

Empirical Analysis of determinants of Labour Use by Selected Food Crops' Farmers in Oyo and Ondo States, Nigeria.

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Abstract: Despite the wide belief that manual labour is a fundamental input in agricultural production in Africa, very few studies have been conducted to empirically substantiate this claim. Likewise, the determinants of manual labour use among food crops farmers in Nigeria have not been validated. Hence, this study examined determinants of labour use among selected food crops' farmers in Oyo and Ondo States, Nigeria. Sources of labour used by food crop farmers were self (9.6%), family (11.6%), hired (65%), informal/exchange (3.3%) and mechanical (10.4%). Majority, (90.0%) of them did not have enough labour for production. Average annual labour used was 87.9 ± 21.2 man-days. Predictors of labour used by food crop farmers in Oyo state were use of labour saving devices, education and contact with extension agent. However, predictors of labour used by food crop farmers in Ondo state were family size, farm location, use of labour saving devices, number of dependants, farm size, years of experience, and contact with extension agents. Extension contact is a panacea for improving agricultural production and labour utilization in the areas of study.

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1. Introduction

The critical resources in agricultural production are land, capital and labour. Of all production inputs in a rain fed farming economy, human labour is now becoming crucial and limiting. Labour scarcity exists during peak production season among farmers. Manyong, Ikpi and Olayemi (2004) identified labour as a major problem affecting investment in agriculture in Nigeria. Yet, majority of Nigeria's farm produce still come from small holders who use hoes, similar basic tools and rely on human labour. Though large scale machine-based farming has increased substantially, it accounts for only a fraction of total production (Encarta, 2005).

In Nigeria, human labour is the key element for production and it constitutes the most important input in smallholder agricultural production (NISER, 2003). And timeliness of labour is very critical because farm operations must be carried out at appropriate time in crop production cycle. However, up till now, a key feature of Nigerian agriculture is the dominance of small scale farms. These small farms constitute an important and invaluable component of the nation's economy. Over 80 percent of total food production comes from farms which look individually insignificant but collectively form an important component on which the economy rests. They also provide equitable distribution of income as well as

effective structure for other sectors of the economy (CBN, 1999).

Yam, cassava and maize are very important staple food crops in Nigeria. They are very important because they are consumed in variety of forms. These crops are raw materials in manufacturing of many industrial products. For example, yam is a good raw material for manufacturing of several types of corticosteroid drugs. Starch from cassava is an important raw material in the manufacture of sandpaper, cardboard, charcoal briquettes, dolls, flashlight batteries, glues, adhesives, photographic films and filters. In addition, bland flavour of cassava starch, its non-retro gradation tendency and excellent freeze are important quality needed for manufacturing capsules, pills and cosmetics. Maize is a raw material for manufacturing of industrial product such as starch, oils, spirit, syrups, adhesive and sweeteners (Coursey, 1982).

Out of all production activities, weeding is the most critical in crop production. Both pre-emergence and post emergence herbicides may be used instead of manual weeding. Yam production is known to require a lot of labour, especially for staking, mulching and harvesting which is uncommon to other food crops. It has numerous labour intensive operations (Coursey, 1982). Ajani (2001) also affirmed that cultivation of yam is decreasing in relation to high cost of labour involved for its production activities. But cassava has

displaced yam cultivation to some extent in the southern part of Nigeria owing to its ease of cultivation, considerable resistance to drought and ability to thrive in exhausted or poor soils. However, well timed hoeing and weeding is required if conventional herbicide is not applied. This is because weeds must be controlled before canopy of cassava stems cover the ground. However, development of high yielding variety of cassava which form canopy and suppress weeds has shifted labour requirement from weeding to harvesting (Coursey, 1982).

Labour is the most important input in Nigeria agriculture yet, little research has been carried out on various aspects of labour in traditional agriculture (Idachaba, 2006). Moreover, Nigeria has an estimated cultivable land of 71.4 million hectares with a farming population of 38 million people (Kuta, 2004). This obvious strength notwithstanding, there is widespread hunger and food insecurity. UNESCO (2003) rated Nigeria among dependent nations and classified the country as food deficit. FAO corporate document repository of (2004) indicated slowing growth rates in crop production in Nigeria.

Labour productivity in agriculture is extremely low particularly when measured in terms of food production per head. Similarly, Asamao (2001) remarked that in most west African countries, labour productivity in agriculture is low. Idachaba (2006) also noted low productivity per man-hour of labour in Nigerian agriculture. However, very few farmers use tractors on their farms because of high cost, unavailable spare parts, small farm sizes, extensive lateral root system of some trees, complex soil topography and framework of river system which are the common features in most rural areas. In addition, farm machinery and implement are beyond the means of most farmers. Yet, demand for food is increasing, over 30 percent of the population including the producers experience chronic food insecurity (IITA, 2004). The declining farm population is not capable of supplying the food and fibre needs of the non-farm population. A food labour constraint therefore, is the introduction of the mechanical implement to increase the output per unit of labour. Similarly, NAERLS and PCU (2005) reported that only 45 percent of the tractors owned by government were functioning while 54.8 percent of them were non-functional. Although a number of machines and structure have been fabricated in the faculties of engineering and technology, but their impact in Nigerian agriculture is yet to become obvious.

Besides, available labourers charge more than farmers could afford. The high cost of hired labour depresses labour use for rural production. High cost of labour also imposes limitation on crop types and cropping intensity on small holder farms. Labour

constitute about 60 percent of the total cost of production (Babalola, 2002). Most farmers are resource poor and cannot expand their farm size due to high cost of labour. High cost of labour is a major constraint towards expanding the scope of production of small scale farmers of southwestern Nigeria. However, for sufficient production of these crops as food and raw materials, labour input must be increased (Federal ministry of agriculture and natural resources, 2009). Okoruwa and Agulana (2004) also discovered debilitating effects of sickness on farm labour and its reducing effect on farm efficiency level leading to low productivity in Nigeria. Oyo and Ondo states are food baskets of the western Nigeria and the apathy of people in these two states toward agricultural production is a bane of food crop production as noted by Arokoyo (2006) and Idachaba (2006). This assertion shows the importance of labour use in agricultural production.

Despite the wide belief that labour is a vital input in food crop production in Africa, there are limited empirical findings to substantiate this proclamation, Hence there is need to determine the farm labour use in the study areas with hope of alleviating the problem of inadequate labour supply and increase food production. Likewise, empirical studies providing information on labour utilisation for productive activities performed by rural households are particularly important for policy makers to understand the effect of policy on individual welfare and level of living. Furthermore, understanding of labour input for agricultural production activities will enable investors and stakeholders to allocate resources appropriately. It will ensure formulation and implementation of idealistic, practical and developmental goals towards generation and use of labour. This is necessary as there are yet many untapped potentials in rain fed agriculture prevalent in rural areas of Nigeria where bulk of human and natural resources are located.

The specific objectives of the study are to:

- Analyse the socio-economic characteristics of food crop farmers in the study areas
- Identify the sources of labour available to farmers in the study areas.
- Identify constraints to labour use among food crop farmers in the study areas.
- Identify determinants of labour use for food crop production in Oyo and Ondo states.

Hypothesis of the study

The hypothesis was stated in null form and tested at $p \leq 0.05$ significant level.

- There is no significant difference in labour used by food crop farmers in Oyo and Ondo states.

2. Material and Methods

The study was conducted in Oyo and Ondo states, Nigeria. Multi-stage sampling procedure was used to select respondents for the study. It involved sampling of states, zones, blocks, cells and registered food crop farmers. Through simple random sampling procedure, two zones were selected from Oyo state while a zone was selected from Ondo state, representing fifty percent (50%) of the zones from each state. The second stage involved selection of ten percent (10%) of the blocks from the selected zones through simple random sampling. Two blocks were selected in Oyo state while a block was selected from Ondo state. The third stage involved sampling of twenty five percent of cells from each of the selected blocks constituting two (2) and one (1) cells from Oyo and Ondo states respectively. Lastly, through simple random sampling, ten percent of the farmers were selected from each cell from the village extension agents' list. In all, two hundred and forty (240) farmers were selected for the study.

Instrument for data collection was subjected to face and content validity. Reliability of the instrument was determined through split-half technique and the result was $r=0.95$ and $r=0.66$ for Oyo and Owo zones of Oyo and Ondo states ADP respectively. A structured questionnaire was designed and administered to the farmers in order to obtain data from the respondents. Data were collected on the respondents' age, sex, marital status, educational level, farming experience, primary occupation, family size, number of farms, size of farms, sources of labour, access to labour information, migration, contact with extension agents, constraints to labour availability and use, average hours of work, labour-

saving devices and reward of labour. Labour use was expressed as man-days. The number of days and hours of daily work of men, women and children were calculated for farm operations using the Adult Male Equivalence (AME)

The data collected were analysed using descriptive statistics such as frequency distribution and percentages. Inferential statistics used were, t-test and multiple regression.

The regression model was, $Y = b_0 + b_1x_1 + b_2 x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8 + b_9x_9 + b_{10}x_{10} + b_{11}x_{11} + b_{12}x_{12} + bu$

b_0 = regression constant

b = slope of the line

Y = labour use: labour use =1, Not use = 0

x_1 = Sex: Male= 1, Female=0

x_2 = age (years)

x_3 = Marital status: Married =1, Not married =0

x_4 = family size (exact number)

x_5 = number of dependants (exact number)

x_6 = Education: formal education =1, no formal education =0

x_7 = years of experience (years)

x_{18} = size of farm (hectare)

x_{19} = membership of work group: Membership of work group =1, not a member =0

x_{10} = hours of work (hours)

x_{11} = Source of labour: Hired labour =1, otherwise =0

x_{12} = number of sources of labour information

x_{13} = contact with extension agents: contact with extension agent =1, No contact =0

x_{14} = use of labour saving devices: use of labour saving devices =1, otherwise =0

3. Results

The results are shown in Tables 1-5.

Table1: Distribution of respondents on socio-economic characteristics in Oyo and Ondo states

Variables	Oyo		Ondo		Total	
	Freq	%	Freq	%	Freq	%
Age						
<30 years	15	8.7	-	-	15	6.3
30-39	21	12.1	-	-	21	8.8
40-49	45	26.0	6	9.0	51	21.3
50-59	67	38.7	19	28.4	86	35.8
>60	25	14.5	42	62.7	67	27.9
Sex						
Male	123	71.1	31	46.3	154	64.2
Female	50	28.9	36	53.7	86	35.8
Marital status						
Single	15	8.7	-	-	15	6.3

Married	148	85.5	58	86.6	206	85.8
Divorced	7	4.0	4	6.0	11	4.6
Widowed	3	1.7	5	7.5	8	3.3
Household size						
3-5	86	49.7	65	97.0	151	63.0
6-10	78	45.1	2	3.0	80	33.3
>10	9	5.2	-	-		3.7
Dependants						
1-5	165	95.4	63	94.0	228	95
6-10	8	4.6	4	6.0	12	5.0
>10	-	-	-	-	-	-
Education status						
No formal	71	41.0	23	34.3	94	39.2
Primary	45	26.0	37	55.2	82	34.2
Secondary	34	19.7	7	10.4	41	17.1
Tertiary	23	13.3	-	-	23	9.6
Number of farmlands						
1	126	72.8	13	19.4	139	57.9
2	41	23.7	26	38.8	67	27.9
3	6	3.5	28	41.8	34	14.2
Farm size						
<2ha	14	8.1	16	23.9	30	12.5
2-5ha	89	51.4	3	4.5	92	38.3
>2ha	70	40.5	48	71.6	118	49.2
Years of experience						
<10 years	8	4.6	1	1.5	9	3.8
11-20 years	19	11.0	2	3.0	21	8.8
21-30 years	97	56.1	19	28.4	116	48.3
31-40 years	49	28.3	45	67.1	94	39.2
41-50 years	-	-	-	-	-	-
>50 years	-	-	-	-	-	-
Membership of farmers' association						
Farmers' cooperative	82	47.4	51	76.0	133	55.4
Credit and thrift	32	8.5	16	23.9	48	20.0
Both	-	-	-	-	-	-
None	59	34.1	-	-	59	24.6
Residency						
Absentee farmer	19	11.0	5	7.5	24	10.0
Migrant farmer	10	5.8	3	4.5	13	5.4
Resident farmer	144	83.2	59	88.1	203	84.6
Food crops						
Cassava/maize/yam	153	88.4	60	89.6	213	88.8
C/m/y/cocoyam	14	8.1	5	7.5	19	7.9
C /m/y/beans/rice	4	2.3	-	-	4	1.7
C /y/m/sweet potato	2	1.2	2	3.0	4	1.7
NB:c/y/m=cassava/maize/yam						

Source: Computed from field survey, 2011

Table 2: Labour use for food crop production in Oyo and Ondo states

Food crop	Production activities	Mean
Yam	Land preparation	68.32
Cassava	Land preparation	67.11
Maize	Land preparation	42.98
Yam	Ridge making	72.55
Cassava	Ridge making	66.41
Maize	Ridge making	45.54
Yam	Planting	35.91
Cassava	Planting	32.23
Maize	Planting	28.31
Yam	Weeding	56.12
Cassava	Weeding	47.00
Maize	Weeding	36.05
Yam	Fertilizer application	22.33
Cassava	Fertilizer application	20.00
Maize	Fertilizer application	24.50
Yam	Harvesting	58.75
Cassava	Harvesting	49.08
Maize	Harvesting	22.21
Yam	Other activities	33.80
Cassava	Other activities	19.47
Maize	Other activities	18.20

Source: Computed from field survey, 2011

Table 3: T test statistics of difference in labour utilisation for food crop production in Oyo and Ondo states

Labour Use	N	Mean	Std. deviation	Std Error mean	Mean diff	t	df	F	P
Oyo	173	18.87	21.95	1.28	-9.03	-4.58	238	4.79	0.00
Ondo	67	27.91	18.89	1.50					

Source: Computed from field survey, 2011.

Table4: Distribution of respondents on constraints faced on food production in Oyo and Ondo states.

Constraints	Oyo		Ondo		Total	
	Freq	%	Freq	%	Freq	%
High cost of labour	43	24.9	9	13.4	52	21.7
Poor labour management/human relationship	6	3.5	5	7.5	11	4.6
Migration of labourers	22	12.7	21	31.3	43	17.9
High demand for labour during peak periods	34	19.7	17	25.4	51	21.3
Poor quality of work done	21	12.1	7	10.4	28	11.7
Excess demand for fringe benefit	2	1.2	1	1.5	3	1.3
Labourers work for few hours	44	25.4	7	10.4	51	21.3
Uncooperative attitude	1	0.6	-	-	1	0.4

Source: Computed from field survey, 2011

Table 5: Multiple regression of labour use among food crop farmers in Oyo and Ondo states

Variables	Labour use in Oyo state β	t-values	Labour use in Ondo state β	t-values
Constant	30.05	0.51	-21.53	-0.35
Gender	-16.79	-1.35	11.497	0.98
Age	0.12	0.23	0.33	0.78
Marital status	20.48	1.79	-1.84	-0.17
Family size	-3,26	-1.63	7.21	2.47*
Number of dependants	-1,27	-0.55	-8.86	-3.79*
Educational level	-14.44	-2.23*	4.32	0.61
Farm location	3.25	0.27	28.25	2.68*
Farm size	2.33	1.75	-2.06	-1.42*
Years of experience	-13.52	-1.28	-20.03	-2.67*
Farmers association	-2.26	-0.38	-23.68	-2.28*
Residency of farmers	-7.49	-0.97	1.50	0.16
Source of labour	0.71	0.85	1.02	0.82
Source of labour information	13.51	1.31	-5.78	-0.46
Contact with extension agents	-25.05	-2.53*	-20.02	-1.65*
Labour cost	-6.44	-0.26	-81.79	-1.57
Use of labour saving devices	24.68	2.91*	37.19	2.47*

Source: Computed from field survey, 2011

4. Discussions

The result in table1 shows that 57.1% of the respondents were between 40-60 years of age. This finding correlates with the work of Ogunsumi and Adetayo (2002) who found that most farmers in Nigeria were 40 years and above. Information on marital status of the respondents revealed that majority (85.8%) were married, and 6.3%, 4.6% and 3.3% were found to be single, widowed and divorced respectively. In addition, 64.2 percent of food crop farmers were male while 35.8 percent were female. Supporting this finding, Fakoya (2000) found that majority of the food crop farmers in Oyo state were males. However, IFAD (2012), Hashmi and Jamali (2009) confirmed that women play significant role in farming activities. Besides, 56.7 percent food crop farmers had modal household family size of three to five members and most (74.0%) had between one to five dependants living with them who also assist in household and farming activities.

In addition, 39.2 percent food crop farmers had no formal education while 34.2 percent had primary education. A large proportion (81.9%) of respondents had work experience spanning over 20 years and most (84.6%) food crop farmers were resident farmers. Most (49.2%) of the farmers had farm sizes greater than or equal to two hectares. Only few (12.5%) food

crop farmers had less than two hectares. This finding is supported by Adejare and Arimi (2013) who posited that most farmers in Nigeria are small scaled farmers. Farm sizes of the respondents may determine the number of labour to be used on the farms. The distribution reveals that 38.3 percent food crop farmers had between two to five hectares of land. Furthermore, 57.9 percent food crop farmers had a single farmland. Almost 28 percent of them had two farmlands while only 14.2 percent had three farmlands. Most (88.8%) of the farmers planted maize, yam and cassava either as sole crops or mixed based crops. Others planted cassava, maize and yam in combination with other food crops. This finding shows that most of the farmers practices mixed cropping. Similarly, Lawal-Adebowale and Oyegbami (2004) identified maize, cassava and other crops as crop enterprise combination employed by their selected arable crop farmers in Nigeria.

Few (11.6%) food crop farmers used family labour. Family labour is no more readily available. Besides, some members of farm families engaged themselves with other non-farm activities and social obligations that reduce their involvement in farm work. Use of hired labour was accounted for by 65.0 percent of food crop farmers. Only 3.3 percent of the farmers use informal/exchange while 10.4 percent

used mechanical labour. Corroborating this, Ogunsumi and Adetayo (2002) found that farmers used hired labour to supplement family labour. Lawal-Adebowale and Oyegbami (2004) in their study also noted that only 21.8 percent of their farmers used tractor during land preparation.

High cost of labour was a serious constraint to labour use as indicated by 21.7 percent of the food crop farmers. Similarly, Lawal-Adebowale and Oyegbami (2004) confirmed that shortage of capital for purchase of services limits the production capacity of selected arable crop farmers to barely producing for household consumption. Therefore, high cost of labour is one of the major constraints on cropping intensities on smallholder farms. In addition, 21.3 percent of the food crop farmers indicated that labourers work for few hours. Few hours of work by labourers are becoming critical constraint to labour utilisation. Dipeolu (2000) discovered that hours actually spent on farm are occasionally low as it can take a considerable length of time to walk from homestead to farms. Furthermore, land preparation and other labour intensive farm activities have competing demand during peak period. The drudgery involved reduces labour for such tasks as agreed by 21.3 percent food crop farmers. Corroborating this, Afolami (2001) complained that lack of simple saving technology and devices in root and tuber production causes drudgery that reduces labour use for root and tuber crop production. Hence, there is need for increased use of labour saving technologies to reduce the seasonal bottleneck in labour supply (Adegeye and Akande, 1988).

Total (annual mean) labour use for food crops was $\bar{\chi} = 62.7 \pm 21.58$ man-days per hectare. It include the labour input in man-days per hectare by farm operations for land preparation, ridge/mound making, weeding and harvesting were labour demanding operations for most of the food crops. Labour input per hectare was highest for yam and least for maize. Labour used for yam production activities were 68.3 for land preparation, 72.6 for ridge making, 35.9 for planting, 58.8 for harvesting and 33.8 for other activities such as staking and mulching. This is so because yam production required more labour as numerous activities were involved and necessary for its production.

T-test result shows significant difference in labour used by farmers for food crop production in Oyo and Ondo states ($t=-4.58$, $p \leq 0.05$). Since farmers were into different mixed crop production with varying crop combination, therefore, labour use for each type of food crop production will differ in terms of quantity and quality. Besides, intensity of use of labour varies. Supporting this finding, Adejare and Arimi (2013) observed that coefficient of labour ($t=$ -

6.57, $p \leq 0.00$) was a significant factor in the production of tree crops in Oyo state, Nigeria. Farmers in Oyo state used more labour for food crop production. But food crop farmers in Ondo state exceeded farmers in Oyo state in labour use for yam production.

Labour used by food crop farmers in Oyo state was significantly influenced by use of labour saving devices ($\beta=2.91$) and reduced by education ($\beta=-2.23$) and contact with extension agent ($\beta=-2.53$). However, labour used by food crop farmers in Ondo state was significant positively influenced by family size ($\beta=2.47$), farm location ($\beta=2.28$) and use of labour saving devices ($\beta=2.47$) but reduced by number of dependants ($\beta=-3.79$), farm size ($\beta=-1.42$), years of experience ($\beta=-2.67$) and contact with extension agents ($\beta=-1.65$).

Farmers were small and medium scale producers who cultivate wide range of crops mostly in mixtures. Common sources of labour of food crop farmers were family, hired, informal and mechanical labour. Generally, intensity of use of labour for food crops differs for the two states. use of labour saving devices and extension visit influenced farm labour-use in the two states. Therefore, increased use of labour saving devices and other management practices will make farming less labour demanding. Extension services should be improved to impact more technical knowledge to farmers thus making them better off in agricultural production. In addition, there is need to enhance farmers' access to available and needed information on labour related matters.

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