GENDER DIFFERENTIALS IN SWEETPOTATO PRODUCTION ON THE LIVELIHOOD STRATEGIES OF FARMERS IN EBONYI STATE, NIGERIA

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ABSTRACT

This study was conducted to analyse the determinants of sweetpotato production on the livelihood strategies of the male and female sweetpotato producers in Ebonyi State. A multi-stage randomized sampling procedure was used to collect cross sectional data in 2014. Data collected from 120 Sweetpotato producers were analysed using descriptive statistics and ordered probit analyses. The results of the study showed that the mean age of male and female farmers was about 30 and 40 years respectively. Results show that the male and female farmers had about 15 years of farming experience, and household size of about 7 persons each. The result of the Ordered Probit Regression analysis showed a significant Chi^2 at 1% % level of probability for male and female producers indicating that the variables used were appropriate for the analysis. The results show that the coefficients for location and age were negatively signed and significant at 10% and 5% level respectively. The coefficients of quantity harvested and area of land cultivated were positively signed and significant at 1% level each. Coefficient for area of land cultivated were positively signed and significant at 5% as well as, age and household size at1% level each. Coefficient of gender was negative and significant at 5% level of probability indicating that female farmers are more likely to be full time producers order than paid or self-employed. The results call for policies aimed at encouraging rural farmers through provision of institutional and infrastructural facilities to attract young men and women who are agile and stronger to increase the cultivation of sweetpotato as well as land reform policies by making more land available especially to the female sweetpotato farmers.

Keywords: Gender, Sweetpotato production and Livelihood strategies

INTRODUCTION

The utmost concern for the rural farmer is to meet the energy needs to overcome hunger (Ajayi and Laogun, 2005) and earn some income to take care of the family. Crop like sweetpotato (*Ipomoea batatas*) is a good source of energy and food security crop for rural household and has a high yield potential that may be realized within a relatively short growing season. Sweetpotato is a creeper of the *convolvulaceae* family, originated from Central America and is widely grown as important staple food in most parts of the world (Tewe *et al*., 2003). It is produced on small scale in a household based subsistence economy in Africa but recently grown as commercial crop (Kisiangani and Pasteur, 2008).

Gender gaps in terms of production in the agricultural sector are common phenomena in many developing countries especially among the farmers. Gender is a term that describes the roles and activities of men and women according to traditions and beliefs of a particular culture (Buckland, 1995). In most developing countries (Nigeria), 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, 2005). Tewe *et al*., (2003) reported that if the contribution of men and women are taken into

account equitably when allocating productive resources, agricultural production can be on the increase, women are involved in the production and processing of certain food crops like sweetpotato and are also responsible for weeding, harvesting, transporting, processing, storage and marketing of this crop.

The word livelihood is the material means whereby ones live. Livelihood strategies refer to a bundle of activites that people undertake to provide for their basic need (or surpass them). Sweetpotato, amongst the root and tuber crops, is the only crop with a positive per capita annual rate of increase in production in Sub-Saharan Africa (Gbigbi, 2011). According to FAO (2013) production of sweetpotato in Nigeria increased from 2,468,000 in 2000 to 3,400,000 metric tones in 2013. Area of cultivation increased from 381,000 ha to 1,115,000 ha over the same period. However, estimates of sweet potato production in Nigeria vary widely among different sources. FAO (ibid) noted that 80% of the sweetpotato produced in Nigeria was used for human food. It is an important revenue earner for the country and employer of labour for rural people who are engaged in its production.

Portfolio for sweetpotato farmers could range from cultivating sweetpotato for own consumption, raising pigs (and feeding them with sweetpotato leaves), household noodle product for market and migrant labour. Livelihood areas in sweetpotato include: area of production system (the root and vine production), genetic resource conservation (seeds), processing, marketing, and consumption (Gbigbi, 2011). Others are Community-based production of clean planting materials, improved market orientation of local cropping systems and optimal use of local feed resources, including sweetpotato, for cattle rearing. The order which these activities are structured and on the basis of which they are planned is known as livelihood strategies. It is the part of the system in which the decision and management are needed for strategic implementation.

Gender issues on livelihood strategies depend on the degree to which strategies are jointly designed and decisions jointly taken. In a situation where men and women have separate budget responsibilities, each may adopt different strategies for maintaining their own as well as their dependents livelihood. Therefore this study is aimed at estimating the determinants of sweetpotato production on the livelihood strategies of the male and female sweetpotato producers in Ebonyi State.

METHODOLOGY
A multi-stage randomized sampling procedure was used to collect cross sectional data in 2014 among 120 Sweetpotato producers in Ebonyi state with the aid of a well structured questionnaire. Two LGAs from the three agricultural in the state were selected. In the second stage, two communities were purposively selected from each zone. At the last stage 20 producer households were randomly selected, giving a total of 120 respondents. Descriptive statistics and ordered probit were used for the study.

The Ordered Probit Model
A widely used approach to estimating models of ordered type is an ordered response model, which almost employs the probit link function. This model is thus often referred to as the ''ordered probit'' model. Like many models for qualitative dependent variables, this model has its origins in bio-statistics (Aitchison and Silvey 1957) but was brought into the social sciences by two political scientists (McKelvey and Zavoina 1975). The central idea is that there is a latent continuous metric underlying the ordinal responses observed by the analyst. Thresholds partition the real line into a series of regions corresponding to the various ordinal categories. The latent continuous variable, Y* is a linear combination of some predictors, X, plus a disturbance term that has a standard Normal distribution:

$$Y_i^* = X_i\beta + \varepsilon \qquad \text{……………………………….(1)}$$

The latent variable Y_i^* exhibits itself in ordinal categories, which could be coded as 0, 1, 2,…, k. The response of category k is thus observed when the underlying continuous response falls in the *k*-th interval as:

$Y^* = 0$ if $Y^* \leq \delta_0$
$Y^* = 1$ if $\delta_0 < Y^* \leq \delta_1$
$Y^* = 2$ if $\delta_1 < Y^* \leq \delta_2$ ……………………………………….(2)

Where Y^* (i=0, 1, 2) are the unobservable threshold parameters that will be estimated together with other parameters in the model. When an intercept coefficient is included in the model, Y_0^* is normalized to a zero value (Green, 2000) and hence only k-1 additional parameters are estimated with Xs. Like the models for binary data, we are concerned with how changes in the predictors translate into the probability of observing a particular ordinal outcome. The probabilities for each of the observed ordinal response which in this study had 3 responses (0, 1, 2,) will be given as:

prob $(Y = 0) = P(Y^* \leq 0) = P (\beta'X + \epsilon_i \leq 0) = \emptyset (-\beta'X)$
prob $(Y = 1) = \emptyset (\delta_1 - \beta'X) - \emptyset (-\beta'X)$
prob $(Y = 2) = 1 - \emptyset (\delta_1 - \beta'X)$ ……………………….(3)

where $0 < Y_1^* < Y_2^* < ... < Y^*_{k-1}$ …. n is the cumulative normal distribution function such that the sum total of the above probabilities is equal to one.

The specification of the ordered probit model is as follows. Let *Y i* denote the category – paid employed (0 = *Y i*), self employed (1 = *Y i*), or full-time producer (2 = *Y i*) – to which household *i* belongs. The specification of the first-stage decision is that of an ordered probit. The ordered probit model allows for the possibility of sequential household choice of livelihood strategy following (Bellemare and Barrett, 2006).

The Ordered Probit regression estimates of the determinants of livelihood strategies among male and female sweetpotato producers are specified thus;

$Li = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7 ………. X_{10}) + e$ ………………… (4)

Where,
Li = Livelihood strategies (2= full time producer, 1=self-employed, 0=paid employed)
X_1= location (dummy variable; rural=0, urban= 1)
X_2= Distance to the farm (km)
X_3=Farm size (ha)
X_4= Output (kg)
X_5= Cost of Labour (N)
X_6= Cost of Fertilizer (N)
X_7= Age (years)
X_8= Experience (years)
X_9= Household size (number)
X_{10}= Gender (dummy variable, female=0, male=1)
e= error term

RESULTS AND DISCUSSION
Descriptive statistics were used to describe the socio economics characteristics of the respondents in Ebonyi State as shown in Table 1. The results showed the mean age of male and female farmers were about 30 and 40 years respectively. The male and female farmers had about 15 years of

experience, and household size of about 7 persons each. This implies that the respondents were still in the productive years of age, experienced with large household sizes.

Table 1: Socio Economics Characteristic of Male and Female Respondents

Variable Description	Female	Male
Age of the respondent	40.00	37.30
	(6.54)	(6.94)
farming experience	15.99	14.65
	(5.82)	(6.19)
Household size	7.09	7.10
	(2.25)	(2.45)
Distance from farm to market(km)	1.98	2.30
	(0.85)	(0.81)
Distance from house to farm(km)	1.48	1.94
	(0.66)	(1.87)
Distance from farm to urban centre(km)	2.83	4.39
	(1.60)	(4.04)
Distance from house to health centre(km)	2.36	2.99
	(0.95)	(1.36)
Distance from farm to water source(km)	1.14	1.19
	(0.33)	(0.61)
Dummy Variables (%)		
Location	93.75	95.00
Native of community	92.50	100.00
Married	100.00	100.00
Member of social organization	26.25	30.00
Access to communication facilities	100.00	92.50
Personal means of transportation	47.44	82.50
No access to credit	100.00	95.00
Access to electricity	71.25	75.00

Field Survey, 2014
Numbers in parentheses are std dev.

The travelling distance from farm to market for females and males were 1.98km and 2.30km and from house to farm were about 1.48km and 1.94 respectively. The distance from farm to nearest urban center for male (2.83km) and female (4.39), from house to urban center for male (2.36km) and female (2.99km). The distance from farm to water source was about 1.14km and 1.19 for males and females respectively. Majority of the male (95.00%) and female (93.75%) respondents were located in rural area, 100% and 92.50% for males and female farmers respectively were native of the community, and 75.00% (male) and 71.25% (female) had access to electricity. All (100%) were married, 95.00% (male) and 100.00% (female) had no access to credit. The males (82.50%) had more means of transportation than their female (47.44%) counterparts.

The results in Table 2 show the Ordered Probit Regression Estimates of the Determinants of Livelihood Strategies among the Sweetpotato Producers in Ebonyi State. The Chi^2 for male and female producers were highly significant at 1% level of probability indicating that the variables used were appropriate for the analysis. The results show that coefficient for location for male farmers was negatively signed and significant at 10% level of probability. This implies that male farmers located in the rural areas are more likely to be full time producers order than self-employed or paid employed. This is expected probably because of the availability of more land in the rural area than the urban centres. Coefficient of area of land cultivated for both male and female were positive and significant at 1% and 5% level of probability respectively. This implies that any

increase in farm size will lead to a corresponding increase in the probability of being a full time producer order than paid or self-employed. This is expected and in accordance with a priori expectation because the larger the farm size cultivated, the higher the interest, and choice of being a full time farmer.

Table 2: Ordered Probit Regression Estimates of the Determinants of Livelihood Strategies among Sweetpotato Producers in Ebonyi State

Variables	Parameter	Male	Female	Pooled
Cut1	b_o	1.9852	4.6108	-1.9114
		(0.15)	(1.38)	(1.17)
Cut2	b_1	2.9099	5.9064	0.5642
		(0.22)	(1.75)	(0.35)
Location	X_1	-2.2741	-1.1724	-1.0517
		(-1.69)*	(-1.37)	(-1.84*)
Distance from farm to market	X_2	-0.1738	-0.3460	0.0002
		(-0.21)	(-0.37)	(1.34)
Area of land cultivated	X_3	1.2287	0.3859	0.0032
		(2.73***)	(2.42**)	(2.85**)
Quantity harvested	X_4	0.0014	0.0002	-0.3173
		(2.60**)	(0.94)	(-1.35)
Labour	X_5	0.0002	-5.29×10^{-7}	-0.0145
		(0.81)	(-0.05)	(-1.42)
Fertilizer cost	X_6	-0.0013	0.0001	-0.1789
		(-1.23)	(1.28)	(-0.78)
Age	X_7	0.0316	0.1837	0.0099
		(-2.63**)	(2.81***)	(2.53**)
Experience	X_8	0.1302	0.1591	0.9731
		(0.52)	(1.87)*	(1.91*)
Household size	X_9	-0.0419	0.0234	0.2037
		(-0.14)	(3.10***)	(2.57**)
Gender	X_{10}			-0.1345
				(-2.40**)
Chi^2		7.91	10.71	79.15
Pro chi ^{2}		0.0431	0.0058	0.0000
Log likelihood		-22.2856	-4 3.0008	-61.3522

Source: Survey Data, 2014
*, ** and *** is significant at 10%, 5% and 1% level respectively

Coefficient of quantity harvested for males was positive and significant at 5% level of probability. This implies that any increase in quantity harvested will lead to a corresponding increase in the probability of being a full time producer order than paid or self-employed. This is expected and in accordance with a priori expectations because respondents tend to be committed towards what will yield them reasonable output. Coefficient of age was significant and negative for males but positive for females at 5% and 1% level of probability respectively. This implies that increase in age will lead to a corresponding decrease for males but increase in females with respect to the probability of being a full time producer order than paid or self-employed. This is against priori expectation probably because of rural- urban migration of young and able bodied male youths.

Coefficient of household size for females was positive and significant at 1% level of probability. This implies that any increase in household size will lead to a corresponding increase in the probability of being a full time producer order than paid or self-employed. This is expected and in accordance with a priori expectation indicating availability of family labour. Coefficient of gender

was negative and significant at 5% level of probability indicating that female farmers are more likely to be full time producers order than paid or self-employed. This is against a priori expectation probably because the rural areas are dominated by women order than men who tend to migrate more to the urban center in search of white collar jobs.

CONCLUSION

The study revealed that the determinants of livelihood strategies among male Sweetpotato producers were: location (rural), area of land cultivated, quantity harvested and age and for females were: area of land cultivated, age and household size. The results call for policies aimed at developing and encouraging rural farmers through provision of basic amenities to minimize rural urban migration. Policy should focus on ways to attract and encourage young men and women who are agile and stronger in farming. Land reform and re-distribution policies should be pursued by making more land available especially to the female sweetpotato farmers.

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