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Fostering Sustainable Pathways for Climate Change Adaptation and Mitigation: The Implications for Africa's Agriculture

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Abstract

Global climate change has emerged as one of the most dominant issues both in industrialized and developing economies. There is an acknowledgement that anthropogenic forces, which produce 'greenhouse' gases, are to blame for the phenomenon. While social and economic activities in developed economies account for the bulk of greenhouse gas emissions, many countries in the developing world are set to become the hardest-hit victims. Although Africa's contribution to greenhouse gas emissions is minimal, put at about 7 percent of the world's total, the region is most vulnerable to the negative effects of the global climate change. Its agricultural sector, which accounts for 50 percent of the region's export value and 30 percent of its annual GDP, is particularly threatened by the phenomenon. The development calls for concerted efforts aimed at fostering sustainable policies that are hinged on climate change adaption and mitigation frameworks.

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1. Global Climate Change: Recent Trends & Development.

One of the world's contemporary development issues with profound implications for the future of humanity is the emergent global climate change phenomenon. Blamed on anthropogenic – human induced-activities, the global climate challenges have assumed alarming dimensions, which pose considerable dilemmas to policy makers, scientists, civil society organizations and development agencies around the world. The world's climate continues to change at rates that are projected to be unprecedented in recent history. The Third Assessment of the Intergovernmental Panel on Climate Change (IPCC) in 2001 reveals that the global average surface temperature increased by about 0.6°C during the twentieth century, and that "... most of the warming observed over the last 50 years is attributable to human activities". The report also projects global average surface temperature between 1.4 to 5.8°C to 2100, depending largely on the scale of fossil fuel burning between 2001 and 2100.

2. The Nexus of Climate Change and Agriculture

Global climate change has far reaching consequences for agriculture in highly uncertain ways. However, it is certain that agriculture will bear the brunt of the adverse consequences of climate change. The impact of climate change on agriculture and human well-being include the biological effects on crop yields; the resulting impacts on outcomes, including prices, production and consumption; and the impacts on per capita calorie consumption and child malnourishment. Also, the biophysical effects of climate change on agriculture fuel changes in production and prices, which manifest through the economic system, as farmers and other market players adjust rationally, altering crop mix, input use, production, food demand, consumption and trade (IFPRI, 2009). Various studies also reveal that agriculture is extremely vulnerable to climate change, as high temperatures reduce crop yields and fuel weed and pest proliferation. Climate change also induces changes in precipitation patterns, increasing the likelihood of short-run crop failures and long-run production declines, in a development that poses severe threat to global food security.

3. The State of Global Climate Change and Implications for Africa's Agriculture

Africa remains one of the most vulnerable regions of the world prone to the adverse impact of the global climate change. The region is particularly susceptible to climate change because it is home to some of the world's poorest people (AERC, 2009). Its populations are also growing rapidly, while its stock of natural resources is being depleted through environmental degradation. Global climate change continues to manifest rapidly in Africa. In a comprehensive study and projections on climate change in the region between 1900 and 2100, it is revealed that the phenomenon is not simply a future issue, but also one of the relatively recent past (Hulme et al, 2001). The study shows that the continent is warmer than it was 100 years ago. It also reveals large regional variability in precipitation. The Sahel region, for example, has displayed considerable multi-decadal variability with recent drying. On the other

hand, there appears to be a relatively stable rainfall regime in East Africa, with evidence of long-term wetting. South-east Africa is considered to have a stable regime too, but with marked inter-decadal variability.

Although Africa's contribution to the global greenhouse gas emission is small, estimated at about 7 percent of the world's total in 1990; the continent stands to be impacted by a disproportionate effect of the climate change phenomenon. Perhaps there is no other sector that stands to be impacted more than Africa's fragile agricultural sector. There are five main climate change related drivers in Africa: temperature, precipitation, sea level rise, atmospheric carbon dioxide content and incidence of extreme events. These are expected to affect the region's agriculture in the following ways (CEEPA, 2010):

- Reduction in crop yields and agriculture productivity.
- Increased incidence in pest attacks
- Reduction in the availability of water
- Exacerbation of drought periods
- Reduction in soil fertility
- Low livestock productivity and high production cost
- Vector and vector-borne diseases expected to undermine availability of human resources.

4. Policy Challenges: Climate Change Adaptation and Mitigation in Africa.

In view of the severe Consequences of the global climate change, policy makers at Local, national, regional and global levels have adopted policies in two primary ways: adaptation and mitigation. The former involves acting to minimize the effects of global warming, while the latter refers to measures aimed at reducing the intensity of greenhouse gases in order to reduce global warming. With most of the Least Developed Countries located in Africa, the region faces severe financial challenges to tackle global climate change. Although Africa's potential adaptation financing needs are highly uncertain, they are likely to range between US \$10-30 billion a year by 2030 (PACJA, 2009). Under international protocols and conventions on climate change, including the climate change conference in Copenhagen, developed countries are responsible for providing adaptation finances required by developing countries through structured financial mechanisms (DF, 2008; IIED, 2008; UN, 2009).

The following policy recommendations are presented to drive Africa's agriculture and climate change adaptation frameworks:

- Scale-up regional agreements to enforce environmental and animal protection laws.
- Promote agro-ecological approaches to farming.
- Support agricultural knowledge, science and technology as well as its widespread adoption by resource-poor, small-scale farmers.

- Design and support location – specific agricultural systems anchored on improved varieties, drought-tolerant stocks and fertilizers, irrigation systems and management techniques driven through extension services.
- Integrate afforestation and reforestation initiatives.
- Fast-track climate monitoring and forecasting
- Create disaster prevention and response mechanisms
- Undertake coastal protection measures

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