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FARM LABOUR SUPPLY AND UTILIZATION FOR FOOD CROP PRODUCTION IN NIGERIA

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Abstract

This study examined the factors that affect farm labour supply and utilisation for food crop production in Niger state, Nigeria. The data were collected from 180 participants of Fadama II in Katcha and Agaie LGAs and analysed using descriptive statistics and 2sls regression model. The result shows that majority of the farm labour suppliers were within the ideal age distribution in the rural society of Africa and that family and hired labour are major source of the farm labour supply in the study area. Result from the 2SLS analysis confirm that variables such as income, migrated farm labour supplier, agro-chemical, household size, wage rate, farm size, and gender were statistically significant. However the level of farm/family income, high wage rate, age composition of family, lack of timely/adequate supply of labour and, aging of farm labour suppliers were identified as important constraints affecting farm labour supply and utilisation for food crop production. It is recommended that regulation of farm wage rate should be pursued in order to ensure that farm operations are carried in time at optimum cost.

Keywords: Farm labour suppliers, wage rate, Niger State, Fadama II, 2sls.

1 INTRODUCTION

In Nigeria, farm labour is a major source of employment opportunity for the rural labour force and technological change is one of the major forces leading to change in employment, output and functional income distribution. In recent years, the introduction and distribution of technologies such as farm power and machinery, improved planting materials and production of chemical fertilizers have brought about substantial increase in agricultural productivity in Nigeria (Olayide, 2002). According to Adeoti (2002), although the growth rate in the agricultural sector in Nigeria increased from an average of about 7% in the mid-2000, the food security in Nigeria has continued to decline. Therefore programs such as Farm Settlement Schemes (FSM) in 1959, the River Basin Development Authority (RBDA) in 1973, the National Accelerated Food Production Program (NAFPP) in 1973, the Agricultural Development Project (ADP) in 1975, Operation Feed the Nation (OFN) in 1976, Green Revolution (GR) in 1983, Directorate of Food, Road and Rural Infrastructure (DFRRI) in 1986, the Agricultural Credit Guarantee Scheme Fund (ACGSF) in 1977, and National Agricultural Land Development Authority (NALDA) in 1993 were all aimed at promoting and diversifying agricultural production in the country (Ayoola and Azever,2010). In spite of all these programs and policies, farmers in Niger State still engage in subsistence agriculture i.e. providing food for their family and little for sales. A survey of the farmers in the state by the Ministry of Agriculture showed that 80% of the farmers are small, 13% are medium farm holders and 7% are large scale farm holder (Nmadu and Peter, 2010).

Labour plays important economic and social roles in any economy. It is one of the key factors of production as well as a source of livelihood to billions of people worldwide (Schneider, 2005). Nigeria's agricultural production is highly labour intensive. Over 90% of non-mechanized production systems depend on human labour, and for mechanized production systems, between 50 and 60% of the tasks depend on human labour (Olayide, 2002; Shaib et al., 1997). Family labour constitutes over 76% of farm labour and human labour is about the only form of farm labour available to farmers and farmers contribute over 80% of total domestic agricultural output, it therefore means that, human labour accounts for domestic food supplies in Niger State

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and Nigeria in general (Shaib *et al.,* 1997). At present there is no indication that farming will be mechanized in Niger State and most other States in Northern Nigeria in the nearest future. Therefore, the hope to continue to supply the food need of the ever growing population anchors very auspiciously on human labour productivity.

In Nigeria, labour is a major constraint in food crop production (Gocowski and Oduwole, 2003). The availability of labour has been found to have impact on planting precision, better weed control, timely harvesting and crop processing (Oluyole *et al.*, 2007). The various studies on farm labour supply and use confirm that human labour on the farm is not homogenous and job contents differ. For instance, King (1992) found that in general, men performed heavy preparation such as land preparation while women and children performed lighter operations such as planting, fertilizer application and weeding. The study also confirmed that separate wage rates are obtained for these labour categories. Several problems are associated with agriculture and over the years agricultural production has drastically reduced (Ogundari and Ojo, 2006). The importance of food crop and agricultural production to the world requires the efforts of farm labour suppliers. The efforts, as observed from some researchers were apparently hindered due to some factors such as Migration, Wage rate, farm income, age composition, barrier to adoption of technology and effect of diseases on farm labour suppliers. According to Tanko *et al.*, (2006), Nigeria's food deficient situation has been worsened by declining farm productivity owing to inefficient production techniques, poor resource base and insufficient farm labour supply among others, labour has been found to constitute a large proportion of cost in the food crop production process in Nigeria and its productivity has become increasingly low because farm households largely comprised fairly old people and very young children coupled with the use of crude implements which impede their ability to raise yield of food crops and income with subsequent reduction in poverty level. Therefore given the relevance of labour to agricultural production in developing countries such as Nigeria, this study is designed to provide answers to the following research questions:

i. What are the socio-economic characteristics of the farm labour suppliers and demanders?

ii. What are the different sources of farm labour supply available in the study area and how are they utilised?

iii. What are the factors that affect the supply of farm labour for food crop production?

iv. What are the constraints faced by farmers in ensuring adequate farm labour supply for food crop production?

In view of the above, the broad objective of this study is to determine the factors affecting farm labour supply for food crop production in Niger State. The specific objectives are to:

i. describe the socio-economic characteristics of farm labour suppliers and demanders,

ii. describe the different sources of farm labour supply available in the study area and how they are utilized,

iii. determine the factors that affect the supply off-farm labour for food crop production and,

iv. describe the various constraints faced by farmers and suppliers farm labour supply for food crop production.

Given the importance of farm labour supply in the production of food crop and agricultural production, studies are generally required to provide information that could guide the prospective food crop farmers on those effects and factors that are likely to affect the supply of labour use on the farm. Unavailability of technology and decreasing availability of an energetic population who could cope with the task of farm operations has reduced agricultural and food crop production (Qio and Datom, 2000).An alternative suggestion was to introduce labour intensive technology that required an increase in farm labour supply (Francis, 2011). The cost of purchased inputs in capital intensive technology could be replaced by family labour by providing farmers with the potential for more profit while at the same time protecting the environment (Tegegne *et al.*, 2001). This research will serve as a guide to policy makers in Niger State. It will sharpen policy focus with a view to improving the livelihood of the farm labour suppliers by dealing with those factors affecting farm labour supply for food crop production. A study of this nature will add to the existing body of knowledge.

2 METHODOLOGY

The study was conducted in Niger State of Nigeria which lies between latitude 8o and 11o20'N and longitudes 4o30' and 7o40'E (Niger State, 2007). The State is bounded by Kaduna State and FCT to north-east and south-east respectively; Zamfara State to the north, Kebbi State to the north-west, Kogi State to the south and Kwara State to the south-west, the Republic of Benin to the north-west. It has a land area of

74,244km2, which is about 10% of the total land area and about 85% of the arable land (Niger State GIS, 2007). The population has been projected to be about 5,060,286 in 2013 at growth rate of 3.42% (United Nations Fund for Population Activities, 2010). Niger state possesses fertile land as a cherished asset and the potentials are yet to be fully explored. The state experiences distinct dry and wet seasons with annual rain fall varying from 1.100mm in the northern part to 1,600mm in the southern parts. The maximum temperature (usually not more than 94oC) is recorded between March and June, while the minimum is usually between December and January. The rainy seasons last for about 150 days in the northern parts to about 120 days in the southern parts of the state. Generally, the fertile soil and hydrology of the state permit the cultivation of most Nigeria's staple crops and still allows sufficient opportunities for grazing, fresh water fishing and forestry development (Niger State, 2007- 2013).

The sampling frame for the study are the farm labour suppliers among the Second National Fadama Development Programme (Fadama II) participants which according to Nwachukwu and Onyenweaku (2008) operated in 11 Local Government Areas (LGAs) out of the 25 in the state. About 186 Fadama Community Associations (FCAs) with registered 2,058 Fadama Users Groups (FUGs) and membership strength of 26,068 composed of 17,462 males (67%) and 8,606 females (33%) participated in the programme. The LGAs involved were classified into rural and urban and then one urban (i.e. Agaie) and one rural (i.e. Katcha) LGAs that are contiguous to one another were purposively selected. The second stage involved a random selection of five FUGs from each of the LGAs selected and then the random selection of 18 farm labour suppliers from each of the FUGs, thus, making a total of 180 respondents. From the socio economic perspective, the involvement of the above target population in job creation, poverty eradication and increased rural economic development (African Development Bank, 2010) is a very good platform for this study. The FUGs selected are Taimako WMCS, Egba ce ekotu WMPS, Farin kasa CMPS, Lafarma Women CMPS, Etsu Kudu Farmers CMPS from Agaie and, Edotsu Groundnut Farmers, Kashe Rice Farmers, Yebosoko Support Group II, Yebosoko Support Group I, Kashe Coop.& Credit Marketing from Katcha.

The data for this study were collected through primary source. The primary data were collected by the use of structured interview schedules to elicit information from the respondents on farm size, labour use and effect of labour supply in productivity. The data collected were analysed using descriptive statistics like frequencies, percentages, means and tables; and two stage least square (2SLS) regression model. The model is implicitly expressed in equation 1.

$$Y = F (X1, X2, X3, X4…X14) \qquad (1)$$

$$X7 = F (Y, X1, ..X6, X8…X14)$$

Where Y = the vector of dependent variable and it represents the amount of labour (man-days) used for food crop production by the supplier

The independent of the exogenous variable of the structural model include

X1 = age of the farm labour suppliers in years

X2 = household size of the farm labour suppliers (numbers)

X3 = wage rate of farm labour in NGN /man-day

X4= non-farm income generated from other income generating activities (NGN)

X5 =farm size of the farm labour supplier in ha

X6 = gender (if male =1, 0 otherwise)

X7 = farm income generated from agricultural production (NGN)

X8 = level of education (number of years spent on formal education)

X9 = numbers of family members working on the farm that migrated out of the community to other locations

X10= health Status (numbers of days the farmer was absent from the farm due to illness)

X11= amount of cash spent on purchase of seeds for planting on the suppliers farm (NGN)

X12= amount spent on agro chemicals for farm production by supplier (NGN)

X13= other farm capital and equity invested on the suppliers' farm ventures (NGN)

X14= amount spent on purchase of fertilizers (NGN)

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3 RESULTS AND DISCUSSION

The socio-economic characteristics of the respondents are presented on Table 1 while Table 2 is a presentation of the various sources of farm labour supplied for crop production in the study area. Table 3 presents the utilisation of the labour supplied for various farm operations by the demanders in the study area while Table 4 presents the parameter estimates of the factors affecting labour supply in the study area and finally, Table 5 shows the various constraint faced by farm labour suppliers and demanders in the study area.

The result on Table 1 shows that farm labour suppliers are married males (70.6%) and had a mean age of 47 years which falls within an ideal age distribution in the rural societies of Africa (World Bank, 1996) for supply of farm labour. The results is similar to a number of findings (e.g. Ojo et al., 2013; Oluyole et al., 2013)and suggest that those involved in farm labour supply are in the prime age of strength and vigour that is required to perform many of the farm operations. Although majority (65.6%) of them had acquired formal education, the family size of 15 suggest that most of the respondents have large family. The implication of this is in two folds: first it enables the farm suppliers to have surplus labour which is supplied to others even at peak periods of demands and secondly, it enables the suppliers to have enough supplies of labour to adjust to any situation on the farm especially when there is failure in planting or there is excessive weeds on the farm to remove e.g. Oluyole et al., (2013). The mean farm income of NGN331255 suggests that most of the respondents in this survey are not poor based on USD2/day i.e. NGN124,100.00 (Nmadu et al., 2013) hence there involvement in farm labour supply might be for other reasons than shortage of income. However, the distribution of income and their differentials in other factor endowments are key variables that is likely to influence the amount of farm labour put into the marketplace e.g. Bedemo et al., (2013). The mean farm size of 4.75ha shows that there is likely to be a lot of idle labour as each family member is expected to work only 0.32ha per annum.

The results on Table 2 indicate that a combination of family and hired sources contributed most of the labour supplied for crop production. This is a clear indication that agricultural production in the study area is very much of very crude technology. The challenges of low technology application in production are low efficiency and income. And this is confirmed by the utilisation of the labour supplied as shown in Table 3 although it could be observed that almost all the communal labour are applied to ridging. This is an understandable situation, since land clearing, preparation and planting is done within a very short time which may lead to overstretching of available family and hired labour, then the demanders utilised communal labour which is a form of cooperative supply and it is benefited in turn. A number of studies FAO (2004); Dayo et al., (2008); Fakayode et al., (2008), Ebong et al., (2009) have attributed the low rates of agricultural production to low rates of technologies adoption and dependence on indigenous knowledge. There is need, therefore, for improved strategies to address this situation. Combinations of farm enterprises with the aim of increasing the level of efficiency of farm resources and making efficient use of resources already committed to the food sub-sector was advocated by (Tanko et al., 2006). Stabilization policies to help reduce inflation and ensure that subsidies in the form of cheap credit get to the intended target were suggested by Okoye,(2006) to assist farmers in acquiring inputs. According to Onyenweaku and Nwaru (2005), efficient utilization of productive resources is a way of increasing productivity.

With a rank of 30, the result of the estimates of the 2SLS on Table 4 shows that while crop output is influenced by three factors, namely non-farm income (X5), migrated family (X9) and agrochemical (X12); six factors influenced labour supply/utilisation i.e. household size (X2), wage rate (X3), non-farm Income (X4), farm size (X5), gender (X6), agro-chemical (X12). These results are generally in line with expectation and are similar to other studies including Innocent and Victoria (2011), Lele and Stone (1989), Oluyole and Lawal (2010), McNally (2002), Babikir and Babiker (2007), Oluyole and Lawal (2010) and, Echebiri and Mbanasor (2003) except the issue of those family members that have migrated. The estimate is an indication that those who migrated are very important to subsistence food production and income for the family. The negative sign on the estimates for the agrochemicals implies that increase in agro-chemical decreases the amount of labour used for the operations which are supplemented by the agrochemicals which is contrary to the findings by Francis (2011) and Gould and Saupe (1989). These results have clearly shown that the assumed factors did not influence labour supply and utilisation as expected. In that case, there is need to initiate further study to perfectly understand the labour supply market in developing economies like Nigeria.

The results on Table 5 shows that the most serious constraints faced by farm labour suppliers and demanders are level of farm/family income, high wage rate, age composition of family, lack of timely/adequate supply of labour and, aging of farm labour suppliers. High family income will enable the family to engage more hired labour thus ensuring that farm operations are carried out in time but the

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opposite will mean that the family might miss farm operations target and that means low income and family welfare. High wage rate reduces the quantity of labour the demanders can purchase while it increases the quantity of labour in the marketplace. From the estimates of the 2sls, the wage rate is a positive function of labour supply and utilisation, which confirms that it is a serious threat to sustainable food crop production in the community. There is need for a policy that will regulate the wage rate just like the regulatory restraints put on public sector wages by the Salary and Wages Commission. The age composition for now seems to be in favour of high labour supply because the majority are in the age of strength, however, other constraints like the wage rate has made this a constraint. All these constraints will affect timely and adequate supply of labour for farm operations. In order to ensure increases in food production to feed the ever increasing population which is 3.2% per annum, there is need to pursue a policy of wage regulation and technology improvement, particularly, the improvement of tillage technology that will ensure less reliance on human labour for farm operations.

Table 1 Socio-economic characteristics of the respondents

Characteristic	Frequency	(%)	Mean
Age			
21 -30	11	6.1	
31 -40	47	26.1	
41-50	62	34.4	
51 – 60	44	24.4	
Above 60	16	8.9	47
Sex			
Female	53	29.4	
Male	127	70.6	
Marital status			
Single	1	0.6	
Married	172	95.6	
Widow	6	3.3	
Divorce	1	0.6	
Household size			
01-05	4	2.2	
06-10	26	14.4	
11-15	79	43.9	
16-20	45	25	
Above 20	26	14.4	15
Educational level (number of years spent in formal education)			
Non – formal	62	34.4	
Primary	32	17.8	
Secondary	40	22.2	
Tertiary	26	14.4	
Adult education	20	11.1	7
Farm income(₦)			
1-200000	1	0.6	
200001-40000	56	31.1	
400001-600000	51	28.3	
600001-80000	19	10.6	
800001-1000000	7	3.9	331.255.56
Farm size (Ha)			
0.01-1.00	81	45	
1.01-2.00	69	38.3	
2.01-3.00	16	8.9	
3.01-4.00	5	2.8	
Greater than 4.00	9	5	4.75

Source: field survey, 2013

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Table 2 Different sources of farm labour supply

Source of labour	Frequency	%
Family only	12	6.7
Hired only	10	5.6
Friends only	0	0
Mechanized only	2	1.1
Communal only	0	0
Family + hired	70	38.9
Family + friends	4	2.2
Family + mechanized	14	7.8
Family + communal	1	1.0
Family + hired + friends	11	6.1
Family + hired + mechanized	38	21.1
Family + hired + friend + mechanized	3	1.7
Hired + mechanized	`5	8.3

Source: Field survey, 2013

Table 3 Labour utilization for different farm operations

OPERATION	Family (man-day)	Hired (man-day)	Friends (man-day)	Communal (man/day)
Land clearing	1586	1139	66	7035
Ploughing	35	79	3	0
Ridging	991	1513	61	30031
Planting	1360	909	46	6
First fertilizer application	1153	478	34	0
Second fertilizer application	1005	324	30	5
Staking of yam	166	97	1	0
First weeding	1320	1718	51	35
Second weeding	1210	1170	45	0
Third weeding	402	137	5	0
Harvesting	1440	1712	55	6
Processing	154	131	3	5
Threshing	909	1134	59	0
Winnowing	800	301	22	5
Bagging	796	498	21	10
Transportation	0	0	0	0

Source: field survey, 2013

Table 4 Two stage least square (2SLS) estimates on crop output and labour input

Variable	crop output	labour input	Marginal effects	elasticity
Constant	-13565.006 (61448.35)	36.642 (17.394)		
Total labour (Y)	220.691 (259.9)		220.691	0.06
Age (X_1)	293.087 (1118.193)	0.088 (0.32)	293.087	0.051
Household size (X_2)	532.106 (2271.5)	3.159*** (0.607)	532.106	0.029
Wage rate (X_3)	-0.709 (1.116)	0.001*** (0.0003)	-0.709	-0.033
Non-farm Income (X_4)	.795*** (0.06)	.0.000017*** (0.0000241)	.795***	0.695
Farm size (X_5)	2190.95 (5277.921)	3.289*** (1.943)	2190.95	0.029
Gender (X_6)	1254.041 (25662.34)	13.611** (7.282)	1254.04	0.003
Farm income/Crop output (X_7)		0.0000153 (0.0000213)		

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Education (X$_8$)	1115.556 (2366.023)	-0.238 (0.678)	1115.56	0.027
Migrated Family (X$_9$)	-7526.569** (6095.376)	0.012 (1.754)	-7526.569**	-0.053
Health status (X$_{10}$)	3233.122 (4028.992)	0.769 (1.155)	3233.12	-0.0003
Seed (X$_{11}$)	-0.105 (1.705)	0.0003 (0.00049)	-0.105	-0.105
Agro-chemical (X$_{12}$)	9.302* (5.476)	-0.023* (0.002)	9.302*	0.067
Capital and equity investment (X$_{13}$)	11.965 (7.493)	0.003 (0.002)	11.965	0.104
Fertilizer (X$_{14}$)	-21.168 (48.506)	-0.009 (0.014)	-21.168	-0.024
AIC	6641.8738			
BIC	6737.6625			
rank	30			

*Note: values in parenthesis are standard errors while *P<.1 **P<.05 and ***P<.01*

Source: Field survey 2013

Table 5 Constraints to farm labour supply for food crop production in Niger State

Constraints	Never	Rarely	Sometime	Often	Always	Rank
Migration to town	11(6.1)	19(10.6)	89(54.4)	23(12.8)	29(16.1)	6
High wage rate	4 (2.2)	23(12.8)	69 (38.3)	50 (27.8)	34 (18.9)	2
Dwindling income	12 (6.7)	33 (18.3)	76 (42.2)	20 (11.1)	39 (21.7)	8
Farm size expansion	10 (5.6)	70 (38.9)	51(28.3)	24 (13.3)	25 (13.9)	15
Household	19 (10.6)	22 (12.2)	72 (40.0)	31 (17.2)	34 (18.9)	7
Gender composition of family	15 (8.3)	33 (8.3)	76 (42.2)	35 (19.4)	21 (11.7)	10
Number of extension visit	39 (21.7)	53 (29.4)	65 (36.1)	16 (8.9)	7 (3.9)	17
Educational level	56 (31.1)	60 (33.3)	42 (23.3)	16 (8.9)	6 (3.3)	20
Age composition of family	12 (6.7)	20 (11.1)	78 (43.3)	33 (18.3)	35 (19.4)	3
Aging of farm labour suppliers	22 (12.2)	17 (9.4)	82 (45.6)	22 (12.2)	37 (20.6)	5
Barrier to adoption of techniques	30 (16.7)	34 (18.9)	38 (21.1)	9 (5.0)	68 (37.8)	12
Effect of disease on supplier (HIV/AIDS)	31 (17.2)	50 (27.8)	38 (21.1)	56 (31.1)	4 (2.2)	16
Level of farm/family income	2 (1.1)	24 (13.3)	118 (65.6)	14 (7.8)	22 (12.2)	1
Food security	18 (10.0)	49 (27.2)	82 (45.6)	4 (2.2)	27 (15.0)	13
Poor road network	68 (37.8)	35 (19.4)	28 (15.6)	34 (18.9)	15 (8.3)	19
Lack of access to the market	27 (15.0)	46 (25.6)	71 (39.4)	24 (13.3)	12 (6.7)	14
Lack of access to banking facilities	28 (15.6)	31 (17.2)	78 (43.3)	25 (13.9)	18 (10.0)	11
Lack of access to formal education	47 (26.1)	54 (30.0)	43 (23.9)	26 (14.4)	10 (5.6)	18
Lack of access to modern health care	12 (6.7)	34 (18.9)	71 (39.4)	35 (19.4)	28 (15.6)	9
Lack of timely/adequate supply of labour	14 (7.8)	21 (11.7)	100 (55.6)	21 (11.7)	24 (13.3)	4

Note: Values in parenthesis are percentages, multiple responses allowed

Source: Field survey, 2013

4 CONCLUSION

This study examined the factors that affect farm labour supply and utilisation for food crop production in Niger state, Nigeria. The data were collected from 180 participants of Fadama II in Katcha and Agaie LGAs and analysed using descriptive statistics and 2sls regression model. The study has shown that agriculture in the study area is characterized by the use of low technology dominated by human labour. In addition most of the significant factors exhibited expected signs hence there is need to intensify the search for factors that might reduce labour supply and utilisation. For instance, personal and off farm employment characteristic

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may also affect farm labour supply in addition to macro and micro conditions such as national unemployment rates, land tenure issues, agro-ecological zones as well as the existence of micro-climates for specific crops that need intensive labour during the peak seasons in some farming areas also need to be examined. In the light of the above, there is need to put in place a policy like provision of modern amenities, communications and entertainment facilities and improvement in technology that will ensure less utilisation of human labour for crop production and discourage some of the farm families from migrating out of the communities. There is need to have regulatory policies in place that will ensure that farm labour wage rate does not affect the quantity of production. And finally, farm families should form associations that will make them to merge their farm land to large estates which will make technology application like mechanisation easier.

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