Original Research Article

Gender Roles in Cassava Processing in Imo State, Nigeria

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Abstract

This study investigated gender roles in cassava processing in Imo State, Nigeria. Purposive and multi-stage random sampling techniques were used in the selection of male and female cassava farmers. A sample size of 240 respondents comprising of 120 male and 120 females were involved in this study. Instrument for data collection was a structured and pre-tested questionnaire. Descriptive statistics were used to analyze the data generated. Results indicate that most of processing operations including peeling, sieving, toasting, fermenting, cooking, pounding and wrapping were carried out mainly by women. Youths and men dominated grating and dewatering because they operated the machines used for these operations, while youths assumed prominence in washing of peeled roots, and played important part in sieving, toasting *garri* and pounding *fufu*. Gender gaps in cassava processing exist in the study area. In order to address these gaps, males in the state should be encouraged to be more involved in cassava processing through the mechanization of the entire process, while females should be encouraged, through provision of credit facilities, to own and access these processing machines.

Keywords: Men, Women, Youths, cassava processing, gender roles, socioeconomic characteristics

Introduction

Wide adoption of high-yielding cassava varieties, better disease management and value addition technologies have resulted in a sharp increase in cassava production, processing and consumption in Nigeria. The roots which are used for human consumption are processed into many food forms such as *garri*, *fufu*, tapioca and other products. The uses of cassava are expanding, as further processing can produce chips, pellets, flour, alcohol and starch (Adebayo, 2009).

Gender is not about sex; that is men or women, boys and girls play in the society. It refers to socially constructed role differences between men and women for the purpose of allocating power,

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duties, status, responsibilities and roles in any given social milieu or context (USAID, 2005). Gendered power relations permeate social institutions such that gender is never absent as it deals with the social relationships between men and women, and how these relationships are negotiated in the production of goods and services (Ironkwe *et al.,* 2007). Such gender relations exist in agricultural production where men and women have different roles, priorities, opportunities and constraints.

Studies reported by Nweke *et al*. (2001) and FAO (2007) showed that both men and women make significant contributions to the cassava industry in most of African countries. However, men and women are found to specialize in different tasks. The cassava value chain reflects gender roles for men and women in value addition activities (Nweke and Tollens, 2002).

There is insufficient disaggregated data on gender which could help in understanding gender differences in cassava processing. In addition, there is poor planning, monitoring and evaluation of development programmes targeted at different gender and social groups to increase productivity due to scarcity of necessary gender specific data (Ironkwe and Asumugha, 2007). Ukeje (2004) reported that the major constraint to effective recognition of women's actual roles and responsibilities in agriculture is the scarcity of gender disaggregated data for purposes of planning and policy making.

This inadequate data and statistics on gender roles has given rise to stereotype assumption on the contributions of men and women, and diverse groups in cassava processing. This consequently, has negatively influenced agricultural policies and programmes geared towards increased productivity. This paucity of empirical disaggregated data on gender necessitated this study on gender roles in cassava root processing by farmers in Imo state Nigeria.

Methodology

This study was carried out in Imo State in South Eastern Nigeria. The state lies within latitudes 4°45'N and 7°15'N of the Equator and longitudes 6°50'E and 7°25'E of the Greenish Meridian with an area of 5,100 sq km. (NPC, 2006). A purposive and multi-stage sampling technique was used in selecting two hundred and forty (240) cassava farmers consisting of 120 males and 120 females. Instrument for data collection was a structured and pre-tested questionnaire. The primary data gathered included socio-economic characteristics of respondents like age, education, marital status, household size, farm size, quantity of roots produced, farming experience and membership of cooperative societies, and gender roles in specific processing activities. Descriptive statistics were used to analyze the data generated from the study.

Results and Discussion

Socio-economic Characteristics of Cassava Processors in Imo State

The distribution of male and female cassava processors in Imo State according to their ages is presented in Table 1. It is evident from the table that majority of the males (69.0%) and of females

Table 1: Socioeconomic Characteristics of Cassava Processors in Imo State

	Male		Female	
Age (years)	**Frequency**	**Percent**	**Frequency**	**Percent**
<20	0	0	2	1.66
20-29	20	16.66	13	10.82
30-39	45	37.49	42	34.99
40-49	18	14.99	27	22.5
50-59	28	23.37	26	21.67
>60	9	7.49	10	8.36
Mean (years)	***40.63***		***41.29***	
Years in school				
0	4	3.35	6	5
1-6	40	33.33	28	23.34
7-12	43	35.83	45	37.51
13-16	29	24.17	26	21.67
≥17	4	3.32	15	12.48
Mean(years)	**10.26**		**11.45**	
Marital status				
Single	22	18.33	12	10.00
Married	89	74.17	92	76.67
Widowed	9	7.50	15	12.50
Separated	0	0.00	1	0.83
Household size				
1-3	3	2.5	6	5.0
4-6	48	40.0	42	35.0
7-9	51	42.5	50	41.67
10-12	14	11.67	18	15.0
13-15	4	3.33	4	3.33
Mean	**7.19**		**7.23**	
Farm size (ha)				
< 1ha	62	51.66	66	54.99
1-3 ha	48	39.98	45	37.52
>3 ha	10	8.36	9	7.49
Mean(ha)	**1.25**		**1.13**	
Qty of roots processed weekly (kg)				
0	32	26.67	7	5.83
1-500	83	69.17	105	87.5
500-1000	5	4.16	8	6.67
>1000	0	0.00	0	0.00
Mean(kg)	**146.58**		**182.50**	
Experience (Years)				
1-10	57	47.49	44	36.67
11-20	43	35.85	55	45.84
21-30	15	12.5	12	10.0
>30	5	4.16	9	7.49
Mean(years)	**13.89**		**15.43**	
Membership of Cooperative Societies				
Yes	24	20.00	22	18.33
No	96	80.00	98	81.67

Source: Field survey, 2017

(70.0%) were within the age range of 20 to 49 years. The mean ages of male and female respondents were 40.6 and 41.3 years respectively. This result indicated that cassava farmers and processors were mostly of middle age hence within the active and productive work segment of the population. Age is known to be a primary latent characteristic affecting agricultural production and processing. Being aged (>60 years) is known to reduce the ability of a farmer to bear risk, be innovative (Nwaru, 2004); and effectively withstand the rigours, strain and stress involved in agricultural production (Onyenucheya and Ukoha, 2007).

Most (97.0% of males and 95.5% of females) of the respondents were literate at various levels with only a small proportion (3.0% for males and 5.0% for females) having no formal education. Cassava processing can be restrained or improved by the overall level of education of individual members of the household. According to Okoye *et al* (2004), education has the capacity to influence people to accept new technologies and change their attitude to the desired technology. Higher level of education generates additional intellectual capital stock which may, in turn, lead to increased potential for skills acquisition during participation (Lapar *et al*., 2003). Moreover, the time taken to process and act on information decreases with education (Pingali *et al*., 2005).

Majority (74.0% males and 77.0% females) were married. The preponderance of the married people could create potential for increased labour supply which would contribute positively to cassava processing. Amadi *et al*. (2016) observed that the married class does have access to extra financial, moral and physical supports from their spouses that could go a long way to improve their production activities. Furthermore, Nze *et al*., (2017) reasoned that married women engaged themselves in cassava processing in order to utilize the different end products of cassava which can serve for both household and commercial uses.

The most (83.0% for male and 77.0% for female) frequent household sizes ranged from 4-9 persons. This is in agreement with the reports of other authors (Udensi *et al.*, 2011; Ezeibe *et al.*, 2015). The mean household size of 7 reported in this study suggests availability of family labour in the study area. The availability of substantial family labour may reduce the cost of labour, thereby improving the chances of increasing agricultural production. This is consistent with the report of Awoniyi *et al.* (2009).

Many of the respondents (52.0% males and 55.0% females) had farms whose sizes were less than one hectare. This is in agreement with the report of Onumadu and Onuoha (2015) who noted that the sizes of the land cultivated by majority of male and female farmers were in the range of 0.1 - 2.0ha. Moma *et al*. (2014) reported an average farm size of less than one hectare by women cassava farmers in Bityili in the south of Cameroon. Less than a hectare average farm size is a clear manifestation of the land tenure by inheritance which is prevalent in the study area. The fragmentation of land into small sizes for sharing to family members makes it difficult for an average farmer in the study area to operate on a large scale basis. Ugwumba *et al*. (2010) revealed that small sizes of farms amongst smallholders in south Eastern Nigeria call for some form of land integration policy.

Average quantities of cassava roots processed weekly by male and female respondents were 147.0kg and 183.0kg respectively. More males (27.0%) than females (6.0%) did not process their roots implying that they sold off their roots for cash while women processed probably to feed their families. It appears that the major aim of women producing cassava was to feed their families. This finding and conclusion are corroborated by the report by Butterworth *et al*. (2008).

A sizable proportion (48.0%) of males had between 1 and 10 years of experience, while a similar proportion (46.0%) of females had between 11 and 20 years of experience in cassava production and processing. Though female respondents had slightly more mean farming and processing experience (15.0 years) compared to males (14.0 years), both groups of respondents were established and knowledgeable in cassava production and processing. Farming and processing experience affects farm and processing managerial know-how and decision-making. Khanna (2001) also noted that higher farming experience attainable through increased years of farming leads to higher rates of adoption of new agricultural innovations.

Distribution of respondents according to their membership of cooperative societies showed that only 20.0% male and 18.0% female respondents belonged to cooperative societies, indicating that majority of the respondents did not. This finding is consistent with the report of Onyemauwa (2012) which showed that about 72.0% of the respondents do not belong to, and take part in, cooperative activities. Incidentally, most agricultural technologies are provided to farmers who belong to, and take part in cooperative activities. Their non-participation in cooperative activities will likely constrain their processing activities (EATA, 2012; FAO, 2012; Tahirou *et al*., 2015).

Gender Roles in Cassava Processing

The distribution of respondents according to their indication of who performs what role in cassava processing is presented in Table 2. Generally, women dominated most processing operations with youths and men playing complimentary roles especially where heavy strength is needed. This finding is in accord with the report of many other authors (Butterworth *et al*., 2008; Chinaka *et al*., 2011; Ezeibe *et al*., 2015). Moreover, Aminu *et al*. (2017) found women to be technically more efficient in processing than men.

An analysis of specific processing operations show that both male and female respondents indicated that peeling was carried out mostly by women (50.0% by males, 52.5% by females) and youths (31.0% by males, 40.0% by females) with men (6.0% by males, 3.0% by females) playing a negligible role. This finding is consistent with other reports (Butterworth *et al*., 2008; Taiwo and Fasoyiro, 2015; Aminu *et al.*, 2017). Peeling, which is usually the first operation in cassava processing, is time-consuming and laborious. Men lack the patience to do such work. Aminu *et al*. (2017) added that peeling represents the most labour-intensive unit of operation of the cassava value chain, is non-mechanized, and traditionally represents a critical stage in terms of food safety as the process removes the outer periderm of the root, where the highest concentrations of cyanogenic compounds lie. Youths assume prominence in washing of peeled roots as indicated by 62.0% of male respondents and 58.0% of female respondents. Next to youths in this role are

women as indicated by 32.0% of male and 51.0% of female respondents. Men hardly partook in washing peeled roots as indicated by less than 5.0% of both male and female respondents.

Grating of peeled cassava roots was carried out by mainly youths, and men to a lesser extent as indicated by both male and female respondents. This finding is consistent with those of Ogunleye *et al*, (2008) and Mgbakor and Nwamba (2013). Youths and men operated the grating machines as this was perhaps considered too complex, heavy and risky for women. Taiwo and Fasoyiro (2015) reports that peeled roots are grated by women using traditional tools. In the area covered in this present study, grating has become fully mechanized and these grating machines are operated mostly by youths and men thus freeing women from this traditional role. This is consistent with the report by Ugwu and Ay (1992) that when machines are used for activities such as grating, pressing and milling, men often own the equipment and operate them with the help of youths thus suggesting that gender roles in processing begins to change as processing becomes more mechanized. Forsythe *et al*. (2016) reported that men were also involved in operating the equipment at processing centers, which meant that women's processing activities would sometimes be delayed if men were not available to operate the equipment.

Men and youths were also the main operators of the pressing or dewatering machines in the study area. However while male respondents indicated that youths (48.0%) were the major operators of the dewatering devices in the study area, female respondents gave it to men (43.0%). This is consistent with a similar finding by Ogunleye *et al*. (2008). Taiwo and Fasoyiro (2015) reported that traditional pressing and dewatering using stones or jacked wood platforms were carried out by women but that dewatering using hydraulic press was usually done by men who dominate the management of processing machines.

Sieving which serves to break up compressed mash of grated roots and remove un-grated fragments and fibres was carried out mostly by women and youths while men played a negligible role (Table 2). Majority of male respondents (50.0%) gave it to youth while majority of female respondents indicated that women played the dominant part in sieving. Both male and female respondents were in agreement that women played pivotal role in the toasting (frying) of dewatered and sieved cassava mash into *garri*. This finding is in agreement with other reports (Ogunleye *et al*., 2008; Fasoyiro, 2012; Taiwo and Fasoyiro, 2015) Youths also play a significant part in toasting grated cassava roots to produce *garri*.

Fermenting operation as indicated by both groups of respondents was carried out mostly by women and, to a lesser extent, youths with men playing negligible roles (Table 2). Perhaps men considered this operation petty and not strength-exerting hence they left it for women and youths. Cassava processed into *garri* undergoes solid state fermentation for about 3 days while *fufu* is a product of submerged fermentation in which whole roots or pieces of peeled roots are placed in water for 3-5 days. Fermentation process either by solid or submerged fermentation reduces the cyanide content of cassava (Imeh and Odibo, 2013).

Table 2: Distribution of male and female respondents according to gender roles in processing

Gender Roles	Male		Female	
Peeling	***Frequency**	**Percent**	***Frequency**	**Percent**
Men	7	5.83	4	3.34
Women	60	49.99	63	52.5
Youths	37	30.83	48	40
All	41	36.16	44	36.67
Washing				
Men	5	4.16	4	3.34
Women	38	31.67	61	50.84
Youths	74	61.66	69	57.5
All	28	23.33	26	21.67
Grating				
Men	40	33.33	44	36.67
Women	23	19.17	28	23.34
Youths	65	54.17	55	45.84
All	25	20.83	25	20.83
Pressing				
Men	53	44.16	51	42.5
Women	14	11.66	22	18.34
Youths	57	47.49	43	35.84
All	22	18.33	30	25
Sieving				
Men	5	4.16	1	0.83
Women	56	46.67	71	59.17
Youths	60	50	60	50
All	24	20	24	20
Toasting				
Men	7	5.83	2	1.66
Women	78	65	90	75
Youths	53	44.16	43	35.83
All	17	14.17	22	18.33
Fermenting/Soaking				
Men	7	5.83	4	3.34
Women	96	79.99	99	82.51
Youths	27	22.49	25	20.84
All	14	11.67	17	14.17

*Source: Field Survey, 2017; Males: 120, Females: 120, *Multiple responses,*

Distribution of respondents according to their indication of who cooked, pounded or wrapped food is presented in Figures 1, 2 and 3 respectively. Women dominated these activities as these were within their traditionally assigned roles going by the culture of the people in the study area. However the role of youths in pounding was significant perhaps due to the strong physical exertion

involved. The dominant role of women in cooking and related activities have also been previously reported (Taiwo and Fasoyiro, 2015)

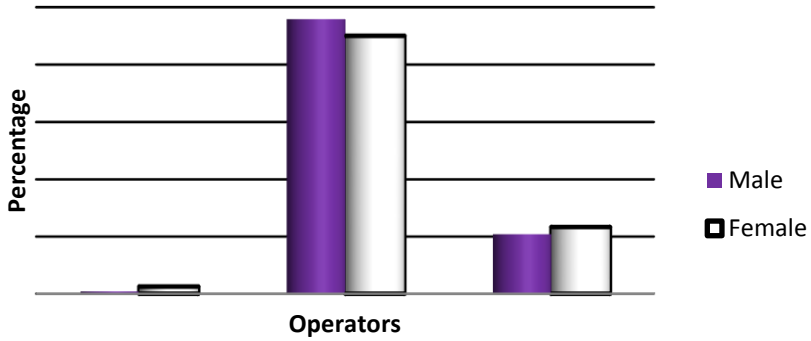

Fig 1: Distribution of Respondents According to who does the Cooking

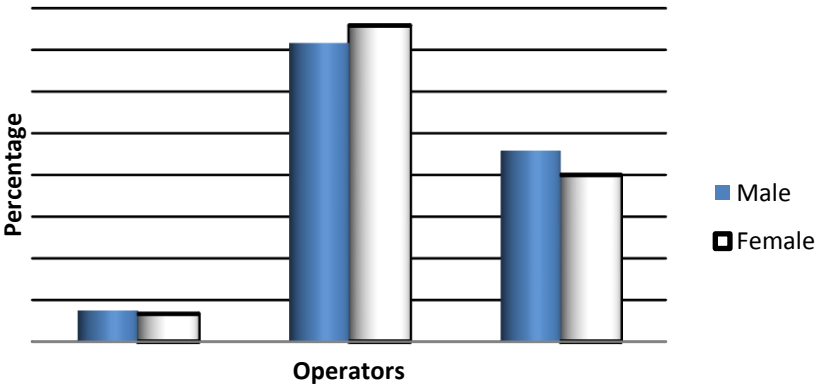

Fig 2: Distribution of Respondents According to who pounds Fufu

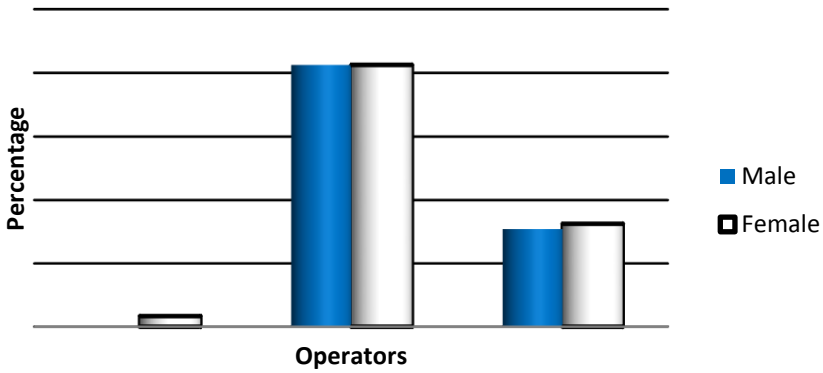

Fig 3: Distribution of Respondents According to who Wraps Fufu

Conclusion and Recommendations

This study investigated the gender roles in cassava processing among farmers in Imo State, Nigeria. Purposive and multi-stage sampling techniques were used in the selection of 240 respondents comprising of 120 males and 120 females involved in this study. Instrument for data collection was a structured and pre-tested questionnaire. Descriptive statistics were used to analyze the data generated from the study. Men, women and youths played complementary roles in various operations involved in cassava processing. Women dominated most processing operations except mechanized grating and dewatering.

Gender gaps in cassava processing exist in the study area. In order to address these gaps, males in the state should be encouraged to be more involved in cassava processing through the mechanization of the entire process while at the same time females should be encouraged through provision of credit facilities to own and access these processing machines.

References

Adebayo, K. (2009). Dynamics of technology adoption in rural-based cassava processing enterprises in South-West, Nigeria. *International Journal of Agricultural Economics and Rural Development* 2(1): 15-25.

Amadi, G., Ibezim, G.M. and Ezeh, C.I. (2016). Adoption of cassava value -added products among female and male farmers in Imo State, Nigeria. Nwachukwu, I.N., Amadi, C.O., Ewuziem, J.E., Okoye, B.C., Afuape, S.O., Agwu, N.M. and Oteh, O.U. (eds). *Economic Diversification: The Agriculture Road Map.* Proceedings of the 50th Annual Conference of the Agricultural Society of Nigeria held

at the National Root Crops Research Institute, Umudike Abia State Nigeria 3rd – 7th October, 2016. Pp 356-360.

Aminu, F.O., Rosulu, H.O., Toku, A.S.O., Dinyo, O.B. and Akhigbe, E.C. (2017). Technical efficiency in value addition to cassava: A case of cassava-*garri* processing in Lagos State, Nigeria. *Journal of Agriculture and Sustainability* 10(1): 97-115.

Awoniyi, O.A., Awoyinka, Y.A. and Kehinde, A.L. (2009). Effect of the Presidential Initiative on Cassava and household food security status in Iwo zone of Osun State Agricultural Development Programme. In: *African Crop Science Conference Proceedings* 9:755 – 760.

Butterworth, R., Abdulsalam-Sagir, P and Adrienne, M.S. (2008). *Nigeria Gender and Diversity Report*. C,AVA PROJECT 48pp FUAAB and NRI University of Greenwich

Chinaka, E.C., Okoye, B.C., Akinpelu, A.O., Ezebuiro, N.C., Obasi, M.N. and Oti, E. (2011). Gender roles among cassava processors in Anambra State, *A Journal of Agricultural Extension* 7 (2): 51-56

Chukwu, A.O. and Nwaiwu, J.C. (2012). Evaluation of gender participation in palm oil processing in Ohaji Egbema Local Government Area of Imo State. *International Journal of Agriculture and Rural Development* 15(2): 204 – 207

Ethiopian Agricultural Transformation Agency (EATA) (2012) *Agricultural Cooperatives Sector Development Strategy 2012-2016, 2012*, Available from: <http://www.ata.gov.et/news/resources/sector-strategies/> [03 April 2018].

Ezeibe, A.B., Edafiogho, D.O., Okonkwo, N.A. and Okide, C.C. (2015). Gender differences and challenges in cassava production and processing in Abia State. *African Journal of Agricultural Research* 10(2): 2259-2266.

Ezeigbo, H. I. (1990).Towards efficient water resources management in Nigeria. *Water Resources* 2(1): 40 – 42.

Fasoyiro, S.B. (2012). Locally processed street-vended foods in Nigeria: how safe? *International Journal of Food Safety and Engineering* 2:381-391.

Food and Agriculture Organization, (FAO) (2007) FAO database: Crop production. Retrieved on 19 July 2007 from http://www.faostat.fao.org

Food and Agriculture Organization, (FAO) (2012) Agricultural cooperatives: paving the way for food security and rural development, *Food and Agriculture Organization of the United Nations, Rome*.

Forsythe, L., Posthumus, H. and Martin, A. (2016) A crop of one's own? Women's experiences of cassava commercialization in Nigeria and Malawi. *Journal of Gender, Agriculture and Food Security* 1 (2): 110-128

Imeh, S.O. and Odibo, F.J.C. (2013). Production of high protein and low cyanide wet fufu mesh using starter culture. *International Journal of Applied Sciences and Engineering*, 2:48-51.

Ironkwe A.G. and Asumugha, G.N. (2007). Gender role in cassava production in Enugu State. *Proceedings of the 41st conference of the Agricultural society of Nigeria* Samaru pp. 606-609.

Ironkwe, A.G., Ekwe, L.C., Mbanaso, E.O., Asumugha, G.N. and Okoye, B.C. (2007). Gender roles and constraints in cassava production and processing in Akwa-Ibom State South-east agro ecological zone of Nigeria. *NRCRI, Annual Report, 2007*. Pp. 261-266.

Ironkwe, A.G., Ekwe, K.C., Mbanaso, E.O., Asumugha, G.N. and Okoye B.C. (2008).Gender roles and constraints in cassava production and processing in Abia State. *NRCRI Annual Report, 2008*. Pp. 260-265.

Khanna, M. (2001). Non-mandatory Approaches to Environmental Protection. *Journal of Economic Surveys* 15(3): 291-324.

Lapar, M.L., Holloway, G. and Ehui, S. (2003). Policy options promoting market participation among small-holder livestock producers: A case study from Philippines. *Food Policy* 28:187-211

Mgbakor, M. and Nwamba, H.O. (2013). The role of women in cassava production in Awgu L.G.A, of Enugu State, Nigeria. *American-Eurasian Journal of Agronomy* 6 (1): 19-24

Moma, C., Mfoumou, C., Zibi, M. and Lebailly, P. (2014). Opportunities and challenges of women cassava producers in Bityili (South-Cameroon) and the implications for gender roles. *Fifth International Scientific Agricultural Symposium "Agrosym 2014*"Original scientific paper 10.7251/AGSY14041092M 1092-1099

National Population commission NPC, (2006). *National Population Census*, Federal Republic of Nigeria official gazette, 94(4) Lagos, Nigeria.

Nwaru, J.C. (2004). Rural credit market and resource use in arable crop production in Imo state of Nigeria .PhD Dissertation, Michael Okpara University of Agriculture, Umudike, Nigeria.

Nweke, F.I. and Tollens, E. (2002). Contributions of men and women to food crop production labour in Africa: Information from COSCA. *Outlook on Agriculture*. 31(4): 259-265.

Nweke, F.I., Spencer, D.S.C. and Lynam, K. (2001). *The Cassava Transformation: Africa's Best Kept Secret*. Michigan State University press, East Lansing, Michigan. 115pp

Nze, E.O., Nzeakor, F.C. and Enyinna, G.C. (2017). Analysis of women's participation in cassava production and processing in Owerri Zone of Imo State. *Nigeria. Journal of Community and Communication Research* 2(2):169-176

Ogunleye, K.Y., Adeola R.G. and Ibigbami, I.O. (2008) Gender roles in cassava processing activities among processors in Ogo-Oluwa Local Government Area of Oyo State. *International Journal of Agricultural Economics and Rural Development* 1(1): 30-38

Okoye, B.C., Okorji, E.C. and Asumugha, G.N. (2004).Outlook on production economics of paddy rice under resource constraints in Ebonyi State. *Proceedings of the 38th Annual Conference of the Agricultural Society of Nigeria (ASN)*, 17- 21 Oct. 2004, Lafia, Nasarawa State, pp. 337-342.

Onumadu, F.N. and Onuoha L.U. (2015) An Analysis of the Difference in Gender Level of Cassava Production and Access to Land in Abia State, Nigeria. *International Journal of Scientific and Technology Research* 4 (3) 16-20

Onyemauwa, C.S. (2012). Analysis of Women Participation in Cassava Production and Processing in Imo State, South-east Nigeria. *Journal of Economics and Sustainable Development* 3 (5): 81-90.

Onyenucheya, F. and Ukoha, O.O. (2007). Loan Repayment and Credit Worthiness of Farmers under the Nigerian Agricultural Cooperative and Rural Development Bank, Abia state. *Agricultural Journal* 2(2): 265-270

Pingali, P., Khwaja, Y. and Meijer, M. (2005).*Commercializing Small Farms: Reducing Transaction Costs*. ESA Working paper No 05-08 Agricultural and Development Economics Division, FAO. http://www.fao.org/es/esa

Tahirou, A.,Bamire, A.S., Oparinde, A. and Akinola, A.A. (2015). Determinants of adoption of improved cassava varieties among farming households in Oyo, Benue, and Akwa Ibom States of Nigeria. *HarvestPlus Working Paper* No 20, October 2015.

Taiwo, K.A. and Fasoyiro, S.B. (2015). Women and cassava processing in Nigeria. *International Journal of Development Research* 5(2): 3513-3517

Udensi, U., Tarawali, G., Favour, E. U., Asumugha, G., Ezedinma, C., Okoye, B.C., Okarter, C., Ilona, P., Okechukwu, R. and Dixon, A. (2011). Adoption of selected improved cassava varieties among smallholder farmers in South-Eastern Nigeria. *Journal of Food, Agriculture and Environment* 9(1):329-335

Ugwu, B.O. and Ay, P. (1992). Seasonality of cassava processing in Africa and test of hypotheses. In: Gregory J. Scott (ed.). *Desarrollo de productos de raices y tuberculos*. International Potato Centre, Lima, Peru.

Ugwumba, C.O.A., Okoh, R.N., Ike. P.C., Nnabuife, E.L.C. and Orji, E.C. (2010). Integrated farming system and its effect on farm cash income in Awka South Agricultural zone of Anambra State, Nigeria. *American-Eurasian Journal of Agriculture and Environmental Science* 8(1): 01-06.

Ukeji, E. (2004). Modernizing small Holder Agriculture to ensure food security and Gender Empowerment: Issue and policy https://www.g24.org/wp-content/ uploads/2016/01/Modernizing-Small-Holder-Agriculture-to-Ensure-Food-Security.pdf Downloaded August 3rd, 2018

United States Aid for International Development (USAID) (2005). Gender assessment for USAID Nigeria, Dev. Tech. System, Inc. Washington Dc.