The Causes and Effects of Climate Change on Decreasing Food Production in Africa

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Abstract

Climate change becomes a major issue universally because of global warming which both are interchangeable. Global warming occurs because of pollution, deforestation and greenhouse gas emissions leading to climate change like higher temperatures, drought, floods and changing rain fall patterns. In this article we discussed about causes of climate change in Africa and their effects on food production in African countries. Extreme droughts lead towards the drying up of soil, which is not a suitable condition for agricultural crops, consequently it becomes a major reason for food insecurity. Higher temperatures create more pests' diseases in crops and livestock which also leads towards food insecurities because of loss in crops and livestock. These natural food losses also affect rural livelihoods. Fisheries also effected because of rising sea level temperatures and floods which is also a major factor of food insecurity in African region. Many waters borne diseases also spread into foods and humans due to floods which cause disturbance of food chain and human capacity to get enough nutrients from available foods. Consequently, there should be proper management of climate changes and food availability on government level to overcome the problems of food insecurity.

Keywords: *Climate change, Global warming, Agriculture, Food production, Livestock*

Introduction

Climate change is one of the biggest threats to global agricultural growth. Food production and rural livelihoods are under further strain due to the continent's weather systems' growing unpredictability and irregularity. It also has a substantial financial impact on agriculture. In many regions of the world, particularly Africa, the problems of climate change and how it affects food production are becoming more widely acknowledged. Africa is the continent extremely sensitive and most at risk from climate change, according to several research (World Bank, 2016; Liliana, 2005; Vogel, 2000; Bwalya, 2013); IPCC, 2007).

The 21st-century environmental and human problem has been attributed to climate change. Most experts, studying the possible effects of climate change, which impacted a large portion of Africa's population including rising sea levels, altered rainfall patterns, greater temperatures, and increasing climatic unpredictability. These effects of climate change are real and have potential, to affect many facets of daily life. In many regions of sub-Saharan Africa, several climate models show that agricultural food production are expected to suffer due to climate change (Al et al., 2008). One of the biggest environmental, social, and economic threats facing Africa is climate change, which is already occurring as evidenced by rising temperatures, soil drying up, increased pest and disease pressure, changes in areas that are suitable for raising crops and livestock, increased desertification in the Sahara region, floods, deforestation, and erosion (UNFCCC, 2006).

Impact of climate change on African agriculture

The 2007 study from the Intergovernmental Panel on Climate Change offers a thorough analysis of the anticipated impacts of climate change on African agriculture. Due to the combined strains of inadequate infrastructure, poverty, and governance, it predicts that Africa would be the continent most vulnerable to climate change worldwide. This century, temperatures are predicted to rise by 1.5–4ºC. Crop revenue is predicted to decline by as much as 90% by 2100, while yield reduction projections indicate a 50% decrease. Parts of the Sahara are predicted to see agricultural losses of 2-7% of GDP by 2100, whereas Western and Central Africa and Northern and Southern Africa are predicted to experience 2-4% and 0.4-1.3% losses, respectively. Sea temperature changes will have a particularly negative impact on fisheries, perhaps reducing production by 50–60%.

According to Africa's Population Emergency (2010), the population of Sub-Saharan Africa is predicted to grow from 700 million in 2007 to 1100 million in 2030 and 1500 million by 2050, with a growing urbanization trend.

Climate change and food security in Africa

Rural and pastoralist populations are at risk owing to the reduction of agricultural yields, crop failures, and livestock losses brought on by severe and protracted droughts, floods, deforestation, overgrazing, and fuelwood collection that has degraded the soil. Recurrent droughts have severely affected pastoralist areas on the border between Ethiopia, Kenya, and Somalia. The loss of livestock has caused a crisis for about 11 million people who depend on livestock for their livelihoods, and it has also led to a mass evacuation of pastoralists from drought-affected areas (IPS, 2010).

One in four households in sub-Saharan Africa lack access to enough food, according to the United Nations Development Report (United Nations, 2012). Southern Africa is particularly vulnerable to climate change, according to the IPCC (2007), and the effects might be severe, affecting many people's livelihoods. According to the IPCC (2007), climate change would cause sub-Saharan Africa's agricultural productivity to drop from 21% to 9% by 2080. According to the analysis, precipitation temperatures that rise might potentially cut stable food output by as much as 50%.

According to Rowhani et al. (2011), Tanzania's average output of rice, sorghum, and maize would decrease by 13%, 8.8%, and 7.6%, respectively, by 2050 due to the predicted 2°C increase. According to Knueppel et al. (2010), Tanzania's high levels of food insecurity are closely related to lower educational attainment. According to research by Tesso et al. (2012), Ethiopia's food production is severely hampered by climate change, with yearly production losses resulting from climatic variability rising sharply year over year. According to a 2009 assessment by the European Commission, climate change in Africa would result in lower agricultural yields, which will raise food prices and compel people to alter their patterns of production and consumption. Food security will be severely impacted by global warming, according to Schmidhuber & Tubiello (2007), who predict that between 5 and 170 million people would be in danger of famine by 2080. According to Hendriks (2005), food insecurity affects between 58% and 73% of families in South Africa, despite the country's overall food security.

Causes and effects of climate Change

Global warming and climate change are frequently used synonymously (Manstrandrea & Schneider, 2009). However, in scientific publications, climate change encompasses both global warming and all other effects of rising greenhouse gas concentrations, whereas global warming refers to rises in surface temperature. Any change in the climate over time, whether brought on by human activity or natural variability, is referred to as climate change by the Intergovernmental Panel on Climate Change (IPCC, 2001). Deforestation, ozone layer depletion, rising CO_2 and greenhouse gas emissions into the atmosphere are some of the causes of climate change (Syrquin, 2008; Manstrandrea & Schneider, 2009; Whitfield et al., 1998). Natural activities including animal respiration, volcanic eruptions, and the burning or decomposition of plants and other organic things all release carbon dioxide into the atmosphere. CO_2 is released into the atmosphere by human activities such burning solid waste, wood products, and fossil fuels to heat homes, power cars, and provide electricity (Paehler, 2007). Global warming has made droughts more severe, which reduced the amount of arable land that is available. A reduction in arable land would result in a lack of food security for many rural households who rely heavily on subsistence farming for their livelihood. Between 5 and 170 million more people are predicted to be in danger of hunger by 2080 because of global warming, which would have a substantial detrimental impact on food security (Statistical Review of World Energy, 2016).

The availability of water has a significant impact on agriculture. According to Rosenzweig & Hillel (1995), climate change would alter runoff, evaporation, rainfall, and moisture storage. Droughts began to occur in parts of tropical and subtropical Africa in the 1970s (Paehler, 2007; Syrquin, 2008). Droughts in tropical and subtropical Africa are predicted by the World Bank Group (1998) to become longer and more severe. The requirement for appropriate crop management has increased because of climate change, which causes water to escape from the soil more quickly and causes the soil to dry up quickly between rains (Southworth et al., 2000, 2002). Reduced soil productivity, food supply, and water resources may result from climate change-induced increases in the severity of droughts, floods, and shifting growing seasons (Luo et al., 1999; SWCS, 2003). In turn, this will represent suffering and mortality in the ecosystems of plants and animals.

According to the IPCC (2001), the global surface air temperature is expected to increase from 1.4 to 5.8 degrees Celsius by the year 2100 in comparison to 1990. Over the latter two decades of the 20th century, Nigeria's mean annual temperature increased by an average of 0.4 degrees Celsius in different regions of the nation (FME, 2003). Numerous areas, including agriculture, forestry, fisheries, biodiversity, water, and health, would be impacted by such changes. Conditions for the spread of illnesses and insect pests are more favorable in warmer temperatures. Changes in wind patterns can affect the transmission of fungus and bacteria that cause crop diseases as well as wind-borne pests. In most African locations, economically significant pests and illnesses may predispose livestock to greater incidences of heat stress, increased disease transmission, and potential resistance to disease management efforts. Many forms of stored food would be more susceptible to bacterial and mold development in warmer, more humid environments, which would accelerate food spoiling and pose some toxicological health risks. Furthermore, the food chain and people's physiological ability to get the nutrients they need from their diet may be impacted by the rise in water-borne illnesses in flood-prone areas, modifications to the vectors of climate-responsive pests and illnesses, and the development of new diseases (Manstrandrea & Schneider, 2009).

Conclusion and Suggestions

Investing in technology intervention is necessary to address the vulnerabilities and weaknesses in food systems as well as to prevent and manage climate hazards to food security. From agricultural production to food distribution and consumption, climate change poses a serious threat to food security in African nations. Therefore, an integrated policy strategy is required to alleviate these hazards and safeguard cattle, water supplies, and arable land from global warming. More assistance is also required for small-scale rural farmers to boost agricultural output, especially at the domestic level.

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