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Impacts of HIV/AIDS on Farmers' Efficiency in Anambra State, Nigeria

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Abstract: HIV/AIDS is beyond a medical issue. Its networks cut across the whole system of human endeavor-social, finance/business, household decisions, government policy and food security. The study assessed the impact of HIV/AIDS on agriculture in Nnewi Local Government area of Anambra State, Nigeria. Primary data were collected from 102 respondents. Sixty two HIV positive and 40 HIV negative farmers were selected randomly from the village within Nnewi. Stochastic frontier production function was the analytical tool. The result showed that farmers were inefficient in their resource use. HIV status and number of sick days were found to increase inefficiencies among the farmers by 7.58 and 0.243 unit respectively. While production inputs should be made accessible to farmers, proper attention should be paid to the infected farmers and enlightenment campaign against the spread of the virus be embark upon.

Key words: HIV/AIDS, infected farmers, inefficiencies, human endeavor, government policy, Nigeria

INTRODUCTION

Agriculture is the largest sector in most African economies. It accounts for significant portion of production and employment. In many African countries, farming and other rural occupations provide a livelihood for more than 70% of the population. The role of agriculture in the Nigerian economy cannot be overemphasized. The sector contributes about 41% of the country's Gross Domestic Product (GDP), it employs about 65% of the total population and provides employment for about 80% of the rural population (Federal Ministry of Agriculture and Rural Development, FMARD, 2005).

AIDS, though a relatively need infectious disease of only a quarter of a century old; its negative impact is felt mostly in sub-Saharan Africa to which Nigeria belongs (Papageorgion and Sroyrchenia, 2005). The report of UNAIDS showed that sequel to this infection; food security has worsened dramatically in a number of African countries as regionally the magnitude of the epidemic is greatest in sub-Saharan Africa, where more than 28.5 million people are infected with the virus, than anywhere else in the world. The national HIV Sero-prevalence sentinel survey of 2003 conducted by the Federal Ministry of Health showed that all states of Nigeria are affected by HIV/AIDS scourge. The adult HIV prevalence has increased form 1.8% in 1991 to 4.5% in 1996 and 5.8% in 2001. As at 2003, the natural prevalence rate stood at 5.0%. The steady increases in the prevalence therefore become issues of concern. FAO (2002) estimated that in the 27 hardest-hit countries in sub-Saharan Africa, seven million agricultural workers had died from AIDS since 1985 and another 16 million may die by 2020.

Research reports have shown that certainly, the epidemic existed in the rural areas and particularly among farming households in Nigeria (Oyekale, 2004; Adeoti, 2003; Akintoye, 1998). In Zimbabwe, a country with an adult prevalence HIV/AIDS of more than 25%, Kwaramba, (1997) found that agricultural output declined by nearly 50% in the households affected by AIDS. FAO reported a shifting work pattern and an overall reduction in food production in Burkina Faso. The study also showed the net revenues from agricultural production had decreased by 25 to 50%.

If farmers become ill or died as a result of this disease, the hecterage of land planted becomes reduced hence the harvest. Therefore, household survival is affected as well as the natural food security. In very recent times; studies have begun to look at issues on AIDS impacts in Nigeria. A wide variation was shown in the technical efficiencies of farmers of HIV positive and HIV negative farmers in Benue state, Nigeria, in the study of Adeoti (2003). The study showed that HIV farmers had a mean efficiency of 0.52 while the HIV negative farmer had 0.70. Oyekale (2004) found that the average efficiency levels of HIV

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negative farmer was 75.02% while it was 45.36% for HIV positive farmers. If the variation lingers on; A significant macro-economic problem would be precipitated in a country whose agricultural activity is the mainstay of the economy. There is still a great need to study the effect of this virus on the activities of rural populace since it has spread to every part of the country. Policy formulation and implementation might actually lack the merit to meet the needs of the infected and affected population if studies are not focused deeply at revealing the effects of the virus in the various communities in the country. The objective of the study therefore assessed the effect of HIV/AIDS on efficiencies of farmers in Nnewi local government of Anambra state, Nigeria.

MATRIALS AND METHODS

The study was carried out in Nnewi local government area of Anambra state, Nigeria. The area was selected as agriculture in the major means of livelihood. The study area also exists in a state with a steadily increasing HIV prevalence rate since 1991. The rates were 0.4, 2.4, 5.3, 6.0 and 6.5 from 1991/92, 1993/94, 1995/96, 1999 and 2001. Currently, the Nnamdi Azikwe University Teachers Hospitals, located in the study area treats as many as 210 HIV positive patients every week. Both primary and secondary sources of data were utilized. A multi-stage random sampling procedure was used to select of 62 HIV positive farmers and 40 HIV negative farmers while questionnaire administrations were used to seek information from the farmers. Information sought included some socio-economic characteristics, production factors and returns, common sickness, number of sick days and so on. Descriptive statistics tools and stochastic frontier production function were used as tools.

Stochastic frontier production model: The stochastic frontier model production function is defined by:

$$Y_i = f(X_i \beta_i) \exp(V_i - U_i) \quad (1)$$

Where i = 1, 2, ------- n

Y_i = The explained or dependent variable
B_i = Vector of parameters
X_i = Independent variables
V_i = In a random error
U_i = Technical inefficiency

The symmetric component, V_i accounts for random variation in output due to factors outside the farmers' control, such as weather and diseases. It is assumed to be I ndependently and identically distributed as N~ $(0, \sigma^2 v)$. A one-sided $u \leq 0$ reflects technical inefficiency relative to the stochastic frontier, $f(X_1 B) e^{\varepsilon}$, where $\varepsilon = (v + u)$.

Maximum likelihood procedures were used to estimate the parameters. The estimation was done using Frontier 4.1 developed by Coelli (1996). This is one the available and most widely used statistical packages for efficiency analysis.

The Cobb-Douglas function of the frontier is given below:

$$Y_i = (\beta_0 X_i^{\hat{a}i}) \quad (2)$$

However, the model is linearized as given below.

$$\text{Log } Y_i = \beta_0 + \beta_1 \log X_1 + \beta_2 \log X_2 + \beta_3 \log X_3 + \beta_4 \log X + {}_4 \beta_5 \log X_5 + \beta_6 \log X_6 + (v_i - u_i) \quad (3)$$

Where Y_i= Output of the farmer (Naira)

X_1 = Land area of ith farmer (hectare)
X_2 = Cost of family labour of ith farmer
X_3 = Cost of hired labour of ith farmer
X_4 = Cost of fertilizer of ith farmer
X_5 = Cost of chemicals of ith farmer
X_6 = Cost of seed of ith farmer
V_i = Symmetry error
U_i = Inefficiency

Inefficiency model: The inefficiency model is stated as

$$|U_i| = \theta_0 + a_i \sum_{i=1}^{4} M_i + \delta_i \quad (4)$$

Where $|U_i|$ = Inefficiency of ith farmer

M_1 = Sex of household (Male = 1, 0 otherwise)
M_2 = Farming experience (years)
M_3 = HIV status (positive 1, 0 otherwise)
M_4 = Total farm days lost due to sickness in the cropping season
δ_i = Error farm

RESULTS AND DISCUSSION

The result of Maximum Likelihood Estimates (MLE) of the frontier production function specified in Eq. 3 is

Table 1: Determinants of economic inefficiency and effects of HIV/AIDS on productivity

Variable	Coefficient	Standard-error	T-ratio
Constant	3.065	0.1042	29.42***
Land area (hectare)	0.3325	0.0883	37.67***
Family labour (₦)	0.00624	0.0156	0.399**
Hired labour (₦)	0.0745	0.0145	5.15***
Fertilizer cost (₦)	0.1248	0.0179	6.96***
Chemicals cost (₦)	0.1537	0.0211	7.28***
Cost of seeds (₦)	0.2679	0.0232	11.57***
Inefficiency model			
Constant	-12.60	3.97	-3.18**
Sex	0.8651	0.9039	0.9571
Farming experience	-0.014	0.0601	-0.2326
HIV status	7.58	2.24	3.382***
Total sick days	0.243	0.1307	1.858*
Diagnostic statistics			
Sigma-squared	2.47	0.5729	4.31***
Gamma $\gamma = \sigma_u^2/(\sigma_u^2 + \sigma_v^2)$	0.991	0.0042	234.31***

Log likelihood function = -17.85 Likelihood ratio test of the one-sided error = 134.57***Significant at 1% **Significant at 5% *Significant at 10%

Table 2: Frequency distribution of efficiency estimates of farmers

	HIV positive		HIV negative	
Efficiency estimates	Frequency	(%)	Frequency	(%)
0.30-0.39	-		1	2.5
0.40-0.49	5	-	2	5
0.50-0.59	11	8.06	5	12.5
0.60-0.69	15	17.75	8	20
0.70-0.79	14	24.19	9	22.5
0.80-0.89	11	22.58	8	20
0.90-0.99	6	17.74	7	17.0
Total	62	9.68	8	100
Average efficiency	7.032	100	7.35	

presented in Table 1. The diagnostic statistics revealed that the efficiency effects jointly estimated are not simply random errors. The gamma (γ) in the ratio of the errors in Eq. 3. If $\gamma = 0$, inefficiency is not present and if $\gamma = 1$, there is no random noise. The estimated value of gamma is 0.991 for the farmers. This implies that the farmers are inefficient.

The result shows that the elasticity coefficient of the production factors (land area, family/hire labour etc.) were all positive and statistically significant at different levels. This is implies that the farmers could still increase their output, hence gross margin if more of these production factors are used.

The fact that the fertilizer and chemical should be increased for increased output is due to the fact that Anambra state where Nnewi Local Government is located suffers from poor soil due to erosion and land over utilization. It is also shown from the inefficiency model Table 1 that HIV positive status increase inefficiency by 7.58. Total sick days; which reduces the number of days of farming activities also increases the inefficiency among the farmers. From the result, if the sick days is increased by 1 day, the inefficiency of an average farmer will increase by 0.243unit.

Efficiency levels: HIV positive and negative farmers: The distribution of economic efficiency among the HIV positive and HIV negative farmers is shown in Table 2. The table shows that the modal economic efficiency estimated for the HIV negative farmers is between 0.70 and 0.79 while it is between 0.60 and 0.69 for the HIV positive farmers. It is also shown that 82.26% of HIV positive farmers had between 0.50 and 0.89 efficiency estimates while 80% of HIV negative farmers had between 0.60 and 0.99 efficiency levels. This further shows the negative effects of HIV/ AIDS on the farmers efficiency in the study area.

CONCLUSION

The study has shown that HIV/AIDS and number of sick days had negative impact on the efficiency of farmers in the study area. It is also evident from the study that more production factors/resources should be used for increased output, hence gross margin.

RECOMMENDATIONS

- Policies should be geared towards making agricultural inputs such as fertilizers, chemicals, seeds and land available and accessible in the study area in order to increase the farmers' potential for higher economic efficiency.
- The farmers should be made to have access to health facilities in the study area so as to reduce number of sick days due to ill health. Special attention should be paid to the needs of HIV positive farmers while enlightenment campaign should be embark upon to reduce grossly, the transmission rate among the farmers since they are lees educated and have low access to information.

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