

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**  
3  
4  
5  
6

7 **ABSTRACT**  
8

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.  
38  
39  
40

41 **BACKGROUND INFORMATION**  
42

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 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

#### 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 Km<sup>2</sup> out of this 6670 Km<sup>2</sup> has  
74 potential for agriculture of which, 3591 Km<sup>2</sup> 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).

77  
78



Fig. 1. Map showing the Western Region of Kenya

79  
80  
81  
82  
83  
84



85  
86  
87 **Fig. 2. Map showing the Counties in the Western Region of Kenya**  
88

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.

91  
92 **Table 1. Showing the accessible population**  
93

<b>District</b>	<b>Accessible population</b>
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).

107  
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:

120

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

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).

126

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

143

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.

146

147

148

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 **Acres**

175 <b>Maize yield</b>	<b>Women farmers (%)</b>	<b>Men farmers (%)</b>
176 ≤ 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 <b>TOTAL</b>	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.

188

189

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

191

Extension packages passed and adopted by farmers					
	None of the Packages Passed	Quarter of the packages Passed	Half of the packages passed	Three quarters of the packages passed	All of the packages 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.

212

213

214

215

216

217

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	<b>Attitude towards maize farming</b>						
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	<b>Attitude toward farmer organisations</b>						
226							
227	<b>Men</b>	4.1	20.4	40.8	31.6	3.1	98
228	<b>Women</b>	10.4	17.2	39.6	27.6	5.2	134
229	<b>Attitude toward opinion leaders</b>						
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 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	<b>Maize Acreage</b>	<b>men (%)</b>	<b>women (%)</b>	<b>Education level</b>	<b>Men (%)</b>	<b>Women (%)</b>
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	<b>Total</b>	<b>100</b>	<b>100</b>		<b>100</b>	<b>100</b>
264	<b>Farm size</b>				<b>Other occupations</b>	
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	<b>Total</b>	<b>100</b>	<b>100</b>		<b>100</b>	<b>100</b>

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  
284  
285  
286  
287  
288  
289  
290  
291  
292  
293  
294  
295  
296  
297  
298  
299  
300  
301  
302  
303  
304  
305  
306  
307  
308  
309  
310  
311  
312

**RECCOMENDATION**

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

**REFRENCES**

Baiya, F. M. (2003). Focal area extension planning: National agriculture and livestock extension programme field guide notes. Nairobi, Kenya, Government Printers; 2003.

Borg, WR, Gall, MD. (1993) Education research: An introduction. New York: Longman Inc; 1993.

Chamala (1987). Adoption process and extension strategies for conservation farming. In “Tillage: New Directions in Australian Agriculture (Eds P.S. Cornish and J.E. Prately) pp.400-19. (Inkata Press: Melbourne).

Charles Ombuki (2018). Factors affecting maize production in Kenya International Journal of Arts and Commerce Vol. 7 No. 6 July

Central Beural of Statistics (2001). The 1999 population and housing census, Nairobi, Kenya: Government Printers

Guerin and Guerin (1994). Guerin LJ, Guerin TF. Constraints to the adoption of innovations in agricultural research and environmental management: a review. Australian Journal of Experimental Agriculture.34 (4).549-571

Kathuri & Pals, Kathuri NJ, Pals, DA. (1993). Introduction to educational research. Njoro, Kenya: Educational Media Centre, Egerton University.

313 Kenya Agricultural Research Institute (2019). The Major Challenges Of The Agricultural Sector  
314 In Kenya  
315

316 Kodhek, GA (2005). Contemporary issues determining the future of Kenyan agriculture: An  
317 agenda for policy and research.2005; Available: [http://www.yahoo.Agenda\\_pol\\_resrch\(1\).htm](http://www.yahoo.Agenda_pol_resrch(1).htm)  
318

319 Ministry of Agriculture, (2006). Western Region annual report; 2006.  
320

321 Ministry of Agriculture and Ministry of Livestock and Fisheries Development. (2006). Impact  
322 assessment NALEP Phase 1. Nairobi, Kenya: Ministry of Agriculture and Ministry of Livestock  
323 Development; 2006.  
324

325 Ministry of Agriculture and Rural Development. (2002). Department of Agriculture Western  
326 Region 2001 annual report; 2002  
327

328 Nassiuma D. K. (2000). Survey sampling: Theory and methods. Njoro, Kenya: Egerton  
329 University Press; 2000.  
330

331 Republic of Kenya. (2010). Agricultural sector development strategy 2010-2020. Nairobi,  
332 Kenya: Government Printers; 2010.  
333

334 Republic of Kenya (2013a). Crops act; Kenya Gazette Supplement. Nairobi, Kenya: Government  
335 Printers; 2013.  
336

337 Republic of Kenya (2013b). Ministry of Agriculture Food Security Assessment Report. Nairobi,  
338 Kenya: Government Printers; 2013.  
339

340 World Bank. 1994. Governance - the World Bank's experience (English). Development in  
341 practice. Washington, D.C. : The World Bank. s to farmers  
342