Journal of Agriculture and Veterinary Sciences
Volume 9, Number 2, 2017
ISSN: 2277-0062

EFFECT OF MALARIA PREVALENCE ON FARM PRODUCTIVITY OF FARMING HOUSEHOLDS IN IMO STATE, NIGERIA

[1]Osuji, E.E., [2]Ehirim, N.C., [2]Anyanwu, U.G., [2]Okwara, M.O

[1]Department of Agricultural Economics, Michael Okpara University of Agriculture Umudike
[2]Department of Agricultural Economics, Federal University of Technology Owerri, Imo
Email: osujiemeka2@yahoo.com

ABSTRACT

This study evaluated the effect of malaria prevalence on farm productivity of farming households in Imo State, Nigeria. Multi-stage random sampling technique was used to select 108 respondents who sourced malaria treatment from health care service providers with the aid of a well structured questionnaire. Data were analyzed using descriptive statistics, malaria prevalence and incidence rate model, productivity index model, as well as ordinary least square multiple regression model. Farmers had a mean age of 49 years, 8 persons per household, 8 years educational attainment, and mean household income of ₦52,606. The result shows a mean extension effectiveness of 20.3%. This is low compared to a recommended effectiveness of over 80% by World Health Organization. The study shows that Farmers with the highest TFP index between 4.081 to 5.15 have the least average RMP of 15.8%. Linear function was selected as the lead equation which indicates that; malaria prevalence rate, education, age, household income, cost of malaria treatment, distance to health centers and type of health service providers are significant and contributed to the malaria incidence on farm productivity of the farmers. The study recommends the use of mosquito treated bed-nets to be equitably distributed to the farmers and other malaria prevention measures should be encouraged through effective health extension services in the study area.

Keywords: Malaria Prevalence, Farm Productivity, Farming Households, Linear function

INTRODUCTION

Agriculture plays a major role in the economy of many developing countries, as it is a significant source of nourishment for citizens and a means of livelihood for the most vulnerable members of these countries (Liverpool et al. 2011). As a consequence, raising agricultural productivity is an important policy goal for concerned governments and development agencies. Increasing agricultural productivity requires one or more of the following: an increase in output and input with output increasing proportionately more than inputs; an increase in output while inputs remain the same; a decrease in both output and input with input decreasing more; or decreasing input while output remains the same (Adewuyi, 2006).

Increasing inputs in order to expand output involves raising both the quality and quantity of inputs, examples of which would include the mechanization of agricultural processes, use of high yield varieties, use of fertilizers, irrigation in areas where rainfall is inadequate, and the use of agrochemicals such as herbicides and pesticides. Though all of the aforementioned activities have the potential for productivity enhancement, smallholder farmers who account for the vast majority of farmers in developing countries, often cannot afford these investments due to their limited resources and restricted access to credit (Basurko, 2013). As the world's population increases and requires greater food production, farming sites will continue to increase (Asenso-Okyere *et. al.*, 2009;) and some agricultural practices such as poorly constructed or water logged irrigation systems can increase the risk of malaria transmission through the spread of mosquitoes while agricultural pollutants is likely to favour malaria resistance (Kebede *et al.* 2005). In addition, the rapid emergence of urban farming has been associated with adaptations in vectors' preferred habitats and breeding locations (De-Silva and Marshall, 2012).

According to Onwuchekwa (2005) malaria undermines farmers output, labour productivity, interrupts production cycle, and causes resources to be diverted from farm inputs into treatment of malaria episodes. Also, the man-hour loss in farm work at very critical stages of farming activities also impaired production and ultimately results to food shortage and rising food prices across the States in Nigeria (Oluwalana and Ogunsusi, 2013). Evidence shows that Nigeria has the largest population at risk of malaria in Africa and therefore most vulnerable to the risk of missing MDGs target (Girardin et al. 2004). The disease, malaria is a major health problem in the country, with stable transmission throughout the country. It accounts for about 50 percent of out-patient consultation, 15 percent of hospital admission, and also prime among the top three causes of death in the country (National Malaria Control Plan of Action 1996 to 2001). The disease carries with it two categories of costs; morbidity and mortality costs. Malaria morbidity affects households' welfare (through families' allocation to treatment and prevention of the disease), and decline in farm productivity, through lost time. In the case of mortality, losses to households include loss of future income and cumulative investment decline due to malaria incidence.

Malaria in Nigeria is currently confined to all parts of the States including Imo State but with varying incidence and prevalence rate (WHO, 2010). Farming households in the State have witnessed a consistent drop in farm productivity and income due to malaria incidence. Thus, malaria incidence arise from abject poverty; large-scale deforestation, infrastructure development; fuel wood extraction and expansion of settlement; increase in urban agriculture and irrigation farming; increase in urban and watershed flooding due to interference with water ways; presence of surface water bodies and open water storage facilities; indiscriminate dumping of refuse and the spatial pattern of health care facilities and infrastructure (Adesina, 2005; Laah and Zubairu, 2008). Also, coastal, riverine, forested and urban areas are endemic areas. Reducing malaria increases the performance of intensive agricultural production, contributing to national food security and greater rural prosperity (World Bank, 2007).

MATERIALS and METHOD

This study was carried out in Imo State, Nigeria. The state is located in the South-Eastern rainforest belt of Nigeria. Imo State has a total of 27 Local Government Areas which is divided into 3 Agricultural Zones namely; Owerri, Orlu and Okigwe. Across these zones, agriculture is a major economic activity predominant amongst the people of the State. A multi-stage sampling technique was employed in selecting the respondents. This was to enable the survey cover the entire State. In the first stage, one local government area was purposively selected from each of the three Agricultural Zones of Owerri, Orlu and Okigwe respectively. The areas selected are noted for their predominant agricultural activities especially on staple food production. The Local Government Areas are (Ohaji-Egbema in Owerri, Nwangele in Orlu and Okigwe in Okigwe zone thereby giving a total of three Local Government Areas.

Secondly, from each of the Local Government Areas, One Autonomous Community was selected making a total of three communities from which three villages were randomly selected. The presence of health care service providers consisting of Primary Health Care Centers; Private Clinic/Pharmacy/Drug dispensary Centers and Traditional healers located in the selected villages provided the sampling frame. The list of all in-patients and out-patients that patronized these Health Care Service Providers over the past six months was collected. The last stage involved a random selection of 12 households in each village based on the sample frame as obtained from the health care service providers, to give a total of one hundred and eight (108) households for the study. Data for this study were collected through secondary and primary sources using a set of structured questionnaire. Data were analyzed using descriptive statistics, Malaria Incidence and Prevalence rate model, Productivity index model and Ordinary least square regression model.

Malaria Incidence rate model is specified as;

Malaria Incidence rate $(MI) = \left(\frac{x}{y}\right) * k$ ………………………………………… Eqn. 1

Where x is the number of new cases of malaria in the defined population which had its onset during a specified period of time; y is the person time at risk which is defined as population of a defined geographic area under study and k is a constant usually an expression of 1000.

However, Malaria Prevalence rate model is further specified as;

Malaria Prevalence rate $(MP) = \left(\frac{x-z}{y}\right) * 100\%$, …………………………… Eqn. 2

x is the number of existing cases, new and old, in a defined population during a specified period, z is the number of treated cases of malaria at that period of time expressed in percentage.

Productivity index model in line with Osuji et al. (2013) is specified;

Given that $TVP = P * q$ and $TFC = c * X$

$TFP = \frac{TVP}{TFC}$ ……………………………………………………………… Eqn. 3

Since it is assumed that all factor inputs are variable enough to measure their productivity, $TFC = TVC$

Hence, $AVC = \frac{TFC}{TVP}$-- Eqn. 4

Therefore $TFP = \frac{1}{AVC}$ ……………………………………………………… Eqn. 5

Where TFP is the Total Factor Productivity, TVP is the Total Value Product, TFC is the Total Factor Cost, AVC is the Average Variable Cost.

Ordinary least square regression model is explicitly stated as;

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + e$

……………………………………………………………………………………… *Eqn. 6*

Thus, eqn. 6 is further expressed as follows;

Linear Function

$Y_1 = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_nX_n + U$………………………… Eqn. 7

Exponential Function

$\text{Log } Q = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_nX_n + U$……………………………Eqn. 8

Semi-log Function

$Q = b_0 + b_1\log x_1 + b_2\log x_2 + b_3\log x_3 + b_4\log x_4 + b_5\log x_5 + b_n\log X_n + U$…… Eqn. 9

Double – log Function

$Y = b_oX_1^{b1}X^{b2} + b_nX_n^{bn} + U$ …………………………………………………… Eqn. 10

Where

Y= Total productivity index expressed in (Naira)

X_1 = malaria incidence (measured in eqn. 1)

X_2 = House hold size (Number of persons)

X_3 = Education status of the household head (years spent in school)

X_4 = Age of the household head (years)

X_5 = Household income (Naira)

X_6 =Amount spent on malaria control/treatment (Naira)

$X_7 =$ Amount spent on malaria prevention (mosquito nets, insecticides, area spray) (Naira)

X_8 = Accessibility of Primary Health Care Center (distance from farmers' house in km)

$X_9 =$ Type of health care service provider patronized (dummy; 1 = orthodox; 0= alternative)

X_{10} = Time spent on treating malaria (days)

DISCUSSION

Socio-Economic Characteristics of Farming Households in the Area

Table 1; shows that majority 78.7% of farmers were males while only 21.3% were females who owned and engaged in farming. This implies that the male folk dominated the production of staple food in the area (Osuji, 2017). The presence of female-headed households in farming was due to death of male heads, migration, divorce and economic reasons. The frequency of the respondents portrayed more married households than unmarried with a percentage of 96.3 which implies more households' members as well as more responsibility among the farmers (Osuji, 2017). The mean age of the respondents was 49 years. The implication of this is that the majority of the respondents fell above the active and productive age category. Age classification is relevant to this study in that physical ability and productivity depend on age and this will influence land productivity positively or negatively (Osuji et al. 2012).

The mean household size for the farmers in the study area was 8 persons. The high percentage of household size implies that less hired labour is utilized in the course of production, hence reducing labour cost of production. The mean years spent in school was 8 years. This implies that majority of the household attended formal education. Education play a major role in creating awareness among the farmers and influence the adoption of techniques that will improve productivity (Osuji, 2017). The mean income size of the respondents was ₦52606. Income is a vital part of the productivity level of farmers (Nwaru, 2004), an increased level of income implies a reduce level of malaria prevalence.

Table 1: Socio-Economic Characteristics of Farming Households

Variables	Frequency	Percentage	Mean
Sex			
Male	85	78.7	
Female	23	21.3	
Marital Status			
Married	104	96.3	
Single	4	3.7	
Age			
31-40	20	18.5	49
41-50	31	28.7	
51-60	46	42.6	
>61	11	10.2	
Household Size			
1-4	18	16.7	8
5-8	41	37.9	
9-12	49	45.7	
Education			
0-6	38	35.2	8
7-13	63	58.3	
>13	7	7.0	
Household Income			
10000-50000	64	59.3	52606
50001-90000	36	33.3	
90001-130000	1	0.9	
130001-170000	0	0	
170001 >	7	6.5	

Source: Field Survey Data, 2016

Health Extension Workers' Effectiveness

The result in Table 2 below shows that 75.7% of the farmers perceived a very low health extension workers' effectiveness of less than 20.0%. More than 13% of them perceived an effectiveness of between 40.1% to 60% while 6.5% perceived an effectiveness of between 20.1%-40.0%. The result shows a mean extension effectiveness of 20.3%. This is low compared to a recommended effectiveness of over 80% by World Health Organization (WHO, 2013). There should be at least one health worker to 5 people in a community and they should disseminate over 80% of information on better means of prevention and control measures towards malaria. The findings recommend more health workers to farmers or training of extension agents properly to provide better preventive measures to malaria related cases so as to help the farmers cope with malaria issue instead of spending their resources.

TABLE 2: Health Extension Workers Effectiveness

Perceived Health extension effectiveness	Frequency	Percentage (%)
0-20	81	75.7
20.1-40	7	6.5
40.1-60	14	13.1
60.1-80	0	0
80.1-100	5	4.7
TOTAL	**107**	**100**

Source: Field Survey Data, 2016
Mean = 20.3

Total Factor Productivity and Rate of Malaria Prevalence

The result in Table 3; shows the total factor productivity levels of farmers and their corresponding mean rate of malaria prevalence in the area. Farmers with relatively low total factor productivity of 0-1.02 have an average rate of malaria prevalence of 53.5%. Farmers with total factor productivity of 1.021-2.04 has an average RMP of 43.3% while farmers with 2.041 to 3.06 total factor productivity index has a reduced average RMP of 24.7%. The study shows that as farmers Total Factor Productivity increased to 4.081 from 3.061, RMP further reduces to 18.9%. Farmers with the highest TFP index of between 4.081 to 5.15 have the least average RMP of 15.8%. It could be deduced from the result that increased RMP reduces TFP index, hence as the rate of malaria prevalence increases, mean total factor productivity is reduced. This finding agrees with the findings of Onwuchekwa (2005) that increase in malaria prevalence will have a force down effect on farmers' productivity in food crop production. This further suggests that malaria prevalence may imply increasing new cases or even amount of treated cases, the risk of spread for others keep increasing. Increase in malaria cases may reduce labour, increase cost of treatment and reduce resources allocated to input acquisition in farming. All these may force down output and increase cost of production, hence reduces total factor productivity. The study recommends that farmers with high malaria prevalence be given consideration to ensure high productivity (Shepard, 1991).

TABLE 3: Total Factor Productivity and Rate of Malaria Prevalence

TFP boundaries	Frequency	Relative Frequency	Mean TFP	Mean RMP(%)
0-1.02	42	39.2	0.5	53.5
1.021-2.04	43	40.2	1.3	43.3
2.041-3.06	5	4.7	3.2	24.7
3.061-4.08	8	7.5	3.8	18.9
4.081-5.15	9	8.4	5.0	15.8
TOTAL	107	100		

Source: Field Survey Data, 2016

Malaria Factors Affecting Total Factor Productivity

The four functional forms were estimated in the analysis as shown in the Table 4 below. Linear function was selected as the lead equation based on having the highest number of significant variables, highest R^2 and F-statistics and was used to interpret the factors affecting total factor productivity in staple food production in the state. The model is explicitly stated as:

TFP=0.596-0.141X1+0.090X2+0.110X3+0.029X4+0.142X5-0.001X6+0.015X7-0.003X8-0.730X9-0.086X10
(0.878)(0.006) (0.056) (0.033) (0.015) (0.011) (0.001) (0.002) (0.001) (0.244) (0.055)

The result showed that the co-efficient of multiple determination (R^2) is 0.594, this means that 59.4% variation of the total factor productivity can be explained by the included explanatory variables. The F-statistics is greater than the tabulated value at $P \le 0.05$ level signifying fitness of the model.

Malaria prevalence rate is significant at $P \le 0.1$ critical level and negative as shown in the result. This implies that there is an inverse relationship between the total factor productivity and malaria prevalence rate, implying that the farmers are less productive with an increase in rate of malaria prevalence, this follows an a priori expectations that ill health impacts negatively on the productivity of farmers. This means that malaria prevalence is capable of reducing total factor productivity of staple food production by 14.1% if it increases by 1.0%.

Malaria prevalence increases the risk of chances of ill-health and subsequently production. This is because, apart from reducing the outcome per labour due to low physical effort that comes with it, it can lead to diversion of resources away from farm input expansion, which is capable of reducing farm output at large. This finding agrees with that of Abiodun and Abayomi (2013) who observed that malaria prevalence rate decreases productivity. The level of formal education increases with total factor productivity in the area. As farmers' educational status increases by 1.0%, total factor productivity of staple food will increase marginally by 11.0%. Educational attainment increases health knowledge and understanding of the farmers which helps them in overcoming incidence of malaria prevalence through first hand information on prevention and control of malaria parasite which aid farm productivity (Ogunniyi et al. 2015).

Increase in Age increases total factor productivity marginally by 0.029%. Farmers' age increases with more risk aversion strategies and less attention to innovation or improved farm practices. However, farmers' age comes with advanced knowledge, advancement in management of malaria risks and its prevalence (Gallup and Sachs, 2001).

Household income was significant and positive which interprets that household income has a direct relationship with total factor productivity. If there is an increase in income say by 1.0% there would be a corresponding increase in total factor productivity by 14.2%. The finding agrees with Gollin and Zimmermann (2007) who posed that increased income would bring about new levels of productivity in that the farmers would be able to acquire new inputs and also combat malaria incidences and prevalence rate. Cost of malaria treatment can reduce the volume of capital needed for production or even result to no production in the short run. The result shows that a percentage increase in cost of treating malaria will lead to 0.001% reduction in total factor productivity of staple food production in the area. This finding collaborate the findings of Laah and Zubairu (2008) that cost of treating ill-health in a family may reduce income generation and economic activities of such household.

The distance to health centers is negative and significant at $P \leq 0.01$ critical level. Increase in the distance to health centers by 1.0% will reduce total factor productivity by 0.003%. The health service providing centers' must be near to the farming households for quick and easy access otherwise, ill-health will multiply before health service is accessed in a very short time. It will also multiply reduction in physical strength required to increase production. This study recommended that health centers or even alternative health facilities be located close to the farming households in the rural areas to afford the farmers quick and easy access to health service (Achwai, 2016).

Type of health care service provider patronized is also negative though significant at P≤ 0.05 critical level. The sign showed that orthodox health service, which is mostly, preferred to alternative medicine services in the area increases with a reduction in total factor productivity in staple food production. Increase in the use of orthodox medical services with 1.0%, will reduce total factor productivity of staple food by 0.73%. This finding did not imply that orthodox medicine, which is mostly preferred, is inferior to alternative medicine services as the study did not conduct further analysis to suggest that. While alternative medicine services is still good in treatment of malaria, orthodox medicine services may be costly and may reduce farmers net income, thus resulting to low productivity. According to Oluwalana and Ogunsusi (2013) orthodox medicine services involves a lot of processes and takes proper precaution in treatment of malaria. They also noted that people patronize them than any other health service provider because they are sure of the services and the efficacy can be traced in case of any risk outcome. Other health services may be difficult even though it could be cheap and easily accessible (Asenso-Okyere et al. 2009).

Table 4: Estimates of Malaria Factors affecting Total Factor Productivity

	Semi-log coefficient	t-value	+Linear-log coefficient	t-value	Exponential coefficient	t-value	Double log coefficient	t-value
Constant	1.178	0.315	0.596	0.678	-1.243**	-2.122	-1.056	-0.395
(S.E)	(3.745)		(0.878)		(0.585)		(2.670)	
Malaria prevalence rate (x_1)	-0.027	-0.822	-0.141*	-1.623	0.003	0.904	-0.165	-0.955
(S.E)	(0.243)		(0.006)		(0.004)		(0.173)	
Household size (x_2)	-0.254	-1.020	0.090*	1.599	0.110**	2.954	0.080	0.451
(S.E)	(0.249)		(0.056)		(0.037)		(0.178)	
Educational status (X_3)	0.541***	3.016	0.110**	2.282	0.073***	3.084	0.363**	2.842
(S.E)	(0.179)		(0.033)		(0.026)		(0.128)	
Age (X_4)	1.803**	2.756	0.029*	1.898	0.010	0.963	0.884*	1.896
(S.E)	(0.654)		(0.015)		(0.01)		(0.466)	
Household income (X_5)	0.517	1.040	0.142**	2.467	5.4E-06**	2.119	0.277*	1.760
(S.E)	(0.221)		(0.011)		(0.020)		(0.157)	
Malaria treatment (X_6)	-0.898***	-3.493	-0.001**	-2.036	-5.2E-05	-0.924	-0.483**	-2.637
(S.E)	(0.257)		(0.001)		(0.050)		(0.183)	
Malaria prevention (X_7)	0.060	0.824	0.015	1.053	-1.7E-05	-0.270	-0.013	-0.263
(S.E)	(0.073)		(0.002)		(0.04)		(0.052)	
Distthc (X_8)	-0.361**	-2.524	-0.003***	-3.181	-0.002***	-3.304	-0.271**	-2.659
(S.E)	(0.143)		(0.001)		(0.000)		(0.102)	
Tohcsp (X_9)	-0.700**	-2.799	-0.730**	-2.985	-0.433**	-2.673	-0.430**	-2.415
(S.E)	(0.250)		(0.244)		(0.162)		(0.178)	
Noduma (X_{10})	-0.096	-0.304	-0.086	-1.059	0.001	0.033	0.125	0.553
(S.E)	(0.318)		(0.055)		(0.036)		(0.226)	
R^2	0.380		0.594		0.382		0.382	
Adjusted R^2	0.315		0.531		0.318		0.318	
F-cal	5.890***		8.252***		5.947***		5.947***	

Source: field data, 2016

***, **, * = Significant at 1 %, 5%, and 10% respectively;

+ = Lead equation; values in parenthesis are the standard errors.

Distthc = distance to health center
Tohcsp = type of health care service provider
Noduma = number of days under malaria attack

CONCLUSION

Farm productivity of the farmers in recent times has been undermined and this is attributed to the incidence of malaria prevalence associated with individual households. Findings showed that the mean income size of the respondents was ₦52,606. Income is a vital part of the productivity level of farmers. An increased level of income implies a reduced level of malaria prevalence and incidence rate. The result shows a mean extension effectiveness of 20.3%. This is low compared to a recommended effectiveness of over 80% by World Health Organization. There should be at least one health worker to 5 people in a community and they should disseminate over 80% of information on better means of prevention and control measures towards malaria. Linear function was selected as the lead equation based on having the highest number of significant variables, highest R^2 and F-statistics and was used to interpret the malaria factors affecting total factor productivity in staple food production in the State. The use of mosquito treated bed-nets should be equitably distributed to the farmers and other prevention measures should be encouraged through effective health extension services in the study area.

REFERENCES

Abiodun O.O and Abayomi S.O, (2013) Effect of Malaria on Farming Households' Welfare in Ido Local Government Area of Oyo State, Nigeria, *J Hum Ecol,* 44(2): 189-194 (2013)

Achwai, I. H, (2016) Prevalence and Economic Burden of Malaria among Family Households in Bokkos L.G.A, Plateau State, Nigeria. Unpublished M.Sc Thesis, Department of Public

Health, Federal University of Technology, Owerri.

Adesina, F.A. (2005). Geoinformation and Natural Resources exploitation in Africa; United Nations Economic and Social Council Paper delivered in Fourth meeting of the committee on Development Information, Addis Ababa on 23 – 28 April.

Adewuyi S.A, (2006). "Resource Use Productivity of Rural Farmers in Kwara State, Nigeria."*International Journal of Agricultural Sciences, Environment and Technology* 1(1): 56-59.

Asenso-Okyere, K., Asante, F.A., Tarekegn, J. & Andam, K.S. (2009), "The Linkages between Agriculture and Malaria. Issues for Policy, Research, and Capacity Strengthening". *IFPRI Discussion Paper 00861*

Basurko, C, (2013). Deforestation, agriculture and farm jobs: A good recipe for Plasmodium vivax in French Guiana. *Malar. J. 12(4): 90-97*

De Silva, P. M. and Marshall, J. M. (2012). Factors contributing to urban malaria transmission in sub-Saharan Africa: A systematic review. *J. Trop. Med.* 2(1): 819-563.

Gallup, J. L. and J.L. Sachs. (2001). The economic burden of malaria. *American Journal of Tropical Medicine and Hygiene.* Vol.64, No.1, pp. 85-89.

Girardin, O. D., Dad, G., Koudo, C., Esse,G.,Cisse,T.,Yao, E.,and K.Goran (2004).Opportunities and limiting factors of intensive vegetable farming in malaria endemic Cote d'Ivoire."*Acta Tropica* 89 (2): 109–123.

Gollin, D. and C. Zimmermann. (2007). Malaria: Disease Impacts and Long-Run Income Differences. IZA Discussion, Paper No. 2997. Bonn, Germany: Institute for the Study of Labor.

Kebede, A., J. C. McCann, A. E., Kiszewski and Y. Ye-Ebiyo. (2005). New Evidence of the Effects of Agro ecological Change on Malaria Transmission. *American Journal of Tropical Medicine and Hygiene.* 73(4):676–680.

Laah, J. G and Zubairu, M. (2008). An Examination of the Trend and Seasonal Variation in the Incidence of Malaria in Gwagwalada, Nigeria. In Bisong, F. E. (Ed), Geography and the Millenium Development Goals: Translating Vision into Reality in Nigeria. Index Books Publishers, Calabar, pp. 537-541

Liverpool, L.S.O., Kuku, O., and A. Ajibola, (2011). A Review of Literature on Agricultural Productivity, Social Capital and Food Security in Nigeria. Nigeria Strategy Support Program (NSSP) NSSP Working Paper No. 21 pp1-53

National Malaria Control Plan of Action (1996 to 2001). Reports of National Malaria Control Plan of Action. Abuja, Nigeria.

Nwaru, J.C. (2004). Rural credit markets and resources use in arable crop production in Imo State, Nigeria. Unpublished Ph.D Thesis, Department of Agricultural Economics, Micheal Okpara University of Agriculture, Umudike, Nigeria.

Ogunniyi Adebayo, Kehinde Olagunju and Adewuyi S. A. (2015). The Impact of malaria disease on productivity of rural farmers in Osun State, Nigeria. *Studia Mundi – Economica. Vol. 2. No.1. 45-49.*

Oluwalana and Ogunsusi, (2013) Impact of Malaria on Productivity and Coping Strategies among Small-Scale Garri Processors in Odeda Local Government Area of Ogun State Nigeria. *Journal of Agric*. 2(1): 118-129.

Onwuchekwa, I.B. (2005). Socioeconomic Burden of Malaria on Productivity of Rice Farmers in Rural Southwest, Nigeria. *Bio. Sci. Journal. Vol 5 No 15*: pp.175 – 182

Osuji, E. E (2017). Impact of Sustainable Soil Management Techniques on Land Productivity and Poverty Levels of Arable Crop Farmers in Imo State, Nigeria. Unpublished PhD Thesis, Department of Agricultural Economics, Michael Okpara University of Agriculture Umudike, Abia State

Osuji, E. E., Ohajianya, D. O., Ehirim, N. C., and Eze, E. (2012). Effect of Land Use Patterns on Agricultural Productivity in Imo State, Nigeria. *International Journal of Food and Agricultural Research,* Vol.9, No.1, 81-87.

Osuji, E.E., N.C. Ehirim, E.U. Eze and M.N. Osuji (2013). Analysis of Socio-Economic Variables on Agricultural Productivity of Some Selected Arable Crops in Imo State, Nigeria. *Int'l Journal of Agric. and Rural Dev.* Volume 16 (1):1385-1391

Shepard D.S.(1991). The economic cost of malaria in Africa. *Tropical Medicine and Parasitology*, 42(3):199-203.

WHO, (2010). WHO guide to identifying the economic consequences of diseases and injury. Department of Health Systems and Services. World Health Organization, Geneva, Switzerland.

WHO, (2013). Guide for tutors and participants: Epidemiological approach for malaria control. WHO Library Cataloguing-in-Publication Data – 2nd ed.

WorldBank, (2007). World Development Indicators. Washington D.C. Retrieved from http://web.world bank.org/website/external/data statistics.

References to this paper should be made as follows Osuji, E.E., Ehirim, N.C., Anyanwu, U.G., and Okwara, M.O (2017), Effect of Malaria Prevalence on Farm Productivity of Farming Households in Imo State, Nigeria. *J. of Agriculture and Veterinary Sciences,* Vol. 9, No. 2, Pp. 1-19