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EFFECTS OF HOOKWORM INFESTATION ON LABOUR INPUT AND GROSS MARGIN ANALYSIS OF FARMERS IN SELECTED RIVERINE COMMUNITIES IN KOGI STATE.

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ABSTRACT

The study compared labour input and gross margin 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 , identification of infected farmers was by observation of symptoms and later confirmed from their medical records from the health institutions they attended. Statistical and economic tools were used to determine the labour input and gross margin. The labour input reported were 3 to 5 hours for 80% infected, 6 to 8 hours for 10 of infected farmers and none of the infected farmers put in more than 8 hours. 50% of non infected farmers put in 6 to 8 hours daily , 40% put in 3 to 5 hours daily and 10% worked for more than 8 hours in a day The total revenue and gross margin for infected farmers were 161,000 and 108,780 Naira , while those of the non infected farmers were 170,000 and 125, 000 Naira. It was concluded that hookworm infection reduced the labour input, gross margin and hence productivity of farmers , it was recommended that future agricultural policies and programmes should have health care for farmers as an integral part with a view to increasing farmers productivity

Keywords: Hookworm, Labour Input, Gross Margin, Riverine, Farmers

1.0 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 and Obiechina, 1985). It is the most expensive farm input-in a labor-intensive economy like Nigeria (Arene, 1985). Labour in the simplest terms describes the effort of human beings. It is the work done by human beings and not the persons themselves. Labour productivity in agriculture ,that is the average value product per man-hour, may be increased either by

producing more with the present labour supply or by saving labour. Labour is so important in economic activities that radical socialist –oriented economist think it is the sole embodiment of production. Except for land (with water) which is considered by these economist as given by nature, every other factor of production in their eyes can be expressed in terms of labour. A tractor or a bag of fertilizer, for instance can be expressed in terms of labour units, that is the number of man-days (labour units) needed to produce them. Large proportion of Nigerians are still dependent on agriculture for their livelihood and for many years to come, the bulk of Nigeria's food will be produced in the rural areas by small-holder farmers (Okoye, 1989). .

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). He noted that there has been a steady decline in labour since the 1930's and the total change has been dramatic. 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, which 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 input and hence productivity. (Idenyi *et al*, 2022)

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. Health of the farmers has direct relationship with agricultural labour productivity (Bleakley 2007; Haas and Brownlie, 2001; Guyatt 2000)

In Nigeria, there is inadequate data on the economic impact of this diseases on agricultural labour productivity of the small farmer, rather data in 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 hookworm have more serious 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 riverine 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.(Ginzia *et al* .,2014)

Specifically, the study seeks to:.

(1) Measure the efficiency of labour-use by both categories of famers.

(2) Compare the output of both categories of farmers (Gross Margin).

.Based on the above specific objectives, the null hypothesis formulated is that labour-use by both categories of famers has no significant impact on output.

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 ill health to infested persons, but also reduces the capacity to work on the farms, leading to a waste of man-hours in food production.

In spite of this effort and unlike other health programmes embarked upon by government to control such diseases, hookworm disease has attracted government intervention for its eradication and control.

Investigating the economic effect of this on agricultural labour input productivity and gross margin 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 may be the only problematic issue left in solving the Nigeria food question.

2.0 MATERIALS AND METHODS

2.1 Study Area

The study area was riverine areas of Kogi State. The State is made up 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 area 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, Ondo and Kwara States. Kogi lies between latitude 6°33' and 8°44'N and longitudes 5°22' and 7°49'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 areas 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 farmers 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 used include frequency distribution, Tables, percentages were .

2.5 Model Specification

The Cob-Douglas production function was fitted as follows

$$Y = {}_{ax}{}^{b1}\ {}_{x2}{}^{b2}\ {}_{x3}{}^{b3}$$

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 input 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 used.. 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 the backdrop of the above, the following measures were used:

(1) Value of farm production per person year.

This measures 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.

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.

Labour cost per hectare of land.
This was determined by dividing the total labour cost for a year by the number of tillable hectare or rotated hectares. Lower value indicates greater labour efficiency. The gross margin was determined by using Gross Margin analysis. For this purpose, various production units were considered using the Gross Margin formula as follows:

GM = TR – TVC, where
GM = Gross Margin (N)
TR = Total Revue (N)
TVC = Total variable cost (N)

In computing the gross margin, all the production units were considered. This include cost of labour and capital services, such as seeds, cuttings, herbicides, insecticides and fertilizers. In the case of labour input, the opportunity cost of operator and family labour was included in total labour cost. The cost of treatment of hookworm infestation was also included in the total variables cost of the infested farmers The prevailing market prices of the main and by-products of these crops were estimated, taking into consideration the values given out as gift, value of food consumed by family and value sold. The average land area cultivated was put at 2.2 ha.

3.0 RESULTS AND DISCUSSION

3.1 Labour input (Man-Hour)

The comparism of labour input by both infected and non infected farmers is presented in Table 1 This is the period (estimated in number of man.-hours) spent on the farm performing farm works. It decreases with intensity of hookworm infection attack. The study revealed that 50% of the respondent healthy farmers put in between 6—8 hours daily on the farm, while 10% put in above 8 hours. In the case of the infested farmers, 80% put in 3 — 5 hours, with none putting in above 8 hours. This showed that hookworm infection reduces labour productivity, this result is in line with the report of Arene and Idenyi (1996) who reported a three hour reduction in labour input in hookworm infected farmers, it also corroborates the report of Mohammed *et al* (2016)who also reported reduction in labour input in farm work.

Table 1: Labour Input by Farmers

	Non-Infested farmers		Infested farmers	
Range (Hrs)	Frequency	Percentage (%)	Frequency	&
3-5	20	40	40	80
6-8	25	50	10	20
Above 8	5	10	-	-
Total	50	100	50	100

Source: Field data, 1997.

3.2 Gross Margin Analysis For Non-infested and Infested Farmers

Gross margin analysis for Hookworm infested and non infested farmers is presented in Tables 2 and 3. The cost of labour in this area is between N 80 and N100 per man-day. It was revealed by this study that the healthy farmer put in 144 man-day for the production of maize and cassava enterprise, while the infested farmer put in 160 man-days. This result conforms with the findings of Zuvekas (1979) which named hookworm diseases as one of the major parasitic diseases thriving in the tropical environment and directly attacking humans, thus, causing loss of man-hour at work. The study revealed that the infested farmers put in more man-days than the healthy farmers ,as a result of his poor health, thereby incurring more labour cost. This farmer also has a higher variable cost, resulting from cost of treatment of hookworm infestation. It then implied that the non-infested farmers have a bigger gross margin of N 125,610.00 than the infested one with N 108,890.00,this result corroborates the reports of Guyatt, (2000) Brownlie (2001) and Mohammed *et al*.,(2016) who all reported that hookworm infection reduced the productivity and hence earning capacity of infected farmers.

Table 2: Gross Margin Analysis (Non-infested farmers)

Items	Quantity/unit	Unit price(S)	Total
REVENUE			
a. Gifts	0.5 tan	20.00	10,000.00
maize cob/flour	0.5 tan	6,000.00	3,000.00
cassava			
b. sales	1.0 Tan	20.00	20,000.00
maize	12.5 tan	6,000.00	75,000.00
cassava			
c. Value consumed	1.0 Tan	20.00	20,000.00
maize	7.0 tan	6,000.00	42,000.00
cassava			170,000.00
Total Revenue (TR)			
VARIABLES COST			
a. labour	144 mandays	100.00	14,400.00
b. seeds	7kg	20.00	140.00
c. cutting	80 bundles	15.00	1,200.00
d. (i) insecticides	21 bundles (Apron plus)	70.00	1,400.00
(ii)insecticides	5 litres	650.00	3,250.00
e. Herbicides	15 litres	800	12,000.00
f. Fertilizer	15 bags	800	12,000.00
Total variable cost (TVC)			44,390.00
Gross margin (GM)			125,610.00

Source : field data, 1997.

Table 3 : Gross Margin Analysis (Infested Farmers)

Items	Quantity/unit	Unit price(S)	Total
REVENUE			
a.Gifts			
maize cob/flour	380 tan	20.00	7,600.00
cassava	6 tan	6,000.00	3,600.00
b. sales			
maize	800 tan	20.00	16,000.00
Cassava	13 tan	6,000.00	78,000.00
c. Value consumed			18,000.00
maize	9 tan	20.00	37,800.00
cassava	6.3 tan	6,000.00	161,000.00
Total Revenue (TR)			
VARIABLES COST			
a. labour	160 man-days	100.00	14,400.00
b. seeds	7kg	20.00	140.00
c. cutting	80 bundles	15.00	1,200.00
d. (i) insecticides	21 Satchets of	(Apron plus) 70.00	1,400.00
e. insecticides	5 litres	650.00	3,250.00
f. .Herbicides	15 litres	800	12,000.00
g. Fertilizer	15 bags	800	12,000.00
h. cost of hookworm infection treatment			5,500.00
			52,220.00
Gross margin (GM)			108,780.00

4.0 CONCLUSION AND RECOMMENDATIONS

4.1 Conclusion

It has been demonstrated in the study that labour is the most important input with a marginal value productivity of 0.8 for healthy farmers and 0.2 for infested farmers. If these farmers have access to medical services, many of them can increase production 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 ones The study showed that any reduction in labour Input 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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