THE INFLUENCE OF AGRICULTURE EDUCATION ON SELF-EMPLOYMENT IN FARMING BY SECONDARY SCHOOL AGRICULTURE GRADUATES IN KANGUNDO AND MATUNGULU SUB- COUNTIES, KENYA

MUTISO Stephen Kyalo (PhD), University of Nairobi, School of Education,
P.o Box 30197-00100 Nairobi, E-mail: mutisostephen@gmail.com. Cell phone No. 0721681619

ABSTRACT

Farming is a major contributor to Kenya's economic development. It is the source of livelihoods for over 80 percent of the population. Major sources of agriculture knowledge include secondary schools, tertiary institutions, agricultural extension services and farmer training centers. A number of secondary school agriculture graduates (SSAGs) are expected to be self-employed in farming. Their choice of engagement is presumably influenced by adoption of the farming skills and knowledge acquired at school. These engagement in and adoption of farming skills have scarcely been studied and documented. The survey targeted farmers with secondary school agriculture knowledge. A sample of a hundred (100) respondents was obtained through snowballing method. The survey used an ex-post facto research design. Data were collected using structured questionnaires in Kangundo and Matungulu Sub-counties. Descriptive statistics used for analysis of the objectives were means and percentages. The findings and conclusions of the survey revealed that majority of secondary school agriculture graduates have taken up farming as the primary source of their livelihood. Secondly, they have adopted and practiced the farming skills learned at school on their farms.

Keywords: *self-employment in farming, secondary school agriculture graduates (SSAGs), adoption of farming skills.*

1. Introduction

World Bank report (2009) paints a gloomy picture on youth employment particularly in Africa. It consequently warns that, the worst is yet to come unless policy interventions are urgently made. Youth aged between 15 and 24, and numbering about 200 million are increasingly finding it difficult to find jobs. Most fall off to join the "reserve army". In this context, reserve army mean people who are actively looking for jobs but cannot find one. This transition to the labour market is marked by periods of unemployment or underemployment and is fraught with frustration. Currently, making up just over one-third of working-age population, unemployment in youth is high accounting for 60 % of the "reserve army".

Steadily, worsening over the years, youth joblessness and underemployment in the continent are assuming crisis proportions, particularly in the wake of the current global economic recession. Each year, 7-10 million youth enter the job market in Africa, often directly from school, yet only about 10% find wage employment, mostly in farming, which provides over 65% of total employment. To address the problem of youth unemployment, countries have to make interventions in various policy dimensions. In the medium to long-term, the solution lies in rapid and labour-absorbing growth (World Bank, 2009).

In Kenya, the 2009 World population data sheet showed that population will grow by 87% to 67 million by 2050, from about 38.4 million then, half of them aged below 24 (GOK, 2009). This is expected to further pull youth unemployment to crisis proportions. To address this crisis, a lot needs to be done in terms of creating a more conducive environment for the private sector to invest in labour intensive business. This calls into play all the macro, micro, and regulatory measures that attract investment, particularly from the private sector, and promote growth, including farming in the rural areas (World Bank, 2009).

1.1 Education and Socio-economic Empowerment

Education plays a significant role in terms of socio-economic empowerment of citizenry. It is a tool for advancement of economic strategies in a country. It's also the general enlightenment of the masses. Education therefore, should induce into the youth the knowledge, skills and attitudes appropriate to their contributions in society. There should be relevance between the schools' curricula and the changing economic and social contexts of the community. What learners are taught in schools should endeavour to change in accordance to the societal needs in order to serve the contemporary society ((Murillo, 2011). The influence of education is greatest when it is promoting knowledge, skills and attitudes which the community actively accepts and adopts.

In rural areas, education should create aspirations in learners for a better standard of living and better quality of life. There is value addition when learners participate in the economic activities of their communities after schooling. This reinforces and exemplifies the skills learned at school. Positive community-school linkage provides an opportunity for skills and knowledge transfer towards community development (Mutiso, 2011). Community-school linkage becomes part of an outreach program for schools where they contribute actively to the efforts of those in community and provide basic skills and knowledge. The school farm is the agriculture laboratory for the neighbouring communities (Konyango, 2010). Schools-community linkage can also be an out-reach program whereby schools open their doors and allow communities to come and learn new skills

Schools have been efficient at imparting literacy in numeracy and basic pre-vocational orientation. Communities have a high desire for these skills when they are relevant to their socio-economic context (Murillo, 2011). One of the global aims of education is solving problems that plague humanity. Schools are meant to prepare its graduates for productive work in the community. If youth are oriented positively to life in community, rural life will be enhanced (United Nations Education, Science and Cultural Organization (UNESCO, 2010). According to Konyango (2010), the concept of community school should serve the whole community, which is its physical part and encourage the community in efforts which are beneficial to the wider society. Schools seem to be most effective as agents in socio-economic development when they expedite programs that have demand-driven designs (Murillo, 2011).

In a departure from the 19th and 20th centuries, when schools were efficient at producing wage-earners and socializing children into habits appropriate to work in the modern industry, schools are duty-bound to develop the capacity to address emerging community needs and concerns (Murillo, 2011). In the developing countries, governments have made efforts to adopt the schools to the local needs. Schools have been named community schools with an aim of preparing the learners for more productive or effective life in the local community. Currently, the school is perceived as directly functional to personal needs, therefore virtually all communities have become clients of schools. The communities have ambitions for their children to reap the occupational and material benefits of learning (Murillo, 2011).

1.2 Self-Employment in Farming

Kenya's economy is agriculturally based (Government of Kenya (GOK, 2013). It is the livelihood of over 80 percent of the Kenyan populations who live in the rural areas and practice farming in small-scale holdings (Wanyama & Chang'ach, 2013). Despite enormous efforts to industrialize, Kenya has remained an agricultural nation since independence (Lewa & Ndungu, 2012). Farming serves as a source of food, raw materials for industries, employment, foreign exchange, market for industrial goods, capital for national development, and helps to correct the balance of trade deficit (Food Agricultural Organization (FAO, 2012).

Kenyan youth constitute 78.31 percent of the total population (GOK, Population Census, 2009). The youth by definition refer to persons in the period between teenage and young adulthood (UNESCO, 2010). The World Bank (2009) defined youth as comprising to persons falling within the age group of 13 – 35 years. The youth add up to about 29 million and comprise of 61 percent of unemployed Kenyans (GOK, 2009). Given the high population growth in Kenya, the youth population is expected to double by 2045, further increasing pressure on job creation (WB, 2009).

It is, therefore, expected that, most of the employment opportunities that will be created will be agriculture related and will target these youth (GOK, 2013). The role of education in employment creation is very critical. It calls for a better focus by education systems on skills development, preparing youth for the transition to work, and for strong public-private partnerships. Modern agriculture and non-farm activities have considerable potential for job and wealth creation and may absorb large numbers of youth who currently crowd the urban towns and cities with underemployment (WB, 2009).

The teaching of skills necessary for self-employment and self-reliance is only possible where there are adequate and proper materials and human resources (KIE, 2013). The resources include school farms and competent and trained agriculture teachers. The teaching of agriculture has improved over the years to reflect the practical orientated approach. Among the steps undertaken by the Kenya Government through Ministry of Education (MOE) include, ensuring that every school offering agriculture as an elective subject either owns or hires a farm for practical purposes. And should include the project work (Agriculture Practical Paper 3) as stipulated in the Kenya National Examination Council (KNEC). Where students should fully participate in developing their psychomotor skills, geared toward self-reliant and better farmers after schooling (KIE, 2013).

1.3 Potential Growth in Agriculture Sector

The agricultural sector is projected to grow at about 4-6% per annum if it has to contribute to national growth, and increase rural wealth (International Monetary Fund (IMF), 2013). Majority that is 80% of the population is poor and live in the rural areas, relying upon small-holder farming at subsistence levels. It is evident that poverty reduction demands for higher agricultural growth rates. Agricultural growth can catalyse growth in other sectors, with an estimated growth multiplier of 1.64, compared to 1.23 in non-agricultural commodities (IMF, 2013).

To achieve the projected growth rate in agriculture sector, however, the most precious resource would be the people regardless of their gender, age, and geographic location, and secondly their potential to work for the collective betterment of Kenya. Human resource development through education translates to creation of labour and employment. This in turn trigger the improvement in provision of knowledge, skills and attitudes for the work-force, stimulation of economic growth,

maximization in utilization of labour, and human resources in income generating opportunities (Murillo, 2011).

The goal to raise Gross Domestic Product (GDP) growth to 10% per annum by 2030, and thereafter, to a sustainable level of 16-17% per annum would be unrealistic without significant contribution from agriculture sector (GOK, 2013). Rural farmers in all circumstances are ill-placed to take advantage of economic growth, unless deliberate interventions are put in place to increase their potential and access to resources, skills, technologies, and services necessary for them to rise out of poverty trap.

In Lipton's (2005) report, the role of crop science in poverty alleviation kick starts with the reduction of mass poverty in rural areas by accelerated growth of staple food crops out-put on family farms. Whether this is feasible and sufficient depends on national political and economic incentives and research institutions to create and apply appropriate crop science, land, and water access as well as open markets in the merit of agricultural products. Progress is made possible by new technologies and by a crucial demographic shift-though many a times is handicapped by rich-world policies towards agriculture, trade, and technology.

Family farms have advantages that enable them to dominate, such as, lower labour related transaction costs, more family workers per hectare each motivated to work and find, screen and supervise hired workers, and finally, low capital per unskilled worker and scarce land per person as compared to large farms in developed countries. Despite differing farm sizes and techniques, family management dominates farming at all levels of development. Data strongly points out that, such farms retain competitive advantages despite market distortions and despite some genuine and growing market handicaps as agricultural supply chains globalize and concentrate. The evolution of the family farms is thus linked to economic development. Almost all the family farms are now commercial and profit-seeking enterprises (Lipton, 2005).

This success is, however, not without challenges, for instance, farm land is getting scarcer due to competing range of demands from other sectors like, human habitation, education, communication and health. This requires a technology-based agricultural revolution to counter the effect. Lipton, (2005) argues that, progress based on technology-agriculture for small family farms does not initially need good roads, credits, agriculture extension services and so on, helpful though they are. He emphasises on the following as almost always essential; (i) total Factor Productivity (TFP) growth on farms via locally profitable employment-intensive technology, (ii) land and water that are neither very unequally distributed nor unsustainably used, and (iii) farm production patterns that are not too vulnerable to disabling of incentives by domestic or overseas policies that sharply erode or distort farm prices. Technologies in farm production are increasingly needed to satisfy the food and income demand. With increase in population and decline in farm land, poverty alleviation requires TFP increasing technical progress to be faster, more yield-enhancing, and employment intensive. To achieve this, farm-based innovations are necessary to complement formal off-farm technologies.

Another challenge on family farms is the law of diminishing returns that characterizes farm production. Research based on Mendelian break-through has increasingly focused on maintaining yields rather than raising them. Radical scientific and institutional innovations require private companies to seek public-purpose outcomes in terms of profits, mainly through contracts to achieve specific outcomes in raising family-farm productivity or robustness in neglected areas and crops (Lipton, 2005).

Lastly, land and water sustainability has been threatened by crop expansion in to marginal lands. Some aspects of intensification have raised serious environmental concerns. Loss of biodiversity, inappropriate or excessive pesticide use, water and plant nutrient depletion, salinity and water logging, as well as nitrate and nitrite build-up in drinking water imperfectly separated from excess nitrogen fertilization and ill-drained farm water. These environmental concerns, while not obviating the need for yield-increasing intensification through innovation in farming technology, may narrow the acceptable expected means to that end (Lipton, 2005).

1.4 Agricultural Diversification and Food Security

Agricultural diversification is defined broadly as the increased variety of agricultural commodities produced (Kipkemei, 2004). The livelihood of many farmers critically depends on incomes from diverse sources including the production of commercial crops and livestock products. Agricultural diversification represents a powerful counteractive force against population pressure that otherwise results in increasing poverty and inequality in many developing countries.

Consequently, food security has been defined as the ability of countries, regions or individuals to meet their year round target calorie food requirements through domestic production, storage, and international trade (Mutiso, 2011). Kipkemei, (2004) on the other hand, defines food security as the access to enough food by people for active and healthy living. Food insecurity is achieved when households especially those with smaller land holdings in Arid and Semi-Arid Lands (ASALs), and weaker resource base are more vulnerable to food stress than wealthier households. Such households begin to suffer earlier than the rest, when food shortage occurs. Poverty is a major course of inability of many individuals to acquire calorie adequate diet throughout the year. To be food secure, one needs a level of education that can enable him or her to be innovative and hence plant more, store more, or purchase food for utilization (Kipkemei, 2004).

A well-chosen crop and livestock can mean the difference between survival and starvation (David & Otsuba, 2003). A survival crop is one that provides food in times of need. It is characterized by one or more of the following traits: It provides food even when it is not tended regularly, it can be stored for a long time, it has different parts that can be harvested, and, it survives when other crops fail. Examples for such crops include cow peas, cassava, arrow roots, pumpkins, potatoes among others. Diversification in crop and livestock is not likely to be successful unless it is based on major technological advancements in farm production. Significant progress cannot be expected unless it is supported by technological innovations. These innovations require a higher level of education among farmers for better adoption of new technologies of production (David & Otsuba, 2003).

1.5 Re-Orienting Education to Agricultural Production

The main objective of the 8-4-4 system of education which was introduced in Kenya in 1985 was to prepare youth for self-reliance (Oluoch, 1982). It meant to transmit relevant attitudes, knowledge and skills needed in life after school. This was as a result of the realization that, the previous (7-4-2-3) system of education did not respond adequately to the needs of the people. Technical and vocational subjects previously taught only in a few technical schools were recommended for introduction in all other secondary schools (Kenya Institute of Education (KIE, 1985). This was to ensure secondary schools graduates have scientific and practical skills that can be utilized in self-employment, salaried employment or further training. These technical/vocational subjects are: agriculture, woodwork, and building and construction among others. The students are supposed to choose one of the subjects (KIE, 2013).

Agriculture was identified as a major vehicle for transmitting farming skills to the youth (Kipkemei, 2004). It was hoped it would orientate them better to exploit their immediate environment for livelihoods. According to KIE (2013), its general objectives were thus formulated as; development of an understanding of agriculture and its importance to the family and the nation; promotion of interest in agriculture as an industry, and creation of awareness of the opportunities existing in agriculture and related sectors; demonstration that farming is a dignified and profitable occupation; and development of self-reliance, resourcefulness, and problem-solving abilities in agriculture among others. In order to achieve the stated objectives especially the one on self-reliance, agriculture skills and knowledge were recommended to be taught both theoretically and practically by professionally qualified teachers (KIE, 2013).

1.6 Statement of the Problem

It is now three decades since the advent of 8-4-4 system of education, which emphasized on creation of self-reliance through self-employment. Yet despite the country's endowment with favourable agricultural climate, few secondary school leavers with agriculture knowledge and skills are taking up farming irrespective of whether they are in any formal employment or not. Of major concern, the country continues to experience high youth unemployment, poverty, and dependence on donor countries for food and non-food agricultural commodities.

3. Purpose and Objectives

The purpose of the survey was to examine the influence of agriculture education on self-employment in farming by secondary school agriculture graduates in Kangundo and Matungulu sub- counties, Kenya.

The specific objectives of the survey were;

i) To investigate the influence of agriculture education on self-employment in farming by secondary school agriculture graduates.

ii) To determine whether the secondary school agriculture graduates (SSAGs) were utilizing agricultural skills and knowledge acquired in secondary school.

4. Theoretical Framework

The study was guided by Carney's (1999) theory, on "Sustainable livelihoods". The theory describes the sustainable livelihoods framework as a tool that can define the scope and provide the analytical basis for livelihoods analysis, by identifying the main factors affecting livelihoods and the relationships between them. Carney outlines factors like, poor access to finances, natural resources/land, and the employment opportunities, and the way they interact at micro, intermediate, and macro levels, gradually shifting to livelihoods (Carney, 1999). A key feature of sustainable livelihoods framework is its recognition of people as the actors, with knowledge and skills as assets that are capable of rational action in pursuit of their own livelihood goals. The framework also recommends for the initial emphasis on resource management to shift gradually to livelihoods after knowledge and skills (assets) acquired at school are fully utilized (Tyler, 2006). In this study, livelihoods related to self-employment in farming while Carney's factors for livelihoods related to the agricultural skills and knowledge.

5. Conceptual Framework

Acquisition of secondary school agriculture education and the practical skills/knowledge have been related to Carney's livelihood factors. The study adopted a conceptual framework which related independent variable, dependent variables and the intervening variables (Figure 1). To minimize the

effects of intervening variables, the researcher used respondents who besides having acquired agriculture knowledge at secondary school were also sharing the same agro climatic conditions and geographical location with similar socio-economic characteristics.

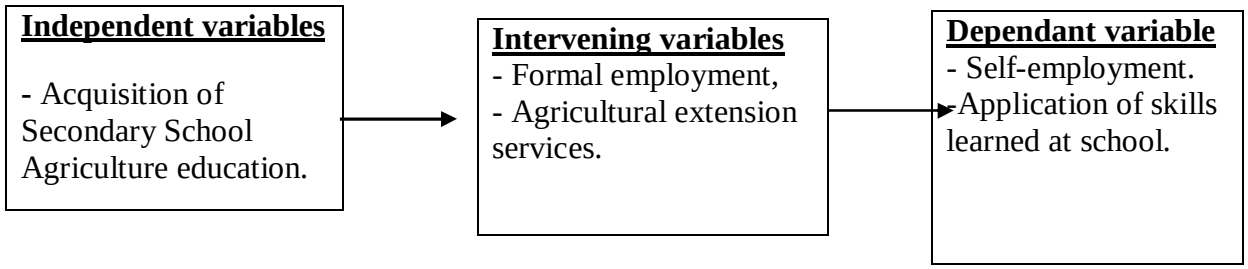

Figure 1: Conceptual Framework of the Relationship between Independent, Intervening and Dependent Variables

The independent variable on whether respondents had proficiency agriculture education was informed by targeting respondents who had studied and done agriculture as an examinable subject at KCSE. The first dependent variable was captured by subjecting the respondent to give data on annual income generated from agricultural enterprises for the last three years. The second dependent variable was captured by subjecting respondents to tick against practices/operations they used on either crops or livestock enterprises.

6. Methodology

The research design chosen for the study was *ex-post facto* research design. In *ex-post facto* design, changes in independent variables have already taken place, and are studied in retrospect for their possible effects on observed dependent variables (Ary, Jacob & Razevieh, 1979). The major weakness of the design is control, since randomization and manipulation of the independent variables are impossible. The research design chosen allowed the researcher to apply aspects of survey research to track the specified target population.

The main agricultural enterprises carried out in the area include coffee, maize, beans, pigeon peas, vegetables, fruits crops, root crops, dairy cattle, beef cattle, sheep, goats, poultry, and bees. A snowball sampling technique was used to obtain 103 respondents from the two Sub-counties though only 100 ended up participating in the study to conclusion.

Table 1: Distribution of Respondents per Sub-county and Division (N=100)

Sub-county	Division	Frequency	Percentage
	Kanzalu	10	10.0
	Kivaani	8	8.0
Kangundo	Kawethei	9	9.0
	Kangundo	14	14.0
	Kakuyuni	9	9.0

	Tala	9	9.0
	Kyanzavi	8	8.0
Matungulu	Kyeleni	7	7.0
	Komarock	3	3.0
	Nguluni	5	5.0
	Kalandini	7	7.0
	Matungulu	11	11.0
Total		**100**	**100**

Data were collected using questionnaires. The effects of history and maturation were controlled through collecting the data at one point in time. To moderate the effects of education, the study only used respondents who had attained secondary school agriculture education.

The raw data obtained were organized via coding and indexing it into numerical values before finally keying it into a computer master data sheet for reorganization using Statistical Package for Social Sciences (SPSS) software version 17. Descriptive statistics i.e. means/averages, standard deviations and percentages, were used to analyze the data.

7. Results and Discussions

Due to diversity of crops and livestock enterprises, the Skills/operations were categorized as:

i) Dairy cattle production skills that is; zero grazing, feeding and nutrition, selection and breeding, fodder production and conservation, and records keeping.
ii) Poultry production skills that is; records keeping, market survey for poultry products, control of parasite and diseases, feeding and rearing, and proper housing.
iii) Beef cattle/sheep/goats production skills that is; feeding and nutrition, parasite and disease control, selection and breeding, fodder production and conservation, and records keeping.
iv) Coffee production operation that is; pruning, soil and water conservation, soil fertility, control of weeds/pests/diseases, harvesting, and records keeping.
v) Cereals production (maize/beans/pigeon peas) skills that is; soil and water conservation, soil fertility, weeds/pests/disease control, harvesting and marketing, and records keeping.
vi) Horticultural production (vegetables/fruits/root crops) skills that is; soil and water conservation, soil fertility, weeds/pests/disease control, harvesting and marketing, and records keeping.

Objective 1: To investigate the influence of agriculture education on self-employment in farming by secondary school agriculture graduates

Data on this objective were obtained by subjecting the respondents to indicate by ticking on an annual income schedule against the categories of annual income generated from agricultural enterprises for the last three years.

Table 2: Annual income assessment

Enterprise	**Total Annual Income (Kshs.) for the past three years**		
	Year 1	**Year 2**	**Year 3**
1.Crops	140,000- 160,000	130,000-150,000	150,000-170,000
2. Livestock	40,000-60,000	140,000-160,000	180,000-200,000
Average Annual Income (Kshs.)	**200,000**	**290,000**	**350,000**

The results points out that, all the respondents sampled practiced mixed farming. On average, the annual income generated from farming amounted to Kshs. 200,000 in the first year, Kshs. 290,000 in the second year, and Kshs. 350,000 in the final year. On further analysis the average monthly incomes, were as follows; Kshs: 16,666.70 in the first year, Kshs. 24,166.70 in the second year, and Kshs. 29,166.70 the final year of the study. These findings translated to worthwhile monthly incomes which may have influenced the secondary school agriculture graduates to adopt farming for self-employment after schooling.

The results further concur with the principle of enterprise diversification which safeguards farmers against total loss in case one enterprise fails due to inevitable risks and uncertainties common in agricultural production. The inconsistencies in annual income consequently may have stemmed from edaphic, biotic or abiotic factors that influence farming negatively David & Otsuba, (2003) & Kipkemei, (2004).

Objective 2: To determine whether the secondary school agriculture graduates (SSAGs) were utilizing agricultural skills and knowledge acquired in secondary school.

This objective determined whether secondary school graduates utilized agricultural skills /operations acquired in secondary schools in diverse agricultural activities on their farms. The respondents were required to score the degree to which they utilized the acquired knowledge in the agricultural enterprises. Scoring was done for the past three consecutive years against a score scale of 1 to 5, with 5 being the highest score. After the scoring was done, the average score for each farming activity was ranked. The ranks were: ≤ 2 = below average, 3 = Average and ≥ 4 = above average.

1. Utilization of skills in dairy cattle production

When the data were analyzed, the findings revealed that, out of 100 farmers studied, 23 kept dairy cattle. On average the score denoting the utilization of skills in various activities of dairy cattle keeping was 3.65±0.11. The minimum score was 2.67, while the maximum was 4.67. The findings were further subjected to ranking on the basis of: Below average, Average and above average scores in the various activities and the results presented as shown in Table 3.

Table 3: Skill Utilization in Dairy Cattle Production

	Categories of Skill Utilization Scores (%)		
Skill	**Below average ≤ 2**	**Average 3**	**Above average ≥ 4**
Zero grazing	6.45	12.90	80.64
Feeding & nutrition	0.00	32.26	67.74
Parasite & disease control	0.00	25.81	74.20
Breeding & selection	3.23	35.48	61.29
Fodder production & conservation	6.45	19.35	74.20
Recording keeping	3.23	38.71	58.06
Aggregate % score	**3.22**	**27.41**	**69.35**

After ranking, the findings were that, zero grazing, fodder production and conservation, and parasite and disease control had the highest proportion of scores that ranked “above average” 80.64% and 74.20% respectively (Table 3). The activities with the highest proportion of scores that ranked “average” were records keeping (38.71%), breeding and selection (35.48%), and feeding and nutrition (32.26%). The activities with a proportion of utilization scores that ranked “below

average" were fodder production and conservation, and zero grazing both at (6.45%), record keeping and breeding and selection both with (3.23%) scores. The aggregate percentage scores for, above average, average and below average were 69.35%, 27.41% and 3.22%, respectively.

2. Utilization of skills in poultry production

Farmers were required to score the utilization of selected skills on poultry keeping. The results of the data gathered showed that, 93% of the farmers used in the study practiced poultry keeping. The aggregate score for utilization of skills was 3.48± 0.07. The minimum and maximum aggregate scores were 1.80 and 5.00, respectively.

Table 4: Skill Utilization in Poultry Production

	Categories of Skill Utilization Score (%)		
Skill	**Below average ≤ 2**	**Average 3**	**Above average ≥ 4**
Poultry record keeping	8.6	51.6	39.8
Market survey for products	8.6	32.3	59.1
Control of parasites & diseases	1.1	31.2	67.8
Feeding & rearing of poultry	1.1	34.4	64.6
Proper housing	1.1	49.5	49.5
Aggregate % score	**4.1**	**39.8**	**56.16**

After ranking the activities with the highest percentage of scores in the "above average" category were, control of parasites and diseases (67.8%), feeding and rearing of poultry (64.6%) and market survey for product (59.1%). The highest proportion of "below average" score was in record keeping and market survey for products both at 8.6%. While the highest proportion of "average" scores were in poultry record keeping (51.6%) and proper housing of poultry (49.5%). The aggregate percentage scores for above average, average and below average were 56.16%, 39.8% and 4.1%, respectively (Table 4).

3. Utilization of skills in beef cattle/sheep/goats production

On utilization of selected skills in beef cattle, sheep and goats, farmers were required to score for them as one enterprise. The results indicated that, 38% of the farmers practiced beef cattle, sheep and goats farming. The aggregate score for utilization of agricultural skills were 3.54±0.09. The minimum and maximum were 2.47 and 4.47 respectively.

Table 5: Skill Utilisation in Beef Cattle/Sheep/Goats Production

	Categories of Skill Utilization Score (%)		
Skill	**Below average ≤ 2**	**Average 3**	**Above average ≥ 4**
Feeding and nutrition	0	28.9	71.0
Parasites and disease control	5.3	13.2	81.6
Breeding and selection	10.5	23.7	65.8
Fodder production & conservation	2.6	34.2	63.2
Record keeping score	18.4	44.7	36.9
Aggregate % score	**7.36**	**28.94**	**63.7**

The highest proportions of utilization scores for all activities except record keeping were ranked "above average" (Table 5). For instance, 81.6%, 71.0%, 65.8% and 63.2% of the utilization scores in parasite and disease control, feeding and nutrition, breeding and selection, and fodder production and conservation were ranked "above average". The highest proportion of utilization of scores in record keeping (44.7%), were ranked "average". While in the "below average" category, records keeping, and breeding and selection had the highest proportions that is 18.4 and 10.5 respectively. The aggregate percentage scores for the categories, above average, average and below average ranked 63.7%, 28.94% and 7.36%, respectively.

4. Utilization of skills in coffee production

Regarding utilization of selected skills in coffee farming, results from data gathered showed that, 62% of the farmers studied practiced coffee farming. The aggregate score for utilization of skills was 4.02±0.08, with a minimum and maximum of 2.61 and 5.00 respectively.

Table 6: Skill Utilisation in Coffee Production

	Categories of Skill Utilization Score (%)		
Skill	**Below average ≤ 2**	**Average 3**	**Above average ≥ 4**
Pruning	8.1	16.1	74.8
Soil & water conservation	3.2	19.4	77.4
Soil fertility	1.6	19.4	79.1
Control of weeds/pests/diseases	3.2	21.0	75.8
Harvesting & marketing	1.6	9.7	88.8
Record keeping	12.9	12.9	74.2
Aggregate % score	**5.1**	**16.41**	**78.35**

When ranked, 78.35% of the aggregate percentage scores were ranked "above average", and 16.41% average and 5.48% (Table 5). The highest proportion of utilization scores in harvesting and marketing (88.8%), soil fertility (79.1%), soil and water conservation (77.4%), control of weeds/pests/diseases (75.8%), pruning (74.8%) and records keeping (74.2%) were ranked "above average". The activities with the highest proportion of utilization scores in the "below average" category were record keeping (12.9%) and pruning (8.1%). While the highest proportion of scores in the "average" category were control of weeds/pests/diseases (21.0%), soil and water conservation and soil fertility both with (19.4%) and pruning (16.1%).

5. Utilization of skills in cereals (maize, beans and pigeon peas) production

Regarding utilization of selected skills in maize, beans and pigeon pea farming, the data obtained revealed that, 97 farmers out of 100 practiced maize, beans and pigeon pea farming, where the aggregate utilization score 3.93±0.07. The minimum and maximum scores were 2.00 and 5.00, respectively.

Table 7: Skill Utilization in Cereals (Maize, Beans and Pigeon peas) Production

	Categories of Skill Utilization Score (%)		
Skill	**Below average ≤ 2**	**Average 3**	**Above average ≥ 4**
Soil & water conservation	2.0	13.3	84.7
Soil fertility	3.0	15.2	81.9
Weeds/ pests/ diseases control	2.0	13.1	84.9
Certified seeds	4.0	22.2	73.7
Harvesting, processing &storage	2.0	9.1	88.9
Market survey for produce	12.1	18.2	69.7
Record keeping	13.3	26.5	60.2
Aggregate % score	**5.48**	**16.8**	**77.71**

After ranking, the activity with the highest proportion of score in the "above average" category were harvesting, processing and storage (88.9%), weeds/pests/disease control (84.9%), soil and water conservation (84.7%) soil fertility (81.9%) and certified seeds (73.7%). The activities with the highest proportion of utilization scores ranked "below average" were record keeping (13.3%) and market survey for produce (12.1%). While the highest proportions of the "average" category were, records keeping (26.5%), certified seeds (22.2%), and market survey for produce (18.2%). The aggregate percentage scores for the categories above average, average and below average were 77.71%, 16.8% and 5.48% respectively, (Table 7).

6. Utilization of skills in horticultural (vegetables, fruits and root crops) production

For the utilization of selected skills in vegetables, fruits and root crops farming, results showed that, for the 50 farmers out of 100 studied, the aggregate average utilization score was 4.48±0.08, with minimum and maximum being 3.2 and 5.0 respectively.

Table 8: Skill Utilization in Horticultural (Vegetables, Fruits and Root crops) Production

	Categories of Skill Utilization Score (%)		
Skill	**Below average ≤ 2**	**Average 3**	**Above average ≥ 4**
Soil and water conservation	0	0	100
Soil fertility	0	0	100
Weeds/ pests/ diseases control	0	6	94
Harvesting and marketing	0	2	98
Record keeping	4	12	84
Aggregate % score	**0.8**	**4.0**	**95.2**

The highest proportion of utilization scores for all the activities were ranked "above average" (Table 8). In all activities, the proportion of scores in the above average category ranged between 84% and 100%. In the aggregate percentage score, 95.2% of all the scores were in the above average category, 4.0% in the average and 0.8% in the below average categories.

In this study, farmers had a high aggregate utilization of agricultural skills score of 3.65 (out of a total of 5.00). This finding agrees with Kipkemei's (2004) report that, farmers with secondary school agricultural knowledge performed significantly better in all farming aspects as compared to

farmers without secondary agricultural knowledge. The findings further agreed with Murillo's (2011) findings that, agriculture education in schools and colleges is one of the ways of expanding agricultural development of this nation. This also is in line with the World Bank, (2009), that "without education, development will not occur. Only an educated person can command the skills necessary for economic growth".

8. Conclusion and Recommendations

The main conclusions drawn from the survey revealed that, majority of the SSAGs were engaged in farming as their primary source of livelihoods. Consequently, they utilized the farming skills and operations acquired at school in their farms.

The major recommendations drawn from the survey were that, secondary school agriculture syllabus enhances creation of self-employment among SSAGs; therefore agriculture teachers should inculcate positive attitudes on learners to appreciate farming as a business with potential employment opportunities. Consequently, agriculture teachers should reinforce the agriculture learning through community outreach programmes for learners to interact with agriculture researchers and commercial farmers.

REFERENCES

Ary, D., Jacob, L.C., & Razevieh, A. (1979). *Introduction to research in education*. New York: Hort, Rinehart and Winston.

Carney, G., Drinkwater, M., Rusinow, T., Neefjes, K., Wanmali, S., & Sigh, N. (1999). *Livelihood approaches compared.* London: McGraw Hill Publishing.

David, N., & Otsuba, J. (2003). *Agricultural diversification for growth and equity in agricultural technology.* Washington, D.C: Oxford Press.

Food and Agriculture Organization, (2012). Small livestock, big impact. Retrieved on 27/4/2012 from *http://ilriclippings.wordpress.com/category/livestock-challenges /indigenous-breeds/*

Government of Kenya (GOK). (2013). *Education sector strategy plan,* Ministry of Education, Science & Technology, Nairobi: Government Printer.

Government of Kenya (GOK). (2009). *The 2009 Kenya Population & Housing Census.* Nairobi: Government Printer.

International Monetary Fund (IMF). (2000). *Interim poverty reduction strategy papers*. Washington, D.C: International Monetary Fund.

International Monetary Fund (IMF). (2013). *Kenya: Poverty reduction strategy paper preparation status report*. Washington, D.C: International Monetary Fund.

Kenya Institute of Education (KIE). (2013*). Secondary school agriculture syllabus for Kenya Certificate of Secondary School Education.* Nairobi: Kenya Institute of Education.

Kipkemei, P. (2004). *Contribution of secondary school agriculture knowledge to rural productivity among small-scale farmers in Uasin Gishu District* (Unpublished M.Sc. Thesis). Njoro, Kenya: Egerton University.

Konyango, J. (2010). An Analysis of the implementation of education policies influencing secondary school agriculture in Kenya and their implications on curriculum improvement between 1959 and 2004. *(Unpublished Ph.D. Thesis).* Njoro, Kenya: Egerton University.

Lewa, K. K. & Ndungu, J. M. (2012). Does educational level influence the choice of farming as a livelihood career? Results of an empirical study from coastal lowland Kenya. Retrieved on 4-10-2014 from http://www.google.co.ke/future-agricultures.

Lipton, M. (2005). *The family farm in a globalizing world: The role of crop science in alleviating poverty*. Southern African Regional Poverty Network-Agriculture.

Murillo, G. (2011). *Education, Entrepreneurship and Community Development Centre for Science Industry and Natural Resources,* New York: Shesta College Redding C.A.

Mutiso, S. K. (2011). Influence of selected factors on performance in farming by secondary school agriculture graduates. *(Unpublished MSc. Thesis).* Njoro, Kenya: Egerton University.

Oluoch, *G. P. (1982). Essentials of curriculum development*. Nairobi: Elimu Bookshop.

Tyler, S. R. (2006). *Communities livelihoods and natural resources.* Warwickshire, U.K: Intermediate Technology Publications.

United Nations Education, Science & Culture Organization (UNESCO, 2010). *World conference on higher education, Higher education in the 21st century, vision and action volume 1-plenary.* New York United Nations Children's Fund (UNICEF).

Wanyama P. M. & Chang'ach, J. K. (2013). Education Reforms in Kenya for Innovation. *International Journal of Humanities and Social Science Vol. 3* No. 9.

World Bank, (2009). *Education in sub-Saharan Africa: policies for adjustments, revitalisation and expansion*. Washington D.C: World Bank.