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LABOUR USE IN SMALL-SCALE YAM PRODUCTION IN QUA'AN PAN LOCAL GOVERNMENT AREA OF PLATEAU STATE, NIGERIA.

I. M. POLYCARP and K.N. FUTULESS

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ABSTRACT

The study analyses labour use in small-scale yam production in Qua'an Pan Local Government Area of Plateau State, Nigeria. In the process, data were collected from 92 randomly selected yam farmers on sources, categories, intensity and utilization of labour. Analyses were conducted using descriptive statistics and marginal analyses. Results indicate the family as the most prevalent source of labour with men featuring in all farm operations unlike women and children. Furthermore, harvesting was the most labour intensive operation, followed by weeding and planting. Labour was found to be utilized below economic optimum level (under-utilization) by the farmers. Recommendations given include the need for timely provision of drudgery-minimizing inputs like herbicides, while policy and research efforts should make an articulate organization of rural labour markets and migrant labour to ensure availability throughout the production season.

KEYWORDS: Labour use, Double log (Cobb-Douglas) fuctional form, Marginal analysis, Qua'an Pan Local Government Area, Plateau State.

INTRODUCTION

Labour is an indispensable input in agriculture, especially in a developing country like Nigeria, where the level of production has become low, while the principal tools in use continue to include hoes, cutlasses, axes and knives. It is estimated that human labour accounts for almost 90% of all farm operations in non-mechanized system of farming and in areas where mechanization is possible, human labour requirements make up 50-56 % of all farm operations (Falusi and Olayide, 1980). The major source of labour in Nigerian agriculture is family labour and despite the large rural population, farm labour continues to constitute serious bottlenecks. This is so because hired labour has constituted a major constraint to increased agricultural production. In northern Nigeria, for example, Hamidu, (1995) reported that the amount of land a family could cultivate is not limited by the availability of land but, by the amount of labour they could supply.

For the yam crop, Alvarez and Hahn (1984) identified large amount of labour requirement as the most critical of the inputs in its production. From the foregoing, it becomes pertinent to study labour utilization in small-scale yam production, since yam is an important source of carbohydrate to millions of people in Nigeria and other developing countries. The objective is to analyze sources, categories, intensity, utilization, and efficiency of labour use in small-scale yam production in Qua'an Pan Local Government Area of Plateau State, Nigeria.

Significance Of The Study

Labour constitutes the most crucial and exorbitant farm input in yam production (Alvarez and Hahn, 1984). Due to massive labour requirement, yam production is expensive compared to other root and tuber crops (Nweke, 1980). To this backdrop, the genuine need for a study that will take into account the various components of labour use (sources, category, cost, intensity, efficiency, etc) in yam production and proffer useful recommendations where necessary, cannot be overemphasized. This study will therefore, be useful to farmers who are willing to properly organize the sources and amount of labour they commit to yam production as well as aid policy makers in root and tuber crops development. Furthermore, researchers with interest in related fields will find this work useful.

METHODOLOGY

Qua 'an Pan Local Government Area is located at the southern fringe of Plateau State. It has a land area of about 3,975,111.21 KM^2 and an estimated population of 1.8 million (Qua'an Pan Local Government Council, 1991). The predominant occupation of the inhabitants of the area is farming. The major food crops cultivated are yams, cassava, cowpea, rice and maize with cash crops like groundnut. beniseed and palm trees.

Data for the study were derived mainly from primary sources and sparingly from secondary sources. A random sample of 92 small-scale farmers was drawn from six purposively selected villages, namely: Kwall (16), Namu (17), Kwande (13), Kurgwi (18), Dokan Kasuwa (15) and Bwall (13). The basis of selection of these villages is that they are the peak yam producing areas. The respondents were served with questionnaires for their responses on general farm production activities, delving much into sources, categories and costs of labour use as well as other socio-economic characteristics. The study was conducted between June and November 1999. Data analysis was conducted using descriptive statistics and marginal analysis.

Marginal analysis was conducted to determine labour efficiency in farm production. This involved determining the Marginal Value Product (MVP) and the Marginal Factor Cost (MFC) for labour at geometric mean level. The Marginal Value Product (MVP) and the Marginal Factor Cost (MFC) for labour were derived from a production function analysis (Cobb-Douglas) given on table 5. The choice of Cobb-Douglas production function was necessitated because it rendered the best fit using statistical and econometric criteria. Furthermore, the Cobb Douglas production function has been found by economists to be the most suitable in analyzing problems in industry and agriculture (Sankhayan, 1988).

The double log (Cobb-Douglas) functional form is formulated as follows;

$$\text{Log } Y = \text{Log}b_0 + b_1\text{Log}X_1 + b_2\text{ Log}X_2 + b_3\text{Log}X_3 + b_4\text{Log}X_4 + b_5\text{Log}X_5 +$$

I. M. Polycarp:Faculty of Agriculture, Adamawa State University, Mubi, Adamawa State, Nigeria
K.N. Futuless: Faculty of Agriculture, Adamawa State University, Mubi, Adamawa State, Nigeria

$b_6 LogX_6 . E$

Where; Y= Yam output/ ha (Kg)
X_1= Farm size (Ha)
X_2= Labour (Man days)
X_3= Quantity of yam setts planted (Kg)
X_4= Quantity of Fertilizer applied (Kg)
X_5= Quantity of Herbicides used (Litres)
X_6= Cost of stakes/mulching materials used (N)
b_1-b_6 = Coefficients of independent variables
b_0= constant term
E= Error term

The Marginal Value Product (MVP) on the other hand was computed as follows:

$$MVP = Bi \frac{Yi}{Xi} Py$$

Where: MVP = Marginal Value Product
Bi = Regression coefficient of labour
Yi =Geometric mean of yam output (Kg)
Xi = Geometric mean of labour (Man days)
Py = Unit price of yams/Kg

The MFC of labour was taken as the unit price of labour per man day. This is because yam farmers were assumed to be operating in a purely competitive market (Alimi, 2001).

Efficiency was measured on the basis that labour is used efficiently if the MVP and MFC ratio is one or unity. As a decision rule, if the ratio is less than one, it implies that labour has been excessively used (over utilization) whereas a ratio greater than one indicates underutilization of labour.

RESULTS AND DISCUSSION

Data collected from the study on sources of farm labour by the respondents show that 68.5% of them use family labour while 22.8% obtained labour from hired sources. In addition, only 8.7% were found to have used communal labour (table 1). From these results, it is evident that family labour is the most popular source of farm labour among the farmers. This may be due to the fact that hired labour in yam production is very expensive hence its low popularity compared to family labour. Tetteh and Saakwa (1991) indicated that hired is becoming so exorbitant that farmers resort to the use of family and communal labour.

Table 1: Source of labour for Yam Production

Labour use	Frequency	Percentage
Family	57	62
Hired	21	22.8
Communal	14	15.2
Total	92	100

Results on the category of labour use in yam production by operation are given on table 2. These show that land clearing and mound making are done solely by men. This may be due to the laborious nature of these operations. On the other hand, planting, weeding, staking and harvesting were undertaken by men, women and children, though a higher percentage of men are involved in all the operations than are women and children. Again, only men and women participate in fertilizer application while only men and children undertake crop protection

Table 2: Category of Labour use in Yam Production

Operation	Male(%)	Female (%)	Child (%)	Total (%)
Land clearing	100	0	0	100
Mounding	100	0	0	100
Planting	71.24	19.18	9.58	100
Weeding	63.63	21.53	14.85	100
Staking	61.07	29.16	9.77	100
Fertilizer application	68.81	31.19	0	100
Crop protection	93.26	0	6.74	100
Harvesting	69.77	25.61	4.62	100

(Table 2). The low percentage of women and children involvement in farm operations may be because women combine farm work with household chores like cooking, sweeping, nursing babies, etc while children attend school, run errands as well assist women with housework.

Table 3: Cost and Intensity of Labour Use by Operation for Yam Production

Operation	Wage rate (N/man-day)	Labour use (N/man-day)	Labour cost (N/Ha)	% labour use (%)	Labour* Intensity
Land clearing	80	19.8	1584	7.4	15.5
Mounding	150	25.5	3825	17.8	19.9
Planting	80	34.1	2728	12.7	26.6
Weeding	80	47.8	3824	17.8	37.3
Staking	80	13.4	1072	5.0	10.4
Fertilizer-application	50	12.6	630	3.0	9.8
Crop protection	80	1.4	112	0.5	1.1
Harvesting	150	51.1	7665	35.8	39.9
Total	750	205.7	21,440	100	160.5

* = Labour intensity is computed by dividing labour Use in man days/Ha by average farm size (1.28Ha).

Table 4: Efficiency of Labour Use (Marginal Analysis) For Yam Production

Marginal Value Product (MVP)	18021.76
Marginal Factor Cost (MFC)	750
MVP/MFC	24.029

Table 5: Production Function Results (Cobb-Douglas) for Yam Production

Predictor	Coefficient	T-ratio	P
Constant	4.3318	25.44	0.000
Farm size (X_1)	0.9653***	18.07	0.000
Labour (X_2)	0.1021**	2.13	0.036
Yam setts (X_3)	0.0169***	2.85	0.005
Fertilizer (X_4)	-0.0386*	-1.77	0.080
Herbicides (X_5)	0.0395^{NS}	1.49	0.140
Stakes/Mulching(X_6)	0.003*	1.82	0.072

S= 0.05605 R^2= 92.6% R^2 (adj) = 92.0%

* = Significant at 10%
** = Significant at 5%
*** = Significant at 1%
NS = Not Significant

Study results on cost and intensity of farm operations are given in table 3. Wage rates were found to be the same for farm operations like land clearing, planting, weeding, staking and crop protection which attracted a sum of N80 per man day. Mound making and harvesting attracted N50 per man

day, while the average labour input for yam production was found to be 205.7 man days per hectare costing N21440/Ha. The labour input (205.7 man days/Ha) is slightly lower than that of Ezeh (1991) who obtained 218.3 man days/Ha in Eastern Nigeria, and much lower than that of Acquah and Evange (1991) who got 281.1 man days/Ha in Cameroon. This may be due to differences in the supply of labour or nature of soils and vegetation in the various areas where the studies were conducted. Harvesting, which attracted 51.1 man days costing N7665 was the costliest followed by weeding which attracted 47.8 man days valued at N3825. These are followed by planting (34.1 man days), mounding (25.5 man days), staking (13.4 man days), fertilizer application (12.6 man days) and crop protection (1.4 man days) in that order. These results are further confirmed by their corresponding percentages and intensities which are all depicted on table 3.

Marginal analysis results for labour (computed from yam production function results) are given on table 4. The Marginal Value Product (MVP) for labour was N18021.76. This implies that increasing labour by one percent will increase Total Value Product (TVP) by N18021.76, if other inputs are held constant. The acquisition cost or Marginal Factor Cost (average sum of wage rates) of labour was N750 per man-day (table 3), which is lower than the MVP. This gives an MVP/MFC ratio of 24.029, which is greater than one, implying that revenue from yam production can therefore be increased by increasing the amount of labour used. The reason for labour underutilization may be because the older farming population is ageing while the younger men are not willing to undertake heavy chores with simple tools which magnify the drudgery of primary production (Falusi and Olayide, 1980). The young men prefer to leave for the cities for white collar jobs (rural-urban migration). This is particularly true for yams which are difficult to mechanize.

CONCLUSION AND RECOMMENDATIONS

The study delved into labour use in small-scale yam production. It was discovered that family was the major source of labour with men featuring in all farm operations unlike women and children. Harvesting was found to be the most labour intensive farm operation followed by weeding and planting. Furthermore, labour was found to be under-utilized by the farmers hence the need to apply more of it for increase in yam output and revenues.

To facilitate a more improved use of labour in yam production, the study therefore recommends that drudgery minimizing inputs like tractor services should be made easily available and affordable to the farmers. Furthermore, there should be a re-organization of rural labour markets and migrant labour to ensure availability whenever necessary as well as the need for the development of rural areas, where a greater part of agricultural labour is concentrated, to curb rural urban migration.

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