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ANALYSIS OF ILL-HEALTH AND TECHNICAL EFFICIENCY OF MAIZE FARMERS IN SELECTED LOCAL GOVERNMENT AREAS OF OSUN STATE, NIGERIA

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ABSTRACT

Several farmers have died or incapacitated as a result of preventable and curable health challenges. These challenges no doubt have had negative impact on farmers' welfare, agricultural production, efficiency of the farmers and the economy of developing countries like Nigeria. Though it is a known fact that ill-health is devastating but the extent of the devastation may not be known with certainty until it is scientifically proven through research. The study therefore investigated the effect of ill-health on the technical efficiency of maize farmers in Osun, State, Nigeria. 220 farmers were interviewed while the tools of analysis included descriptive statistics, stochastic production frontier and cost of illness procedure. The results revealed that aches (34.32%) and malaria (22.53%) were the most prevalent illness in the area while the perceived causes of illness included stress, poor financial base and, inadequate medical facilities. Meanwhile, the main sources of treatment included consultation with herbalists, local/self medication and hospitals. The main challenges in seeking for good health comprised inadequate medical personnel, inadequate finance and, long distance of the clinics/hospitals from their farm/residence. Time cost accounted for the largest proportion of the economic cost of illness. In addition, access to health care services, number of days absent from farm due to illness and amount spent on drugs all had significant effect on the technical efficiency of the farmers. With a mean of 0.64, none of the farmers operated at the frontier level of technical efficiency. Based on the results, it is therefore recommended that extension personnel should educate the farmers on the need for adequate rest always and use of treated mosquito nets at night.

Keywords: Efficiency, ill-health, self-medication

INTRODUCTION

Nigeria is predominantly agrarian with about 60% of her population engaged in on-the-farm and off-farm activities. Of the various factors of production, labour supply is a very key determinant of the output and efficiency of the farmers because human resource is the principal operator either in the traditional or mechanized agriculture. Efficiency is concerned with the optimal production, consumption and distribution of resources and a farmer is said to be technically efficient when he can combine various resources to produce an optimum output level. Human resource supplies the labour needed almost in every segment of agricultural operations either as hired or family labour and so is needed to be kept healthy to fulfill her role in feeding the nation. According to Adekunle *et al.* (2016), health is defined as the complete physical, social, mental, and physiological well-being of an individual, and not merely the absence of disease or infirmity and it is as a key component of human capital development. Good health of farmers enhances work effectiveness and the productivity of an individual by increasing the physical and mental capacity of people. It could also enhance farmer's income and economic growth since people of good health generally have better intellectual capacities to perform their roles on the farm (Kussa, 2012). In rural communities, most of ill health results from preventable diseases and ailments such as aches, malaria, typhoid fever, diarrhea, meningitis, HIV/AIDS, cough and catarrh

among others. But inadequate and near non-functional health centers due to inadequate health professionals and equipments and, prevalence of quack doctors and drug vendors has worsened the situation of the farmers in remote areas of the country. The effect of ill-is far reaching as incidence of ill-health could have serious impact on the quantity and quality of maize output from the farm and could undermine the strength of economically active farmers leading to weak financial base, hunger, poverty and death in extreme cases. The efficient use of production resources is also threatened when farmers are not wholly coordinated to prevent over or under utilization of the resources at their disposal. As pointed out by Adekunle *et al.,* 2016, ill-health also reduces farmers' efficiency and productivity which further decreases their ability to address their health challenges. Moreover, it could also result in loss of work days or decrease in workers capacity and their ability to explore diverse farming practices for increased crop production. Wahab and Oni (2015) also reported that in Nigeria, ill-health accounts for the major cause of hospitalization and represents about 90 percent of all avoidable morbidity and mortality in almost all ages and sex groups. The overall effect is the hampering of the growth and development of the economy of Nigeria at large. Maize (*Zea mays*) is a cereal, staple and versatile crop grown across range of agro ecological zones. It originated from South and Central America and covers nearly 17% of the estimated 200 million hectares cultivated land in sub-sahara Africa of which Nigeria is inclusive (FAOSTAT, 2015). According to IITA (2016), maize is cultivated by approximately 55 million smallholder farmers in sub-Saharan Africa. Maize is cultivated by approximately 55 million smallholder farmers in sub-Saharan Africa. Farmers' current maize yields are 50 to 75% lower than attainable yields. The persisting yield gap has been attributed to many biophysical and socioeconomic factors, and are exacerbated by extant weak support systems for wide technology adoption among farmers (IITA, 2016).

Maize will continue to play an important role in the food basket of Nigerians because it is usually the first crop to be harvested for food immediately after the onset of rainy season thus helps in the fight against hunger and poverty in the area. Industrially, maize is a raw material in many agro-based industries in the production of food, beverages, beer and livestock feeds. In fact, about 50% of the maize produced is consumed by the animal feed sector, with poultry claiming as much as 98% of the total feed produced in Nigeria. In addition to this, it is usually consumed as a starchy base in a wide variety of porridges, pastes and grits. Green maize (fresh on the cob) is eaten parched, roasted or boiled. It is easy to grow as sole crop or intercropped with other crops and does not shatter during harvest. Therefore, to effectively fight against poverty and food insecurity, good health status of the maize farmers needs to be ascertained and sustained for efficient production of maize through improved productive capacity. Hence, the study is aimed at providing empirical analysis of the effect of ill-health on technical efficiency of maize farmers in the study area. The specific objectives are set to identify the illness prevalence in the study area, determine the economic cost of illness in the study area and the effect of ill-health on technical efficiency of maize farmers in the study area.

MATERIALS AND METHOD

Study Area

The study was conducted in Osun State, Nigeria. The State is located in the south west zone of Nigeria, and lies between latitude 7° 9 N and 4° 6 E and between longitude 7° 9 N and 4° 6 E. The State is bounded in the north by Kwara State, in the east by Ekiti and Ondo State, in the south by Ogun State and in the west by Oyo State. The state covers land area of about 9,251km^2 the projected population stood at 3,423,535 with an annual growth rate of 2.45 percent (United Nations Population Fund (UNFPA), 2013). It has a bimodal pattern of rain fall with peak in June, July and September with a short break in August. The total rainfall ranges between 1000 mm and 1500 mm with daily temperature ranged between 30$^{\circ}c$ and 35$^{\circ}c$ while the mean daily minimum temperature ranged between 17$^{\circ}c$ and 19$^{\circ}c$.The State consists of 30 Local Government Areas (LGAs) and has a considerable number of highly urbanized towns namely: Ile-Ife, Ikirun, Ilobu, Iwo, Ede, Ila-Orangun and Ikire. The predominant language is Yoruba while the major economic activities of the inhabitants is farming. The main crops grown in the State are: maize, cocoa, yam and tomatoes. The major livestock kept are poultry (Broilers, layers and turkey), goats and pigs. The farmers use simple

farming tools such as hoes, cutlass and sickles among others, for their farming operations.

Sampling Technique

The respondents for this study were selected using multistage sampling procedure. Osun State was stratified into three agricultural zones namely, zone I, zone II and zone III. Each zone comprises of 10 LGAs each. Therefore, the first stage involved the random selection of one LGA from each of the zones. The second stage involved random selection of three towns/villages from each of the LGAs selected while at the third stage, 43% of the total registered maize farmers were randomly selected from the towns/villages making a total of 220 respondents in the study area.

Table 1: Distribution and selection of sample size

Zones	LGAs	Selected Towns/villages	Sampling Frame	Sample size (43% of sample frame)
I	Ife Central	Ajebandele	67	29
		Ifetedo	60	29
		Oke-Ogbo	50	22
II	Odo- Otin	Irabiji	72	31
		Aagba	61	26
		Ada	53	23
III	Aiyeda-ade	Inisa	59	25
		Oyan	45	19
		Abeye	43	19
Total			**530**	**220**

Source: Agricultural development Programme (ADP, 2015)

Method of Data Collection

The data used for this study were obtained from primary sources. The data were collected with the aid of structured interview schedules with the assistance of trained enumerators. Data were collected on farmers' characteristics such as age, sex and marital status; production factors such as farm size, agrochemicals and planting materials and, institutional factors such as extension contact, source of farm labour and source of capital.

Analytical Technique

The analytical tools such as descriptive statistics, stochastic production frontier and stochastic profit frontier were used to analyze the objectives of this study. The cost of illness procedure as used by Sauerborn *et al.* (1996) and Akinbode (2011) was used to analyze the economic cost of ill-health in the study area.

Thus, the economic costs of illness adopted for this study were specified in equations 1-4 as follows:

$$E_c = \sum_{j}^{n} \left(F_c + T_c + P_c\right) \ldots\ldots\ldots (1)$$

Where:

Fc = Financial cost (₦)
Ec = Economic cost (₦)
Tc = Time cost (₦)
P_c = Preventive cost (amount spent on mosquito net and other preventive items (₦))

The **financial cost** was presented in equation 2, viz:

$$Fc = \sum_{j=0}^{n} \left(F_d + F_m + F_t + F_{su}\right) \quad \ldots\ldots\ldots\ldots (2)$$

Fc = Total financial cost of health care (₦)
F_d = Financial cost of drugs, herbs etc (₦)
F_m= Financial cost of medical consultancy (₦)
F_t= Financial cost of transportation to health centre (₦)
F_{su}= Financial cost of subsistence (feeding) (₦)

The **time cost** was presented in equation 3, thus:

$$Tc = \sum_{j=0}^{n} \left[\left(T_{si} * w\right) + \left(T_{ci} * w\right)\right] \quad \ldots\ldots\ldots\ldots (3)$$

Where,
Tc = Total time cost
T_{si} = time cost of sick person (number of days of forgone production)
w = daily wage rate (₦)

T_{ci} = time cost of caregiver(s) (number of days of attending to the sick person)

To determine the effect of ill-health on the technical efficiency of maize farmers in the area, stochastic production frontier was adopted as used by Aminu *et al.* (2013). It is expressed as expressed in equation 4:

$$\ln y_1 = \beta_o + \beta_1 \ln x_1 + \beta_2 \ln x_2 + \beta_3 \ln x_3 + \beta_4 \ln x_4 + \beta_5 \ln x_5 + \beta_6 \ln x_6 + v - u$$

Where:

y_1 = Maize output (kg)

x_1 = Farm size (hectares)

x_2 = Quantity of seed planted (kg)

x_3 = Labour (Man-day)

x_4 = Quantity of agrochemicals used (Litres)

x_5 = Quantity of fertilize (kg)

x_6 = Capital inputs (₦)

v_i = random variable which is assumed to be independently and identically distributed (iid) $N(0,\sigma v^2)$ and independent of u.u_i = non- negative random variable associated with technical inefficiency in production, it is assumed to be independently and identically distributed half normal (iid) $N(0,\sigma u^2)$ where conditional mean N was assumed to be related to farm and farmers related socio economic characteristics.

The inefficiency model was specified as follows:

$$u_i = \delta_0 + \delta_1 D_1 + \delta_2 D_2 + \delta_3 D_3 + \delta_4 D_4 + \delta_5 D_5 + \delta_6 D_6 + \delta_7 D_7 \quad (5)$$

Where,

u_i = Inefficiency effect

D_1 = Number of days absent from farm due to illness (No.)

D_2 = Amount spent on drugs (₦)

D_3 = Access to health care service

D_4 = Household size (No.)

D_5 = Farming experience (Years)

D_6 = Educational level (Years)

D_7 = Extension visits (No.)

δ = parameter to be estimated.

RESULTS

Prevalence of Illness among Maize Farmers in the study area

Maize farmers in the study area were prone to diverse illness episodes during the production year. The specific illness and the implications on the production efficiency were discussed in this section.

Prevailing illness among the maize farmers

The prevalence of illness as perceived by the maize farmers was presented in Table 2. The result revealed that there were a total of 12 illness and 475 illness episodes reported by the respondents during the study. Findings revealed that aches (back and abdominal pains) accounted for 34.32% of the total prevalent illness episodes; Malaria accounted for 22.53%; head ache, 19.79%, accidents on the farm, 7.58% and fever, 5.26%. Other illness, such as cough, rheumatism, diabetes, measles, cholera and appendicitis, identified occurred less frequently and accounted for 10.31% as shown in Table 2.

Table 2: Distribution of prevalent illness in the study area

Type of Illness	*Frequency	Percentage
Aches (Back pain, abdominal pain)	163	34.32
Malaria	107	22.53
Headaches	94	19.79
Accident on the farm	36	7.58
Fever	25	5.26
Rheumatism	13	2.74
Cough	13	2.74
Typhoid	11	2.32
Diabetes	6	1.26
Cholera	5	1.05
Appendicitis	1	0.10
Measles	1	0.10
Total	**475**	**100.00**

Source: Field Survey, 2017 * Multiple response allowed

Perceived causes of Illness among the Maize Farmers in the Study Area

The causes of illness perceived by the maize farmers were presented in Table 3. The result showed that there was a total of 270 perceived causes of illness episodes reported by the sampled maize farmers within the period covered by the study and that stress/use of crude tools and implements, finance/poor personal hygiene, inadequate medical facilities and malnutrition were the main causes. Interestingly, stress/use of crude tools and implements ranked first and accounted for 37.04% of the sampled farmers in the study area. In addition, poor financial means of getting quick medical attention when the need arises and poor personal hygiene ranked 2nd while inadequate medical facilities and personnel and, malnutrition ranked 3rd and 4th at 22.22% and 14.82%, respectively. This implied that majority of the farmers did not only relied on crude tools but also did not have enough rest due to incessant farming operations and yet were financially inadequate in meeting basic nutrition requirements as well as their health needs. This finding agrees with that of Ugwu *et al*. (2013) on impact of adverse health on agricultural productivity of farmers in Kainji Basin, Niger State, Nigeria. It was found out that majority of the perceived causes of illness among farmers was as a result of stress embedded in farm operations.

Table 3: Distribution of Perceived causes of illness in the study area

Causes of Illness	*Frequency	Percentage	Rank
Stress/use of crude tools and implements	100	37.04	1st
Inadequate finance/poor personal hygiene	70	25.93	2nd
Inadequate medical facilities	60	22.22	3rd
Mal-nutrition	40	14.82	4th
Total	**270**	**100.00**	

Source: Field Survey, 2017 *Multiple response allowed

Sources of Treatment of Sick Farmers in the Study Area

The sources of treatment received by the sick farmers were presented in Table 4. The result revealed that there were 4 main sources of treatment received by sick farmers in the area. A good number (44.4%) of the farmers sought the assistance of herbalists in the treatment of their illness because of the belief that evil personalities were responsible for their ill health. Also, 29.63% of the farmers received treatment through herbal medication with the believe that the herbs contain active ingredients (even though not known with all certainty) that could cure their ailments. Meanwhile, about 18.52% of the farmers sought for medical attention from government established clinics/hospitals while only 7.41% patronized private hospitals. These findings revealed that majority of the farmers were engaged in drug abuse (*i.e*, self-medication) and were also backward in terms of understanding the danger embedded in self medication and seeking spiritual assistance from herbalists.

Table 4: Distribution of Source of treatment of sick maize farmers in the study area

Source of treatment	*Frequency	Percentage
Herbalists/Spiritualists	120	44.40
Local medication	80	29.63
Government Clinics & hospital	50	18.52
Private Clinic	20	7.41
Total	**270**	**100.00**

Source: Field Survey, 2017 *Multiple response allowed

Perceived Challenges in Seeking Good Health

The challenges encountered by the farmers seeking for good health were presented in Table 5. The result showed that there was a total of six main challenges encountered during illness episodes reported by respondents during the study. The study

revealed that inadequate medical personnel ranked first at 22.87%. Inadequate finance, distance of the health centers/hospital from their farm/residence and, cultural belief ranked 2nd, 3rd and 4th at 18.30%, 16.33% and 16.33%, respectively. The least of all the challenges is that of self medication at 11.43%.

Table 5: Distribution of Challenges of seeking good health by maize farmers in the study area

Challenges	*Frequency	Percentage	Rank
Inadequate medical personnel	70	22.87	1st
Inadequate finance	56	18.3	2nd
Distance of the health centres/hospital	50	16.33	3rd
Cultural belief	50	16.33	4th
Delay in supply of drugs	45	14.07	5th
Self medication	35	11.43	6th
Total	**306**	**100**	

Source: Field Survey, 2017 *Multiple response allowed

Economic Cost of Illness among Maize Farmers in Area

The analysis of the economic cost of illness among maize farmers in Osun State as presented in Table 6, showed that the financial cost was ₦12,568.38 out of which cost of drugs and herbs and feeding took 12.11% and 18.53% of the economic cost respectively. The time cost illness among the farmers was estimated to be ₦16.856.56 out of which the time cost of the sick person and the caregiver took 32.96% and 21.36% of the economic cost respectively. Also, the preventive cost was estimated to be ₦1607.59 with 5.18% of the economic cost respectively. The economic cost of illness among the farmers in the area was estimated to be ₦31,032.53. It is established that the time cost of illness among the farmers accounted for the largest proportion (54.32%) of the economic cost. This is an indication that the time cost of illness among the maize farmers is more severe than even the financial cost of illness. This finding is in conformity with that of Adekunle *et al.* (2016) who reported that time cost of illness among farmers in Ogun State accounted for 64.08% of the economic cost. Moreso, the preventive cost of illness accounted for only a meagre proportion (5.18) of the economic cost among the maize farmers in the state.

Table 6: Economic cost of Illness among maize farmers in Osun State

Cost of items	Average Amount/ Farmer/ Year(₦)	Percentage (%)
Financial cost on ill-health		
Drugs and herbs	3760.33	12.11
Transportation	3054.61	9.84
Feeding	5753.22	18.53
Total	**12,568.38**	**40.48**
Time cost for illness		
Time cost of sick person	10,227.68	32.96
Caregivers time cost	6, 628.88	21.36
Total	**16,856.86**	**54.32**
Preventive cost		
Mosquitoes net and others	**1,607.59**	**5.18**
Economic cost (Fc + **Tc + Pc**)	**31,032.53**	**100.00**

Source: Field Survey, 2017

Effect of Ill-health on the Technical Efficiency of Maize Farmers in Osun State

Different empirical findings explain the relationship between efficiency and ill health. The effect of ill-health on production efficiency was discussed in sections.

Maximum Likelihood Estimates of the Parameters of Stochastic Frontier Model

The maximum likelihood estimates of the parameters in the stochastic frontier model for maize farmers in Osun state, Nigeria as presented in Table 7 revealed that the sigma squared ($ð^2$) of 0.67 was high and significant at $P < 0.01$, which indicates goodness of fit of the model and correctness of the specified assumption of the composite error term distribution. The gamma (λ) was 0.58 and significant at 5% level. This showed that about 58% of the variability in output of the maize farmers was due to their technical inefficiencies.

The coefficient of all the significant variables included in the efficiency model showed positive relationships with maize production output in the study area. Seed was found to be significant at $P < 0.10$ while labour, agrochemical and fertilizer were all significant at $P < 0.01$ probability level. The sources of inefficiency were examined by using the estimated coefficients of the variables associated with the inefficiency function. This provided some explanations for the relative efficiency level of the maize farmers. Since the independent variables of inefficiency function represent the model of inefficiency, a positive sign of estimated parameters implied that the associated variables had a negative effect on efficiency and vice versa. Therefore, days absent from farm due to illness, amount spent on drugs, age of farmer and household size were all positive and significant at $P < 0.01$, $P < 0.10$, $P < 0.10$ and $P < 0.10$, respectively. Conversely, access to health care services, farming experience and educational level were all negative but significant at $P < 0.01$, $P < 0.01$ and $P < 0.05$, respectively.

This is in line with the findings of Amaza and Olayemi (2002) who studied the analysis of technical inefficiency in food crop production in Gombe State, Nigeria. Their findings showed that increased years of formal education increased farmers' level of allocative and technical efficiency which implied improved economic efficiency. The finding also corroborates that of Laha and Kuri (2011) on the measurement of allocative efficiency in agriculture. The findings revealed that years of schooling and farming experience positively influenced the level of economic efficiency in agriculture. The result is further supported by a study conducted by Idiong (2005) on the evaluation of technical, allocative and economic efficiencies in Rice production in Cross River State, Nigeria who reported that the older a farmer becomes, the more he or she is unable to combine resources in an optimal manner given the available technology.

Technical Efficiency Estimates of the Maize Farmers in the Study Area

The scores in Table 8 showed that the mean technical efficiency of the sampled maize farmers in the study area was less than one, that is, less than 100%). This implied that averagely the farmers in the study area were producing below the maximum efficiency frontier. The most efficient farmer had a technical efficiency of 0.8219, that is, 82.19%, while the worst farmer had a technical efficiency of 0.2033, that is, 20.33%. The mean technical efficiency was 0.6410, which implied that on the average, farmers in the study area were able to obtain a 64.10% of potential maize output from a given mix of production inputs. From the results obtained, although farmers were generally relatively efficient, they still have room to increase the efficiency in their farming activities as about 35.90% efficiency gap from optimum (100%) was yet to be attained by all farmers. Thus, in short run there is a scope for increasing maize yield by 18.09% through adoption of technology and techniques used by best practice maize farm in the study area.

Table 7: Maximum likelihood estimates of the parameters of stochastic frontier model of effect of ill health on the technical efficiency of maize farmers

Variables	Coefficient	T – Statistics
Efficiency Model		
Constant	-5.07	-4.78***
Farm size	8.35	1.16
Seed	3.76	1.85*
Labour	0.36	4.51***
Agrochemical	0.32	2.83***
Fertilizer	0.21	6.63***
Capital input	29.06	0.40
Inefficiency Model		
Constant	5.76	0.82
Days absent due to illness	0.11	5.66***
Amount spent on drugs	0.10	1.83*
Access to health care services	-0.21	-3.23***
Age	3.91	1.59*
Gender	64.19	1.02
Household size	-3.12	1.80*
Farming experience	-166.57	-3.20***
Educational level	-447.29	-2.26**
Extension visit	1008.20	0.24
Diagnostic Statistics		
Sigma squared ($ð^2$)	0.67	
Gamma (λ)	0.58	
Log likelihood	-45.18	

Note: *** = P < 0.01; ** = P < 0.05 and * = P < 0.10 probability level
Source: Field Survey, 2017

Table 8: Distribution technical efficiency indices among maize farmers in the study area

Efficiency Class Index	Frequency	Percentage
< 0.31	3	1.34
0.31 - 0.40	6	2.68
0.41 - 0.50	10	4.46
0.51 - 0.60	22	9.82
0.61 - 0.70	110	50.00
0.71 - 0.80	65	29.02
0.81 - 0.90	4	1.79
Total	220	100.00
Mean	0.6410	
Minimum	0.2033	
Maximum	0.8219	

Source: Field Survey, 2017

DISCUSSION

As revealed by the study (Table 2), the most prevalent ill-health cases were aches and malaria while rare cases were appendicitis and measles. Cases of aches could have resulted from inadequate rest, over involvement in strenuous farm activities

and bad posture during carriage of farm stuff while that of malaria could be as a result of stagnant water due to poor drainage system, poor environmental hygiene and inadequate (or none) use of treated mosquito nets at nights. Ill-health could reduce the availability and fitness of maize farmers for productive farm operations. This could have great consequences on their productivity and resultant low output leading to poor quality of life, food insecurity, poverty and in extreme cases, death. Therefore, the prevalence of illness among food crop farmers constitutes a great burden on the already depressed Nigerian economy through its severe negative impact on the agricultural sector. This finding is similar to that of Akinbode *et al* (2011) in a research on the effects of diseases burden on technical efficiency among low land rice farming households in North-central, Nigeria and Adekunle *et al.* (2016) in a study on the effect of health condition on technical efficiency of small-scale crop farmers in Yewa division of Ogun State, Nigeria. The findings revealed that malaria and back pain were the most prevalent diseases suffered by farmers in North-Central Nigeria and Ogun State. It also lend credence to the report of Asogwa *et al.* (2011) in a study on technical and allocative efficiency analysis of Nigeria Rural farmers who reported that repeated bouts of malaria in agrarian households caused a decline in output, farm income, food security and poverty.

Perceived causes of illness among the maize farmers in the study area implied that majority of the farmers did not only relied on crude tools but also did not have enough rest due to incessant farming operations and yet were financially inadequate in meeting basic nutrition requirements as well as their health needs. This finding agrees with that of Ugwu *et al*. (2013) on impact of adverse health on agricultural productivity of farmers in Kainji Basin, Niger State, Nigeria. It was found out that majority of the perceived causes of illness among farmers was as a result of stress embedded in farm operations.

The analysis of the sources of treatment of sick farmers in the study area revealed that majority of the farmers were engaged in drug abuse (i.e, self-medication) and were also backward in terms of understanding the danger embedded in self-medication and seeking spiritual assistance from herbalists.

The challenges encountered by the farmers seeking for good health increased the numbers of illness episodes experienced by the farmers in the area. The analysis of the economic cost of illness among the maize farmers showed that most of the farmers were not proactive against incidence of ill-health in the area and that the time cost of illness among the maize farmers was more severe than even the financial cost of illness. This finding is in conformity with that of Adekunle *et al.* (2016) who reported that time cost of illness among farmers in Ogun State accounted for 64.08% of the economic cost. Moreso, the preventive cost of illness showed that most of the farmers were not proactive against incidence of ill-health in the area.

The effect of ill-health on production efficiency revealed that increase in days absent from farm due to illness, amount spent on drugs, age of farmer and household size increased the inefficiency level of the maize farmers in the study area. Conversely, access to health care services, farming experience and educational level showed that an increase in any of these variables led to increment in the efficiency level of the maize farmers in the area. In addition, increase in seed, labour, agrochemical and fertilizer led to a proportionate increase of about 8.35, 3.76, 0.36, 0.32, 0.21 and 29.06 units in maize production output, respectively. This is in line with the findings of Amaza and Olayemi (2002) who studied the analysis of technical inefficiency in food crop production in Gombe State, Nigeria. Their findings showed that increased years of formal education increased farmers' level of allocative and technical efficiency which implied improved economic efficiency. The finding also corroborates that of Laha and Kuri (2011) on the measurement of allocative efficiency in agriculture. The findings revealed that years of schooling and farming experience positively influenced the level of economic efficiency in agriculture. The result is further supported by a study conducted by Idiong (2005) on the evaluation of technical, allocative and economic efficiencies in Rice production in Cross River State, Nigeria who reported that the older a farmer becomes, the more he or she is unable to combine resources in an optimal manner given the available technology.

The result of the technical efficiency indices implied that sampled farmers in the study area were producing below the maximum efficiency frontier. The mean technical efficiency of 0.6410 implied that on the average, farmers in the study area were able to obtain a 64.10% of potential maize output from a given mix of production inputs. From the results obtained, although farmers were generally relatively efficient, they still have room to increase the efficiency in their farming activities as about 35.90% efficiency gap from optimum (100%) was yet to be attained by all farmers. Thus, in short run there is a scope for increasing maize yield by 18.09% through adoption of technology and techniques used by best practice maize farm in the study area.

CONCLUSION

Based on the findings of this study, it was concluded that aches, malaria were the most prevalent illnesses which were mostly caused by stress, weak financial base and inadequate medical facilities. Most of the maize farmers resulted into self medication and also sought the assistance of herbalists and medical personnel from government established clinics/hospitals. The economic cost of these illnesses was high with the time cost posing the highest burden on the farmers. In addition, illness posed a major setback to the attainment of the optimum level of technical efficiency of the maize farmers.

RECOMMENDATIONS

The following recommendations were made based on the outcome of this study:

1. Given the high prevalence of illness among the farmers and its significant negative effect on their technical efficiency, primary health care centers should be well equipped and made accessible to the rural farmers by the government and relevant donor agencies.
2. Government in collaboration with World Health Organizations should made treated mosquito nets available to the farmers at affordable prices.
3. Mass media should be used as a means of educating farmers on the importance of rest and dangers of self medication.
4. Extension agents in collaboration with relevant health workers should provide adequate health education and illness prevention measure to the farmers in the study area. This should form a core of the extension service delivery in the area.
5. The farmers should aim at inculcating good personal and environmental hygiene always

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