

Some Factors Affecting the Demand for Hired Labor: A Case Study of Maize Farmers of Benue State, Nigeria

¹I.U. Odoemenem and ²L.N. Odom

¹Department of Agricultural Economics, University of Agriculture, P.M.B. 2373, Makurdi Benue State, Nigeria

²Department of Agricultural Economics, Federal University of Technology Minna

Abstract: A quantitative analysis was used to examine the factors affecting the demand for hired labor among maize growers of Benue State, Nigeria, according to different farm operations. A total of 126 small-scale maize growers were interviewed during the 1988 farming season. The objectives of the study are: determine the economic variables that affect demand for hired labor; analyze the demand for different operations; and identify the socio-economic characteristics of the maize farmers. The results showed that the specified variables accounted for more than 50% in the variation in quantity of labor hired for different farm operations. Empirical measures of maize prices, maize production, farm size, "other inputs" costs, cost of hired labor, cost of hiring machine services and unpaid family labor were variables included in the specified model. Furthermore, 51.59% of the farmers operated farm land within the range of 0.10-1.99 hectares and 47.62% of hired labor was used.

Key words: Farmer, labor, operation, revealed, relationship, salient, significant, small-scale

INTRODUCTION

This research article is an outcome of a survey of one hundred and twenty six (126) Small-scale maize farmers selected from Council Wards in Benue State, Nigeria.

In Nigeria, the number of small-scale farmers has fallen considerably as a result of certain factors such as education and differences in rural and urban income and population Odoemenem (2007). Various National Development Plans have advocated rapid transformation of agriculture to ensure "employment opportunities" self reliance and sufficiency in basic food production, higher per capita real income, foreign exchange earnings, and provision of raw materials (FMP, 1981). The need for self-reliance and sufficiency strategy in food production is the bedrock of a nation's economic and political sovereignty. It implies a country's determination to use its domestic resources in creating utility for its citizens.

Maize (*Zea mays*) is Africa's third most important cereal after wheat and rice Dasbak (2000). It is believed to have originated in Guatemala and Southern Mexico where it was cultivated by the Indians before the arrival of Christopher Columbus. It is reported that the Spaniards and the Portuguese introduced maize throughout the tropics and it reached West Africa during the early 16th century.

Maize grows well in most varied conditions Obi (1991) and currently has more extensive distribution than any other cereal crop. The feature of maize

cultivation in Nigeria is its occurrence in all ecological zones Irving (1969). Its traditional area of production has been the south of latitude 8°N where it is cultivated twice in a year Obi (1991). The expansion of maize into the vast savanna region has not been as rapid as expected because of the various factors required for its profitable. One of such factors is the amount of rainfall for optimal yield maize requires. Maize requires an annual rainfall of between 760mm-1530mm of rain. The traditional areas of maize grain production in Nigeria have been those approximately south of latitude 8°N, mainly the forest zones, but now the production potential of maize has increased from South to the Middle Belt and even to the Northern guinea savanna. Maize formed the major cultivated cereal in the rainforest and derived savanna zones of south-western Nigeria Daramola (1991). The production in the entire country generally increased between 1970 to 1990 due to government projects, incentives and ban on maize importation, extensive promotions by the World Bank assisted Agricultural Development Projects (ADPs) in all the States. For high yield to be realized in mass production, high level production measures were taken.

Idachaba (2004) observed that food insecurity could be caused by supply-side factors and demand-side factors. One of the supply-side causes of food insecurity is food-marketing problem. Institutional arrangement was put in place by Nigerian government for maize marketing until 2003, when the Arable Crops marketing and Development

Company (ACMDC) was established. The establishment of Arable Crops Marketing and Development Company was an integral part of the food security program, which brought about the reactivation of the strategic grain reserve scheme. This involved the building of thirty-three silo complexes to procure and release grains to stabilize price and maintain food security stock.

Maize is a staple food eaten in various forms (processed and unprocessed). It is also an important source of income to the farmers, source of animal feed such as grain, silage or fodder and an important raw material for industrial products such as corn starch, corn oil, corn syrup, ethyl, butyl, and propyl alcohols, acetaldehyde, acetone, glycerol and acetic, citric and lactic acids.

The need for the reappraisal of the demand for hired labor unfortunately arises. This is due to the fact that most authors often take the pattern of demand for hired labor over different operations to be the same, and, therefore carried out analyses only on the combined operations. According to BNARDA (2004), the pattern of demand for hired labor varies from one operation to another. It is also reasonable to believe that the relative variables in influencing the farmer's decision on hired labor demand will differ from operation to operation.

Maize production; in Benue State, by small-scale farmers assumed a greater importance since the imposition of a ban on rice importation. These farmers use a mixture of practices, which differ in terms of land preparation, nursery practices, planting population, use of fertilizer, physical and chemical control of birds and rodents, timing of various operations and in water management practices.

Differences in these practices are often motivated by resources endowments, but in a few cases may be due to ignorance. For some or all of these variations, output is lower than expected and varies from farm to farm BNARDA (2004).

The objectives of this study are: (a) determine the economic variables that affect demand for hired labor; (b) analyze the demand for different operations; and (c) identify the socio-economic characteristics of the maize farmers.

MATERIALS AND METHODS

The study area: Benue State in the Middle Belt Zone of Nigeria was selected for the study: during the 2008 farming season. Benue State derives its name from River Benue, the second largest River in Nigeria. The State, created in 1976, is located in the Middle Belt region of Nigeria, approximately between latitudes $6\frac{1}{2}$ and $8\frac{1}{2}$ ° N and longitude $7\frac{1}{2}$ and 10 ° E. The State shares boundaries with five other states namely, Nasarawa, to the North, Taraba to the East, Cross River to the South-East, Enugu

to the South-East, and Kogi to the West. The Southern part of the State shares boundary with Republic of Cameroon. The State is also bordered on the North by 280 km River Benue, and is traversed by 202 km of River Katsina-Ala in the inland areas. The State has a total land area of about 30,955 square kilometers and administratively it is divided into 23 Local Government Areas. Benue State has an estimated population of 4,219,244, and is made up of 413,159 farm families NPC (2006). Benue State has a tropical climate, which manifests two distinct seasons. The rainy season is from April to October while the dry season is from November to March. Annual average varies from 1750 mm in the Southern part of the state to 1250 mm in the North. In the mountain region of Kashimbia area average rainfall rises up to 400mm. The hot season comes in mid April with temperatures between 32 and 38°C with high humidity.

Data collection: Considering the time and cost advantages of working, Benue State of Nigeria, was selected for this study. This State is in the Middle Belt Region of Nigeria and it is one of the States known for high production of Maize with a land mass for the production of cereal crops BNARDA (2004).

A multistage random sampling method was used to select the respondents for the survey. Seven Council wards were randomly selected. Finally, from the selected wards, 18 small-scale maize farmers were randomly selected making a total of 126 small-scale farmers for the study.

A very important factor considered in surveying these farmers were the high dependence of the farmers on both hired and family labor as well as tractor for farm operation and the literacy of the farmers which made collection of data reliable and easy. All the 126 small-scale maize farmers were interviewed. Field and house interviews, using structured questionnaires were employed in obtaining information from the farmers. The interviews were conducted at the time of land preparation and harvesting periods. To prevent memory lapses, the farmers were interviewed after performing each operation. The questionnaires, were designed in such a way as to obtain data on the following: laborers hired according to operations measured in man-days, prevailing price of maize per 100 Kg bag at the end of the harvest season, output of maize per annum measured in 100 Kg bag. Analysis was done for all the different operations.

Model specification: The relationship between the dependent and explanatory variables can be expressed as follows:

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, U)$$

where,

- Y = labor hired during an operation measured in man-days
- X₁ = hired cost per hectare measured in Naira
- X₂ = prevailing price of maize measured in Naira
- X₃ = total cost incurred on production of maize per annum in Naira
- X₄ = amount of maize output per annum measured in kilograms
- X₅ = farm size measured in hectares
- X₆ = other inputs cost
- X₇ = cost of hiring machine services
- X₈ = unpaid family labor measured in man-days
- U = random error

All the explanatory variables in the model were predetermined and with the equation specified, the disturbances and the explanatory variables were presumed to be independently distributed. Hence, the ordinary least square regression technique was employed in the analysis.

RESULTS AND DISCUSSION

The socio-economic characteristics of the small-scale maize farmers (Table 1) such as hired labor (31.75%), family labor (47.62%), annual maize output in kilogram (41.27%), and farm size in hectares (51.59%), respectively constitute the major farm operations of the respondent farmers. The implication of this result is in spite of the high cost of labor, the farmers invested on hired labor to supplement family labor for increased farm production.

Analysis in (Table 2), shows that majority of the small-scale maize farmers (50.00%), planted improved variety of maize while (39.68%), planted local variety of maize. The study further revealed that (55.56%), of the respondents did not have access to credit while (67.46%) did not have access to extension services. This result suggests that unavailability of credit and extension services hindered the farmer's ability to acquire new technical knowledge as well as have access to improved production Technology, (Odoemenem and Obinne, 2010).

In (Table 3), the study revealed that hired labor (35.71%), family labor (18.25%), fertilizer (16.67%), improved seed (15.08%), insecticide (7.94%), and access to tractor (6.35%), respectively were the most scarce production resources among the respondents. This analysis shows that the demand for the production resources, especially hired labor, family labor, improved seed and fertilizer as production resources were on the increase thereby causing scarcity. Ojo (2004), reported that the greatest constraint to adoption of improved technology is the unavailability of the technology.

The following results were observed in the regression analysis. Firstly, the result that include the most salient

Table 1: The socio-economic characteristics of the small-scale maize farmers

Index	Frequency	Percentage
Labor		
Hired labor	60	47.62
Family labor	40	31.75
Both	26	20.63
Total	126	100.00
Annual maize output (kg)		
1000	52	41.27
1001-3000	30	23.81
3001-5000	18	14.29
5001-7000	14	11.11
7000 and above	12	9.52
Total	126	100.00
Farm size (ha)		
0.10-1.99	65	51.59
2.00-3.99	46	36.51
4.00-6.00	15	11.90
Total	126	100.00

Source: Field Survey 2008

Table 2: Technology distribution of maize enterprise by the farmers

Index	Frequency	Percentage
Variety of maize		
Local variety	50	39.68
Improved variety	63	50.00
Not sure	13	10.32
Total	126	100.00
Access to credit		
Did not use credit	70	55.56
Used credit	40	31.74
No access to credit	16	12.70
Total	126	100.00
Access to extension services		
No access to extension services	85	67.46
Access to Extension services	41	32.54
Total	126	100.00

Source: Field Survey 2008

Table 3: Distribution of maize farmers by scarcity of production resources

Production resources	Frequency	Percentage
Fertilizer	21	16.67
Insecticide/herbicide	10	7.94
Access to tractor	8	6.35
Improved maize seed	19	15.08
Family labor	23	18.23
Hired labor	45	35.71
Total	126	100.00

Source: Field Survey 2008

factors which affect demand for hired labor by providing a good fit to the demand data as revealed by a reasonably high coefficient of multiple determination (R²); and secondly, that with a significant t-ratio. The regression coefficient is presented in Table 4. The results for the planting operation indicate that the functional relationship was highly significant. However, "other inputs" cost was found to be statistically insignificant. This shows that the variable (6) is likely to be a redundant one. The coefficients of all the other variables have acceptable signs in all the instances except labor cost. The positive sign of labor cost coefficient in planting operation could be due to obvious reasons. Firstly, the time of planting

Table 4: Estimates of regression coefficients of demand for hired labor

Operations	No. of observations	Constant terms	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	R ²	F
						NS			**		**	
Planting	126	- 0.61	0.45 (3.67) NS	0.35 (4.65) **	1.35 (3.40) **	1.75 (4.20) **		0.29 (4.01)	-0.06 (-0.6)	-0.69 (5.48) **	0.69	13.39
Thinning	126	10.16	-0.10 (-0.02) **	0.31 (4.45) **	4.06 (4.45) *	3.70 (8.30) *	0.35 (5.61)			-0.44 (-5.79) **	0.74	49.92
Weeding	126	4.16	-0.03 *	0.45 *	5.49 *	3.09 *	0.24 *		-1.29 **	0.44 *	0.65	27.4
Fertilizer Application	126	6.11	-0.30 (-2.52) *	0.28 (2.78) *	4.39 (4.47) *	3.28 (4.72) *	0.34 (4.75) *	0.30		-0.44 (-3.30)	0.72	41.28
Harvesting	126	1.15	-0.25 (-2.37)	0.52 (4.97)	2.88 (2.75)	1.67 (4.11)	0.35 (4.80)	0.11 (0.99)	NS	NS	0.49	16.95

** : Significant at the 1 % level; * : Significant at the 5 % level; NS = Not significant; Source: Field survey 2008

after the first one or two rains is very important in maize production for seed germination. Farmers hired more labor even at higher cost to meet the limited planting time constraint. Secondly, an alternative mechanical planter, available to the farmers for planting was not very popular with the farmers because of its inefficiency. In addition, there was no substitute to labor, hence farmers demanded more labor despite the high cost. Thirdly, the cost of hiring labor to plant a hectare of land was fairly small when compared with other operations. As a result, farmers employed more labor even when there was increase in labor cost.

The regression coefficients in thinning operation of all the variables except labor cost were statistically significant in all instances. The results for weeding operation are statistically significant. The coefficients of all the variables have acceptable signs in all instances. The coefficients of all the variables estimated during fertilizer application were significant in all instances except “other inputs” cost and the unpaid family labor were statistically insignificant. Farm size coefficient was also insignificant. The results further indicate that the coefficient of most of the variables were highly significant. The model explains 71, 64, 66 and 49% of the variation in the demand for hired labor in planting, thinning, weeding, fertilizer application and harvesting respectively. This implies that the demands for hired labor by the sampled farmers for their farm operations are explained by the joint changes in the explanatory variables. Furthermore, the result showed that at 1 and 5% levels of significance, planting, thinning, weeding, fertilizer application and harvesting had positive and significant effect on the use of hired labor for maize production in Benue State. The possible reason for the low (R²) value in harvesting operation may be related to the intensity of work, which was not captured in the model. The same number of laborers can achieve more or less, work, depending on how intensively they work.

CONCLUSION

One of the findings of this study reveals that the prevailing price of maize has a positive coefficient, suggesting a positive effect on current demand for hired labor. The implication is that maize producer price is an important factor in hired labor demand function. Another finding of the study is that it is more informative to estimate demand for hired labor, according to different operations after which the estimate of the combined farm operations could be undertaken. This is because the former determines response “between” operations. This suggests that the former captures mostly, short-term effect of variables variation, while the latter captures mostly the long-run effect.

In spite of the high cost of hired labor, the favorable policy environment in the maize industry with its profitability improvement capacity has encouraged the rural maize farmers in Benue State to invest on hired labor to supplement available family labor for increased maize production. Furthermore, findings of the study reveal that the favorable environment in the maize industry has brought about an improvement, in the income generation of the maize farmers.

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