

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 because maize is the
19 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.

47
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 **maen** 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

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

65 **METHODOLOGY**

66
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).

70
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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87 **Fig. 2. Map showing the Counties in the Western Region of Kenya**

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

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92 **Table 1. Showing the accessible population**

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

94
95 Busia, Bungoma, Mt. Elgon and Lugari counties were selected through purposive sampling
96 because Busia County had the lowest average maize yields (7 bags per acre) in the region
97 while, Lugari County experienced the highest average maize yield (18 bags per acre).
98 Bungoma and Mt. Elgon counties were in-between in terms of maize yield (Central Bureau of
99 Statistics, 2001; Ministry of Agriculture, 2006). The four counties also represented Western
100 Region in terms of all the Agro-ecological zones that exist in the Region and therefore, results
101 obtained could be generalized to the whole Region.

102
103 Two sub-counties from each of the four selected counties were selected by simple random
104 sampling. The study sub-counties were Bumula and Webuye in Bungoma County; Kaptama
105 and Kapsokwony in Mt. Elgon County; Funyula and Butula in Busia County and Lugari and
106 Likuyani in Lugari County (figure 2).

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108
109 For uniformity purposes the small holder farmers were selected from focal areas through
110 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.

118

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

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$$121 \quad n = NC^2 \div C^2 + (N-1)e^2$$

122

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 shown in Table 2.

132

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

141

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

150
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.
156

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

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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189

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	194 Quarter	195 Half of the	196 Three quarters	197 All of the
	198 Packages	199 of the	200 packages	201 of the	202 packages
	203 Passed	204 packages	205 passed	206 packages	207 passed
		208 Passed		209 passed	
210 Men	19.2	6.1	14.1	21.2	39.4
211 Women	28.4	3.7	21.6	14.9	31.3

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

217 The results further showed that relatively more women farmers (27.6%) had very poor to poor
 218 attitude towards farmer organisations as compared to 24.5% of men farmers with the same
 219 attitude towards farmer organisations. On the other hand, more men farmers (75.5%) had average
 220 to positive attitude towards farmer organisations as compared to 72.4% of the Women farmers as
 221 shown in Table 4. Generally, both men and women farmers had average to very good attitude
 222 towards opinion leaders. However, more women (7.5) had very poor to poor attitude towards
 223 opinion leaders as compared to 3.1 % of the men farmers. The extension service, the government
 224 and other stake holders may have to give more emphasis to problems facing women farmers if
 225 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**

220		Very poor (%)	Poor (%)	Average (%)	Good (%)	Very good (%)	n
221	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
224							
225	Attitude toward farmer organisations						
226							
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
229	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

232
 233 Table 6 shows that slightly more women (37.3%) than men (21.1%) had planted maize on land
 234 sizes of less than one acre. In addition, more men (45.5%) than women (37.4%) farmers had land
 235 sizes of more than four acres. Similarly, more men farmers (52.7%) had acquired secondary
 236 school education or above as compared to the women farmers (23.2%). Furthermore, correlation
 237 coefficients indicated statistically significant relationships (Pearson correlation of 0.180, at $p <$
 238 0.007) between education level and maize acreage and between education level and maize yield
 239 (Pearson correlation of 0.262 at $p <$ 0.0005). This implies that men farmers are in a better
 240 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 intelligent
 246 farmers made greater financial progress on their properties. In addition, Itharat (1980) suggested
 247 that farmers with larger parcels of land used for agricultural production are more innovative.
 248 Table 6 further shows that more men farmers (32.3%) had some form of employment compared
 249 to 27.6% women farmers who had some form of employment. For farmers to be productive they
 250 need money to buy farm inputs, indulgence of men farmers in other forms of employment earns

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

253

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

272

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 below primary level and they were not
 281 involved in any other occupations apart from farming.

282

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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