

1 **The influence of Farmers' Gender on Factors Affecting Maize production among Small**
2 **Scale Farmers in the Agricultural Reform Era: The Case of Western Region of Kenya**

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7 **ABSTRACT**

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9 The introduction of Structural Adjustment Programmes (SAPs) and trade liberalisation resulted
10 in agricultural reforms in Kenya and other developing countries. Hence the Kenya government
11 no longer gives incentives to small scale farmers. Therefore, the small scale farmers, extension
12 service and the government at large have to look for all ways to increase maize production in the
13 country, hence the study. Men and women both make significant contributions in maize-based
14 farming systems and livelihoods, although gender roles in maize cultivation vary greatly across
15 and within regions. Their contribution to agricultural work varies even more widely, depending
16 on the specific crop and activity. The purpose of the study was to determine the influence of
17 Farmers' Gender on Factors Affecting Maize production among Small Scale Farmers in the
18 Agricultural Reform Era: The Case of Western Region of Kenya. This **is was** because maize is
19 the main staple for most of the Kenyan population and Western Region is the food basket. The
20 study used Ex-post facto research design via cross sectional survey. Busia, Bungoma, Mt. Elgon
21 and Lugari Counties were purposively selected to represent the Western Region of Kenya. Two
22 sub-counties from each of the four Counties were selected by simple random sampling. For
23 uniformity purposes 200 small scale farmers were selected from focal areas through systematic
24 random sampling hence ensuring that they all had been exposed to extension staff. Four key
25 informants were sampled purposefully based on their positions of authority. In addition, 52
26 extension staffs were sampled through systematic random sampling. The small scale farmers
27 were interviewed with the help of interview schedule containing open and closed ended
28 questions. Data were analyzed using descriptive statistics. The results of the multiple regression
29 illustrated that there was a statistically significant relationship between factors affecting maize
30 production among small scale farmers (adoption of improved agricultural practices, attitude
31 towards maize farming attitude towards farmer organizations and attitude towards opinion
32 leaders) and farmers' gender. The results showed that the adjusted $R^2=0.090$, $F=3.830$ at $p < 0.01$
33 and $df=8$. The study recommended that the Kenya government, extension service and researchers
34 should pay more attention to the women small scale farmers, who form a large percentage of the
35 small scale farmers in the western region, yet produce less bags of maize in order for Kenya to
36 be food secure. There is therefore need for further research to find ways of motivating women
37 small scale farmers to increase maize production in the Western Region of Kenya.

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41 **BACKGROUND INFORMATION**

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43 Structural Adjustment Programmes (SAPs) as propagated by the International Monetary Fund
44 (IMF) and the World Bank in the 1980s in Kenya occurred against a background of the country's
45 declining economic performance, which increased poverty levels. The trend has continued to
46 date with agricultural production and especially maize production declining.

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48 Agricultural Sector in Kenya is the backbone of the country's economy and the source of
49 livelihood for majority of the rural population. The sector contributes about 26 percent of the
50 country's GDP, employs about 75 percent of the population and is a major source of food to
51 Kenya's growing population (Ombuki C., 2018). The small scale farmers are expected to
52 purchase their inputs, source for information on increasing production, store their own produce
53 and seek for the best markets for their produce. One of the main issues in this regard is the lack
54 of and the poor conditions of rural roads linking the farmer's facilities and the commercialization
55 spots in the country. All these challenges are solved differently by the men and women small
56 scale farmers. There is therefore need more researches to be carried out on the factors affecting
57 maize production by gender among small scale farmers in the western region of Kenya, which is
58 the main maize producing area in Kenya
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60 **PURPOSE OF THE STUDY**

61 The purpose of the study was to determine the influence of Farmers' Gender on Factors Affecting
62 Maize production among Small Scale Farmers in the Agricultural Reform Era: The Case of
63 Western Region of Kenya
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65 **METHODOLOGY**

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67 Ex-post facto research design was used via a cross sectional survey. This was because the study
68 used naturally occurring treatments on subjects having a self-selected level of the independent
69 variable (Kathuri & Pals, 1993; Borg & Gall, 1993).
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71 The study was conducted in Western Region which is administratively divided into six counties
72 as shown on Fig. 1 & 2. The region is made up of Busia, Bungoma, Kakamega, Lugari, Vihiga
73 and Mt. Elgon counties. The Region covers an area of 8436 Km² out of this 6670 Km² has
74 potential for agriculture of which, 3591 Km² is cultivated for various crops. Rainfall is bimodal.
75 The long and short rains come in March-May and August-November periods, respectively.
76 Annual rainfall ranges from 900mm in Busia to 2100mm in Bungoma (MARD, 2002).
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Fig. 1. Map showing the Western Region of Kenya

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Fig. 2. Map showing the Counties in the Western Region of Kenya

The target population was made up of small scale farmers in the Western Region. The accessible population is as shown on Table 1.

Table 1. Showing the accessible population

District	Accessible population
Lugari County	41,809
Bungoma County	158,370
Mt. Elgon County	19,746
Busia County	136,736

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Busia, Bungoma, Mt. Elgon and Lugari counties were selected through purposive sampling because Busia County had the lowest average maize yields (7 bags per acre) in the region while, Lugari County experienced the highest average maize yield (18 bags per acre). Bungoma and Mt. Elgon counties were in-between in terms of maize yield (Central Bureau of Statistics, 2001; Ministry of Agriculture, 2006). The four counties also represented Western Region in terms of all the Agro-ecological zones that exist in the Region and therefore, results obtained could be generalized to the whole Region.

Two sub-counties from each of the four selected counties were selected by simple random sampling. The study sub-counties were Bumula and Webuye in Bungoma County; Kaptama and Kapsokwony in Mt. Elgon County; Funyula and Butula in Busia County and Lugari and Likuyani in Lugari County (figure 2).

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For uniformity purposes the small holder farmers were selected from focal areas through systematic random sampling thus ensuring that they all had been exposed to extension staff. At

111 the time of data collection, the extension staff had trained the farmers in one focal area per
112 division and had moved to the next. The focal area approach which is under the National
113 Agriculture and Livestock Extension Programme (NALEP) aims at improving livelihoods of the
114 poor rural households (MOA & ML&FD, 2006). In the focal area approach the extension staffs
115 works in one area of approximately 400 farmers per year. The focal area is taken as a
116 demonstration site where farmers from the rest of the division can learn latest technologies
117 (Baiya, 2003). The key informants were purposefully sampled due to their positions of authority.

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119 The sample size was arrived at using the following formula:

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$$n = NC^2 \div C^2 + (N-1)e^2$$

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123 (note: n=sample size; N=population size; C=Coefficient of variation which is 30%; e=margin of
124 error which is fixed between 2-5%). The study sample was calculated at 25% coefficient of
125 variation and 5% margin of error (Nassiuma, 2000).

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127 For the purpose of generalizing the results to Western Region, twenty five percent coefficient of
128 variation was used to ensure that the sample was wide enough. Five percent margin of error was
129 used because the study was an ex-post facto survey. In ex-post facto survey the independent
130 variables are not be manipulated hence necessitating relatively higher margin of error. The study
131 sample is as shown in Table 2.

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133 The small scale farmers and extension staff were selected through systematic random sampling
134 from sampling frames that were obtained from the extension staff offices. Four key informants
135 were interviewed in order to generate additional information and clarify issues on the reform
136 measures that had taken place. The key informants included the Provincial Director of
137 Agriculture and Livestock Extension, the Provincial Crops Officer, an officer in position of
138 authority in Agricultural Finance Corporation and an officer in position of authority at the
139 National Cereals and Produce Board, Western Region. The small scale farmers were interviewed
140 with the help of interview schedules and the extension staff were asked to fill questionnaires

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142 **Table 2. Total number of subjects by category from which the sample was drawn**

Category	Number of subjects	Sample size
Extension staff in the Region	832	52
Household heads in Busia County	136,736	50
Household heads in Lugari County	41809	50
Household heads in Bungoma County	158370	50
Household heads in Mt. Elgon County	19746	50
Key Informants		4
Total	357,493	256

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144 The study sought to determine the relationship between factors affecting maize production
145 among small scale farmers in the agricultural reform era, by gender, in Western Region.

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149 **RESULTS AND DISCUSSIONS**

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151 The results of the multiple regression illustrated that there was a statistically significant
152 relationship between factors affecting maize production among small scale farmers (adoption of
153 improved agricultural practices, attitude towards maize farming attitude towards farmer
154 organisations and attitude towards opinion leaders) and farmers' gender. The results showed that
155 the adjusted $R^2=0.090$, $F=3.830$ at $p < 0.01$ and $df=8$. Hence the null hypothesis was rejected.

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157 The study further sought to establish the differences in the factors affecting maize production
158 among small scale farmers between men and women farmers. The differences in maize yield
159 between men and women farmers were also determined. The results revealed that there was a
160 statistically significant difference at 0.05 significant level in maize yield ($F=12.038$, $df=1$).
161 However, there was no statistically significant difference between adoption of improved
162 agricultural practices ($F=3.582$, $df=1$), attitude towards farmer organisation ($F=0.100$, $df=1$),
163 attitude towards maize farming ($F=0.305$, $df=1$) and attitude towards opinion leaders ($F=2.695$,
164 $df=1$) between men and women small scale farmers.

165 To facilitate discussion of the gender differences in maize yield, adoption of improved
166 agricultural practices, and farmers' attitude towards maize farming, farmer organisations opinion
167 leaders, cross tabulations were run. The results were as shown in Tables 4.20-4.23. at The results
168 revealed that more women farmers (71.4 %) achieved maize yield of less than 11 bags per acre
169 as compared to 47.9% of the men farmers who achieved the same yield. On other hand, more
170 men farmers (27.6%) achieved maize yields of over 16 bags per acre compared to the 16.6%
171 women farmers who achieved the same yield as shown in Table 4.20. The low yields realised by
172 women farmers could be explained in part by the factors shown in Table 4.21-4.23.

173 **Table 3: Percentage Men and Women Farmers Who Achieved Various Maize Yields per**
174 **Acre**

175 Maize yield	Women farmers (%)	Men farmers (%)
176 \leq bags per acre	30.8	21.4
177 6-10 bags per acre	40.6	26.5
178 11-15 bags per acre	12.0	24.5
179 16-20 bags per acre	8.3	9.2
180 21-25 bags per acre	5.3	4.1
181 Over 25 bags per acre	3.0	14.3
182 TOTAL	100	100

183 | Table 3 illustrates that more men farmers (60.6%) adopted either three quarters or all the
184 improved agricultural practices taught by the extension staff, as compared to 46.2% women. On
185 the other hand, more women farmers (32.1%) than men farmers (25.3%) either did not adopt or

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186 adopted only one quarter of the improved agricultural practices. This explains in part the reason
187 why women farmers generally achieved lower maize yields than men farmers.

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190 **Table 4: Cross Tabulation of Adopted Improved Agricultural Practices by Gender**

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192 Extension packages passed and adopted by farmers					
	193 None of the	193 Quarter	193 Half of the	193 Three quarters	193 All of the
	194 Packages	194 of the	194 packages	194 of the	194 packages
	195 Passed	195 packages	195 passed	195 packages	195 passed
		195 Passed		195 passed	
196 Men	19.2	6.1	14.1	21.2	39.4
197 Women	28.4	3.7	21.6	14.9	31.3

198 Cross tabulations of attitude of farmers towards maize farming, farmer organisations and opinion
199 leaders indicated that relatively more women farmers (55.2%) had either very poor or poor
200 attitude towards maize farming as compared to 47.9% men farmers. On the contrary, more men
201 farmers (52.1%) had average to very good attitude towards maize farming as Compared to 44.8%
202 of women farmers as shown in Table 5.

203 The results further showed that relatively more women farmers (27.6%) had very poor to poor
204 attitude towards farmer organisations as compared to 24.5% of men farmers with the same
205 attitude towards farmer organisations. On the other hand, more men farmers (75.5%) had average
206 to positive attitude towards farmer organisations as compared to 72.4% of the Women farmers as
207 shown in Table 4. Generally, both men and women farmers had average to very good attitude
208 towards opinion leaders. However, more women (7.5) had very poor to poor attitude towards
209 opinion leaders as compared to 3.1 % of the men farmers. The extension service, the government
210 and other stake holders may have to give more emphasis to problems facing women farmers if
211 food production in Western Region and in the country should improve.

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218 **Table 5: Attitude of Farmers towards Maize Farming, Farmer Organisation Opinion**
 219 **Leaders by Gender**

	Very poor (%)	Poor (%)	Average (%)	Good (%)	Very good (%)	n
Attitude towards maize farming						
222 Men	11.2	36.7	48	3.1	1	98
223 Women	10.4	44.8	33.6	11.2	0	134
Attitude toward farmer organisations						
227 Men	4.1	20.4	40.8	31.6	3.1	98
228 Women	10.4	17.2	39.6	27.6	5.2	134
Attitude toward opinion leaders						
230 Men	0	3.1	52	42.9	2	98
231 Women	1.5	6	61.9	26.9	3.7	134

233 | Table 6 **shows** that slightly more women (37.3%) than men (21.1%) had planted maize
 234 | on land sizes of less than one acre. In addition, more men (45.5%) than women (37.4%) farmers
 235 | had land sizes of more than four acres. Similarly, more men farmers (52.7%) had acquired
 236 | secondary school education or above as compared to the women farmers (23.2%). Furthermore,
 237 | correlation coefficients indicated statistically significant relationships (Pearson correlation of
 238 | 0.180, at $p < 0.007$) between education level and maize acreage and between education level and
 239 | maize yield (Pearson correlation of 0.262 at $p < 0.0005$). This implies that men farmers are in a
 240 | better position to realise higher yields in agricultural production than women farmers. Simplified
 241 | extension packages should be designed for women farmers.

242 | The high maize acreage, farm acreage and education levels **give** men an edge over women
 243 | farmers. This **is** because the high levels of education possessed by men will help them
 244 | understand improved agricultural practices passed by extension staff making adoption of these
 245 | practices easy. This **is** supported by Sing and Ray (1980) who observed that more
 246 | intelligent farmers made greater financial progress on their properties. In addition, Itharat (1980)
 247 | suggested that farmers with larger parcels of land used for agricultural production are more
 248 | innovative. Table 6 further **shows** that more men farmers (32.3%) had some form of employment
 249 | compared to 27.6% women farmers who had some form of employment. For farmers to be
 250 | productive they need money to buy farm inputs, indulgence of men farmers in other forms of

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251 employment earns them extra income which may enable them to purchase farm inputs, hence as
 252 are able to adopt improved agricultural practices.

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254 **Table 6: Maize Acreage, Education Level, Farm and Other Occupations Possessed by Men**
 255 **and Women farmers**

256	Maize Acreage	men (%)	women (%)	Education level	Men (%)	Women (%)
257	No response	1.4	1.0	none	4.3	17.6
258	<1 acre	19.7	36.3	primary level	43.0	59.2
259	1-3 acres	62.0	46.1	secondary level	47.3	21.6
260	4-6 acres	7.0	9.8	college/ university	4.3	1.6
261	7-9 acres	1.4	1.0		1.1	0.0
262	≥ 10 acres	8.5	5.9			
263	Total	100	100		100	100
264	Farm size				Other occupations	
265	<1 acre	7.0	5.1	none	67.7	72.4
266	1-3 acres	47.5	57.5	self employed	18.2	20.9
267	4-6 acres	21.2	23.9	church/ community	4.0	1.5
268	7-9 acres	8.1	6.0	formal employment	8.1	5.2
269	10-12 acres	5.1	3.0	politician	2.0	0.0
270	>12 acres	11.1	4.5			
271	Total	100	100		100	100

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273 **CONCLUSION**

274 More male small scale farmers achieved more bags of maize yield per acres compared to the
 275 women small scale farmers, more men farmers (60.6%) adopted either three quarters or all the
 276 improved agricultural practices taught by the extension staff, as compared to 46.2% women.
 277 relatively more women farmers (55.2%) had either very poor or poor attitude towards maize
 278 maize farming, farmer organizations and opinion leaders as compared to 47.9% men farmers.
 279 The study also revealed that most of the small scale farmers who had small farm sizes were
 280 women, they also had low education levels, that **is** were below primary level and they were not
 281 involved in any other occupations apart from farming.

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283 **RECCOMENDATION**

284 The Kenya government, extension service and researchers should pay more attention to the
285 women small scale farmers, who form a large percentage of the small scale farmers in the
286 western region, yet produce less bags of maize in order for Kenya to be food secure.

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