Historical Analys of Declining Maize Production in Kenya; A Case of Trans-Nzoia County.

FRED OMUSE MANG'ENI
Department of Social Sciences, Kibabii University

Abstract- ***Maize is the most important cereal crop in Kenya. It forms an important part of the food and feed system, and contributes significantly to income generation for rural households. It is the main staple food for the people of Kenya, providing more than a third of the caloric intake. In terms of land usage, maize accounts for about 56% of cultivated land in Kenya. About 98% of the 3.5 million small-scale farmers in Kenya are engaged in maize production. The study covered the determining factors that affect maize production in Trans-Nzoia county,Kenya. The researcher used the cobweb economic theory to articulate why production was declining. The study was guided by the following objectives: to investigate how costs of production influence maize production of small-scale farmers, to establish how demographic characteristics influence maize production of small-scale farmers, to determine how extension services influence maize production of small-scale farmers and to examine how accessibility to credit influence maize production of small-scale farmers of Trans-Nzoia county. The study adopted descriptive survey design which was used to obtain information to describe the existing phenomena. A questionnaire with closed ended questions was prepared and distributed to the respondents in all the constituencies. The questionnaires were then collected after one week. All the questionnaires were filled and were used for analysis. Data was analyzed using descriptive method. Frequency tables and percentages were used for data presentation after analysis. The findings revealed that fertilizer remains the most costly input in maize production, followed by land preparation. Also, most farmers do not attend field days and only a negligible percentage have access to credit. The national and county governments should avail subsidized fertilizer in good time and make it easily accessible. Proper sensitization should be done by agricultural extension officers to all farmers about the available extension services and county government should provide sufficient facilitation to agricultural extension officers to promote extension services. Farmers should be encouraged to form groups in order to access credit services, market their produce and acquire farm inputs collectively. Both national, county governments and financial institutions should make credit easily accessible and affordable to small scale farmers. The researcher recommends further research on causes of low attendance of field days and low level of accessing extension services in general to ascertain the underlying causes of low dissemination of extension information. Research shall be of great benefit to; farmers, maize traders, future researchers and the donor community in the region.***

Indexed Terms- ***Small scale farmers, Production influence, Agriculture, Economy***

I. INTRODUCTION

Maize is one of the most important cereal crops in the world, in agricultural economy both as food for human beings, feed for animals and other industrial raw materials. It is one of the world's leading crops cultivated over an area of about 142 million hectares with a production of 637 million tons of grain. In Nepal, the current area planted under maize was 849,892 ha with an average yield of 2.02 ha (CBS, 2006). It is estimated that for the next two decades the overall demand of maize will be increased by 4% - 8% per annum resulting from the increased demand for food. Such increase in demand must be met by increasing the productivity of maize per unit of land (Paudyal et al., 2001; Pingali, 2001). However, over the decades, the agricultural production including maize has either remained stagnant or increased at a very slow rate (Kaini, 2004).

Agriculture is the backbone of Kenya's economy and source of livelihood for the majority of rural

population. The sector plays a critical role in the Nation's economic growth and development process. This role is reflected in employment creation (75% of population is employed in agriculture), Foreign exchange earnings (sector accounts for two thirds of total domestic export), overall contribution to GDP standing at 26% and major source of food. The sector also provides raw materials to the manufacturing sector thereby, stimulating indirect growth in non - farm incomes and employment (Republic of Kenya, 2002).

Kenyan planners have identified growth of agricultural incomes as key to a successful development strategy. This is because growth in agriculture and enhanced incomes for the rural people will directly and positively impact on rural poverty. Kenya's agricultural sector is dominated by production of few crops, six (6) of which (Maize, Wheat, Sugarcane, Coffee, Tea, and Cotton) account for 68% of agricultural GDP and 17.5% of Kenya's overall GDP. On other hand, Kenya's agricultural related activities (Transportation, Trading and Processing) account for between 20 and 30 percent of total GDP. In sum therefore, agriculture and related activities account for up to half of all economic activity in the country (Nyangito, H.O.et al, 2003). This implies that the achievement of Kenya's major development goals such as The BIG FOUR agenda, Vision 2030, Agricultural sector development strategy, 2010-2020, Strategy for Revitalizing Agriculture, 2004-2014, Status of newly industrialized country by 2020 (Republic of Kenya, 1997), Poverty alleviation as outlined in Poverty Eradication plan (Republic of Kenya, 1999) and Poverty Reduction Strategy Paper (Republic of Kenya, 2000) will to a large extent depend on the development of agricultural sector. All these signals the efforts of the government of Kenya to ensure food security for all. Over the years in Kenya, agricultural policy has focused on enhancing maize productions so as to ensure the country is food secure. Food security in Kenya is synonymous with self-sufficiency in maize production (Nyoro et al, 2007).

Maize is a staple food to a large proportion of people in rural Kenya. Nearly all agricultural households in Kenya do plant maize. Small scale production dominates maize production since about 80% of maize is supplied by smallholders. In the years following attainment of independence, Kenya was self-sufficient in Maize production. Maize production exceeded demand and hence there was surplus for export. Beginning 1980s however, the trend took a reverse order such that demand exceeded supply for the staple crop (Maize). This is explained by rapid population growth among other actors. Over the years, growth rate of maize output has remained at 2% per year while population growth stands at 3%. Specifically, maize has a per capita consumption of 98 kilograms translating to between 30 and 34 million, 90-kilogram bags of maize annually. The country however, produces an average of 28 million, 90-kilogram bags annually (Kimeli, 2013). In 2017, maize deficit in Kenya stood at 12 million; 90-kilogram bags. Nyoro et al, 2007, projected that by the year 2020, there will be 1.2 million tonnes of maize deficit. The deficit is usually bridged by imports using the scarce foreign currency.

II. MATERIALS AND METHODS

The study was guided by the cobweb model or cobweb theory advanced by Nicholas Kaldor (1934). The economic model explains why prices might be subject to periodic fluctuations in certain types of markets. It describes cyclical supply and demand in a market where the amount produced must be chosen before prices are observed. Producers' expectations about prices are assumed to be based on observations of previous prices. This theory is important because it explains why maize production is declining.A total of 120 households were selected for study.The study adopted descriptive survey design which was used to obtain information to describe the existing phenomena. A questionnaire with closed ended questions was prepared and distributed to the respondents in all the constituencies. The questionnaires were then collected after one week. All the questionnaires were filled and were used for analysis. Data was analyzed using descriptive method. Frequency tables and percentages were used for data presentation after analysis.

III. RESULTS AND DISCUSSION

The study sought to investigate historical analysis of declining maize production among small scale farmers

in Trans-Nzoia County with an aim of suggesting correctivemeasures so as to improve maize yield to attain food security and improve income levels among households.

The researcher sought to investigate the extent to which cost of inputs influences maize production among small scale farmers.41% of the farmers indicated that fertilizer acquisition is the most costly input in maize production followed by 23% who cited land access and land preparation costs especially among women while13.86% of the farmers that cited land preparation. 19% of farmers cited unstable market prices, climatechange, competition from international organizations like COMESA and pests and diseases. This implied that acquisition of fertilizers has remained a challenge despite government subsidy.

According to Nyoro J.K (2000) Machinery costs includes costs of ploughing, harrowing, chiseling, planting, spraying, harvesting, shelling and transport to stores. Machinery costs are generally high particularly in maize. Farmers have also complained that the ownership of farm machinery has reduced in the last 10 years due to lack of financing mechanism for procurements of farm machinery. High costs of farm machinery thus have affected the quality and timeliness of farm operations such as the land preparation in the key maize production zones. The high costs of farm operation have forced farmers to reduce the quality of seedbed preparation. Whereas in 1994, most maize producers for example did two ploughs and two harrows to create fineseedbed suitable for planting maize and wheat, in 1999 and 2000 seasons, most farmers had reduced the number of times they ploughed and harrowed thereby reducing the quality of the seed bed. Thorough land preparation normally involves deep ploughing and thorough incorporation of weeds and crop residues, row planting, correct placement of fertilizers through use of machinery; superior and thorough crop protection against weeds, and better harvesting operations due to use of machinery. Reduction in the quality of land preparation thus could have adversely affected maize yields and hence cause an increase in production costs per unit production. Maize yields in the country during the favorable weather conditions vary from 10 to 27 bags per acre (2.0 and 5.4 tons per hectare).

Production levels and structure of production costs differ between the large and small production systems. Large-scale production systems have higher yields than the small-scale systems because of various reasons. In Trans-Nzoia for example, large-scale maize production systems use about 39 percent more intermediate inputs- fertilizers and agrochemical-than the small-scale systems. Similarly, the large-scale systems have higher mechanization costs than the small-scale systems. The small-scale systems on the other hand depend on manual labor for some operations hence incurring higher labor costs. Although the yields for the large-scale systems in Trans-Nzoia are about 47 percent higher than that in the small-scale systems, the costs of production are about the same at Ksh 780 per bag because the large-scale systems incur on average a higher cost per acre. Due to slightly lower yields, Uasin Gishu has a higher cost of production than Trans Nzoia.

Farm characteristics that make a significant impact on uptake of the improved maize varieties include hiring of labor and off-farm income. Hiring labor might not directly influence adoption of improved varieties, but it is a proxy for available cash to invest in agricultural production, E. Wekesa et al., (2003). From the time of planting until about athird of its life, maize is very susceptible to weed competition. Failure to weed during this critical period may reduce the yield by 20% (Bangun 1985). The recommended practice is to weed twice or more depending on the extent of weed infestation. Most farmers who grow high-yielding varieties weed twice, while those with local varieties usually weed only once. Requirements for labor vary according to variety, type of land, previous crop in sequence, cropping method, moisture availability and the source of labor. It appears that both male and female labourers work interchangeably for most of the various cropping operations, except for: Soil preparation, where male labour is used in combination with draft cattle and spraying, where male labor is used exclusively. Limited evidence from previous research suggests that too much farm family labor encourages the adoption of labor-intensive technology, while the lack of it discourages both the adoption and efficient use of the technology (Schutjer and Van der Veen 1976). In the absence of labor-saving technology, therefore, limited family labor may hamper the adoption of hybrid varieties. Availability of family

laboris positively related to the frequency of adoption in hybrid maize variety, the relationship being stronger in cases of mono cropping than of intercropping. Limited family labor therefore appears to constrain the adoption of more labor-intensive technology such as the hybrids. Aman D. et al., (2004).

Fertilizer prices can influence negatively or positively maize yields; if the price decreases farmers purchase more meaning they will apply more leading to higher yields and if it increases farmers purchase less, therefore apply less and therefore get less yields. (Wanyama et al., 2010). Many farmers in Sub-Saharan Africa (Hassan, 1998) countries face declining crop yields, which has constrained economic growth. The underlying constraints are low and unreliable rainfall, pests and diseases, and inherently infertile soils. The soil infertility is related mainly to the low nutrient status of the soils while the qualities of some soils have declined as a result of continuous cultivation without returning enough of them to the soil.

Maize is the most important staple food crops in Kenya. It is estimated to contribute more than 25% of agricultural employment and 20% of total agricultural production (Government of Kenya, 2001). Despite the key role maize plays in food security and income generation in Trans Nzoia district and the whole country at large, its productivity has not been adequate especially in the past four decades during which stagnation/decline in maize yield led to frequent food security problems. Ariga et al., 2006) have attributed maize yield decline to two main reasons: (i) declining soil fertility and (ii) increase in world fertilizer prices (Omamo 2003; Xu, et al., 2006). The situation has been exacerbated by maize price fluctuation and occasional importation of cheap maize grains. The problem of declining maize yields is magnified by the fact that population continues to increase annually at a rate of about 2.9% leading to decreasing per capita consumption. The combined effect of increasing human population and poor maize yields on the country's capacity to feed the population is then accelerated annually (Government of Kenya, 2001; and 2004).

The major contributory factors are soil degradation and low use of fertilizers. It has been proposed that soil nutrient mining is an important issue contributing to poor maize production in Kenya (De Jaeger et al., 1998). Enhanced soil management has been recognized as crucial to soil fertility replenishment and enhanced agricultural productivity Though important in soil fertility improvement it has be reported that, farmers typically apply inorganic fertilizers at rates well below recommended levels, or not at all (Ariga et al., 2006). In a move to bolster production after a disputed presidential election that led to disruption of farm activities, NCPB imported fertilizer in 2008 but delivered it late which contributed to a poor crop. This in turn created pressure from some farmer lobby groups and activists for increased subsidization of inputs (fertilizer and seed) to raise productivity of maize to counter an expected increase in hunger in 2009. In 2009 the GoK imported substantial amounts of fertilizer through NCPB to be distributed through its branches and select private retailers at subsidized prices. Given the prominence of maize in Kenyan agriculture (Pearson et al., 1995), returns to maize production as reflected in maize prices likely are an important influence on households' willingness to apply fertilizer. Indeed, Mose, Nyangito, and Mugunieri (1997) identified the maize: fertilizer price ratio as a significant determinant of fertilizer use on small farms in Kenya: the higher the ratio, the higher were fertilizer application rates among sampled farmers. The positive and significant relationship between maize prices and revenues from fertilizer sales confirms the dominant perception in Kenya of a positive correlation between the demand for fertilizer and returns to maize production.

Agricultural technology for the small scale farmer must help minimize the drudgery or irksomeness of farm chores. It should be labor-saving, labor-enhancing and labor enlarging. The farmer needs information on production technology that involves cultivating, fertilizing, pest control, weeding and harvesting. V. N. Ozowa, (1995). Herbicides lower production costs by saving labor and enhancing productivity. The Cost of production is lower per bag and gross margin per hectare is greater when herbicides are used, FSRP/ACF and MACO, (2 February, 2011).

CONCLUSION AND RECOMMENDATIONS

The study sought to investigate historical analysis of declining maize production among small scale farmers in Trans-Nzoia County with an aim of suggesting corrective measures so as to improve maize yield to attain food security and improve income levels among households. 41% of the farmers indicated that fertilizer acquisition is the most costly input in maize production followed by 23% who cited land access and land preparation costs especially among women while13.86% of the farmers that cited land preparation. 19% of farmers cited unstable market prices, climate change, competition from international organizations like COMESA and pests and diseases. This implied that acquisition of fertilizers has remained a challenge despite government subsidy. The study concluded that these factors are associated with the declining maize production in Trans-Nzoia County.

Due to the declining production of maize in the county which is deemed food basket of Kenya, the researcher recommended:

The government should step up all machineries at its disposal to redeem maize production in Kenya specifically the cost of farm inputs.

Maize producers should diversify agricultural production to beef up food security in event that maize production will fall.

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