Strategies to Educate Farmers on Climate Change
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Abstract: The document looks at climate change, effect of climate change and how those effects can be mitigated. Farmers are advised on strategies to be taken for better yields hence food security. The document has looked at intensive literature review on climate change.

Key Words: Climate Change, its causes, its effects and mitigation strategies

I. INTRODUCTION

Climate variability and change have adversely affected agricultural sector which is the mainstay of the Kenyan economy that contributes to food security and employment of rural households and the situation is expected to worsen in the future (Ochieng, Kirimi & Mathenge 2016).

Climate Change

Adedeji, Okocha and Olatoye (2014) defines climate as long-term weather pattern that describe a region. For example the New York metropolitan region climate is temperate with rain evenly distributed throughout the year. Center for Climate Change and Health (2017) and Denchak (2017) defines climate change as systemic change in the long-term state of atmosphere over multiple decades or longer.

Causes of Climate Change

Adedeji, Okocha and Olatoye (2014), Kaddo (2016) and Denchak (2017) argued that the following are factors that influence climate change;

Natural activities

Some of the natural activities that cause climate change include; variation in ocean current- which alter the distribution of heat and precipitation)- large eruptions of volcanoes -which can sporadically increase the concentration of atmospheric particles blocking out more light and change in intensity of sunlight reaching the earth cause cycle of warming and cooling. Nature also contributes to climate change by emitting CO2 from volcanoes (Kaddo 2016).

Anthropogenic causes

Human- more specifically the greenhouse gas we generate from industrial revolution mostly from burning of fossils ,fuel for energy, agriculture ,industrial process and transportation which increase gases such as CO2, methane in the atmosphere causing the earth rapid changing climate. Deforestation which releases sequestered carbon into the air. It was estimated that clear-cutting, logging, fires, and other forms of forest degradation contribute up to 20% of global carbon emissions. Other human activities that generate air pollution include, livestock production (cattle, buffalo, sheep, and goats are major methane emitters), fertilizer use (a primary source of nitrous oxide emissions) and certain industrial processes that release fluorinated gases. Activities like agriculture, urbanization and road construction can change the reflectivity of the earth’s surface, leading to local warming or cooling, too (Denchik 2017).

II. LITERATURE REVIEW ON EFFECT OF CLIMATE CHANGE

Ranesh (2017) carried out an empirical review on impact on climate change on crop production on humid tropics. From the empirical review it was discovered that; to achieve food security under climate change it’s important to sustain or enhance both food yield and its sustainability. Henderson, Reinert, Dekhtyar and Migdal (2018) states that Global food production is also affected by warmer temperatures, increased CO2 levels, and extreme weather events.
Rahman and Rahman (2019) carried out an empirical on impact of climate change on crop production in Bangladesh. The researcher undertook different review from published literatures. From his review it was found that already the impact had begun badly in Bangladesh. Temperatures were gradually increasing, frequency of flood, magnitude of cyclone, salinity intrusion and volatility of rainfall had increased. All these have led to decrease in crop production.

Villega and Thomton (2015) carried out an empirical review on climate change impact on Africa crop production. It was discovered that change in climate over the last 30 years have already reduced global agricultural production in the range 1-5% per decade with particularly negative effects for tropical cereal crop such as maize and rice.

Zwane (2019) conducted a research on impact of climate change on primary agriculture, water source and food security in Western Cape, South Africa. After having review a variety of literature from 11 government report and 21 journals. It was discovered that many dams had low water levels which reduced crop production. The researcher concluded by coming up with mitigation strategies for instance scaling up on the use of organic matter to avoid burning and creating gas emissions to the atmosphere. Another strategies was the effective use livestock manure and use appropriate up to date seed varieties. This is in line with Mulungu and Ng’ombe (2019).

Ochieng, Kirimi and Mathenge (2016). Conducted a research on effect of climate variability and change on agricultural production. The case of small scale farmers in Kenya. The researcher used balanced panel household-level dataset collected 2000, 2004, 2007 and 2010 with respondent of 1243 households across 8 agro-regional zone in Kenya. Findings revealed that climate variability and change affects agricultural production, but effect differs across crop. For example Temperature has negative effect on crop and maize revenue but positive on coffee.

III. LITERATURE REVIEW ON ADAPTATION STRATEGIES ON CLIMATE CHANGE

Ali and Erenstein (2017) conducted a research by Assessing farmers’ use of climate change adaptation practices and impacts on food security and poverty in Pakistan. Comprehensive data was undertaken using 950 farmers from its major province. From the research it was revealed that adjustment in sowing time (22 %), use of drought tolerant varieties (15%) and shifting to new crops (25%) were the major adaptation practices used by farmers in the study area. It was concluded that climate change adaptation practices at farm level have significant development out comes in addition to reducing exposure to weather risks.

Sekaleli and Sebusi (2013) carried out a research on farmer response and their adaptation strategies to climate change in Lesotho. The study assessed the response of farmers to climate change and its impact to their livelihood and the potential of the three agricultural systems. It was revealed that farmers were experiencing drought, sporadic and heavy rainfall periods, soil erosion, declining yield which led to developing their own adaptation strategies to climate change. Some of the adaptation strategies include; water harvesting technologies, conservation tillage, use of keyhole and trench gardens, agro-forestry and application of traditional medicine to control pests and diseases.

Mulungu and Ng’ombe (2019) argue that, more competent irrigation technologies, increased research and development of drought-tolerant varieties are the climate-smart adoption strategies that should be adopted. Jairo and Korir (2019) conducted a research on climate knowledge, adaptation and intensity of adaptation strategies among farmers in the slopes of Mt Kenya. The research was conducted in Kirinyaga County in Kenya. Result showed that same of the adaptation strategies included planting new crops, adjusting planting time, planting of drought tolerant crops and practicing soil and water conservation.

IV. STRATEGIES TO EDUCATE FARMERS ON CLIMATE CHANGE

Ali and Erenstein (2017), Zwane (2019), Mulungu and Ng’ombe (2019) and Jairo and Korir (2019) argued that some of the mitigation measures that farmers can be educated on climate change include;

1. Adapting water conservation methods in time of drought such as drip irrigation, planting cover crops, dry farming to reduce the use of fossil fuel and greenhouse gas emission by use of energy.
2. The use of on-farm renewable energy production such as use of solar panel and wind turbines, minimize use of petroleum-based fertilizers.
3. Adapt organic practices such as use of manure, mulching and use of cultural practices.
4. Farmers should support and adapt the process of carbon sequestration.
5. Keeping agriculture green by practicing reforesting, rangelands, restoring riparian zone, planting hedgerows and other perennial plants.
6. Rotational Farmers should adopt holistic pasture-based livestock management through practices like grazing.

Drip irrigation in Budalangi, Busia County (2020)

V. CONCLUSION

From the reviewed literature it is clear that climate is a threat to food security. Unless drastic strategies are taken many countries will face food shortage. Some of the cause of climate change are; deforestation, poor farming method, use of fossil fuel. Strategies include; water conservation, renewable energy, cultural practices, and organic practices.

REFERENCE