

Research Article

Maize Crisis: A Position Paper on Strategies for Addressing Challenges Facing Maize Farming In Kenya

Dr.Catherine Barmao Kiptanui Tarus

Uasin Gishu County Box 100-30100 Eldoret Kenya

*Corresponding Author

Dr.Catherine Barmao Kiptanui Tarus

Abstract: Maize farming has been practiced in the country for a long time since it was introduced by the Portuguese in the 16th century. With time maize has become the main staple food for Kenyans gradually replacing the indigenous foods. In addition, maize farming also serves as a source of income for many farmers. This duo-role makes maize production a sensitive subject in the country. Until 1990's, Kenya was a net exporter of maize. This trend has now reversed and the domestic demand is higher than the domestic production. In 2017 for example, the country produced 37 million bags of maize against a requirement of 52.8 million bags for the same year. Kenya is indeed one of the sub-Saharan countries that have recorded negative gains in maize production and is now a net importer of this commodity. For the last few years, there has been a public outcry from maize farmers in relation to marketing and pricing. This paper looks at the maize sector and observed that the farmers continue to suffer unwarranted challenges related to expensive land preparation cost due to lack of support from Agricultural mechanism services (AMS) and county governments, limited availability of suitable high yielding maize varieties and inefficient farm inputs and fertilizer subsidy programs, prolonged droughts, flooding of the local market by cheap imports following the creation of the common market in East Africa, fluctuation in prices, poor maize handling and storage, infestation by pests and diseases. The handling of farmers produce and maize strategic reserves by the National Cereals and Produce Board has not helped the situation. NCPB is mandated only to purchase strategic food reserves on behalf of the Strategic Food Reserve Trust Fund. The National strategic food reserve is only 2-3 million bags and the extra is left to the market forces. It was concluded that without other interventions the farmers are unlikely to break even and the maize deficit may continue being a mirage. The mandate of NCPB should also be reviewed such that the board buys only from contracted farmers and the prices be announced ahead of the production season. The government should consider zero-rating on the fertilizers, enhance credit facilities, and also encourage formation of farmers' cooperative societies for ease of maize marketing. The study recommended the diversification of eating habits, growing of alternative food security crops and blending of maize flour with other traditional nutrient dense crops such as sorghum, millet, cassava, grain amaranths and others and further introduce other high value agricultural enterprises to increase farm income.

Keywords: Challenges, Crisis, Farming, Maize, Strategies.

INTRODUCTION

This section covers background information and problem statement.

Background Information

Maize is grown in many parts of the world. The leading producer is the United States accounting for 40% of the world's harvest. France, Mexico, China, Brazil, Indonesia, India, and Argentina are among the top grain producing countries. By region, based on 2008 data, North America was the largest producer of maize accounting for 38.8% of the global output. Asia was second (28.5%); South America third (11.2%). Others were, Europe (11.1%); Africa (6.9%); Central America

(3.4%); and Oceania (0.07%), in that order (Martinez, 2011). In the developing world, Argentina, Brazil and China produce over 60 percent of total maize output. China alone produces over 45 percent. White maize constitutes over 60 percent of the maize area in developing countries. However in the developed world, white maize is of less significance. In the United States, the world's largest maize producer, white maize cultivation accounts for less than one percent of the total maize produced (Morris, 2014).

Quick Response Code



Journal homepage:

<http://www.easpublisher.com/easjehl/>

Article History

Received: 25.02.2018

Accepted: 05.02.2019

Published: 22.03.2019

Copyright @ 2019: This is an open-access article distributed under the terms of the Creative Commons Attribution license which permits unrestricted use, distribution, and reproduction in any medium for non commercial use (NonCommercial, or CC-BY-NC) provided the original author and source are credited.

Maize was first brought to Africa by the Portuguese in the 16th to 18th century. Since then, it has become a staple food in Africa. South Africa, Tanzania, Uganda, Zambia and Swaziland produce most maize in East and Southern Africa. Major importers of maize were Zimbabwe, Angola, Ghana, Kenya and Mozambique (Pingali, 2011). Small-scale farmers produce most of the maize produced in Africa. Such small-scale farmers produce maize under very difficult conditions. The challenges include variation in environmental and climatic conditions, poor soils, and low-yielding seeds among others. Post-harvest losses are also another challenge the farmers are facing. Traditional granaries are used for grain storage in Africa. This leads to great postharvest loss of maize grain. (International Maize and Wheat Improvement Centre, (CIMMYT, 2010).

According to CIMMYT (2015), Maize is Kenya's most important crop with more than 2.1 million ha of Kenya's 5.3 million ha of all crops harvested area between 2011 and 2013 having been occupied by maize. This implies that maize accounts for 40% of all crop area in Kenya. The Ministry of Agriculture data for 2011 indicate that maize accounts for more than 51% of all staple food grown in the country. The major counties that are suitable for maize production are; Trans Nzoia, Uasin Gishu, Kakamega, Nakuru, Embu, Nyeri, Kirinyaga, Taita-Taveta and Kwale. Kenya's per capita maize consumption is estimated at 103 kg/person/year (CIMMYT, 2015), with the 2017 annual maize demand being 52.8 million bags. However, maize production has shown a deficit over the years. The 2017 annual production was 37 million bags of maize which fell below the annual domestic demand for the year (KNBS, 2018). The National Cereals and Produce Board (NCPB) buys surplus maize during bumper harvest. It also regulates maize prices in the market. Other maize buyers are the major millers which include Dola millers, Unga Millers, Mombasa Millers and Premier Millers among others.

1.2 PROBLEM STATEMENT

Food security is complex and requires elaborate measures to accomplish as it focuses on the daily consumption of food where distribution systems ensure a continuous availability of food and also sustained economic ability to acquire food through the supply system. In Kenya, maize yields are in the decline despite the fact that the area under cultivation have increased. This is mainly because maize growing in Kenya is mainly rain-fed. Apart from other climatic, edaphic, human and economic factors, rainfall and temperatures are major determinants of maize yields. Maize production and food security in Kenya are intertwined. Deficits in maize production are met through importation. In May 2017, for instance, in a response to lower maize supplies, the Government of Kenya, issued permits for the importation of 6 million 90kg bags of maize for human consumption with an

aim to improve the market supply and announced the provision of a subsidy on maize flour, regulating the price at Kshs 45 per kilogram to stabilize prices and improve household access to the commodity. In Kenya, maize also accounts for about 14% of household income. The government's inconsistent, incoherent policies and pronouncements on the maize importation led to massive importation of maize without proper control which led to over importation and massive revenue loss. It is perhaps for this reason that, in the last few years there has been an outcry from maize farmers in relation to marketing and the pricing of maize. The money allocated to pay farmers for their supplied crop was diverted to pay traders and merchants causing the delay of payment to genuine farmers who had already delivered their crops to NCPB depots/silos. Most farmers who delivered their produce to the NCPB in the year 2018 were not been paid immediately and there were claims that those who were paid were not farmers but middlemen and cartels that imported maize from neighboring countries and were able to manipulate the NCPB for payment. However in early 2019, farmers who delivered maize were paid almost immediately though subsidy fertilizer was not availed to farmers by the government hence leading to high cost of fertilizer and out of reach to many in the open markets and Agro-Vets. Despite the Kenya's Agenda Four, the issue of Food security is at brim due to high cost of production discouraging many farmers from planting maize which may lead to maize shortage and inadequate food security in a near future.

2.0 SITUATION ANALYSIS

This section covers historical perspective of maize production in Kenya, food and nutrition security, maize production trends, gross margins and strategic food reserves.

2.1 Historical Perspective of Maize Production in Kenya

A report by a Commission of Maize Inquiry (Republic of Kenya, 1966) indicates that by the time the British authorities came to Kenya maize was already being grown in the country, although it was not a widespread crop. When the Department of Agriculture was established, attempts were begun to replace the indigenous maize with better varieties. According to that report the maize subsector has experienced significant events such as overproduction in certain years followed by inadequate production in other years. Prices have also fluctuated significantly. Previous inquiries have tended to give temporary relief, rather than a permanent solution. Production has not quite matched the demand (CIMMYT, 2015), and marketing remains a big challenge (Nyoro *et al.*, 2007)

2.2 Food and Nutrition Security

According to the United States Agency for International Development (USAID), food security means having, at all times, both physical and economic

access to sufficient food to meet dietary needs for a productive and healthy life and that families are able to afford and obtain enough nutritious food. A family is food secure when its members do not live in hunger or fear of hunger. Studies show that both in the United States and in developing nations, food insecurity is often linked to poverty and that shifts in the global economy, including rises in global food and oil prices, can affect food security throughout the world, with severe effects in low-income countries. (USAID, 2011)

Food security is an issue in both developed and developing countries. The world is experiencing rising demands for food, stemming from three key forces: increasing human population, meat and dairy consumption from growing affluence, and biofuel consumption (Ray, Mueller, West, and Foley, 2013). The increasing food demand is not met by production because globally, food insecurity today is largely a problem of access to the resources or services needed by families to produce, purchase, or otherwise obtain enough nutritious food (FAO, 2014a). Possibilities for increasing food production seem to be inadequate owing to the fact that the natural resource factor on which agriculture depends has degenerated faster in the past 50 years than ever before in human history (Neely & Fynn, 2013).

2.3 Food and Nutrition Security

Status in Kenya Food and nutrition security is key to achieving both human and economic development agenda of our country. Indeed the Government strives to achieve a food secure, healthy, productive and wealthy nation as enshrined in the Constitution of Kenya 2010. Article 43(c) assures Kenyans’ the right to be free from hunger and to have adequate food of acceptable quality. Food security is further recognized in the country’s long term development blue print, Kenya Vision 2030 (National Food and Nutrition Security Policy Implementation Framework [NFNSP-IF], 2017).

According to the NFNSP-IF (2017), about 40% of Kenya’s population is poor and on average, 25% suffer from chronic food insecurity and poor nutrition. In recent years, it is estimated that at any one time about 2 million people require relief food assistance. During periods of drought, floods, or other calamities, the number of people in need more than doubles. Food and nutrition insecurity is closely linked to poverty. About 50% of the Kenyan populations fall below the poverty line. Among these are those living in extreme poverty. Some of these are resident in relatively well endowed rural and urban areas. Chronically food insecure people suffer from extreme poverty and with no access to some of the safety net programmes available to those suffering acute food shortages during emergencies. Under-nutrition in Kenya is a serious public health challenge.

The Food and Nutrition Security Policy (FNSP) was developed as an overarching framework that covers multiple dimensions of food security and nutrition improvement to add value and create synergy to existing sectoral and other government and partner initiatives. It is framed in the context of basic human rights, child rights and women’s rights, including the universal ‘Right to Food’ (Republic of Kenya, 2017) Ensuring food and nutrition security in Kenya is a critical challenge. Food security encompasses food availability through production, storage or imports; and the access to food by people through their purchasing power in markets.

2.4 Maize Production Trends in Kenya

In spite of maize having a huge importance for food security and economic wellbeing of the country, its productivity and production have not shown significant improvements over the years (Figure 1). The current yield is estimated at 1622 kg/ha, with average production of nearly 3.5 million tons. Increases in maize production in Kenya resulted from area expansion rather than from increases in productivity (CIMMYT, 2015).

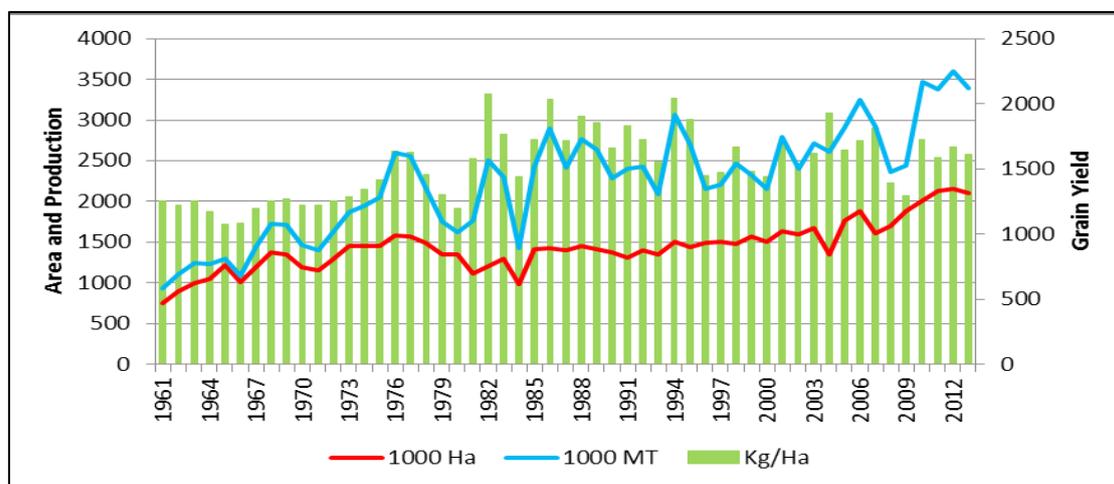


Figure 1: Performance of maize in Kenya (source: CIMMYT, 2015)

2.1.5 Maize Production Analysis

In Kenya more than 75% of maize area is cultivated by small-scale farmers – who produce more than 65% of the maize consumed in the country. Maize is produced for both home consumption and market – with small-scale farmers only selling an estimated 20% of their production. An analysis of yield gains between

1980 and 2013 indicates that Kenya’s average yield has shown a slight decline of about 1kg/ha/year, compared to growth figures of 146 kg for South Africa, 121 kg for Mali, 120 kg for Ethiopia, 97 kg for Zambia, and 93 kg for Malawi; the SSA average was 31 kg/ha/year (Figure 2) (CIMMYT, 2015).

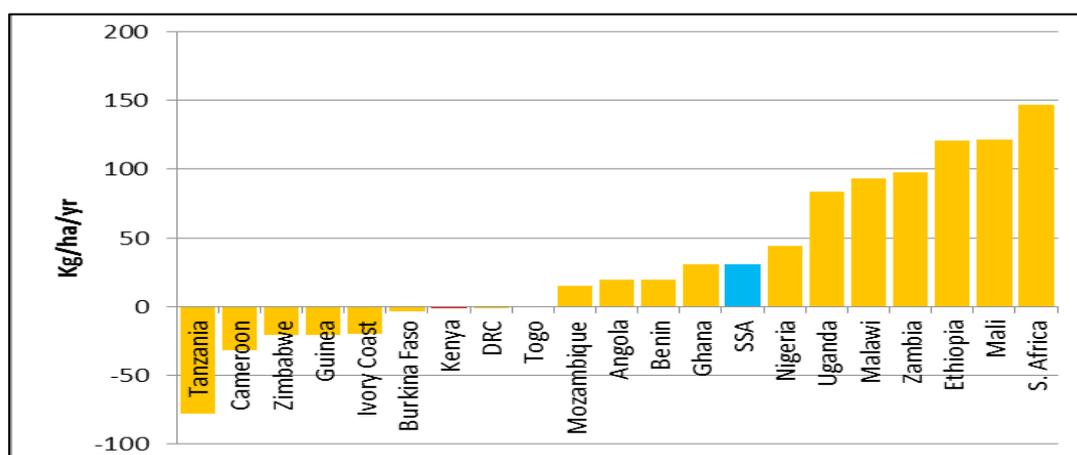


Figure 2: Maize yield gains in top 20 producing countries of SSA between 1980 and 2013 (CIMMYT, 2015)

2.1.6 Gross Margin Analysis in Selected Maize Growing Counties

Analysis of the production costs for maize in the country’s three maize basket counties indicate an average production cost of Kshs.1866 (Table 1). This high production cost makes the Kenyan crop less competitive in the market compared to crops from neighboring countries. According to Tegemeo Institute the cost of producing one 90kg bag is roughly Sh1,800

in Kenya compared to Uganda’s at Sh1,000 or slightly less (Rugalema , 2018). Despite the above research done by Tegemeo Institute on gross margin analysis claiming that the cost of production of 90kg to be roughly Sh 1,800, It is however prone to changes due to the rising cost of farming and production of maize which may be the same in the neighbouring countries also.

Table 1: Cost of Small Scale Maize Production in Trans Nzoia, Uasin Gishu and Nakuru Counties

	Trans Nzoia	Uasin-Gishu	Nakuru	Overall
Maize yields (90kg bags/acre)	17	18	19	18
Seed	1,850	1,830	1,800	1,620
Fertilizer	5,425	6,400	3,100	4,831
Pesticides & fungicides	1,490	147	-	503
Herbicides	-	1,800	-	450
Machinery (planting, 1 st -2nd Harrowing,	5,810	7,400	3,540	5,288
Labour	9,112	6,507	11,285	8,938
Others(gunny bags, sisal twines)	1,065	1,367	1,729	1,140
Transport Cost				
Working capital	1,980	2,036	1,716	1,822
Production costs	26,732	27,486	23,170	24,592
Total production costs per bag	1,572	1,527	1,219	1,366
Land rent	10,000	10,000	10,000	9,000
Total production costs(with land rent)	36,732	37,486	33,170	33,592
Total production costs per bag (with land rent)	2,161	2,083	1,746	1866

Source : Table 1(Tegemeo Institute-Egerton Survey, 2016)

2.1.7 Maize Trade

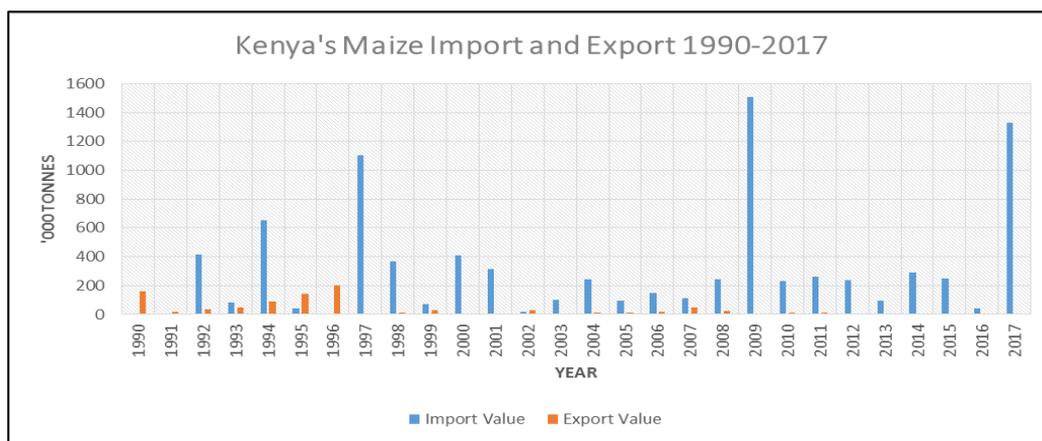


Figure 3: Maize trade in Kenya (source: FAOSTAT, for 1990-2016 data, accessed on 23/11/2018) KNBS, 2018 for 2017 Data

Kenya’s maize import and export has been sporadic. Between 1961 and 1990, Kenya was mostly a net exporter of maize. However since the late 1990s, the country has predominantly remained a net importer of maize (Figure 3). Kenya’s net import reached its highest peak in 2009 where the net import was more than 1.5 million tons of maize grain

2.1.8 Strategic Food Reserve

Gilbert (2011) in the paper on the Food Reserves in Developing Countries revealed that Prices for key food commodities touched high record levels earlier that year, repeating the highs last seen in 2008, although real prices may be low by historical standards, sharp upward swings and downward corrections have impeded the ability of farmers to respond appropriately to both short and medium term signals. In many cases, people have been priced out of the market and driven to hunger. Increasingly, a system of reserves, either physical or virtual is being viewed by many as a key part of any response to food price volatility. Some experts argue that an international system of reserves may be prohibitively expensive and difficult to maintain. Instead, humanitarian food stocks at the national and regional levels, particularly in developing countries are gaining currency in the debate.

In developing countries governments and international organizations have employed a range of policies to address high or volatile food prices. It is useful to draw a two way distinction:

- International policies which is employed by the international community to lower prices or to reduce volatility. These include trade agreements, such as the International Wheat Agreements (I.W.A.s), a possible international stockpiling arrangement or controls or limitations on activities on futures markets.

- National policies which are employed by national governments to lower prices or to reduce volatility. National policies on the other hand include food security stocks, export bans, variable export taxes or import tariffs, measures taken at the national level against speculation and direct price controls (Gilbert, 2011).

2.1.9 Role of National Cereals and Produce Board

According to senate report on maize crisis (2018), NCPB was created by an act of parliament to regulate and control the marketing and processing of maize, wheat and schedule agricultural produce. However, over the period through underfunding, mismanagement frequent legal amendment to NCPB Act and corruption, NCPB lost its status and stature and has been reduced to the biggest impediment and frustration to the farmers. NCPB now operates as a storage facility for anybody including millers, traders, individual’s farmers and brokers who have been leasing space without clear regulation.

In this position paper, deficits in maize and wheat has been from 1996/97 to date, which was associated with uncertain commodity prices, poor support systems for farmers, unpredictable/severe weather conditions, and poor farming methods, among others. The deficits are normally met through official and unofficial cross border trade and offshore imports.

After the liberalization of the maize sector, NCPB’s role was reduced to be the Government’s arm for grain price stabilization, Procurement of Strategic Grain Reserves (SGR) and Famine Relief Stocks (FRS) in collaboration with national and county governments. Strategic Food Reserve" includes maize, beans, rice, fish, powdered milk and canned beef. Its other roles included providing logistics support services for distribution of SGR, Provision of storage and grain maintenance services to clients and distribution of

government subsidized fertilizers to farmers in the country.

As a country we face many challenges of grain market in a liberalized environment. The general ones include lack of an effective legal framework; weak support systems for stakeholders; frequent food shortages that greatly compromise the welfare of citizens; stabilization and/or intervention by the government; escalating costs of farm inputs and labor; unpredictable income to producers; escalating unpredictable food prices leading to high inflation; and, uncertainty about the role of NCPB (service provider or commercial trader) (Misoi, 2009). The government through the public finance management act no 18 of 2012 intervened by the creation of Strategic food reserve trust fund that was first gazetted in 2015. The new Strategic Food Reserve Trust Fund was to be run by an oversight board comprising a chairperson appointed by the President and Principal Secretaries drawn from the ministries of Agriculture, Interior and Coordination of national government and Devolution as per above gazette notice (GoK 2015a).

Specifically the Fund was to stabilize the food supply and prices in the country, arrange for procurement, storage and sale of food commodities and maintain adequate strategic food reserve (Gazette notice no 6048, 2015). The NCPB bought the maize from farmers on behalf of the Strategic Food Reserve Oversight Board (SFROB) for two years from October 16, 2016. The SFROB had budgeted to purchase 2 million bags of maize for financial year 2017/18 at KShs. 6 billion and targets to buy 2.5 million bags of the produce from the 2018/2019 harvest (GoK, 2015 b).

Data from the Department of Agriculture in Nakuru County, shows that in Bahati Sub County, about 30 farmers delivered over 600 bag of 90 Kg maize per farmer. Based on the average farm size of 2.5ha, the above yields could not have been realized. There is a possibility that these were not genuine farmers.

2.2.0 Challenges Facing the Maize Subsector

Various challenges face maize production in Kenya among them high production cost, fluctuating prices, prolonged droughts, flooding of the local market with cheap maize, poor maize handling and storage, and infestation by pest and diseases. The national maize production levels have been declining from an all-time high of over 36.8 million bags in 2015 to about 32.5 million bags in 2016 reflecting a 12% decline (Mediamax, 2018). The agricultural reforms focused on removing government monopoly in the marketing of agricultural commodities and associated price controls which were vested in parastatals, and removal of government controls on importing, pricing and distribution of purchasable farm inputs (Nyangito, 2003; Sacred Africa, 2009). Furthermore there is reduction in government involvement and expenditure

on agriculture, resulting in low investment and support for farmers (Oluoch -Kosura, 2011). This has led to inefficient maize production and marketing systems which have contributed to economic stagnation and worsening levels of poverty in Kenya (USAID (United States Agency for International Development), 2011).

According to Njagi, a researcher with Tegemeo institute notes that the cost of producing 90 kilogramme bag of maize in 2017 was Ksh. 2150. This was attributed to high cost of land rates that increases with Ksh. 1000 every year coupled with use of chemicals to control pest and diseases in maize which was not a practice in earlier years (The standard, 2018).

In recent years, there has been droughts that depressed maize harvest and pushed up the prices of a two (2) kilogramme flour packet to two hundred Kenya Shillings early 2017. Mexico, Malawi, South Africa and Ethiopia were identified as the potential sources of the maize imports. A shortfall of five million bags was projected to curb the food insecurity until the next season crop of maize was ready. As a result of the Government decision, over 51 million bags of cheap maize was supplied to the market in the year 2017, as importers took the advantage of the Government decision to open its borders under the maize subsidy programme to import in extra maize). This resulted to the Government silos being full and unable to accommodate the farmers stocks (The standard, 2018). Data from KNBS indicates that 14.76 million bags of maize were imported in 2017 against an estimated shortfall of 20.5 million bags (KNBS, 2018)

According to Masila of East African Grain Council, lack of maize storage facilities and inadequate dryers have resulted to farmers' maize going bad. This is mainly severe during the wet season. This has resulted to a lot of maize being discoloured and sold as animal feed (Business daily, 2014).

FAO, acknowledges that maize left standing un-harvested starts to show diminished qualitative and quantitative returns through shatter losses and attack by insects, moulds, birds and rodents. It's therefore important to complete harvesting as soon as possible. One of the most critical physiological factors in successful grain storage is moisture content of the crop. High moisture content leads to storage problems because it encourages fungal and insect problems, respiration and germination (FAO, 1994).

A food situation assessment carried out in 2017 showed that maize losses could be quite substantial. The country produced 37 million bags in 2017 of which 12% is estimated to have been lost. This loss translated to about 4.5 million bags. This was greater than the entire 2017 harvest for the short rain season of October and January (The conversion, 2018).

Maize storage is important because it bridges the gap between surplus at harvest time and scarcity during the post-harvest period. However maize producers in many parts of the country encounter a lot of losses as a result of poor storage. Post-harvest management has been a major challenge in Kenya's agricultural sector with an estimated loss of 20%-30% of harvested crops. These losses include but are not limited to; weevil damage, rodents, theft and aflatoxins. The magnitude of one may vary from region to region. In one study (Chemiat and Makone, 2015), the major cause of loss were the weevils (53.1% of the maize loss) followed by the rodents (30.3%), theft (8.0%) and the aflatoxins (8.6%).

In Kenya, Maize is relished by both the rich and the poor alike and is used in various forms such as *ugali*, *uji*, *mahindi choma* and *githeri*. The average per capita consumption is 103 Kg per person. One of the major challenges in maize marketing and trade policy in Kenya has been the "food price dilemma" whereby the issue is how to keep farm prices high enough to satisfy the farmers while at the same time keeping them low enough to avoid making maize unaffordable to the poor. The maize marketing policy has extensively been analyzed by Ariga and Jayne (2007). The report indicates that the maize marketing and pricing system has undergone several reforms beginning from the late 1980's. Until that time, the Government would set producer and into-mill prices for maize and also set maize meal prices to be sold by millers and retailers to consumers. These prices were pan-territorial and pan-seasonal, adjusted once per year at the beginning of the marketing season. The government marketing board, known as the National Cereals and Produce Board (NCPB), had a longstanding monopoly on internal and external trade. Informal private trade across district boundaries was illegal, as was cross-border trade. Traders were required to apply for movement permits to allow them to transport grain across district boundaries.

The report also indicates that the Cereal Sector Reform Program began in 1987/88. The European Union supported the program as part of the country's overarching structural adjustment policies. At first, the GoK and donors agreed to legalize inter-district maize trade, with the maximum volume of maize trade to be progressively raised over time. The reform process intensified in late 1993, when, under pressure from international lenders, the government eliminated movement and price controls on maize trading. By 1995, private traders were allowed to transport maize across districts without any hindrance.

Prior to market liberalization in the late 1980s, the NCPB purchased between 5-8 million bags of maize per year. Even during the early years of liberalization, the NCPB received enough public funds to purchase between 3 to 6 million bags per year, which was more than half of domestically marketed maize output. Thus,

the NCPB remained the dominant player in the maize market even six to seven years into the liberalization process. This is not surprising considering that the NCPB set its maize purchase prices considerably higher than prevailing market prices. In the maize breadbasket areas of Western Kenya, the incomes and living standards of many farmers, especially large-scale farmers, depended on the NCPB continuing to offer support prices for maize. In this way, by offering above-market support prices, the NCPB used its market power and access to treasury subventions to discourage private sector investment in maize wholesaling and storage.

Starting in the 1995/96 marketing year, and under pressure from external donors, the government dramatically reduced the NCPB's operating budget. This forced the NCPB to scale back its purchases substantially to about 1 million bags per year between 1995 and 2000. The reduction in NCPB maize purchases from 3-8 million to 1 million bags led to intensive lobbying by commercial maize farmers for increased purchases. Gradually, a year before the national elections, the government increased the NCPB's budget in the 2000/01 year. Since 2000, the NCPB's maize purchases have been trending upward (Nyoro *et al.*, 2007).

Since the major withdrawal of the NCPB in 1995, Tegemeo/Egerton survey data show that most small farmers in Kenya sell their maize to private traders. The Tegemeo/Egerton/MSU household survey has tracked the maize selling and buying behavior of 1,313 small farm households in 1996/97, 1999/00, and 2003/04. The study revealed that in the High-Potential Maize Zone, 9% of the maize selling households sold maize to the NCPB. The other 91% of the households selling maize in the High-Potential Maize Zone sold to private buyers. Over the entire nationwide sample, only 2% of the households sold to the NCPB, while 34% sold to private buyers. The remainder of the sample did not sell maize.

The 2007 National Food and Nutrition Programme (NFNP), a draft government document that attempts to address the shortcomings in earlier policy documents (Republic of Kenya, 2007), acknowledges that high staple food prices, while favorable to farmers who can produce a surplus, directly hurt not only urban consumers but also a large portion of rural small-scale farmers who are net buyers of staple food. The NFNP emphasizes increased availability and accessibility to diverse foods to meet the basic minimum food nutritional requirements. It proposes a gradual removal of import duties on maize, wheat and rice, promotion of cross-border trade in food items, control importation of subsidized foods, and educating local authorities and administrators on importance of free movement of food items. By proposing appropriate reforms in domestic and external trade policy, the NFNP brings into

perspective the importance of perceiving food security in the broader context of regional market integration and globalization rather than just as a localized issue (Nyoro *et al.*, 2007).

Maize remains the staple food crop in Kenya and consumption is expected to continue increasing despite the diversification of Kenyan diets. Demand for maize in the manufacture of animal feeds is also expected to increase due to recent major private sector investment in the subsector. Kenya will therefore remain a maize deficit country and the need for imports will remain into the foreseeable future (Global Agricultural Information Network, 2017). Kenya is a member state of the East African community (EAC) which came into being in 1999, the other countries being, Uganda, Tanzania, Burundi and Rwanda and most recently South Sudan.

According to Ouma (2014), the sequential happenings around the East African Community found out that, under the EAC treaty implemented officially in 2001, the first entry point to the community was the establishment of a customs union, then a common market, subsequently a monetary union and ultimately a political federation of the East African States. Rwanda and Burundi were officially admitted into EAC in July 2007 and South Sudan in 5th September 2016. The protocol establishing the East African Common Market was signed in 2009 and came into force on July 1, 2010. The establishment of the customs union and the common market has continued to pave way for free movement of goods (including maize) and services, and 'labour within the region. Results from all the countries show effects of trade creation, with that of Uganda and Burundi being statistically insignificant, while the coefficients of EAC (trade creation dummy) are found to be highly significant at 1% level of significance and with the right positive sign for both Kenya and Tanzania. This implies that Kenya and Tanzania on average tend to export more agricultural products to the EAC region as a result of the regional trade agreement. More specifically, the results show that there is 14.3% increase in Kenyan agricultural exports to EAC as a result of being a member of the RTA, while Tanzania realized 20.5% increase in the agricultural exports to EAC as a result of being a member of the RTA (Ouma, 2014).

2.3 Agriculture as a devolved function

According to senate report (2018), despite agriculture being a fully devolved function the county government were at the very least unaware of their role in promoting agriculture in their respective counties and at the very most looked like helpless bystanders as farmers continued to suffer. The national government has continued to hold onto agricultural functions thereto despite clear constitutional and legal provision that show that, these are devolved functions and fall squarely in the realm of the county government.

According to this report the county governments have done little to assert their authority in realizing their functions in agricultural sector and that the national government has not been helpful either as it has held onto functions and commensurate resources that are clearly devolved despite the county being a signatory of the AU Maputo Declaration on Agriculture which states that, 10% of the GDP should be allocated to Agriculture.

3.0 CONCLUSION

Kenya produced 37 million bags of maize against a national requirement of 53 million bags in 2017. There was an estimated postharvest loss of 4.5 million bags. That means there was a deficit of 20.5 million bags. Maize production and productivity is on the decline and the demand is on the increase, which therefore means the country will not meet the demand from local production. However, during 2017/2018 there was endemic corruption during the purchase and payment of maize supplied by farmers resulting to very long queues during delivery of maize consequently many farmers were forced to offload their stocks to traders and brokers, expensive land preparation, poor quality seeds availed to farmers and inefficient fertilizers subsidies which is normally in adequate during the planting season, fertilizer that is not soil specific, of poor quality and it is not delivered on time to maize farmers are some of the challenges facing the farmers. In fact in some places, farmers complained that top dressing fertilizer arrived before planting instead of the subsidized fertilizer which later finds its way to traders who would re package and sell it to them at exorbitant prices making production cost really expensive hence difficult to break even. Finally, corruption at the weigh bridges and NCPB Depts regarding quality, quality and irregular procedures and technicalities frustrate the farmers when delivering maize to NCPB depots or releasing fertilizer.

4.0 RECOMMENDATION

The county governments to construct a data base of all the farmers to ensure proper identification for purposes of maize deliveries, payments provision of subsidies and other services. The government to develop regulation and guidelines on importation of maize and other food crops in the country. The NCPB Act and Public Management (SFR) Trust Fund regulation to be reviewed with a view to realigning and reconciling their mandate to the devolved system of government and the county government to immediately take over the NCPB depot silos domiciled in their jurisdiction and come up with a management plan as stipulated in the schedule IV and the legal notice by the transitional authority (Transfer of Function) and ensure that, among others market for farm produce, enhanced accessibility to affordable credit and insurance packages and availability of farm inputs such as certified seeds and fertilizer to the farmers. Further there is need to increase maize production and productivity through zero-rating

agricultural inputs, enhancing extension service delivery and adoption of modern technology such as, the use of high yielding seeds, conservation agriculture, irrigation and farm mechanization. The study recommended involvement of farmers cooperatives societies and public private partnership in maize marketing, value addition, storage and distribution through contracted investors in warehousing and large scale farmers with the government as the regulator and allow the market forces to determine the price. The study further recommended the need to ease pressure by diversification of eating habits, growing of alternative food security crops and blending of maize flour with other traditional nutrient dense crops such as sorghum, millet, cassava, grain amaranths and others. Finally there is need to introduce other high value agricultural enterprises to increase farm income.

REFERENCES

1. Ariga, J., & Jayne, T.S. (2009). Maize Trade and Marketing Policy Interventions in Kenya. Chapter in A. Sarris and J. Morrison (eds), Food Security in Africa: Market and Trade Policy for Staple Foods in Eastern and Southern Africa. Food and Agriculture Organization of the United Nations and Edward Elgar, Cheltenham, UK.
2. Business daily. (2014). Post harvest puts a damper on maize farmers cash prospects. Retrieved on 20th November 2018. <http://www.businessdaily.com>
3. CIMMYT. (2015). Maize in Kenya: Chance for Getting Back to Former Glory? DT MAIZE. A Quarterly Bulletin of the Drought Tolerant Maize for Africa Project, Vol 4, No.3, September 2015
4. FAO (2005). Food and Agriculture Organization Annual Report 2005 Guthiga and Newsham, 2011:pp105).
5. FAO. (2009). How to Feed the World in 2050, Food Agriculture Organization of the United Nations, Rome FAO (2011a). *Global Food Losses and Food Waste: Extent, Causes and Prevention*, Food Agriculture Organization of the United Nations. Rome
6. FAO. (2014c). Joint FAO/WHO Second International Conference on Nutrition (ICN2), Regional Conference for Europe, Twenty-Ninth session. Bucharest, Romania, 2 - 4 April 2014. *Food and Agriculture Organization of the United Nations, Rome*.
7. FAO, IFAD., & WFP. (2012). The State of Food Insecurity in the World 2012. *Economic growth is necessary but not sufficient to accelerate reduction of hunger and malnutrition*. Rome, FAO.
8. FAO. (2018) Global Information and early Warning Systems 8th May 2018.
9. FAO. (1994). Grain storage techniques: The evolution and trends in developing countries. FAO Agricultural services Bulletin No. 109. Pg 363-386.S
10. FAO/WFP, (2004/05).Swaziland drought flash appeal field Consolidated Appeals Process, 29.
11. FAOSTAT, (2007). FAO Statistical Data. <http://www.fao.org/faostat/foodsecurity>.accessed 5th June 2016.
12. FAOSTAT. (2009) Food and Agricultural Organization of the United Nations.
13. Farm Management Handbook of Kenya (2007/2009) Vol. II– Natural Conditions and Farm Management Information –2nd Edition part A, B and C. German Agency for Technical Cooperation (GTZ). Nairobi. Kenya.
14. Flour blending secretariat report. (2018). Flour blending initiative for food security, Nutrition and Employment. Kenya
15. Food and Agriculture Organization of the United Nations. (FAO), (2005) Fertiliser Use by Crop. FAO Fertiliser and Plant Nutrition Bulletin 17.
16. Gilbert, C.L., (2011). *Food Reserves in Developing Countries: Trade Policy Options for Improved Food Security*; ICTSD Programme Agricultural Trade and Sustainable Development; Issue Paper No. 37; International Centre for Trade and Sustainable Development, Geneva, Switzerland, www.ictsd.org.
17. Global Agricultural Information Network. (2017). Grain and Feed Annual 2017 Kenya Corn, Wheat and Rice Report
18. GoK. (2015 a). The Public Finance Management Act 2015. The Kenya Gazette Supplement No. 103. Retrieved on 30th November 2018. <http://www.kenyalaw.org>.
19. GoK. (2015b). Public Finance Management Act 2015. The Kenya Gazette No. 6048. G 1911. Retrieved on 30th November 2018. <http://www.kenyalaw.or>
20. Government of Kenya. (2008). Ministry of agriculture strategic plan (2008-2012). Nairobi, Kenya, Government Printers
21. International Maize and Wheat Improvement Center (IMWIC). (2010). Annual Report 2007-2008. Mexico,D.F.: CIMMYT.
22. Kabubo-Mariara, J., (2009). "Global warming and livestock husbandry in Kenya: Impacts and adaptations." *Ecological Economics*, 68 (7), 1915-1924.
23. Kabubo-Mariara, J., & Fredrick, K. K., (2007). "The economic impact of climate change on Kenyan crop agriculture: A Ricardian approach." *Global and Planetary Change*, 57 (3), 319-330.
24. Kamau. (2013).Current status of fruits and vegetables production and consumption in francophone African countries - Potential impact on health. *ActaHorticulturae*, 841, 249–256.
25. Karanja, F. K. (2006). "CROPWAT model analysis of crop water use in six districts in Kenya." *CEEPA DP35*, University of Pretoria, South Africa.
26. Martinez, A. (2011). Fertilizer Use Statistics and Crop Yields. Muscle Shoals, Alabama: IFDC.
27. Mediamax. (2018). Proposed flour blending law to curb food shortage. Retrieved on 20th November, 2018. <http://www.mediamaxnetwork.co.ke>

28. Midgley, J., (2009). *Just Desserts? Securing global food futures*. London: ippr.
29. Ministry of Agriculture (2009). *Agricultural Sector Development Strategy (ASDS)*. Government Printer. Nairobi.
30. Morris, M. (2014). Assessing the benefits of international maize breeding research: An overview of the global maize impacts study. Part II of the CIMMYT 1999-2000 world maize facts and trends.
31. Mugenda, O.M., & Mugenda, A.G. (2003). *Qualitative and Quantitative approaches*. Research Methods Africa Center for Technology Studies (Acts) Press. Nairobi Kenya
32. *National Food and Nutrition Security Policy Implementation Framework 2017-2022*, June 2017. Agricultural Information Resource Centre. Nairobi.
33. Neely, C. & Fynn, A. (2013). *Critical Choices for Crop and Livestock Production systems that enhance productivity and builds ecosystem resilience*. SOLAW Background Thematic Report TR-11. The Food and Agriculture Organization of the United Nation
34. Nyangito, H.O., & Karugia J.T. (2003). The impact of recent policy changes on the agricultural sector and public agricultural research in Kenya. Retrieved on 19th November 2018. http://www.Glob_cho5.pdf.
35. Nyoro, J., Kirimi, L. & Jayne, T. (2004). Competitiveness of Kenyan and Ugandan Maize Production: Challenges for the Future. Working Paper 5/2004, Egerton University/Tegemeo Institute, Nairobi.
36. Nyoro, J.K., Ayieko, M., & Muyanga, M. (2007). The Compatibility of Trade Policy with Domestic Policy Interventions Affecting the Grains Sector in Kenya. Paper presented at the FAO's workshop Trade and Policy for Food Products Conducive to Development 1-2 March 2007, Rome, Italy.
37. Oluoch-Kosura, W. (2011). Maize farming in Kenya: where did it go wrong? IDS Institute of Development Studies.
38. Ouma, D. (2014). Effects of East African Community Regional Trade Agreement on Member's Agricultural Exports. Paper presented in Kenya International Conference on Dynamics of Rural Transformation in Emerging Economies, Kenyatta University, Nairobi 27-28 March, 2014
39. Pingali, P.L. (2011). CIMMYT 1999-2000 World maize facts and trends: Meeting world maize needs: Technological Opportunities and Priorities for the Public Sector, CIMMYT, D.F, Mexico.
40. Ray, D. K., Mueller, N. D., West, P. C., & Foley, J. A. (2013). Yield Trends Are *Insufficient to Double Global Crop Production by 2050*. PLoS ONE, 8 (6), 6428.
41. Rugalema, G. (2018). Maize Farming in Kenya, unearth untapped white gold.
42. SACRED Africa. (2009). Challenges facing farmers in Kenya. Sustainable Agriculture for Research and Development at Sacred@africaonline.co.ke.
43. The conversion. (2018). Key challenges for Kenya in a big push to reduce post harvest losses. Retrieved on 20th November 2018. <http://www.theconversion.com>.
44. The Hunger Project. (2013). *Invitation to apply for the position of president and chief executive officer*. The Hunger Project, New York
45. The Senate Ad Hoc report on maize crisis in the country. (2018). A report on the inquiry of the maize crisis in Kenya.
46. The Star. (2018). Maize production remains high in 2017. Retrieved on 19th November 2018. <http://www.Thestar.co.ke>
47. UN. (2013). *World Economic and Social Survey 2013: Sustainable Development Challenge*. United Nations Department of Economics and Social Affairs
48. USAID. (2011). Kenya maize programme. Retrieved on 20th July 2011. http://www.usaid.gov/our_work/humanitarian_assistance/foodcrisis.
49. World Bank. (2012). *Kenya Agricultural Policy Review: Current Trends and Future Options for Pro-Poor Agricultural Growth*. Report no. 53707-ke, World Bank, USA.(2009- 2012)
50. World Food Program. (2005). *World Hunger Kenya*. Rome: World Food Program of the United Nations.
51. World Food Summit. (1996). *Rome Declaration on World Food Security*.