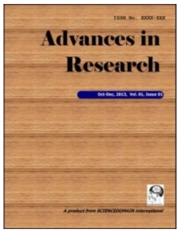

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Evaluation of Small Scale Farmers' Educational Level, Experience, Age and Effects on Performance of Greenhouse Technology Production of High Value Horticultural Crops in Gusii Highlands, Kenya

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Authors' contributions

This work was carried out in collaboration between all authors. Authors PO, AAS and SNM designed the study, wrote the protocol, and wrote the first draft of the manuscript. Author RBO managed the literature searches and adherence to the journal outlines and authors PO and AAS managed the experimental process. All authors read and approved the final manuscript.

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ABSTRACT

Aims: The study aimed to evaluate how farmers' education level, experience and age affect performance of the technology.
Study Design: The research design employed in the study is a survey research design.
Place and Duration of Study: Sample: Department of Medicine (Medical Unit IV) and Department of Radiology, Services Institute of Medical Sciences (SIMS), Services Hospital Lahore, between June 2009 and July 2010.
Methodology: A purposive and multi-stage sampling technique was used to sample 276 respondents guided by target population of 1,000 and the concentration of farmers practicing the technology in the study area. Questionnaires and key informant interviews

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were used to collect data. Data was then computer analysed using Microsoft excel, linear regression analysis and SPSS software.

Results: The study major finding is that greenhouse tomato production in small scale farms in Gusii Highlands is low ranging between 2,484.67kg and 6,558.50kg compared to the potential of 7,500kg and a mean deviation of -3609.76kg. It was evident that that education level and experience had a significant effect on performance by 88.90 kg and 700.39 kg respectively (t- value 2.867 and sign level 0.005) and (t- value 9.020 and sign level 0.000). Age had an insignificant effect on performance with one year age increase resulting to increased performance by 9.74kg (t- value 1.466 and sign level 0.144).

Conclusion: The study concluded is that there is need to invest more in education of farmers to enhance greenhouse technology performance.

Keywords: Food; security; agricultural; productivity; literacy.

1. INTRODUCTION

The dynamics of land use systems are constantly changing, influenced by social, economic and cultural factors such as population density, farmers' level of literacy, need for alternative sources of income, search for higher standards of living, and the need to conserve the productive potential of land and environment [1]. Increasing agricultural productivity requires building the capacity of small-scale farmers to innovate and adopt new technologies [2]. In developed and developing countries all over the world, farmers and local communities have indigenous traditional knowledge (ITK), expertise, skills and practices related to food security, and agricultural production and diversity. Local knowledge is crucial for survival, but for poor people to be agents of their own development, it is not enough [2,3]. In these settings, traditional farming is based on long established knowledge and practices that help to ensure household food availability. However, traditional livelihood systems and indigenous plant varieties are now increasingly endangered by large-scale commercialization of agriculture, population dynamics, land-use/cover changes and the impacts of climate change. To this end, FAO is promoting collaboration to strengthen the interface between traditional knowledge and conventional science and technology and to help maintain and enhance the world's food production and agricultural diversity and sustainability [3]. The development agents on the other hand support communities with livelihood diversification opportunities, improved crop varieties and practices, modern irrigation systems and innovative technologies. In agriculture, innovations can include new knowledge or technologies related to primary production, processing, and commercialization [2]. Inventions and innovations emanating from conventional scientific advancements would have no significant value if they are not translated into actual practice by farmers. Farmers apply the technical skills, experience and economic principles to effectively run and sustain their agricultural production systems for profit and satisfaction. During this process they make decisions on proper economic use of their production resources of land, capital and labour to yield economic and sustainable results [4]. In addition to extension efforts, there are other ways to build the capacity of small-scale farmers by providing them with basic and technical information that can help them improve their productivity and livelihoods [5]. There are numerous non formal educational methods, including night schools and radio, television, print media, movies and plays, the internet, and even mobile phones [2]. Such approaches also, provide farmers with the science behind the technologies and not just technologies. This enables them understand principles behind the technologies and in turn encourages farmers to adapt/innovate technologies appropriate to their own farming systems; especially when farmers are actually involved in the development not only of the technology system, but also of the practices that define it. By listening and learning from the farmers, extension service providers can recommend those techniques most suited to the farmers' situations, rather than introducing a predetermined technology and its accompanying practices. Another benefit is, providing farmers with an array of practices to choose from generally results in greater adoption rates. Farmers can select and adopt those practices that suit their own unique needs. Organizing farmers and helping them to consolidate their efforts to address problems on a community basis through fora enables them access information, markets and form groups [5].

Learning approaches should be practical, discovery-based and need-driven as well as tailored to the goal of transforming farmers into experts of their own farming systems. In order to realize the potential of these approaches, farmers are viewed as development partners and not beneficiaries. Secondly, extension agents are viewed as knowledge and learning catalysts and not information givers. Thirdly, focus is on learning skills and mechanisms for learning and not on giving information [5]. Agricultural growth cannot occur without new innovations that can increase both the land and labor productivity of small-scale farmers in poor rural communities. Innovation cannot occur without the creation, accumulation, sharing, and use of knowledge. The involvement of farmers and other agricultural actors and their networks in this process is important and requires building their capacity so that they can seek knowledge either in the form of information or new findings and process it into innovations. This study evaluated farmers education level, experience and age and their effect on green house technology as used in production of majorly high value horticultural crops mainly tomatoes.

2. METHODOLOGY

2.1 Study Area Description

The study area consists of high potential agricultural area of Kisii and Nyamira Counties [6]. It covers a total area of 2,334.2 Km^2 out of which approximately 80% is arable land. The counties lay between longitudes 340 581E and 350 051E and latitudes 00.351S and 00.883S. This area falls squarely under AEZs LH1, LH2, UM1, LM1 and LM2. The altitude range is between 1700-1800M ASL. The two counties border Kericho, Bomet, Narok, Homabay, and Migori counties. The soil types are generally clay loam in most parts of the study area. The counties have two rainy seasons; long rains from February to June and short rains from August to December with dry spells in January and July. The two seasons sometimes overlap leading to continuous cropping. The rainfall ranges from 1,200-2,500 mm per annum. The mean temperatures are 20-27ºC (maximum) and 15-18ºC (minimum). Administratively Kisii and Nyamira counties are divided into fourteen (14) districts/sub counties carved out in 2009 namely; Gucha, Gucha south, Kisii central, Kisii south, Marani, Masaba south, Nyamache, Sameta, Borabu, Masaba North, Nyamira, Nyamira North , and Manga with a total of thirteen (13) constituencies. These are further subdivided into smaller administrative units as follows; 274 sub locations, 149 locations, 65 wards, and 35 divisions. The total population for the area is approximated at 1,865,149 persons with 193,165 farm families and a household having an average of 6 persons (National Housing and Population Census, 2009). In terms of extension services there are 149 extension units and with average staff: farmer ratio of 1:2,500. The average farm size is 0.5-1.5 Ha. With the highest having over 100 Acres (in Borabu) while the lowest is having 0.25 acres (in other sub counties). The major economic activity is agricultural production food and income. The major crops grown include cash crops such as tea, coffee, bananas, industrial and chewing cane and pyrethrum. Food crops are maize, beans, bananas, sweet potatoes cassava, sorghum millet and various fruits and horticultural crops like tomatoes, kales, and indigenous vegetables for both local and export market. Livestock production is dominated by dairy and local poultry. Agriculture employs an estimated 80% of the population either directly or indirectly. The estimated rural poverty is 30% with some areas having as high as 61% according to Kisii and Nyamira counties profiles [7].

2.2 Sampling and Data Collection Procedures

The target population of the study was the entire small scale greenhouse farmers in Kisii and Nyamira counties estimated to be approximately one thousand (1,000) and who are members belonging to eighty eight (88) groups and institutions and one hundred and twenty one (121) as individual farmers. All together they own a total of two hundred and nine (209) greenhouse units in the study area. The study sample size used was two hundred seventy six (276) as dictated by factors such as: research cost, size the area covered, time, transport and human resources among others. This was as derived from the Morgan table [8] based on probability proportional to size sampling from practicing greenhouse farming groups, individual greenhouse farmers, input suppliers and extension staff. The study used a purposive and multi-stage sampling technique to select farmers to participate in the study [9]. The choice of this technique was guided by the concentration of individual farmers and groups undertaking greenhouse farming and the spread in the study area sub sampled. This was aimed at minimizing errors and provided opportunities to check some of the more likely sources of bias or random error [10]. First stage was the sub-counties where greenhouse farming was undertaken. The second stage is the division/ ward and the third stage is the groups undertaking the farming and the agro-dealers. Selection of individual farmers, group members, stockists, and extension staff was undertaken randomly. The main data collection instruments were key informant interview checklist and questionnaires schedules. Key informant interviews using focused group discussions were conducted for agro-dealers and extension staffs at the district and division/ward office. The researcher used interview checklist with open ended questions for cross checking responses given on technology performance related issues by various groups. Questionnaires administered by enumerators were used to collect data at farm level on greenhouse technology performance from farmers. Data on education level and experience, production levels and technological skills, farm input types and use, and challenges facing the target groups were collected. The research instrument content was shared with the supervisors for their necessary input and approval before embarking on field data collection and then pre-tested in a pilot study for validity then finally used. The respondents were informed of the purpose of the interview and the need to respond truthfully. This was to ensure that the data collected by the enumerator was reliable. Data was analysed and interpreted using Microsoft excel, linear regression analysis and SPSS programmes. Findings were further critically analyzed, interpreted and are presented in descriptive statistics and by use of diagraphs e.g. tables, pie charts and bar graphs. The research findings on the fertilizer application rates and its effect on greenhouse technology performance informed the recommendations and way forward on the future of greenhouse technology in the study area and beyond.

3. RESULTS AND DISCUSSION

3.1 Description of the Study Sample

The sample population used in the study was two hundred seventy six (276) that comprised of one hundred and ninety eight (198) small scale greenhouse farmers, forty two (42) farm input suppliers and thirty six (36) extension staff. This was based on number of practicing greenhouse farmer groups, individual greenhouse farmers, farm input suppliers and extension staffing levels. Kisii County contributed 60% sampled from the following four sub counties Kisii central, Gucha, Kenyenya, and Masaba south due to its larger size compared to Nyamira County 40% sampled from two sub counties of Manga and Nyamira north. Out of the six (6) sub counties sampled each contributed equal number of respondents forty six (46) comprising thirty three (33) farmers, seven (7) farm input suppliers and six (6) extension staff. Selection of individual farmers, members from groups, stockists and extension staff was done at random. The results of population sample are presented in Table 1 below;

Table 1. Distribution of study sample population per county

County	Sub county	Frequency	Percentage
Kisii	Kisii central, Gucha Kenyenya, Masaba S	166	60
Nyamira	Manga, Nyamira north	110	40
Total		276	100

3.2 Greenhouse Farmers by Gender and Age as Percentage of Sample Population

The sample population of 198 greenhouse farmers distribution by gender comprised 62% (122 males) and 38% (76 females) while according to age distribution was 71% (142 adults) and 29% (56 youths). Further analysis of results indicate that for both age groups female farmers were less than males i.e. 27% (female adults) and 11% (female youths). The results of the findings are presented in Table 2 and Fig. 1 below;

Table 2. Distribution of greenhouse farmers by gender and age as percentage of population

Gender	Frequency	Sub total	Percentage	Sub total
Male Adult	87		44	
Female Adult	55	142	27	71
Male Youth	35		18	
Female Youth	21	56	11	29
Total	198		100	

The challenge of youth unemployment is still present in rural Kenya, despite the fact that agriculture supports about 75% of Kenya‘s population. This is because Kenya‘s farming population is ageing (averaging 60 years), implying that agriculture is not a core attraction for the youth [11]. The study findings on gender and age indicate that the uptake of greenhouse technology by youths is on the raise with 29% of sample population being youths. This confirms that youths prefer modern farming technologies, with higher returns per unit area and regular income such as greenhouse farming technology.

3.3 Assessment of Greenhouse Technology Performance

The ideal greenhouse technology performance measure is production in kg per unit, because total and net income from produce harvested and sold and gross margins may not take into account what is consumed within the household and what is given out. According to HCDA and KHDP greenhouse tomato yield potential for a greenhouse unit measuring (6 x

15) M with 500 plants that was used in the study is 15- 20 kg per plant and 7.5-10 tons total yield and as shown in Table 3 below. This is what was assessed in relation to farmer education level, experience with technology and age, extension staff visit frequency and fertilizer application rate in the study. The following sub-sections give details of the findings of the study in the three objective areas.

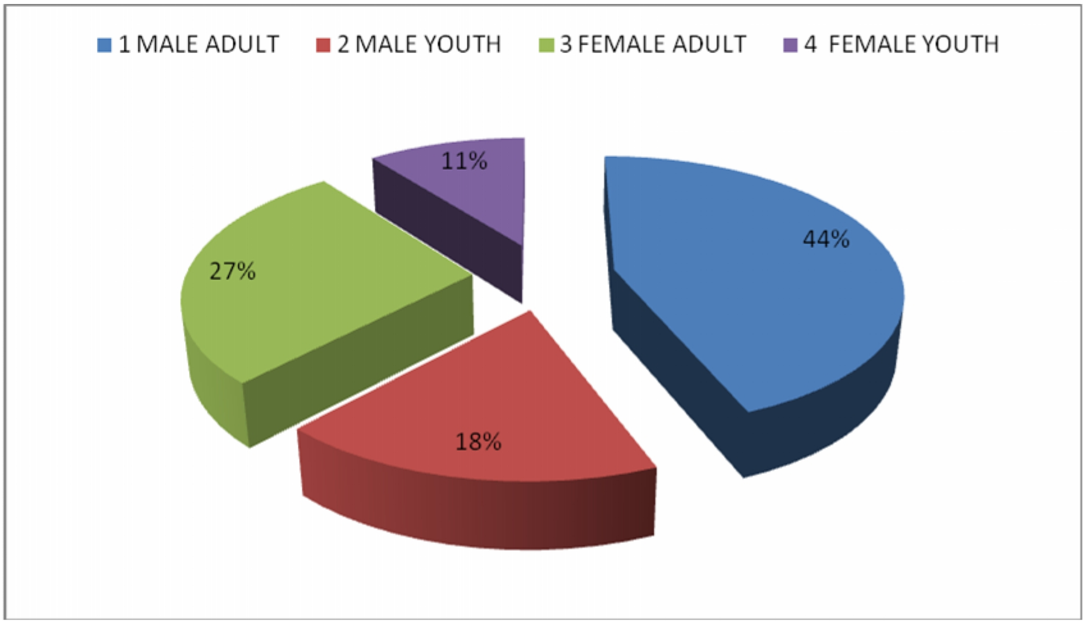

Fig. 1. Comparisons' of greenhouse farmers by gender and age

Table 3. Different greenhouse sizes, number of plants and yield potential

Size	No. of plants	Potential yields/plant	Total yield potential	Actual yield
60M2		a)15- 20 kg	4.5 - 6 tons	
6X10M	300	b)20- 40 kg	6 - 12 tons	
80M2	**500**	a)15 - 20 kg	**7.5 - 10 tons**	**2.48 – 6.5 tons**
6X15M		b)20 – 40 kg	10- 20 tons	
120M2	700	a)15 - 20 kg	10 - 14 tons	
6X20M		b) 20 – 40 kg	14 - 28 tons	
150M2	800	a)15 - 20kg	12 - 16 tons	
6X25		b)20- 40kg	16 - 32 tons	
180M2	1000	a)15- 20 kg	15-20 tons	
6X30M		b) 20 – 40 kg	20- 40 tons	

NB a) Single stem, b) Double stem
Source: HCDA, (2008).

The greenhouse technology performance measure mean output in kg of the one hundred and ninety eight (198) small scale greenhouse farmers interviewed, thirty three (33) from each of the six sub counties sampled were analysed and the results of study ranged between 2,484.67 kg and 6,558.50 kg compared to potential performance of 7,500 kg. The details were as follows: Masaba south had the highest mean performance of 6,558.50 kg while Kisii central had the lowest mean of 2,484.67 kg, Kenyenya 5,352.47 kg, Nyamira north 3,436.98 kg, Manga 2,937.37 kg and Gucha 2,571.47 kg in a decreasing order. The study area sub county means sum divided by six, the number of sub counties results in a study area mean of 3,890.24kg and with a negative deviation of -3609.76 kg. A summary of the findings are as presented in Table 4 and Fig. 2 below;

Table 4. Last season greenhouse mean performance and deviation from potenial

Sub county	Nyamira north	Kisii central	Gucha	Manga	Masaba south	Kenyenya	S/Area mean
Performance (kg)	3436.98	2484.67	2571.47	2937.37	6558.50	5352.47	3890.24
Deviation	-4063.02	-5015.33	-4928.53	-2147.53	-941.50	-2147.53	-3609.76

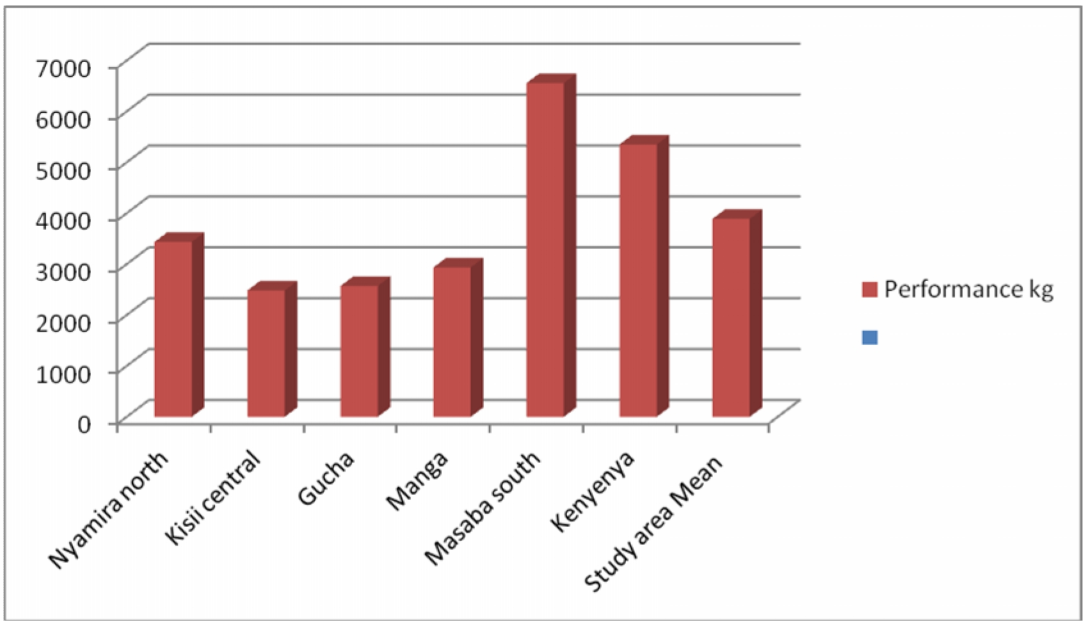

Fig. 2. Bar chart of mean performance in kgs per greenhouse last season

3.4 Counties Technology Performance

3.4.1 Kisii county technology performance

The sub counties sampled from the county were Kisii central, Gucha, Kenyenya and Masaba south and whose study results were as follows; Masaba south had the highest mean performance of 6558.50 kg Kenyenya 5352.47 kg, and Gucha 2571.47 kg while Kisii central had the lowest 2484.67 kg, in the decreasing order. The county mean derived from above data is calculated by sum of sub counties means total 16967.11kg divided by the number of sub counties sampled, resulting to a county mean of 4241.78 kg as summarized in Table 5 and Fig. 3 below;

Table 5. Kisii county technology performance deviation from potenial

Sub county	Performance kg	Deviation
Kisii central	2484.67	-5015.33
Gucha	2571.47	-4928.53
Masaba south	6558.50	-941.50
Kenyenya	5352.47	-2147.53
county mean	4241.78	-3258.22

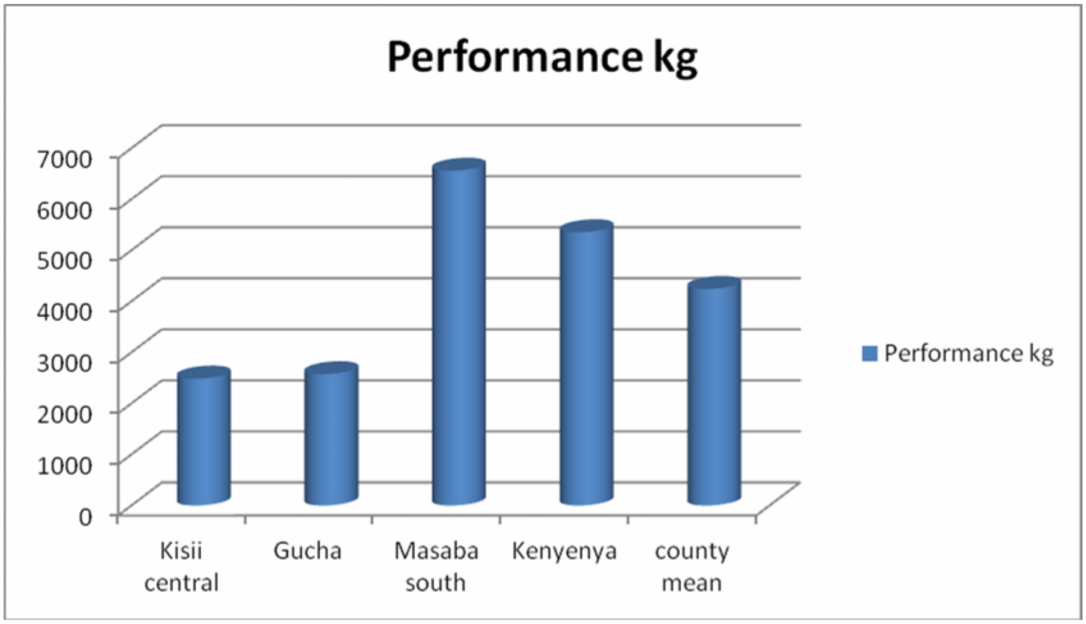

Fig. 3. Kisii county technology performance

3.4.2 Nyamira county technology performance

The sub counties sampled were only two Manga and Nyamira north and whose technology performance study findings were as follows; Nyamira north 3436.98 kg and Manga 2937.37 kg. The county mean derived from above data was calculated by sum of sub county means totalling to 6374.35 kg divided the number of sub counties sampled, resulting to a county mean performance of 3187.18 kg as summarized in Table 6 and Fig. 4 below;

Table 6. Nyamira county technology performance and deviation from potenial

Sub county	Performance kg	Deviation
Manga	2937.37	-4562.63
Nyamira north	3436.98	-4063.02
county mean	3187.18	-4312.82

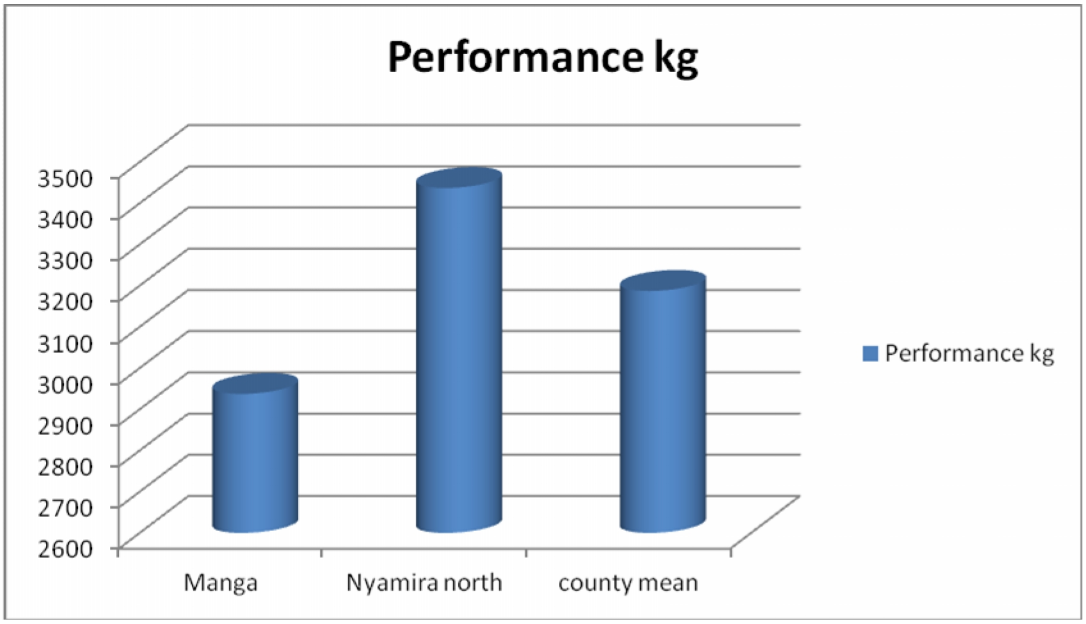

Fig. 4. Nyamira county technology performance

3.4.3 Comparison of counties technology performance

Kisii County had a technology performance mean of 4241.78 kg while Nyamira County had a technology performance mean of 3187.18 kg. The study area comprising the two counties of Kisii and Nyamira mean is derived from above data which is calculated by sum of sub county means totalling to 23341.46 kg divided six, the number of sub counties that were sampled from resulting to the study area mean of 3890.24kg These in summary is as illustrated in Table 7 and Fig. 5 below;

Table 7. Comparison of counties technology performance and deviation from potenial

County	Performance kg	Deviation
Kisii	4241.78	- 3258.22
Nyamira	3187.18	- 4312.82
Study area Mean	3890.24	- 3609.76

3.5 The Effect Farmer of Education Level, Experience and Age on Performance

The study findings indicate that farmers' education level, experience and age showed no big difference in sample population among all sub counties. There effect on performance however was varied education level showed no significant effect with a mean of 10.47. Age had uncorrelated effect youngest age 39.67 and oldest 46.10 with performances of 2571.47 kg and 2937.37 kg respectively. The highest performance of 6558.50kg was from age 40.14 with a mean age of 41.67. Experience on the hand showed a direct and positive relationship lowest experience of 2.17 gave lowest performance of 2484.67 kg while the highest experience of 4.33 also gave highest performance of 6558.50 kg. The mean experience of the study area was derived to be 2.98. Experience of farmers from study area confirms an earlier study that increased agricultural productivity requires building the capacity of small-scale farmers to innovate and adopt new technologies [2]. In addition to extension efforts, there are other ways to build the capacity of small-scale farmers by providing them with basic and technical information that can help them improve their productivity and livelihoods [5]. This is done effectively by accredited stockiest as they sell inputs to farmers. Poor technological performance can be attributed to not only limited use of inorganic and organic fertilizers but also certified seeds. It is also manifest in limited adoption of a technology [12]. The study findings were as presented in Table 8 and Fig. 6 shown below;

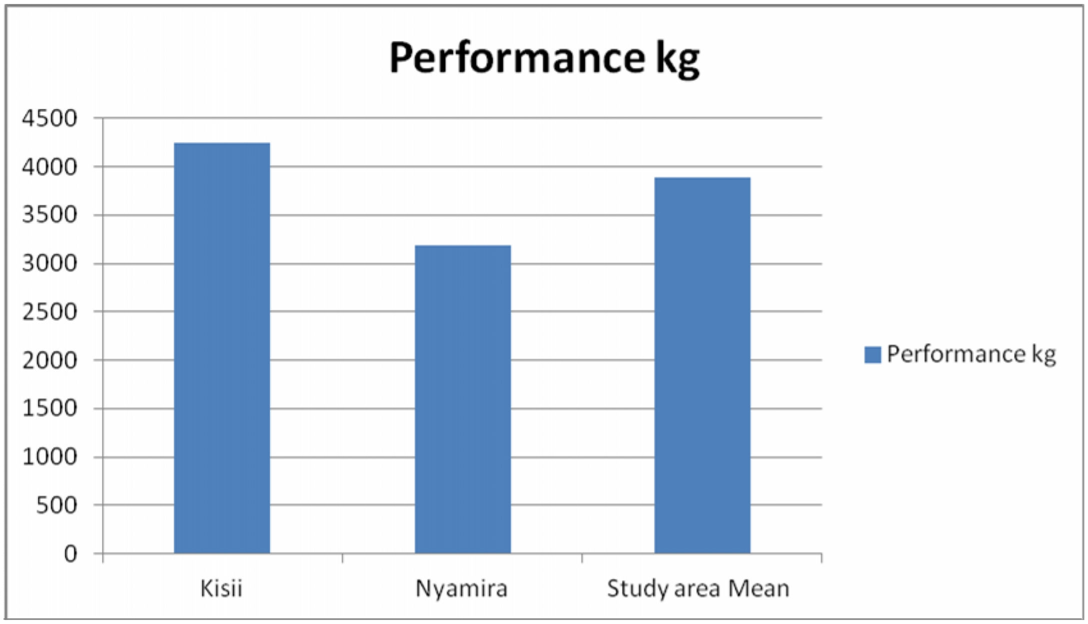

Fig. 5. Comparison of counties technology performance

Table 8. Results of effect of farmers' education level, experience and age on performance

Sub county	Education (years spend learning)	Experience in years	Age in years	Performance (Kg)
Nyamira N	10.40	2.48	42.22	3436.98
Kisii Central	10.40	2.17	43.30	2484.67
Gucha	10.40	2.23	39.67	2571.47
Manga	10.53	2.63	46.10	2937.37
Masaba S	10.53	4.33	40.13	6558.50
Kenyenya	10.53	4.03	38.57	5352.47
Combined	10.47	2.98	41.67	3890.24

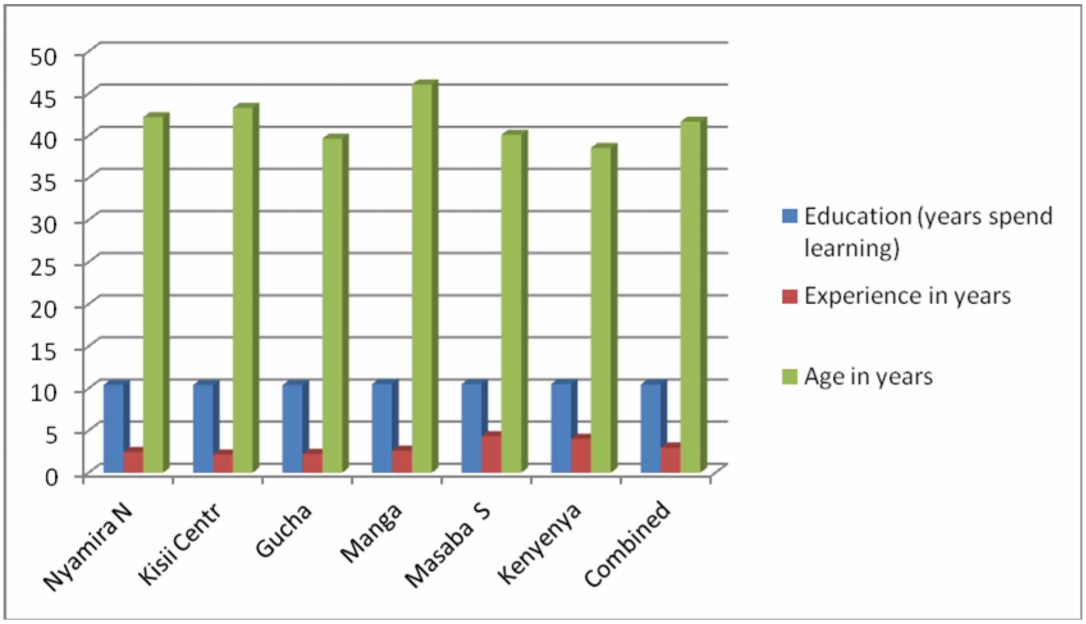

Fig. 6. Effect of farmers' education level, experience and age on the performance

3.5.1 Kisii county education level, experience and age effect on performance

Kisii county education level, experience and age means of 10.47, 3.19, and 39.67 respectively with a performance mean of 4241.78 kg. The results of sub counties findings indicate that performance showed a direct relationship with farmer experience, Kisii central had the lowest experience mean of 2.17 and a corresponding lowest performance of 2484.67 kg. While Masaba south had highest experience mean of 4.33 and a corresponding highest performance mean of 6558.50 kg. Education level and age results showed there was no relationship with performance from study results indicated in Table 9 and Fig. 7 below;

Table 9. Kisii county education level, experience and age effect on technology performance

Sub county	Education (years spend learning)	Experience in years	Age in years	Performance (Kg)
Kisii central	10.40	2.17	43.30	2484.67
Gucha	10.40	2.23	39.67	2571.47
Masaba south	10.53	4.33	40.13	6558.50
Kenyenya	10.53	4.03	38.57	5352.47
Combined	10.47	3.19	39.67	4241.78

3.5.2 Nyamira county education level, experience and age effect on the performance

Nyamira County had education level, experience and age means of 10.47, 2.56, and 44.16 respectively with a performance mean of 3187.18 kg. Sub counties performance from study results indicated in Table 10 and Fig. 8 below shows there was no relationship with education level, experience and age of farmers sampled.

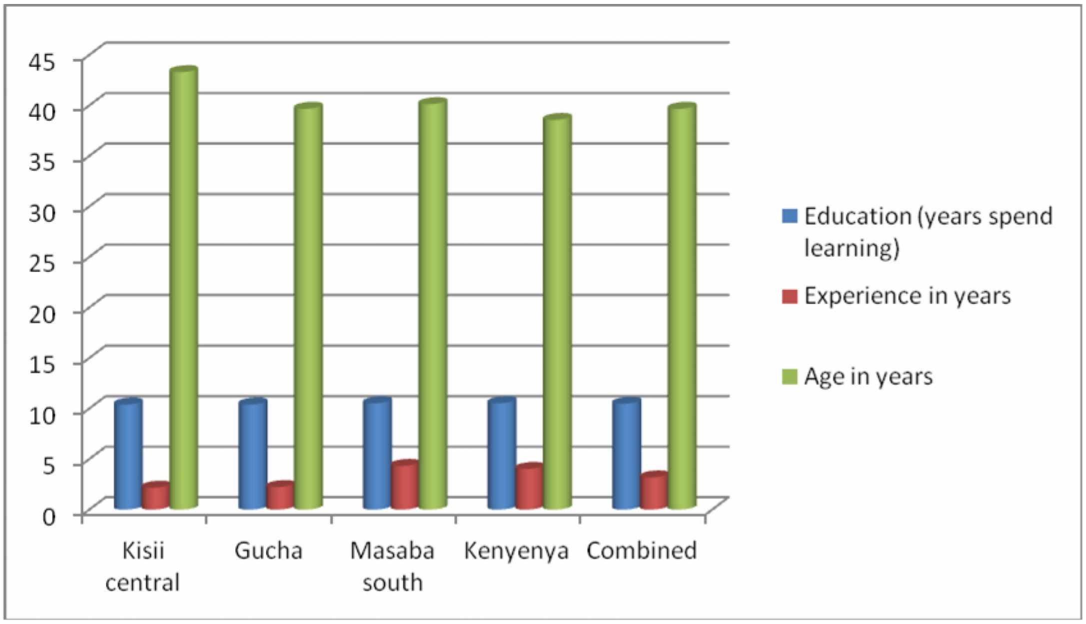

Fig. 7. Education level, experience and age effect on technology performance

Table 10. Nyamira county education level, experience and age effect on the performance

Sub county	Education (years spend learning)	Experience in years	Age in years	Performance (Kg)
Manga	10.53	2.63	46.10	2937.37
Nyamira north	10.40	2.48	42.22	3436.98
Combined	10.47	2.56	44.16	3187.18

3.5.3 Counties comparison of education level, experience and age effect on performance

Study area had education level, experience and age means of 10.47, 2.98, and 41.67 respectively and a performance mean of 3890.24 kg. While Kisii had highest experience mean of 3.19 and a corresponding highest performance mean of 4241.78 kg. Nyamira had lowest experience mean of 2.56 and a corresponding lowest performance mean of 3187.18 kg. Education level and age results showed that there was no relationship with performance from study results as indicated in Table 11 and Fig. 9 below;

3.5.4 How farmers' education level affect the performance

The research hypotheses used to guide the study were null hypothesis and alternative directional hypothesis based on a sound rationale from theory, professional experience and variables that were in consistent with objective and research question. The following null hypothesis was tested at 5% level of significance in the study: Ho_1.There is no relationship between farmers education level and technology performance. H_1 There is a relationship between farmers education level and technology performance. Regression analysis was used in statistics to measure average relationship between two or more variables. Since this research is testing relationship of more than two variables, we will apply multiple regression method in linear form. The independent variable is the technology performances whereas the regressor variable is education level in number years spend in education (school/college) whose coefficient 0.087 is significantly different from 0 with β value is 0.005 < 0.05 is less than 0.05 hence null hypothesis is rejected and accepted alternative.

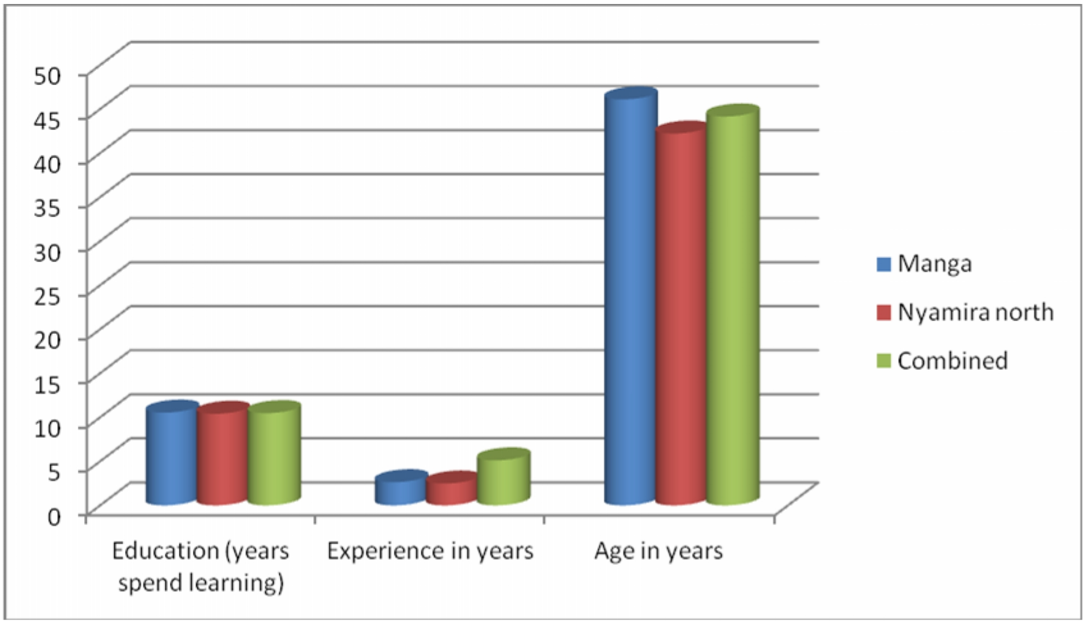

Fig. 8. Education level, experience and age effect on the perforance

Table 11. Counties comparison of education level, experience and age effect on performance

County	Education (years spend learning)	Experience in years	Age in years	Performance (Kg)
Kisii	10.46	3.19	40.42	4241.78
Nyamira	10.66	2.56	44.16	3187.18
Combined	10.47	2.98	41.67	3890.24

3.5.5 The effect of experience on the performance

Regression analysis was used in statistics to measure average relationship between two or more variables. Since this research was testing the relationship of more than two variables, multiple regression method in linear form was applied. The independent variable was the technology performance whereas the regressed variable was experience coefficient 0.395 was significantly different from 0 as its β value is 0.000 < 0.05 was less than 0.05 implying that there was a relationship between experience and technology performance.

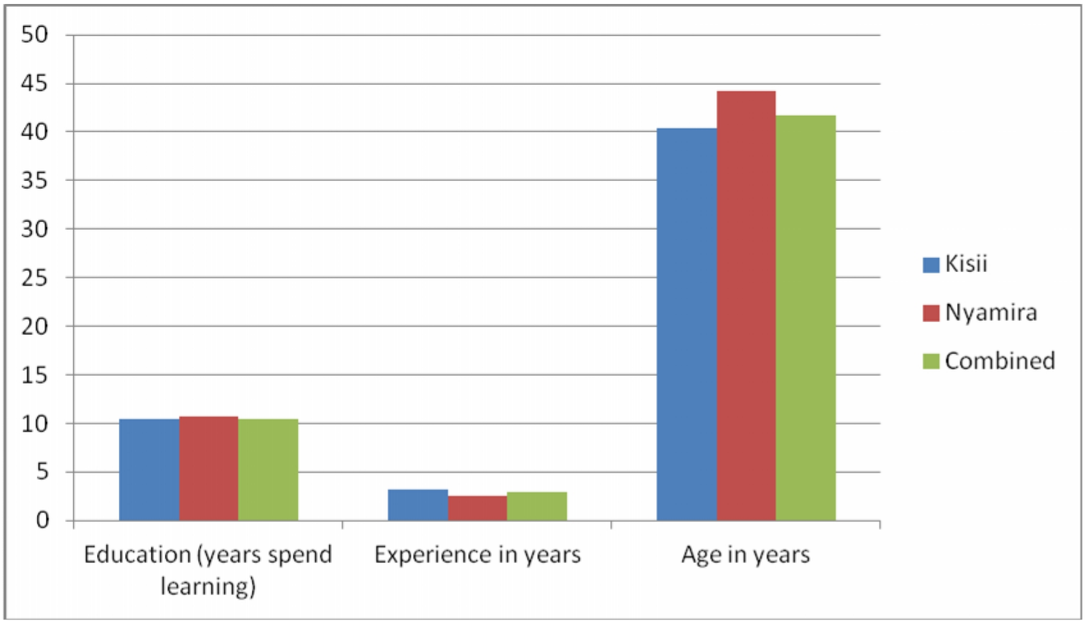

Fig. 9. Counties comparisons of education level, experience and age effect on the performance

3.5.6 The effect of age on the performance

Regression analysis was used in statistics to measure average relationship between two or more variables. Since this research was testing relationship of more than two variables, what was applied was multiple regression method in linear form. The independent variable was the technology performance whereas the regressed variable was age coefficient 0.036 was significantly different from 0 as its β value was 0.144 > 0.05 was greater than 0.05 implying that there was no relationship between age and technology performance.

3.7 Challenges and Opportunities to Improve the Technology Performance

Focused group discussions (FGD) that involved researcher interaction with extension staff and stockiest in the study area aimed to get insight on their role and views on technology uptake and performance. Discussion focus areas were; experience, inputs, recommended practices, markets, technology gaps, and suggestions to improve technology performance. Table 12 below presents a summary of study findings on the challenges and opportunities to improve the greenhouse technology performance.

Table 12. Challenges and opportunities to improve the greenhouse technology performance

Intervention area	Challenges	Opportunities
i. Extension services	Low staffing level Low budget support Low skills	Group approaches, involve collaborators, employment of staff, increased allocation, retraining, internet access
i. Farm inputs	High cost Insufficient water	Use of IPM, organic manure, credit access, utilize rain and ground water resources
i. Technology gaps	Low skills Structural design Labour intensity Disparity in yields Soil analysis not done Trellising and support Temperature control at top	Training, structural redesign, unemployed labour, unexploited yield potential, apply inputs at recommended rates, do soil analysis
iv. Marketing	Poor marketing skills Poor market infrastructure Post harvest losses	Organized group/cooperative marketing, improved market infrastructure, value addition, planning

4. CONCLUSION

Based on the data analysed and results presented and discussed in chapter four, the following conclusions can be drawn; Greenhouse technology performance in small scale farms in Kisii and Nyamira Counties is in general lower than the potential of 7,500 kg and above. Performance ranged from 2,484.67 kg to 6,558.50 kg and with a performance mean of 3,890.24 kg and a negative mean deviation of -3609.76 kg. The conclusion drawn is that there is need enhance greenhouse technology performance to exploit fully the unexploited potential. From the study findings, the farmer's characteristics of education level and experience have direct effect on performance. Education level showed no significant effect with a mean of 10.47. Experience on the hand showed a direct and positive relationship lowest experience of 2.17 gave lowest performance of 2484.67 kg while the highest experience of 4.33 also gave highest performance of 6558.50 kg. The conclusion drawn is that there is need investing in capacity building of farmers to enhance greenhouse technology performance and to exploit fully the unexploited potential.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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