

“Climate Finance Issues”: Implications for Climate Change Adaptation for Food Security in Southern Africa.

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Doi:10.5901/mjss.2013.v4n6p47

Abstract

Global development has been asphyxiated by climate change as evidenced by significant repercussions on the world economy. While agriculture is the backbone of most developing economies in the global south, this sector is extremely vulnerable to climate change. Grim statistics point to a bleak future if the risk posed by climate change is not tackled. The impact of climate change has generally seen precipitation increasing in the Global North while the same has decreased in the Global South resulting in both wetter and drier scenarios. This scenario has meant that global food security is under threat. It is against this background that climate change adaptation becomes significant in averting the climate change induced food crisis. However, the UNFCCC “funding streams” for climate change adaptation strategies have been criticised for being financially and technically inadequate for meeting the adaptation needs of poor countries that are more vulnerable to climate effects. The disbursal of climate change is inefficient and more costly. African countries have also been clamouring for direct access to climate finance. Therefore, the ravaging impact of climate change on global development lingers. While there are debates on climate finance for effective adaptation, the resolution of issues involved is key if the battle against climate change is to be won. It is important that adaptation is mainstreamed in government policies, mainly, in the developing countries for effective financing of climate change adaptation to be realised while the poor and most vulnerable in developing countries should be given priority.

Keywords: Climate change; climate finance; food security; climate change adaptation.

1. Introduction

Global development has been asphyxiated by Climate change. Global surface temperatures recorded in 11 years from 1995 to 2006 have been ranked among the 12 warmest years in the history of global surface temperature, in the last hundred years. Global average temperature has also been increasing at the rate of 0, 74 degrees Celsius. While precipitation has declined mainly in the Global South, the same has seen a significant increase in the Global North. This trajectory constitutes the evidence of climate change. The ravaging actual and potential impact of climate change is well documented in extensive literature (IFPRI, 2012; O'Brien, 2010; Madzwamuse, 2010; IPCC, 2007; Ericksen, 2008; Stern, 2007; UNFCC, 2006).

Climate change has a global economic impact as evidenced by significant impacts on the global economy. Climate change effects have led to a decline of 1.6 percent in global output of the world Gross Domestic Product (GDP) translating to almost \$1.2 trillion annually (DARA, 2012). Moreover, a 3.2 percentage decline in GDP in global economic growth has been forecasted while it has been predicted that at least 100 million people face death. While agriculture is the backbone of most developing economies in the Global South, this sector is extremely vulnerable to climate change. Grim statistics point to a bleak future if the risk posed by climate change is not tackled. More than 30 million people have

been affected by extreme weather events, 250 million people are vulnerable to sea-level rise; permafrost thawing has affected 25 million people and desertification is threatening 5 million people (IFPRI, 2012).

Currently, it is estimated that five million people die from a combination of air pollution, hunger and disease attributable to the changing climate and economies which are carbon-intensive. What is further disturbing are estimates indicating that this number may increase by a million to six million a year coupled with agriculture and fisheries specific losses which are estimated to be at least \$500 billion annually by 2030. The United States and China which are the world's biggest economies are likely to register a decline in their respective GDPs of 2.1 percent by 2030 (DARA, 2012). All four dimensions of food security are most likely to be ravaged by climate change. These are food availability, food accessibility, food utilisation and the stability of food systems. The Food and Agriculture Organisation (FAO) observes that "food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life" (FAO, 2002:1). While climate change threatens food security, the FAO has observed a phenomenal increase in the number of hungry people from about 852 million to 105 billion from 2007 to 2009. Furthermore, FAO (2010) reported that the undernourished and hungry were estimated to be about 925 million people. Moreover, droughts, cyclones, floods have been observed as the leading cause of hunger in Southern Africa with 30 million people affected. The Intergovernmental panel on climate change has warned that by 2020 crop yields in sub-Saharan Africa will decline by 50 % while 75-250 million will be vulnerable due to water shortages. It is against this background that climate change adaptation becomes significant in averting the climate change induced food crisis.

However, the UNFCCC "funding streams" for climate change adaptation strategies have been criticised for being financially and technically inadequate for meeting the adaptation needs of poor countries that are more vulnerable to climate effects. Oxfam indicates climate change adaptation costs in excess of US\$50 billion per annum while commitments to date have been far from convincing. Moreover, according to Huq and Ayers (2008) though by 2007, the three Global Environmental Funds received pledges of approximately US \$200 million these commitments were still falling short of the actual figures required for adaptation. The World Bank (cited in Huq and Ayers, 2008) estimates that climate funding under the adaptation fund may amount to between US \$100 and 500 million by 2012; this tremendously falls short of the estimated cost of adaptation.

2. Conceptualising Climate Change adaptation.

The United Nations Framework Convention on Climate Change definition of adaptation states that, "Adaptation is a process through which societies make themselves better able to cope with an uncertain future" (UNFCCC, 2007:10). Implied in this definition, is the fact that climate change adaptation entails taking proper measures to mitigate the negative effects of climate change (or exploit the positive ones) by making the necessary adjustments and changes. Francisco (2008:9), opines that "adaptation measures can be classified as reactive, that is, those undertaken to respond to impacts of current climate variability and climate change and anticipatory, referring to those undertaken before impacts are observed".

The Intergovernmental Panel on Climate Change classifies adaptation from technological, behavioural and managerial perspectives. The technological perspective entails construction of protective infrastructures like river and sea dykes, increased sea defences and flood-proof houses on stilts; the behavioural perspective involves changing food and recreational choices, reducing use of water during drought years and use of insecticide-sprayed mosquito nets; while the managerial perspective entails changing choice of crops or cropping patterns and lastly the policy perspective focuses on the implementation of new planning regulations. The UNFCCC, (2007:10) highlights other capital intensive adaptation mechanisms and strategies such as "early warning systems for extreme events, better water management, improved risk management, various insurance options and biodiversity conservation".

Ericksen (2008) defines food security from a multidimensional perspective, arguing for the measurement of food security at the individual, household, community, or national level. The multidimensional nature of food security entails food accessibility, availability, food utility, and stability. Moreover, it has been observed that "food security is not narrowly defined as whether or not food is available, but whether the monetary and non-monetary resources at the disposal of the population are sufficient to allow everyone access to adequate quantities and qualities of food" (Schmidhuber and Tubiello, 2007 cited in Ludi, 2009).

It has been argued that all dimensions of food security will be affected by the impact of climate change (Ludi, 2009). A multi-dimensional conceptualisation of food security may allow household level analysis. In contrast food

insecurity entails the lack of access to an adequate diet, which can be either temporary (transitory food insecurity) or continuous (chronic food insecurity) (Devereux *et al*, 2004).

3. Issues in Financing Climate Change Adaptation

The impact of climate change has generally seen precipitation increasing in the Global North while the same has decreased in the global south resulting in both wetter and drier scenarios. The International Food Policy Research Institute (2012) has observed that climate finance is required for a number of reasons which include increasing crop productivity, research in agriculture as well as water management. Climate change adaptation costs in a wetter scenario are estimated to be around US\$7, 1 billion while the costs in wetter scenarios have been estimated to be approximately US\$7, 3 billion. The IFPRI (2012) has observed that in drier scenarios, climate finance is required for the improvement of irrigation efficiency; adopting technologies which are water efficient for water harvesting, soil moisture conservation as well as developing and adopting improved crop varieties and species resistant to heat and other drought related stresses. In wetter areas, capital intensive projects entail infrastructural development for drainage, integrated water management for the prevention of nutrient leaching and water logging, promoting of crop varieties which are adapted for water logging and the development and implementation of early warning systems and monitoring strategies for averting crop damages. Other capital intensive issues include crop breeding for increasing crop productivity, biotechnology for the development of stress tolerant material for addressing drought, tolerating heat (as a result of a rise in temperature) and water harvesting to avert shortage of water.

3.1 Global architecture of funding

One of the critical questions relating to climate change adaptation is the question of funding. The global architecture for climate finance is stifling climate change adaptation strategies. Developing countries face challenges in various stages of the delivery of climate finance. Therefore, adaptation continues to be structurally and technically underfunded thereby leaving developing countries vulnerable to climate change. Estimates indicate that investment amounting to 2 percent of global GDP is required for limiting, prevention of and adaptation to climate change. Madzwamuse (2010) argues that prior to Copenhagen 2010, developing countries, including those from Africa, demanded an increase in funding for adaptation, since available funds were not adequate. The table 1 below shows a mismatch between approved amounts and disbursed amounts in climate finance in millions of dollars.

Table 1: Mismatch between approved and disbursed amounts of climate finance

Type of fund	Approved amount	Disbursed amount	Number of projects disbursed
International Climate Initiative	52	22	5
Adaptation fund	12	12	5
Least developing countries fund	15	4	2
Special climate change fund	90	60	49
Millennium development goals fund	20	12	6
Pilot program for climate resilience	16	13	3
Total for sub-Saharan Africa	114	0	0
Sub-Saharan Africa	319	123	70

Source: ODI, 2011

What is worrying is that funding is a potential problem for small-scale farmers and households adapting to climate change because small-scale farmers and rural households do not have the capacity to adapt to climate change. According to the Department For International Development (DFID), "the poor have mechanisms to cope with climate variability since generations, but many of these will be overwhelmed by the extent of changes or other pressures on their livelihood" (DFID, 2008:139).

3.2 Funding mechanisms

Current funding mechanisms are difficult for developing countries to access and there has been a call for funding to be made more accessible and more equitable. For instance, developing countries according to the Global Environmental Facility (GEF) criteria for the UNFCCC financial mechanisms have made two observations (Madzwamuse, 2010). The requirement for projects to have incremental costs puts a burden on poor states for mobilising resources and, the need for “global benefits” and adaptation requirements do not match.

3.3 Equity in Funding

Another challenge in climate financing is the issue of equitable funding and direct access to climate finance. Developing countries receive varying amounts of funding for climate change adaptation some of which are administered through the African Development Bank (AFDB). The top recipients so far in sub-Saharan Africa have been South Africa, which has received 488 million, Mozambique which has received 30 million the Democratic Republic of Congo and Tanzania have both received an equal amount of 25 million. These figures rank above what many countries in the sub-region have received. Nigerian and South Africa are the only recipients of the clean technology fund which is implemented by the African development bank for emission reductions. These disparities stifle the capacity of those countries which do not receive adequate funding to effectively adapt to climate change, thereby, impacting their food security negatively. Box1 below summarises the impact of climate change on food security hence the need for financing adaptation strategies.

Box 1 Climate change impacts on food security.

	Climate impacts	Gendered differences in impacts
Availability	The most direct impact of climate change on food security is through changes in food production. Short-term variations are likely to be influenced by extreme weather events that disrupt production cycles and change seasonality. Climate change impacts on the availability of food will vary geographically – temperate regions in the high latitudes will see a slight increase in productivity. However South Asia and southern Africa will suffer negative impacts on food crops, livestock, forest produce and fisheries.	Although availability has consequences for both men and women, each attaches importance to different issues. For example, men tend to focus on there being less fodder for animals; whereas women are more likely than men to focus on the implications for the well-being of their families.
Stability	Weather extremes and climate variability are the main drivers of food production instability, especially in rain-fed farming systems with limited irrigation. More research is needed especially on this issue.	A shortage of water affects both men and women, but men tend to focus on there being less water for farming and production whereas women tend to focus more on lack of drinking water and its implications on the health of their families.
Utilization	Increases are projected in weather-related disasters, such as flooding, caused by rising sea level and increased precipitation especially for coastal settlements. This is likely to lead to an increase in the number of men and women exposed to vector-borne (e.g. malaria) and water-borne (e.g. cholera) diseases. This, in turn, lowers people’s capacity to utilize food effectively, which compromises their food security status.	With farming systems changing there is a risk that traditional crops for food will not be available. As women tend to be responsible for the households, food preparation and food security this is felt especially strongly by them.
Access	Access to food by all members of the population is arguably as important as food availability. Access to food is likely to be influenced by complex secondary impacts of climate change including conflict, human insecurity, migration and soaring food prices.	Women are often more vulnerable than men in conflict situations and will thus be affected more than men when access to food is threatened. Both men and women migrate in order to secure income, but women tend to be less flexible in the distances they can travel from their homes. Men travel farther away while women stay closer to home.

Source: FAO: 2012

3.4 Funding Sources

Climate change financing for mitigation and adaptation is a complex field. Developing nations have largely held the developed countries, mainly in the north, accountable for the current climate changes, due to excessive industrialisation in the past. As a result, the debate on the funding of adaptation has been focusing on the language of compensation and environmental justice. Despite the global debates, there are a host of bilateral and multilateral sources of funding. The box 1 below highlights some of the bilateral and multilateral sources of funding.

Box1: Current Options for Adaptation Funding

- 1) Least Developed Countries Fund (LDCF), established under the UNFCCC to help developing countries prepare and implement their National Adaptation Programmes of Action (NAPAs).
- 2) Special Climate Change Fund (SCCF), also established under the UNFCCC to support a number of climate change activities such mitigation and technology transfer, but place top priority on adaptation.
- 3) GEF Trust Fund's Strategic Priority for Adaptation (SPA), which pilots 'operational approaches' to adaptation.
- 4) Adaptation Fund (AF) which was established under the Kyoto Protocol and is intended to assist developing countries carry out 'concrete' adaptation activities.

The LDCF, SCCF, and Trust Fund are based on voluntary pledges and contributions from donors, since April 2007, the LDCF and SCCF amounted to approximately US\$114 million in received allocations (Huq and Ayers, 2007). While this is a significant amount, it falls short of billions required for effective adaptation and mitigation leaving developing countries vulnerable. These three funds are managed by the Washington-based Global Environment Facility (GEF) which is under the guidance of the UNFCCC. The GEF collaborates with the World Bank, United Nations Environment Programme (UNEP), and the United Nations Development Programme [UNDP] who are its three Implementing Agencies responsible for administration and financial oversight.

The context of climate change adaptation funding is based on the Kyoto protocol. The central feature of the Kyoto Protocol is its requirement for the limitation or reduction of greenhouse gas emissions by countries (UNFCCC, 2007). These targets in emission reductions took on economic value (UNFCCC, 1998). In an effort to motivate countries in meeting their emission targets, and also motivating the private sector and developing countries, negotiators of the Protocol included three market-based mechanisms - Emissions Trading, the Clean Development Mechanism (CDM), and Joint Implementation (UNFCCC, 1998).

UNFCCC (1998) states that the CDM allows emission-reduction projects in developing countries to earn certified emission reduction (CER) credits, each equivalent to one tonne of carbon dioxide. The Industrialised countries can trade or sell these CERs, and use them to meet their emission reduction targets under the Kyoto Protocol. This development can lead not only to the stimulation of sustainable development and reductions in green house gas emissions but also some flexibility to these industrialised countries in how they meet their targets in emission reduction (UNFCCC, 1998). The clean development mechanism is the major source of income for the UNFCCC Adaptation Fund, established for financing adaptation projects and programmes mainly in developing countries.

Madzwamuse (2010) states that in addition to the major UNFCCC funds, donor countries created a Copenhagen Green Climate Fund and pledged almost US\$30 billion between 2010 and 2012 in short term financing for mitigation and adaptation in developing countries during the COP15 in Copenhagen (Madzwamuse, 2010; Roberts, Stadelmann and Huq, 2010). The same donors also pledged to increase funding to US\$100 billion from public and private sources (Roberts *et al*, 2010; Busby, 2010). However, where the funds will come from, their distribution and management remains unclear (Madzwamuse, 2010).

According to Huq and Ayers (2007), about 2% levied on clean development mechanism (CDM) transactions funds the Adaptation Fund. The thirteenth Conference of the Parties (COP 13) in Bali in December 2007 finalised the oversight of the Adaptation Fund while it was operationalised in 2008 (Madzwamuse, 2010). The World Bank estimates that this levy could generate funding amounting to US\$100-500 million by 2012, which however is far from the required totals needed for proper adaptation to take place (World Bank, 2008). Table 2 below shows a mismatch between the required adaptation funds and the pledges to date.

Table 2: Required Adaptation Funding and Pledges to Date

Required Adaptation Funding	Funding And Pledges To Date
Oxfam International: USD 50 billion per year.	Current allocations and pledges under the UNFCCC funds: USD 200 million.
World Bank: USD 10-40 billion per year.	Expectation of the Adaptation Fund: USD 100-500 million by 2012.
UNFCCC: USD 28-67 billion in 2030.	
Stern Review: 5% of global GDP each year, with higher losses in developing countries.	

Source: (Klein, 2007)

4. Climate financing: Towards Climate smart agriculture.

The devastating impact of climate change on agriculture and food security highlighted earlier has meant that new efforts must be directed towards climate smart agricultural activities. It goes without saying that these climate smart activities also require adequate funding for their effectiveness to be realised. The box below extracted from FAO summarises some climate smart activities practised by small holder farmers.

Box 2. Examples of climate-smart activities of small holder farmers

<p>Increasing use of weather and climate forecasting to reduce production risk. Increased productivity and resilience through altering inputs, varieties and species for increased resistance to heat shock and drought, flooding and salinization; increased soil carbon content, optimizing organic and inorganic fertilizer rates to maintain production levels and grain or fruit quality while minimizing greenhouse gas emissions; Altering amounts and timing of irrigation and other forms of water management for stable yields and maximum biomass production and altering the timing or location of cropping activities and local seed storage (seed banks).</p> <p>Managing river basins for more efficient delivery of irrigation services and prevent water logging, erosion and nutrient leaching, making wider use of technologies to "harvest" water to maximize "crop by drop" and conserve soil moisture, use and transport water more effectively. Improving livestock management practices for increased productivity per animal while decreasing emissions. Matching livestock stocking rates with pasture production, altered pasture rotation, modification of grazing times, alteration of forage and animal species/breeds, integration within livestock/crop systems including the use of adapted forage crops, re-assessing fertilizer applications and the use of supplementary feeds and concentrates for increased productivity and increased carbon sequestration.</p> <p>Diversifying income through the integration of activities such as marketable crops, livestock raising, fish production in rice paddies, bee-keeping and non-timber forest products. Introducing forest conservation, agroforestry and forest-based enterprises for diversification of rural incomes, increased resilience and carbon sequestration. Making wider use of integrated pest and pathogen management, developing and using varieties and species resistant to pests and diseases increasing productivity per used inputs; improving quarantine capabilities and monitoring programmes.</p>

Source: FAO, 2012.

The adoption of climate smart agricultural activities may go a long way in mitigating the impact of climate change on food security in many developing countries. The trajectory of the impact of climate change highlighted in this article demonstrates the overwhelming impact that climate change may have on food security. While adaptation is also significant in ameliorating its impact, its effectiveness is hampered by lack climate of funding. Such climate smart agricultural activities highlighted here should not be allowed to suffer the same fate. It is important to mainstream the idea of climate smart agriculture in agricultural policies adopted by developing countries in an attempt to boost food security in these countries.

5. Conclusion

The global architecture for climate finance is stifling climate change adaptation strategies. Developing countries face challenges in various stages of the delivery of climate finance. Therefore, adaptation continues to be structurally and

technically underfunded, thereby, leaving developing countries vulnerable to climate change. The disbursal of climate change funds is inefficient and more costly. African countries have also been clamouring for direct access to climate finance. Therefore, the ravaging impact of climate change on global development lingers. While there are debates on climate finance for effective adaptation, the resolution of issues involved is key if the battle against climate change is to be won. It is important that adaptation is mainstreamed in government policies, mainly, in the developing countries for effective financing of climate change adaptation to be realised while the poor and most vulnerable in developing countries should be given priority. FAO has already warned that consequences for inaction regarding climate change impacts are too ghastly to contemplate while inaction has been predicted to be the leading cause of human deaths in the next century. Grim statistics highlighted in the article in the trajectory of climate change depredations emphatically demonstrate the severity of the consequences. Estimates of 100 million people facing death due to climate change impacts must be a wakeup call. We argue that developed countries have a moral obligation for "climate compensation" for adequately funding climate change mitigation and adaptation strategies since they are the major culprits in green house gas emissions. 100 million climate deaths must certainly be avoided.

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