American Journal of Public Health Research, 2018, Vol. 6, No. 3, 155-159
Available online at http://pubs.sciepub.com/ajphr/6/3/5

DOI:10.12691/ajphr-6-3-5

Impact of Poor Health of Maize Farmers on Farm Performance in Southwestern Cameroon

Telma A. Yamou[1,*], Ernest L. Molua[2]

[1]School of Agriculture, Policy and Development, University of Reading, Reading, United Kingdom
[2]Department of Agricultural Economics and Agribusiness, Faculty of Agriculture and Veterinary Medicine, University of Buea, Buea, Cameroon, P.O. Box 63 Buea, Cameroon
*Corresponding author: yamoutelma@gmail.com

Abstract The study analyzed the impact of poor health on maize farmers' performance in the Buea municipality. It made use of primary data collected with the help of a well-structured questionnaire, administered to 60 randomly sampled maize farmers in Buea municipality. The Ordinary Least Squares technique was used to analyze a non-linear stochastic model that captured the relationship between maize output, poor health and other important inputs. It was observed that a 1% increase in working hours of labour would increase output by 0.319% in the study area. Also, a 1% improvement in the health condition of the farmer will increase output by 0.291%. On average, 5,965.1 FCFA was spent by each farmer on health care and this led to a 29.2% loss in income. Given that the labour hours variable had the greatest magnitude, it shows the importance of health in the productivity of these workers, through the quantity and quality of labour. This implies the greater part of poor performance on the farm is a result of poor health, and so an improvement in the health condition will improve maize production significantly. Health should thus be given priority both by the farmer, where possible, and the government in any policy aimed at increasing maize production particularly in the study area.

Keywords: *health, maize farmers, farm performance, Cameroon*

Cite This Article: Telma A. Yamou, and Ernest L. Molua, "Impact of Poor Health of Maize Farmers on Farm Performance in Southwestern Cameroon." *American Journal of Public Health Research*, vol. 6, no. 3 (2018): 155-159. doi: 10.12691/ajphr-6-3-5.

1. Introduction

Health as a capital good can either improve or reduce a household's productive ability [1]. Good health increases the GDP per capita of any nation, by increasing both labour productivity and the relative size of the labour force [2]. Cameroon's agricultural practice is mainly rain-fed and labour intensive and due to the over dependence on labour, the health of the workforce is critical to agricultural output. Emphasis is laid on maize production since worldwide, its production has reduced to about 40% and it is the first most widely produced and consumed cereal in Cameroon, with the Southwest Region having the highest yield potential for maize production [3].

The Impact of Adverse Health on Agricultural productivity of farmers in Kainji Basin North-Central Nigeria, had similarly been examined using a stochastic production frontier approach and reveal some affects on agricultural production by affecting the health of the producers [4]. Poor health will result in loss of work days or decrease worker capacity, decrease innovation ability and the ability to explore diverse farming practices. Besides efficiency variables, they employed six inefficiency explanatory variables; primary occupation, level of education, sex, actual age, health status and farming experience of the respondent. The health variable was measured as average days lost to incapacitation, multiplied by the frequency of occurrence of the sickness. Out of the entire variables specified in the inefficiency model, health had the largest coefficient of 0.31 and was statistically significant at 5%. This implied that, a greater part of the inefficiency of the farmers was as a result of adverse health and so the improvement of the health condition of the farmers would improve efficiency greatly.

On studying health and farm labour productivity in Africa, it is revealed that, per malarial attack, depending on the severity; typically entail a loss of four working days, followed by additional days with reduced capacity for about four episodes per year [5]. Recently, similar observations were established for Cameroon on the impact of malaria on the wellbeing and maize productivity of agricultural households in the Buea Municipality [6]. The study made use of seven explanatory variables; malaria, marital status, education, age, frequency of yearly malaria attack, farm size and gender. Using the Ordinary Least Squares technique, the results showed that the frequency of malaria attack had a negative coefficient (-0.035) and statistically significant at 5%. This implies that a 1% increase in the frequency of malaria attacks will lead to a 0.035% decrease in the output of the agricultural households. From the study, 55% of farmers go for modern methods of treatment (hospital, drugs). The average cost of treatment being 14,683FCFA and average cost of prevention, 2,633FCFA giving a total health care of 17,316FCFA.

Based on some studies on the relationship between health and farm productivity as a business strategy, health- related productivity costs are significantly greater than medical and pharmacy costs alone and chronic conditions like depression/anxiety, back/neck pain, obesity and arthritis are especially important causes of productivity loss [7]. The well-being, or the sense of life satisfaction of the individual, may be the ultimate determinant of productivity [8]. Firms must consider how the costs of programs to improve employee wellness, whether provided directly, or through their health plans, will relate to indirect costs and other gains for the employer.

This study is an attempt to analyze the impact of poor health on maize farmers' performance. It seeks to determine the factors that influence the health conditions of the farmers, whether health status affects farm performance, the share of health status on farm performance and to determine whether an improvement in the health status of the farmer will affect his/her farm performance positively. The study is limited in its small sample size of sixty farmers, thus questioning its external validity. Its use of only seven explanatory variables is also problematic as far as model fitting is concerned. Despite these, the study is relevant as it sheds more light on the relationship between farmers' health status and agricultural production, and particularly attests the vitality of improving the health conditions of the population in the study area so as to improve on farm output, thereby ensuring food security, and driving towards the attainment of an emergent nation by the year 2035, with agriculture playing its deserved significant role.

2. Methods

This study was carried out in Buea Sub-Division in the Fako Division, of the South West Region of Cameroon. With a population of about 200,000 inhabitants [9], Buea has a mixed cosmopolitan setting and a constellation of about 67 villages inhabited mainly by the Bakweris. Buea has black, well drained soils which are very rich in nutrients and allow for the cultivation of various crops such as tomatoes, cabbage, okra, pepper, corn, cocoyam, yams, cassava, plantains, beans, vegetables and even some cash crops such as palm trees, cocoa and bananas [6]. A stratified random sampling technique was used to collect primary data from the maize farmers in the study area, so that each farmer has an equal chance of being chosen. This is similar to the multistage random sampling procedure adopted by [4] in their study on the impact of adverse health on the agricultural productivity of farmers in Kainji Basin. Ten farming communities were selected for the study, with six maize farmers interviewed from each of the ten communities. Data was collected through well-structured questionnaire, and a total of sixty respondents were surveyed.

The research made use of statistical and econometric techniques. A stochastic econometric production function was employed to model the relationship between the various factor inputs and output (maize yield). The choice of model was because it assumes a non-exact relationship between the variables due to the random shocks like weather, disease, beyond the control of the farmer, and which can affect maize output. A general form of the model is written as:

$$Yi = f(X_i, \alpha) + U_i$$

Y_i =output of the ith maize farmer
X_i = actual input quantities used by the i^{th} farm
α = vector of the parameter to be estimated
U_i= Stochastic error term [10]

The Ordinary Least Squares (OLS) technique was used to estimate the parameters of the econometric model and STATA was used to run the OLS analysis. The parameter estimates obtained from the OLS have some optimal properties of unbiasedness, minimum variance and minimum mean square error and the technique is an essential component of most other econometric techniques [10]. The empirical model is specified as a non-linear stochastic production function:

$$\ln Y = \alpha_0 + \alpha_1 \ln x_1 + \alpha_2 \ln x_2 + \alpha_3 \ln x_3 + \alpha_4 x_4 + \alpha_5 \ln x_5 + \alpha_6 \ln x_6 + \alpha_7 \ln x_7 + U_i$$

Where;
Y_i= Output of the ith farmer, in Kg
X_1= Farm size, in hectares
X_2= Capital in FCFA
X_3= Poor health, measured as the number of days the farmer lost due to sickness and could not go to the farm, multiplied by the frequency of the attack.
X_4= Length of Education, measured in years
X_5= Labour; hours worked on the farm
X_6= Fertilizer quantity, measured in Kg
X_7= Pesticide quantity, in Litres
U_i= stochastic error term
i= 1, 2, 3……n farmer
α_0, α_1, α_2……α_7 = parameter estimates.

The coefficient of the farm size variable, α_1 is supposed to be positive. This is because according to theory, output increases as the quantity of land cultivated increases. The coefficient of capital, α_2 is expected to be positive since theory postulates that output increases with an increase in capital. The coefficient of the health variable (poor health) in the model is expected to be negative in order to conform to theory, since theory stipulates that poor health impacts negatively on the performance of farmers. The coefficient of the education variable is expected to be positive, as output is directly proportional to length of education, according to theory. Similarly, the coefficients of labour hours, fertilizer and pesticide quantities are expected to be positive because according to theory, these variables proof a positive relationship with output.

3. Results and Discussion

All the farmers sampled reported one or more episodes of illness. The study revealed that, 41.7% of the sampled farmers had been sick of only malaria during the last season; 5% had been sick of malaria and typhoid; 11.7% complained of body pain; 8.3% typhoid only; 5% gastritis; 10% rheumatism; 6.7% yellow fever; 6.7% farm injury; 1.7% appendicitis; and 3.3% river blindness. Table 1 shows that a greater number of farmers were attacked by malaria. This means that policy measures aimed at preventing/treating malaria is very important to reducing the population of unhealthy maize farmers in the study area. Doing so is sensitive to maize output.

Table 1. Illnesses Faced by Farmers

Illness/attack	Number of farmers	Percentage of total
Malaria only	25	41.7
Typhoid only	5	8.3
Malaria and Typhoid	3	5
Body pain	7	11.7
Rheumatism	6	10
Yellow fever	4	6.7
Farm injury	4	6.7
Gastritis	3	5
River blindness	2	3.3
Appendicitis	1	1.7
Total	60	100

Source: Survey data, 2016.

Table 2 further presents on average, the frequency of each attack, the number of days lost due to ill health and the cost of health care per farmer. On average, maize farmers sampled in the study area were sick 16.69 times per farming season, loss 120.86 days due to ill health and spent 357,908.6 FCFA on health care. This includes prevention and treatment costs.

Table 2. Frequency of Each Attack, Number of days lost and Cost of health care

Illness/attack	Frequency of attack	Number of days lost	Cost of health care (FCFA)
Malaria only	1.72	7.36	22,980
Typhoid only	1.8	7	21,800
Malaria and Typhoid	1.67	8	10,666.7
Body pain	2	10.6	13,928.6
Rheumatism	2.5	12.2	55,333.3
Yellow fever	1	8.5	36,250
Farm injury	1.5	7.5	24,450
Gastritis	2	8.7	30,000
River blindness	1.5	15	37,500
Appendicitis	1	36	105,000
Total (on average)	16.69	120.86	357,908.6

Source: Survey data, 2016.

The study revealed that 61.7% of the farmers used modern medications for their health conditions; 28.3% used traditional medications and 10% used both (Figure 1). Traditional medication was especially used by farmers who had typhoid only and both malaria and typhoid. Although a greater proportion of farmers use modern medications, most of them simply take these medications at home without going to the hospital. This is due to inadequate finance to obtain full treatment in the hospital; hence unstable good health conditions prevail. In the same light, about 72.4% of the farmers complained that frequent inhalation of farm chemicals is a dominant cause of most respiratory problems they face; another influence to their health conditions.

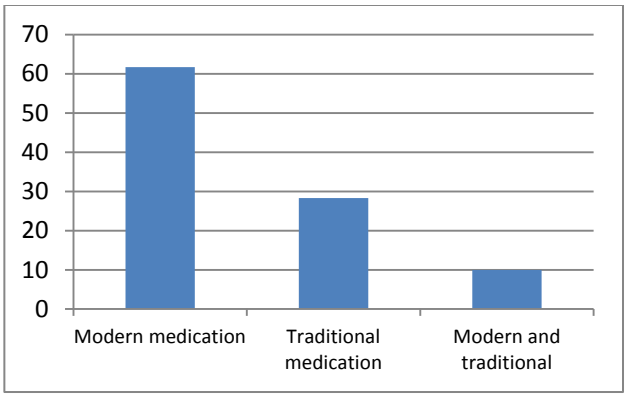

Figure 1. Mode of treatment/prevention of illness (Source: Survey data, 2016)

The findings uncovered that 71.7% of the sampled farmers were assisted by other labourers or family members when sick, while the remaining 28.3% did not receive any help in their farms when they were sick. Out of the 71.7% who were assisted, 25% were assisted for half of the period of sickness, while 46.7% were assisted throughout the period of sickness. Whether or not assistance was received and the duration of assistance, is sensitive to the degree of loss of output/income /profit of the farmers.

The results show that 40% of the sampled farmers had other household members who were sick and the remaining 60% of farmers had no cases of sickness which attacked other household members. Out of the 40% of household sick members, malaria had the highest occurrence; 35% of household members suffered from malaria, while the remaining 5% suffered from other illnesses like typhoid, gastric, body pain and influenza. Hence, targeting malaria in the study area is a bold step towards reducing the number of sick persons in the area. Also, farmers who depend largely on family labour faced a greater loss of produce/lower harvest when household members are sick, compared to farmers who mostly hire labour.

The mean income of all the maize farmers in the study area was 505,306.7 FCFA and the farmers spent on average, 357,908.6 FCFA on health care; resulting in a 29.2% loss of income to health care. This shows that ill health makes the farmers spend more, increasing the total cost of production. Similarly, each farmer had an average income of 8,421.8 FCFA and spent on averagely 5,965.1 FCFA on health; resulting in a 29.2% loss of income. This significant loss is only due to poor health conditions, indicating that health as a form of human capital is a major input of maize production. The remaining 70.8% is due to other factors. The average number of days lost to health care was 12.1 days. The findings showed that 10% of the farmers' harvest was not affected when he or she was sick while 90% complained of either significant or mild loss of yields.

The mean loss of harvest for all the farmers due to ill health recorded 958.6Kg and the mean yield of the farmers was 3,158.2Kg (yield which was realized). This shows that, without poor health, the farmers could have recorded a mean yield of 4,116.8Kg (958.6+ 3,158.2). This is equivalent to a 23.3% loss of average output as a

result of poor health. Farmers who were not affected were mostly those who either received assistance throughout the period of sickness, or were sick when little or no work was to be done on the farm or both. Those with mild loss received assistance for half of their period of sickness or lost few days due to ill health or both. Those with a significant drop in yields either did not receive assistance when sick or lost many days due to ill health or both.

In addition, the study uncovered that, farmers who were not assisted (17 farmers) on their farms when sick, lost a mean yield of 1,493.5Kg and had a mean harvest of 2,709.4Kg; while farmers who were assisted (43farmers) lost a mean yield of 728.98Kg) when sick and harvested 3,530.93Kg. Table 3 shows that farmers who were assisted in their farms when they were sick were better off than those farmers who were not given assistance. This gives a justification for the importance of health to the performance of the famers, in terms of output of dry maize harvested.

Table 3. Assisted and Non- assisted Farmers

Farm assistance	Frequency	Harvest lost (Kg)	Harvest realized (Kg)
Not assisted	17	1,493.5	2,709.4
Assisted	43	728.98	3,530.93

Source: Survey data, 2016.

The results of the non-linear regression econometric estimates are presented in Table 4 below.

Table 4. Non-Linear Econometric Estimates of Maize Performance

Variables	Coefficients	t-calculated (t-calc)	t-critical (t-crit)
Constant	903.089	0.809	1.684
Farm size	0.290	4.321	1.684
Capital	0.100	1.385	1.684
Poor health	-0.291	-2.947	1.684
Length of education	0.067	1.088	1.684
Labour hours	0.319	2.756	1.684
Fertilizer quantity	0.047	0.711	1.684
Pesticide quantity	0.216	2.568	1.684

Source: Field survey, 2016.

The coefficient of the constant term in the model is positive (903.089) and it shows that when the other factors (farm size, capital, poor health, education, labour hours, fertilizer and pesticide quantity) are held constant, the value of the log of maize output is 903.089. The coefficient of farm size is 0.290 which indicates a positive relationship between farm size and maize farmers' production meaning that 1% increase in land size will lead to a 0.29% increase in the maize output in Buea. The education variable has a positive coefficient of 0.067 showing that a year increase in education will bring about a 6.7% increase in maize output. The coefficient of capital is 0.10 which is positive, implying a percent increase in capital invested will lead to a 0.10% increase in maize output. The coefficient of labour hours 0.319 is positive, showing a positive relationship with maize farmers' production which implies an increase in labour hours will lead to a 0.319% increase in maize farmers' production. The coefficient for poor health is negative (-0.291) showing an inverse relationship between poor health and maize farmers' production, meaning that a percentage increase in the state of ill health will bring about a 0.291% decrease in maize farmers' production. Fertilizer quantity has a coefficient of 0.047 which shows a positive relationship with maize farmers' production, implying an increase in fertilizer quantity by 1% will lead to a 0.047% increase in maize farmers' production. The coefficient of pesticide quantity is 0.216 which indicates a positive relationship between pesticide quantity and maize farmers' production meaning that a percentage increase in the pesticide quantity will lead to a 0.216% increase in the maize farmers' production in Buea.

The t-calculated was obtained using the 95% confidence interval and at 5% level of significance, the t-table at $t_{0.05}$ and degree of freedom (df) is 51 which is 1.684. Following the decision rule in multiple linear regression, when t-cal> t-tab, we reject the null hypothesis showing significance of the results and when t-cal< t-tab, we fail to reject showing that our results are not significant. For the constant variable we fail to reject since t-cal is less than t-tab that is 0.809<1.684. We reject the null hypothesis for farm size since 4.321>1.684 and this shows that the results are significant. We fail to reject our null hypothesis for capital since 1.385<1.684 and hence the result is not significant at 5% level. We reject that for poor health since |-2.947|> 1.684 and hence our result is negatively significant. We also fail to reject our null hypothesis for length of education since1.088<1.684 and hence the result is not significant at 5% level. We reject the null hypothesis for labour hours since 2.756>1.684 and hence our result is significant. We fail to reject the null hypothesis for the fertilizer quantity since 0.711< 1.684 and hence result is insignificant. For pesticide quantity, t-cal> t-tab (2.568> 1.684 at 5% level), so we reject our null hypothesis showing that our result is significant at 5% level.

For the F- statistics, since the F-calculated is 33.371 and it is greater than F-table which is 2.17, this means our overall results are significant at 5%, we therefore reject the null hypothesis and our result is more than 95% reliable based on the F-ratio and it can be used for policy implementation. The Durbin Watson (DW) value is 2.043 read from the Durbin Watson table given k=9 and n = 60 which falls in the region of "positive inconclusive." Therefore, our estimated parameters are still reliable and our model can be used for forecasting.

The line of best fit is considered as the regression line which is designed to explain the extent to which the independent variables explain the behaviour of the dependent variable and this is reported by the coefficient of multiple determinations in this case known as R^2 or R^{-2}. The R^{-2} is 0.793 showing that the regression line accounts for more than 79.3% variation in maize farmers' performance, meaning that over 79.3% changes in maize farmers' performance are due to changes in the independent variables. That is, the independent variables (farm size, capital, poor health, education, labour hours, fertilizer and pesticide quantity) jointly explain more than 79.3% changes in maize farmers' performance with 20.7% accountable for by the stochastic error term. Therefore, the model fits the equation very well. The degree of freedom is 51 and it shows the extent to which the variables are flexible.

The results revealed that the variables; farm size, poor health, labour hours and pesticide quantity were significant at 5% level of significance. This implies any government policy aimed at increasing the production of maize in the area should focus on these variables. Labour, farm size and pesticide quantity had positive coefficients, implying an increase in quantities of each will increase output of maize. The coefficient of poor health was negative implying proper health condition will increase output of maize. The magnitude of the coefficient of labour which is 0.319 shows its greatest level of importance in maize production. This means increasing labour availability through an increase in the number of productive hours per day, will greatly increase the output of maize. This is a justification of the fact that, maize farms in the area are very vulnerable to household labour disruptions. The health of the principal farm operator (farmer) is also important given the large coefficient (0.291) of the poor health variable. This will intend affect the labour (hours worked) input of the farmer on the farm. Since health affects labour directly and subsistence agriculture is highly labour intensive, health is therefore a strong determinant of maize output in Buea. Besides the incidence of poor health of the farmer on own labour, it is also seen that other labour sources have an impact on output and so must be properly managed so as to optimize yields. The study shows that other household members were sick. These members constitute a greater proportion of the labour used by the farmers in the area. Given that the labour hours variable has the greatest magnitude, it shows the role of health in the productivity of these workers, through the quantity and quality of labour. This implies the greater part of poor performance on the farm is a result of poor health, and so an improvement in the health condition will improve maize production significantly.

4. Conclusion

The current study is an empirical investigation of the impact of poor health on maize performance. The research findings bring to light the importance of health capital and the subsequent labour availability as an indispensible production input in agriculture and the economic development of the nation as a whole. The coefficient associated with poor health in the variable is negative, large and statistically significant; thus the study proposes that, achieving self sufficiency in food production (particularly maize) and the much desired growth in the agricultural sector of the economy will continue to elude the Cameroon economy if health issues in agriculture are not properly addressed. Policy actions to train farmers in work related risks reduction geared at curbing infections and incapacitations occasioned by diseases, accidents and strains may impact farmers' health and agricultural production, greatly. With inadequate finance being an important obstacle to obtaining appropriate health care, the study strongly recommends health care subsidies be given to these farmers to enable them obtain full treatment, when necessary, which will help improve their farm performance. Health capital expenditure is a justification basis of promoting development through large increases in farm performance.

References

[1] John U., 2009. "Farmers' Health and Agricultural Productivity in Rural Ethiopia" *International Food Policy Research Institute (IFPRI), Washington, DC* Vol 3, No 2, September 2009.

[2] Ruger, Jennifer Prah, Dean T. Jamison and David E. Bloom, 2001, "Health and the Economy", *page 619 in International Public Health,* edited by Michael H. Merson, Robert E. Black and Anne J. Mills (Sudbury, Massachusetts: Jones and Barlett).

[3] MINEPAT, 2008. Rapport d etude sur le fillierMais. Pp. 110.

[4] Ajani, O.I.Y., and P.C. Ugwu. 2006. "Impact of Adverse Health on Agricultural Productivity of Farmers in Kainji Basin North-Central Nigeria Using a Stochastic Production Frontier Approach." *Trends in Agriculture Economics* 1:1-7.

[5] Brohult J., L. Jorfeldt, L. Rombo, A. Björkman, P.O. Pehrson, V. Sirleaf, and Bengtsson. 1981. "The Working Capacity of Liberian males: A Comparison Between Urban and Rural Populations in Relation to Malaria."*Annals of Tropical Medicine and Parasitology* 75 (5): 487-494.

[6] Ebock A.J. 2015. "Impact of Malaria on the Wellbeing and Productivity of Agricultural Households in the Buea Municipality." Bsc Dissertation (Unpublished), Department of Agricultural Economics and Agribusiness, University of Buea.

[7] Loeppke, R., Taitel, M., Haufle, V., Parry, T., Kessler, R. and Jinnett, K., 2009. "Health and Productivity as a Business Strategy: A Multiemployer Study." *Journal of Occupational and Environmental Medicine*, 51(4), pp.411-428.

[8] Evans, R., Barer, M., and Marmor T. (n.d.). "Why Are Some People Healthy and Others Not? The Determinants of Health of Populations."

[9] Central Bureau of the Census and Population Studies (BUCREP), 2005. Available online at: [http://bucrep.cm/index.php/en/home?id=128].

[10] Olayide S.O., and Heady E.O., 1982. "Introduction to Agricultural Production," Ibadan.