

Determinants of Labor Supply for Food and Tree Crops in Southwestern Nigeria

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Abstract

Of all the production inputs in a rain fed farming economy, human labour is now becoming crucial and limiting. In Nigeria, farm labour supply especially for planting, weeding and harvesting still constitutes serious bottleneck. Hence, this study examined labour supply for food and tree crop in southwestern Nigeria. Multi-stage sampling procedure was used to select respondents for the study. Primary data were collected through structured questionnaire to elicit information on socio-economic characteristics and labour supply. Data were analysed using descriptive and inferential statistics.

T-test result showed that coefficient of labour supply ($t=4.79$, $p \leq 0.05$) was a significant factor in food and tree crop production. Significant predictors of labour supply for food crops are household size, farm location, hours of work, number of sources of information, contact with extension agents and use of labour saving devices. However, the significant predictors of labour supply for tree crop are number of dependants, farm size and contact with the extension agents. Labour supply for food crops was significantly increased by number of sources of information ($\beta=19.65$), contact with extension agents ($\beta=6.53$) and use of labour saving devices ($\beta=13.38$) but reduced by household size ($\beta=-0.23$), farm location ($\beta=-0.96$) and hours of work ($\beta=-4.10$). Also, labour supply for tree crops was significantly increased by farm size ($\beta=7.13$) and contact with extension agents

($\beta=7.98$) but reduced by number of dependant ($\beta=-3.03$).

Agricultural extension still plays a pivotal role in meeting the information needs of peasant farmers. Hence, increased use of labour saving devices and extension contact remain panacea for labour supply for agricultural production.

Key words: Labour supply, Food and Tree crops, Southwestern Nigeria

Introduction

Nigeria became independent over 50 years ago, once an exporter of food and her agricultural share of Gross Domestic Product (GDP) stood at 90 percent before independence and at about 56 percent from 1960-1969. The nation's GDP later declined to an average of about 24 percent between 1970 and 1979, and 22 percent in 1980 (CBN, 2003). However, the advent of oil in the sixties as a major foreign exchange earner caused a drastic reduction in the contribution of agricultural production to the national economy. But with recent changes in governance, agriculture accounted for 42 percent of the nation's GDP in 2006 (CBN, 2006). Various governments have identified agriculture as their main priority sector by devoting a proportion of their budgetary allocation to it.

The estimated output of some major crops showed an average growth rate this include cassava, yam, maize, oil palm and cocoa. This improved performance notwithstanding, the agricultural sector is

still confronted with numerous production problems preventing it from providing adequate and affordable food to the nation. Thus, the nation is witnessing an increment in prices of food stuffs which is not attributed to inflationary tendencies alone, but also production related problems. Of these production problems, insufficient supply of labour for agricultural production is evident.

Nigeria is the world largest producer of cassava and yam, yet, it is a food deficient nation and import large amount of grains. According to IFPRI (2012), the global hunger index was 15.7, Human Development Index was 0.423 (UNDP, 2010) and GDP was 193669 USD million (World Bank, 2010). However, marginal success has so far been recorded since the output is not sufficient to meet the ever increasing demand and enhance foreign exchange earning capacity of the sector.

Statement of the problem

The basic factors of production in any economy are land, labour, capital and entrepreneur. Of all these, labour is an important factor of production and it differs from land and capital in that it is supplied by human being. At work peak, critical tasks like planting, weeding and harvesting are closely related and must be finished in a limited time. Idachaba (1998) and Upton (1997) found that large scale rural-urban migration and ageing farm labour were the major causes of labour shortage.

In southwest Nigeria, there are seasonal peaks of activities associated with different crops that do not necessarily coincide. For example, pattern of monthly labour requirement per hectare over a year for yam is different from that of maize. Despite this, allocation of labour among crops at peak periods of the cropping season at times become a big problem. The

supply of labour that at first is elastic becomes increasingly inelastic as agricultural output and demand for labour continue to grow (Adeyeye and Akande, 1988).

Besides, it is expected that adoption of technology will lead to improved yield, more income and better standard of living, but most technologies were not adopted because of scarcity of labour and additional cost incurred to hire labour. Dvorak (1996) complained that scarcity of labour can constrain use of labour demanding technology. Similarly, Ogunsumi and Saka (2001) discovered that majority of farmers could not carry out the whole package of recommendation due to non-availability or high cost of labour. Scarcity of cheap labour scares away resource-poor farmers from adopting technology. Therefore, it implies that farmers are not resistant to change but lack resources required to change.

Pearce and Artkinson (1994) remarked that technology packages for raising yields and income may seem readily available but their use may be hindered by limitations such as lack of effective system for disseminating technology, non availability of agricultural inputs and labour. Hence, poor farmers have limited resources to hire labour that can result in optimal use of technological packages that will enhance their productivity. Technology is useless if farmers are unable to put it to use. Therefore, tackling agricultural production problems of farmers including labour problems is a prerequisite for increasing per capita food production of farmers.

Understanding labour supply response of farm households to changes in economic opportunities is also crucial for achievement of dual goal of income growth and equity in agricultural and rural development. Therefore, empirical studies providing information on 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. The study of labour supply is also relevant for agricultural extension intervention.

Management practices and labor requirement of food and tree crops

Although labor requirement of crop varies across system because of differences in land condition and cultivation practices, however, it is particularly high for crop maintenance and land preparation for cassava, yam and maize. But total amount of labor input by sexes for agricultural operations is quite disproportionate. Men are responsible for land clearing, ridging and weeding while women undertake processing and marketing of farm produce. In all farm operations, hired male labourers worked although it declines from land preparation to harvesting. Female family members and hired labour are almost entirely engaged in processing of oil palm to palm oil, cassava to "gaari" and a number of food crops in southwest Nigeria.

Yam has always been a male controlled food crop enterprise in southwestern zone as in other parts of west Africa. Labor requirement for yam was 670 persons hour per acre. Weeding was the most demanding farm operation for yam and it requires 74-85 man days/hectare. Average human labour needed for producing maize was 144 man days/hectare and 46 percent of it was supplied by family members while 54 percent was supplied by hired labor (Monlruzzaman, Rahman, Karim and Alam, 2009).

But labour input for maize based cropping system involved both male and female. However, in all farm operations of cassava based cropping system, land preparation is mostly labour intensive accounting for about 59 percent of total labour used. Therefore, farmers use casual or temporary hired labourers to cope at seasonal work

peaks (Adedipe, Tayo, Fabiyi and Daramola, 1997). On fully commercialised farms, farmers use hired labour predominantly who may be regular, contract or casual workers.

However, the quantity of labour used depends on its price in relation to price of other factors. It also depends on the type of crop grown, the size of farm, prevailing season and production activities involved. In order to determine which crop to grow and how much of each to grow, farmer will need to wisely calculate number of days of work that will be required for each of the crop in any month of the year and the cost of labour. Labor is required in all aspects of maize, yam and cassava production. Availability of experienced labor is needed if timely harvest of yam and cassava tubers will be guaranteed. Also, planting of yam and cassava requires skill as these cannot be done without prior knowledge.

Cocoa grows on a well-drained and well aerated soil with good structure and adequate supply of water and nutrient. Application of fertiliser to cocoa is necessary at emergence stage in order to obtain maximum and continuous high yield. It also requires an annual dressing with 60-80kg Nitrogen, 30-40kg phosphorus and 100-200kg of potassium per hectare (MANR, 1980). Cocoa requires spraying at least 2 to 3 times in a year. The spraying of the whole plant once then pods two or more times so that it will not spoil. Weeding of coca continues until harvesting period. Most especially at early stage, hand weeding of areas surrounding the seedling is necessary before using cutlass. Weeding must be thorough before cocoa plant grows up and closes. However, labour becomes more important and crucial because tree crop production in Nigeria is mostly done manually (Akinwumi, 1995; Asoegwu and Asoegwu, 2007).

Oil palm grows on a wide range of tropical soil and its plantation is usually established in area of primary and secondary forest. Transplanting of nursery requires application of 15kg of Nitrogen, 45kg of potassium and 7kg of magnesium per hectare necessary for efficient production. In the second year after the transplanting, 30kg of Nitrogen, 60kg of potassium and 10kg of magnesium per hectare must be applied. However, in subsequent years, there is need to apply 30kg of Nitrogen, 75kg of potassium and 17kg of Magnesium per hectare because oil palm fruit bunches remove nutrients from the soil in high quality and few crops can support optimum growth and yield unless adequately fertilized. On large plantations, planting of cover crops is common as a measure to control weeds. Alternatively, Simazone may be applied to control weeds.

Kolanut requires spraying until it matures. Spraying of kolanut is important at least twice a year. During the first spraying, both kolanut trees and fruits must be sprayed, afterwards spraying of trees alone. After harvesting, kolanut does not require serious processing, just the removal of kolanut from the pod and spreading of the fruit in the sun for drying. However, Ojo (2010) documented that 621.83 man days was required for production of kolanut.

Determinants of labour supply

Labour in production is best portrayed as labour service. However, exhaustive appraisal of determinants of labour supply for agricultural production is necessary in order to establish its effect on production. Some of the determinants are age, gender, level of education, income or wage expectation, family size, other job opportunities and size of population.

Age-Adegeye and Dittoh (1985) identified age as a significant determinant of the size of labour force. A country with greater number of people falling between 15 and 65 will have greater workforce than a country with greater number of people below 15 and above 65. The basic minimum age for employment is 12 years (ILO, 2000). In Nigeria, legal minimum working age is 17 years (Fajana, 2000). Age may have varied implication on participation function. Olusoji (2004) asserted that labour participation rate of women is expected to be positively related up until a certain age and thereafter falls. She found that hours of work of women fall as their age rises.

Gender-Adegeye and Dittoh (1985) and Fajana (2000) agreed that supply of labour is determined by specialisation, age group and sex. In the process of labour supply formation, gender relations play a central role (Sender and Smith, 1990). Female farmers of all ages allocate more hours per day to agriculture than male during farming season (Craig, 2000). For instance, in agricultural activities, role of women enables male farmers to earn cash in non-farm jobs. Besides, women concentrate on food crop production while men concentrate on tree crops.

Women play significant role in agricultural production although division of labour within the household is gender specific and according to age (Federal ministry of agriculture and natural resources, 2009). Therefore, it is necessary to take steps that will lighten household tasks of women to increase labour supply for farm work.

Level of education-Educational system often determines when a person would normally be available for employment. Labour supply will be delayed when people spend too long time in school (Fajana, 2000). It is expected that the higher the level of education, the higher the expected rate of participation in labour

market. Echeibiri and Mbanasor (2003) reported a positive influence of education on household adult labour supply. Furthermore, young people are prone to change jobs more often and receive more schooling and training on the job than older people. Economic theory would not really discriminate against the value of education to different levels of workers, since wage is expectedly determined under economic theory by the interplay of demand and supply functions.

Income or wage expectation-Deduction from consumer theory established that individuals are free to choose to work or not to work. Decision on how much work to do and type of work to do may be innately unpleasant but wages will compensate for it. Also, desire to obtain subsistence need often affect amount of work an individual does. If an individual is satisfied with current earnings, he may not be motivated to do extra work or work extra hours.

On the other hand, good remuneration will motivate workers to participate in farm operations. Vaish (2002) advanced that supply of labour for longer period of time require payment of higher real wage. To induce a worker to supply a given number of man-days, the real wage must be high enough to compensate for it. Besides, individual worker responds to changes in shadow wages and total work time is influenced by labour supply in the household economic condition (Bagamba, Burger and Kuyvenhoven, 2007). Thus, Akanni and Dada (2012) advocated that there should be increase in farm wages to compensate for farm labour that were engaged in cocoa production since the traditional family labour is not sufficient to meet labour requirement for cocoa production.

Family size-Family size determines labour supply in developing countries. Family sizes are unusually large because of the

wish to have many children and larger family sizes often have greater labour force. In other words, household size has a direct influence on labour supply. In addition, in extended families, relatives are regarded as part of one large family and they provide labour to meet various needs of the family. On the contrary, transition to modernisation and increased participation in wage employment made larger family members to have greater felt need to participate in market or self-employment activities in recent time. As a result, it makes practice of having many children with intention of ready supply of farm labour to decline in Nigeria (Ekong, 2003).

Other job opportunities-All over the world, increasing demographic changes increase supply of labour for paid employment at the expense of unpaid services. For instance, farmers seek off farm employment due to push factors (Bagamba *et al.*, 2007). Youths and men offer labour services for paid employment because of various income earning ventures they engage in to augment household resources. This leads to reduction in labour available for non-paid employment and for agricultural activities. An individual may be engaged in both self-employment and paid job at the same time. But types of job opportunities in a locality will determine how and when labour will be supplied (Adegeye and Dittoh, 1985).

Farm size-Farmers with large sizes of farm depend more on hired labour for operations such as weeding and harvesting due to intensive nature of farming in Nigeria. Norman (1973) established an inverse relationship between average labour use (man-hour) and farm size. He used different farm sizes when average labour use (man-hour) was regressed with farm sizes in different categories of farm. This could be simply explained since constraints such as inadequate labour may be responsible for reduction in labour use of farmers with large farms. But regression

analysis of his work showed a positive relationship between farm size and marginal value product.

Size of population-Berkely (1990) highlighted that quantity of labour supply depends on size of population and the proportion of it that is available for work at any time. It is assumed that the greater the population, the greater the labour force. However, individuals may decide not to engage in a particular type of employment and rather prefer not to work at all until the desired choice is available. This is common mostly in the primary production.

Objectives of the study

The general objective is to investigate labour supply for food and tree crops by farmers in southwestern Nigeria. The specific objectives are:

1. Analyse the categories of people hired and frequency of use for food and tree crops.
2. Examine factors that determine labour supply for food and tree crop production in southwestern Nigeria.
3. Determine labour supply for food and tree crops in southwestern Nigeria

Hypothesis

Ho: 1. There is no significant difference in labour supply for food and tree crops in southwestern Nigeria.

Methodology

The study was conducted in southwestern states of Nigeria which lies between latitude 5°N and 9°N and longitude 20°E. It is bounded by the Atlantic Ocean in the

south, Kwara and Kogi states in the north, eastern Nigeria in the east and Republic of Benin in the west. It has a land area of about 114,271km², representing 12 percent of the country's total land area. The zone has a population of 29.9 million and a population density of 195 persons/km (NPC, 2003). The target population for the study comprised food and tree crop farmers (yam, cassava, maize cocoa, kolanut and oil palm) who are duly registered with the state Agricultural Development Projects (ADPs) and participate in their activities. Multi-stage sampling procedure was used to select respondents for the study. It involved sampling of states, zones, blocks, cells and registered tree crop farmers. Through simple random sampling procedure, tree crop farmers were chosen from each of the selected cells. Data was collected and analysed using descriptive and inferential statistics such as t-test and multiple regression.

Discussion and summary of findings

Table 1 shows categories of people hired by the respondents. In all, 64.2 percent food crop farmers used migrant/seasonal labourers regularly, 51.3 percent used youth and children occasionally, but 52.1 percent have never used contract labour. Corroborating this finding, Badmus and Akinyosoye (2006) observed that smallholder farmers often use children to substitute adult labour in order to keep up farm business. On the other hand, 65.9 percent tree crop farmers use local landless residents regularly, 57.0 percent also used contract labour regularly and 59.3 percent used youth or children occasionally while 22.9 percent had never used youth or children. These findings however showed disparity in the category of people hired by food and tree crop farmers.

Table 1: Distribution of farmers by categories of people hired and frequency of use

Categories	Food			Tree		
	Regularly	Occasionally	Never	Regularly	Occasionally	Never
	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)
Local landless residents	146 (60.8)	54 (22.5)	40 (16.7)	141 (65.9)	39 (18.2)	34 (15.9)
Migrant/season labourer	154 (64.2)	52 (21.7)	34 (14.1)	122 (57.0)	57 (26.6)	35 (16.4)
Contract labourers	72 (30.0)	43 (17.9)	125(52.1)	124 (57.9)	54 (25.2)	36 (16.8)
Youth and Children	45 (18.7)	123 (51.3)	72 (30.3)	38 (17.8)	127 (59.3)	49 (22.9)

Source: Field survey, 2011.

Majority (90.0%) of the food crop farmers indicated that they did not have enough labour. Only 8.8 percent have adequate labour for production, while 1.3 percent did not have hired labour. Similarly, many

(73.4%) tree crop farmers did not have enough labour for production activities. Only 11.7 percent of the tree crop farmers have adequate labour for production while 15 percent did not have hired labour.

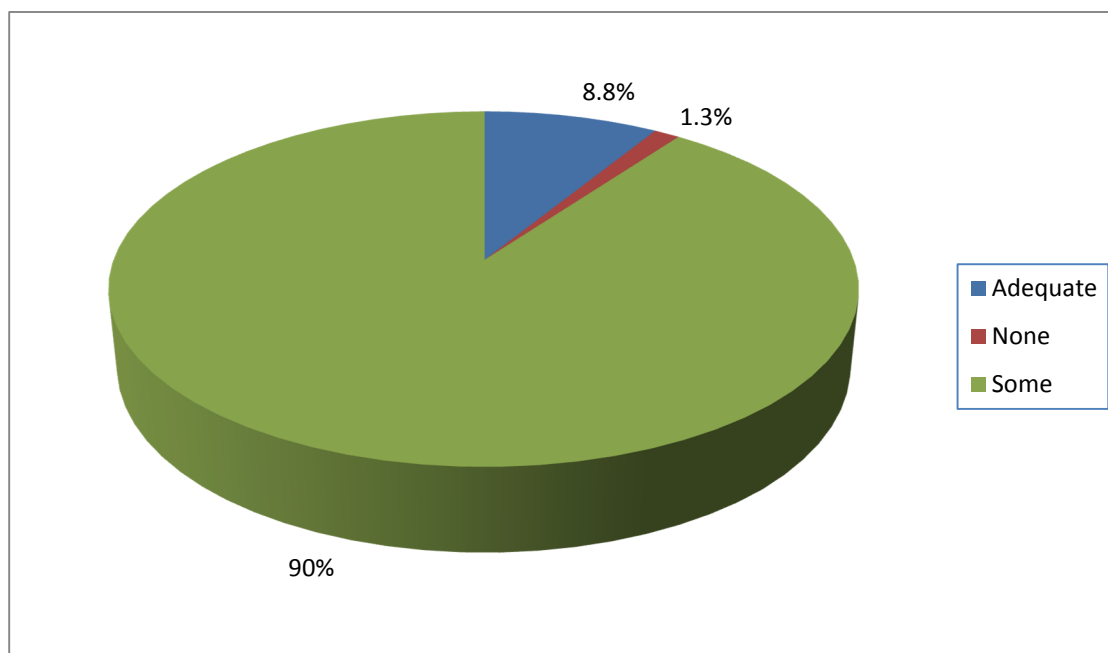


Fig 1: Distribution of labour supply of food crop farmer

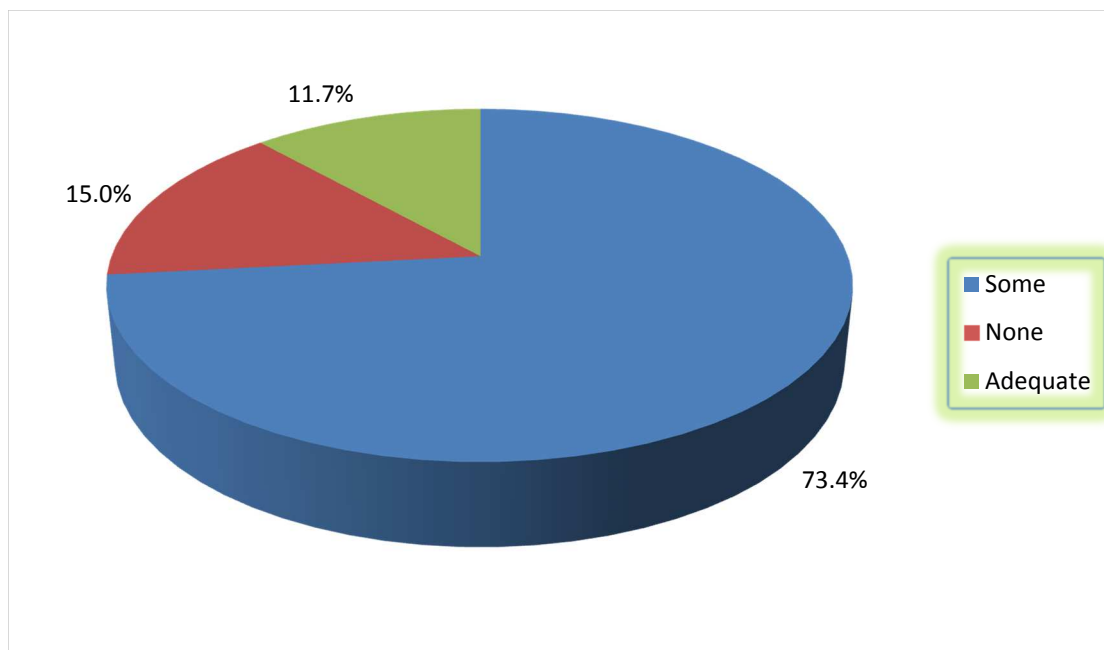


Fig 2: Distribution of labour supply of tree crop farmers

T -test result in 2 shows that coefficient of labour supply ($t=4.79$, $p \leq 0.05$) was a significant factor in food and tree crop production in southwestern Nigeria. Farmers are into different mixed crop production with varying crop combination, hence, food or tree crop production will differ in terms of quantity and quality

labour required. Besides, most activities involved in tree crop production were not mechanised, more labour was required for higher output. In addition, most of the tree crop farmers are into large scale production that required a lot of human labour.

Table 2: T-test statistics of difference in labour supply for food and tree crop production

Labour Supply	N	Mean	Std deviation	Std Error	Mean Diff	t	df	F	P
Food	240	22.68	21.57	1.39	1.33	0.66	447	4.79	0.00
Tree	214	21.35	21.17	1.44					

Source: Computed from field survey, 2011.

Multivariate analysis shows that significant linear relationship exist between the dependent and the independent variables ($F=4.837$ (food), $F=5.323$ (tree), $p \leq 0.05$). This implies that the effectiveness of the combination of independent variables in predicting labour supply could not have occurred due to chance. Six independent variables were significant predictor of labour supply for food crops. The variables are household size, farm location, hours of work, number of sources of information, contact with extension agents and use of labour saving devices. However, three independent variables were significant predictor of labour supply for tree crop, and they are number of dependants, farm size and contact with the extension agents.

Coefficients of household size ($\beta=-0.23$), farm location ($\beta=-0.96$), hours of work ($\beta=-4.10$) were negative but significant predictor of labour supply for food crops. Number of sources of information ($\beta=19.65$), contact with extension agents ($\beta=6.53$) and use of labour saving devices ($\beta=13.38$) were positive and significant predictors of labour supply for food crops. Coefficients of number of dependant ($\beta=-3.03$) was negative but a significant predictor of labour supply for tree crops while coefficient of farm size ($\beta=7.13$) and contact with extension agents ($\beta=7.98$) were positive and significant predictors of labour supply for tree crops.

Corroborating this study, an increase in household size would increase the number of people available for farm work and reduce the number of hired labour and this conform to the a priori expectation. Large household size is a source of labour for most farm operations. Simonya and Obiakor (2012) also found that coefficient of household size was significant and had an inverse relationship with labour use for yam production. Besides, the study showed that an increase in farm size would increase the number of labour needed.

Ezedinma (2000), Fasoranti (2008), Oluyole and Lawal (2010) and by Enete and Okon (2012) in their studies similarly found that farm size significantly affected labour input. Therefore, the larger the farm size the more the labour input required for farm production activities.

Farmers who utilise many sources of labour information will have more exposure and understanding on various aspect of labour and be able to use more labour efficiently. Williams, Stanfield, Whiting and Senining (1998) also found a significant and positive relationship between mass media exposure and innovativeness. Their findings also revealed that age and education influence contact with information sources. The major source of farm practice information remains undoubtedly the extension source. Supporting this finding, Simonya and Obiakor (2012) also documented that extension contact was positive and significantly related to household labour use for yam. Akintola and Rahji (2000) also established a significant relationship between extension agent's visit and increased intensity of farmers' participation in fadama. A number of studies by Amaza and Olayemi (2000), Ajibefun, Ademola and Obioma (2000) revealed that extension contact had positive coefficient and was statistically significant.

Conclusion

Based on the result of this study, the following conclusions are drawn.

There exists a relationship between labor supply and technology adoption. Hence labor use implications of recommended technology must be taken into consideration. Increased use of labour saving devices and other management practices will also make farming less labour demanding.

Table 3: Regression analysis on tree crop production in southwestern determinants of labour supply for food and Nigeria.

	Food (labour supply)		Tree (labour supply)	
	B	t	B	t
Constant	-6.43	(-0.47)	-15.13	(-1.18)
Age	-1.79	(-0.60)	-4.19	(-1.19)
Sex	0.54	(0.92)	0.11	(0.91)
Marital status	1.52	(0.56)	1.99	(0.64)
Household size	-0.23	(-1.92)*	-0.19	(-0.36)
Number of dependants	-0.17	(-0.30)	-3.03	(-5.10)*
Educational level	2.55	(0.91)	-0.61	(-0.42)
Farm location	-0.96	(-2.33)*	0.26	(0.45)
Farm size	8.68	(2.92)	7.13	(2.44)*
Years of experience	0.30	(0.91)	-0.45	(-1.19)
Hours of work	-4.10	(-1.94)*	0.63	(0.25)
Number of farms	-0.46	(-0.23)	0.41	(1.44)
Number of sources of labour	-1.33	(-0.61)	-2.51	(-1.11)
Number of sources of labour information	19.65	(2.80)*	-2.51	(-0.28)
Number of contact with extension agents	6.53	(2.38)*	7.98	(2.84)*
Use of labour saving devices	13.38	(4.61)*	10.08	(4.30)
Labour cost	-1.10	(-0.39)	2.38	(0.78)
R	0.54		0.58	
R ²	0.29		0.34	
Adjusted R	0.23		0.27	
F	4.83		5.32	
P	0.00		0.00	

$$Y = b_0 + b_1X_1 + b_2 X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + b_{11}X_{11} + b_{12}X_{12} + b_{13}X_{13} + b_{14}X_{14} + b_{15}X_{15} + b_{16}X_{16} + U$$

b₀ = regression constant

b = slope of the linear regression

U=error term

x₁ =age (years)

x₂ = sex

x₃ = marital status

x₄ = household size (exact number)

x₅ = number of dependants (exact number)

x₆ = education

x₇ =farm location

x₁₈ = size of farm (hectare)

x₁₉ = years of experience (years)

x₁₀ = hours of work (hours)

x₁₁ = number of farms

x₁₂ = source of labour

x₁₃ = number of sources of labour information

X₁₄ = contact with extension agents

X₁₅ = use of labour saving device

X₁₆ = labour cost

References

- Adedipe, N.O., Tayo, T.O., Fabiyi, Y.L. and Daramola, A.M.C. 1997. National Agricultural Research Strategy Plan (NARSP),
Report on south west zone of Nigeria, National Agricultural Research Project.
- Adegeye, A.J. and Dittoh, J.S. 1985. Essential of agricultural economics. Nigeria: Impact publishers Limited. 51-109.
- Adeyeye, V.A. and Akande, S.O. 1988. Labour crisis in Nigeria Agriculture, *Paper presented at the Conference on Rural Employment Generation in Nigeria* Y. L. Fabiyi Eds. Nigerian Association of Agricultural Economists. Obafemi Awolowo University, Ile-Ife. 134-138.
- Ajibefun, I.A., Ademola, G. and Obioma, A. 2000. Investigation of factors influencing technical efficiency of small holder crop farmers in Nigeria. CEPA working paper 10/96. Department of Economics, University of New England. 19.
- Akanni, K.A. and Dada, A.O. 2012. Analysis of labour use pattern and small holder cocoa farmers in southwestern Nigeria. Department of Agricultural Economics, College of Agricultural sciences, Olabisi Onabanjo University. 16. 2: 107. Retrieved Dec. 18, 2012, <http://connection.ebtcohost.com/c/article/7447669/analysis-labour-use-pattern>
- Akintola, J.O. and Rahji, M.A.Y. 2000. Analysis of small scale farmers in participation in national fadama. Dry season farming scheme in Oyo state. *Journal of Tropical Forest Reserve* 16. 1:116-117.
- Akinwumi, J.A. 1995. The Nigerian and world cocoa production. Outline cocoa research in Nigeria. *Proceedings of a National Seminar on Revolutionizing Nigeria Cocoa Industry*. A. J. Adegeye and W.D. Ajayi, Eds. Ibadan: Adaptive research group. 3-7.
- Amaza, P.S. and Olayemi, J.K. 2000. The influence of education and extension contact on food production in Gombe state, Nigeria. *Journal of Agribusiness and Rural Development* 1, 1:80-92.
- Asoegwu, S.N. and Asoegwu, A.O. 2007. An overview of agricultural mechanisation and it environmental management in Nigeria. *Agricultural Engineering International: The CIGR E Journal* 6, 9. Retrieved March 19, 2013 from <http://economics.cornelledu/bitstream/>
- Asamao, A.K. 2001. On social change in sub-Saharan Africa. A guide to the study of the process of social transformation. Supported by Ford foundation. Accra, Ghana: CAF Woeli publishing services. 23.
- Babalola, O. 2002. Nigerian agriculture: Basis for hope, hurdles against hope, hope for tomorrow. A University lecture, Department of Agronomy, University of Ibadan. 38- 67.

- Badmus, M.A. and Akinyosoye, V.O. 2006. Determinants of child labour supply in rural areas of Nigeria. *Journal of Rural Economics and Development* 15. 2: 87-101.
- Bagamba, F., Burger, K. and Kuyvenhoven, A. 2007. Determinants of small holder farmer labour allocation decisions in Uganda. *Paper Prepared for presentation at the 106th Seminar EAAE Pro-poor Development in Low Income Countries*: Retrieved Dec. 18, 2012 from <http://ageconsearch.umn.edu/bitstream/79201/pdf>
- Berkley, H. 1990. An introduction to economics for students of agriculture. Oxford, United Kingdom: Pergamon Press. 174.
- Central Bank of Nigeria (CBN) 2003. Central bank of Nigeria annual report and statement of account for year ended 31st December 2003. Abuja.
- Central Bank of Nigeria (CBN) 2006. Central bank of Nigeria annual report and statement of account for the year ended 31st December, 2006. Abuja.
- Craig, B. 2000. Women, children and calculation of labour productivity in Europe and North America. *History and Measures*. 13, 3-4:271-287. Retrieved Dec. 18, 2012, from www.persee.fr/web/.../hism_0982_1783_20000_num_15_13_1795.
- Dvorak, A.K.1996 Adoption potential of alley cropping. Final project report. Resource and crop management research monograph. 23. Ibadan: IITA.
- Echebiri, R.N. and Mbanasor, J.A. 2003. Rural age distribution and farm labour supply in food crop production systems in Abia state, Nigeria. *Tropical and sub-tropical agro ecosystem* 2:129-136.
- Ekong, E.E. 2003 Rural development in Nigeria. An introduction to rural sociology. Ibadan: Jumak publishers Ltd.
- Enete, A.A. and Okon, U.E. 2012. Economics of water leaf *Talinum triangulare* production in Akwa Ibom state, Nigeria. 4. Retrieved March 12, 2013, from <http://factsreports.reviews.org/438>.
- Ezedinma, C.I. 2000. Farm resource allocation and profitability of arable crops enterprises in the humid forest inland valley ecosystem: A case study of Ozu Abam in southern Nigeria *UNISWA Journal of Agriculture* 9: 48-56.
- Fajana, S. 2000. Functioning of the Nigerian labour market. Lagos Island: Labofin and Company. 64-67.
- Fasoranti, O.O. 2008. The determinants of agricultural production and profitability in Akoko land, Ondo state. Department of Sociology, Adekunle Ajasin University, Akungba. Retrieved Dec. 18, 2012, from <http://irsa-world.org/xii/papers/16-175.pdf>.
- Federal Ministry of Agriculture and Natural Resources. 2009. Cassava development in Nigeria. A country case study towards a global strategy for cassava development. Retrieved Dec. 19, 2012, from www.fao.org/docrep/009/a0154e/A0154E05.ATM.
- Gladwin, C. and McMillan, D. 1989. Is a turnaround in Africa possible without helping African women to

- farm? *Economic Development and Cultural Change* 37. 2: 346-369.
- Idachaba, F.S. 1998. Priorities for Nigerian agriculture in the 5th National Development Plan 1986-1990.
- Idachaba, 2006. Good intentions are not enough. Collected essays on Government and Nigeria agriculture Volume 1: The Agricultural policy process. Ibadan: University of Ibadan. 234, 337-355 & 510.
- International Food Policy Research Institute (IFPRI) 2012. "Global Conference on Women in Agriculture." Retrieved June 26, 2014. (<http://www.ifpri.org/blog/global-conference-women>).
- International Labour Organization 2000. Labour education top on the agenda: Health and safety in agriculture. *Journal of International Labour Organization* 118-119.
- Ministry of Agriculture and Natural Resources (MANR) 1980. Tree crop planting project. Ibadan Western Nigeria: MANR. 1, 219.
- Monluzzaman, M.S., Rahman, M.K., Karim, and Alam, Q.M. 2009. Agro-economic analysis of maize production in Bangladesh: A farm level study. *Bangladesh Journal of Agricultural Research* 34.1:15-24. Retrieved May 22, 2013 from www.banglaajol.info/index.php/BJAR/article/download/5748/4502.
- Norman, D.W. 1973. An economic study of three villages in Zaria province, Samaru Miscellaneous paper 37. Input output study 1. Zaria: Institute of Agricultural Research.
- Nigeria Population Commission (NPC), 2003. Nigeria-Demographic and health survey. Federal republic of Nigeria, ORC Macro: Maryland USA. 1-37. Retrieved Dec. 18, 2012, from http://www.measuredhs.com/pubis/pdf/FR48/00_Front_Matter.pdf.
- Ogunsumi, L.O. and Saka, J.O. 2001. Comparative analysis of labour use efficiency between on-station and on-farm maize production in south western Nigeria. *Moor Journal of Agricultural Research* 2. 2:66-69.
- Ojo, O.S. 2010. Economic analysis of kolanut production in Nigeria. Retrieved June. 5, 2013 from www.krepublishers.com/.../JSS-22-1-001-10-712-Ojo-O-S-Tt.pdf.
- Olusoji, M.O. 2004. Determinants of women labour force participation in Nigeria. Empirical evidence from the geopolitical zones. PhD. Thesis. Dept. of Economics. University of Ibadan. 38.
- Oluyole, K.A. and Lawal, J.O. 2010. Precision farm labour supply for effective cocoa production in Nigeria. *Research Journal of Applied Sciences* 5:191-194. Retrieved Dec. 11, 2011, from <http://www.medwellonline.net/fulltext>
- Pearce, D. and Atkinson, G. 1994. Sustainable agricultural and rural development. Education Exchange Papers DEEP. Rome: Food and Agricultural Organization.
- Sender, J. and Smith, S. 1990. Poverty, class and gender in rural Africa: A Tanzanian case study. Routledge, USA: Chapman and Hall Inc.
- Simonya, J.B. and Obiakor, C.T. 2012. Analysis of household labour use in Yam production in Anambra West Local Government Area of Anambra state. 8, 1:6-10 Retrieved

Dec. 22, 2012, from
[http://patnsjournal.net/vol8
No1/p1.pdf](http://patnsjournal.net/vol8No1/p1.pdf)

Upton, M. 1997. *The Economics of Tropical Farming System*. Cambridge: Cambridge University Press. 1-8.

Vaish, M.C. 2002. *Macroeconomic theory* 12th edition. New Delhi: Vikas publishing house PVT Limited Jangpura. 137, 168.

Williams, A.H., Stanfield, S.D., Whiting, G.C. and Seninig, L. 1998. Pattern of diffusing in rural Brazil. Report of phase 111 diffusion of innovation in rural society. Michigan, USA. *Michigan State University Research Report* 10, 115.