



EFFECTS OF FARM LABOUR MIGRATION ON CROP PRODUCTIVITY AMONG FARMERS IN KADUNA STATE, NIGERIA

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ABSTRACT

The study examined effects of farm labour migration on crop productivity among farmers in Kaduna State, Nigeria. Multi-stage sampling procedure was used to select 242 farmers from the study area. Data were collected through interview schedule using structured questionnaire with the help of trained enumerators under the supervision of the researcher. Analytical tools used were descriptive statistics (frequency distribution, percentages and mean) and inferential statistics (multiple regression) was employed in this study. The results showed that the mean age of the respondents was 45 years and were married; and 84.7% were male. These implied that crop farmers were in their productive stage of life and had the capacity of carrying out agricultural production. More so, the mean household size of the farmers was 11 persons, and about 80.6% had formal education. This implied that high educational level of farm household could increase income earnings and reduce poverty level in Kaduna State. The multiple regression analysis on the effects of farm labour migration on farmers' crop productivity showed that the double-log functional form gave the best fit based on the significance of F-statistics and adjusted R-squared parameter estimated in conformity with the *a priori* expectation. Farm size ($P < 0.01$), labour ($P < 0.05$), manure ($P < 0.05$) and poverty incidence of the farmers ($P < 0.01$) were statistically significant. Farm labour migration (-0.05822) was found to negatively influenced crop farmer's productivity. Major constraints encountered by the crop farmers in the study area include high cost of inputs, inadequate credit facilities and inadequate market linkages. In conclusion, poverty incidence had a negative and significant effect on crop productivity. It was recommended that farmers should form rotating saving association to enable them have access to micro loan; rural crop farmer should be linked to the urban market through appropriate information channels such as extension agent and media to attract good value for their crops and Government and Non-governmental Organizations (NGOs) should make farm inputs readily available at a subsidized rate.

Keywords: Crop productivity, Effects, Farmers, Farm labour migration, Kaduna State.

INTRODUCTION

Agriculture accounted for over 60% of the National Gross Domestic Product (GDP) from 1960-1970, but fell drastically to 28.4% in 1971-1980 (Adenom and Oyejola, 2013). However, with the advent of petroleum in the early 1970s, petroleum became the country's major foreign earner and agriculture became grossly neglected (Oni, 2008). Agriculture in Nigeria has been the most important sector of the economy from history and a basis for rural employment, food production and major export earnings before the discovery of black gold



(Oni, 2008). The assertion made above was based on the evidence that as at pre-independence to independence little was known of petroleum as a major source of revenue for Nigeria. The National agricultural system was able to produce food crops like, maize, sorghum, millet and soya beans to the extent that there was almost no need for importation (Ogunlela and Ogunbible, 2014).

Migration refers to the movement of people from one geographical location to another, either on a temporary or permanent basis (Ekong, 2003). It is a common observation all over the world that rural-urban migration is the dominant pattern of internal migration. Migration is a selective process affecting individuals or families with certain economic, social, educational and demographic characteristics. People migrate in response to prevailing conditions and the reasons for it differ from one individual to another. Farm labour migration has a significant influence on the economy and crop production of the households. The family labour which the rural farmers depend upon was reduced because of the labour migration of youth from rural areas to urban centers. This consequently resulted to high cost of production, low productivity and reduction in income and also low standard of living of the rural dwellers (Akange, 2006).

The migration of rural youth to the urban area has always caused a lot of labour shortage in rural areas, due to the transfer of agricultural labourers to urban areas, leaving the aging men and women as well as children to labour on the farms. This has led to decrease in agricultural productivity, thereby reducing agricultural contribution to the Gross Domestic Product (GDP). According to Fadayomi (1998), Ekong (2003) and Afolabi (2007), rural-urban migration negatively impacts on agricultural productivity through loss of productive members of the rural areas. It is expected that a reversed trend in migration will help to mitigate this problem of negative impact on agricultural productivity. Afolabi (2007) also observed that some factors such as crisis, old age, transfer, retirement and infestation of pests and diseases are correlates of urban-rural migration.

The Food and Agriculture Organization (FAO) of the United Nation (UN) has it that of the estimated 925 million hungry people in the world, 239 million of them were in sub-Saharan Africa (Saheed, 2014). Nigeria rural households are considered to be poor and hungry despite its abundant fertile land and other natural resources that could guarantee adequate food crops production, but productivity have seriously declined over the years as result of rural farm labour migration. Nigeria progress in raising agricultural productivity in the last decade has been disappointing, while crop production per person in Asia almost double (FAO, 2009). Certainly, more need to be done to raise crops productivity in order to reduce the poverty and hunger of rural people and increase the food production that will reduce the cost of food.

Farm labour migration has also been a challenging issue for policy makers and government especially in developing countries like Nigeria. Farm labour migration may result in drastic decrease in the labour which in turn reduces total cropped area and quality of work. This could further result into reduced food production and household income, leading to increase in vulnerability in many rural areas which may bring about food insecurity. The effect of farm labour migration may also result in the speedy decline of the rural economy that leads to persistent poverty and food insecurity (Mini, 2000).

However, most studies on rural-urban migration done in Nigeria virtually excluded the effects of these migrations on the rural areas, and are in most cases sample survey on characteristics and determinants of migration. There is, therefore a need for studies that will determine the effect of farm labour migration on rural communities in developing countries especially in Nigeria, where farm labour migration has been on the increase in recent time. It is against this background that this research work investigated the effect of rural farm labour migration on crop productivity of farmers, in Kaduna State. In view of the above problems the



following research questions are formulated: what are the socio-economic characteristics of food crop farmers in the Kaduna State; what are the effect of rural poverty and labour migration on food crops productivity?; and what are the constraints faced by food crops farmers in the study area? The broad objective was to determine the effects of rural farm labour migration on crop productivity among farmers in Kaduna State, Nigeria. The Specific objectives were to:

- i. describe the socio-economic characteristics of food crop farmers in the study area;
- ii. examine the effect of rural farm labour migration on crop farmer productivity; and
- iii. identify the constraints faced by crop farmers in the study area.

The hypothesis to be tested was H_0 : Households' farm labour migration have no significant effect on crop productivity in the study area.

MATERIALS AND METHODS

The Study Area

This study was conducted in Kaduna State Nigeria. The State is situated in the North – West geo-political zone of the country at about 200km² away from the Federal capital territory Abuja. It is located between latitude 9° 04' to 11° 50'N and longitudes 07° 09' to 10° 04'E, respectively. It shares boundary with Katsina and Kano States to the North, Plateau State to the North East, Nasarawa State and Federal Capital Territory, Abuja to the South and Niger and Zamfara States to the West. The National Population Census (NPC, 2006) provisional census shows that the State has a population of 6,066,562, and farm families of 606,007 (Kaduna State Agricultural Development Project [KADP], 2014), going by the population growth rate of 3.2% in Nigeria, the population of the State was projected to be 8,054,895, as at 2015 by 2019 the projected population will be 9,136,476.

Sampling Procedure

Multi-stage sampling technique was used for the selection of respondents. In the first stage, one Local Government Area (Kagarko, Lere and Kudan) was randomly selected from each of the four agricultural zones; Samaru, Maigana, Birni-Gwari and Lere, respectively. In the second stage, three villages were randomly selected from each Local Government Areas (LGAs chosen to give a total of twelve villages. In the third stage, respondents (farmers) were selected proportionately from the sampling frame of 2,423 total (Table 1) registered farm families in the study area obtained from Kaduna State Agricultural Development Project (KADP). Lastly, a sample size of 242 farmers which is ten percent (10%) of the sampling frame was selected for this study. Data were collected through interview schedule using structured questionnaire with the help of trained enumerators under the supervision of the researcher.

Method of Data Analysis

Descriptive statistics such as frequencies, percentages and arithmetic mean and inferential statistics, multiple regression model and total factor productivity (TFP). The t-value of the ordinary least square (OLS) regression results was used to test the hypotheses of the study. Total factor productivity and multiple regression models according to Fakayode *et al.* (2008), can be measured as the inverse of unit variable cost. It is the ratio of the output to the Total Variable Cost (TVC) which was used to determine the productivity of the crop farmers. This is mathematically expressed as:

$$TFP = \frac{Y}{TVC} \quad \dots(1)$$

where;

Y = Value of output (₦) and TVC = Total variable cost (₦).

Alternatively,

$$TFP = \frac{Y}{\sum P_i X_i} \quad \dots(2)$$



where;

Y = Value of output in naira.

P₁ = unit price of ith variable input and X_i = quantity of ith variable input.

The general multiple regression model in its implicit form is expressed as:

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, X_{12}) \quad \dots(3)$$

The explicit forms of the model are expressed as follows:

1. Linear form:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \dots + \beta_{12} X_{12} + e \quad \dots(4)$$

Table 1: Distribution of Crop Farmers in the Study Area

Agricultural Zones	LGA	Villages	Sample frame	Sample size 10%
Samaru	Kagarko	DogoKurmi	288	29
		Katugal	149	15
		Chinka	137	14
Lere	Lere	Mariri	228	23
		Gure	321	32
		Dama-kasuwa	230	23
Birni-Gwari	Chikun	Kujama	250	25
		Gwagwada	198	20
		Kakau-daji	168	17
Maigana	Kudan	Doka Kudan	201	19
		Dandubus	122	12
		Pabea	131	13
Total	4	12	2,423	242

Source: KADP (2014)

2. Double-log form:

$$\ln Y = \ln \alpha + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + \dots + \beta_{12} X_{12} + e \quad \dots(5)$$

3. Semi-log form:

$$Y = \ln \alpha + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + \dots + \beta_{12} X_{12} + e \quad \dots(6)$$

4. Exponential form:

$$\ln Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \dots + \beta_{12} X_{12} + e \quad \dots(7)$$

where;

Y = Productivity index (obtained from total factor productivity)

X₁ = Farmland (ha);

X₂ = Labour usage (Mandays);

X₃ = seed (Kg);

X₄ = Fertilizer application (Kg);

X₅ = Manures (Kg);

X₆ = Agro-chemicals (₦);

X₇ = Age of farmers (Years);

X₈ = Educational level (Years);

X₉ = Poverty status (Poor = 1, otherwise = 0);

X₁₀ = Amount of credit (₦);

X₁₁ = Extension contact (Number of visit)

Determinant of farm labour migration was achieved using logit regression. Generally, logit regression is well suited for describing and testing hypotheses about relationships between



a categorical outcome variable and one or more categorical or continuous predictor variables. The model is expressed in its implicit form as:

$$Y = f(X_1, X_2, X_3, X_4, X_6, X_7, X_8, X_9) \quad \dots(8)$$

Its explicit form is expressed as:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + e \quad \dots(9)$$

where;

Y = Labour migration (Migrated=1, otherwise = 0);

α = Model intercept;

X_1 = Age (Years);

X_2 = Level of education (Years);

X_3 = Land ownership (Owned =1, otherwise = 0);

X_4 = Farming experience (Years);

X_5 = Household size (Number);

X_6 = Income per annum (₦);

X_7 = Extension visit (Number of visits);

X_8 = Remittance from migration (₦);

X_9 = Perception of agriculture;

$\beta_1 - \beta_9$ = Coefficients of the independent variables;

$X_1 - X_9$ = Independent variables;

e = error term.

RESULTS AND DISCUSSION

Socio-economic Characteristics of the Respondents

The results presented in Table 2 that, majority (51%) of the crop farmers were within the age group of 40 years and above, with the mean age of 45 years, implying that farmers were in their productive stage of life and have the capacity of carrying out agricultural production. This result agrees with the findings of Ajah and Ajah (2014) who reported mean age of rice crop farmers in the country as 44 years.

Results on gender distribution (Table 2) showed that majority (84.7%) of the farmers were male while (15.3%) were female implying that male farmers dominated agricultural activities in the area. This study is in tandem with the findings of Okere and Shittu (2012) which revealed that the males dominated the work force in Nigeria's agricultural rural areas. Results in Table 2 reveal that majority (87.1%) of the farmers were married, while 12.9% were single, divorced or separated. This implies that there were more married crop farmers with some level of family responsibility in the area. This finding is in agreement with that of (Ugwuja *et al.*, 2011) who reported that 88.7% of the farmers in Ekiti State were married. Findings of this study shows that majority (80.6%) of the farmers had formal education. This implied that literacy level in the study area was high. This result is in consonances with the findings of Awoniyi and Salma (2012) who pointed out that high educational level of farm household could increase income earnings and reduce poverty level. About 86% of the farmers had more than 11 years of farming experience in the study area with a mean of 22 years and had farm size which ranges between 1.1 – 2.0 hectares with a mean farm size of 3.4 hectares. This finding is in line with the work of Oyekale and Idjesa (2009) who reported a mean farming experience of 20 years of maize crop farmers in River State, Nigeria.



Table 2: Distribution of Socio-Economic Characteristics of Food Crop Farmers

Variables	Frequency	Percentage	Mean
Age (Years)			45
< 21	6	2.5	
21 – 30	30	12.4	
31 – 40	82	33.9	
>40	124	51.2	
Sex			
Female	37	15.3	
Male	205	84.7	
Marital status			
Single	12	5.0	
Married	211	87.1	
Widower	13	5.4	
Divorced	6	2.5	
Educational level			
Non Formal	47	19.4	
Primary	46	19.0	
Senior Secondary	80	33.1	
Tertiary	69	28.5	

Source: Field survey data, 2016

The result in Table 2 further shows the mean household size of 11 persons. This implied that the household size in the study area was fairly large and could negatively influence the expenditure pattern of the household especially on food consumption. Large family size is important in subsistent agricultural production especially within the rural setting. (Odoemenem and Obinne, 2015) This is in line with the findings of Okere and Shittu (2012) who affirmed that larger households could experience poverty than smaller sized households. The result of the finding in Table 2 indicated that, (50.8%) of the farmers acquired their land through inheritance which could lead to farmland fragmentation while majority (66.1%) of the farmers indicated that their primary occupation was farming. This implied that farming was the pre-dominant occupation in the study area as those who engaged in other form of occupation still practice farming as their secondary occupation.



Table 2: Distribution of Socio-Economic Characteristics of Food Crop Farmers **Cont'd.**

Variables	Frequency	Percentage	Mean
Farming experience (Years)			22
1 – 5	8	3.3	
6 – 10	25	10.3	
11 – 15	36	14.9	
> 15	173	71.8	
Household size			11
1 – 5	52	21.5	
6 – 10	119	49.1	
> 10	71	29.4	
Farm size (hectare)			3.4
0.1 – 1.0	14	5.8	
1.1 – 2.0	104	43.0	
>2.00	124	51.2	
Land ownership			
Inheritance	123	50.8	
Purchase	46	19.0	
Rent/lease	67	27.7	
Gift	6	2.5	
Primary occupation			
Farming	160	66.1	
Gathering	2	0.8	
Trading	35	14.5	
Civil servant	40	16.5	
Artisan	4	1.7	
Agro-processing	1	0.4	
Total	242	100.0	

Source: Field survey data, 2016

Institutional Variables Assessed by the Food crops farmers

The result in Table 3 revealed that, majority (62.8%) of the farmers do not belong to cooperative, while 37.2% were members of cooperative societies implying low participation of cooperative membership in the study area. This could lead to none exposure to vital information as well as lack of access to production inputs through cooperative societies.

Access to credit will go a long way in improving individual farm enterprise in terms of agricultural production. As revealed in Table 3, majority of (86.0%) of the farmers had no access to credit; while 14.0% had access to credit which implied that access to credit is a problem in the study area. Access to agricultural credit has the propensity to break the vicious cycle of poverty and raise the purchasing power of farm households.

The result in Table 3 shows that, majority (86.0%) of the farmers had no access to credit as earlier indicated, hence have no source of credit. However, for those that have access to credit in the study area, 7.0% sourced their credit through cooperative, 4.5% through agricultural bank, 1.7% through Kaduna Agricultural Development Project (KADP) and *Fadama* Project, while paltry 0.8% of the farmers' source their credit through commercial banks.



Table 3: Institutional Variables Assessed by the Respondents

Variables	Frequency	Percentage
Cooperative		
Not member	152	62.8
Member	90	37.2
Access to credit		
No Access	208	86.0
Access	34	14.0
Sources of credit		
Cooperative	17	7.0
Agric. Bank	11	4.5
KADP/ <i>fadama</i>	4	1.7
Commercial bank	2	0.8
None	208	86.0

Source: Field survey data, 2016

Effects of Households' Farm Labour Migration on Crop Productivity

The result (Table 4) of multiple regression analysis which showed the effect of households' farm labour migration on crops productivity is presented in Table 4. From the regression analysis result, output of the double-log functional form gave the best fit based on the significance of the F-values, the value the coefficient of determination (R^2) and the adjusted R-Square (R^2). The R-square (R^2) value of 0.2774 shows that about 27.8% of the variation in the dependent variable (productivity index) was due to the independent variables included in the model. Estimated F-value was found to be 7.33 at 1% level of significance implying goodness of fit of the model.

Factors such as farm size, labour, and manures were found to be positive, and statistically significant at 1%, and 5%, level of probability. This implied that an increase in any of the variable will increase the productivity of the crop farmers in the study area. It is generally expected that increase in production factor inputs such as hecterage cultivated, labour and fertilizer usage will lead to increase production output, this finding confirmed with the *a priori* expectation of the study. More so, rural labour migration which is another variable of interest shows no significant effect on the farmer's crop productivity. This corroborate the findings of Oluyemi *et al.* (2019). Assessing the migration dynamics in the context of agriculture and human development. Reported that migration processes are closely related to agriculture, and rural development. Transformation processes in agriculture and rural areas influence migration patterns and migration dynamics, which in turn have significant implications for agriculture and rural development. For instant, rural out-migration tends to exert a downward pressure on agricultural labour per capita. However, this does not automatically lead to reduced agricultural incomes because the loss in household labour may be, and often is, compensated by improvements in other areas, such as increased access to capital. The outcomes of migration therefore depend on the broader agro-ecological, economic, and institutional context.



Table 4: Regression Estimates on Effects of Households' Farm Labour Migration

Variables	Linear	Exponential	Double-log	Semi-log
Constant	8.08502 (2.91)***	1.48182 (4.03)***	0.47649 (0.35)**	-3.82964 (-0.34)
Farm size	0.096318 (0.72)	0.01943 (1.10)	0.25048 (2.69)***	1.01749 (1.31)
Labour	0.03128 (1.72)*	0.00332 (1.38)	0.31272 (2.19)**	3.06350 (2.57)***
Seeds	-0.01042 (-1.05)	0.00154 (1.17)	0.02235 (0.36)	-0.00052 (-0.00)
Fertilizer	-0.00052 (-3.21)***	-0.00006 (-2.71)***	0.05673 (1.46)	0.01937 (0.06)
Manures	0.00289 (1.58)	0.00044 (1.80)*	0.16616 (1.89)**	1.48072 (2.02)**
Agro-chemicals	0.09340 (4.09)***	0.00523 (1.73)*	-0.77049 (-0.58)	1.14666 (1.03)
Age	-0.10022 (-1.81)*	-0.00536 (-0.73)	-0.27736 (-0.84)	-3.31555 (-1.20)
Education	-0.01347 (-0.16)	-0.01816 (-1.59)	-0.07802 (-1.35)	0.15577 (0.32)
Poverty index	0.08808 (1.98)*	-0.02624 (-4.44)***	-0.16136 (-6.25)***	0.07653 (0.35)
Migration	-0.48128 (-0.48)	-0.00211 (-0.02)	-0.05822 (-0.32)	-1.36422 (-0.89)
Credit	-2.39478 (-2.17)**	-0.27160 (-1.86)*	-0.34120 (-1.69)*	-3.40877 (-2.02)**
Extension contact	-0.98445 (-0.96)	-0.17159 (-1.27)	-0.30097 (-1.58)	-1.42378 (-0.89)
R ²	0.2487	0.2260	0.2774	0.1386
R ² -adjusted	0.2093	0.1854	0.2395	0.0935
F-ratio	6.32***	5.57***	7.33***	3.07***

Note: ***, ** and * significant at 1%, 5% and 10% levels, respectively.

Source: Field survey data, 2016

Constraints Faced by the Crop Farmers

The result in Table 5 shows that the major constraints faced by the respondents includes: high cost of inputs (76.4%), inadequate market linkages (65.7%), and inadequate credit facilities (57.4%), respectively. This finding is in agreement with Aniedu (2007) who posited that high cost of input is a constraint face by most farmers.



Table 5: Distribution of Crop Farmers based on their Constraints

Constraints	*Frequency	Percentage	Rank
High cost of inputs	185	76.4	1st
Inadequate credit facilities	159	65.7	2nd
Inadequate market linkages	139	57.4	3rd
Problem of pest and diseases	119	49.2	4th
Small size of farmland	117	48.3	5th
Inadequate labour supply	98	40.5	6th
Inadequate extension services	93	38.4	7th
Poor yield of farm produce	84	34.7	8th
Inadequate information and communication	53	21.9	9th
Complexity of farm technology	41	16.9	10th
Small household size	19	7.9	11th

*Multiple response

Source: Field survey data, 2016

Testing of Hypothesis

The null hypothesis states that the households' farm labour migration had no significant effect on farmers' crop productivity in the study area was tested using the Z-test as presented in Table 6. The Z-cal = 0.0582 while Z-tab = 1.649. This implies that households' farm labour migration had no effect on crop productivity as hypothesized; therefore, we accept the null hypothesis.

Table 6: Result of Z-test of the Household' Farm Labour Migrations

Variable	Households farm labour
Mean	1.8189
Known variance	2.3121
Observations	242
Z- Stat	0.05822
P(Z<=z) one-tail	0.0000
Z- Critical one-tail	1.649

Note: *** significant at 1%

Source: Field Survey, 2016.

CONCLUSION AND RECOMMENDATIONS

Based on the empirical evidence from the findings of this study, it is concluded that majority of the farmers were married, educated, highly experienced and actively involved in crop production and most of the farmers were poor in the study area. The factors that had significant effected farmers crop productivity were farm size (($P < 0.01$), labour (($P < 0.05$), manure (($P < 0.05$), poverty index ($P < 0.01$). High cost of inputs, inadequate credit facilities and inadequate market linkages were the major constraints faced by the crop farmers in the study area. It was recommended that farmers should form rotating saving association to enable them have access to micro loan; rural crop farmer should be linked to the urban market through appropriate information channels such as extension agent and media to attract good value for their crops.



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