

## **THE SOCIO-ECONOMIC CONSEQUENCES OF CLIMATE CHANGE IN THE SOUTH WEST REGION OF CAMEROON**

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### **ABSTRACT**

Climate change exerts a constraint on the way of life of farmers necessitating urgent actions like mitigation and adaptation to reverse negative outcomes. For many in rural communities, agriculture is not only a source of food but also an important source of income. This study aims to describe how climate change brings about low yields of crops and the socio-economic consequences of low yields as farmers are often envisaged as the most vulnerable given that their livelihoods depend on agriculture. **The study was carried out in the South West region of Cameroon which** is predominantly agrarian and agriculture is rain-fed. Through simple random sampling, a sample size of 680 farmers was constructed. Data were collected through questionnaire administration and observations. Findings revealed that decrease in rainfall amount and intensity, increase temperature and sunshine intensity reduce water availability for crop growth, cause withering of plants and stunted growth decreasing crop yields. Socio-economic consequences of low yields are hunger and poverty making farmers more vulnerable since their livelihoods depend on farm yields.

**Keywords:** Climate change, Consequences, Livelihood, Vulnerability

### **1. INTRODUCTION**

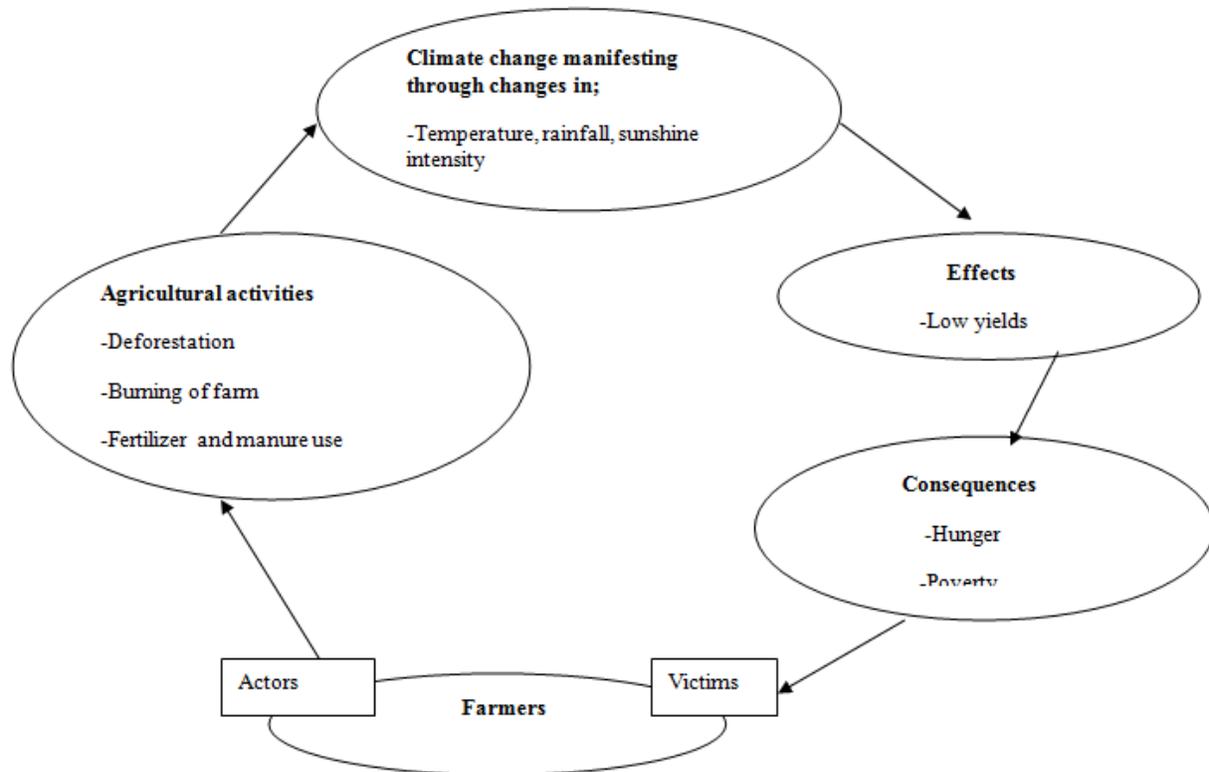
Climate change exerts a constraint on the way of life of farmers necessitating urgent actions like mitigation and adaptation to reverse negative outcomes. Farmers are not only the victims of negative impacts of climate change but are also the drivers of climate change through agriculture linked activities. Deforestation to increase agricultural land, farm clearing through bush burning increase carbon-dioxide (CO<sub>2</sub>) concentration in the atmosphere; fertilizer used to improve soil fertility contains nitrous oxide (N<sub>2</sub>O) and animal dung used as manure contains methane (CH<sub>4</sub>). Increase concentration of these greenhouse gases (GHGs) bring about climate change affecting

crop yields. Action Aid (2009) confirmed that agriculture contributes to and suffers from negative effects of climate change.

For many in rural communities, agriculture is not only a source of food but also an important source of income. According to FAO (2008), climate change will have significant adverse effects on the agricultural sector because many low-income countries are located in tropical and subtropical regions, which are particularly vulnerable to rising temperatures, and in semi-desert zones which are threatened by decreasing water availability. In Khanal (2009), the patterns of impact of climate change on agriculture are classified into biophysical and socio-economic impacts. The biophysical impacts include; physiological effects on crop and livestock change in land, soil and water resources and increased weed and pest challenges. The socio-economic impacts include decline in yield, reduced GDP from agriculture, fluctuation in world market price, increased number of people at risk of hunger and food insecurity, migration and civil unrest. As stated by Kumar *et al.*, (2011), climate change is a serious challenge to ensuring food security in developing countries as the incidents of extreme climate events such as drought, flood are likely to increase in the coming decades making rain-fed agriculture much risky. Edame *et al.*, (2011) noted that climate change will increase hunger and malnutrition; worsen the living conditions of farmers, fishers and forest-dependent people who are already vulnerable and food insecure in Sub-Saharan Africa. Climate change impacts are therefore diverse, altering people's lives in different ways which demands for immediate actions to ensure livelihood. Livelihood according to Ellis (2003) attempts to capture not just what people do in order to make a living, but the resources or assets (education, health, money, land, water, food) that provide them with the capability to build a satisfactory living, the risk factors that they must consider in managing their resources and the institutional and policy context that either helps or hinders them in their pursuit of a viable or improving living.. This study aims to describe how climate change brings about low yields of crops and the socio-economic consequences of low yields as farmers are often envisaged as the most vulnerable given that their livelihoods depend on agriculture.

## **2. CONCEPTUAL FRAMEWORK**

Figure 1 presents the conceptual framework of the study. Farmers are presented as actors and victims of climate change. Their agricultural activities lead to climate change which results to low yields with consequences hunger and poverty.



**Figure 1:** Conceptual framework of the study

### 3. METHODOLOGY

#### 3.1 Description of the study area

The study was carried out in the South West region of Cameroon; more precisely in Meme, Fako and Kupe- Manenguba divisions. The region is predominantly agrarian. Traditionally farms are cleared by use of cutlasses but due to the strenuous nature of the activity and increasing sunshine drying shrubs, farmers have resolved to bush burning and the use of weed killers. Minimum tillage is mostly practiced in which after clearing of the farm, farmers turn soil over using cutlass or hoe. This practice reduces time, labour, conserves soil moisture and reduces erosion. Food crops cultivated include plantain, egusi, yam, maize, cocoyam, cassava, vegetables and groundnuts. Predominant cash crops are cocoa and palms. Mix cropping dominants monoculture as food crops are often associated in cash crop farms. This farming system has the advantage of maximizing land and minimizing labour input and reduces risk of pests and diseases spread on plants. Due to population growth, shifting cultivation is gradually wearing out as same piece of land is cultivated year in and out with application of fertilizer and manure being

the only means of regaining soil components. Agriculture is rain-fed in the area and farming is usually for sustenance and commercial purposes.

### 3.2 Sample size and data collection

A sample size of 680 farmers was constructed through simple random sampling technique. The tool used for data collection was the questionnaire administered to farmers who constituted the sample size and observations captured as photographs and presented as figures in results.

## 4. RESULTS

### 4.1 Social and farm characteristics

Majority of the farmers were male (71%) and the dominant age group of the respondents was 40-49 years (38%). A greater proportion (54%) of the farmers had attained primary education and the majority of the farmers (51%) had a household size of 6-10 persons. This is an indication that there might be enough labour from the household to manage farming activities. This equally implies more mouths to feed and more income needed to provide basic necessities and ensure livelihood. The majority of the farmers (38%) had been into farming for more than 20 years; an indicator of their dependency on agriculture for livelihood and are therefore vulnerable to the negative impacts of climate change on crop yields.

**Table 1: Social characteristics of the respondents**

Variable	Variable modalities	Frequency	Percentage
Sex	Male	481	71
	Female	199	29
	Total	680	100
Age	30-39	102	15
	40-49	259	38
	50-59	170	25
	60 and above	149	22
	Total	680	100
	Never attended school	71	10
	Primary	364	54

<b>Level of education</b>	Secondary	185	27
	High school	51	8
	Tertiary	9	1
	Total	680	100
<b>Household size</b>	1-5	254	37
	6-10	345	51
	11-15	65	10
	15 and above	16	2
	Total	680	100
<b>Farming experience</b>	<10 years	207	30
	10-19 years	218	32
	20 and above years	255	38
	Total	680	100

Source: Field survey 2016

#### **4.2 Effects of climatic variables on the yields of crops.**

Here, the climate variables considered are rainfall, temperature and sunshine and their influence on yields of cocoyam, plantain and cocoa are discussed.

##### **4.2.1 Effects of rainfall, temperature and sunshine intensity on yields of plantain**

The farmers remarked that the rainy season has become shorter since rains begin late. Also observed is a decrease in the rainfall intensity. Agriculture in the area is predominantly rain-fed therefore inadequate water supply has adverse effects on efficient crop growth, resulting in low productivity. Plantains need water and this explains why banana plantations are often irrigated. Insufficient water makes plantain stem to bear small bunches and fingers and the plant often dies after the first harvest.

Increase temperature and sunshine intensity causes plantain leaves to become yellowish in colour (Figure 2) and the plantain plant and young suckers wither and die before maturity. Increase temperature is also a favourable condition for the proliferation of nematodes and borers that bore into the plantain trunks and roots (Figure 3). They cause small holes on trunks and eat off the roots. This leads to rotting and weakening grip of the plant in the soil causing it to topple since the roots are shallow. These findings are in line with Thornton & Cramer (2012), who stated that

if banana-plantain plant undergoes water stress for a long period of time and if temperature increases by 2°C favouring increase risk of pest and diseases, a significant yield loss will be observed.



**Figure 2: Yellowing and drying of leaves due to intensive sunshine**



**Figure 3: Plantain trunk attacked by nematodes and borers**

#### **4.2.2 Effects of rainfall, temperature and sunshine intensity on yields of cocoyam**

Low rainfall reduces water availability for cocoyam plant. Change in start and end of rain is a great challenge to farmers because it makes rainfall highly unpredictable and tends to confuse farmers. Cocoyam withers and dies after cultivation due to lack of water in the soil since the start of rain is followed by a period of dry spells. Seeds planted at the beginning of rains are scorched during the dry spells occurring at the critical periods of crop growth thereby leading to low yield or crop failure. This agrees with the findings of Molua & Lambi, (2007) which stated that insufficient and irregularity of rainfall could affect yields adversely especially its failure to arrive during the crucial growing stage of the crops development.

High temperatures burnt germinating seeds. Farmers observed that rains were readily evaporated by high temperature emphasizing that few hours after the rain; the soil would appear dry as if it did not rain at all due to high temperatures. This often leads to stunted growth of the crop. Increase temperature also favours pest and diseases like the dasheen mosaic causing spots on leaves like eczema and cocoyam blight causing leaves and roots to rot (Figure 4). This has made

affordability of cocoyam a problem to the farmers and the consumers at large. The colocasia commonly referred to as “Ibo coco” in the past produced much and was affordable but due to pest attack, farmers have to look for alternative sources of food. Sunshine is necessary for photosynthesis but increase sunshine intensity leads to excessive heat which results in excessive transpiration and water loss and is evidenced in yellowish leaves, dryness of leaves and stems of cocoyam and eventual death.



**Figure 4: Cocoyam plant attacked by cocoyam blight disease**

#### **4.2.3 Effects of rainfall, temperature and sunshine intensity on yields of cocoa**

Sensitivity of cocoa to rainfall, temperature, and sunshine makes it vulnerable to climate change. Rainfall variability (especially late start and early end of rain) reduce water availability in stem and soil. Decrease in availability of waters causes late flowering. *The farmers equally depend on rain water which they collect in water reservoirs to spray their farms. However, low rainfall in recent years has rendered this task difficult.* Another danger to cocoa production is prolonging sunshine which encourages bush burning and drying of cocoa trees. Increase sunshine causes cocoa pods to ripe before maturity giving poor yields, low weight and quality. Increase mortality

of cocoa seedlings and water deficit in mature cocoa plant are further consequences. Also, due to increase sunshine, the moss plant commonly referred to as “carpet” in the study area clings to cocoa tree (Figure 5). This moss blocked eyes of cocoa where flowering takes place thereby reducing its productivity.

Increase temperature is a favourable condition for proliferation of pests and disease infestations like capsids and black pods (Figure 6). Black pod is a destructive disease which attacks the developing or ripening cocoa pod. It is very contagious and poses some challenges to farmers due to yield losses which affect cocoa production. The month of May –June is the period that cocoa is highly exposed to the black pod disease. Capsids are sucking insects that damage the young shoots by piercing it with their mouth parts to make a wound and then drain the shoot by sucking the liquid in it. While sucking, they inject toxic substances into the plant which might result to death of the affected shoot and in the long run death of the entire plant. They are usually most active and destructive from September to March particularly when there is higher temperature, sun intensity and extension of dry season. However, black pods cause more loss to cocoa than capsid due to its contagious nature. kimengsi & Tosam, (2013) noted that alternating climatic situations in the South West Region of Cameroon have increased the frequency and magnitude of pests and diseases affecting cocoa thus lowering yields.



**Figure 5: Cocoa trunks attacked by moss**



**Figure 6: Some cocoa pods attacked by capsids and black pods**

### **4.3 Socio-economic consequences of low crop yields on livelihood of farmers**

Climate change is a serious threat to the livelihood of farmers in the South West Region considering that the principal food and cash crops they depend on for their sustainability are negatively affected by adverse changes in rainfall, temperature and sunshine patterns. The socio-economic consequences of climate change identified in this study are hunger and poverty with their numerous tentacles.

#### **4.3.1 Hunger**

According to the farmers, climate change has entrained hunger into the area. Even though some of food consumed by the household is bought (rice), a greater proportion is from household production. Majority of households depend on farm output for availability of food and when yields are poor, farmers become more vulnerable. The labour force needed for farm activities is mostly provided by the family and to maximize labour productivity, it is necessary to feed well

in order to be energetic for the tasks. Hunger also has health consequences which also limit labour productivity. Poor yields have further made women more vulnerable as they prefer to go hunger sacrificing the little food available for other members of the family. Farm families normally have difficulties having two square meals a day and climate change has worsen the situation as they can barely have a meal a day. Another social consequence of hunger is theft of farm products often witnessed by farmers whose farms are perceived to produce well (usually these are farmers who have taken adaptation measures like use of improved seed varieties, application of organic fertilizer and manure and) than that of others. Proprietors of such farms have also being labeled with witchcraft accusations as farmers who have not perceived climate change have no understanding of why their farms do not produce well despite all the labour input. Hunger also pushes some farmers (especially girl children) into prostitution in order to ensure their livelihood.

#### **4.3.2 Poverty**

Agriculture is not only the main source of food for farming communities but it is also the principal source of income as farmers rely on sales of farm output for income. Income generated from sales of crops permits them to acquire food items not cultivated by the household and other household necessities. However due to poor yields of crops (especially cocoa the principal cash crop farmers rely on in the area) farmers have become more vulnerable as very little money is made from sales of farm products. Similarly, Molua & Lambi (2007) noted that increase temperature and decrease in precipitation would cause revenues from agricultural products in Cameroon to drop. Drop in farm income has entrained poverty. Poverty has other tentacles like school dropout as children have been forced to drop out of school because the little money made from sales of farm products cannot meet school requirements. Also living standards have deteriorated as household projects to make the family live comfortably have not been undertaken/realized.

#### **5. CONCLUSION**

Farmers' dependency on agriculture for livelihood cannot be over emphasized. Hunger and poverty as a result of poor crop yield increases vulnerability of farm families. Climate change, a sustainable development goal is a threat to achievement of other sustainable development goals like hunger and poverty. There is the urgent need for action by mitigation or adaptation to halt the trend and be sustainable by 2030.

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