



Effects of Small Holder Maize Farmer Associations on Sustainable Maize Farming in Kitui County, Kenya

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Abstract

The purpose of this study was to determine the effects of Small Holder Maize Farmer Associations on structural transformation for sustainable maize farming in Kitui County, Kenya. The study used sample size determination formula for finite populations to get the sample size. Probability and non-probability sampling methods were used to obtain the study sample. Purposive sampling was administered to pick a sample of 10-small holder maize farmers and 5-agricultural officers as key informants. Stratified random sampling was utilized to select the 237 subjects that participated in the study. Data was collected using questionnaires and interview guides. Quantitative data was validated, edited, coded, and analysed using Statistical Package for Social Sciences (SPSS) Version 21 and further presented using figures and tables. The Chi Square test 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 Small Holder Maize Farmer Associations and sustainable maize farming (≤ 0.05). Qualitative findings from the interview further revealed that there are no farmer groups and cooperatives for farmers.

Introduction

To establish the effects of small holder maize farmer associations on sustainable maize farming in Kitui County, autonomous and semi-autonomous resilient associations are needed to propagate small holder maize farmer interests. These associations are critical not only in the organisation of small holder maize farmers but also in keeping away a lot of government interference with the internal mechanisms of small holder farmers which are unique and particular to their survival. This anticipated phenomenon of small holder maize farmers searching for autonomous associations is worldwide based on the number of small holders.

Studies have indicated that out of 570 million maize farms worldwide, 475 million (83%) were small holder farms with less than 2 hectares in size (Fanzo, 2017). The 83% small holder farmers can form strong and resilient associations. It is noted that seventy percent (70%) of the world's maize consumed in Africa, Asia and Latin America is produced by small holder maize farmers making a significant contribution to the world economy (Fanzo, 2017).

In Kenya, political interests that interfere with the formation of small holder farmers' associations (Neven & Woolverton, 2014), poor reward for small holder maize farmers due to inadequate government support for associations and cooperative movements and curtailed power of farmer associations form reasons for low maize production without downplaying the effects of climate change and rainfall variability. The bureaucratic hurdles restrict the work of cooperative movements at the County Government and National government levels. The fact that the Cabinet Secretary (CS)

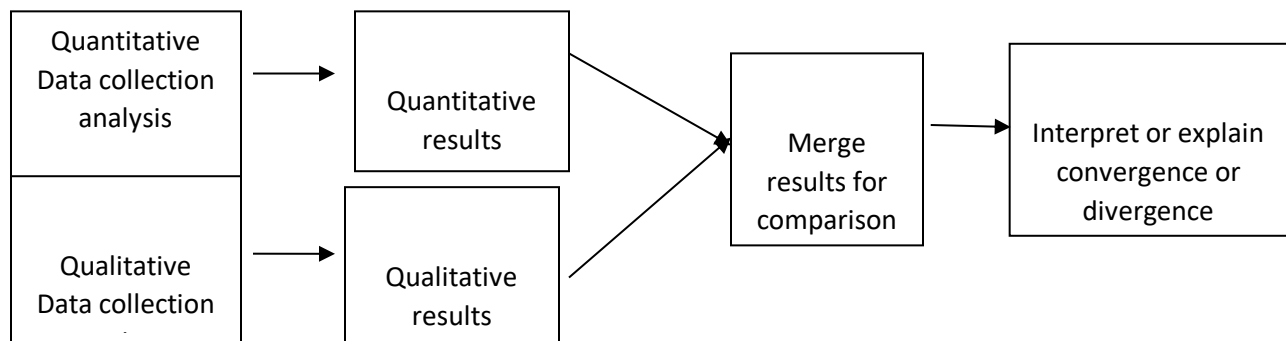


for cooperatives has powers to register, deregister and amalgamate cooperatives at will clearly indicates Curtailed small holder maize farmer associations' power to organise them creatively as dictated by their environment. In Kitui, for instance, out of 104 cooperatives or associations in Kitui County, no single maize cooperative is documented, hence this study.

Methodology

A convergent parallel design was adopted in this study. The design was used as the researcher considered simultaneously collecting quantitative and qualitative data and analysing each data set. The researcher would then get results for both quantitative and qualitative and then merge the two sets for comparison. Interpreting the compared data would explain the convergence (complementarily) or examine whether there is divergence (Tomasi et al., 2018). The researcher used this method to deepen the understanding of the research problem by conducting a quantitative data collection, then conducting a qualitative data collection, analysing each independently and then interpreting the data together for a comprehensive result. An illustration of the design is in Figure 1.

Figure 1: Convergent parallel mixed method



Source: *International Journal of Academic Research in Business and Social Sciences*, Vol.9. No.14, Special Issue. Education 4.0: future Learning Collaboration, 2019

Convergent parallel mixed design enabled concurrently collecting quantitative and qualitative elements in the same phase of the research process, weighing the methods equally, analysing quantitative and qualitative elements independently and interpreting the results together (Tomasi et al., 2018). This method facilitated the researcher to carry out quantitative and qualitative data collection. The quantitative method was used to collect numerical data converted into useable statistics (Burns et al., 2014). The researcher used this measurable data to formulate facts using tables and figures. A qualitative approach was used to capture the qualitative information of the key informants. Key informants in this study were 10-small holder maize farmers and five agricultural officers based at the County level. The two sets of respondents were purposely selected based on their experience, information and general understanding of maize farming and the area under study. This was applied to reveal detailed information on the trends of small holder farmer in maize farming, experiences of small holder maize farmers and those of agricultural officers. It explored the small holder maize farmers' understanding of farmers' associations. The application entailed two sets of interview guides; one for small holder maize farmers and the other for agricultural officers.

Based on the population census data of 2017, Kitui West Sub-County had a total population of 52,057 drawn from its four wards: Mutonguni, 16,145, Matinyani, 12,868, Kauwi, 13,712 and Kwa-mutonga-Kithumula, 9,317 (IEBC, 2017). Grounded on the census data, adults in the sub-county formed 40% which translated to 6,458 persons for Mutonguni ward, 5,147 for Matinyani, 5,485 adults for Kauwi and 3,727 for Kwa-Mutonga/Kithumula ward, respectively.



Precisely, small holder maize farmers constituted 80% of the adult population. This, therefore, translated to 5,166 for Mutonguni, 4,118 for Matinyani, 4,388 for Kauwi, and 2,982 for Kwa-Mutonga/Kithumula ward respectively. The Sub-County had 16,654 as the total number of small holder maize farmers. The researcher used a purposive sampling approach to get ten small holder maize farmers and five Sub-County Agricultural Officers. The purposive approach also called judgmental sampling, was very important at this stage for allowing the researcher to use own judgment in choosing who to participate. Gathering qualitative responses would lead to more insights and precise results by collecting data from the best-fit participants. The researcher then selected through this approach 10 farmers: two farmers each representing Mutonguni, Matinyani and Kauwi wards and four farmers from Kwa-Mutonga/Kithumula ward (Kwa-Mutonga-2 and Kithumula-2) for interviews. The researcher selected five (5) Sub-County agricultural officers for the same exercise based on experience, familiarity, expertise and knowledge of the subject under study. Table 1 shows the distribution of the study population by categories.

Table 1: Distribution of the study population by categories

No.	Ward	Actual Population	40% population	Adult	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

In this study, two sampling techniques were used: probability sampling and non-probability sampling. The usefulness of probability sampling (random sampling) was to help the researcher specify the probability of participants included in the sample. Non-probability sampling allowed the researcher to choose participants based on specific parameters that were helpful in this study. The researcher used the sample size determination formula for a finite population (Nassiuma, 2000) to select 222 subjects to participate in the study. The study entailed small holder maize farmers from the four wards: Mutonguni, Matinyani, Kauwi and Kwamutonga-Kithumula. Farmers were organised into clusters based on the wards from which subjects were drawn using simple random sampling. Another technique of obtaining key informants involved purposive sampling to extract those for interviews (Schmidt & Brown, 2012). Purposive sampling, known as judgmental or authoritative sampling, leaves the researcher at the discretion of selecting subjects familiar with relevant characteristics of the population (Maheshwari 2017). Such a procedure enabled the researcher to choose participants conversing with the study’s thematic areas (Tongco, 2007). The key informants were selected based on their experience, regional knowledge, and interest in participating in the study.

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

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

Where:

- n = sample size,
- c = Coefficient of variance (30%)
- e = Error Term (2%)
- N = Target Population



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

Sample size

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

Ward Target population

a)	Mutonguni	5,166
b)	Matinyani	4,118
c)	Kauwi	4,388
d)	Kwa mutonga/Kithumula	2,982

Using the target population, the proportionate sample for each ward is computed using the following formula:

$$\left(\frac{n}{N} \right) N_i$$

where:

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

thus, calculation of sample size per individual ward

$$\text{Mutonguni: } n = \frac{222}{16,669} * 5,166 = 69$$

$$\text{Matinyani: } n = \frac{222}{16,669} * 4118 = 55$$

$$\text{Kauwi: } n = \frac{222}{16,669} * 4388 = 58$$

$$\text{Kwa-Mutonga/Kithumula: } n = \frac{222}{16,669} * 2982 = 40$$

Therefore, 69+55+58+40 =222 (The large sample size from quantitative data.)

The study interviewed 10 small holder maize farmers and five agricultural officers as key informants for qualitative data. The total of respondents was 237. The sample size, as indicated, included 222 small holder maize farmers from all four wards, 10 small holder maize farmers and five agricultural officers from the Ministry of Agriculture.

A questionnaire and an interview guide were used as the main instruments for data collection in the study. The questionnaire was purposely used to collect quantitative data from the field. According to Harris and Brown (2010), a questionnaire is the heart of data collection in research. This is because of its many advantages such as cost saving, reaching audience or subjects quickly, scalability, anonymity of respondents, flexibility and data accuracy.

The questionnaire had two main divisions: The first covered six questions that extracted respondent information on gender, age bracket, level of education, number of years in maize farming, the main reason for doing maize farming and the approximate size of their maize farm. This information contained in the first division was essential in understanding the gender parity and involvement, the age bracket most involved and their educational standards, experience and resilience in maize farming and the total land area apportioned for maize. The size allocation for maize implicitly meant the



importance assigned to this crop. The second division of the questionnaire had four questions addressing the 4-variables examined in this research (research objectives). Each objective had four sub-questions sequentially presented as statements to be measured. Likert scale with a range rate of 1-5 was used: 1- representing the lowest and five the highest (or from strongly disagree (1) to agree (5) strongly).

The interview guide was employed in this study to collect crucial qualitative data. Two interview guides were developed: one guide for small holder maize farmers and another guide for Sub-County agricultural officers. Small holder maize farmer perception on maize farming was crucial as part of the analysis. Agricultural officers' guide was equally essential as an oversight eye looking at the corporate view of the overall maize growing in the study area. The agricultural officers' presence and involvement would reflect the government's interpretation and engagement in maize farming. The information from the two guides was essential in complementing any missing information from the quantitative data.

Results

Respondents Background Information

The study sought respondents' background information such as gender, age, education, years in maize farming, and the main reasons for maize farming. Results of the variables were presented.

Gender

The gender parity of the respondents was presented as shown in Figure 2.

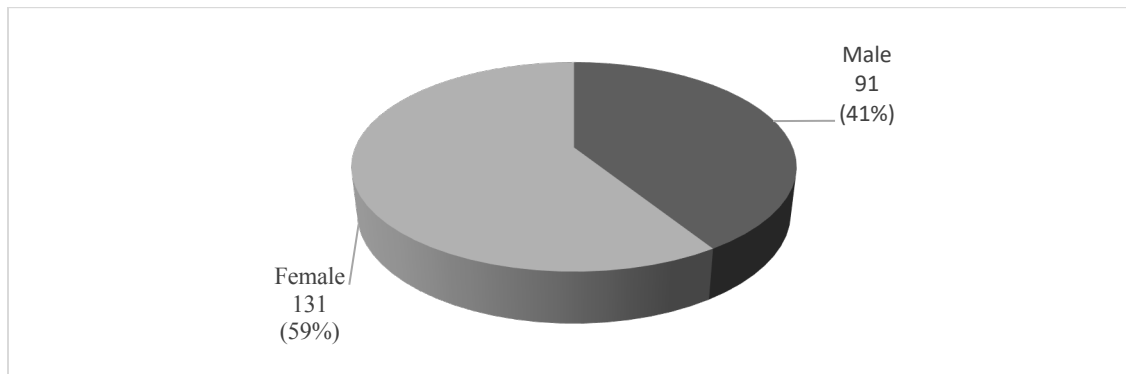


Figure 3 Respondents' parity per gender

As shown in Figure 2, fifty-nine per cent (59%) of respondents were female, 41% male. This demonstrated gender parity among respondents, with females marking a 20% margin higher than males.

Age

The study examined respondents' age, and the results indicated that 31 (14%) respondents were below 30 years, 54 respondents (24.3%) were 30 to 40 years, 53 respondents (23.9%) were 41 to 50 years while 80 respondents represented 36% were above 51 years of age. This showed that almost 60% of respondents were above 40.

Education Level

The study examined respondents' education levels while taking part in the research. The education categories included Informal, primary, secondary, diploma and degree levels.

The results indicated that 16 (7.2%) respondents had informal education, 106 (47.7%) respondents had acquired a primary level of education, 74 (33.3%) had a secondary school level of education, and 20 (9%) had reached a diploma level. In comparison, 6 (2.7%) were undergraduates and above. It can be



deduced that the majority (81%), that is, 47.7% and 33.3% of respondents attained primary and secondary education. This indicated that most small holder maize farmers are well endowed in acquiring formal education. Precisely 92.2% of those who had participated had educational levels ranging from primary to university.

Respondents' Years in Maize Farming

The study examined how long the respondents had been involved in maize farming. From the results, at least 18 (8.1%) respondents had done maize farming between 0 – 5 years. Other 56 (25.2 %) had an experience of 6–10 years in maize farming, 49 respondents (22.1%) knew of between 11 and 15 years, while 99 (44.6 %) had more than 16 years. This demonstrated that 148 (66.7%) of respondents had extensive knowledge of over 10 years in maize farming.

Reasons for Maize Farming

The study sought the main reasons for engaging in maize farming. Most respondents, 178 (80.2%), grew maize primarily to provide family food. A small number of 10 (4.5%) respondents indicated that maize farming was solely to generate income. Another 12 (5.4%) of respondents had shown that maize farming was to feed their livestock, while the remaining 22 (9.9%) indicated that they grew maize because it was what was commonly grown. This showed that most respondents (80.2%) engaged in maize farming to feed their families. When the number of those growing maize for food is added to those raising the crop, for it is what is commonly grown traditionally, the percentage rose to 90.1%, indicating maize is mainly grown for subsistence.

Size of farmer land

Respondents indicated the size of their land under such use to determine the approximate land size under maize cultivation. The responses were rated on the following options marked with a tick: i) Less than 2 acres, ii) more than 2 acres, iii) less than 10 acres, and iv) more than 10 acres.

The results showed that 67 (30.2%) indicated land size under maize utilisation as less than 2 acres. Another 91 (41%) respondents indicated that their land size was more than 2 acres. 50 respondents (22.5%) indicated they had more than two acres but less than ten acres while 13 respondents (5.9%) indicated that their land size was more than 10 acres. The responses showed that slightly more than 69% put more than two acres of land under maize. This percentage corresponds to the fact that 70% of maize is cultivated by small holder maize farmers. It was an indicator of the value of maize in the area under study.

Sustainability of Maize Farming

The study examined the extent of conviction in sustainability in maize farming among small holder maize farmers in Kitui. Respondents were to investigate the importance of sustainability in maize farming if there were sound government policies that had been put in place to ensure the sustainability of maize production in Kitui County.

The statements were provided to assess whether respondents strongly disagreed, disagreed, were undecided, agreed or strongly agreed with such statements. Going by the responses, respondents who ticked strongly disagreed or just disagreed were categorised together and had their frequencies and percentages merged. Undecided respondents were placed under their category. The respondents who ticked agreed or strongly agreed had their frequencies and percentages lumped together. The reasons for coming up with measures of strongly disagree or strongly agree were premised on discovering the actual percentage of such respondents. The merging was done for ease of clarity since disagreeing or agreeing were the two opposite sides. Thus, the final data was presented in three main divisions: (i) disagreeing, (ii) undecided, and (iii) agreeing respondents.

In responding to the statement on whether, without small holder maize farmer associations' support, there would be no sustainability in maize farming in Kitui West Sub-county, 78 (36%) of the



respondents disagreed, 27(12%) were undecided, while 113 (52%) agreed with the statement. As shown, 36% were convinced that production and sustainability would be achieved without small holder farmer associations. A small percentage of 12% remained undecided whether such associations impacted sustainability while 52% held that small holder maize associations were critical for sustainable maize farming.

Small Holder Maize Farmer Associations and Sustainable Maize Farming

The study examined effects of small holder maize farmer associations on sustainable maize farming in Kitui West Sub-county. The respondents were required to rate the impact based on certain key statements. The rating was divided into three categories: Disagree, Undecided and Agree. Table 8 shows the distribution of responses.

Table 8: Effect of small holder maize farmer associations on sustainable maize farming

Statement	Disagree		Undecided		Agree	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1. Small holder maize farmers have strong farming association	180	81.1%	13	5.9%	29	13.9%
2. Majority of small holder maize farmers are members of these associations	186	83.8%	16	7.2%	20	9.0%
3. Farmer associations help small holder maize farmers to set selling prices and period to sell	185	83.4%	23	10.4%	12	5.4%
4. Small holder maize farmers do not know about these associations	70	31.6%	10	4.5%	40	63.1%

Key: 1-2: Disagree, 3: Undecided, 4-5 Agree

Discussion

This research question attempted to establish the effects of small holder maize farmer associations on sustainable maize farming in Kitui County. In other words, to demonstrate whether there was any association or influence between the two variables. From the quantitative research findings, Table 6: shows more than half of the respondents (52%) were convinced that without small holder maize associations, the sustainability of maize farming would be jeopardised. This meant, small holder maize farmers knew the importance of associations whether they existed or not. Joining such associations would benefit smallholder maize farmers in penetrating markets and bargaining for government subsidies. Maize farmer associations were to be held high as key tools in sustainable maize farming and, more so, structural transformation.

The 36% of respondents who reputed the importance of small holder maize farmer associations in sustainable maize farming reflect the view held by farmers who, throughout their maize farming maintained their production with no assistance or any lobbying group for their interests. This was



demonstrated in Table 8, where 63.1% of respondents could not reckon with small holder maize farmer associations.

Contrary to these assumptions indicated in Table 6, Table 8 shows that the majority (81.1%) of respondents showed no strong small holder maize farming associations. The existence of strong farming associations indicated by 13.9% of respondents implied that masses of small holder maize farmers produced and stored their produce individually. On the same Table (8), 83.8% were not members of any maize associations while 83.4% indicated no assistance on pricing, timely selling, or such help emanating from such associations. Close to two-thirds (63.1%) did not know any of these associations, with less than one-third (31.6%) indicating the existence of maize farmer associations. Implicitly, when majority (83.8%) are not members of these associations, it would suggest that farmers efficiently run into a “commitment drain”. The phrase translates to isolated farmer activities that drain energy away from maize farming. This leads to farmers’ disinterest in maize farming, which causes low production. Again, a lack of such cooperation would lead to exploitation, post-harvest loss, and non-rewarding of maize farmers.

The policy question had the following note: the absence of maize policies or non-reinforcement of the existing policies was detrimental to structural transformation. Without underestimating the impact of climate change, poor rainfall distribution and poor rain patterns, poor governance remains the leading cause of the food deficit experienced in Kenya. Without the government as a prime mover or a central actor in promoting smallholder maize farmers no other factors would produce fruits. If the government promoted its staple food in all its diverse mechanisms, financial incentives, price stabilisation, and protection of small holder maize farmers from middlemen-citizens would reach affluence and maize commercialisation would be attained. Promoting small holder maize farmers is a characteristic of good governance. The subsidiary principle that prevents abuse of people from a social authority of a level higher than theirs calls such authorities to help individuals and immediate groups fulfil their duties. The principle opposes centralisations, bureaucratisation and welfare assistance (par.186, b) and unjustifiable state presence (John Paul II, 2004). Centralisation in this sense, is opposed to devolution - where devolution is power and resources are put at the discretion of the people. Bureaucratisation creates hurdles deterring people from being protagonists of their development. Welfare assistance domesticates citizens, creating dependency syndrome. All these aspects act against the free, resilient and autonomy of groups.

The regression analysis (ANOVA) showed a close association between maize policies and sustainable maize farming since the results were statistically significant (less than 0.05). The first independent variable (maize policies) coefficient was 0.533 with a standard error of 0.142. Government maize policies were positively related to sustainable maize farming. This meant a unit increase in the score of government maize policies attracted a score for sustainable maize farming increase of 0.533 units. Inadequate or/and inappropriate enforcement of policies affected sustainable maize farming negatively. This means sustainable maize farming could be directly related to adherence of good policies. Notably, political will is required in which maize yields automatically increase, thus reducing costs of production and achieving affluence and sustainability.

Conclusion

Maize policies and other Government bureaucratic hurdles have been mentioned in most studies as detrimental to Africa’s food (maize) production and sustainability. Skewed policies and practices that benefit a few or a segment of society within the elites have hindered Africa’s/ Kenya’s structural transformation. The high production potential and demand for maize is a sure way to a sustainable market. Kenya, for example, faces chronic maize deficits, with imports of 28% annually. This means Kenya has the potential to expand its capacity to meet its own maize needs. The researcher



recommends reviewing government maize policies to develop farmer-oriented and climate-friendly policies to take the country to structural transformation.

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