International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Index Copernicus Value (2016): 79.57 | Impact Factor (2017): 7.296

Relationship between Curriculum Coverage and Technology Adoption in Farming by Form Four Graduates: A Case of Nyandarua West Sub County

Charles Mwangi Njenga[1], Maurice O. Udoto[2]

Department of Agricultural Education and Extension Egerton University, P.O Box 536- 20115 Egerton, Kenya

Abstract: ***Agriculture contributes the highest in the country's economy. Despite agriculture being taught in secondary schools, many secondary school graduates seem not to participate in farming activities in Nyandarua West Sub-County.The purpose of this study was to evaluate the relation between curriculum coverage and technology adoption in farming by form four graduates in Nyandarua West Sub County.Despite the agricultural technologies that have been generated through research in Africa, the impact of such technologies is yet to be felt in most households owing to inefficiency in communicating and sharing agricultural knowledge. The situation in Africa is aggravated by slow adoption of modern information and communication technologies and the shortage of information and communication management professionals. The target population was farmers in Nyandarua West Sub-County who sat for Kenya Certificate of Secondary Education (K.C.S.E) in the period between year 2000 and 2007. Ex-post-facto research design was used in this study. Snowball sampling procedure was used to establish a sample size of 100 respondents collected from five administrative divisions. A Questionnaire and observation schedules were used in data collection. Statistical Package for Social Sciences (SPSS) was used to analyze data using descriptive statistics (means and percentages) and inferential statistics (t-test and chi-square) to test the hypothesis at 0.05 significance level. The study results indicates that agricultural knowledge had a positive relationship with use of technology in farming. The study concludes secondary school agriculture knowledge positively contributes to adoption of technologies and diversification. The researcher recommends that schools and educators should enhance their efforts aimed at encouraging the students taking secondary school agriculture subject to interact with superior modern technologies in agriculture since it promotes increased production.***

Keywords: Agriculture Technologies, Form four graduates,Ex-post-facto,Snowball

1. Background of the Study

Agriculture has an immense impact to humanity in terms of global food supplies, hunger alleviation, economic development and provision of employment (Nova, 1996). Therefore, agriculture can be considered as a pillar for human survival and hence the importance of agriculture being taught at all levels of education. In the U.S.A, formal programs in agricultural education are conducted in secondary schools, community colleges and universities. As a vocational educational program, agricultural education focuses on three major components - formal classroom instruction, career experience programmes and leadership development. These components are delivered through a competency-based curriculum in the context of agriculture in the USA (Lloyd and Osborne, 1988). Beyond the secondary agriculture program, community colleges and universities provide excellent opportunities for students to specialize and gain skills and knowledge in agriculture (Williams and Dollisso, 1998).

In sub-Saharan Africa, the agricultural sector is still the dominant provider of employment, and it remains crucial for economic growth. Moreover, in most parts of Africa, food security is still a critical issue and therefore food production will continue to be a major focus of agricultural education and training institutions. In some countries in sub-Saharan Africa, agriculture has been introduced in general school curricula at secondary education levels as a compulsory or as an optional subject. Development of the agricultural sector in many African countries hinges on the development of the smallholder systems that have sustained African agriculture to date, but continue to face challenges of low productivity. Poverty in Africa has been found to be predominantly a rural phenomenon. About 75% of the world's poor are believed to work and live in rural areas, and it is estimated that, by the year 2020, 60% of the poor will still be rural (Olwande and Mathenge, 2010).

In Kenya, agriculture is offered at all levels of the formal education system. The primary level has 8 years of compulsory universal education system and agriculture is integrated in the science subject. The secondary schools level lasts for four years and agriculture is offered as an optional subject. There are 3 categories of tertiary education levels, that is, certificate, diploma, and degree, and agriculture is offered in the three levels (Kironchi &Mwangombe, 2007). The teaching of agriculture in Kenya is expected to promote the acquisition of skills for self–reliance in farming (Mwiria, 2002). It is viewed as particularly critical for the development of Kenya as agriculture is the main economic activity in most parts of the country. The overall objective of the course is the development of basic agricultural skills relevant to Kenya and the learners' home environment. The subject is meant to have a large practical component to enable learners acquire useful agricultural practice skills. According to Omiti *et al.* (2009), agriculture supports the livelihoods of about 80% of the rural population in Kenya (about 85% of them being small-scale farmers). Most of these people are engaged in agricultural activities, which in turn contribute to the production of food, raw materials for industries, employment, and market for industrial goods, foreign exchange, and capital for national development, and helps to correct the balance of trade deficit (Government of Kenya,

2009). Only 22% of land in Kenya is arable though another 40% has potential for irrigated agriculture. The agricultural sector employs 70% of the national labor force through forward and backward industrial linkages, thus providing food and incomes to individuals and households (Omiti *et al.*, 2009). Agriculture was included in the secondary school curriculum with an objective of equipping the students with practical skills that may help them to engage in agriculture after their studies. This was informed by the fact that Kenyan economy is dependent on Agriculture and a majority of the workforce is absorbed by agriculture either directly or indirectly.

The youth comprises of individuals aged 35 years and below and are more vulnerable to unemployment, (Students in Free Enterprise-Kenya, 2004).Arnon (1989) observed that Small-scale farmers have great potential in increasing agricultural production in the Least Developed Countries, (LCDs), Kenya included. There is a rapid growth of population and steady expansion of the education system leading to unemployment of secondary school Form Four graduates who do not get access to further education. It was expected that empowering the community with agricultural knowledge would help alleviate the problem of unemployment in the rural areas. This led to the need for initiating agriculture in secondary schools in Kenya (Ministry of Education, 1964).

The role of education in employment creation is thus critical. The education system of a country plays a major role in the development of humans and natural resources as well as creating attitudes, which inspire and dispose people towards inevitable changes. Education can therefore be described as a process of transmitting cognitive, practical and affective skills from one generation to another. It provides participatory skills in people, which in turn enhance economic, political and social development (Mwangi, 1998). The 8-4-4 system of education was introduced in Kenya in 1985 with the main objective being that of transmitting skills that would help the youth to attain self-reliance after school. Perception is the cognitive process by which an individual gives meaning to the environment (Wardsworth, 1996). The way individuals select and organize their perception depends on the characteristics of the objects, persons, or events being perceived. Attitude is a persistent tendency to feel and behave in a particular way towards some object about which people have both feelings and beliefs (Hattie, 1992). In a school setting, attitude can come from many sources including the peers, physical environment and past predispositions. The new system emphasized teaching more technical and vocational skills in secondary schools in order to serve those who would not continue with further formal education (Kathuri, 1990). Agriculture was identified as one of the key subjects useful in transmitting farming skills to the secondary school Form Four graduates. It was therefore expected that if teaching of agriculture in secondary schools was effectively done through proper syllabus coverage and participation in agriculture practical activities, students would be well equipped with agriculture knowledge. This would have led to secondary school Form Four leavers involving themselves in farming activities after school. Although other factors like access to land, climatic conditions, capital availability amongst others may have influenced them negatively; their attitudes towards farming was still expected to be positive.

Nyandarua West Sub-County relies entirely on farming activities. In crop production, maize remains the staple food of the Sub-County hence a major farming activity while beans, potatoes and vegetables production are also other common farming activities. Wheat is a major cash crop but common with farmers who own relatively large parcels of land and hence may not be very common to Form Four graduates. In livestock production, dairy forms the major source of income to the farmers in the Sub-County. Dairy plays a major role in both milk and beef production because of bull calves and old culled cows. In many parts of the Sub-County, free grazing system in the unimproved pastures is practiced. Other farmers practice semi-zero grazing system in their farms. In poultry production, most of the farmers rear indigenous birds under free range system although few farmers rear exotic birds under deep litter system. Few farmers practice bee keeping although the Sub-County has a high potential for honey production. Sheep and goat production is one of the most ignored industry by farmers hence management is very poor. This study therefore focused on the relationship between secondaryschool agriculture knowledge and the farming activities engaged after school by Form Four graduates.

The purpose of this study was to evaluate the relation between curriculum coverage and technology adoption in farming by form four graduates in Nyandarua West Sub County.Despite the agricultural technologies that have been generated through research in Africa, the impact of such technologies is yet to be felt in most households owing to inefficiency in communicating and sharing agricultural knowledge. The situation in Africa is aggravated by slow adoption of modern information and communication technologies and the shortage of information and communication management professionals. Besides the slow adoption of technologies, interest in agriculture among students at education institutions has been on the decline. Agriculture as a subject is devalued in primary and secondary schools. The situation is made worse since agriculture is given undesirable connotations e.g. agricultural activities are sometimes used as punishment. In some instances, agriculture is merged with other subjects, agricultural curriculum is poorly designed and most often students do not have access to learning aids that can enable them learn about new technologies in agriculture(Mwangi, 1998; World Bank, 1988).

2. Research Methodology

2.1 Research Design

The study used a descriptive survey in *ex-post facto* approach. In this type of research, changes in the independent variables had already taken place, and the researcher studied them in retrospect for their effects on an observed dependent variable (Ary, Jacob and Razavieh, 1979). The researcher has no control over the variables; he could only report what has happened or what was happening. This implies that there were no manipulations of the variables investigated. Descriptive *ex post facto* research

design is recommended in educational studies because many causes and effects relationship that are studied in does not allow manipulation.

2.2 Location of the Study

This study was carried out in Nyandarua West Sub-County, Nyandarua County in Kenya. The Sub-County is one of the seven sub-counties in Nyandarua County. It boarders Nyandarua North Sub-County to the North East and East, LaikipiaSub-County to the North, MilangineSub-County to the West and Nyandarua Central to the South. The Sub-County covers an area of approximately 381.9 sq. Km. According to the National Census (2008), the Sub-County consists about 133,148 persons from 15,980 households. It has a population density of 142 persons per sq. Km. This Sub-County was curved off from the larger NyandaruaSub-County and has five divisions namely; Boiman, Gathanji, Gatimu, OlJoro-orok and Weru divisions. This Sub-County was chosen due to its larger population of farmers engaged with variety of agricultural and socio-economic activities.

2.3 Target Population

The target population of the study consisted of 7893 Form fourgraduates in Nyandarua West Sub-County who had sat for K.C.S.E and were involved in farming activities (DEO, Nyandarua West Sub-County). They must also have sat for K.C.S.E. in the period between year 2000 and 2007 and were presently actively involved in farming activities. The reason for exclusion of former students who had done K.C.S.E. after year 2007 was because such graduates may not have had adequate time for them to have significant progress on their farming activities. The Sub-County has a population of about 133,148 people. This target group should have been farmers who might have been heads of their households and might have been relying on farming for their livelihood.

2.4 Sampling Procedure and Sample Size

The study systematically identified a few Form Four graduates from each of the five divisions selected for inclusion in the study. In this case initial subjects with the desired characteristics were identified using purposive sampling technique where the researcher used cases that had the required information with respect to the objectives of the study. A snowball sampling method was then used. A total of 100 sampled O-Level Farmers was eventually achieved from the entire Sub-County. These Form Four graduates were evenly distributed from the Sub-County to give every division an equal chance of representation in the study (Mugenda&Mugenda, 1999).

Table 1: Sample Distribution

Sample No.	Division	Population	Total Respondents (Per Division)
1	Oljoro-orok	1915	24
2	Weru	1613	20
3	Gatimu	1389	18
4	Gathanji	1274	16
5	Boiman	1702	22
TOTALS		**7893**	**100**

Source: DEO, Nyandarua West Sub-County.

A combination of two types of instruments was used to collect data, namely research questionnaires and an observation schedule. The questionnaires were semi-structured in form of questions for the Form Four graduates to tick the appropriate answer or fill in the blank spaces. The farmers 'questionnaires were used to solicit information on the following: secondary school agriculture knowledge, level of technology used in farming activities, diversification of enterprises and attitude towards farming. The questionnaire contained likert type items with a scale of 1 to 10. In this study the observation schedule was used in order to capture in-depth information on agricultural activities undertaken as well as extents of diversification among farmers. While using this method, the researcher was a non-participant observer and had minimal interaction with the subjects in order to obtain as complete a record as possible of the level of technology used by farmers in the study area. The Observation schedule helped in producing supporting ways of collecting data (Mutai, 2000). To control the effects of history and maturation, the data was collected at one point at a time. To moderate the effects of education, the study only used subjects who had studied and done agriculture in secondary school.

Primary data was collected from the Form Four graduates using questionnaires consisting of closed and open ended questions. The identified Form Four graduates were visited on their farms within their Wards and at their most convenient time. Face-to-face interview with the identified graduates was done at that time. The questionnaires were then given to them to complete. Documents that include records, books, periodicals and other academic work from schools, MOA and MoEST offices within the Sub-County were used to compile necessary secondary data. The heads of the relevant offices were requested to allow the researcher to access the relevant documents. In all the above cases, confidentiality was always assured.

2.5 Data Analysis

Data from questionnaires and scheduled interviews was coded and analyzed using Statistical Package for the Social Sciences (SPSS) computer software. The data was then analyzed using qualitative and quantitative methods and presented by the use of tables, frequencies and percentages, statistical measures of relationships between the independent and dependent variables. The results were used to draw conclusions and in making recommendations.

Pearson's correlation coefficient and regression analysis were used to determine the relationship between secondary school agriculture knowledge and the level of technologies on farming activities.

3. Results and Discussions

3.1 Descriptive Statistics

Characteristics of Respondents

The characteristics of the 100 form four graduates who participated in this study were examined with regard to gender, age, marital status and size of land owned. The characteristics are presented in Table 2.

Table 2: Characteristics of the Form Four Graduates

Scale (n = 100)	Characteristic	Frequency	Percentage
Gender	Male	73	73.0
	Female	27	27.0
Age	25 years and below	22	22.0
	26 - 35 years	40	40.0
	36 - 45 years	29	29.0
	46 - 55 years	5	5.0
	56 years and above	4	4.0
Marital status	Married	63	63.0
	Single	34	34.0
	Others*	3	3.0
Size of farm	2.5 acres and below	70	70.0
	2.6 - 5.0	21	21.0
	5.1 - 7.5	4	4.0
	7.6 and above	5	5.0

**Widows/widowers/divorced*

Table 2 reveals that nearly three quarters (73%) of the respondents were male while slightly more than a quarter (27%) were female. The results indicate that majority of form four graduates who engage in farming in the Nyandarua West Sub County are males. **N**early two thirds (62%) of respondents were aged 35 years and below. This is an indication that the form four graduates who engage in farming in the sub county are relatively young. Majority (63%) of the respondents were married. The sizes of the farms of nearly all (91%) of those who participated in the study were 5 acres and below.

Farmers who engaged in both crop and livestock farming

Farmers may decide to engage in one or more enterprises on their farms. This decision depends on several factors among them; availability of financial resources, land, labor and even knowledge of the farmer. Farmers who have more knowledge supported by availability of resources are more likely to diversify their farming operations. Table 9 indicates the different activities that farmers are engaged in.

Table 3: Agricultural Activities that the farmers are engaged in

Activity	N	Percentage	
		Yes	**No**
Crop farming	100	85.0	15.0
Diary production	81	60.5	39.5
Beef production	81	2.5	97.5
Poultry production	81	38.3	61.7
Bee keeping	81	4.9	95.1

Majority of the farmers were engaged in crop farming and dairy farming at 85% and 60.5% respectively. Poultry production was third with 38.3% of the farmers practicing while bee keeping and beef production were the least practiced at 4.9% and 2.5% respectively. Crop and dairy farming are the most common activities performed by many farmers because they directly address the issue of food security in the household. They are also the most common enterprises that almost all farmers like to engage in as a source of income. Poultry and bee keeping are viewed to be more technical and labor intensive and are presumed to be difficult enterprises especially for small-scale farmers.

Crops grown by the Farmers

Farmers grow different crops depending on their preference, market availability, availability of resources and skills to manage the crop. Farmers choose those crops they can manage comfortably and derive maximum yields leading to better returns. Table 4 indicates the crops grown by the farmers in the study area.

Table 4: Crops grown by the Farmers

Crop	N	Percentage	
		Yes	No
/Maize	81	49.4	50.6
Potatoes	79	39.2	60.8
Beans	81	24.7	75.3
Vegetables	81	34.6	65.4
Pyrethrum	81	4.9	95.1

Most farmers in the area were growing maize, potatoes and vegetables at 49.4%, 39.2% and 34.6% respectively. Beans was planted by 24.7% of the respondents while only 4.9% planted pyrethrum. This can be attributed to the importance of maize beans and vegetables as food crops hence most farmers would want to enhance the households' food security status. Pyrethrum is the least planted crop because of the instability that has been witnessed in the industry for a long period of time. The prices went very low hence the farmers have no incentive of planting it.

Animals kept by the Farmers

Farmers have a choice between several species of livestock that they can keep depending on their needs and financial ability. Some are kept for income generation, others for prestige while others are kept for labour purposes. They may also be viewed as an investment that can be easily turned into cash. Table 11 shows the types of animals that are kept by farmers in the study area.

Table 5: Animals kept by the Farmers

Animals	Percentage	
	Yes	No
Dairy cattle	76.0	24.0
Poultry	72.0	28.0
Pigs	8.0	92.0
Sheep	19.0	81.0
Beef cattle	42.0	58.0
Bees	17.0	83.0
Goat	7.0	93.0

Dairy cattle and poultry were the animals kept by majority of farmers at 76% and 72% respectively. Beef cattle were kept by 42% while sheep and bees followed by sheep and bees at 19% and 17% respectively. Pigs and goats were the least kept at 8% and 7% respectively. Dairy cattle and poultry are common because their products (Milk, eggs and chicken) are consumed by many people and are readily marketable. These products especially milk contributes towards the major diets in almost every household. Many people have traditionally kept poultry as a source of food and income because of their ease of disposal. Beef and mutton are also fairly consumed hence sheep and beef are also kept. The market for honey has been developing in the recent past because of the perception of it being medicinal and the prices are high. This has made many people to start bee keeping. However, pork is not universally accepted by

many because of religious beliefs and many people associate it with unhygienic conditions hence the market is not highly developed. This makes it less popular making it unattractive to rear by farmers. Goats are delicate animals and majorly browsers, which survive in hot and dry areas. Cold conditions may make it difficult to survive thus many farmers avoid keeping them.

3.2 Agricultural Knowledge and Adoption of Technologies in Farming.

Objective two of the study examined the relationship between agricultural knowledge and adoption of technologies by form four graduates in their farming activities**.**

Several technologies are available to the farmers in crop and animal production depending on the type of crops and animals in question and the region. Most farmers implement those technologies that will end up increasing productivity

3.2.1 Crop production

Table 6: Technologies used in Maize and Beans Production

Technology	Maize		Beans	
	Frequency	Percentage	Frequency	Percentage
Mechanization (during land preparation, weeding, harvesting, irrigation)	53	53.0	46	46.0
Pesticide and herbicide	50	50.0	43	43.0
Improved seed varieties	38	38.0	41	41.0
Disease control (Chemicals)	43	43.0	43	43.0

Slightly more than half of the farmers (53%) had mechanized their activities in maize production as compared to 46% who had mechanized operations in beans production. Maize is the main crop in Kenya and intensive investments have been made in technologies to enhance its production. On the other hand there are some activities that have not been mechanized in beans production. Pesticide use was also higher in maize at 50% as compared to beans where 43% of the farmers used pesticides in beans production. Maize tends to be attacked by more pests during growth and even after harvest hence the need for increased use of pesticides. However on the use of improved seeds many farmers had adopted improved beans seeds (41%) as compared to maize at 38%. Many farmers trust the seeds that they have tasted and proved and because most of the times maize is grown on a large scale, most farmers fear risking by introducing new varieties. On the other hand beans is mostly planted on a small scale and farmers may be willing to experiment because of the low risk associated. In terms of disease control, 43% of the farmers controlled diseases in both maize and beans. However in beans both technologies were practiced by less than half of the farmers while in maize improved seeds and disease control were practiced by less than half of the farmers. This may be due to the little importance attached to beans by most farmers and also there may be few incidences of diseases in the area for both crops. Sharma *et al.* (2010) noted that agriculture is economically lucrative for farmers hence permitting them to secure the use of effective expertise and technology.

Technologies used in Livestock Production

Different technologies are used in livestock production to improve production, reduce production costs or manage the health of the animals. Farmers use the various technologies depending on their financial ability. The technologies include mechanization of operations, use of acaricides, disease control, and artificial insemination among others. Table 12 indicates the technologies use by farmers in livestock production.

Table 7: Technologies used in Livestock Production

Technology	Frequency	Percentage
Mechanization (prepare feeds, milking etc.)	25	25.0
Acaricides	43	43.0
Disease control (e.g. antibiotics)	53	53.0
Artificial insemination	40	40.0
Feeds (forage, silage, mineral licks, concentrates etc.)	52	52.0

Most farmers majored on feeds and disease control technologies in production at 53% and 53% respectively. Use of acaricides and artificial insemination practices were also popular among farmers at 43% and 40% respectively. Mechanization was adopted by only 25% of the respondents. Feeds and disease control are very essential practices that contribute directly and almost immediately to the level of production. Most farmers ensure proper feeding of their livestock in order to improve production, disease control is also essential because an unhealthy animal cannot produce optimally. Accaricides also control pests, which may lead to diseases, and use of accaricides is one of the basic practices in livestock production. Artificial insemination has become popular among farmers as a way of improving the genetic makeup of animals to improve production and resistance to diseases and environmental conditions. Mechanization on the other hand involves higher financial investment and only those farmers who are capable will invest in them. This therefore sidelines those farmers who have low financial capabilities and majority of the small scale farmers are constrained in terms of finances.

Adoption of technologies

Data on adoption of technologies was generated using a set of 9 items in the graduates' questionnaire. The respondents indicated the frequency of use of crop and livestock production technologies. The responses were scored as follows; Never = 0, Rarely = 1, Sometimes = 2, Often = 3. The scores were averaged and transformed into the adoption of technologies index.

Table 8: Frequency of use of technologies

Technology	N	Mean	SD
Crop Production			
Mechanization in crop production (during land preparation, weeding, harvesting, irrigation)	87	1.52	0.78
Pesticide and herbicide	93	1.30	0.69
Improved seed varieties	93	1.68	0.80
Disease control (Chemicals)	94	1.31	0.73
Animal Production			
Mechanization in livestock production(prepare	94	1.06	0.75

feeds, milk etc)			
Accaricides	96	1.50	0.71
Drugs for controling diseases (eg antibiotics)	93	1.22	0.66
Artificial insemination	86	2.36	0.78
Feeds (forage, silage, mineral licks, concentrates etc)	92	1.95	0.95
Adoption index	100	1.41	0.37

Technologies that had been adopted by farmers include mechanization in crop production, improved seed varieties, use of accaricides, artificial insemination, feeds. Artificial insemination was the most popular followed by feeds. These strategies have direct impact on production of the animal. Pesticides, disease control, mechanization in livestock production and drugs for controlling disease were the least adopted strategies. These are technologies conditional to the infestation of diseases or pests while mechanization in livestock is very capital intensive hence many farmers are constrained to invest in them. This is due to the low incomes that most farmers get from their production.

3.2.2 Categorizing the form four graduates – adopters and none adopters

Form four graduates were categorized as either adopters or non-adopters depending with the rate of technology use. Categorization was done by converting the indices of each respondent using the scale: Adopters (1.51 to 3.00) and Non adopters (0.00 to 1.50.)

Table 9: Category of Form Four Graduates

Category	Frequency	Percentage
Non Adopter of technology	62	62.6
Adopter of technology	37	37.4

Majority of form four graduates 62.26% had not adopted technologies in their practices while only 37.4% had adopted. This may be due to the kind of knowledge that is given in high school whereby it may not directly advocate for technology use but only give the learners general agricultural knowledge. Adoption is also a function of financial availability regardless of the knowledge that an individual may have. This is in line with Feder*et al*., 2004 who noted that even if graduates gain knowledge that could improve performance, the change is rather small and cannot be detected in the econometric study. This was attributed to systemic challenges associated with technology adoption including finances.

Hypothesis test

The hypothesis that there is no relationship between agriculture knowledge and technology adoption was tested for acceptance or rejection. The results are indicated in Table 15.

Table 10: Agriculture Knowledge and Adoption of technology

Scale	Chi-Square value	df	p-value
Continuity Correction	.336	1	.562
N of Valid Cases	82		

The results of the chi-square test in Table 15 reveal that the relationship between agriculture knowledge and adoption of technology was not statistically significant, χ^2 (1, N = 82) = .336, $p \leq 0.05$. This implies that agricultural knowledge has no relationship with farmer adoption of technology. The results support the second hypothesis, which states that the relationship between agriculture knowledge and adoption of technology is not significant. It was thus accepted.

Adoption of technology is a function of several factors that interact together to make an individual decide whether to adopt. Having agriculture knowledge alone may not be enough to influence an individual's decision to adopt. Most farmers work with experience and will try out any technology after seeing it work or succeed somewhere else. Past experiences, weather conditions and availability of funds also play an important role in ensuring that farmers adopt new technology. Feder*et al.* (2004) noted that the knowledge gained in training is complex, as learners do not master a specific set of contents rather, they master a process of learning that can be applied continuously.

4. Conclusions and Recommendations

Knowledge in agriculture is very important in exposing the learners to different technologies that are available in agriculture. It gives the learner an insight of new avenues that can be exploited in order to improve agricultural productivity. Form four graduates had adopted different technologies in their farming activities especially mechanization and disease control though the relationship between agricultural knowledge and technology use was not significant

Agriculture departments in secondary schools should implement a whole round approach towards encouraging adoption of technology should be used in order to ensure that the knowledge acquired is practiced. This should involve demonstrations and trainings to the farmers on the importance of those technologies.

References

[1] Alluri, K., &Zachmann, R. (2008). Technology-mediated open and distance education for agricultural education and improved livelihoods in Sub-Saharan Africa.
[2] Arnnon, I. (1989). Agricultural Research and Technology Transfer. London, U.K.:Elsevier Science Publishers Ltd.
[3] Ary, D. Jacobs, L. C. &Razavieh, A. (1979). *Introduction to Research in Education* (2nd Ed.) New York: Hort, Rinehart and Winston.
[4] Feder, G., Murgai, R., &Quizon, J. B. (2004). The acquisition and diffusion of knowledge: The case of pest management training in farmer field schools, Indonesia. *Journal of agricultural economics*, *55*(2), 221-243.
[5] GoK. (2009). Government of Kenya. Food security in Kenya. Ministry of Agriculture Report, Government printer, Nairobi.
[6] Hattie, J. (1992). *Self-concept*. Hillsdale, Lawrence Erlbaum Associates Inc, New Jersey. Inc.
[7] Kathuri, N. J. (1990). *A Study of the New Agricultural Education in the Secondary Schools in Kenya.* A PhD

Thesis, University of Illinois at Urbana-Champaign, U.S.A.
[8] Kenya Institute of Education. (2006). Secondary Education, Agriculture Teachers
[9] Kenya Institute of Education. (2002). *Secondary School Agriculture Syllabus for Kenya Certificate of Secondary School Education-Nairobi*. Kenya Institute of Education.
[10] Lloyd, P. J. and Osborne, E. W. (2008). Handbook on Agricultural Education in PublicSchools**.**Dunville, UL: International Printers
[11] Mathenge, M., Place, F., Olwande, J., &Mithoefer, D. (2010). Participation in agricultural markets among the poor and marginalized: Analysis of factors influencing participation and impacts on income and poverty in Kenya. *Unpublished Study Report Prepared for the FORD Foundation*.
[12] Ministry of Education (1964). Kenya Education Commission Report, part 1, Nairobi. Government Printer
[13] Mugenda, O. M. &Mugenda G. D. (1999). Research Methods: Quantitative and Qualitative Approach, Nairobi: Acts press.
[14] Mutai, B. (2000). How to write Quality Research Proposal: A Complete and Simplified Recipe. NewDelhi: Thelley publications.
[15] Mwangi, J. G. (1998). Contributions of Education and Research to National Development with Special Reference to Kenya. Egerton Journal of Humanities, Social Sciences and Education.
[16] Mwiria, K. (2002). Vocationalisation of Secondary Education; Kenya Case Study, Kimkam Development Africa Limited.
[17] Nova, T. (1996). An Agri-Tourism Strategy, for Nova Scotia. Scotia Department of Agriculture and Marketing.
[18] Omiti, J., Otieno, D., Nyanamba, T., & McCullough, E. (2009). Factors influencing the intensity of market participation by smallholder farmers: A case study of rural and peri-urban areas of Kenya. *African Journal of Agricultural and Resource Economics*, *3*(1), 57-82.
[19] Shanks, G., Sharma, R., Seddon, P., & Reynolds, P. (2010). The impact of strategy and maturity on business analytics and firm performance: a review and research agenda. *ACIS 2010 Proceedings*, *51*.
[20] Wardsworth, B. J. (1996). Piagets theory of Cognition and Affective Development. World Bank. Washington.
[21] Williams, D. L. &Dollisso, A. D. D. (1998). Rationale for research on sustainable agriculture in the high school agricultural education curriculum. Journal of Agricultural Education, 39(3), pp.51-56. doi: 10.5032/jae.1998.03051
[22] World Bank. (1988). Education Sector Policy paper, Washington D.C., U.S.A, cited by World Bank. Education in Sub-Saharan Africa: Policies for Adjustment, Revitalization and Expansion. Washington D.C.: World Bank.