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DETERMINANTS OF DECISION TO ENGAGE IN MULTIPLE INCOME GENERATING ACTIVITIES AMONG MALE AND FEMALE HEADED CASSAVA BASED FARM HOUSEHOLDS IN UMUAHIA AGRICULTURAL ZONE, ABIA STATE

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Abstract
The study determined factors influencing decision to embark on multiple income generating activities by male and female headed cassava based farm households in Umuahia Agricultural Zone of Abia state. Data for this study was collected using a Purposive and multistage random sampling techniques for the selection of 144 cassava- based farm households (consisting of 72 male-headed and 72 female-headed). Primary data was elicited by use of a pre-tested and structured questionnaire. Data were analyzed with descriptive statistics and probit regression analytical model. The composition of total income from different income sources in male and female- headed cassava based farm households revealed that all male and female- headed cassava farm households earned income primarily from farming, which accounted for 48.07% and 56.69% of annual total incomes in male and female- headed cassava farm households respectively. Important factors that influenced decision to engage in multiple income generation activities by male and female headed farm households in the study area were age and annual profit. Household size, education, access to credit, and value of tangible income generating assets were important factors influencing decision to engage in multiple income generating activities among the male farmers and farm size and livestock number for the female farmer. The important constraints militating against farm income generation by male-headed and female-headed cassava farm households were; access to credit and inadequate power supply/ inadequate storage facilities. The results therefore call for policies aimed at upgrading technologies for agricultural production to further improve equity in distribution of income.

Keywords: Multiple Incomes generating activities, cassava based farm households and gender

Introduction

In many rural areas, agriculture (cassava production) alone cannot provide sufficient livelihood opportunities for male and female headed cassava based households hence there is a need for male and female headed cassava based households to embark on multiple income generating activities as a coping strategy to improve household livelihood and reduce poverty (Kamugisha *et al.*, 2004). Multiple income generating activities refer to those incomes earned by the farmer from non-farm income generating activities at different times of the year (Barrett *et al.*, 2001 and Carletto *et al.*, 2007). Multiple motives prompt male and female headed cassava based households to diversify assets, incomes, and activities. According to World Bank (2003), Lanjouw and Lanjouw (2001) and Meludu *et al* (1999) noted that male and female headed cassava based households globally embark in a variety of multiple activities to generate income. The engagement in multiple income generating activities is peculiar to rural farming communities of Africa. The major multiple income generating activities which the female headed cassava based households engaged in include; food processing, trading, mat weaving and pottery, basket weaving, food vending, hair plaiting, petty trading, tailoring and collection of forest products (Oladeji, 2007). Also, male headed cassava based households embark on multiple income generating activities such as blacksmithing, clothe weaving, carpentry, palm-tapping, welding, barbing, teaching, motor cycle (Okada) riding, brick layering, traditional medicine and transportation (Oladeji, *ibid*).

Agricultural productivity has been declining or has remained stagnant in many countries in sub-Saharan Africa Nigeria inclusive (IFAD, 2001). One of the greatest weaknesses of agriculture is low productivity which is mainly caused by other deficiencies in the

agricultural sector such as lack of finance for procuring inputs, limited access to support services such as extension, research findings, information on plant and animal protection services, un-reliable market and un-favorable weather condition leading the farmers to produce for subsistence. These unfavorable circumstances have compelled male and female headed cassava farmers to embark on multiple income generating activities as coping strategies to increase household income. The objective of the study was to analyze the Determinants of Decision to Engage in Multiple Income Generating Activities among Male and Female Headed Cassava Based Farm Households in Umuahia Agricultural Zone, Abia State.

Methodology

The study was conducted in Umuahia Agricultural Zone of Abia State, Nigeria. The zone lies between Latitudes 05^0 30'N and 05^0 40'North of the equator and longitudes 07^0 25'E and 07^0 32' East of the Greenwich Meridian and is made up of five Local Government Areas (LGAs) namely: Ikwuano, Isiala Ngwa North, Isiala Ngwa South, Umuahia North and Umuahia South. The zone has a land area of 2032.570square kilometers with a population of 563,380, out of which 271,194 or 48.0% are females and 292,186 or 52.0% are males (FRN, 2006). It has a relatively high population density of 277.176 persons per square kilometer. Its minimum and maximum temperatures are 20^{o}C and 32^{o}C respectively and its annual rainfall lies between 1700mm and 2000mm. The sampling technique involved the use of Purposive and multistage random sampling technique. In the first stage, three (3) LGAs were randomly selected from the five LGA's that make up the agricultural zone. The selected LGAs were Ikwuano, Isiala Ngwa South and Umuahia North. In the second stage, two autonomous communities were selected randomly from each of the three selected LGAs, making a total of six (6) autonomous communities. The selected communities were Ibere, Ariam, Ama-Asaa Nsulu, Ovungwu, Ibeku and Afara ukwu. This was followed by a random selection of two villages from each of the selected communities, making a total of 12 villages. From each village, a random selection of (6) male-headed cassava-based farm households and (6) female-headed cassava-based farm households was done using a list formulated with the help of natives. This gave 144 cassava- based farm households (consisting of 72 male-headed and 72 female-headed cassava-based farm households). Primary data was elicited by use of a pre-tested and structured questionnaire for the study. However, 140 respondents' questionnaire was found adequate for analysis.

Descriptive statistics such as frequencies, tables, means and percentages were used for data analyses and Probit regression model to estimate the determinants of decision to embark on multiple income generating activities.

Probit model is specified as follows:

$$Pi\ [y=1] = [Fzi] \quad (1)$$

Where,

$$Zi = \beta_o + \beta_1 X_1 + e \quad (2)$$

$$Yi = \beta 1 + \beta_2\ X_2 i + \ldots\ldots + \beta k\ Xki + N \quad (3)$$

Yi* is unobserved but yi = 0 if yi*< 0, 1 if yi* ≥ 0

P(yi = 1) = P (yi* ≥ 0)

$$P(yi \geq \beta_1 + \beta_2\ X_2 i + \ldots\ldots + \beta k\ Xki) \quad (4)$$

Where,

$$i = 1, 2, \ldots 144 \quad (5)$$

Where,

Y = decision to embark on multiple income generating activities (yes = 1, otherwise = 0), X_1= Age of head of household (years), X_2= Household labour available for activity (man-days), X_3= Education status (number of years spent in school), X_4= Primary Occupation (1 = Farming, 0= otherwise), X_5= land owned by household (hectare), X_6= Number of livestock, X_7= Annual net profit made from enterprise (Naira), X_8= Access to credit (Yes = 1, No = 0) , X_9= Value of tangible income-generating assets (Naira), ei = Error term.

Results and Discussion

Socio Economic Characteristics of Respondents

The Socio-economic profile of male-headed and female-headed cassava-based farm households in Umuahia Agriculture Zone is presented in Table 1.

The Table showed that the mean ages of male and female heads of cassava-based farm households were 54.09 and 46.42 years. This implied that both male and female heads of cassava-based farm households were within the national active productive work force age of 18 to 65 years and has the ability to withstand the rigors, strain and stress involved in cassava production (Onyenucheya and Ukoha, 2007). The average household sizes of male and female heads of cassava-based farm households were 5.47 and 4.38 persons respectively. This scenario was responsible for high levels of malnutrition, mortality, illiteracy, unemployment especially in the rural economy which led to a change in family emphasis (Ezeh, 2007). The results also showed that the mean years of farming experience for male and female-heads of cassava households were 19.35 and 12.56 years respectively. This implies that headship of both group of respondents were established and knowledgeable in

cassava production. The number of years spent in farming gives an indication of the practical knowledge acquired on how to overcome certain inherent problems in such farm enterprise (Okolo, 2007).

Annual Income Generation Sources

Table 2 showed the composition of annual total incomes and how much different income sources contribute to total income of male and female- headed cassava farm households in the study area. The table indicates that all male and female- headed cassava farm household's derived income from farming, which however, accounted for 48.07% and 56.69% of annual total income in male and female- headed cassava farm households respectively. Crop farming (primarily cassava), which mainly was subsistence in nature, was the most important single source of income for the respondents, providing about 26.36% and 32.70 % of total incomes in male and female-headed cassava farm households respectively. Despite the growing skepticism on the role of agriculture (cassava production) in reducing poverty among rural household, this result showed that, it remained the major source of income for rural households. Many (57.14 and 58.57%) of the male and female- headed cassava farm households derived income from livestock enterprises, but income from this source was only 8.9% and 11.35% of total incomes of male and female- headed cassava farm households respectively. This implies that they had small scale livestock kept extensively on free range. The other income (51.93% and 43.31% proportions for male-headed and female-headed cassava farm households respectively) sources were derived from different off-farm sources. Self-employed income was important in female-headed households as it accounts for 15.69% of total income. Self-employed income was mainly from handicrafts, food processing, shop-keeping and other local services, and trade in agricultural and non-agricultural goods. Similarly, a good number of male-headed farm households in the study area received income from off-farm sources with remittances as the most important. Male headed farm households received remittances from local and international sources which contributed only 12.86% of their total annual incomes. Given that a smaller proportion of the households received remittances made this source of income the least important for farmers in the study area. This was expected since many of the farmers are poor and do not have any of their household members in the diaspora to remit money. This is a reflection of vicious cycle of poverty. It would be risky for poor farmers to rely on this income source. Table 2 further revealed that 11.43% and 4.29% of the male and female-headed farm households respectively participated in non-agricultural wage activities. This source contributed only 5.55% and 6.86 % to total annual incomes of male-headed and female- headed cassava farm households respectively.

The non-agricultural wage employment includes; jobs in construction, manufacturing, education, health, commerce, administration, and other services. The low contribution of non-agricultural wage incomes to total annual income was based on account of low paying jobs secured outside the farms by the farmers and their household members. Another source of income to the households was supply of agricultural labour which accounted for 12.77% and 10.65% of total annual incomes of male and female headed cassava farm households respectively. This suggest a phenomenon by which landless farmers as opposed to land owing farmers, participated in supplying wage labour to farms which was common in the study area. The reasons for this included the need to earn additional cash income to meet urgent financial needs, reduce income risks and finance farm expansion (Babatude, 2010). Other income sources comprise of capital earnings and pensions which contributed 15.41% and 10.39% of total annual income of male and female headed cassava farm households respectively.

Considering the total incomes of households who participated in the various income activities, the results showed that the male and female-headed farm households who participated in crop production received the largest annual farm income. This indicated that crop production was the most remunerative activity in the area. This result is contrary to Babatunde, (2010) that self-employed activity is the most remunerative, and the productivity of family labour is highest in self-employed activities among farm households in Nigeria. However, because establishing self-employed business require initial investment, rural farm households that are disadvantaged in terms of initial startup financial capital are edged out from reaping potential benefit of self-employed activities.

Decision to engage in Multiple Income Generating Activities

The factors influencing decision to embark on multiple income generating activities by male-headed farm households in Umuahia Agricultural Zone of Abia State, Nigeria was estimated with probit regression model and estimates are shown in Table 3. Overall, the model predicted 64.03 percent of the sample correctly and posted a log likelihood value of -33.909097 and a goodness of fit chi-square value of 26.40 which was statistically significant at 1.0% level. The table showed that six out of ten explanatory variables significantly determined decision of male-

headed cassava farm households to embark on multiple income generating activities in the study area.

Specifically, the coefficient of age (-0.0088504) was negative and statistically significant at 90.0% confidence level. This implies that increase in age was disincentive for decision to embark on multiple income generating activities by male-headed farm households. The sign identity of this variable was in tandem with *a priori* expectation. Following the life-cycle hypothesis, young and energetic individuals, with ambition to earn higher incomes, are expected to be more active in livelihood diversification to accumulate wealth (Mpuga, 2008). Therefore, younger male-headed farm households tend to diversify their income sources while aged farmers inclined less embarking on multiple income generating activities. The life-cycle hypothesis predicts that the aged are likely to rely more on their past savings and accumulated wealth (dis-saving). Therefore, decision to embark on multiple income generating activities by male-headed farm households varied negatively with age. This is in contrast with Oluwatayo (2009) who found age to positively affect livelihood diversification in rural Nigeria.

The negative coefficient of educational level (-0.0212824) was significant at 10.0% risk level. This implies that an increase in the level of formal education of male-headed cassava farm households decreased decision to embark on multiple income generating activities. The implication of this is that respondents with formal education (especially those educated up to tertiary level) were engaged in better and well-paid salaried jobs than their counterparts with no formal education, hence they had lower likelihood of combining two or more jobs (multiple job holding). This is because education enhances the potential of household heads to explore available opportunities with little stress. The result agrees with (Onyebinama, 2004), who stated that the level of educational attainment of an entrepreneur is likely to affect the degree of his or her business acumen and ability to seize business opportunities. The coefficient of household size (0.0799025) was positive and significant at 5.0% alpha level. The implication is that the larger the household size in male-headed farm households, the more the likelihood to embark on multiple income generating activities. This result conforms to *a priori* expectation. This had implication on the provision of labour for both farm and off- farm work (Okolo, 2007). In the absence of well-functioning labor markets, larger household's face little labor bottlenecks at critical points (Ezeh *et al*, 2012). Similarly, the coefficient of access to credit (0.2275464) was positive and statistically significant at 10.0% level. The implication is that male-headed cassava farm households with access to credit facility had higher probability of diversifying their livelihood sources. This is in agreement with *a priori* expectation because inadequate capital had been a major problem confronting small-scale enterprises including farmers in Nigeria. Restricted access to credit facilities constitutes a constraint in purchase of raw materials and other enterprise inputs (DBSA, 2005; Anyiro and Oriaku, 2011).

The negative coefficient of annual net profit (-9.00e-07) was statistically significant at 10.0% level. This implies that an increase in annual net profit made from farm enterprise would lead to a corresponding decrease in decision of male-headed farm households to embark on multiple income generating activities. This result is in consonance with *a priori* expectations. The implication is that with increase in net profit realized from farm enterprise, the male-headed farm households were less inclined to embark on multiple income generating activities. The coefficient of value of tangible income-generating assets (1.75e-08) was positive and statistically significant at 5.0% level. This implies that increase in the value of tangible income-generating assets increased the likelihood to embark on multiple income generating activities by male-headed farm households. This result is in consonance with *a priori* expectation.

Factors influencing Decision to engage in Multiple Income Generating activities by Female-headed farm households

The probit regression estimates of factors influencing decision to embark on multiple income generating activities by female-headed farm households in Umuahia Agricultural Zone of Abia State, Nigeria are presented in Table 4. Overall, the model posted a log likelihood value of -32.819718 and a goodness of fit chi-square value of 29.33 which was statistically significant at 1.0% level. Four out of ten explanatory variables fitted to the model were statistically significant at given critical levels and these include; age, farm size, livestock number and annual net profit from farm enterprise. Specifically, the coefficient of age (-0.0284717) was negative and statistically significant at 5.0% level. This implies that an increase in age of female-headed farm households decreased their decision to engage in multiple income generating activities. The sign identity of this variable is in tandem with *a priori* expectation. The young and energetic individuals with ambition to earn higher incomes are expected to be more involved in livelihood diversification to accumulate wealth (Mpuga 2008). Therefore, aged female farm household heads are less inclined to embarking on multiple income generating activities and are likely to

rely more on farming, past savings and remittances from family and friends.

The coefficients of farm size (0.3129926) and number of livestock (0.0029276) were positive and significant at 5.0% and 10.0% level respectively. The implication is that the larger the farm size and number of livestock kept by female farm household's heads, the more their likelihood to embark on multiple income generating activities. However, this result is at variance with *a priori* expectations. It must not be unconnected with high input demands to keep the large enterprises going in face of dearth of credit in Nigeria. The negative coefficient of annual net profit (-4.70e-06) was statistically significant at 10.0% level. This implies that an increase in annual net profit made from farm enterprise would reduce the probability to embark on multiple income generating activities by female-headed farm households. This result is in consonance with *a priori* expectation. This depicts rational behavior of most farm household heads when their net profit realized from farm enterprise increase. Increase in net farm profit induces many to diversify income generating activities.

Constraints militating against Farm Income Generation

The constraints perceived by male and female-headed cassava farm households militating against their income diversification are shown in Table 5. The table showed that the main constraints militating against income diversification in male headed farm households were limited access to credit and inadequate power supply/ inadequate storage facilities indicated by 51.43% of the respondents. Constraints that militated against income diversification in female-headed farm households were limited access to land (52.86%) and limited access to credit (45.71%).

Another hindrance that militated against income diversification in both male and female- headed households was inadequacy of mechanized equipment indicated by 37.14% of male and female-headed farm households each. Other serious constraints for male headed farm households were limited access to land (47.14%), limited access to improved farm inputs (30.0%), limited access to extension services (34.29%) and inadequate reliable public transportation (27.14%). For the female-headed farm households, they were; inadequate power supply/inadequate storage facilities (30.0%), limited access to improved farm input (34.29%), limited access to extension services (21.43%) and inadequate reliable public transportation (18.57%). The implication of these results is that hindered access to credit and land were major constraints that militated against income diversification in both male and female- headed farm households. This supports the findings of Anyiro and Oriaku (2011), that inadequate access to credit was a problem confronting small scale farmers in Nigeria. It has also been established that in most rural areas, women's rights to land is still regarded as secondary to those of men and many customs suggest that women's access to land is still mediated via patrilineal systems (Aluko and Amidu, 2006).

Conclusion

The study analyzed the Determinants of Decision to Engage in Multiple Income Generating Activities among Male and Female Headed Cassava Based Farm Households in Umuahia Agricultural Zone, Abia State. Important factors that influenced decision to engage in multiple income generation activities by male and female headed farm households in the study area were age and annual profit. Household size, education, access to credit, and value of tangible income generating assets were important factors influencing decision to engage in multiple income generating activities among the male farmers and farm size and livestock number for the female farmer. The results therefore call for policy instruments to increase farm production and productivity, hence income from non-farm and off-farm employments. Likewise, government should make provision for physical infrastructure such as good roads, water and electricity to enhance employment opportunities in the off-farm sector, and this could lead to income growth among poor households' heads. Broad-based rural income growth would allow the poor and disadvantaged households to benefit from the structural change thereby reducing the level of income inequality among male headed and female-headed farm households in the area.

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Table 1: Distribution of Male-heads and Female-heads of Cassava-based Farm households by Socio-economic characteristics in Umuahia Agricultural Zone of Abia State, Nigeria

	Male-headed		Female-headed	
Variables	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Age (years)				
30-40	16	22.86	29	41.43
41-50	19	27.14	23	32.86
51-60	24	34.29	12	17.14
Above 60	11	15.71	6	8.57
Mean (years)	54.09		46.42	
Household size				
1-4	17	24.29	52	74.26
5-9	51	72.86	15	21.43
Above 9	2	2.86	3	4.29
Mean	5.47		4.38	
Farming experience (years)				
1-5	14	20.00	26	37.14
6-10	15	21.43	15	21.43
11-15	8	11.43	12	17.14
16-20	19	27.14	6	8.57
Above 20	14	20.00	11	15.71
Mean (years)	19.35		12.56	
Total	70	100.00	70	100.00

Source: ***Field survey 2018***

Table 2: Annual income from different sources among Male-headed and Female- headed farm households in Umuahia Agricultural Zone of Abia State, Nigeria

		Male-headed			Female-headed	
Income pattern	Income per capita (₦)	Share of total Income (%)	Participation rate (%)	Income per capita (₦)	Share of total Income (%)	Participation rate (%)
Total farm income	118,328.57	48.07	-	101156.81	56.69	-
Crop income	64888.57	26.36	75.71	58341.43	32.70	82.86
Livestock income	22011.43	8.94	57.14	23815.38	13.35	58.57
Agric wage income	31428.57	12.77	17.14	19000.00	10.65	14.29
Total off farm income	127,807.14	51.93	-	77269.9	43.31	-
Non-Agric wage income	13671.43	5.55	11.43	12244.9	6.86	4.29
Remittance	46928.57	19.07	12.86	18482.14	10.36	10.0
Self employed	29285.71	11.90	14.29	28000	15.69	7.14
Other income	37921.43	15.41	14.29	18542.86	10.39	21.43
Total household incomes	246,135.71	100	-	178,426.71	100	-

Source: field survey, 2018

Table 3: Binary Probit regression estimates of Factors influencing Decision to engage in multiple income generating activities by Male-headed Cassava farm households in the study area

Variable	Estimated coefficients	Standard errors	z-ratios
Age	-0.0088504*	0.0056294	-1.57
Household size	0.0799025**	0.0344497	2.28
Education	-0.0212824*	0.0120259	-1.76
Occupation	-0.0729871	.0721469	-1.01
Farm size	0.0393518	.0436153	0.90
Livestock number	0.0000225	0.0002065	0.11
Farming experience	-0.0358207	0.0239798	-1.49
Access to credit	0.2275464*	.1368466	1.65
Annual net profit	-9.00e-07*	5.02e-07	-1.82
value of tangible income-generating assets	1.75e-08**	8.26e-0	2.09
Constant	1.884651*	1.114019	1.69
Log likelihood:	-33.909097		
Cases predicted correctly (%):	64.03		
Pseudo R^2	0.2802		
Wald chi^2	26.40***		

Source: Field Survey, 2018.

***,**, * indicates that variables are significant at 1.0%, 5.0% and 10.0% risk levels, respectively

Table 4: Binary Probit regression estimates of factors influencing Decision to engage in Multiple income generating activities by Female headed Cassava farm households in in the study area

Variable	Estimated coefficients	Standard errors	z-ratios
Age	-0.028472**	.0136557	-2.08
Household size	0.0607817	0.0818603	0.74
Education	0.0204555	.0431318	0.48
Occupation	-0.1559245	0.2382198	-0.65
Farm size	0.3129926**	0.1541869	2.03
Livestock number	0.0029276*	0.0019327	1.51
Farming experience	-0.0120342	0.017806	-0.68
Access to credit	0.1535597	0.3020225	0.51
Annual net profit	-4.70e-06*	2.46e-06	-1.91
value of tangible income-generating assets	1.08e-08	2.47e-08	0.44
Constant	0.9540959	0.894008	1.07
Log likelihood:	-32.819718		
Pseudo R^2	0.3089		
Wald chi^2	29.33***		

Source: Field Survey, 2014.

***,**, * indicates that variables are significant at 1.0%, 5.0% and 10.0% risk levels, respectively

Table 5: Constraints Militating against Income Generation among Male-headed and Female-headed cassava farm households in the study area

	Male-Headed		Female-Headed	
Farm size (hectares)	Frequency*	Percentage	Frequency*	Percentage
limited access to farm credit	36	51.43	32	45.71
Limited access to extension services	24	34.29	15	21.43
Limited access to land	33	47.14	37	52.86
Inadequate access to mechanized equipment	26	37.14	26	37.14
limited access to improved farm inputs	21	30	24	34.29
Inadequate reliable public transportation	19	27.14	13	18.57
Culture and norms	14	20	25	35.71
Inadequate power supply/inadequate storage facilities	36	51.43	21	30.0

Source: *Field Survey, 2018* * Multiple responses recorded