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INFLUENCE OF FORMAL AGRICULTURAL EDUCATION ON UPTAKE OF TISSUE CULTURE BANANA IN KIAMBU COUNTY, KENYA

Research article

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INFLUENCE OF FORMAL AGRICULTURAL EDUCATION ON UPTAKE OF TISSUE CULTURE BANANA TECHNOLOGY IN KIAMBU COUNTY, KENYA

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Abstract

The study was carried out to determine the influence of agricultural education on the uptake of tissue culture bananas in Kiambu County. The objective was to determine the influence of formal agricultural education on the uptake of improved banana technology using a Likert scale of 1-5. The second objective examined the influence of non-formal agricultural education on the uptake of improved agricultural technology using a five-point scale. The study was carried out in 2022 in Kiambu County, Kenya. The study adopted a descriptive survey research design. The study targeted 1881 farmers in the 12 sub-counties in Kiambu County. The purposive sampling method was used to select 6 sub-counties that were part of the study. The stratified random sampling method was used to select the farmers in the selected sub counties. The study's sample size was 302 respondents. The study collected quantitative data which was analysed using descriptive and inferential statistics. The Statistical Package for Social Sciences (SPSS version 23) was used. A linear regression analysis was conducted to determine the relationship between independent and dependent variables. Multiple regressions were also conducted to determine the relationship between the independent variables and the dependent variable. The study found that formal agricultural education has a significant influence on the uptake of improved technology for tissue culture bananas in Kiambu County. The study recommends that the government increase its funding on agricultural education in learning institutions. This would ensure that more learners take agriculture as a subject in school.

Keywords: formal agricultural education, Uptake, tissue culture banana

1. Introduction

Agriculture is the backbone of many economies globally. This is because agriculture contributes highly to nation's gross domestic product (Ofoegbu, 2015). Therefore, education is very important in agriculture in a rapidly changing technological or economic environment.

As technological innovations spread more widely within countries, the significance of agricultural education ought to become more apparent (Zertuche, 2015). Agricultural education may have both cognitive and non-cognitive effects for farmers. Cognitive outputs include the transmission of specific information as well as the formation of general skills and proficiencies. The education also produces non-cognitive changes in attitudes, beliefs and habits (Osongo, 2014).

Therefore, increasing literacy and numeracy may help farmers to acquire and understand information and to calculate appropriate input quantities in a modernizing or rapidly changing environment. Improved attitudes, beliefs and habits may lead to greater willingness to accept risk, adopt innovations, save for investment and generally to embrace productive practices (Asfaw & Admassie, 2014). The education may either increase prior access to external sources of information or enhance the ability to acquire information through experience with new technology. That is, it may be a substitute for or a complement to farm experience in agricultural production. Agricultural education may assist farmers to learn more about farming (Kochenkova, *et al.*, 2016).

Agricultural education covers a broad range of formal, non-formal and informal learning activities that build capacity within the agriculture sector. Formal education is what is usually meant by the term education and it can comprise higher education, diploma and certificate levels (Cremades *et al.,* 2015). Non-formal education includes agricultural extension contacts, apprenticeships, adult literacy training, vocational and in-service training (Qin & He, 2015). Informal education may refer to a wide range of experiences, including 'learning by doing' and migration, smallholder farmers education systems on the ground, such as farmer field schools or other activities which provide exposure to new ideas and facilitate learning (Rogers, 2014). Formal education tends to promote formation of cognitive skills and abstract reasoning ability as well as changes in attitudes. Non-formal education most often serves to transmit specific information needed for a particular task or type of work. Informal education can serve mainly to shape attitudes, beliefs and habits (White, 2012). Contribution of formal education and non-formal education in agriculture is that it helps individuals to acquire new knowledge, attitude and skills essential to the development of citizen farmers and agricultural leaders (Cameron & Harrison, 2012).

Globally, in the US Agricultural education is an old and well-established area of study. Formal programs in agricultural education are conducted at secondary schools, community colleges and universities. As a vocational educational program, agricultural education focuses on three major components formal classroom instruction, career experience programs and leadership development. These components are delivered through a competency-based curriculum in the context of agriculture in the USA. In Kenya, agriculture has been incorporated in the school curriculum and is taught in secondary schools and tertiary institutions (Nyang'au *et al*., 2020, 2021, 2022a, 2022b). Beyond the secondary agriculture program, community colleges and universities provide excellent opportunities for students to specialize and gain skills and knowledge in agriculture (Knight *et al*., 2013). In Malaysia, the government provides informal courses to farmers. The courses concentrate on teaching managerial skills as inevitable means for small farms to succeed by making farmers more creative and innovative (Lee, *et al.*, 2012).

In Africa, since the end of Second World War, the role and importance of agricultural education has undergone profound and unprecedented change. From being a relatively minor activity principally concerned with the training of junior field staff for work in agricultural extension, forestry and animal health, technical education and training in food and agriculture are now universally recognized as key factors in the whole process of economic and social development in African countries. Agricultural education at all levels, from university faculties through intermediate levels to farmer training, has developed out of all recognition during the past 10 years. In some African nations like Nigeria, South Africa, Ghana and Kenya, agriculture has been introduced in general school curricula at secondary education levels as a compulsory or as an optional subject (Olwande & Mathenge, 2010).

In Kenya, in the 1990s, agriculture was taught in schools mainly to impart knowledge to pupils and inculcate in them a positive attitude towards farming (Ayua & Omware, 2013). Today, agricultural education has been incorporated in the school curricula. As a result, the government provides resources to support agricultural education in partnership with the private sector such as seed and agricultural chemical companies and foreign donors, educate farmers through short courses, field tours and demonstrations that lead to the usage of new technologies. The expansion of agricultural education at theoretical and practical levels in Kenya is anticipated to positively impact on farming standards and increase production (Omiti, 2012).

Therefore, it is evident that agricultural education can contribute to agricultural development by strengthening capabilities for innovation and willingness to adopt and apply new technologies. In addition, farmers would be able to engage with traders and other actors on a more equal footing. Although collective action in the form of farmer associations or cooperatives can be a source for continued agricultural education, they tend to be more effective when farmers have achieved a minimum level of literacy and numeracy (Ahmed, 2015).

However, in Kenya, most farmers only have access to primary education. Basic education is also frequently biased against agriculture since most school curricula do not incorporate agriculture as part of learning (Ouma *et al.*, 2010). The quality of tertiary agricultural education is critical because it determines the expertise and competence of scientists, professionals, technicians, teachers, and civil service and business leaders in all aspects of agriculture and related industries. It raises their capacities to access knowledge and adapt it to prevailing challenges and to generate new knowledge and impart it to others. The absence or decline of education and training institutions leaves a large gap in a country’s innovation capacity. Even so, government and donor investments in agricultural education and training have become negligible (Ahmed, 2015).

Banana is one of the most important food crops in Kenya. Apart from its value as a food crop in Kenya, sales from surplus banana output provide additional household income for small-scale farmers. Production of bananas in Kenya is basically a small-scale farm activity, with a national average of 0.32 ha of bananas per farm (Muyanga, 2009). Banana production in the country has been on the decline over the last decade due to invasions by pests and diseases. Traditional cultural practices in banana production have been a major cause of this problem. Farmers transmit inadvertently most of the banana pests and diseases through banana suckers through the practice of sourcing planting material from fellow farmers (Mathenge, *et al*, 2015).

Responding to this challenge of declining banana production, Kenya Agricultural Research Institute (KARI) and several non-governmental organizations (NGOs) have been in the forefront promoting adoption of tissue culture banana technology since 1997. Tissue culture technology, popularly known as TC, is a method of biological research in which fragments of tissue from a plant are transferred to an artificial environment in which they can continue to survive and function (Collier & Dercon, 2014). The main aim is to provide clean and disease-free planting material. This process does not alter any genetic make-up of the plant (Kabunga, *et. al*, 2012).

Muyanga (2010) did an evaluation adoption of tissue culture banana in Kenya. Results showed that while some households have opted not to adopt tissue culture banana biotechnology, almost all the adopters are growing tissue culture bananas alongside non-tissue culture banana varieties. The scale of production and productivity of non-tissue banana varieties significantly exceeds that of tissue culture bananas. The cost of production of tissue culture bananas exceeds that of non-tissue varieties. Among the key drivers of adoption include education level of the household head, land tenure and credit availability. Incomes of households that have adopted tissue culture banana biotechnology are not a significantly different from those of the non-adopters. The results generally indicate that smallholder farmers in Kenya are yet to realize the full potential of tissue culture banana biotechnology.

Therefore, this study sought to determine the influence of agricultural education on uptake of improved agricultural technology: A case of tissue culture banana in Kiambu County.

2. Research methodology

2.1. Setting

This study was conducted at Kiambu County. The County is one of the 47 Counties in the Republic of Kenya that was established under the constitution of Kenya 2010. Its location is the central region and covers a total area of 2543.5 Km^2 43.6 Km^2 under forest cover. The county borders Nairobi and Kajiado Counties to the South, Machakos to the East,Murang'a to the North and North East, Nyandarua to the North West, and Nakuru to the West. The county lies between latitudes 00 25'and 10 20'South of the Equator and Longitude 360 31'and 370 15'East.

Currently, Kiambu County has twelve (12) constituencies, which are Gatundu South, Gatundu North, Juja, Thika Town, Ruiru, Githunguri, Kiambu, Kiambaa, Kikuyu, Kabete, Limuru, and Lari. These constituencies are further divided into 60 electoral wards. Ruiru Constituency has the highest number of wards with 8 wards, while the rest of the constituencies have five each with the exemption of Kiambu, Gatundu South and Gatundu North which has four each.

The county has a total population of 2,417,735 of which 1,187,146 are males, 1,230,454 females and 135 intersex persons. There are 796,241 household with an average household size of 3.0 persons per household and a population density 952 people per square kilometre (KNBS, 2019). On education, there are 1515 ECD centers, 948 primary schools, 365 secondary schools, 33 youth polytechnics, 165 adult education centers, one technical training institution, one technical institute of technology and five universities.

The county annual rainfall varies with altitude, with higher areas receiving as high as 2,000 mm and lower areas of Thika Town constituency receiving as low as 600 mm. The average rainfall received by the county is 1,200 mm. The mean temperature in the county is 26o C with temperatures ranging from 7oC in the upper highlands areas, to 340C in the lower midland zone. The county 's average relative humidity ranges from 54 percent in the dry months and 300 percent in the wet months of March up to August. Agriculture is the predominant economic activity in the county and contributes 17.4 per cent of the county's population income. It is the leading sub sector in terms of employment, food security, income earnings and overall contribution to the socio-economic well-being of the people. Majority of the people in the county depend on the sub sector for their livelihood, with 304,449 directly or indirectly employed in the sector (Kiambu County, 2020).

2.2. Research Design

The study adopted a descriptive survey research design. Descriptive survey research design can be explained as a statement of affairs as they are at present with the researcher having no control over variable. Descriptive survey research is aimed at casting light on current issues through a process of data collection that enables them to describe the situation more completely than was possible without employing this method (Fox & Bayat, 2007). The main purpose of a descriptive survey study is describing, explaining and validating research findings. It also provides the opportunity to integrate the qualitative and quantitative methods of data collection. Therefore, this design was suitable in establishing the influence of agricultural education on uptake of improved agricultural technology: a case of tissue culture banana in Kiambu County.

2.3. Participants

A population is any group of institutions, people or objects that have common characteristics (Creswell, 2013). Mugenda and Mugenda (2009) describes the target population as complete set of individual cases or objects with some common characteristic to which the research wants to generalize the result of the study. In this study, the population comprised farmers in Kiambu County. The farmers were targeted because they are involved in agricultural activities and hence, they were able to explain whether agricultural education has been helpful in their use of technology in their farming activities. The study targeted farmers in the 12 sub-counties in Kiambu County. Table 1 shows the population of farmers as provided by Kiambu County.

Table 1. *Target population*

Sub-County	**Frequency (Farmers)**	**Percent**
Gatundu South	146	8
Gatundu North	169	9
Juja	98	5
Thika Town	155	8
Ruiru	88	5
Githunguri	116	6
Kiambu	189	10
Kiambaa	134	7
Kikuyu	181	10
Kabete	157	8
Limuru	243	13
Lari	205	11
Total	1881	100

Source: Kiambu Agriculture, Livestock & Fisheries (2020)

2.4 Sampling Procedure and Sample Size

Sampling is a procedure, process or technique of choosing a sub-group from a population to participate in the study. This subgroup is carefully selected so as to be representative of the whole population with the relevant/similar characteristics (Ogula, 2005). Sampling is also the process of selecting a number of individuals for a study in such a way that it is fairly a representative of the large group from which they were selected.

The purposive sampling method was used to select the sub counties that was part of the study. In purposive sampling the researcher relies on their own judgment when choosing members of the population. Out of the 12 sub counties in Kiambu, the study sampled 6 sub-counties. This includes;Gatundu South, Thika Town, Githunguri, Kiambu, Kabete and Limuru.

The stratified random sampling method was used to select the farmers in the selected sub counties. It is a method of obtaining a representative sample from a population that have been divided into relatively smaller sub-populations. Stratified random sampling method is suitable because it minimizes ample selection bias.

Sample size refers to the number of participants or observations included in a study. This number is usually represented by n. To determine the population, the researcher adopted 30% of the target population. According to Mugenda and Mugenda (2009), in a descriptive study, a sample size of 10-50% is acceptable. The study sample size was 302 respondents. This is as shown in Table 2.

Table 2. *Sample size*

Sub-County	Frequency (Farmers)	Sample Size
Gatundu South	146	44
Thika Town	155	47
Githunguri	116	35
Kiambu	189	57

2.5 Research Instruments

Primary data was collected using questionnaires. The questionnaire was structured into close ended questions. Closed questions structure the answer by only allowing responses which fit into pre-decided categories. Close ended questions provide quantitative data. The questionnaires was used because they allow for a greater geographical coverage of respondents within a short time and are flexible enough to give the respondents adequate time to respond to the items, they are cheap to administer given that the only costs are those associated with printing or designing the questionnaires, their postage or electronic distribution, the absence of an interviewer provides greater anonymity for the respondent and when the topic of the research is sensitive or personal it can increase the reliability of responses.

The questionnaire was structured in line with the study objectives. It had six sections: section one covered the demographic information of the respondents, section two, three, four and five had questions on the independent variables while section six covered questions on the dependent variable.

2.6 Validity

Validity is the degree to which the instrument measures the constructs under investigation (Kothari, 2013). To test for validity, the study used the content validity method. Content validity was used since it measures the degree to which the sample of the items in the research instrument represents the content that the test is designed to measure. Validity was affirmed by discussing the instrument with experts in this study field who include the supervisors because it is believed that they are conversant with this activity. From the discussion, the researcher was able to correct the questionnaire.

2.7 Reliability

Reliability refers to the extent that the instrument yields the same results over multiple trials (Miana, 2012). To determine the reliability the test-retest method was used. Test-retest is a method that administers the instrument to the same sample at two different points in time.

In this study the questionnaires were administered to the same sample for an interval of one week. If the scores at both time periods are highly correlated, > .70, they can be considered reliable. The scores from the tests were assessed using the 2222Cronbach's alpha. Cronbach alpha is a correlation coefficient between two sets of data. Field (2009) argues that Cronbach's alpha value that is at least 0.70 suffices for a dependable research instrument. In this study a threshold of 0.70 was espoused to establish the reliability of the data collection instrument. The reliability results are as shown in Table 3.

Table 3. *Reliability results*

Variable	Cronbach Alpha	Verdict
Formal Agricultural Education	0.748	Reliable
Non-Formal Agricultural Education	0.761	Reliable
Informal Agricultural Education	0.734	Reliable
Uptake of Improved Agricultural Technology	0.772	Reliable

The results show that formal agricultural education had a Cronbach alpha value of 0.748, non-formal agricultural education alpha of 0.761, informal agricultural education alpha of 0.734 and uptake of improved agricultural technology alpha of 0.772. This implies that all the variables were reliable.

2.8 Data Collection procedures

The researcher obtained an introduction letter from the university. Further a research permit was obtained from NACOSTI. This assisted in introducing the study to the respondents. During data collection, the researcher introduced the study to the respondents. The researcher administered the questionnaires to the farmers. The researcher gave the respondents one week to give feedback on the questionnaire. This gave them enough time to fill up the questionnaires and return them to the researcher either via mail or the hard copy.

Participation in the study was voluntary. The respondents were not coerced to participate in the study. Those willing to take part were provided with a consent form to sign. Anonymity was ensured since the respondents did not appear anywhere in the research. The respondents were informed that the study is only meant for academic purposes and that their information will be treated confidentially.

2.9 Data analysis

The questionnaires were checked for completeness and edited. Data was then coded using Statistical Package for Social Sciences (SPSS version 23). Descriptive statistics was adopted to analyze quantitative data. Descriptive statistics are mean, standard deviation, frequency and percentages. The analyzed data was presented in form of tables for easy understanding.

Correlational analysis was conducted to determine the strength and direction of the relationship between the independent and dependent variables. A linear regression analysis was conducted to determine the relationship between and independent variable and a dependent variable. The model was as follows;

$Y= \beta0+ \beta1X1+ \varepsilon$ ……………………………………………………………………1

$Y= \beta0+ \beta2X2+ \varepsilon$……………………………………………………………………2

$Y= \beta0+ \beta3X3+ \varepsilon$……………………………………………………………………...3

Multiple regressions were also conducted to determine the relationship between the independent and the dependent variable. The regression equation was:

$$Y= \beta0+ \beta1X1+\beta2X2+ \beta3X3+ \varepsilon$$

Where:

Y= Uptake of improved agricultural technology

β0 = Constant term

X1= Formal agricultural education

X2= Non- formal agricultural education

X3=Informal education agricultural

ε=error term

β1, β2, β3 are coefficients of determination and ε is the error term.

3. Results

3.1 Influence of formal agricultural education on uptake of improved agricultural technology

The first objective of the study was to determine the influence of formal agricultural education on uptake of improved agricultural technology. To achieve this objective, the study conducted descriptive analysis and regression analysis on the variable.

3.2 Descriptive Analysis

The respondents were requited to indicate their level of agreement on the following statements about the influence of formal agricultural education on uptake of improved agricultural technology. Use the scale 1-strongly disagree, 2-disagree, 3-moderate, 4-agree, 5-strongly agree. The results were as shown in Table 4.

Table 4. *Formal agricultural education*

Statements	1		2		3		4		5		Mean	
	F	%	F	%	F	%	f	%	f	%	Std.	Dev.
I acquired knowledge on agricultural technology from primary education	11	3.9	24	8.5	38	13.4	114	40.1	97	34.2	3.92	0.81
The knowledge I acquired in primary education on agricultural technology has been helpful in my farming activities	13	4.6	22	7.7	43	15.1	118	41.5	88	31	3.87	0.78
I acquired knowledge on agricultural technology from secondary education	17	6	30	10.6	37	13	100	35.2	100	35.2	3.83	0.77
The knowledge I acquired in secondary education on agricultural technology has been helpful in my farming activities	19	6.7	27	9.5	45	15.8	103	36.3	90	31.7	3.77	0.71
I acquired knowledge on agricultural technology from tertiary education	20	7	31	10.9	39	13.7	91	32	103	36.3	3.8	0.75

The findings show that majority (40.1%) of the respondents agreed that they acquired knowledge on agricultural technology from primary education (m =3.92, SD = 0.81). Further

41.5% agreed that the knowledge they acquired in primary education on agricultural technology has been helpful in my farming activities (m = 3.87, SD = 0.78). Others, 35.2% agreed that they acquired knowledge on agricultural technology from secondary education (m = 3.83, SD = 0.77). Also, 36.3% of the farmers agreed that the knowledge they acquired in secondary education on agricultural technology has been helpful in my farming activities (m = 3.77, SD = 0.71) and 36.3% also agreed that they acquired knowledge on agricultural technology from tertiary education (m = 3.80, SD = 0.75). The findings concur with those of O'Donoghue and Heanue (2016) who found a positive return to agricultural education and in particular a positive relationship in relation to technical efficiency in terms of improved yields. It was also noted that earlier adopters of innovations or best management practice are more likely to have formal agricultural education. Heanue and O'Donoghue (2014) established that agricultural education improves a farmer's technical efficiency (the more efficient use of a given amount of resources) and allocative efficiency (choice of better inputs and outputs, leading to a more efficient allocation of resources).

3.3 Acres of land used for farming

The farmers were required to indicate the number of acres of land they use for farming activities. Table 5 is a presentation of the results.

Table 5. Acres *of land used for farming*

Acres	Frequency	Percent
1 – 4 acres	92	32.40%
5 – 8 acres	137	48.20%
9 – 12 acres	38	13.40%
Above 13 acres	17	6.00%
Total	284	100.00%

Table 5 depicts that, majority (48.2%) of the farmers use 5-8 acres of land for farming, 32.4% use 1-4 acres of land for farming, 13.4% use 9-12 acres of land for farming while 6.0% use more than 13 acres of land for farming.

3.4 Number of banana suckers planted per stool

The farmers were asked to indicate the number of banana suckers they plant per stool as shown in Table 6.

Table 6. *Number of banana suckers planted per stool*

Banana Suckers	Frequency	Percent
Three	148	52.10%
Four	83	29.20%
Five	53	18.70%
Total	284	100.00%

The findings in Table 6 indicate that majority (52.1%) of the farmer's plant three banana suckers per stool, 29.2% plant four banana suckers per stool whereas 18.7% plant five banana suckers per stool.

3.5 Yields in kgs of bananas

The study sought to determine yields in kgs of bananas that farmers get from their farming activities. The results were as shown in Table 7

Table 7. *Yields in kgs of bananas*

Yields	Frequency	Percent
100kg-500kg	94	33.10%
501kg-1000kg	105	37.00%
Above 1001 kg	85	29.90%
Total	284	100.00%

The results in Table 7 show that 37.0% of the farmers get yield of 501kg-1000kg in their farming activities, 33.1% get yields of between 100kg-500kg while 29.9% get yields of above 1001 kg in their farming activities.

3.6 Income of farmers from farming

The study sought to determine farmer's level of income from their farming activities annually. Table 8 shows the results.

Table 8. *Farmers income from farming*

Income	Frequency	Percent
Ksh 100, 000 to 250, 000	151	53.20%
Ksh 250,001 to 500, 000	86	30.30%
Above Ksh 500, 001	47	16.50%
Total	284	100.00%

The results in Table 58 indicate that majority (53.2%) of farmers income from farming is between Ksh 100, 000 to 250, 000, 30.3% of the farmers income is between Ksh 250,001 to 500, 000 while 16.5% of the farmers income is above Ksh 500, 001. This implies that majority of farmers get more than Ksh 100,000 from their farming activities.

3.7 Regression analysis for formal agricultural education

A linear regression analysis was conducted to determine the influence of formal agricultural education on uptake of improved agricultural technology. The regression analysis comprises of the model summary, analysis of variance and beta coefficients.

The model summary was used to determine the variation of uptake of improved agricultural technology due to change in formal agricultural education. The results were as shown in Table 9.

Table 9. *Model summary for formal agricultural education*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.609[a]	0.371	0.367	0.10472

Table 9 shows that the adjusted R-square is 0.367. This implies that 36.7% variation in uptake of improved agricultural technology was due to formal agricultural education. The other 63.3% shows that there are other factors influencing uptake of improved agricultural technology that were not part of this study model.

3.8 Analysis of variance

Analysis of variance was used to determine whether the data is significant at 0.05 significance level. Table 10 shows the results.

Table 10. *ANOVA for formal agricultural education*

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.761	1	4.761	133.287	0.001[a]
	Residual	10.073	282	0.036		
	Total	14.834	283			

The results in Table 10 depict that the F-calculated (133.287) is greater than the F-critical (3.875) from the F-distribution tables. Further, the significance value (0.001) is less that (0.05). This implies that the model is significant in predicting uptake of improved agricultural technology by farmers in Kiambu County.

3.9 T-test

A t-test was conducted to determine if there is a significant relationship between formal agricultural education and uptake of improved agricultural technology. The coefficient results were as shown in Table 11. The model was fitted as follows; $Y= 1.361+ 0.341X_1$

The equation shows that holding formal agricultural education at a constant zero, uptake of improved agricultural technology will be at a constant of 1.361. Further, formal agricultural education had a significant and positive influence on uptake of improved agricultural technology (B = 0.341, p = 0.001). Therefore, an increase in formal agricultural education would result to an increase in uptake of improved agricultural technology by 0.341 units.

Table 11. *Coefficients for formal agricultural education*

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.361	0.206		6.607	0.001
	Formal Agricultural Education	0.342	0.093	0.269	3.677	0.001

4. Discussion

The purpose of the study was to determine the influence of formal agricultural education on uptake of improved agricultural technology: case of tissue culture banana in Kiambu County.

4.1 Formal agricultural education

The study found that majority (40.1%) of the respondents agreed that they acquired knowledge on agricultural technology from primary education (m =3.92, SD = 0.81). Further 41.5% agreed that the knowledge they acquired in primary education on agricultural technology has been helpful in their farming activities (m = 3.87, SD = 0.78). Others, 35.2% agreed that they acquired knowledge on agricultural technology from secondary education (m = 3.83, SD = 0.77). Also, 36.3% of the farmers agreed that the knowledge they acquired in secondary education on agricultural technology has been helpful in their farming activities (m = 3.77, SD = 0.71) and 36.3% also agreed that they acquired knowledge on agricultural technology from tertiary education (m = 3.80, SD = 0.75)

The study also established that formal agricultural education had a significant and positive influence on uptake of improved agricultural technology (B = 0.341, p = 0.001). Therefore, an increase in formal agricultural education would result to an increase in uptake of improved agricultural technology by 0.341 units.

5. Conclusion

The study sought to determine the influence of formal agricultural education on uptake of tissue culture banana in Kiambu County, Kenya. The study concludes that formal agricultural education has significant influence on uptake of improved agricultural technology of tissue culture banana in Kiambu County. This is so since the farmers indicate that the agricultural knowledge, they acquired in formal learning technology has been helpful in their farming activities.

6. Recommendation

The study found that formal agricultural education has significant influence on uptake of improved agricultural technology of tissue culture banana in Kiambu County. Therefore, the study recommends that the government should increase its funding on agricultural education in learning institutions. This would ensure that more learners take agriculture as a subject in schools.

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