

Strategies to Enhance Agricultural Productivity Among Women Farmers in Navakholo Sub-County, Kakamega County, Kenya

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Abstract Agricultural sector in Kenya has continued underperformed yet it is the backbone of the country's economy contributing to approximately 27% of the economy hence being taken as one of the big 4 agenda targeted by 2030 vision. Women play a crucial role in the agricultural sector as they form a larger proportion of the small scale farmers apart from being the major source of labour in the agricultural sector. Despite their major role in the agricultural sector women farmers still face a lot of challenges in terms of agricultural knowledge and access to other factors of production e.g. land. Agriculture teaching in secondary school was introduced to generate interest in farming among students in their later life studies have also shown low proportion of girls undertaking agricultural courses in secondary schools and there is speculation that this could be challenges faced by agricultural women farmers. This study sought to find out the impact of studying agriculture on their agricultural productivity by women farmers in Navakholo Sub-county, the challenges faced and to propose strategies to improve on the women farmer's productivity. The study was conducted in Navakholo Sub-County. Out of the 20004 households in the region 422 small scale famers were selected to participate in the study. Structured questionnaires and interviews were used in data collection. Collected data were analysed using SPSS version 20 to generate means, percentages chi-square analysis and correlation analysis for the respective parameters. The results showed that few women farmers learnt agriculture as a course at their secondary school level. In terms of agricultural practices and productivity, there was no significant difference between women who did agriculture and those who did not ($p > 0.05$). In conclusion, there was a general low technical agricultural knowledge among the women farmers in Navakholo Sub-County and this was attributed to the poor agricultural curriculum system in our secondary school. The study therefore recommends for the review of the secondary school curriculum to a more practical based rather than the current theory based curriculum with low women transition to agricultural production.

Key words: Agricultural productivity Strategies, Women agricultural education, Teaching practices, Agricultural Curriculum.

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I. Introduction

Agriculture remains to be a backbone of the Kenya's economy accounting 27% of the gross domestic product (GDP)¹. Worldwide, Agriculture contributes to approximately 6.4% of the GDP². Apart from being the major source of food and raw materials for other industries, Agriculture employs more than a half of the total labour force around the world with women offering 43% of the total labour force of which a majority are found in Africa and have low living standards³. Majority of the agricultural farmers in the world and sub-Saharan Africa comprise of mainly the smallholder farmers accounting over 80% of the total farmers worldwide⁴.

In Kenya, 70% of the total population make a living from agriculture or agriculture related service⁵. The Kenya's agricultural sector is mainly composed of small scale farmers of which 86% of the total farmers being women who happens to be the major pillars of their households⁶. Despite the much effort put by women in farming, they still face a lot of challenges which include training for most of them did not advance much in their studies⁷. Trainings for good agricultural practice is still inadequate hence the proposition to improve on the agriculture practices in the secondary school's curriculum. Agriculture as a subject was introduced in school's curriculum as early as the colonial education⁸. Nearly all the schools started offering agriculture subject, a time the 8-4-4 system of education was introduced in Kenya⁹.

Agriculture as a subject in primary and secondary school's curriculum was introduced for the youths to appreciate its role in the economy, since Kenya depends on agriculture for her economic development. However, this subject has been removed from the primary school syllabus, and is an elective subject at secondary school level and this could be a cause to the challenges faced in the agricultural sector⁹.

In western Kenya, the issue of food production and food security has not been attained as the area is facing shrinking due to population pressure^{10, 11}. The sugarcane production in the area has also depleted soils through continuous production¹². According to Navakholo sub County crops report, maize and beans are the main subsistence crops grown in Navakholo sub-county, Kakamega County, Kenya¹³. Agriculture, though done on low resource base is the main source of livelihood for the majority of the population in Kakamega County¹². It was also speculated that the reason for low agricultural production among women farmers could be as a result of inadequate agricultural knowledge. Thus this study sought to understand the general contribution of agriculture subject education at secondary school level to women’s agricultural participation in Navakholo Sub-County and strategies that can be used to enhance agricultural productivity.

II. Materials and Methods

The study was conducted in four wards of Navakholo Sub County, of Kakamega County namely Bunyala West, Bunyala East, Ingotse-matiha, and Bunyala Central in Kenya. The Sub-County lies between latitudes 0°18’0”N and longitudes 34°33’0”E with a total population of 137,165 people distributed in area of 257.9 km²¹³. The area receives a bi-modal type of rainfall with long rains coming between March and June 1800 and 2100mm per annum and short rains between July to October giving a total of 1800-2100 mm of rain per year and temperature ranges of 18°C to 22.5°C¹³. The soils are mainly clay loam and sandy loam on the upper side of the Sub-County although clay loams are the predominant. There are 20004 farm families, with approximately 0.75 acres (0.3 ha) of land under maize per household as indicated by the Navakholo ministry of Agriculture reports 2017.

The study aimed to establish the proportion of former women agriculture subject students at secondary school level practising agriculture in Navakholo, Kakamega County, Kenya so has to come up with strategies to enhance agricultural productivity through women students Agricultural training at secondary school level in Navakholo Sub County, Kakamega County, Kenya. Structured questionnaires were used in the collection of data after being subjected to a pre-test in Bunyala ward so as to check on its reliability.

The fisher formula by Mugenda Mugenda was used to arrive at the sample size of 384 household women from a household population of 20004 within the Sub-County and adding 10% of the sample size to get the 422 working sample¹⁴.

$$n = \frac{Z^2 pq}{e^2}$$

Where n= minimum desired sample size

Z = normal standard deviation at 95% confidence interval

p = the proportion of the target population which has the required characteristics of households (P = 0.5)

q = 1-p where, 1 is the whole population.

The sample size of 422 composed of household heads who are women respondents obtained from an accessible population of households, ward agriculture extension officers, education officers in Navakholo sub-county, traders and creditors of Navakholo sub county, Kakamega County, Kenya.

The parameters collected by the questionnaires and interviews were: the level of education of women farmers, government policies in education and agriculture challenges experienced by female agriculture students and farmers and strategies to improve teaching agriculture as a subject to improve agricultural production.

Table 1: Summary of the data collection instruments for Navakholo sub-county Kakamega County, Kenya

Study population unit	Sampling method	Sample size	Data collection instrument
Household.	Multi-stage random	422	Household questionnaire.
Key informants; agricultural extension ward administrators, agricultural crops officers, area education officers	Purposive	1 per ward	Key informants interview guide
Focus Group Discussions.	Quota	8-12 per ward.	Focus Group Discussions guide.
Observations; household women farming and marketing socio-economic activities.	Purposive	3	Observation check lists

III. Data analysis

Data were analysed using statistical Package for the Social Sciences (SPSS Version 20). Data analysis focused on responses from 422 households. Data collected were subjected to both qualitative and quantitative analysis. Quantitative data from closed ended questions in the questionnaire allowed numerical data (frequencies and percentages) to be presented in tables. It was also analysed inferentially using Chi-square test and correlations (cross tabulation) carried out to determine their relationship.

IV. Results and Discussion

Results of the study showed almost half of the women farmers 190(44.9%) in Navakholo Sub-County had never attained any formal education with the remaining 56 % either having attained primary education, secondary education or tertiary level of education (Table 2). These results agree with those of Abdulhamid¹⁵ who reported a high percentage of rural women attended not more than primary school yet participated in agriculture. A Chi- Square test, ($\chi^2_{3,0.01} = 214.40$) conducted on the results indicated a highly significant ($p < 0.01$, Table 2) variation in the education level of women farmers practising in terms of their agricultural productivity with women who at least attained some level of education and managed to study agriculture doing much better than those who didn't attain any level of education. This is in agreement with the Agriculture Status Report of 2016 which reported that women's education empowers them to use credit and adopt technologies hence increasing productivity and rural livelihood¹⁶. This was also supported by the works of Ogbonna and Okoroafor which showed that enhancing women capacity through trainings increases their capacity in mainstreaming agriculture¹⁷.

Table 2: Distribution of respondent to levels of study

Variable	Frequency	%	Chi-square	
			χ^2	P
<i>Education level</i>			214.40	<0.01
Illiterate	190	44.9		
Primary	16	4.0		
Secondary	46	10.9		
Tertiary	170	40.2		
<i>Necessity for teaching agriculture to girls</i>			50.52	>0.05
Yes	256	60.5		
No	167	39.5		
<i>Learned agriculture and sat for KCE/KCSE</i>			0.021	>0.05
Yes	209	49.6		
No	213	50.4		

The transition from studying Agriculture at Secondary school level among women was tested and the result showed that majority of women who learned agriculture (80.5%) practiced mixed culture but only 61.5% of non-KCSE agriculture subject women farmers practiced mixed culture. Their learning of agriculture had impacted them positively since mixed culture has a lot of advantages and increases productivity as compared to mono-culture (Table 3).

Table 3: Impacts learning agriculture on agricultural practice among women farmers in Navakholo Sub-County.

Learned agriculture and sat for KCE/KCSE		Practice of production	
		Mono culture	Mixed culture
Yes	Frequency	41	169
	%	19.5%	80.5%
No	Frequency	82	131
	%	38.5%	61.5%

Majority of the study participants 256 (60.5%) agreed that it is necessary to teach Agriculture Subject to Girls at Secondary School Level though it was not significantly different ($p > 0.05$) from the views of the 166 (39.5%) of the participants not seeing the necessity of teaching agriculture to secondary school girls.

Key informant interviews and Focus Group Discussions, indicated that there was need to teach agriculture to girls at secondary school level since they are the main participants in major agricultural activities carried out in the sub -County either to produce food or to generate income. About 58% of the respondents agreed that taught agriculture has ultimate positive effects which lead to ensuring household food security and economic empowerment (Table 4). The study results were in agreement with the study by Tandi, who posted that relevant information and knowledge for women farmers improves their agricultural performances and livelihoods¹⁸.

Table 4: Why agriculture should be taught to girls in Navakholo sub county, Kakamega County, Kenya

Reason	Frequency	Percent
Economic empowerment	85	33.3
For household food security	64	25.1
Gives basic farming skills	38	14.9
Teaches correct management practices	24	9.4
Imparts knowledge and skills	17	6.7

They have the right skills for farming	15	5.9
They are economical on inputs	13	4.7
Total	256	100.0

A Chi Square test, $\chi^2_{(6,0.05)} = 50.52$ conducted on the results indicated that there was no significant ($p > 0.05$) variation in the reasons for teaching agriculture to girls and its impact to agricultural productivity of former women agriculture subject students in Navakholo sub-county, Kakamega County, Kenya. Focus Group Discussions indicated that women are at the core of food security in their households, hence there is need for learning application of agriculture knowledge. These results agree with report by Duveskog in the year 2013, that change in productivity require skill application¹⁹. The current Agriculture syllabus allows students to learn agriculture theoretically, but very few application skills are provided.

Challenges faced by women farmers

A majority of women practicing agricultural farming in Navakholo sub-county affirmed that the most challenges faced include: Pest and diseases (38%), low and fluctuating market prices for the farm produce (31%), transport challenges (24%) and lack of markets for their produce at 4%

Table 5: Challenges faced by women farmers in Navakholo sub-county, Kakamega County, Kenya

Problem faced	Frequency	Percent
Transport challenges	100	24
Low prices	130	31
Lack of customers	15	4
Pest and Diseases	160	38
others	17	4

From key informant interviews with officials from the Ministries of agriculture, the main challenges in farmers were: high cost of farm inputs, low cost of farm outputs, lack of transport and others such as low soil fertility, lack of technical knowledge, small pieces of land due to fragmentation and reduced extension services. These results are agreement with the findings by Squire in 2003 who posted that Bias technological change and lack of information are barriers to women full participation in agriculture²⁰.

Strategies used to manage the challenges by the women farmers in Navakholo sub County

Women farmers have tried to solve their problems using various methods. For instance, using both synthetic and organic herbicides to control pest and diseases. Others have opted to sell their products immediately after harvesting giving room for exploitation by middlemen (Table 6).

Table 6: Ways of overcoming challenges faced by women farmers in Navakholo Sub County Kakamega County, Kenya

Ways of overcoming	Frequency	Percent
Use of pesticides	128	30.4
Timely planting	106	25.0
Hire lorries/ motorcycle	53	12.5
Selling immediately to avoid storage problems	42	9.8
Human transport (self)	26	6.3
sell produce to hire transport	18	4.5
sell when prices are high	49	11.6
Total	442	100.0

Most of these mitigation strategies have not helped much since the women formers are not well equipped with sufficient information and knowledge to handle this challenges. From the discussion most of them argued that the agricultural knowledge gained in secondary school agricultural curriculum was not sufficient. During the household interview, a former KCSE Agriculture subject women farmer stated the following as quoted; “I wonder when the education system will change their way of teaching agriculture in secondary school. The only tool I touched practically was the jembe. Up to date, my daughter still uses the same jembe to do the practicals. How I wish they would teach the new ways like use of machines”. This is a clear indication that there is a discrepancy in the way the agriculture course is taught in our secondary schools and there is need to improve so as to come out with well-equipped students with the capacity to implement what they are taught in school. This concur with the statements by Robinson-Pant who posted that “*skill development should take place through formal, informal education system simultaneously during the learning period of a student for future application*”²¹. Ogbonna and Okoroafor also share the same sentiments that food development

and extension strategies should be reviewed, re-designed and packaged to reach women farmers to increase output through technology¹⁷. According Squire²⁰, agriculture education training and employment policies should put in consideration so as to boost the rural women participation in agricultural production as well as employment in the formal agricultural industry.

V. Conclusion and Recommendation

Agricultural knowledge gained in secondary school is vital in the transition to agricultural production by the rural women. The proportion of women graduates of KCSE agriculture subject farmers was lower than the proportion of the non-KCSE agriculture subject farmers. Only 107 (25.4%) had learnt agriculture and sat for KCSE while 315 (74.6). The study showed that the women who took agriculture in secondary school have an upper hand in handling emerging issues compared to their counterparts who didn't take agriculture as a course. The study also showed that the current secondary school agriculture curriculum is not sufficient in equipping skills that can be applied for improved productivity by the women farmers. The study therefore recommends for the restructuring of the secondary school agricultural curriculum from theory based to more practical techniques for better preparation of the students in the practical world where practical skills are required. Since majority of the small holder famers are mainly women, there is need to put up mechanisms to encourage more girls to take agriculture as a course as it lays a strong foundation for the to proceed to practical agricultural farming after the school life.

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