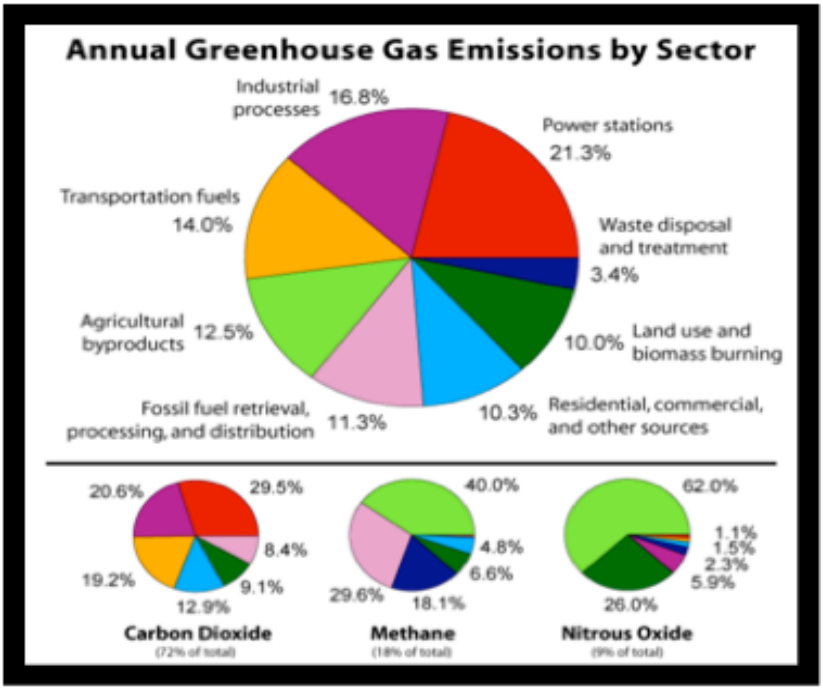
Policy Brief on Climate Change and Agriculture

Key Messages

- Agriculture is undoubtedly the most important sector in the economies of most non-oil exporting African countries. It constitutes approximately 30% of Africa's GDP and contributes about 50% of the total export value, with 70% of the continent's population depending on the sector for their livelihood, and the main generator of savings and tax revenues.
- The agricultural sector is also still the dominant provider of industrial raw materials with about two-thirds of manufacturing value added in most African countries being based on agricultural raw materials and the main source of the continent's food supply.
- Improvement in agricultural performance has potential to increase rural incomes and purchasing power for large numbers of people. Thus, more than any other sector, agriculture can uplift people on a mass scale. With greater prosperity, the consequent higher effective demand for African industrial and other goods would induce dynamics that would be a significant source of economic growth.
- Production is subsistence in nature with a high dependence on rain.
- Climate change and agriculture are interrelated processes, both of which are important at a global scale.
- Despite technological advances such as improved vegetable and animal material, genetically modified organisms, irrigation systems etc, climate is still a key factor in agricultural productivity.
- Agriculture produces significant effects on climate change, primarily through the production and release of greenhouse gases such as carbon dioxide, methane, and nitrous oxide, but also by altering the Earth's land cover, which can change its ability to absorb or reflect heat and light, thus contributing to radioactive forcing.
- Change in the degree of land usage such as deforestation and desertification together with use of fossil fuels are the major anthropogenic sources of carbon dioxide; agriculture itself is the major contributor to increasing methane and nitrous oxide concentrations in earth's atmosphere.
- Agriculture is a key factor for meeting 2°C goal and could be managed to make it part of low carbon development strategies
- Although Africa is responsible for very little of anthropogenic emissions of GHGs, it does have a considerable responsibility to assist in mitigation and adaptation to climate change.

INTRODUCTION

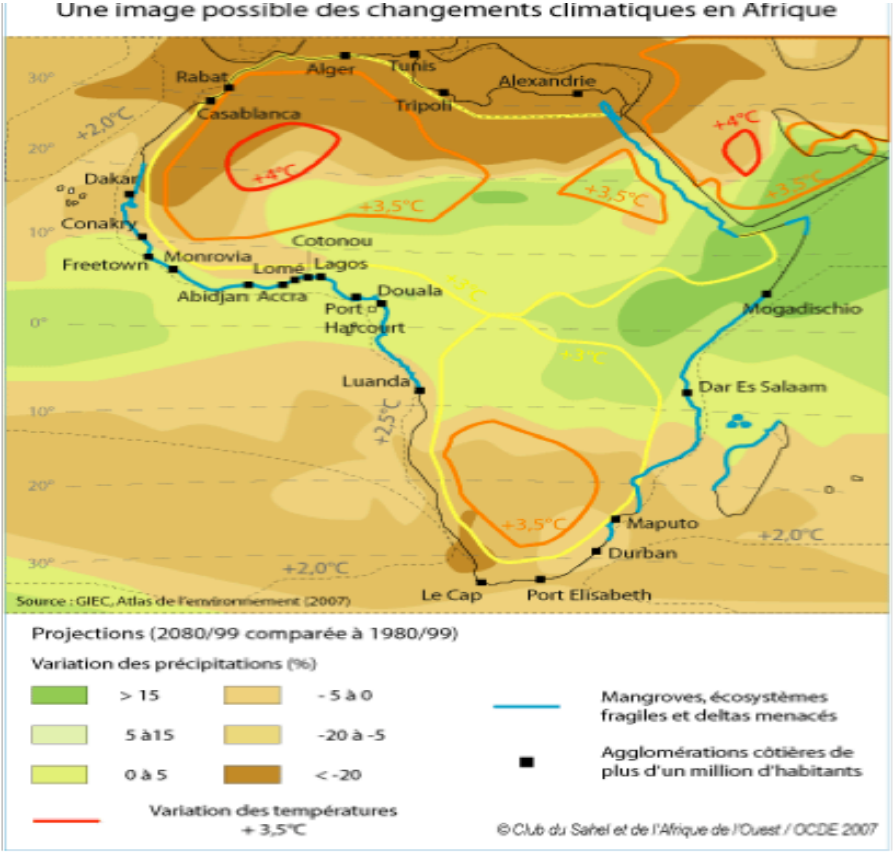
The impacts of climate change on agriculture may add significantly to the developmental challenges of ensuring food security and reducing poverty. Africa's geography makes it particularly vulnerable to climate change, and seventy per cent of the population relies on rain-fed agriculture for their livelihoods. Sub Saharan Africa witnessed the warmest and driest decade on record between 1985 and 1995. These adverse trends will continue under global warming, putting considerable stress on natural resources and agricultural activities, not to mention an intensification of droughts and fires. The destructive fires in South Africa in the year 2000 were provoked by record temperatures of 40 Degrees centigrade. The surface of Lake Chad has decreased from 25,000 square kilometers to 1350 today. And cases are growing in number by the day. Many African countries will face major challenges in adapting to rapid climate change. Analysis of the impacts of climate change suggests that agro-ecological



Source: FAO

systems are the most vulnerable sectors. Agriculture in African countries is expected to be especially vulnerable because climates of many of these countries are already too hot. Further warming is consequently expected to reduce crop productivity adversely. These effects are exacerbated by the fact that agriculture and agro-ecological systems are especially prominent in the economies of African countries and the systems tend to be less capital and technologically intensive.

Predictions of impacts across regions consequently suggest large changes in the agricultural systems of the continent. The debate on climate change and its impact on agriculture is therefore very crucial to the very survival of the continent and its people. The continent is more susceptible to consequences of climate change because it includes some of the world's poorest nations.



Translation of the contents of the above map:

Une image possible des changements climatiques :
A possible picture of climate change

Projections (2080/99 comparée à 1980/9) :
Projections (2080/99 compared to 1980/99)

Variations des précipitations (96)
Changes in precipitation (96)

Variations des températures: Variation in temperature

Mangrove, écosystèmes fragiles et deltas menacés, Agglomérations cotières de plus d' un million d' habitats : Mangroves, fragile ecosystems and threatened Delata Costal towns of more than one million habitants

Though changes in the climate may affect the whole continent, its consequences may vary across the continent. Climate change in the already arid northern sub-region of the continent is expected to enhance desertification and bring a gradual decrease in forest cover. In the Sahara and Sahel sub-regions, rainfall is predicted to drop, resulting in soil degradation and an increasing number of dust storms. In northeast Africa, more intense dry periods and shorter wet seasons are expected to affect even huge river systems such as the Blue Nile, leading to serious water shortages and adverse consequences for the agriculture and forestry sectors throughout the region. East and Central Africa will also see its agricultural capacity decline. In West Africa, more frequent and longer dry periods are expected, again threatening crop failures. Coastal areas may also be affected by rising sea levels and intrusion of salt water into inland freshwater resources. Southern Africa also faces similar threats. The staple food for the region, maize, is particularly susceptible to drought. Wetlands of international importance and wildlife are also under threat from drought in Southern Africa. Climate change, therefore, is expected to worsen the food supply, hence, exacerbate the widespread poverty in the region.

IMPACTS OF CLIMATE CHANGE

Five main climate change related drivers: temperature, precipitation, sea level rise, atmospheric carbon dioxide content and incidence of extreme events, may affect the agriculture sector in the following ways:

- Reduction in crop yields and agriculture productivity: There is growing evidence that in the tropics and subtropics, where crops have reached their maximum tolerance, crop yields are likely to decrease due to an increase in the temperature.
- Increased incidence of pest attacks: An increase in temperature is also likely to be conducive for a proliferation of pests that are detrimental to crop production.
- Limit the availability of water: It is expected that the availability of water in most parts of Africa would decrease as a result of climate change. Particularly, there will be a severe down trend in the rainfall in Southern African countries and in the dry areas of countries around the Mediterranean Sea.
- Exacerbation of drought periods: An increase in temperature and a change in the climate throughout the continent are predicted to cause recurrent droughts in most of the region.
- Reduction in soil fertility. An increase in temperature is likely to reduce soil moisture, moisture storage capacity and the quality of the soil, which are vital nutrients for agricultural crops,
- Low livestock productivity and high production cost: Climate change will affect livestock productivity directly by influencing the balance between heat dissipation and heat production and indirectly through its effect on the availability of feed and fodder.
- Availability of human resource: Climate change is likely to cause the manifestation of vector and vector born diseases, where an increase in temperature and humidity will create ideal conditions for malaria, sleeping sickness and other infectious diseases that will directly affect the availability of human resources for the agriculture sector.

KEY FACTS

Tanzania's official report on climate change suggests that the areas that usually get two rainfalls in the year will probably get more, and those that get only one rainy season will get far less. The net result is expected to be that 33% less maize—the country's staple crop—will be grown. A study published in Science suggests that, due to climate change, "southern Africa could lose more than 30% of its main crop, maize, by 2030 and that many regional staples, such as rice, millet and maize could top 10%." Alongside other factors, regional climate change - in particular, reduced precipitation - is thought to have contributed to the conflict in Darfur. The combination of decades of drought, desertification and overpopulation are among the causes of the conflict, because the Baggara Arab nomads searching for water had to take their livestock further south, to land mainly occupied by farming peoples. The coral reefs in the Indian Ocean experienced massive bleaching in 1998, with over 50% mortality in the same region. In eastern Africa, the deficit of cereals production increased by 70 percent from around 1.4 million tons in 1999/00 to 2.4 million tons in 2000/01, reflecting mainly the impact of a severe drought. Kenya, among the hardest hit, accounts for the largest share, 56 percent, of the total deficit in 2000/01.On the other hand, agricultural trade has grown in recent years, and now provides significant amounts of food, on a continental level to major importing countries, as well as comfortable income to exporting ones. The international aspect of trade and security in terms of food implies the need to also consider the effects of climate change on a global scale. Currently, most African countries are net importers, with over 50% of North Africa's food requirement and between 25% and 50% in sub-Saharan Africa imported (FAO, 2006). Africa's cereal import bill, for example, estimated at about USD 21.748 billion in 2008 and USD 9.8 billion in Sub-Saharan Africa in 2008, represents a 30% and 35% increase over the 2007 level, respectively (Kamara et al., 2009).

DEVELOPMENT OF AGRICULTURE DEALING WITH CLIMATE CHANGE

In global terms, the current African greenhouse gas emissions are relatively insignificant due the low level of development and industrialization. The entire continent is estimated to be responsible for less than 7 % of global emissions and only 4 % of CO2 emissions.

Source: *Encyclopédie Libre Wikipedia*

The impact of these adverse climate changes on agriculture is exacerbated in Africa by the lack of adapting strategies, which are increasingly limited due to the lack of institutional, economic and financial capacity to support such actions.

Africa's vulnerability to climate change and its inability to adapt to these changes may be devastating to the agriculture sector, the main source of livelihood to the majority of the population. The utmost concern should therefore be a better understanding of the potential impact of the current and projected climate changes on African agriculture and to identify ways and means to adapt and mitigate its detrimental impact.

ACTIONS TO DEVELOP AGRICULTURE DEALING WITH CLIMATE CHANGE

Despite the fact that Africa has abundant arable land and human resources that could potentially be translated into increased production, incomes and food security, it nevertheless remains a region that has the highest

proportion of people who suffer from hunger, and the largest poverty head account ration compared to all other developing regions.

Effects of climate change will continue to challenge vulnerable people; it will aggravate all kinds of stresses, which the continent is experiencing: greater water stress, increased crops' and livestock's pests and diseases, and increased salinization of coastal areas.

Taking into account all mentioned challenges that Africa is facing in developing agriculture, it should focus on the following:

- establishment of an interministerial mechanism bringing together ministries of agriculture, environment and water to advance an inter-sectoral approach in addressing the climate change agenda
- enhancement of the understanding of the global climate change negotiations process, international agreements, policies and processes and most importantly the common position Africa needs to take in order to maximize beneficial outcomes of these negotiations
- development of research and technological needs, as well as channels for transferring existing technologies
- development of an African based climate change mitigation and adaptation framework
- protection of natural ecosystems like wetlands, floodplain forests, mangroves and other coastal vegetation
- adaptation of participatory approaches that involve farmers in the early stages of plant breeding, and allow them to select and adapt technologies to social and economic conditions, using indigenous knowledge
- aid programs sent to Africa that carefully consider how they can help African farmers adapt to climate change, and such adaptation should vary geographically depending on conditions
- mapping of available wood energy resources to ensure proper management, utilization and promotion of renewable energy
- development of policies that target vulnerable groups (i.e. that include

gender in adaptation policies since the burden on women's labor will increase with impacts on water and land resources)

- improvement of data access and knowledge dissemination, promotion and protection of traditional and local food and agricultural knowledge. This will require international, intercultural and interdisciplinary approaches, communication and cooperation, coordination of indigenous and local communities' sustainable use, conservation and

- management of food and agriculture within and across ecosystems, landscapes and seascapes which will require synergies that link food security, livelihood sustainability, poverty alleviation and food and agricultural productivity to rural development processes based on in and ex-situ conservation of food and agricultural genetic resources

- development of documentation and dissemination of action oriented data, base, impact assessments, facilitate better access to credit and agricultural inputs, improved water resource management, strengthen cooperation among academic and research institutions

- establishing climate change and food security networks and developing a comprehensive communication plan to share information with regards to climate change impacts, vulnerability, adaptation and mitigation

- promote and build capacity for sustainable land management; this knowledge based procedure helps integrate land, water, biodiversity, and environmental management including input and output externalities

- promotion of Clean Development Mechanism: knowledge and strategies to reduce carbon emissions through community based afforestation and reforestation projects, agro-forestry and reduction of deforestation and degradation (REDD)

- promotion of peri-urban agricultural, where appropriate, using all available land resources to off-set anticipated short falls in relation to climate change. Farm units close to towns and cities have potential to operate intensive semi- or fully commercial farms to grow vegetables and other horticulture, raise chicken and other livestock, produce milk and eggs, and develop aquaculture fisheries.

Actions to reduce climate change impacts in Africa must be seen as additional to ongoing international development assistance, not as a substitute. It is necessary to harmonize approach in international joint efforts on actions that will help insulate the African farmer from the worst impacts of climate change by anticipatory adaptation.

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