

Agriculture in Cameroon: Proposed Strategies to Sustain Productivity

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Abstract

The agriculture sector in Cameroon is amongst the main occupations for over 70% of citizens and contributes enormously to the country's economy. The lack of access to adequate amounts of safe and nutritious food is a public health concern worldwide and particularly in Cameroon. Due to its agro-ecological diversity, Cameroon has great potentials for agricultural production to contribute towards its over 23 million people and beyond, thus contributing towards feeding the world's 9 billion people. Until the late 80s, Cameroon was considered self-sufficient in agricultural production and played a role of food garret for its neighbouring countries. Since early 90s, Cameroon began spending billions of francs CFA to import large quantities of food items (rice, maize, onion, tomatoes, milk and poultry) even though relying on national products has a clear comparative advantage. This has been very worrisome as it undermines local production potentials and pushes many producers out of the production chain as a result of unfair competition. The challenges are numerous (but not impossible) including low levels of input e.g.

via governments subsidies as well as the expected adverse impact of climate change on agriculture now and in the future. This review is a summary of agricultural systems and food crop productivity in Cameroon, with some recommended strategies to improve agricultural practices to ensure sustainable increase in food production capacity and food security in Cameroon.

Introduction

Agriculture is amongst the main occupations for over 70% of Cameroonians and contributes enormously to the Cameroonian economy. In view of the close to 80% of labour force employed in the Agricultural sector, an estimated 45% of Cameroon's gross domestic product (GDP) depends on Agriculture (Johnston et al., 2007). In addition, Agricultural sector is responsible for providing food security to both the Cameroonian rural and urban populations via local production. Notwithstanding, with the rapidly expanding population growth, there is an increased pressure on natural resources. According to Molua and Utomakil (1998), low levels of input and equally low levels of government subsidies (for example quality seeds, fertilizers, and herbicides) per capita food production declined from 22.9% and 12.8% as a result of population growth. As a result, one may clearly anticipate a real challenge to the government which has continuously experienced an increase in populations and currently estimated at 23 million inhabitants. This situation may further be frustrated by the expected adverse impact of climate change on agriculture now and in the future. For example, based on the third and fourth Assessment Reports of the inter-governmental panel on climate change (IPCC) (BOKO et al., 2007) that predicted extreme events due to climate change scenarios (e.g. 1997 and 2005), there remains chances that drought in Cameroon may still occur with devastating effect. These effects may include food shortages and long-term food insecurity (Inter –Research, 2008). These definitely points to the likelihood of serious food security problems in Cameroon. This review is a summary of agricultural systems and food crop productivity in Cameroon, with some recommended strategies to improve agricultural practices to ensure sustainable increase in food production capacity and food security in Cameroon.

BACKGROUND

Geographical Location of Cameroon

Cameroon is a country located at the sub-equatorial Region of Africa. Cameroon shares boundary in the North with Chad, in the East with Central African Republic, in the South with Gabon, and in the West with Nigeria (Fig. 1). Cameroon lies between longitude $6^{\circ} 00' N$ and $16^{\circ} N$ and latitude $1.65^{\circ} E$ and $12^{\circ} 00' E$. Cameroon is therefore located $6^{\circ} 0' 0'' N$ and $12^{\circ} 0' 0'' E$.



Figure 1. The location of Cameroon

Major Food and Cash Crops in Cameroon

Small-scale farmers make up the majority of food producers. The most important food crops produced include plantains, cassava, corn, potatoes, millet and sugar cane amongst others. These crops are cultivated in an agricultural systems such as subsistent Agriculture (Bush fallowing, Dry farming, Terracing, Shifting cultivation, cattle rearing and as well as plantation farming).

This information is inadequate – please do consider discussing more and possibly bring tables on food productions over years etc and per regions etc

Agricultural (Farming) Systems Practice in Cameroon

Cameroon is divided into four ecological zones and two principal climatic zones. The western highland is one of these agro-ecological zones of the country and lies between latitude 4°54 N and 6°36 N and between longitude 9°15 E and 11°24 E. The main farming systems here include shifting cultivation, Bush fallowing, Terracing and dry farming systems. Main crops cultivated include Irish potatoes, tomatoes, rice, yams, corn and Cassava. Cultivation here starts during the rainy season with more than 3Image concentrated around the Ndop plain where favourable topography and the presence of a dam provide favourable conditions. Mean monthly temperature range from about 15°C on the highlands to about 27°C in low-lying regions. The low-activity Kaolinite clays and high quantities of sesquioxides are the common agriculture soils of the region. These clayed soils have a deep slum (several meters thick), a reddish hematite subsurface, a weak macro-structure and high fertility. This fertile soil encourages the cultivation of food crops like corn, millet, sugar cane, potatoes and cassava.

1. Pastoral Normadism

Pastoral Normadism is equally another farming system that has been encouraged on these high relief agro-ecological zones. High relief breeding zones are subject to free-fed mosquito cattle

and animal husbandry, following the principle which states that “the higher a geographical Region, the higher the forces of fluvial flow and the lower the chances of mosquitoes and pesticide survival. This explains why this farming system is said to be located here.

2. Dry farming and Terracing

Dry farming and terracing are equally gross current agricultural systems practiced in the Western Highlands of Cameroon. Terracing is practice across steep-slop banks on the Western Highlands with main crops cultivated such as plantains, yams, and potatoes. Dry farming system is practices along the few fertile gentle slopes and in localities of undulating reliefs.

Approximately 80% of the entire population is engaged in the fore mentioned Agricultural systems, with small farm sizes, almost 0.5 to 2 hectares per family. Generally, traditional agricultural systems predominate with primitive farming practices and poor management. Agriculture here is still dominated with low use of fertilizers, high labour force inputs, limited soil conservation strategies and absence of enabling infrastructure for agricultural development. Farmers still depend on the use of out dated tools (hoes, cutlasses and spades) and techniques (manual weeding, hoeing and harvesting). Approximately 6% of the industrious population possess or practice livestock farming.

Effects of climate change on sustainable crop production in the Western Highlands and coastal lowlands of Cameroon.

Meteorological studies proof that the unstable nature of the inter-tropical convergence zone (ITCZ) influences Cameroon’s rainfall patterns (variability and unreliability). When Rainfall fails to meet the crop requirements, the country’s limited capacity for irrigation and its high population growth rates will increase the probability of food shortage. Only about 56% of land in the country is assumed to be suitable for agricultural activities. Inter annual climatic variability affect agriculture in a number of ways and thus threatens food security in Cameroon.

According to a document jointly published in 2007 by the Ministry of Agriculture and rural development (MINADER) and that of fishery livestock and Animal Husbandry (MINEPIA). Extreme rainfall leads to floods, frost, wind, storm and droughts often causing devastating effect on Agriculture. Decreased rainfall variability results to drought which has severely led to reduction in soil moisture and consequently a decrease in agricultural productivity. A classical case was witnessed in Northern Cameroon .These severe drought periods in the Sahelian Northern region of Cameroon include; 1972-1973, 1982-1987 and 1987-1988. Even though its occurrence and origin proved it was natural, however overgrazing, farming on marginal lands and deforestation from wood gathering contributed to its severity. Droughts have led to hunger and famine as cereal production dropped both qualitatively and quantitatively (MINADER 2013). Extending down to the coastal lowlands, high savannah region has been affected by severe drought conditions.

In the southern parts of Cameroon, frost affects agricultural productivity. Frost occurs in the mountainous regions of the North West and Western Regions. At night during the dry season, cold dense air from the mountain slopes moves down the valleys displacing the warmer air that accumulate in the valley during the day. This process leads to low temperatures at the bottom of the valleys where legumes, grains and plantains are grown. The biting frost kills budding fruits that could otherwise provide vitamin A via nutrition if consumed.

In the coastal zones of Kribi, Campo, Douala, and Limbe storms and wet season floods destroy coastal infrastructure and agricultural resources reduces productivity. Wherever such storms occur large areas of farmland notably the banana plantation whose product are destined primarily for export are destroyed. Rubber, plantations, pineapple fields and oil palm estates are inundated causing massive destruction.

In the coastal lowland of Cameroon main crops production systems include; shifting cultivation, dry farming, livestock farming, bush fallowing and sedentary subsistent farming. Here, food crops items like cassava, maize, cocoyam, yams, sweet potatoes, banana and plantains are cultivated. The farmers allow the farms to shift for two to three harvests in order to permit the

soil regain its fertility. Over the years food crop productivity in the coastal lowland has gained significant improvement especially in maize and potato production

Socio-economic impacts of climate change in Cameroon

Climate change impacts can be measured in economic cost (Smith et al, 2001, 936-94). This is particularly well suited to market impacts that are impacts that are linked to market transactions and particularly directly affect the gross domestic product. Monetary measures of non-market impacts for example impacts on human health and ecosystems are more difficult to calculate. Other difficulties with impacts are still under research.

In a literature, assessment (Smith et al 2001) concluded with uncertainty that climate change is a direct cause of income inequality amongst individuals in Cameroon and the world at large. Predicted estimate of the socio-economic sector on Cameroon economy are forecast to be worse if negative climate change impacts continue.

High Temperatures case, a high rate of dehydration of plants leading to low productivity and consequently a qualitative and quantitative loss both in soil and as well as secure food available to the overgrowing population. Thus malnutrition remains the key killer of young infants and the aged population of Cameroon, be it in urban or rural localities of the Country. The severity of this unsafe environment has led to major health consequences. Every year for example, environmental degradation profoundly affects nutrition; some 5 to 7 million hectares of agricultural land are lost. In Arid and Semi regions of Cameroon, desertification threatens 27 million hectares of irrigated land, 170 million hectares of rain-fed cropland and 3000 million hectares of range-land (WHO/UNICEF International covenant on Economic, social and cultural rights, 1976). In conclusion, harsh climatic conditions have resulted to severe health problems in the Sahelian zones of Cameroon. These include Malaria, tuberculosis, diarrhoea, Measles and poor infant growth.

Discussion

It is likely that crop yield will be different in the future as a result of climatic changes. This is clearly demonstrated by Munang et al., 2008. For the future climates, crop yields are projected to decrease or stay relatively unchanged in all of the agricultural regions of Cameroon. For example, higher temperatures translate into faster crop development and earlier maturation, which results in lower crop yields because the plant intercepts less cumulative So before it reaches maturity and harvest (Brassard and Singh 2008). Clearly, climate change will also have complex interaction with the timing and severity of disease, pest and weed interactions (Fuhrer, 2003), which will all reduce crop yield. This sends a cautious signal to Cameroon where poor and vulnerable people are dependent on agriculture and failure in crop production under climate change will exacerbate poverty and food-insecurity challenges already faced by an impoverished rural and urban society.

In reality the projected climate change will result in higher yield variability, posing significant consequences for farming businesses and future management decisions (Tingem et al., 2008). Thus, predicting seasonal rainfall and yield will become more important than for the current climate, and farmers will need to make more dynamic and tactical decisions about crop choices. On the side of public authorities, more effective extension programs are needed to bring about or increase farmers' awareness of climate change. More effective farm planning, crop insurance and economic diversification offer the potential of increasing farmers' resilience to adverse changes in the future.

However, this paper brings out the possible impacts of climate change on Cameroon's agriculture, which may be useful in designing appropriate adaptation options. It is the responsibility of the government and the scientific community to provide farmers with the adequate and necessary expertise and guidance for undertaking proactive, well informed adaptation measures.

Proposed Strategies to ensure sustainable food production in Cameroon admits climate change

Cameroon constitutes the breadbasket of food production within the sub equatorial sector of the African continent. Her food crop yielding needs qualitative and quantities sustainable strategies

to meet up with her future food demand. These strategies comprise the use of inorganic fertilizers, animal droppings, use of improved seeds, vegetal waste (compost), and associating yields with dominant farming practices amongst others.

A. Use of inorganic fertilizers:

The use of chemical fertilizers is associated with high yields. It must be noted that only 58% of the sampled farming population use any chemical fertilizers. In addition, only about 66% of those using fertilizers were able to meet up to 50% of their fertilizer needs. 39% of the sampled farming population were satisfied with more than 80% of their fertilized seeds. Some farmers admitted that the amount of inorganic fertilizers used is rarely sufficient to achieve optimal yield. This strategy will therefore help to increase and improve sustainable food needs in Cameroon in the future.

B. Application of animal dropping:

Approximately 48% of sampled farmers use animal droppings, but are insufficient in most cases. The use of animal dropping has shown to have the most substantial association with high yields. This ranking is based on comparison with the use of chemical fertilizers and improved seeds and plant vegetal waste products. Animal wastes bring a cocktail of benefits to the poorly structured low-nutrient soils of the region. Studies have documented such benefits. Besides providing more nutrients per unit volume relative to other organic fertilizer sources, animal dropping improve the soil's moisture retention capacity and provide favourable conditions for the growth of beneficial soil microbes. Such improvement in structures, microbial composition and chemistry reduce erosion and help to prevent nutrients from leaching. Animal wastes can be important in balancing extremes in high soil pH of Cameroon.

C. Effective use of improved seeds should be encouraged:

Farming practices that make use of improved seeds experience substantial better yields relative to those that do not use them. Farmers depend coincidentally on the quality of their seeds for

viable crops and good harvest. The traditional method of saving some of the previous harvest as seed for next year's planting has been practiced for several years now in Cameroon. Through such practices, small-scale farms have been able to conserve the genetic materials of the crops for several generations. Some of these crops have survived different environmental challenges that Cameroon has faced. Research on seeds with higher production potential, pest resistance, drought tolerance and other beneficial trait in Cameroon could be the bases on improvement in some of original seed stocks.

D. The collective use of vegetal waste (composed):

Added to the use of animal dropping which might be regarded as insufficient in some communities in Cameroon with limited use of chemical fertilizers, the use of plant residues in terms of compost is even more beneficial. Appreciable amounts of vegetal waste products that can serve as inputs to farming activities are far better encouraging. By converting these products into waste (compost) and using it on farms, farmers may improve crop yield. A collective and well-managed compost use program can go a long way to boost the future production capacity of Cameroon. This practice predominate the small scale farming system of close to about 47.9% in local areas.

E. Mixed cropping or crop rotation:

Mixed cropping or crop rotation can equally go a long way to solve and boost the future crop production in Cameroon. Mixed cropping or crop rotation help to reduce the spread and rapid attack of crops by pests and diseases. This will go a long way to increase food availability and supply in the future.

D. The use of genetically engineered seeds

One of the effects of higher temperature in Cameroon is reduced growth and grain filling periods. Developing different cultivars, which are better adapted to future climates, is one option, especially varieties with a longer season. Other potential adaptations include changes in sowing

date, the implications of which the authors are currently researching. Some locations may be suitable for development of water storage and irrigation capabilities, but these will require substantial infrastructural and educational investments.

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