Factors Affecting the Profitability of Groundnuts (*Arachis hypogaea*) Production among Smallholder Farmers in Homa-Bay County

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Abstract

Kenya's agricultural sector is the country's economic backbone and the main source of income for rural residents. The sector produces 26% of Kenya's GDP, employs 75% of the population, and feeds the rising population. Homa-Bay County is poor, food insecure, and low-income. The purpose for this study was to determine the factors affecting the profitability of groundnuts (Arachis hypogaea) production among smallholder farmers in Homa-Bay County. The study was carried out in Homa-Bay County with the target population of 500 smallholders' farmers. Stratified random was used to select 222 from the target population in each Sub-County that would be the respondents in the study using Cochran 1963 formula at 5 percent level significance. Data was analyzed using descriptive statistics, multiple regression analysis and gross margin analysis. The results showed that fertilizer remains the expensive input in groundnut production followed by land preparation. The result also revealed that most farmers do not attend field days and only a negligible percentage has access to credit. Majority of the respondents (72 %) were relatively young and fell within the active age (20-45). Male respondents marginally dominated groundnut farming at 56.88 % and lastly 63.3 % of respondents were educated. The result further revealed that net farm income per hectare was Ksh 44,152 for groundnut. Family size and level of formal education, land size and access to loans were all statistically significant. The major constraints limiting groundnut production were identified as inadequate capital of 32.57 %, high cost of labour of 24.31 %, poor storage facilities of 16.51 %. Homa-Bay County smallholders' profit from groundnuts. Agricultural extension agents should hold field days regularly, market them, and make them relevant to farmers. Smallholder farmers were encouraged to produce groundnuts commercially, employ more modern inputs, and investigate commodity value addition.

Keywords: Groundnuts (*Arachis hypogaea*), Smallholder, Profitability, Production

INTRODUCTION

Groundnut (*Arachis Hypogaea* L.) is a major food and cash crop in Sub-Saharan Africa (Bediako et al., 2019; Kortei et al., 2022). Njuki et al. (2011) noted that groundnut provides food and nutrition security and income. Groundnut is rich in protein, lipids, carbs, and vitamins (Mingrou et al., 2022). Since animal proteins are getting more expensive and plant proteins are healthier, demand for groundnut is growing as an alternative protein source (Jeske et al., 2018). Groundnuts contain 26 to 28 percent digestible protein and high-quality cooking oil (Ogori, 2020). Groundnut oils and solvents are in medicines, fabrics, cosmetics, nitro-glycerin, plastics, dyes, paints, varnishes, lubricating oils, leather dressings, furniture polish, insecticides, and soap (Mowad & Marks, 2012).

Profit margin from groundnut output relies on smallholder farmer's farming practises that year (Lugandu, 2013).

However, groundnut growing zones in Kenya are different because variety requirements such as soil and climate vary with agro-ecological zones. Differences in Kenya's ecologies have required farmers to have appropriate knowledge on suitable agriculture practises for groundnut production in respective of the ecological zones for better and consistent yield and income generation (Nyemba & Dakora, 2010). There are several economic benefits and uses of groundnut outside foreign exchange profits (Desmae et al., 2019). Groundnut is a commercial crop and a source of nourishment in Kenya and other Sub-20 Saharan African countries (Ibrahim et al., 2012).

Groundnut is a lucrative crop for Kenyan farmers, particularly in Homa-Bay County (Ibrahim et al., 2012; Martey et al., 2015). Producers make money by selling shelled or unshelled groundnuts. Other value-chain actors' profit from groundnut through value addition or activities. Homa Bay farmers sell most of their groundnuts (Ndisio et al., 2017). The groundnut value chain employs many people. As with any crop, groundnut's value chain begins with production and extends to the final customer. All value chain phases use actors (Orr et al., 2014).

Groundnut by-products include haulms, shells, and cake following oil extraction (Ibrahim et al., 2012). Haulms and cake are significant livestock feed items. Farmers may use haulms (fodder) recognised as hay to feed their ruminants or sell them in urban marketplaces to make extra money (Ibrahim et al., 2012). The cake is an essential protein and vitamin source in chicken feed.

Groundnut is a leguminous crop that fixes nitrogen in the soil (Hasan et al., 2018). This enhances the soil's nutrient content, making the crop suited for crop rotation. Vegetative cover prevents wind and rain from eroding soil (Brankatschk & Finkbeiner, 2015).

Homa-Bay County grows groundnuts. Its nutritional advantages, income production, and soil fertility contribute to agricultural and economic progress in Homa-Bay County (Makone et al., 2021). Domestic and international groundnut shortages (Martey et al., 2015). Poor peanut production has hurt farmers' incomes (Rahman, 2013). As the problem remains and research resources are scarce, it's necessary to invest in and prioritise groundnut production research in Homa-Bay County and Kenya. Population growth, rising food prices, and food insecurity in Kenya require agricultural research breakthroughs.

Population growth of 4.3% per year exacerbates the problem of falling groundnut yields (Martey et al., 2015). Despite vast land and other resources in Kenya, production per hectare of groundnut has declined over the years in Homa-Bay County. Homa-Bay County's limited land, labour, and capital lead to poverty, poor income, and food insecurity (Kandagor & Nyandoro, 2018). Therefore, there is a need to increase productivity levels of groundnut farmers, to practice a single crop that gives higher profit to farmers in Homa-Bay County. The study sought to determine the factors affecting profitability in groundnut production among smallholder farmers in Homa-Bay County, Kenya.

METHODOLOGY

Description of the Study Area

The study was conducted in Homa-Bay County one of the 47 county in Kenya and lies between latitudes 0015 South and 0052 South, and between longitudes 340 East and 350 East (Owuonda et al., 2020). The County covers an estimated area of 4,760 km^2 constituting

2,696 km^2 of land area and the water surface covers an area of 2,064 km^2. The county can be divided into seven agro-ecological zones namely: Upper Midland (UM1), Upper Midland (UM3), and Upper Midland (UM4 (Jaetzold *et al.,* 2006). Lower Midland (LM2), Lower midland (LM3), Lower Midland (LM4) (Akenga et al., 2018).

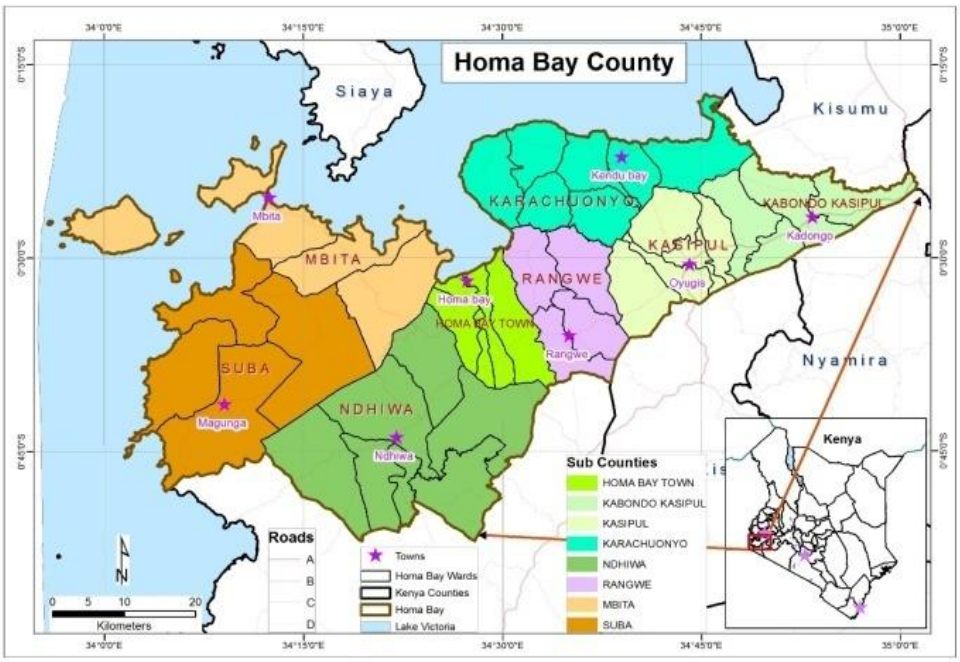

Figure 1: Map of Homa-Bay County
Source: HCIDP 2013, NISK 2017

Research Design
Descriptive research helps the researcher collect data from a large number of instances at once by characterising the features of an individual or group. This design allowed data gathering from the sample on comparing groundnut profitability among smallholder farmers (Creswell, 2011).

A sampling frame is then drawn from the target population in four sub counties; Homa-Bay town, Karachuonyo, Rangwe, and Ndhiwa, this was estimated to have a population of 500registered of groundnut farmers who practice the same crops in every season in the four Sub-counties; (Ministry of Agriculture Homa-Bay County office, 2016). The target population for this study therefore was 500 smallholder groundnut farmers.

The study was conducted in four Sub-Counties in Homa-Bay County and which were selected randomly; purposive sampling procedure was employed to 500smallholderfarmers who grow groundnut in the same agro-ecological zone.

A stratifies sampling technique was applied in order to obtain a representative sample and was divided into each stratum to have equal samples, only four Sub counties was sampled where each Sub-county formed a stratum. Respondents were selected then randomly and proportionately selected from each stratum. The researcher used a formula adopted by Cochran 1963 to determine the sample size of 222 participants.

Primary data was collected for the study using questionnaire that was administered on 222 smallholder groundnut farmers. The data collected from the sample households of

smallholder farmers were analyzed using descriptive statistics, budgetary technique (gross margin analysis), and multiple regressions. Descriptive statistics were run using (SPSS) version 20 while the empirical models were run using (STATA) version 13 software. Analysis involved calculations of mean and frequency distribution of each variable, Frequency and percentages were used in the analysis and presented in a tabular form to enhance interpretation of data. The frequencies and percentages were also used to do a comparative analysis of profitability in groundnut production smallholder farmers. There are five methods used to determine the profitability of an enterprise. These include gross margin analysis, partial budgeting analysis, cost-effective analysis, cost utility analysis and undiscounted cost-benefit analysis (Aweriji, 2014).

Multiple Regression Analysis

The study employed multiple regression models to associate the profitability with factors that influence it. The various forms of regression models were tried and the best-fitted equation was used to analyze the production factors on profitability level. The regression model that was used for this study was presented as follows:

$Y = \beta_0 + \beta_1X_1 + + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + + \beta_7X_7 + \beta_8X_8 + \mu + \beta_9X_9 + \beta_{10}X_{10} + \beta_{11}X_{11} + \beta_{12}X_{12} + \mu$ ……...…..3.2

Where;

Y = Gross margin (Computed)

$\beta 0$ = Intercept

$X1$ = Age of head of household (years)

$X2$ = Gender (Male=0, Female=1)

$X3$ = Family size of household (Number of people in household)

$X4$ = Highest Educational Level Attained

$X5$= Farm Size (hectares)

$X8$= Seed Cost (kg)

$X9$ = Off Farm Income received (ksh/month)

$X10$ = Distance to market (km)

$X11$ = Cost of labour (ksh)

$X12$ = Farm experience (years)

μ = error term (represents the unexplained variation in the dependent variable)

In this study different diagnostic tests were conducted to prove the validity of the models used using the powers of the fitted values for the gross margin equation.

RESULTS

Descriptive Analysis of Social Factors

Gender of the Respondent

The respondents were asked to indicate their gender. The findings are shown in table 1.

Table 1: Gender Distribution of the Respondent

Gender	Frequency	Percentage
Male	124	56.88
Female	94	43.12
Total	**218**	**100**

Source: Field Survey, 2019

Table 1 shows that, the majority (56.88 %) of the households that grow groundnut in Homa-Bay County are male headed household while (43.12%) are female headed households.

Age of Respondents

The study shows the distribution of respondents according to their ages. The results are shown in table 2.

Table 2: Age Distribution of the Respondents

Age Bracket	Frequency	Percentage
Below 20	2	0.9
20-25	19	8.7
26-35	70	32.1
36-40	68	31.2
41-45	50	22.9
46-50	6	2.8
Above 50	3	1.4
Total	**218**	**100**

Source: Field survey, 2019

Table 2 reveals that majority of the respondents (63.3%) were relatively young and fell within the age range of 26-40 years, about 22.9% of them were within the age range of 41-45 years, 2.8 % are of the age of 46-50 and only 1.4% of the responded were above 50 years.

Education Level of the Respondent

The respondents were asked to indicate their literacy level. The findings are shown in figure 1.

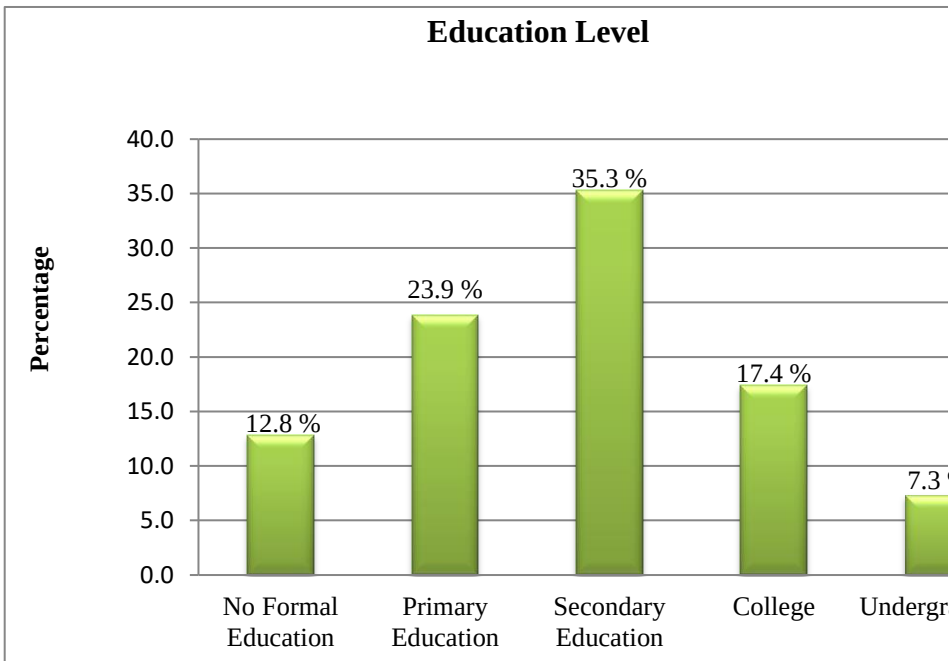

Figure 1: Education Level of the Respondent
Source: Field Survey, 2019

The results revealed that majority of farmers are educated. (35.3%) of the respondents had secondary education, while (23.9%) had primary education, (17.4%) had college level of education, (7.3%) were university level undergraduate and finally only (3.2%) of farmers had postgraduate level of education. (12.8%) of the respondents had no formal education.

Household Size
Respondents were asked to indicate the household head size. The findings are shown in table 3.

Table 3: Household Size

Household Size	Frequency	Percentage
1-3	26	11.93
4-6	96	44.04
7-9	76	34.86
Above 10	20	9.17
Total	**218**	**100**

Source: Field Survey, 2019

The results in table 3 showed that majority (44.04%) had household size of 4-6 members; those who had more than 6 household sizes constituted 34.86%; those with household size of 1-3 had 11.93%; those with household size above 10 had 9.17%.

Farming Experience
Respondents were asked to indicate how long they have been in farming. The results were presented in table 4.

Table 4: Farming Experience

Farming Experience (years)	Frequency	Percentage
1-10	28	12.84
11-20	26	11.93
21-30	104	47.71
Above 30	60	27.52
Total	**218**	**100**

Source: Field survey, 2019

The table 4 shows that 12.84% have 1-10 years farming experience for growing groundnut, 11.93% have 11-20 years farming experience, 47.71% have 21-30 years in farming, and finally 27.52% have above 30 years in farming.

Descriptive Analysis of Economic Factors

Source of Off-farm Income
The respondents were asked to indicate their source of off farm income. The findings are shown in table 5 below

Table 5: Source of Household Off-farm Income

Sources of Household Off Farm Income	Frequency	Percentage
Pension	27	12.39
Remittance from family/friends	20	9.17
Business/Self employed	77	35.32
Salary wages	22	10.09
No response	72	33.03
Total	**218**	**100**

Source: Field Survey, 2019

The table shows that 12.39% get household off farm income from their pension 9.17% get from remittance from family/ friends, 35.32% have some off-farm work business/self-employed, 10.09% get from work salary wages and finally 33.03% did not respond to their sources of off-farm income.

Farm Size
Respondents were asked to indicate the size of farm for groundnut in hectares. The findings are shown in table 6 below.

Table 6: Farm Size

Farm Size (Ha)	Frequency	Percentage
0.5-2.5	156	71.57
2.6-4.5	44	20.18
4.6-6.5	14	6.42
More than 6.5	4	1.83
Total	**218**	**100**

Source: Field Survey, 2019

Results indicate that majority of (71.57%) of the respondents have a farm size ranging from 0.5-2.5 ha, 20.18% of the farmers have 2.6-4.5 ha, lastly 8.25% of the farmers had farm size of 4.6 ha and above, the majority of the farmers are smallholder farmers as indicated in the result.

Credit Access
Farmers were asked to indicate whether they had ever received credit from any source of financial institution or not. The findings are shown in table 7.

Table 7: Credit Access

Credit Access	Frequency	Percentage
No	191	87.61
Yes	27	12.39
Total	**218**	**100**

Source: Field Survey, 2019
The result in table 7 shows that, 87.61% respondents had never received credit from a financial institution and only 12.39% had received credit and had access. Majority (87.61%) had no access to credit, while only 12.39% had access to credit.

Production Cost
This part was developed to look at the extent to which cost of inputs affect the profitability of groundnut production among smallholders' farmers and the result responses to various items, their frequency and percentages.

Sources of Power
The respondents were asked to indicate sources of power on their farms. Figure 2 shows various sources of power that farmers use on their farms.

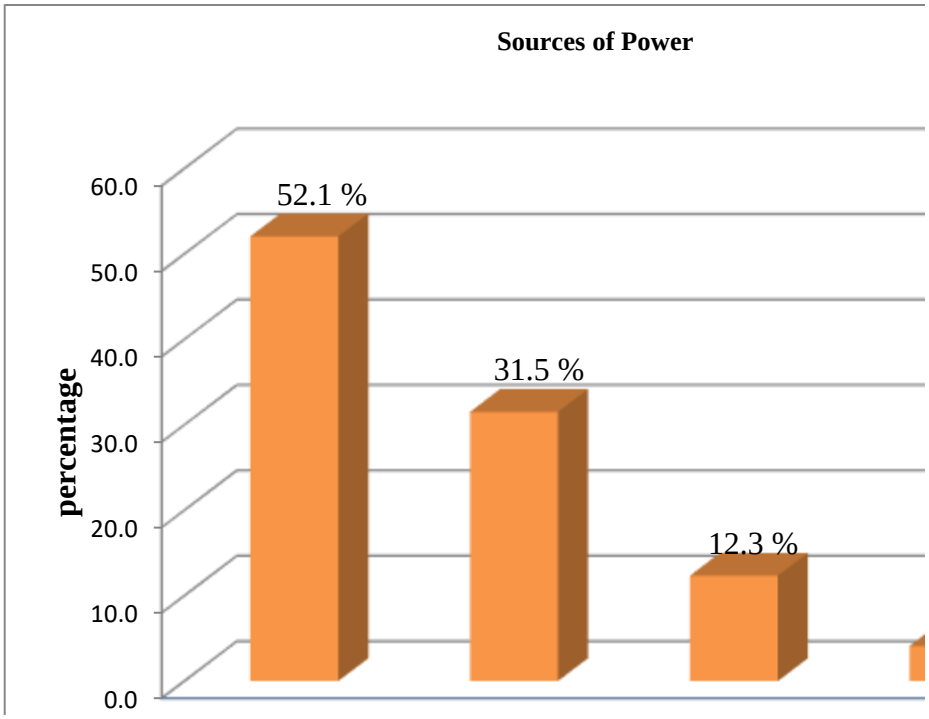

Figure 2: Sources of Power
Source: Field Survey, 2019

Figure 2, above the study shows that 52.1% of the respondents were using unpaid family labour as their source of power; 31.5% of the farmers used hired manual labour,12.3% of farmers used animal draught power and lastly 4.1% of famers used mechanical power in groundnut production. The result revealed that majority 52.1% of groundnut farmers used unpaid family labour for their production.

Source of Seeds of the Respondent
The respondents were asked to indicate the source of seeds used for groundnut farmers. The findings are shown in table 8.

Table 8: Source of Seeds of the Respondents

Source of Seeds	Frequency	Percentage
Local Market	154	70.64
Ministry of Agriculture	36	16.51
Research Institute	24	11.01
Others	4	1.83
Total	**218**	**100**

Source: Field Survey, 2019

The table shows that 70.64% of the farmers uses local seeds, 16.51% use seeds from Ministry of Agriculture, 11.01% use research institute seeds and finally 1.83% uses other source of seed that are not the three stated above.

Farm Pesticides Usage
The respondents were asked to indicate the pesticides used during groundnut farming.
The findings are shown in Table 9.

Table 9: Pesticides Usage

Pesticides Usage	Frequency	Percentage
Herbicides	54	24.77
Insecticides	84	38.53
Seed dressing	14	6.42
All of the above	24	11.01
Others	4	1.84
No response	38	17.43
Total	**218**	**100**

Source: Field Survey, 2019

Table 9 shows that among the different pesticides used by farmers majority of the respondent's 38.53% were using insecticides about 24.77% of them used herbicides, 6.42% were using seed dressing and 11.01% were using herbicides, insecticides and seed dressing, only 1.84% were using other pesticides that are not herbicides, insecticide neither seed dressing. 17.43% of the farmers did not respond to the question at all may because they were not using any or maybe they did not understand the question well.

Quantity of Pesticide

The respondents were asked to indicate the quantity of pesticide used during groundnuts farming the findings are shown in table 10.

Table 10: Quantity of Pesticide

Quantity of Pesticides	Frequency	Percentage
1-5 litres	96	44.04
6-10 litres	81	37.15
Above 10 litres	18	8.26
No response	23	10.55
Total	**218**	**100**

Source: Field Survey, 2019

Table 10 above the result revealed that 44.04% of farmers use 1-5 litres of pesticides, 37.15% used 6-10 litres, only 8.26% of farmers used above 10 litres of pesticides, finally about 10.55% did not respond to the question. This shows that majority of the farmers use between 1 -5 liters of pesticides per hectare.

Quantity of Fertilizer

The respondents were asked to indicate the quantity of fertilizer used during groundnuts production the findings are shown in table 11.

Table 11: Quantity of Fertilizer Used

Quantity of Fertilizer used	Frequency	Percentage
Nil	131	60.09
1-50kg	8	3.67
51-100kg	26	11.93
Above 100kg	53	24.31
Total	**218**	**100**

Source: Field Survey, 2019

Table 11 shows that 60.09% of farmers are not using any type of fertilizer for groundnut production, 3.67% of farmers use 1-500 kg of fertilizer, 11.93% use 51-100kg of fertilizer and finally only 24.31% use above 100 kgs of the fertilizer. This variation was because of size of land owned by farmers.

Table 12: Type of Fertilizer Used

Type of Fertilizer Used	Frequency	Percentage
Poultry manure	133	61.01
Cow dung	29	13.30
Inorganic	48	22.02
Others	8	3.67
Total	**218**	**100**

Source: Field Survey, 2019

From table 12, 61.01% of the farmers use poultry manure, 13.30% of farmers use cow dung and only 22.02% of the farmers use inorganic fertilizer and finally 3.67% of farmer don't use either of poultry, cow dung or inorganic, they use other forms of fertilizer which were not specified by the farmers, among the 39.91% that use fertilizers, 61.01% of them use poultry manure. Among the organic manure, poultry manure is more available as compared to the other manures in the study area.

Regression Analysis

Results from multiple regression analyses indicate both the magnitudes and direction of influence of the regressor variables on the dependent variable (gross margin) as used in the model.

Table 13. Summary of the Diagnostic Tests in Ordinary Least Square (OLS) Assumptions

Test Statistics	Type of Test Employed	Statistical Results	
Normality	Shapiro-Wilk W test on residual	Prob>z	0.799
	Skewness/Kurtosis tests on residual	Prob>chi2	0.402
Heteroskedasticity	Breusch-Pagan/Cook-Weisberg	Prob>chi2	0.000
Model Misspecification	Ramsey RESET test	Prob> F	0.916
Multicollinearity	Variance Inflation Factor(VIF)	Mean VIF	1.420

Source: Field Survey, 2019

Regression Diagnostics

Table 14: Coefficients Regression Model of Factors Affecting the Profitability of Smallholder Groundnut Production

	Regression Coefficient	Standard Error	t	p-value
Constant	0.725	1.277	0.568	0.571
Age	0.091	0.159	0.575	0.566
Gender	0.423	0.221	1.913	0.100***
Family size	0.402	0.221	-1.820	0.506
Education level	0.073	0.109	-0.668	0.406
Farm size	0.671	0.117	5.756	0.00***
Access to extension	0.101	0.056	1.820	0.070*
Access to credit	0.327	0.093	3.516	0.000***
Seed cost	0.017	0.210	0.080	0.937
Off-farm income	0.013	0.009	1.440	0.167
Distance to market	-0.089	0.039	-2.301	0.023**
Cost of labour	-0.002	0.001	-3.790	0.000***
Farm experience	0.644	0.206	3.12	0.002***
Group membership	0.163	0.095	1.71	0.090*

**** Significant at 1% level of probability*
*** Significant at 5% level of probability*
R^2 = 0.890
Adjusted R^2 = 0.823

The regression model had an adjusted R^2 of 0.823, which indicates that 82% of the variation in the profitability of groundnut, this shows that independent variables included in the model is a good indicator that the variables had a very good influence on the profitability level.

Farm Size

The regression coefficient of the farm size was positive and statistically significant at 1 percent level of significant related to the out-put of groundnut farmers (P= 0.00, β = 0.671. A unit increase in farm size leads to an increase in gross margin of ground nuts by 0.671 units. This is because larger farms enjoy economies of scale.

Access to Credit

The coefficient of access to credit was significant 1 percent and positively related to profitability. (β = 0.327; P= 0.000,). A unit increase in farmers who access credit leads to an increase in profitability by 0.327 units. Access to credit avails working capital to farmers thus raising resource productivity for realization of higher profitability.

Distance to Nearest Market

The result of the study indicates that (p = 0.023, β = 0.089) the distance to the nearest market had a negative effect on the profit margin of groundnut production. One percent increases in distance to market in our causes a decrease in groundnut profit margin by 0.09 percent at 5 percent level of significance. This could be because of marketing costs like grain transport cost which increases with distance. This implies that the smallholder farm households nearer to the input-output markets had an easy access to inputs of production (fertilizers, Herbicides, insecticides, improved seeds among others.) and got market price information more easily than those who are far away from the market.

Cost of Labour

This variable had an expected coefficient that was negative and significant at the 1 percent level of significance (P= 0.000, β = -0.002). This implies that the higher the labour cost, the lower the profitability.

Farm Experience

The result of the study revealed that experience had a positive effect on the profit margin of groundnut production. The number of years of the farmers' experience in groundnut production positively affected the groundnut profit margin at 1 percent level of significance (P=0.002<0.01; β =0.644) 1 percent increase in years of experience of the farmer in groundnut production increases the profit margin for ground nut production by 0.64 percent.

Group Membership

Group membership was positive and significant at 10 percent level of significant (P = 0.09<0.1 and a coefficient of 0.163). A unit increase in the number of farmers who are members of a group leads to 0.163 units increase in gross margin for ground nuts.

DISCUSSION

The result from the study showed that 56.88% of agricultural household heads were male, while 43.12% were female. 72.9 % of household heads were under 50, but 27.1% were over, indicating that younger people were still farming. Ahmadu (2009) found that farmer age affects profitability. Older farmers produce less groundnuts. The cultivation, weeding, and harvesting of groundnuts are labor-intensive. More productive are younger farmers.

87.2% had formal education, 12.8% did not, indicating that respondents were educated on average. 59.2% of respondents were primary and secondary farmers, while 28% were post-secondary farmers. This high percentage of educated farmers should have a positive impact

on groundnut profitability through quick understanding of crop management trainings like cultural best practises, pest and disease control, and the adoption of new production techniques. This finding is in line with Nyakaga et al., (2009) who found that Kenyan farmer education positively influenced farm economic efficiency and profitability andagrees with Usman et al. (2013) that education level is significant, implying that educated farmers are quick to adapt new technology and agricultural methods, enhancing profitability. Tatsvarei et al. (2014) found that smallholder farmers in Kenya with less education produce less groundnuts.

Farmers with less than 5.99 ha are considered smallholders (Poole et al., 2013). This shows that most groundnut producers in the study region are small-scale enterprises. Smallholder farmers continue to dominate Kenya's agricultural industry, limiting its potential to alleviate the country's food security challenge. A one-hectare increase in farm size boosts smallholders' groundnut profitability.

Majority 52.1% of groundnut producers utilise unpaid family labour, 70.6% use local seeds, 16.5% use ministry of agriculture seeds, 11.1% use research institute seeds, and 1.8% use other seeds. 24.77% of farmers use herbicides. 75.23% of farmers utilise different weeding and animal traction. This may not be sustainable due to the high cost and lack of labour, especially at the height of the season. Ibrahim et al. (2012) note that some weeding is expensive, labor-intensive, and the availability of labour is often unreliable. Hand weeding may also damage crop roots and reduce crop yield.

Family labour is the most essential component of small holder farmers' production in Kenya and most African countries, which implies most of the farmers in the study have not implemented new farming technology. By adopting new modern farming methods, farmers can attain high levels of profitability. High expenses of farm machinery have damaged the quality and timeliness of farm operations such as land preparation in important groundnut producing zones, forcing farmers to reduce the quality of seedbed preparation, leading to low profit or even a loss in some regions.

Most farmers (44.04%) use between 1-5 litres of pesticides per hectare, which is insufficient, while 55.96% use above 5 litres. Most farmers (60.09%) do not apply fertilisers during groundnut production due to unavailability, inability to afford it, and lack of technical knowledge on fertiliser requirements for and groundnuts. 39.9% use fertiliser. 61% of those who use fertilisers use chicken manure. The research area has more poultry dung than other organic manures. No science recommends using chicken manure. 75.23% of farmers have 23+ years of experience. Farming experience affects output. Various authors say agricultural experience boosts efficiency. Mulwa et al. (2009) found that agricultural experience increases productivity and profitability. Mbanasor and Kalu (2008) found comparable results for Nigerian vegetable farmers. Experienced farmers should have learned from their failures and improved production efficiency for greater revenue. Through farmer's field school, experienced farmers can learn best practises and disease prevention.

Most farmers (93.12%) used one seed per groundnut. Fertilizer is the most expensive input for groundnut growers (44.04%), followed by land preparation (19.27%). Despite government-subsidized fertiliser being inexpensive, most farmers still can't afford it due to high prices. These findings agree with Wanyama, et al. (2010), who said fertiliser prices can influence groundnut production negatively or positively; if the price decreases, farmers purchase more fertiliser, meaning they will apply more, leading to high produce, and if it increases, farmers purchase less fertiliser, apply less, and get less yields and profitability. This has led to most farmers not using fertiliser during plantation. 87.61% had no access to credit, whereas 12.39% did. This means peanut producers have limited access to formal

loans for their fields. 79% of respondents have 4 to 9 family members, with an average of 6.24. Large families boost groundnut production's profitability. This is confirmed by studies like Seidu (2018), which emphasises large families in boosting agricultural productivity since they ensure readily available family labour with decreased costs for groundnut production. Lastly, early marriage is frequent in the study area.

Majority 71.57% of respondents had a farm size of 0.5-2.5 ha, 20.18% have 2.6-4.5ha, and 8.25% have 4.6 ha or more. Smallholder farmers grew groundnuts in the research region. This finding agrees with Olayide et al. and Ojo (2019), who defined smallholder farmers as those with 0.1 to 5.9 hectares. Land ownership affects agriculture production and profitability because farmers without land may not develop and maintain it (Randela, et al. 2010). Population pressure causes the small landholding (Conelly and Chaiken, 2010). This causes little farmlands.

CONCLUSION

Most farmers are active and educated, according to the study. Groundnut farmers are experienced. Poor utilisation of improved seeds, herbicides, and fertilisers is caused by cost, availability, and lack of technical expertise. Farmers utilise organic manure without scientific suggestion since it's easily available. Except for pesticides, land, labour, fertiliser, seeds, and herbicides are overused. As a farmer ages, he or she learns from past mistakes. However, farmer production may drop. Due to infrequent contact, farmers will be sluggish to accept agricultural technologies. Its most expensive input for groundnut farmers is fertiliser, followed by land preparation. Most farmers still can't afford fertiliser due to exorbitant pricing, despite government subsidies, resulting in low peanut production.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations are proffered to enhance the profitability of groundnut farmers;

1. The government should invest in rural education. This will boost farmers' efficiency. Government should establish rural agricultural banks to provide soft loans to rural residents. Smallholder farmers in Homa-Bay should plant groundnuts due to comparative advantages.

2. Fertilizers and agrochemicals should be subsidised for rural farmers. Farmers need credit for inputs. Undercapitalized farmers will adopt better groundnut varieties. The government should give youths who are active in groundnut production grants and/or credit. This will reduce white-collar migration.

3. Smallholder groundnut growers in Homa-Bay should use excellent seeds and fertilisers. Homa-Bay County's Agriculture Ministry should help farmers without formal schooling. These farmers need thorough training to understand recommendations and new technologies.

4. Farmers should utilise government-subsidized fertiliser, which is cheaper than commercial shops, to boost groundnut yields for more profit. On-farm protests should be encouraged to increase farmers' productivity.

5. Smallholder farmers in Homa Bay County produce profitable groundnuts. To increase profits, farmers must increase their acreage devoted to groundnuts, improve production planning, especially providing enough labour at critical points, improve their education to better appreciate modernization in production, secure

additional funds through working capital loans, use more modern inputs, and adopt a more commercial approach.

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