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Effects of Government Maize Policies on Structural Transformation for Sustainable Maize Farming in Kitui County, Kenya

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Abstract
The purpose of this study was to determine the effects of government maize policies on structural transformation for sustainable maize farming in Kitui County, Kenya. The study employed a mixed-method research approach that aimed at employing both quantitative and qualitative approaches. For quantitative data, the study employed a cross-sectional research design, while for qualitative data, the phenomenological research design was employed. The study targeted a total population of 16,669 farmers. To achieve the sample size, the study used a sample size determination formula for finite populations. Both probability and non-probability sampling methods were used to obtain the study sample. A purposive sampling procedure was used to pick a sample of 10 small-scale maize farmers and 5-Agricultural officers as key informants for in-depth interviews. A stratified random sampling procedure was used to select the 237 subjects that took part in the study. Both questionnaires and an interview guide were employed for data collection. Data was validated, edited, coded, and analysed using Statistical Package for Social Sciences (SPSS) Version 21 and further presented using figures and tables. Chi Square test for independence was used to determine the significance of the association between the variables. Qualitative data was edited, coded, and reported using descriptive narratives. The study established a statistically significant association between government maize policies and sustainable maize farming (≤ 0.05). Government maize policies were positively related to sustainable maize farming.

Introduction

The Kenyan government developed various policies and Acts to rejuvenate maize farming. This was done through incentives: farm input subsidisation, agricultural credit access, road maintenance, and irrigation initiatives. For instance, the Comprehensive National Food Policy (CNFP) of 1981, the Cereal Sector Reform Programme (CSRP) of 1987/88 that legalised inter-district trade, the National Food and Nutrition Programme (NFNP) of 2007 that tended to protect not only small holder maize farmers but also net buyers of staple food, the crops Act No. 16 of 2013 (revised in 2016) that placed maize among the scheduled crops are indicators of government attempts to achieve self-sufficiency in staple food (Onono, Wawire & Ombuki, 2013). To demonstrate the importance, maize received a budgetary allocation for production and marketing with support from marketing boards (Onono, Wawire & Ombuki, 2013). However, despite these government efforts, maize output performs below domestic requirements, pushing the government to continuously import maize to make up for the deficit (Onono, Wawire & Ombuki, 2013). Small holder maize farmers continue to languish in poverty with deteriorating livelihoods, which call for interrogation.

Different regimes in Kenya have shown value for maize production as a socio-economic crop. Introduced by the Portuguese in the 15th Century, maize growing spread, becoming the single most extensively cultivated crop in Kenya (Chivatsi et al., 2004). The economic depression of 1929 and 1930 saw maize controlled by the colonial government to support white settlers. The aim was to guarantee high domestic prices for European farmers (Vickery, 1985). Licenses for maize introduced in 1935 (Native Produce Ordinance) restricted African smallholder farmers in maize trade. During the Second World War (1939-1945), maize control was enforced through maize boards with higher prices attached to European maize (Vickery,1985). In the 27 years' post-independence era (1963-1990), maize marketing was controlled through the National Cereals and Produce Board (NCPB).

As part of a structural adjustment programme, the European Union (EU) forced the government to adopt "market liberalisation" in 1993 causing maize policy shift. This did not only affect farmers but also curtailed government control, leaving small holder maize farmers at the cruel hand of "market forces". Liberalisation, anticipated to open up maize market, and provide higher prices and better rewards to small-holder maize farmers, instead led to the decline in maize production as realised from 1995, where production dropped from 34 million bags to 25 million in 2008 (a drop of 9 million bags in 14 years. Again, NCPB reduced purchases of strategic reserves served the interests of large-scale farmers and politically connected people (Ogwora, 2003).

Kitui County is endowed with massive land and good soils and sandwiched between Athi and Tana rivers that can support irrigation. However, despite this potential, maize production is rain-fed, leading to low output with annual maize deficits. With many small holder maize farmers turned net maize buyers, poverty increase is definite. A household baseline survey by Agricultural Sector Development Support Programme indicated that absolute poverty index had increased from 63.1% in 2010 to 63.8 % in 2014 (Gaddis et al., 2018). There seems to be a correlation between maize production and poverty index. At small holder maize farmer level, farmer's age, level of education, farmer skills, farmer capacity and attitude to move from subsistence to commercialisation needed exploration.

The issues of dwindling land for agriculture due to population increase, divisions of ancestral land, rights for women land ownership, cost of farm inputs, poor infrastructure and unpredictable rainfall patterns contribute to unsustainable maize farming, however not the main reasons. Throughout this study maize controls, restrictions and interests in favour of certain groups or segments of society run across, raising questions on skewed policies and disincentives that continue to haunt sustainable maize farming to the very heart of the community. This study, therefore, examined effects of government maize policies on structural transformation for sustainable maize farming in Kitui County, Kenya.

Methodology

The research adopted a convergent parallel design mixed method that simultaneously collects quantitative and qualitative data, merges the data and uses the results to understand a research problem (Tomasi, Warren & Lauren, 2018). The importance of this design was that the researcher concurrently conducted the quantitative and qualitative elements in the same phase of the research process, weighed the methods equally, analysed the two components independently and interpreted the results together (Tomasi, Warren & Lauren, 2018). This method facilitated the researcher to examine quantitative and qualitative data collection. Quantitative research was used to collect numerical data and convert it into useable statistics (Burns, Bush & Sinha, 2014). The researcher used this measurable data to formulate facts. A qualitative approach was used to deeply get to the bottom of the subject to help the researcher capture qualitative information of the subjects under study. It was applied to discover trends in the thoughts and opinions of small holder maize farmers and agricultural officers. The application entailed the use of focus groups, individual interviews and observation.

Based on the Kenya population data of 2017, Kitui West Sub-County (the focus area for this study) had a total population of 52,057 drawn from its four wards: Mutonguni, 16,145, Kauwi, 13,712, Matinyani, 12,868, and Kwamutonga-Kithumula, 9,317(IEBC, 2017). Based on the census data, adults in this Sub-County formed 40%, which translated to 6,458 persons for Mutonguni ward, 5,485 adults for Kauwi, 5,147 for Matinyani and 3,727 for Kwa-Mutonga/Kithumula ward, respectively. However, small holder maize farmers formed 80% of the adult population. The population of small holder maize farmers was approximated as 5,166 for Mutonguni, 4,388 for Kauwi, 4,118 for Matinyani and 2,982 for Kwa-Mutonga/Kithumula ward, respectively. It was therefore, deduced that the total number of small holder maize farmers in the Sub-County was 16,654. Table 1 summarises the target population.

Table 1: Distribution of the study population by categories

No.	Ward	Actual Population	40% Adult population	Approximate number of farmers
1	Mutonguni	16,145	6,458	5,166
2	Kauwi	13,712	5,485	4,388
3	Matinyani	12,868	5,147	4,118
4	Kwa-Mutonga/Kithumula	9,317	3,737	2,982
		52,042	20,827	16,654

Source: IEBC, 2017; Kitui County Ministry of Agriculture, Water & Livestock (2017)

The study employed both probability and non-probability sampling procedures. For probability sampling, the study used a purposive sampling technique to arrive at the agricultural officers and small holder maize farmers who participated. This method was critical in capturing key population characteristics, producing a sample proportional to the overall population (Maheshwari, 2017).

The researcher used the formula to select 237 subjects chosen to participate in the study. The study entailed small holder maize farmers from the four wards: Mutonguni, Kauwi, Matinyani, and Kwamutonga-Kithumula. Farmers were organised into strata based on the wards, from which 56 subjects were drawn using a simple random sampling method. The study employed a simple random sampling procedure to determine the study sample size of 237 respondents.

In determining the sample size for this study, the sample size determination formula for a finite population was used (Nassiuma, 2000) as stipulated:

Where:

n = sample size,

N=Target Population

c = Coefficient of variance (30%)

e= Error Term (2%)

The sample size of the study was computed using the study target population of 16, 654 Therefore,

Sample size

$$n = \frac{NC^2}{C^2 + (N-1)e^2}$$

n=sample size

N=Target population

C=Coefficient of variance (30%)

e=Error Term (2%)

$$n = \frac{(16{,}669)x(0.3)^2}{(0.3)^2 + 16{,}668(0.02)^2} = 222$$

Sample size for specific wards

Target population

Mutonguni	5,166
Kauwi	4,388
Matinyani	4,118
K/Kithumula	2,982

Calculation of sample size per individual ward

Mutonguni: $n = \frac{(5{,}166)x\ (0.3)^2}{(0.3)^2+16{,}668\ (0.02)^2} = 69$

Kauwi: n = $\frac{(4388)x\ (0.3)^2}{(0.3)^2+16{,}668(0.02)^2} = 58$

Matinyani: $n = \frac{(4118)x\ (0.3)^2}{(0.3)^2+16{,}668\ (0.02)^2} = 55$

KwaMutonga/Kithumula: $n = \frac{(2982)x\ (0.3)^2}{(0.3)^2+16{,}668\ (0.02)^2} = 40$

The sample size included small scale maize farmers from all the four wards, agricultural officers from the Ministry of agriculture and small-scale maize farmers. Table 2 presents the sample size distribution. The sample size of specific categories was summarised as shown in Table 2.

Table 2: Sample Size of Specific wards

Wards	**Target Population**	**Sample** $\left(\frac{n}{N}\right)N_i$
Mutonguni Ward members	5,166	69
Kauwi Ward members	4,388	58
Mutinyani Ward members	4,118	55
Kwamutonga-Kithumula Ward members	2,982	40
Ministry of agriculture (Agricultural officers)	5	1
Small scale maize farmers	10	2
Total	**16,669**	**225**

Key: n=sample size; N= Study population; N_i=number of subjects per ward

Questionnaires and interview guides were employed in data collection. The questionnaire was considered an essential instrument as it was less time-consuming, self-administered, and could be delivered to many respondents (Kothari, 2004; Barasa, 2024). A questionnaire is the heart of data

collection in research (Harris & Brown, 2010). A self-constructed questionnaire was designed to capture information adequately. The questionnaire had sections with several questions that sequentially tried to answer the research objectives. A Likert scale rating was conducted to capture the perceptions of the respondents. The range was between those who strongly disagreed to those who strongly agreed.

An interview guide was developed for i) the agricultural officers and ii) the small holder maize farmers. The interview guide for agricultural officers had 10 self-constructed questions relating to objectives, particularly the government's oversight role in the facilitation of self-food sufficiency and enforcement of policies.

The guide for small holder maize farmers had five (5) sections. Each section had four (4) questions surrounding a specific objective. The interview sought to extract information as guided by the research objectives. These interviews were conducted to prevent the loss of any vital information necessary for this study (Leech, 2002). The interview took 30-40 minutes per interviewee which data was captured by recording and notes taking as much as possible

Data analysis involved a preliminary data check and the actual data analysis. In the initial part, validation, editing, and coding were done (La Pelle, 2004). Filled-up questionnaires were scrutinised for completeness to ensure those with omissions, inadequate responses, and illegible and irrelevant responses, accounting for 50%, were discarded. Further scrutiny was done to get the questionable and accurate information. Questionnaires with 80% questionable responses were identified and preserved for vital information (La Pelle, 2004).

Quantitative and qualitative methods were used in the actual data analysis. The quantitative approach summarised the data using descriptive statistics. The results were presented in frequencies and percentages. Statistical analysis was conducted using Statistical Package for Social Sciences (SPSS) version 21 to code data (West, Welch & Gatecki, 2014), while the Chi-square test was applied to determine the significance of the association.

Using an interview guide, qualitative data was extracted by categorising and discussing each response according to study objectives (Bazeley, 2009). The data was edited and coded, and descriptive narratives were used to present respondents' views, experiences, and opinions. The information was analysed and condensed into theme categories to understand the meaning. The summarised data was synthesised, interpreted, and presented using different methods, such as verbatim, narrative, and direct quotations (Bazeley, 2009).

Results

Demographic Characteristics of the Respondents

The study sought to investigate the demographic characteristics of the respondents. The significant characteristics investigated included gender, age bracket, educational level and the number of years spent in maize farming.

Concerning the gender distribution of the respondents, slightly more than half (59%) of the respondents were female, while 41% were male. Regarding the age brackets of the respondents, slightly above a third (36%) were above 51 years of age. Another 23.9% of the respondents had age bracket of 41 – 50 years. The remaining 24.3% and 14% had age brackets of 30 – 40 and below 30 years, respectively. This showed majority of the respondents were over 40 years.

Regarding the years they had been maize farmers, at least 8.1% of the respondents had done maize farming for 0 – 5 years. Other 25.2 % of respondents had spent 6–10 years in maize farming, while 22.1% and 44.6 % had done maize farming for 11–15 and 16 years and above, respectively. This demonstrated that the majority of respondents had extensive knowledge of maize farming.

Government Maize Policies and Sustainable Maize Farming

The study sought to examine the effect of government maize policies on sustainable maize farming in Kitui West Sub-county. The respondents were asked to indicate whether they agreed with various statements on the impact of government maize policies on sustainable maize farming.

Table 3: The effect of government maize policies on sustainable maize farming

	1		2		3		4	
Statement	**(F)**	**(%)**	**(F)**	**(%)**	**(F)**	**(%)**	**(F)**	**(%)**
Officers from the Ministry of agriculture visit farmers frequently to monitor what they are doing	167	75.2	34	15.3	20	9.1	1	.5
Officers from the Ministry of agriculture advice farmers every season	84	37.8	103	46.4	22	10.0	2	.9
Government through its machinery set maize prices and protect farmers from middle men exploitation	183	82.4	16	7.2	13	5.9	10	4.5
Farmers get a chance to sell their maize at national cereals and produce board in the area	193	86.9	15	6.8	5.6	4.5	3	1.4

Key: 1-not at all; 2-Some extent; 3-frequently 4-Great extent

The majority (75.2%) of the respondents disagreed that officers from the Ministry of Agriculture visit farmers frequently to monitor their actions. Another 15.3% of the respondents indicated that officers from the Ministry of Agriculture visit farmers to monitor what they are doing to some extent. Another 9.1% and 0.5% indicated that officers from the Ministry of Agriculture visit farmers frequently and significantly, respectively.

During interviews with farmers, most explained that officers visit their farms but not often. On the other hand, one of them reported that officers do not visit their farms at all. The qualitative findings showed that Ministry of Agriculture officers rarely visit farmers or monitor their operations. The government has neglected the officers and farmers in facilitating officers' reaching farmers. Officers feel humiliated by the poor reporting system and have no assistance from farmers; therefore, they feel discouraged and powerless to visit farmers.

Further, agricultural officers were also asked whether government policies are in place that specifically address maize farming in Kitui West Sub-County. One of them had the following to say regarding the question:

> *There are no policies available. Farmers do maize farming as they traditionally found it or using available information from agricultural extension officers (Agricultural Officer 4, 2021)*

This was backed up by another agricultural officer who reported that the government has no policies in Kitui per se. He further explained that there was an assumption that maize does not do well, but this is comparative. Crops are the leading staple food for the people. The same response was shared among Agricultural Officer 1 and Agricultural Officer 2, who felt that no policy had been implemented. For further explanation, Agricultural Officer 1 said: *"There are no policies in place. Farmers grow maize on their own as a traditional crop. Unfortunately, it is what people depend on"*.

When asked whether officers from the Ministry of Agriculture advise farmers every season, slightly below half (46.4%) of the respondents indicated that, to some extent, officers from the Ministry of Agriculture advise farmers every season, 37.8% of them strongly disagreed that they get advice from the ministry. Another 10% of the respondents indicated that officers from the

Ministry of Agriculture frequently advise farmers every season. The rest, 0.9%, agreed that, to great extent, officers from the Ministry of Agriculture advised farmers every season. This implied that officers from the Ministry of Agriculture provided farmers with advice throughout the year.

A vast majority (82.4%) disagreed that the government set maize prices and protected farmers from middlemen exploitation through its machinery. A small percentage (7.2%) of the respondents agreed to some extent that the government, through its machinery, sets maize prices and protects farmers from middlemen exploitation. Another 5.9% of the respondents agreed that frequently, the government, through its machinery, sets maize prices and protects farmers from middlemen exploitation. In comparison, the rest (4.5%) of the respondents agreed to a great extent. This demonstrated that the government's machinery did not quite set maize prices or protect farmers from middlemen exploitation.

Concerning whether farmers in the area have the opportunity to sell their maize at the National Cereals and Produce Board, the vast majority (86.9%) of respondents disagreed with the statement. A small percentage (6.8%) of them agreed with the statement to some extent. Another 4.5% of respondents agreed that farmers have frequent opportunities to sell their maize at national cereals and produce boards in their area, while the remaining 1.4% agreed to a greater extent. This indicated that most local farmers do not sell their maize to the National Cereals and Produce Board.

Qualitative findings from the interview further revealed that there were no farmer groups and cooperatives for farmers. This makes it hard for smallholder maize farmers to create opportunities for their maize products, hence running at a loss. Upon interviewing some of the farmers who participated in the study, they were asked to indicate whether there was any group or cooperative they had joined to enable them to sell their products. One of the farmers had the following to report:

"I have not joined because I have not heard of such a cooperative or maize production group." The farmer further explained that there were no expectations and that if they were available, the farmer would expect much support in marketing and subsidies. Government maize policies were positively related to sustainable maize farming. This meant that with a unit increase in the score of government maize policies, the score of sustainable maize farming increased by 0.533 units.

Discussion

According to the Ministry of Agriculture, each extension officer is responsible for a vast area range of 30 to 100 square kilometres, with significant distances between farmer groups. Operational expenses are underfunded as they are in many extension systems, and the Ministry lacks the means to cover travel costs to visit farmers and deliver services in remote places (Tata & McNamara, 2018). This has made it very difficult for farmers to access advice from the extension officers.

The study findings revealed that most extension officers operated with minimum farmer visits in their offices. The rationale behind this was that most extension officers in Samburu County lacked the facilities to access the interior regions of the county. The county government is very much interested in the livestock sector, forgetting the crop-growing sector. Similarly, most farmers (78%) do not know extension officers, implying that they have never interacted with them. This was due to insecurities experienced in Laikipia County every year. Another possible reason for being drawn on board was fewer personnel and constant migration of the pastoral communities. Many farmers in Tanzania agreed that they do not come into contact with extension officers on their farms.

There are poor interconnections between the two parties. Contract farming (CF) has the potential to benefit small farmers by offering services that would otherwise be unavailable. Still, the government does not use this to inform the farmers about what to plant. Producers typically experience significant difficulties engaging with businesses, emphasising the necessity for government or farmer-led action. However, because of the hybrid structure and many objectives of CF schemes, organising farmers and designing effective policy interventions is challenging.

In line with the study's findings, Tarus (2019) observed that larger organisations such as NCPB possess adequate and better resources to store maize in large quantities than the farmers. They buy farm produce early in the season when the prices are relatively low and raise the prices later on. Compared to the small holder farmer who does not have large amounts of produce in the store, the farmer can only sell to a few buyers who most likely already know the price range of the major suppliers and will probably expect the same or cheaper than that of the major supplier. This implies that as they have the majority of the produce, they have a competitive advantage in the market and set the price (Tarus, 2019). Thus, the small holder farmer is left at the "mercy" of middlemen for exploitation.

Conclusion

Government maize policies were positively related to sustainable maize farming. This means that with a unit increase in the score of government maize policies, the score of sustainable maize farming increased by 0.533 units. On the other hand, farmer associations, market structures, farmer knowledge/skills had a negative slope. This implied that their relationship with the response variable (sustainable maize farming) was an inverse relationship. That is, as the score of small holder maize farmers become more aware of hurdles in farmer associations market structures and gain knowledge on challenges of maize farming, many leave for alternative agriculture, causing a decrease in maize production. The study, therefore, provided the following recommendation. The national cereal and produce board should actively participate in market stabilisation. In this case, the NCPB would act as a buyer and seller of last resort to stabilise prices within a floor and a ceiling band representing acceptable price variations.

The study anticipated to induce the country to commercialise maize for local and international trade and produce maize for industrial purposes. It was meant to turn around holder maize farmers' mindset from subsistence to commercial production. The study will contribute to policy formulation that is industrially rooted and aimed at unlocking the community potential to high production sectors. This will rejuvenate energies to growing maize for value chains beyond local to international markets. The data generated will vividly reveal the determinants of structural transformation that will lead to sustainable maize farming in Kenya. It will contribute to an industrialising country in line with Kenya's vision for 2030, shifting from subsistence agriculture to high-production sectors, thus achieving structural transformation.

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