GENDER DIFFERENTIALS IN LABOUR SOURCE AND UTILIZATION AMONG RURAL RICE FARMERS IN ENUGU STATE, NIGERIA

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Abstract
In the light of the need to continue to supply food to the ever-growing Nigerian population which anchors on human labour productivity, this study analysed gender differentials in labour utilization and productivity among rice farmers in Enugu State, Nigeria. Data were collected through a multi-stage sampling technique and analyzed using descriptive and inferential statistics such as frequencies, percentages, means, standard deviation, Z-test and multiple regression. The result showed that a combination of family labour and hired sources contributed most of the labour supplied for rice production for female (71.6%) and male (88.3%) rice farmers in the area. It is evident from the result that male rice farmers were more productive than their female counterparts. Labour utilization of the male farmers was positively influenced by distance, farm size, land ownership, credit and education, and for female farmers; was positively influenced by distance, farm size, age, and credit and negative by household size and extension. Also labour productivity of the male farmers was positively influenced by distance, farm size, age and credit and negative by land ownership, while labour productivity of the female farmers was positively influenced by distance, farm size, age and credit and negative by land ownership. The study therefore recommends that farmers utilize their family labour efficiently in order to reduce the hired labour, thereby, leading to a decrease in the cost of rice production and increase in farm revenue. Also government and stakeholders should assist farmers through timely and adequate input supply and access to more land, creating effective services (especially credit) and enabling environment, for efficient utilization of agricultural inputs on farms, which will lead to enhanced productivity among the rice farmers.

Keywords: Land, credit, labour productivity, labour utilization, male, female

Introduction
Human labour is one of the major sources of labour available to small-holder farmers in Nigeria. Small-holder farmers contribute over 85% of domestic agricultural output in Nigeria (Obike *et al*., 2017). Thus, there is need to continue to supply food to the ever-growing population which anchors on human labour productivity. Olukunle (2013) noted that hired labour contribute 88% of the total labour-use on farms, thus emphased its importance in agricultural activities. Other types of human labour that could be employed are family labour and exchange labour. Again, the seasonal relationship between the periodical changes in labour cost reduction, use patterns and different labour operations meant to be timely performed exert a limit to the proportion of household labour that can be depended upon (Obike *et al*., 2017).

Gender is a concept used in social science analysis to look at the role and activities of men, women and youths (Ogunniyi *et al*., 2002). Doku (1990) distinguished sex and gender with the definition that sex is a statistics and biological attribute based on natural characteristics and reproductive role, while gender is a dynamic, social construction that describes feminine and masculine behavior. The word gender means more than sex. It is culturally ascribed as a role performed by either of the sexes. The issue of gender as a process by which individuals are born into biological categories of female and male. This could become the social categories of women and men through the acquisition of locally defined attributes of femininity and masculinity.

Rice is the most strategic food crop in West Africa because of its contribution to food security of the population and its impact on the economy of households and countries (FAO, 2013). However, continued fluctuation in rice production in the country is an indication of limited capacity of the Nigeria rice economy to match the domestic demand which can be

attributed to the inability of the rice farmers to obtain maximum output from the resources committed to the enterprise (Kolawole, 2010). The majority of the rice producing countries in Africa attained yield below the world average (4.3mt) from 2008 to 2014. Some of the pivotal factors for the low yield are inadequate extension services, poor management practices, and structural obstacles (Abdul-Gafar *et al.,* 2017).

The focus on gender analysis of rice farmers is not biological differences between men and women involved in rice farming, but rather on their experiences and expectations as rice farmers. Gender roles give us insight into the issues affecting women and it is focused mainly in the relationship of both men and women into the social and economic structure of a society (Simonyan *et al*., 2011). Gender analysis focuses on the different roles and responsibilities of women and men and how these affect society, culture, the economy and politics. Explicitly, gender analysis focuses on the relations between men and women (Spieldoch, 2007). Men and women play different roles within particular systems of agricultural production, and thus occupy different socioeconomic positions as a result of these roles (Carr, 2008). Gender analysis is a tool to better understand the realities of women and men, girls and boys. It aims to uncover the dynamics of gender differences across a variety of issues. These, principally include gender issues with respect to activities (gender division of labour), access to and control over resources, and those factors that influence gender division of labour and gender differences in access to and control over resources. This is done in order to identify the developmental needs of women and men (GDRC, 2002).

In South East Nigeria, with particular reference to Enugu State, labour is a major constraint in rice production and according to Oluyole *et al*., (2007) the availability of labour has been found to have impact on planting precision, better weed control, timely harvesting and crop processing. Furthermore, various studies on farm labour supply and use confirm that human labour on the farm is not homogenous and job contents differ. Men and women make a significant contribution to rice production and to the processing in terms of labour contribution (Rahman *et al*., 2004). Yet rural rice farmers in Enugu State have been facing various socio-economic obstacles in terms of labour source and utilization, this study therefore examined gender based differentials of Labour source and utilization by rural rice farmers in Enugu State, Nigeria.

Methodology
The study area is Enugu State, Nigeria. The State comprises seventeen (17) Local Government Areas (LGA). The state lies between latitudes 5^0 56'and 7^0 05'N of equator and longitudes 6^0 53' E and 7^0 55'E of Greenwich meridian. According to NPC (2006), the population of Enugu State is about 3,257, 298 people with population growth rate of 3.05% per year, currently estimates as 4 826 582. Multi-stage sampling technique was adopted for this study. At the first stage, two

Agricultural Zones out of six were purposively selected because of the existence of rice production in these zones. These zones are Enugu and Nsukka Agricultural Zones. In the second stage, one LGA was purposively selected from each of the selected Zones based on the intensity of rice production. The LGAs selected were Uzo-Uwani in Nsukka and Isi-Uzo in Enugu Agricultural Zone, giving a total of 2 LGAs. In the third stage, three communities were randomly selected from each of the LGAs giving a sample of 6 communities. The communities selected were Adani, Ojo, Ogurugu in Uzo-Uwani LGA, while the communities selected in Isi-uzo LGA were Mbu, Umualor, Eha Amufu. In the fourth stage 2 villages were randomly selected from each community; giving a sample of 12 villages (the villages selected in Uzo-Uwani were Ajuona, Akutala, Amudala, Umueze, Onu, Odida; while for Isi-uzo the villages visited were Abbia, Ihanyi, Ikem, Isienu, Obegu, Odomogwo). In the last stage, list of rice farmers in the selected 12 villages was compiled with the help of enumerators who are natives of the villages, from this list 10 rice farmers (comprising 5 male and five females) were selected from each village, giving a sample size of 120 rice farmers for the study. Data for this study were collected from primary sources.

Model specification
Labour Productivity
Labour Productivity $= \dfrac{\text{Total farm output}}{\text{labour use (man days)}}$ ......(1)

This was estimated separately for both male and female rice farmers.
Z-test

$$Z_{cal} = \frac{Y_1 - Y_2}{\sqrt{\dfrac{S_1^2}{n_1} + \dfrac{S_2^2}{n_2}}} \quad \text{...... (2)}$$

Where,
Y_1 = Mean labour utilization of male farmers
Y_2 = Mean labour utilization of female farmers
S_1^2 = Standard error of labour utilization (male farmers)
S_2^2 = Standard error of labour utilization (female farmers)
n_1 = number of selected male farmers
n_2 = number of selected female farmers
$n_1 + n_2 - 2$ degree of freedom

Multiple regression model for Determinants of labour utilization among rice farmer;

$Y = f(X_1, X_2, X_3, X_4, X_5, X_6 X_7, X_8, X_9) + e$ .....(3)

Where,
Y = Amount of labour used (man days) by male and female rice farmers each
X_1 = Distance to the farm (km)
X_2 = Farming experience (years)
X_3 = Farm size (hectare)
X_4 = Age of farmers (years)
X_5 = Household size (Numbers)
X_6 = Land ownership (1=Yes; 0= No)
X_7 = Credit access (Naira)

X_8 = Extension contact (Number of visits)
X_9 = Education (No of years in school)
e = error term
These were estimated separately for both male and female rice farmers.

Results and Discussion

The results on Table 1 indicate that a combination of family and hired sources contributed most of the labour supplied for rice production for female (71.6%) and male (88.3%) rice farmers in the area. This is a clear indication that agricultural production in the study area is very much of crude technology. The challenges of low technology application in production are low efficiency and income (Nmadu and Akinola, 2015).

From Table 2, it could be observed that majority of labour are applied in harvesting of rice by both male and female rice farmers; with females accounting for 65 person per man-day for harvesting, while male accounted for 64 labour hands per man-day for harvesting operation; this could be attributed to the stress and volume of output per unit hectare of land owned by each rice farmer in Enugu State. The result also shows that family, hired and communal labour were used in almost every farm operation, this is so because of the trend of rice farming in Enugu state, as the demand for locally produced rice is on the increase in the State; farmers hence employed different sources of labour to increase production per hectare of land. A number of studies (Dayo *et al*., 2008; Fakayode *et al*., 2008; Ebong *et al*., 2009) have attributed the low rate of agricultural production to low rate of technologies adoption and dependence on indigenous knowledge as well as labour from friends. There is need, therefore, for improved strategies to address this situation. According to Onyenweaku and Nwaru (2005), efficient utilization of productive resources such as human labour is a way of increasing output and productivity of farmers. Furthermore, from the result, it can be observed that the male rice farmers were more involved in strenuous activities such as land clearing, ploughing, fertilizer application and planting; this may be because rice farmers in the study area believe that these farm activities involve hard tasks which can mostly be handled by men. This might also be because of the general belief that women are weak in nature and are not as strong as men, therefore, cannot efficiently carry out most of these farm operations. Females tend to engaged themselves more in rice processing activities such as threshing winnowing, bagging and most times weeding. On the whole, both men and women play complementary roles in rice production activities in Enugu State, Nigeria.

The results in Table 3 show the Z-test analyses to estimate for significant difference between labour utilization (kg/man-day) of male and female rice farmers. The result shows a significant difference between the two groups of farmers in the area. The Z-value of 1.746 was significant at 10% level of probability and positively signed. This implies that labour utilization of male farmers was significantly higher than their female counterparts in the area. We therefore conclude there is a difference between the labour utilization by male and female rice farmers in Enugu State, Nigeria. The result shows that the mean labour utilization were 59.33 and 51.12 man-days for male and female respectively, while the mean difference in labour utilization between male and female was 8.23 man-days. This implies that labour utilization of male farmers was higher than their female counterparts in the area.

Multiple regression results on determinants of labour utilization by male rice farmers is presented in Table 4. The double log functional form was chosen as the lead equation. The choice of the lead equation was based on the number of significant variables, magnitude of the coefficient of multiple determination (R^2), conformity of signs borne by the variables to *a priori* expectation and significant F-ratio. The coefficient of multiple determination (R^2) was 0.91 which implies that 91% of amount of labour utilization was explained by the explanatory variables included in the model. Labour utilization of the male farmers was positively influenced by distance (X_1), farm size (X_3), land ownership (X_6), credit (X_7) and education (X_9) which implies that increase in any of these variables will increase labour utilization by male rice farmers in the area. The coefficient of distance and farm size (X_3) were significant at 10% and 1% respectively and positively related to labour utilization, this implies that an increase in distance and farm size, led to increase in labour utilized for farm operation by male rice farmers in the area. These results are generally in line with expectation and are similar to other studies such as Oluyole and Lawal (2010) and Echebiri and Mbanasor (2003). Land ownership was significant at 5% and positively related to labour utilization, the implication is that as more land is owned by the male rice farmers in the area, the more they utilize labour for rice farming operations. Thus, secure ownership increases incentives to undertake productivity-enhancing land-related investments. Land tenure security results in higher levels of labour and management effort, which in turn encourage higher levels of investment in enhancing land fertility (IFAD, 2008). Credit used was significant at 1% and positively related to labour utilization, the implication is that a unit increase in credit acquired by the rice farmers, leads to more labour utilization. This corroborates with a prior expectation. According to Onyenweaku and Nwaru (2005), efficient utilization of productive resources such as credit is a way of increasing the number of labour force engaged in the farm and thus increasing productivity. Furthermore, education was significant at 5% and positively signed. The implication of this result is that increase in the level of education will increase labour use. Education affects labour productivity through a choice of better inputs and output, and through a better utilization of existing inputs. Amaza *et al*. (2006) noted that adoption of agricultural innovations is also easier and faster among the educated farmers than the uneducated and thus, moves them closer to the frontier output.

Multiple regression estimates of determinants of labour utilization by female rice farmers are presented in Table 5. The linear functional form was chosen as the lead equation. The choice of the lead equation was based on the number of significant variables and the conformity of signs borne by the variables to *a priori* expectation and significant F-ratio. The coefficient of multiple determination (R^2) was 0.612 for female, which implies that 61.2% of amount labour utilization was explained by the explanatory variables included in the model. F-ratio (8.758) was significant at 1%; this implies goodness of fit of the regression. Labour utilization of the female farmers was positively influenced by distance (X_1), farm size (X_3), age, (X_4) and credit (X_7) which implies that increase in any of these variables will increase labour utilization by female rice farmers in the area. Also Labour utilization of the female farmers was negatively influenced by household size (X_5) and extension (X_8). The coefficient of distance was statistically significant at 1% and positively related to labour utilization, this implies that an increase in distance, increase the number of labour utilized for farm operation; this result is in line with a priori expectation. The result is generally in line and similar to other studies such as Oluyole and Lawal (2010) and Echebiri and Mbanasor (2003). The coefficient of farm size (X_3) was significant at 1% and positively related to labour utilization; this implies that an increase in farm size will lead to an increase in labour utilization by female rice farmers in the area. The coefficient of age was significant at 5% and positively related to labour utilization. This implies that labour utilization increases as the female rice farmer advances in age. The implication is that, the availability of able-bodied manpower for primary production will increase as age advances. Oluyole *et al*. (2013) suggested that those involved in farm labour supply are in the prime age of strength and vigour that is required to perform many of the rice farming operations. Also, the coefficient of credit was significant at 5% and positively signed. The implication of this result is that increase in the amount of credit given to the female farmers, will lead to increase in labour use; this is true because access to credit affects labour use through a choice of better inputs and output. Also, better utilization of existing inputs and adoption of agricultural innovations is also easier and faster among the farmers who have credit than their counterparts without credit and thus, moves them closer to the frontier output as a result of increase in labour use (Amaza *et al*., 2006). The coefficient of household size and extension were significant at 10% and 5% respectively, this implies that increase in household size decrease the number of labour hired for farm operation. The implication is that household size will provide the farmer with family labour, reduce cost of production and increase their revenue. Adegbite and Oluwalana (2004) reported that a relatively large household size may likely enhance family labour utilization on farm. The implication of extension according to Ukoha *et al*. (2013) is that better education through improved extension service would lead to improved access to knowledge, farm technologies, and farm tools etc. which have strong influence on labour use.

Conclusion

The study shows that labour utilization among male farmers was significantly higher than their female farmers in the area in the area. Distance, farm size, land ownership, credit and education were important variables influencing labour utilization among the male farmers**.** Labour utilization among the female farmers is influenced by distance, farm size age, credit, household size and extension. The study therefore, recommends the need for farmers to utilize both family and hired labour efficiently in order to reduce the cost of rice production and increase farm revenue. Government policy should emphasize measures that promote men and women farmers' access to agricultural resources (especially land and labour) and services at affordable rate. Also there is need to have regulatory policies in place that will ensure that farm labour wage rate does not affect the quantity of production.

Table 1: Sources of Farm Labour for Rice Production in the study area

	Female		Male	
Sources of farm labour	**Frequency**	**%**	**Frequency**	**%**
Family only	22	36.67	31	51.67
Hired only	17	28.33	19	31.67
Friends only	5	8.33	9	15.00
Mechanized only	19	31.67	21	35.00
Communal only	11	18.33	15	25.00
Family + hired	43	71.67	53	88.33
Family + friends	38	63.33	52	86.67
Family + mechanized	14	23.33	18	30.00
Family + communal	16	26.67	15	25.00
Family + hired + friends	39	65.00	49	81.67
Family + hired + mechanized	14	23.33	18	30.00
Family + hired + friend + mechanized	11	18.33	14	23.33
Hired + mechanized	5	8.33	11	18.33

Source: Field Survey (2021)

Table 2: Utilization of farm labour for rice production in the study area

Farming Practice	Female(man-day)					Male (man-day)				
	Family	Hired	Friends	Comm.	N*	Family	Hired	Friends	Comm	N*
Land clearing	3	18	0	19	40	14	7	4	0	25
Ploughing	13	28	0	11	52	25	13	2	0	40
Planting	16	14	0	11	41	18	11	5	0	34
Fertilizer application	11	14	0	8	33	19	9	0	8	36
Weeding	18	0	0	0	18	12	12	0	0	24
Harvesting	18	18	17	12	65	22	14	19	9	64
Threshing	14	6	3	11	34	4	16	17	8	45
Winnowing	9	6	0	3	18	11	5	4	0	20
Bagging	22	5	18	4	49	18	5	0	0	23

*Source: Field Survey (2020.   N = Total Number. * Multiple responses*

Table 3: Z-test for labour utilization differences between male and female rice farmers

Variables	Mean	Std. Deviation	Std. Error Mean	Z-value
Labour Utilization (Male) man-days	59.33	32.85	4.24	1.746*
Labour Utilization (Female) man-days	51.12	11.56	1.49	
Differences	8.22	36.46	4.71	

*Source: field survey (2020) * Significant at 10%*

Table 4: Regression estimates of determinants of labour utilization among male rice farmers

Variables	Linear	Exponential	Double log+	Semi log
Intercept	-8.520	2.382	-5.243	-264.066
	(-0.921)	(9.227)***	(-8.651)***	(-7.122)***
Distance (X_1)	0.775	0.021	0.072	4.460
	(2.222)**	(2.121)**	(1.723)*	(1.736)*
Experience (X_2)	0.358	0.006	0.023	2.668
	(1.396)	(0.800)	(0.726)	(1.360)
Farm size (X_3)	3.421	0.079	0.219	14.870
	(3.588)***	(2.968)***	(2.978)***	(3.306)***
Age (X_4)	0.242	0.004	0.059	7.225
	(2.421)**	(1.280)	(0.968)	(1.946)*
Household size (X_5)	-0.247	0.000	-0.028	-2.742
	(-1.153)	(-0.070)	(-0.613)	(-1.515)
Land ownership (X_6)	3.864	0.116	0.074	2.046
	(2.166)**	(2.337)**	(2.551)**	(1.154)
Credit (X_7)	0.001	1.573E-5	0.783	24.828
	(7.942)***	(6.840)***	(13.777)***	(7.141)***
Extension (X_8)	-0.841	-0.027	-0.027	-1.368
	(-.1.223)	(-1.414)	(-1.016)	(-.852)
Education (X_9)	0.429	0.022	0.070	-0.214
	(1.304)	(2.433)**	(2.574)**	(-0.129)
R^2	0.811	0.733	0.910	0.813
R^{-2}	0.777	0.685	0.894	0.778
F-ratio	28.820***	15.288***	55.132***	23.614***

*Source: Field survey (2020), + = lead equation, *** Significant at 1%, ** Significant at 5%, *significant at 10%, Figures in parenthesis are t-ratios*

Table 5: Regression estimates of determinants of labour utilization among female rice farmers

Variables	Linear+	Exponential	Double log	Semi log
Intercept	-13.675	2.416	-5.727	-295.230
	(-0.848)	(5.569)***	(-9.358)***	(-7.904)***
Distance (X_1)	1.336	0.036	0.121	7.356
	(2.743)***	(2.752)***	(1.659)	(1.648)
Experience (X_2)	0.412	0.008	0.054	4.987
	(1.119)	(0.785)	(0.930)	(1.408)
Farm size (X_3)	7.231	0.173	0.261	18.298
	(6.200)***	(5.498)***	(2.898)***	(3.335)***
Age (X_4)	0.331	0.006	0.065	7.509
	(2.322)**	(1.590)	(1.056)	(2.006)*
Household size (X_5)	-0.536	-0.009	-0.018	-2.775
	(-1.767)*	(-1.094)	(-0.607)	(-1.538)
Land ownership (X_6)	2.609	0.074	0.073	1.973
	(1.021)	(1.075)	(2.530)**	(1.115)**
Credit (X_7)	0.000	3.807E-6	0.791	25.190
	(2.257)**	(0.820)	(14.173)***	(7.397)***
Extension (X_8)	-2.049	-0.060	-0.027	-1.435
	(-2.145)**	(-2.320)	(-1.039)	(-0.893)
Education (X_9)	-0.290	0.001	0.072	-0.139
	(-0.641)	(0.83)	(2.619)**	(-0.083)
R^2	0.612	0.491	0.893	0.813
R^{-2}	0.542	0.399	0.797	0.779
F-ratio	8.758***	5.357***	54.950***	23.655***

*Source: Field survey (2020), + lead equation, *** Significant at 1%, ** Significant at 5%, *significant at 10%, Figures in parenthesis are t ratios*

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