

Gender Analysis of Sweet Potato Production in Osun State, Nigeria

^{1*}Olagunju, F.I; ²Fakayode, S .B, ²Babatunde, R.O
and ¹Ogunwole-Olapade, F

¹Department of Agricultural Economics, Ladoké Akintola University of Technology, Ogbomoso.

²Department of Agricultural Economics and Farm Management, University of Ilorin, Ilorin

ABSTRACT

Aims: The research investigated the determinants of gender differentials in the output of male and female sweet potato farmers in the study area. Specifically, the study examined the socio economic characteristics of the sweet potato farmers, gender levels of potato production, the efficiency estimates of the farmers and factors that determine gender outputs in the study area.

Study design: Cross-sectional study

Place and Duration of Study: Osun State Agricultural Development Programmes (OSADEP) between April 2010 and September, 2011

Methodology: The sampling frame for this study is the sweet potato farmers in Osun State, Nigeria. The sample of 16 respondents were randomly selected from five (5) Osun State Agricultural Development Programme (ADP) zones giving a sample size of 80. Primary data were collected with the use of structured questionnaire and personal interviews. The data collected were analysed using descriptive statistics and Cobb-Douglas production function.

Results: The result suggests that Land clearing, preparation and ridging were found to be done by 90%, 87.5% and 93.8% of the male and 12.5%, 35.0% and 10.0% of the females, respectively. The analysis of the mean output in kg per hectare of the male and female sweet potato farmers shows the difference in the mean output. The efficiency distribution shows that male operate at the efficiency range lower than that of the females. The study reveals that women are more interested and committed to sweet potato farming. Farm size, quantity of input, depreciation, age, education, farming experience and care economy were found to affect output of all the respondents.

Conclusion: It is therefore pertinent that policy makers should pay attention to the female sweet potato farmers as they are found to be more productive, since it was revealed that the female produced more output than their male counterparts. This implies that the female took sweet potato farming more seriously and did not play a supportive or complimentary role to their male counterparts.

Key words: Gender, Efficiency, Sweet potatoes, Cobb-Douglas.

¹Tel: +234 – 803-3918373
E- mail: olagfunk@yahoo.com

1. INTRODUCTION

Food which is a basic necessity of every human being is scarce in its provision; and the provision is a source of concern to both man and woman (Ajayi and Laogun, 2005). Household food security is very important as the women and the men have different but complimentary roles and responsibilities in securing nutritional well-being for all members of the household and the community (Spriggs, 2005). Complementary roles are evident in all activities revolving around sweet potato (*Ipomoea batatas*) production especially in some states in Nigeria. Sweet potato is a creeper of the *convolvilaceae* family. It originated from Central America and is widely grown as important staple food in most parts of the world (FAO, 2006).

Presently, Nigeria is the number one producer of sweet potato in Africa with annual output of 3.46 million metric tons (FAO, 2006), and globally the second largest producer after China. The crop is grown for both human and animal consumption. It is the only crop among the root and tuber crops that has a positive per capita annual rate of increase in production in sub-Saharan Africa (Tewe *et. al*, 2003). Gender participation is a term that describes the roles and activities of men and women according to traditions and beliefs of a particular culture. (Buckland, 1993). A number of new programmatic and funding initiatives targeting female farmers have centered on assumptions of potential farm and nonfarm gains by improving women's ability to access resources (Bill and Melinda Gates Foundation 2008; IFAD 2003; WB/FAO/IFAD 2009; World Food Programme 2009).

In most developing countries men and women participate in traditional agriculture performing different roles. These roles are gender specific, complimentary and reciprocal in natural activities like bush clearing, land preparation, harvesting, processing and marketing (Brearley, 2001). Tewe (2003) reported that if the contribution of men and women are taken

42 into account equitably when allocating productive resources, agricultural production can be
43 on the increase, women are involved in the production and processing of certain food crops
44 such as cassava, sweet potatoes, maize, yam, melon etc. and are also responsible for
45 weeding, harvesting, transporting processing, storage and marketing of their crops.

46 The problem of declining crop productivity in Nigeria is not expected given various
47 interventions by government. Farmers output still fall below 60 percent irrespective of the
48 interventions and to enhance this, the means of production (i.e. technology) should be
49 improved as well as other factors that support farmers output should be given adequate
50 attention (Ebong, *et al.* 2011; Anyanwu and Zaka, 2011).

51 Gender inequality remains a problem that has characterized the Nigerian agricultural
52 climate. In Southern part of Nigeria women are meant to do most of farm work and have
53 ownership of the farms while in the Northern part, men do most of the farm work and
54 ownership of farms. Given that gender roles are culture specific, it was observed that in the
55 middle belt region of Nigeria women make ridges and mounds while in the eastern part of
56 the country that is certainly a job for men (Walabai, 2005). Gender responsibilities and
57 difference have not been adequately considered by policy makers and extension workers in
58 many developing countries. Gender differences have implication for farming responsibilities
59 as it influences the farming activities performed. The allocation and distribution of farm
60 incentives are done with gender bias (Jacoby, 1992). Policy makers and administrators work
61 with baseless assumption that women play supportive role to the men who are the actual
62 farmers (Ajao et.al, 2004).

63 Women farmers like their male counterpart, need all the necessary training and
64 support to enhance their output (Olagunju and Ogunniyi, 2003). In their paper, the study did
65 not compare the efficiency of the output of the male and female farmers which thus created

a gap to be filled. The transformation of traditional or peasant sweet potato farming of which women are of utmost importance to increase output is pertinent. Hence the study therefore made gender analysis of Sweet Potato production in Osun State, Nigeria with the view to analyzing the socio-economic characteristics of the respondents, ascertain various activities performed by male and female sweet potato farmers, analyze the mean output of the male and female sweet potato farmers in the study area, examine the differences in the efficiencies of male and female sweet potato farmers and to determine the factors affecting the output of the male and female sweet potato farmers

1.1 Theoretical Framework:

A stochastic production function is given by

$$Y_i = f(X_{ij} \beta) \exp(V_i - U_j), i = 1, 2, \dots, n \dots \dots \dots (1)$$

where Y_i is output of the i -th farm, X_i is the vector of input quantities used by the i -th farm, β is vector of unknown parameters to be estimated; $f(\cdot)$ represents an appropriate function (e.g. Cobb Douglas, translog, etc). The term V_i is a symmetric error which accounts for random variation in output due to factors beyond the control of the farmer e.g. weather, disease outbreaks, measurements errors, etc, while the term U_j is a non negative random variable representing inefficiency in production relative to the stochastic frontier. The random error V_i is assumed to be independent and identically distributed as $N(0, 6\sigma^2)$ random variables independent of the U_i s which are assumed to be non-negative truncation of the $N(0, 6\sigma^2)$ distribution (i.e. half-normal distribution) or have exponential distribution (Aigner, Lovell and Schmidt, 1977). The stochastic frontier was independently proposed by Aigner, Lovell and Schmidt, (19977). The technical efficiency of an individual farmer is defined in terms of the ratio of the observed output to the corresponding frontier output given the available technology (Onyenweaku and Effiong, 2006).

$$\text{Technical efficiency (TE)} = Y_i/Y_i^* = f(X_i, \beta) \exp(V_i - U_i) / f(X_i, \beta) \exp(V_i) = \exp(-U_i) \dots \dots (2)$$

Where Y_i = observed Output

Y_i^* = Frontier Output

The parameters of the stochastic frontier production function are estimated using the maximum likelihood method.

1.1.2 The Empirical Model:

96 The economic model commonly used to determine the relationship between the various
 97 factors and the output in agriculture is production function model. The production function of
 98 any farmer is determined by resource availability of the farmer. In agriculture, the production
 99 inputs consist of land, labour and capital as the basic factors of production. The expected
 100 relationship between output and land is that as more land is brought under production,
 101 output is increased. To find out the impact of these factors on farm level production of sweet
 102 potatoes on both male and female small-scale farmers in Osun state, the functional
 103 relationship is specified as

$$104 \text{ OUTPUT} = f(\text{FAMS}, \text{LAB}, \text{VINES}, \text{CAPDEPR}, \text{AGRCHEM}, \mu) \dots\dots\dots(3)$$

105 Among the various functional forms for analyzing production functions, double-log gives the
 106 best fit and is the best (Eze et al, 2010 and Goni et al, 2007). The econometric model is
 107 specified using the double-log Cobb-Douglas production function as follows:

$$108 \ln \text{OUTPUT}_i = \ln \beta_0 + \ln \beta_1 \text{ FAMS}_i + \ln \beta_2 \text{ LAB}_i + \ln \beta_3 \text{ VINES}_i + \ln \beta_4 \text{ CAPDEPR}_i + \ln \beta_5$$

$$109 \text{ AGRCHEM}_i + V_i - U_i$$

110 Where,

111 OUTPUT = Sweet Potatoes output (in kilograms)

112 FAMS = Farm size (in acres)

113 LAB = Labour quantity (in man-days)

114 VINES = Potatoes vines in Kg

115 CAPDEPR = Depreciation of Capital

116 AGRCHEM = Agrochemicals used in Naira

117 V_i = Random error

118 U_i = Technical inefficiency

119 **1.1.3 Determinants of Technical Efficiency:**

120 In order to determine factors contributing to the observed technical efficiency, the following
 121 model was formulated and estimated jointly with the stochastic frontier model in a single
 122 stage maximum likelihood estimation procedure using the computer software frontier version
 123 4.1 (Coelli, 1996) as follows:

$$124 \text{ TE}_i = a_0 + a_1 Z_1 + a_2 Z_2 + a_3 Z_3 + a_4 Z_4 + \dots\dots\dots a_7 Z_7 \dots\dots\dots(4)$$

125 Where TE = Technical efficiency of the i-th farmer

126 Z_1 = Level of education of the farmers (years)

127 Z_2 = Age of farmers (Years)

128 Z_3 = Farming Experience (Years)
 129 Z_4 = Frequency of contact with Extension Agents
 130 Z_5 = Marital Status
 131 Z_6 = Credit (N)
 132 Z_7 = Membership of farmers association/cooperatives (dummy)
 133 While $a_0, a_1, a_2, \dots, a_7$ are the parameters to be estimated.
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135 2. METHODOLOGY

136 Osun state was selected purposively based on the dominance of sweet potato
 137 farmers in the area. A two stage sampling technique was used in selecting 80 respondents.
 138 In stage one, the 5 agricultural zones in the state were selected for ease of administering the
 139 questionnaire. In stage two, 16 respondents were randomly selected from each zone from
 140 the list of potato farmers provided by the Osun State Agricultural Development Programme
 141 (OSADEP) Staffs. A structured questionnaire was developed based on the objectives of the
 142 study to collect information from the respondents. Cross-sectional data were collected from
 143 these samples in 2010/2011 cropping season. The data analyses were carried out with
 144 descriptive statistics and Cobb-Douglas production function.

145 3. RESULTS AND DISCUSSION

146 The result of the socio-economics characteristics of the respondents in (Table 1)
 147 shows that the mean age of the female sweet potato farmers (53.90) are more than the
 148 mean age of their counterparts (52.60) with the youngest age of 22 years and the oldest of
 149 74 years. It was discovered that about 65% of the farmers are within the age range of 41 and
 150 55 years, 20% are above 55 years while 15 % are below 41 years. This result indicates that
 151 most of the farmers are still in their productive years. It was also noticed that most of the
 152 young adults are not actively involved in the production of sweet potato in the study area
 153 which might be due to rural urban drift. This situation is most common with the male farmers
 154 than their female counterparts with the aim of getting more lucrative jobs in cities rather than
 155 farming in the villages. This result has policy implication in Nigeria that has been recognized
 156 to have high rural-urban migration. The number of rural inhabitants that migrate to cities with
 157 hope of overcoming powerlessness consistent with rural life is unprecedented (Adewumi,
 158 2008). Majority of the male farmers had spent an average of 10 and half years in school
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160 while the female farmers had only spent an average of 4 years in school. The result implied
161 that majority of these sweet potato farmers did not have the quality education necessary for
162 efficient performance in their chosen farming career and also a reflection of quality of labour.
163 In the same manner, the number of hours spent on care economy (taking care of home and
164 children) is much more than that of the male counterpart. This invariably reduces the quality
165 time they would have given to farm work. This may therefore be responsible for low level of
166 innovation and technology adoption by the farmers and possibly failures of keeping good
167 records.

168 The average family size for male and female sweet potato farmers is 7 and 6
169 respectively constituting mainly family members whose age are below 18 years. It is
170 believed that production increases if there are more members of the household within the
171 productive age of 18-40. Family size is an important source of family labour since it implies a
172 reduction in the cost of hired labour. The mean years of experience for the two categories
173 are high enough to categorize them as being expert in the production of sweet potato in the
174 study area. This result implies that the farmers were experienced and not just amateurs. The
175 average land size cultivated by male and female sweet potato farmers is 2.6ha and 2.0ha
176 respectively. About 65% of the respondents cultivated below this average, which implies that
177 they grow sweet potato on small scale, and the likely implication of this is low productivity.
178 Women generally own less land and the land they have is often of lower quality than the land
179 owned by men. According to the Christian and Pinstrup (2008), women in Africa only own 1
180 per cent of the land and they have to contend with limited access to financial and technical
181 resources.

182 Majority of the male sweet potato farmers 72% were involved in land clearing
183 activities while only 10% of the female respondents were also involved. Land preparation
184 was done by 70% of the male and 28% of the female respondents. Ridging was done by
185 75% of the males and 8% of the females. This is in line with the findings of Tewe (2003) in
186 the study of trends in Sweet potato Production, Utilization, and Marketing in Nigeria in which
187 it was revealed that land clearing and preparation for sweet potato production was done
188 mostly by men. Planting was done by 15% of the males and 76% of the females. About 22%
189 and 55 % of male and female respectively participated in weeding. Majority of the males
190 (76%) were involved in harvesting while 22% of the females were also involved in
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Table 1. Mean values of socio economic characteristics of the respondents

Items	Male	Female	Both sexes
Age (years)	52.60	3.90	53.25
Land area (ha)	3.62	3.32	3.32
Labour (man-days)	19.30	13.40	13.40
Education (years)	10.54	4.23	7.39
Family size (No)	7.40	6.8	14.20
Fertilizer (Kg)	766.53	346.84	556.69
Planting material (₦)	25,436.00	19, 324.00	22, 380.00
Capital (₦)	55,334.00	28,657.00	41, 995.50
Farming experience	8.00	6.50	7.25
Tractor use	40%	10%	25%
Loan recipient (%)	73%	68%	70%
Cooperative Members	68%	90%	79%
Care Economy:			
hours spent on the farm/day			
hours spent on children	6.00	3.30	4.65
hours spent on food	2.00	5.00	3.50
making/water fetching	.30	6.30	3.50

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Source: Field survey, 2011

harvesting. In marketing activity, 27% of the males were involved whereas 62% of the females were into sweet potato produce marketing. The results indicated that the gender participation in marketing activity of sweet potato is still at the rudimentary stage. The result revealed also that majority of the farmers are peasants and with very few in commercialize operations.

204 **Table 2. Distribution of Activities Performed by the Respondents**

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Activities Performed	Male	Female
Land Clearing	72 (90)	10 (12.5)
Land Preparation	70 (87.5)	28 (35.0)
Ridging	75 (93.8)	8 (10.0)
Planting	15 (18.8)	76 (95.0)
Fertilizer Application	38 (47.5)	72 (90)
Weeding	22 (27.5)	58 (72.5)
Harvesting	76 (95)	22 (27.5)
Marketing	27 (33.8)	62 (77.5)

206 **Source: Field Survey, 2011**

207 *Note: Multiple Responses were observed*

208 *Percentages are in parenthesis*

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226 The results from Table 3 show that women's lack of access to finance is also due to
227 factors such as lack of collateral, complicated administrative procedures, **inadequate** loan
228 sizes **and** interest rates, **are** some of the major factors affecting and limiting the investment
229 and productive capacity of women **potato farmers** as well as their ability to finance other
230 basic needs. The availability of adequate and well-targeted resources will help women
231 farmers increase their productivity, providing more food for families and reducing the
232 demand for imports. Examples of ways to help women include expanding their access to
233 credit and inputs, as well as technical assistance. This strategy has big payoffs. The analysis
234 in Table 4 shows that there was a higher output of sweet potatoes from female farmers than
235 male farmers because women are the major producers of sweet potato in the study area.
236 **One possible reason for this may be that female owned farms are mostly rented one, while**
237 **male owned farms are mostly inherited. Female rented land for commercial purposes, so**
238 **they may have more incentives to work and to get benefits from the rented land. On other**
239 **hand, male owned farms which are mostly inherited, they may cultivate for household**
240 **consumption since they have higher percentage of dependents adults in the household**
241 **making a large total number of family size.** By these estimates, agricultural productivity
242 would rise if women farmers' access to inputs, credit and technical assistance were
243 equalized with men's.

244 Women farmers took sweet potato farming as a business while the men were
245 involved either as helpers to the woman or to assist the household consumption. It was
246 observed that a little number of male took sweet potato farming as a serious one. This result
247 is in sharp contrast with the assumption that women only play supportive roles in farming
248 business (Abdulai and Regmi, 2000). Cooperatives societies have a role to play in alleviating
249 the problem of agricultural funding, and paving the way towards recovery that is socially and
250 economically sound and sustainable. Where access to credit is becoming restricted,
251 cooperative can continue as providers of financial services. Where public service delivery is
252 jeopardized as a result of crisis-induced cuts in funding and spending, cooperative can play
253 a bridging role as service providers (e.g. health cooperatives), while at the same time
254 providing employment opportunities to women and men. **The availability of fund encourages**
255 **them to acquire more land for farming.**

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259 **Table 3: Distribution of Respondents According to Farm Inputs Sources**

Characteristics	Male		Female	
	Freq.	Percent	Freq.	Percent
I. Source of Planting Materials				
Purchased	5	12.5	3	7.5
Own Farm	18	45.0	22	55.0
Friends and relatives	6	15.0	2	5.0
Friends and relatives/Own farm	11	27.5	13	32.5
Total	40	100.0	40	100.0
II. Source of Land				
Inherited	19	47.5	1	2.5
Purchased	2	5.0	0	0.0
Rent	11	27.5	21	52.5
Family land	8	20.0	18	45.0
Total	40	100.0	40	100.0
III. Source of Capital				
Personal savings	14	35.0	19	47.5
Cooperative society	8	20.0	3	7.5
Cooperative/personal savings	5	12.5	6	15.0
Friends and relatives/personal savings	11	27.5	12	30.0
Banks	2	5.0	0	0.0
Total	40	100.0	40	100.0
IV. Fertilizer usage				
Used	18	45.0	8	20.0
Not- used	22	55.0	32	80.0
Total	40	100.0	40	100.0

Source: Field Survey, 2011

From Table 4, the total output in naira per year for the male and female sweet potato farmers sampled are ₦8, 327,443 and ₦12, 336,472 respectively. The mean output in naira for the male and female sweet potatoes farmers sampled is ₦208, 186 and ₦308, 411 respectively.

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280 **Table 4.Distribution of the Sweet Potato Producers' Output per hectare.**

Variables (Kg/ha)	Male	Female
Number of respondents (n _i)	40	40
Total Output (X1)	8,327,443	12,336,472
Mean Output (X2)	208186.08	308411.80

281 **Source: Field Data, 2011.**

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283 The Female farmers realized better output than the males, to further substantiate
 284 this fact; Table 5 shows the percentages of the male and female farmers who attained
 285 certain levels of efficiency represented by the ranges quoted. The Table shows the
 286 productivity estimates of the male sweet potato farmer with a minimum value of 0.100, mean
 287 value of 0.541, and the maximum value of 0.963. The range of the efficiency estimates
 288 shows that about 48 percent of the estimates have less than 0.50. The percentage of 12.5
 289 and 7.5 of the estimates are within the range of 0.60-0.69 and 0.70-0.79 respectively. Also,
 290 7.5 percent and 5.0 percent efficiencies estimates were within the ranges 0.80-0.89 and
 291 >0.89 respectively for male gender. The distribution refers that majority (48%) of the male
 292 sweet potato farmers lie within the efficiency rating of <0.50 in contrast with female farmers
 293 with high efficiency rating of 38 % within the ranges of 0.7 - 0.79. The productivity efficiency
 294 estimates of the female sweet potato farmers shows the minimum value of 0.100 and the
 295 mean value of 0.796 with a maximum value of 0.963. About 5.0 percent of the farmers have
 296 efficiency value of less than 0.50. Also, 12.5%, 37.50%, 25% and 12.5% of the female
 297 sweet potato farmers had efficiency values with ranges of 0.60-0.69, 0.70-0.79, 0.80-0.89
 298 and >0.89 respectively. This distribution inferred that the majority were within the efficiency
 299 rating of 0.70-0.79. The result implied that the female farmers are efficient operators in sweet
 300 potato farming than the males.

301 The result from Table 6 shows that there are minimum likelihood of the estimate of
302 the Cobb-Douglas function for female gender output, the coefficient of farm size, quantity of
303 sweet potato stems in Kg, quantity of agrochemical and depreciation of capital. The
304 coefficient of farm size, quantity of sweet Potatovines and quantity of agrochemical in Kg
305 were all significant at 1% probability level and were all positively related with sweet potato
306 output. This was buttressed by the elasticity values of 4.63, 4.93, and 184 respectively.
307 These values indicated that the household sweet potato productivity is still at the second
308 stage of production and increasing the use of any of these inputs will result to greater future
309 productivity among the female sweet potato farmers.

310 The efficiency factors affecting the productivity of the female farmers included
311 farming experience, marital status, number of extension visits and household size. Age
312 related negatively with efficiency of productivity but was not significant. The result implied
313 that old age will reduce efficiency. The analysis further shows that, the coefficient of marital
314 status was significant at 1% probability level and has positive relationship with efficiency.
315 That implied that marital status is an incentive in terms of increased labor force to sweet

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342 **Table 5. Frequency Distribution of Male and Female Gender Efficiency**

Technical Efficiency	Male		Female	
	Frequency	Percentage	Frequency	Percentage
<0.50	19	47.5	02	5.0
0.5 - 0.59	08	20.0	03	7.5
0.6 – 0.69	05	12.5	05	12.5
0.7 – 0.79	03	7.5	15	37.5
0.8 – 0.89	03	7.5	10	25.0
>0.89	02	5.0	05	12.5
Total	40		40	
Min	0.100		0.100	
Max	0.963		0.963	
Mean	0.541		0.796	

343 Source: Field Survey, 2011

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346 potato production in the study area. Also the years of experience was significant
347 at 1% probability level and has positive relationship with efficiency of productivity. This
348 shows that increase in the years of experience increase productivity efficiency. Also number
349 of extension agent visit and household size were also significant at 1% probability level and
350 both had a positive relationship. Thus, the more an extension agent visit the farmer with
351 productive innovations and that is adopted by the farmer the productive and efficient the
352 farmer will be.

353 Table 6 further showed that there is minimum likelihood of the estimate of the Cobb-
354 Douglas function for male gender output. The coefficient of farm size and quantity of sweet
355 potatoes vine input available were significant at 1% probability and they were all positively
356 signed. This implied that increase in the availability of farm land and sweet potatoes vine
357 input for the farmers, leads to increase in the farm output. Furthermore, labor (man days)
358 was significant at 1% probability and negatively signed. The implication of these results is
359 that increase in the number of labor man days will lead to decrease in productivity because
360 of over utilization of resources which invariably increases the production cost. The efficiency
361 factor affecting the productivity includes the age, education status, marital status, extension
362 visits and household size. Age related negatively with the efficiency of productivity and it is
363 significant at 1% productivity level. The implication is that ageing is in consonance with
364 inefficiency. Educational status, marital status, and number of extension visits and

365 household size related positively with efficiency productivity. The implication is that increase
366 in these factors will result to increase efficiency in productivity of the male sweet potato
367 farmers in the study area.

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398 **Table 6: Cobb-Douglas Frontier Function Estimation of Female and Male Gender**
 399 **Output**

	Production function	Parameter	Female		Male	
			Coefficient	t-value	Coefficient	t-value
400	Constant	b0	35.871***	42.602	14.636***	2.131
401	Farm size	b1	0.463***	19.292	3.854***	3.913
402	Labour (Mandays)	b2	-1.167	-0.251	13.295***	-5.030
403	Quantity of sweet					
404	Potatoes vines					
405	in Kg	b3	4.927***	7.436	10.644***	6.856
406	Depreciation of					
407	Capital	b4	-0.546***	-37.655	-2.498***	-37.655
408	Distance travelled	b5	-0.416	-0.472	-0.416	-1.250
409	Quantity of					
410	Agrochemicals	b6	3.844***	6.958	0.864***	6.971
411						
412	Efficiency factor					
413	Educational status in					
414	Years	Z ₁	0.075	0.113	-0.411	-3.385
415	Age in years	Z ₂	-0.056	-0.182	-0.044	-3.385
416	Farming experience	Z ₃	0.382***	3.897	0.255***	2.257
417	Extension visits	Z ₄	8.498***	12.334	8.191***	8.175
418	Marital status	Z ₅	6.212***	8.406	9.997***	12.296
419	Household size	Z ₆	11.221***	12.334	12.011***	13.541
420	Credit availability	Z ₇	1.625	0.449	0.772	0.193
421	Membership					
422	Association	Z ₈	0.624	0.269	0.626	1.122
423	Diagnostic statistics					
424	Sigma	σ^2	3.614**	5.387	28.665**	9.743
425	Gamma	Y	0.500		0.500	
426	Log likelihood function	η	-110.314		-110.314	
427	LR test		12.003		12.006	

428 **Source: Field survey, 2011**

429 *** , ** , * = 1%, 5%, 10% level of probability

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441 4. CONCLUSION AND RECOMMENDATIONS

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444 The study has highlighted that there are gender differential(s) in the output of male
445 and female sweet potatoes farmers in the study area. It was revealed that the female
446 produced more output than their male counterparts. This implies that the female took sweet
447 potatoes farming more seriously and did not play a supportive or complimentary role to their
448 male counterparts. The women were found to be more technically efficient, this may be as a
449 result of their commitment to sweet potatoes farming.

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450 The problem of gender inequality was address by directing attention toward
451 resources for women farmers. The deterioration of conditions for granting credit with the
452 situation of women in the agricultural sector or the access of credits to women was already
453 complicated. Many women who have had to rely on personal savings, with all its limitations,
454 for productive investment, could be affected by the credit crunch due to tightening of it
455 downstream. Both the male and female participated in sweet potatoes farming activities. The
456 males were more involved in sweet potatoes farming activities such as land clearing, land
457 preparation and ridging while the female were more involved in sweet potatoes farming
458 activities such as planting, harvesting and marketing.

458

459 It is therefore, recommended that agricultural extension agencies should intensify
460 efforts in disseminating improved production technologies especially to the women to
461 support their efforts in sweet potatoes farming. Government should provide sweet potatoes
462 farming inputs and ensure that female farmers get a fair share of the inputs. There should be
463 more investment in sweet potatoes farming since it as a source of self employment
464 especially for women, as this will help the government in the fight against gender imbalance
465 and shortage of employment. In order to achieve rural development in Nigeria, which is to
466 increase rural productivity and income, there is need to enhance the quality of life of women
467 sweet potatoes farmers and meet the extension service needs of women farmers in sweet
468 potatoes production.

468

469 Strengthening the role of women in agriculture and ensuring decent work for a
470 growing number of women is one step to help economies to get back on track. This would
471 help to reach the goal of halving the share of poor people. The list of possible measures
472 includes: increasing women's access to farming land and fertilizers, credit, and education;

472 increasing women's participation in decision-making; and strengthening women's role within
473 the family. All these measures are crucial to guaranteeing high productivity.

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