EFFECTS OF HOOKWORM INFESTATION ON LABOUR EFFICIENCY AND MARGINAL PRODUCTIVITY OF FARMERS IN SELECTED RIVERINE COMMUNITIES IN KOGI STATE.

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Abstract

The study compared labour efficiency and marginal productivity between hookworm infested and non infested crop farmers in selected riverine communities in Omalla, Kogi, Idah and Igalamela/Odolu local Government areas of Kogi state. 200 cassava and maize farmers were randomly selected , 50 infected and non infected farmers were picked from each local government area ,Questionniare was administered which also captured their socio-economic data, identification of infected farmers wasby observation of symptoms and later confirmed from their medical records from the health institutions they attended. Statistical and economic tools used were frequency distribution tables, percentages, Cobb Douglass production function and Kays 1981 method for determining labour efficiency.Marginal value productivity was higher in non infected farmers (labour 0.13 vs 0.07) , the value of production /farmer /year for the non infected was 808.15 – 1620.50 Naira and 715.80 – 1280.15 Naira for the infected. Labour cost /Naira ranged from 65.71 – 135.16 Naira for the infected farmers and 86.75 – 150.45 Naira for the non infected farmers. It was concluded that hookworm infection reduced the man hours /day and hence productivity , it was recommended that health care for farmers be stepped up with a view to increasing their productivity

Keywords: Hookworm, Farmers, labour Efficiency, Marginal Productivity,Riverine

Introduction

Labour is a major limiting resource in small-holder farming. It accounts for 70% of the total cost of production in most farming operations in the rural settings (Okorji 1986). It is the most expensive farm input-in labor-intensive economy like Nigeria (Arene, 1995).

Labour has been one of the few and perhaps the only agricultural input (with the exception of draft horses and mules), whose use has declined substantially over time (Edward, 1986). Many factors have contributed to this decline, including soil factors, and pests and disease where they occur. Zuvekas (1979), opined that diseases directly attacking humans thrive in tropical environments, and named such diseases as malaria, yellow fever, hookworm, guinea worm, leprosy, filariasis and bilharzias. According to the author, these diseases affect about 200 million people, reducing their capability to work and that a billion people are weakened by intestinal parasites. Elmer (1985), noted that chains of events begin with the entrance of a parasite into its host and continue without end through populations and communities. .

One of the most important parasitic disease, is hookworm disease caused by *Ancylostoma duodenale* and *Necator americanus*) , hook worm infestion is a global problem of humans causing serious health hazards (Ginzia *et al*., 2014) it has a peculiar biological attributes, in the sense that even after infection, the infested person goes about his farming business unnoticed, for as long as possible, until his condition is eventually serious to break him down. This obviously leads to gradual deterioration of health and reduction in labour productivity.

Various programmes aimed at increasing the productivity of labour in small-holder agriculture in Nigeria have not been giving impressive result. Even recommendations from various researchers, such as easy access to technological improvements like credits, lands and other resources inputs have not significantly raised the agricultural productivity of these farmers. Perhaps, most of these researchers did not attend to these small-holders' health problems.

Inspite of their predominant role in agriculture, the productivity of small holder farmers in Nigeria is still constrained by socio-economic factors, which limit their access to medical services and influence health seeking behavior. Small-holders farmers, in Nigeria, usually poor, uneducated and in desperate need of farm work, are not in a good condition to protest against dangerous detrimental environmental hazards even when accidents occur or they suspect that their health is being affected. This therefore means that any agricultural development strategy should consider the economic significance of raising the productivity of small-holder labour force and ensure their equitable participation in the daily process of agricultural transformation

In Nigeria, there is not enough data on the economic impact of this diseases on agricultural labour productivity of the small farmer, rather data on this regard come mostly from studies on the impact of malaria, schistomiasis, river blindness and guinea worm disease, which are some of the target disease by WHO. For instance the worldwide guinea worm eradication programme has received tremendous attention, and has been significantly brought under

control. However, some of the non-target diseases like hook-worm have more serous effects on rural farmers' agricultural labour productivity than the target ones. An instance of this is revealed by the university of Ilorin community based environmental sickness (COBES), (a health programme under medical students industrial attachment), in its 1992 reports where about 34% of every household is affected by hookworm disease in the reverine areas of kogi State. As a farming population in the rural setting, this has direct relationship with agricultural labour productivity due to its weakening effect.

Health for all, is undoubtedly among the paramount challenges which nowadays are incumbent on developing countries in general and African countries in particular to take up. In this regard, the situation in Nigeria, is still disturbing. Nigeria is one of the many African countries where small-holder famers have the least hope of surviving and to simply live in good health. This dramatic situation is mainly due to malnutrition, infection, diseases, diarrhea and tropical parasitic diseases. Among the later, hookworm disease plays a central role as it not only creates discomfort and health to infested persons, but also reduces the capacity to work on the farms, leading to a waste of man-hours in food production.(Mohammed *et al* 2016)

Although many studies have been done on production efficiency in traditional agriculture with concentration on the allocative aspects not much has been done on labour efficiency with particular reference to quality of labour and productivity, labour being the most expensive of all the farm productive resources in a labour-intensive economy.

Investigating the economic effect of this on agricultural labour productivity of the small-holder farmers in Nigeria, will aid policy makers in the fields of medicine and agriculture in mapping out policies that will alleviate the poverty problems of small farmers in the country and increase the productivity of agricultural labour

This study therefore examines the effects of hookworm infestation on labour efficiency and marginal productivity of farmers in some selected riverine communities in Kogi state

2.0 Materials and Methods

2.1 Study Area

The study area is reverine areas of Kogi State. The State is made of twenty-one local government areas, as follows: Ankpa, Dekina, Bassa, Olomoro, Omalla, Ofu, Idah, Odoru, Igala mela, Yagba East, Yagba West, Kabba, Mopa-Amuro, Ogori-Magongo, Okene, Ajaokuta, Adavi, Okehi.

The choice of the area is based on the fact that there is a high incidence of hookworm disease in the revering areas of the state. The 1992 reports of the Univeristy of Ilorin Community-Based Environmental Sickness (COBES) revealed this. The area is also noted for high agricultural productivity.

Kogi State has a populating of 2.5 million people in the 1991 National population Census (NPC) with an average of 176,000 farm families. The State is geographically important for its confluence status, where rivers, Niger and Benue meet. It is bounded on the east by Enugu and Benue States, while on the west by Edo, Owo and Kwara States. Kogi lies between latitude 6º33' and 8º44'n and longitudes 5º22' and 7º49'E.

An estimated population of 75% are predominantly farmers, but at small- and Medium-scale level, who depend mostly on agriculture with an average household size of six(6). The major crops grown in this area are cassava, maize, cowpea, yam, rice, melon, oil palm and tree crop. In addition to farming in this area, farmer also practice large-scale fishing activities. Some farmer practice sheep, goat and rabbit farming.

2.2 Sampling Procedure

The Local Government Areas that constitute the reverine are of kogi state which is the study area are Omalla, Koto-Karfe, Idah and Igala mela. Multi-stage random sampling was used.

Stage I: A total of two hundred small-holder farmers was randomly taken. These farmer cultivate both cassava and maize crops effectively, and so their production indicator are similar.

Stage II: out of the two hundred farmers, fifty hookworm infested ones were picked, while fifty non-infested ones were also picked. The hookworm infested famers were identified by the following physical symptoms: breathlessness, palpitation and fainting. For confirmation of infestation, secondary data on these farmer were obtained from medical Records Department of health institution in the study areas.

2.3 Data collection

Both primary and secondary data collection were used. Questionnaire administered was in respect of period of infestation of hookworm infested farmers, labour input, crop output, and expenses on production input.

2.4 Data Analysis

Both Statistical and Econometric tools were employed. The statistical tools include frequency distribution, tables, percentages were used t achieved objective 1. The Econometric tools used is the cob-Douglas production Function Model.

2.4.1 Model Specification

The cob-Douglas production function was fitted as follows to achieve objective 2.

$Y = {}_{ax}{}^{b1}x_2{}^{b2}x_3{}^{b3}$

Where Y = Gross value of output consisting of the main and by-products of the crops (Cassava and Maize).

X_1 = Value of human labour put in for crop production.

X_2 = Land in hectare

X_3 = Capital Services (including value of seeds, fertilizers, herbicides and insecticides.

The kay's (1981) method of measuring labour efficiency, was to achieve objective 3. This approach often use the concept of person-years of labour employed. This is a procedure for combining operator, family and hired labour into a total labour figure which is comparable among farms.

Against this backdrop of the above, the following measure are used:

(1) Value of farm production per person year.

This measure the total value of agricultural products produced per person- year equivalent and is formed by dividing the value of farm production by the person-year equivalent.

Higher values indicate greater labour efficiency.

(2) Farm size per person year.

This is obtained by dividing the tillable hectare by person-year equivalent. Higher values indicate greater labour efficiency.

(3) Labour cost per naira of farm production.

This is obtained by dividing the value of farm production by total labour cost. Lower values implied greater labour efficiency.

(4) Labour cost per hectare of land.

This is found by dividing the total labour cost for a year by the number of tillable hectare or rotated hectares. Lower value indicates greater labour efficiency.

2.4.2 Evaluation of Labour Use Efficiency

Four approaches, based on Kay (1981), were used to evaluate labour efficiency (L.E.). these are (a) the values of farm production per person year (L.E.1; (b) farm size per person year (L.E.2); (c) labour cost per Naira of farm production (L.E.3; (d) labour cost per hectare of land (L.E.4).

These labour efficiency measures were applied to three size of farms for both categories of farmers (Tables 1, 2 and3).

3.0 RESULTS AND DISCUSSION

3.1Estimation of Marginal Productivity of Labour, Land and Capital

It could be seen from Table 1 that the production indicator-labour-is highly significant to influence the gross income in both categories of farmers.

The other production indicator- land and capital-have a significant influence on the gross income in healthy farmers than in the infested ones, this was confirmed by the work of Bleakley(2007) in Southern United States ,, where 40% infection rate decreased farm out put and later sponsored interventions reduced infection rate and increase in farm out put and hence gross income.

The marginal labour productivity of labour input is positive for both categories of farmers, confirming the hypothesis that the marginal productivity of labour is positive. But the marginal value productivity of labour is higher in healthy farmers. Hence, any reduction in labour input as a result of ill-health would result in a decrease in gross income.(Arene, 1995)

Since the other factors of production-land and capital-also significantly influence the gross income and the marginal value product is positive, increase in these cooperating inputs would offset the reduction in labour input. This is more in the case of infested farmers, where the marginal productivity of capital is higher than that of labour.(Welsch, 1985)

Table 1: Estimation of Cobb-Douglas Production Function and Marginal Value Productivity of Hookworm infested and non-infestedfarmers.

Variables	Non-infested farmers		Infested farmers	
Labour	B	MVP	B	MVP
	0.37	0.8	0.13	0.2
	(0.13)		(0.07)	
Land	0.25	1715	0.21	1469
	(0.07)		(0.10)	
Capital	0.08	0.2	0.11	0.3
	(0.04)		(0.07)	

Figures within parenthesis indicate (SE) values.
Source: Field data,1997.

Labour Efficiencies According to Farm Sizes of Infected and non Infected Farmers

For efficiency measures (L.E.1) and (L.E.2) (Tables 2 and 3), higher values implied greater efficiency, whereas for (L.E.3) and (L.E.4), lower values implied greater labour efficiency. The Table showed for example, that one hookworm infested farmer produced food worth ₦715.80 (farm size less than 2ha), while one non-infested farmer produced food worth ₦ 808.65 on the same farm size range. This was

in line with the report of COBES,(1992) that hookworm infected farmers produced less food than non infected farmers, this was also confirmed by the report of Zuvekas(1974) The average farmer in all the farms produced N 1,215.77 and N 992.17 worth of food respectively. This means that using this labour efficiency measure, the most efficient farms among the farmers were those more than 3.00 ha. Farms above 3.00ha were also the most efficient labour users with regard to farm size per person year (L.E.2), labour cost per naira of farm production (L.E.3) and labour cost per hectare of land (L.E.4). these were followed by farms of 2.0-3.0 and less than 2.0 ha respectively for (L..E 2),(L.E.3) and (L.E.4.). From the data above 4.0ha,30% had farm of 2.0-4.0ha, while 66% operate farms less than 2.0ha. in the non-infested farmers,16%had farm of 4.0 ha, 48% had farms of 2.0-4.0ha, 36% operate farms less than 2.0ha. it could, therefore, be said that in terms of L.E.1, L.E.2, L.E.3, and L.E.4, efficiency measures, 4% of the infested farmers were efficient labour users, 30% were moderately efficient labour users while 66% were poor labour users. This finding agreed with the report of Arene and Idenyi (1996) that hookworm infected peasant farmers worked three hours less than their healthy counterparts. Therefore, based on labour efficiency, the minimum recommended farm size for agricultural production for both categories of farmers should be 3 hectares.This agreed with the repot of Olayide (1980)

Table 2: Labour Efficiencies According to Farm Size Non-Infested Farmers

Farm Size (ha)					
Labour Efficiency Measures	Unit	Less than 2	2-3	Above 3	Average labour efficiency for all the farms
Values of farm production per person year (L.E.1)	₦*	808.65	1218.17	1620.50	1215.77
Farm size per person year (L.E.2)	Ha	1.54	2.15	3.22	2.30
Labour cost per Naira of farm production (L.E.3)	₦*	0.34	0.29	0.18	0.27
Labour cost per hectare of land (L.E.4)	₦*	150.45	110.64	86.75	115.95

*82 Naira (₦82)=1 US Dollar
Source: Calculation from field survey data,1997

Table 3: Labour Efficiencies According to Farm Size Infested Farmers

Farm Size (ha)					
Labour Efficiency Measures	Unit	Less than 2	2-3	Above 3	Average labour efficiency for all the farms
Values of farm production per person year (L.E.1)	₦*	715.80	980.57	1280.15	992.17
Farm size per person year (L.E.2)	Ha	1.21	1.98	2.65	1.95
Labour cost per Naira of farm production (L.E.3)	₦*	0.27	0.18	0.09	0.54
Labour cost per hectare of land (L.E.4)	₦*	135.16	97.42	65.71	99.43

*82 Naira (₦82)=1 US Dollar
Source: Calculation from field survey data,1997

4.0 Conclusion and Recommendations

4.1 Conclusion

The study revealed that the non-infested farmers operated on more hectarage than their infested counterparts, due to their good health.

The study also reveals that labour is highly significant to influence the gross income in both categories of farmers. The other indicator — land and capital — have a significant influence on the gross income in healthy farmers than in the infested ones0 The study showed that any reduction in labourInput as a result of ill-health, would result in a decrease in gross income.

The study revealed that the gross margin analysis carried out for the two categories of farmers, was more favourable to the non-infested farmers than the infested ones.

4.2 Recommendations

Since the agricultural productivity of the farmers is low, the Government of Nigeria should Formulate means of raising their productivity, especially that of the unhealthy farmers. These include, not merely access to agricultural credit, land and other farm inputs, but also access to medical services. Rural health care should be integrated to any agricultural development strategy with the objectives of raising the productivity of farmers and promoting their equitable participation in the daily farm activities.

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