is fully empowered to identify risks and opportunities in climate change adaptation, their investment in adaptation will not come easily. Thus, the generation and packaging of information that would be relevant for decision-making in each industry sector coupled with case studies on climate change adaptation would help. Training of industry sector associations and consultants in risk identification, forecasting and modeling shall help companies better prepare for climate change adaptation risks.

Further, private sector engagement can be enhanced if the Government can invest more in improving infrastructure to access some areas of Kenya such as the arid and semi-arid lands thus opening them up for development. This is in addition to improving food security through livelihood diversification, promoting indigenous crops and strengthening research and development in new animal breeds and crop varieties.

A policy to create incentive schemes to encourage private sector to invest in climate change adaptation will accelerate delivery. Such policy frameworks include: mainstreaming climate change in Government, developing a technology innovation policy supportive of climate change adaptation and a requirement for companies to internalize environmental costs. A requirement for regular reporting possibly as part of their annual environmental audits and a disclosure of climate risks will accelerate their engagement. In addition, it was found out that if environmental services are appropriately priced, then companies shall see the business sense in investing in climate change adaptation by developing Pro-Poor Rewards for Environmental Services. In order to further stimulate the market for adaptation, a policy on scaling up of financial and risk reduction incentives such as credit lines, concessional loans, green bonds, research grants, seed capital for adaptation-focused enterprises will be necessary.

Despite the above challenges some companies especially in the flower, tea, sugar and coffee industry have started adapting autonomously as part of business risk management, competitiveness enhancement or greening of value chains. This is happening through the introduction of crops that are either drought or frost resistant, short maturing and high yielding. A lot of effort is also going towards conservation of land water, and forests as well as generation of own energy. In the finance and insurance industry a number of insurance products for crops and animals are being piloted but not without risk-guarantee schemes. Companies are also greening their value chains and

Many sources of risk for companies in Kenya are centered in local communities where they have field operations, suppliers, and customers. This is affecting their ability to provide goods and services. Using this fact to illuminate for investors the importance of adapting their value chains from an economical to social and environmental perspectives, a shift of adaptation from a public good to a private risk can be achieved.

The above should see a refocusing of Corporate Social Responsibility (CSR) beyond brand positioning so that resilience building for vulnerable communities is done whilst ensuring that business activities do not exacerbate climate vulnerability. Companies will also see the sense of not only building and facilitating cross-sector alliances but also creating partnerships with

stakeholders from government, civil society, and business on key local development priorities. Productive CSR actions will be sector- and company-specific, but could include using more resource-efficient production techniques, conserving natural resources upon which they and communities depend, sourcing from local businesses to strengthen the economic base, and building capacity throughout their value chains to manage climate risk. This will promote overall development thus helping to reduce vulnerabilities and raise the adaptive capacity of majority of Kenyan poor.

Bibliography

- IIED, 2009. Assessing the Costs of Adaptation to Climate Change. Imperial College London
- Institute of Economic Affairs. Public Private Partnerships, Paper on Practice and Regulatory Policy in Kenya.
- IFC, 2010. A Strategy to Engage the Private Sector in Climate Change Adaptation in Bangladesh
- GoK, 2010. National Climate Change Response Strategy
Water, Agriculture, Forestry, Environment
- OECD, 2011. OECD Environment Working Papers No. 39. Private Sector Engagement in Adaptation to Climate Change
- Oxfam (2009). The new adaptation marketplace: climate change and opportunities for green economic growth, Oxfam America, Boston MA, www.oxfamamerica.org/publications/the-new-adaptationmarketplace
- Parry, M.L., Lowe, J.A., and Hanson, C., 2009. Overshoot, Adapt and Recover. Nature
- Republic of Kenya/Ministry of Trade and Industry (2005) “Private Sector Development Strategy”.
- Stern N. 2007. The Economics of Climate Change: The Stern Review. Cambridge: Cambridge University Press Tirpak D
- UNEP, 2011. Adapting for a Green Economy: Companies, Communities and Climate Change. UN Global Compact Office
- UNFCCC, 2007. Investment and Financial Flows to Address Climate Change. UNFCCC Bonn
- WBCSD (World Business Council for Sustainable Development) (2008), Adaptation: An issue brief for Business, WBCSD, Geneva, www.wbcsd.org/plugins/DocSearch/details.asp