

Trends in Progression in Agriculture Career Among Students in Tertiary Institutions of Kakamega and Bungoma Counties, Kenya

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ABSTRACT

While agriculture is a major source of employment, it is notable that youths in developing countries are unemployed. In Kenya, agriculture is taught in the 8-4-4 syllabus and in the current competency-based curriculum. Despite the above facts, Kenya still requires human resources to drive the agricultural sector. The purpose of this study was to examine trends in progression in agriculture careers among students in tertiary institutions in Kakamega and Bungoma counties, Kenya, from 2016 to 2021. Correlational and cross-sectional research designs were used. Stratified random sampling was used to select agriculture students; purposive sampling was used to select universities, KUCCPS, and TVETs. Purposive sampling was used to select key informants, while quota sampling was employed to select focus group discussions. Using a pragmatic philosophical standing point as a lens, the study applied a mixed research strategy for data collection, coupled with mixed methods for triangulation. The sampling size was determined from Yamane (1967) formulae based on the study population. A sample size of (249) secondary school students, (24) university students, and (131) TVET institution students gives a sample size of 404 from a target population of 11928 students. A pilot study was done in Vihiga County. The data was collected using document content guides, questionnaires, focus group discussions, and interview guides. Due diligence was taken into consideration while collecting and processing the data to ensure both the reliability and validity of the study. Both descriptive and inferential techniques (trend analysis) were employed to analyze the data, which was presented using frequency tables and line graphs. The total KCSE agriculture enrollment in Kenya and total agriculture enrolment in TVET were strongly and positively correlated ($r = 0.889$, $p = 0.018$), and the average difference between the two was significant ($t(5) = 18.978$, $p < 0.05$). The total KCSE agriculture enrollment in Bungoma and Bungoma agriculture progression to the universities in Kenya scores were weakly and positively correlated ($r = 0.384$, $p = 0.453$), while the average difference between the two is significant ($t(5) = 14.095$, $p < 0.05$). The total KCSE agriculture enrollment in Kakamega and Kakamega agriculture progression to the universities in Kenya scores were weakly and positively correlated ($r = 0.154$, $p = 0.771$), and the average difference between the two is significant ($t(5) = 17.825$, $p < 0.05$). The results should inform policymakers and guide efforts toward the career progression of students in agriculture education.

Keywords: Agriculture Career, Agriculture Program, Progression, Tertiary Institutions

I. INTRODUCTION

Agriculture is of global interest since it has cultural, economic, and social development. Africa's agriculture contributes 15 percent of its total gross domestic product (GDP), while in Kenya; agriculture is next to the services sector in terms of national GDP contribution, providing 17.8 percent while the services sector gives 32.9 percent. (World Bank, 2013). Reports from the United Nations indicate that 85 percent of the global youth are found in developing countries and are unemployed, yet agriculture is a major source of employment and food

(United Nations Development Programme (UNDP), 2014). As much as many countries have not been able to convince youths to train for agriculture careers, there are many prospects in the agricultural sector (Tiraieyari & Krauss, 2018).

In West Africa, despite its contribution to economic growth, a decline in skills and labor has been realized since youths are reluctant to enroll in agricultural professions, as it's been observed in Nigeria (World Bank, 2013). They therefore stream to urban centers, leaving the old in the countryside. This has led to reduced productivity due to the aging farmer population (Bloom *et al.*, 2010); Jackson & Wilton (2017); and Mberia & Midigo (2018) found that people intentionally pursue educational paths that bring them to their chosen professions. This means that before entering a certain field of employment, each individual must create a profile outlining the specific qualities, abilities, and knowledge necessary to succeed in that line of work (Kazi & Akhlaq, 2017).

In Kenya, despite this contribution to economic growth, several researchers have posited unemployment among the youth. Agriculture is one of the optional subjects learned in secondary schools. Agriculture is taught for learners to understand the production content and processes that increase the quality and quantity of the products. In the current competency-based curriculum (CBC), agriculture is taught under environmental activities in the early years of education (Nyaboke *et al.*, 2021). In upper primary, a learner's human capacity is developed by involving the learner in practical and experiential activities. Its focus will be to develop knowledge, skills, and attitudes to form a foundation for the development of agricultural competencies. Similarly, agriculture has several branches for learners to choose as a life career; hence, it's taught for the students to appreciate its role in the economy.

Past efforts to understand whatever influences learners to choose agriculture subjects in Kenya have been done at the secondary school level (Ekwere, 2014) as well as perceptions of agriculture subjects by students (Muchiri *et al.*, 2013); however, it's yet to be understood how progressive agricultural career development can be achieved among learners in Bungoma and Kakamega counties of Kenya. The current study fills the gap by determining the enrolment trends in agriculture programs and progression in agriculture careers in selected learning institutions in Bungoma and Kakamega counties, Kenya. The study informs policymakers at the Ministry of Education to increase enrolment and, hence, progression in agriculture careers in tertiary institutions in Kenya.

The agriculture sector is a key driver of achieving Vision 2030 (GoK, 2008); hence, it is Kenya's blueprint for development. As a sector, there are many prospects in the agriculture profession (Tiraieyari & Krauss, 2018). The goals of agricultural education are to introduce learners to the principles and practices of agriculture, develop an understanding of the importance of agriculture as a sector, and stimulate their interest in agriculture's development and economy. It is expected that learners who select agriculture as a subject in secondary school will progress to enroll in agricultural programs in tertiary institutions. Unfortunately, many students select agriculture as a subject in secondary schools, but there is limited enrollment of students in agriculture science programs (Bloom *et al.*, 2010) in tertiary institutions. This has greatly affected the progression percentage of the agriculture KCSE graduates to join the agriculture industry. This is a worrying trend since Kenya requires human resources to drive the agricultural sector. Garwe (2015) sought to establish the trends in student progressions in agricultural degree programs in Zimbabwe and found out that despite the significance of agriculture in Zimbabwe, there were unfavorable and low trends in progression in agriculture-related programs.

Studies by Ekwere (2014) and Muchiri *et al.* (2013) have been conducted on factors that influence students' choice of agriculture as a subject at the school level as well as their perceptions of agriculture as a subject. However, limited studies have been conducted to understand what motivates students to progressively select agricultural education up to the training level in preparation for an agricultural career. The current study will fill this gap. It will therefore evaluate the trends in progression in agriculture careers among students in tertiary institutions in Kakamega and Bungoma counties, Kenya, from 2016 to 2021.

1.1 Statement of the Problem

Agriculture is Kenya's blueprint for development. As a sector, there are many prospects in the agriculture profession, according to Tiraieyari and Krauss (2018). Despite the fact that agriculture is the backbone of the Kenyan economy, contributing 23% of the total gross domestic product (GDP) (World Bank, 2013), there is limited enrolment of students in agriculture science programs (Bloom *et al.*, 2010) in tertiary institutions, though the number of students who select agriculture at secondary school increases yearly. This is a worrying trend since Kenya requires human resources to drive the agricultural sector. Studies (Ekwere, 2014) have been conducted on factors that influence students' choice of agriculture as a subject at the secondary school level. However, limited studies have been conducted to understand trends in progression in agricultural programs among students in preparation for their careers. The current study fills this gap. It evaluates progression in agriculture careers among students in tertiary

institutions in Kenya and informs policymakers of the need for progression in agriculture careers.

1.2 Objective of the study

The overall objective of the study was to establish trends of progression in agriculture career among agriculture students in tertiary institutions of Kakamega and Bungoma counties, Kenya from 2016-2021.

II. LITERATURE REVIEW

2.1 Agriculture Education

Globally, the goal of any agricultural education program, whether it is at the elementary school, secondary school, or university level, is to train future teachers to effectively convey the fundamentals of agriculture to students (Olaitan, 2017). Kennedy (2011) argues that vocational training education (VTE) prepares students for independent work and financial stability when they graduate. Internationally, it teaches agricultural production, livestock management, soil and water conservation, and other areas of agriculture (Olamie, 2012). There is a pressing need for agricultural education to ensure food security, as the rising population in developing countries has resulted in severe food shortages despite the availability of agricultural resources.

Agricultural educational training is anticipated to play an important role in creating a firm foundation and knowledgeable agro-based nations composed of farmers, extension employees, researchers, teachers, and agri-business professionals. Farming is included in the early grades' environmental activities section of the current competency-based curriculum in Kenya, as stipulated by the Kenya Institute of Curriculum Development (KICD) (2021) that, in upper primary, students build their competency capacity via hands-on experiences. Its primary goal is the improvement of agricultural competence in terms of education, training, and practice. The current study focused on the progression trend of students in agricultural careers in selected learning institutions in Bungoma and Kakamega counties of Kenya.

2.2 Agricultural Careers

Reports from the United Nations Development Program (UNDP, 2014) indicate that 85 percent of the global youth are found in developing countries and are unemployed, yet agriculture is a major source of employment and a source of food. Many countries have not been able to convince youths to train for agriculture careers. Tiraieyari & Krauss (2018), yet there are huge prospects in the agricultural sector. Business Insider (2013) indicates that agriculture is not among the most popular major disciplines of study in the United States, yet some of its programs are among those with the highest employment rates in the United States. In the Princeton Review (2013), Porfeli & Lee (2012) opined that it is vital to educate young people about the increasingly dynamic workforce and equip them with the information and abilities to adapt and establish their identity early in life. As such, career education is necessary for pupils; developing a job identity is a sign of a person's sense of purpose and development (Praskova et al., 2015). Obayelu and Fadele's (2019) study found that a greater number of pupils from public schools (51.4%) were willing to pursue agriculture than students from private schools (48.6%). Students' career goals are the driving force behind their secondary school aspirations (Mberia & Midigo, 2018). According to Stitt (2016), students with an attained status chose agriculture in high school and enrolled in an agriculture program in postsecondary institutions. Chemjor (2016) observes that agricultural education is valued at the tertiary level, while primary and secondary education suffer. Similar to other global National Qualifications Frameworks (NQFs), the Kenya National Qualifications Framework (KNQF, 2018) combines learning and job experiences into credits similar to those earned via formal education standardizes and harmonizes the country's qualifications Ochuodho (2016) found that students are admitted to degree programs and universities that are not of their choosing and want to shift. It is an indication of student discontentment. This scenario results in the discontinuation of certain courses. So, there is a need for the current study to devise motivational strategies to ensure progression in agriculture among secondary school students who choose this subject. It is noted that a strong identity develops a sense of direction that shapes the other stages (McLeod, 2018), while a poorly developed career identity tends to lead to confusion in regards to others and the world (Marcia, 1980).

2.3 Conceptual framework

Progression in agriculture was operationalized to mean the choosing of agriculture subject in secondary schools and moving to tertiary institutions to enroll in agriculture programs Progression was therefore measured by increased enrolment in agricultural programs as it leads to agriculture career development.

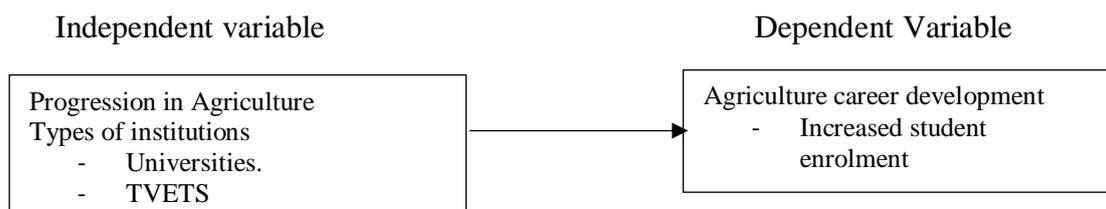


Figure 1
Conceptual Framework

III. METHODOLOGY

Correlational design was used to determine relationships between variables in the study, while descriptive design, Kowalczyk (2015), was employed to describe data. The study was conducted in Bungoma and Kakamega counties in western Kenya. Bungoma and Kakamega counties were preferred for this study due to their large population, which has necessitated the construction of several varieties of learning institutions that offer agriculture education. The study was conducted in agricultural training tertiary institutions in Kakamega and Bungoma counties in Kenya. The research was based on the Pragmatism paradigm, which finds its philosophical foundation in the historical contributions of the philosophy of Pragmatism, which embraces a plurality of methods, allowing both qualitative and quantitative methods to be employed.

Table 1
Target Population

| No | Schools & Institutions | Kakamega | Bungoma | Total |
|-------|------------------------|----------|---------|-------|
| 1 | Universities | 1 | 1 | 2 |
| 2 | TVETs | 9 | 8 | 17 |
| Total | | 10 | 9 | 19 |
| KUPPS | | | | 1 |

Purposive sampling was used to select Bungoma and Kakamega counties as study areas for this research since they have many varieties of learning institutions required to provide the needed information for the current study. Tertiary institutions were then selected by the census method since they were few and all could be accessed to participate in the survey. This increased the accuracy of the findings of the study. Two public universities were selected by the census method. Nine (9) agricultural colleges from Kakamega County and eight (8) agricultural colleges from Bungoma County were sampled to take part in the research study, as shown in Table 1. These institutions were selected purposefully based on the availability of agricultural programs offered to students. One (1) public university from Kakamega County and one (1) from Bungoma County were sampled for the study since some students of agriculture who graduated from secondary school progressed to university to enroll in various programs.

The study involved various participant groups to gain a comprehensive understanding of the factors influencing students' choices in agriculture education. Firstly, there were the agriculture subject students. These were students who opted to study the agriculture subject during their secondary education and subsequently took the KCSE agriculture examinations. Their participation was crucial in order to capture their experiences and perceptions of agriculture education.

Another group involved was the heads of the departments of technical and vocational education training colleges. These individuals were purposefully selected due to their direct interaction with students in technical and vocational education and training colleges. They held valuable insights into students' opinions and the dynamics of agriculture education. Additionally, they had access to enrollment records in their respective departments, providing essential data for the research.

Similarly, the chairs of the departments of universities were included in the study. Like the heads of departments in technical and vocational colleges, they were selected using a purposive sampling method. Their inclusion was based on their roles in overseeing academic programs, including agriculture education. They possessed critical information regarding students' perspectives on career development in the field of agriculture.

Technical and vocational education training and university students of agriculture comprised students who had enrolled in agricultural programs at both national technical and vocational education training institutions and undergraduate programs in universities. To ensure a representative sample, these students were selected through a stratified random sampling approach, taking into account their specific agricultural programs and the year of study.

Table 2*Target Population of Student Respondents as At February 2022*

| Students | Kakamega | Bungoma | Total |
|-----------------------|----------|---------|-------|
| Universities students | 468 | 226 | 694 |
| TVET students | 3023 | 812 | 3855 |
| Total | 6829 | 5079 | 11928 |

Both qualitative and quantitative research approaches were used to collect both qualitative and quantitative data of primary and secondary types. After getting the introductory and approval letter to collect data from the directorate of postgraduate studies, the Masinde Muliro University of Science and Technology ethics office, and then from the National Commission of Science, Technology, and Innovation (NACOSTI), actual data collection activity commenced. Data on placement was collected from Kenya Universities and Colleges Central Placement Services (KUCCPS), followed by qualitative data. Respondents were subjected to various instruments of data collection to give their views on the highlighted themes. Interview guides, questionnaires, and document content guides were used to collect primary data from the respondents. Less structured research instruments were used to gather data. More in-depth information was obtained by asking open-ended questions, as posited by Mugenda and Mugenda (2008), since qualitative research is defined as an inquiry process for understanding social problems by building a complete picture formed by words and reporting detailed views of key informants given in the natural environment (Mugenda and Mugenda, 2008). Quantitative research was carried out to provide numerical data from KUCCPS.

Quality was ensured in both the quantitative and qualitative research methods by checking for validity, reliability of the quantitative data, and trustworthiness of the qualitative data (Denzin & Lincoln, 2000). Supervisors who reviewed the instruments to make sure the content met criteria also ensured construct validity. Supervisors who are experts in the area of study ensured the validity of the content in this document through proper and appropriate formatting. To affirm the degree of content validity of the instruments used in the current study, a pilot study was done. A pilot study was conducted to ensure the quality of the instruments of data collection. It was done to pre-test the questionnaires and the interview guides, identifying any challenges that could be encountered when collecting actual data for the research. The Cronbach reliability coefficient was used to establish the internal consistency of the responses. During the pilot study, the split-half method was used, and a reliability coefficient value of 0.75 (Taber, 2018; Orodho & Kombo, 2002) was attained, which was then considered reliable for this current study.

The collected data was edited, coded, and entered into the data sheets ready for processing using Statistical Package for Social Sciences version 25. All quantitative data collected was subjected to descriptive statistics first before being analyzed inferentially. Descriptive statistics analysis was used to determine frequencies, variances, percentages, means, and standard deviations, which were presented in the form of tables and graphs. The research question was tested using trend analysis, while the hypothesis was tested using factor analysis.

IV. FINDINGS AND DISCUSSION

4.1 Progression in Agriculture Career in Kakamega County

Students who selected agriculture subject in secondary school and joined agricultural Colleges to study agriculture programs were assumed to have progressed in agriculture career. Data on enrolment in agriculture subject in Kakamega County was obtained from KUCCPS and summarized as indicated in Table 3. Further breakdown of data was done to show agriculture students' progression in terms of frequency and Percentages and later a progression ratio was computed.

Table 3**Progression in Agriculture Career in Kakamega County**

| Year | Agric enrolment in Kakamega | Kakamega Progression | Percentage Progression in Kakamega County |
|------|-----------------------------|----------------------|-------------------------------------------|
| 2016 | 11,784 | 313 | |
| 2017 | 12,874 | 105 | 0.9 |
| 2018 | 14,114 | 332 | 2.6 |
| 2019 | 14,901 | 342 | 2.4 |
| 2020 | 16,001 | 466 | 3.1 |
| 2021 | 17,155 | 491 | 3.1 |

Source: KUCCPS Data (2022)

Table 3 shows that, there were few students who progressed in agricultural programs as compared to those that sat for KCSE exams in Kakamega County. From the findings, it emerged that there were only 0.9% of students who progressed from 2016 to 2017, 2.6% from 2017 to 2018, 2.4% from 2018 to 2019, 3.1% from 2019 to 2020 and 3.1% from 2020 to 2021. According to the Quality Assurance and Standards officer of education, some students who select agriculture subject at secondary school drop agriculture and select other programs at tertiary institutions. This is an indication of poor career development process leading to confusion and lack of self-awareness as it regards the developed professional (Marcia, 1980). A researcher argues that, youth with an achieved status have explored an aspect of identity and have committed to it (Sitt, 2016). Another researcher affirms that developing a strong identity develops a sense of direction that shapes the other stages (McLeod, 2018). It is expected that, once students select agriculture subject, it's assumed that they will automatically progress into agriculture career

Further data breakdown was computed to distinguish between the numbers of students in universities and those who progressed to TVET institutions from agriculture students in Kakamega County across the years. The findings are shown in Table 4. The analysis was important because it informed the researcher of the type of tertiary institutions to which most agriculture students are placed, implying that they contribute more to progression in agriculture in the county.

Table 4**Kakamega County Progression to TVET and Universities**

| Year Enrolled | Kakamega Progression | Universities | National TVETs | % Universities | % TVET |
|---------------|----------------------|--------------|----------------|----------------|--------|
| 2016 | 313(15.3) | 234(74.8) | 79(25.2) | 74.8 | 25.2 |
| 2017 | 105(5.1) | 12(11.4) | 93(88.6) | 11.4 | 88.6 |
| 2018 | 332(16.2) | 85(25.6) | 247(74.4) | 25.6 | 74.4 |
| 2019 | 342(16.7) | 133(38.9) | 209(61.1) | 38.9 | 61.1 |
| 2020 | 466(22.7) | 122(26.2) | 344(73.8) | 26.2 | 73.8 |
| 2021 | 491(24.0) | 208(42.4) | 283(57.6) | 42.4 | 57.6 |
| Total | 2049(100.0) | 794 | 1255 | | |

From the Table 4, the number of students who progressed to universities, 234(74.8%) in the year 2016 was higher than those who progressed to TVETS, 79(25.2%). However, those who progressed to TVETS, 93(88.6%) in 2017 were more than those in universities 12(11.4%). They were 247(74.4%) in TVET as compared to 85(25.6%) in universities in 2018, 209(61.1%) TVETS in 2019 compared to 133(38.9%) for universities, 344(73.8%) for TVETS versus 122(26.2%) for universities in 2020 and finally 283(57.6%) TVETS versus 208(42.4%) for those in universities. In general, the number of students who progressed to the TVET institutions across the years was higher than those who progressed to the universities. The total number of students who progressed to tertiary institutions in Kakamega County between 2016 and 2021 were 2049. Between 2016 and 2021, the highest number, 491(24.0%) was encountered in 2021 while the least 105(5.1%), was in the year 2017. The total number of students who progressed to the universities for the six years was 794 out of which, the highest progression to universities 208(26.2%) was encountered in 2021 while the least 12(1.5) was encountered in the year 2017. For TVET progression, the total number of students who have progressed to TVET institutions for the last six years were 1255 out of which the highest progression 344(27.4) was encountered in the year 2020 while the least 79(6.3) was encountered in the year 2016. This indicates a general increment in progression of agriculture students. The implication is that there is a positive progression in agriculture

subject in both Universities and TVET.

4.2 Progression trends in universities and TVET for Kakamega County

Further analysis on progression trends among students in universities and TVET for Kakamega County was carried out across the six years as indicated in Figure 2.

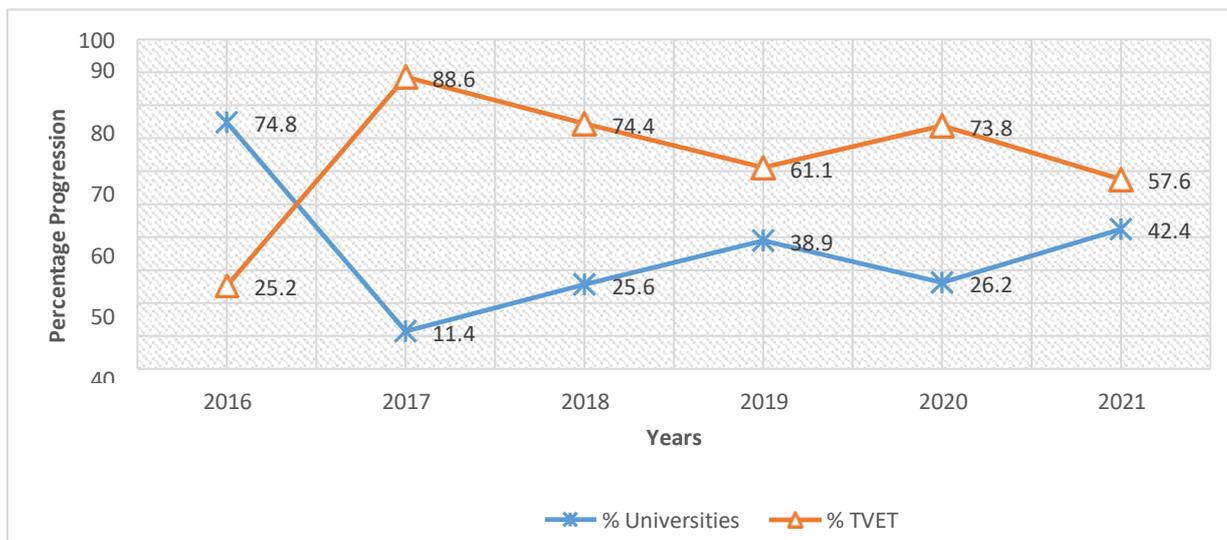


Figure 2
Progression Trends in Universities and TVET for Kakamega County
Source: KUCCPS data (2022)

Figure 2 shows that in 2016, there was a high percentage progression to universities, 74.8% compared to TVETs institutions, 25.2%. However, in the year 2017, the number of students who progressed to TVET institutions increased to 88.6% while that of the university dropped to 11.4%. A steady increase was thereafter observed for the university progression, from 2017 to 2019, after which it slightly declined to 26.2% from 38.9% from 2019 to 2020 but again rose from 2020 to 2021 from 26.2% to 42.4%. For the TVET progression, there was a steady decline from 2017 to 2019, that is from 88.6% to 61.1% and thereafter a slight increase from 61.1% in 2019 to 73.8% in 2020 and again a decline to 57.6% in 2021. This indicates that there is progression to TVETs as well as to universities although there exists a gap between the higher progression percentage in TVETs and the low progression to universities that needs to be closed up. The findings imply that most students like agriculture but they qualify to enroll for agricultural programs. This has kept the percent progression in TVETs higher than that of the universities. According to Chemjor (2016), agriculture in Kenya is given a prominent place in tertiary colleges as a technical discipline that prepares students for employment, such as at Bukura College, Egerton University, and Kabete School of Agriculture and Veterinary Technology.

4.3 Progression in Agriculture Career in Bungoma County, Kenya

Progression percentage in Bungoma county was obtained by taking the number of students who were placed in tertiary institutions out of the total number of students who sat for KCSE examinations in the previous years multiplied by a hundred (100%). The findings are presented as shown in Table 5.

Table 5*Progression in Bungoma County*

| Year | Agriculture Enrolment in Bungoma | Bungoma Progression | Percentage Progression |
|------|----------------------------------|---------------------|------------------------|
| 2016 | 11,118 | 230 | |
| 2017 | 12,275 | 85 | 0.76 |
| 2018 | 14,307 | 269 | 2.19 |
| 2019 | 15,730 | 276 | 1.93 |
| 2020 | 16,982 | 369 | 2.35 |
| 2021 | 17,436 | 430 | 2.53 |

Source: KUCCPS Data @022)

The findings in Table 5 show that in year 2017, only (0.76%) of the students who sat for KCSE agriculture examination progressed to tertiary institutions. The percentage progression was (2.19%) in 2018 and 1.93% in 2019. Progression in 2020 and 2021 was at (2.35%). This is low progression as compared to higher enrollment. Garwe (2015) sought to establish the trends in student progressions in agricultural degree programs in Zimbabwe and found out that despite the significance of agriculture in Zimbabwe, there were unfavorable and low trends in progression in agriculture-related programs.

4.4 Bungoma County Progression in Agriculture Career among Students in TVET and Universities

Further analysis was carried out in order to explore the progression to university and TVET institutions. A percentage progression was presented as shown in Table 6.

Table 6*Progression Trend between Universities and TVET for Bungoma County*

| Year Enrolled | Bungoma Progression | Progression to universities | Progression to TVETs | % Universities | % TVET |
|---------------|---------------------|-----------------------------|----------------------|----------------|--------|
| 2016 | 230(13.9) | 185(24.5) | 45(5.0) | 80.4 | 19.6 |
| 2017 | 85(5.1) | 8(1.1) | 77(8.5) | 9.4 | 90.6 |
| 2018 | 269(16.2) | 57(7.6) | 212(23.4) | 21.2 | 78.8 |
| 2019 | 276(16.6) | 151(20.0) | 125(13.8) | 54.7 | 45.3 |
| 2020 | 369(22.2) | 119(15.8) | 250(27.6) | 32.2 | 67.8 |
| 2021 | 430(25.9) | 234(31.0) | 196(21.7) | 54.4 | 45.6 |
| Total | 1659(100.0) | 754(100.0) | 905(100.0) | | |

Source: Field Data

From the findings in Table 6 it emerged that the total number of students who progressed to tertiary institution from 2016 to 2021 were 1,659. The highest percentage, 25.9% was in the year 2021 while the least, 5.1% was in 2017. For university progression, the total number of students who progressed from 2016 to 2021 were 754 out of which the highest number was 234(31.0%) in the year 2021 while the least was 8(1.1%) in 2017. Total number of students who had progressed with agricultural programs to TVET institutions for the 6 years were 905 with the highest progression, 250(27.6%) occurring in 2020 while the least, 45(5.0%) occurring in 2016. A comparison of the two progression shows that the total number of students who progressed to TVET institutions, 905 was higher than those who progressed to the universities, 754 in Bungoma County implying that there is higher progression to TVETS than to universities agricultural programs.

Further, the percentage progression between university and TVET across the years was also carried out and the findings also presented graphically as shown in Figure 3.

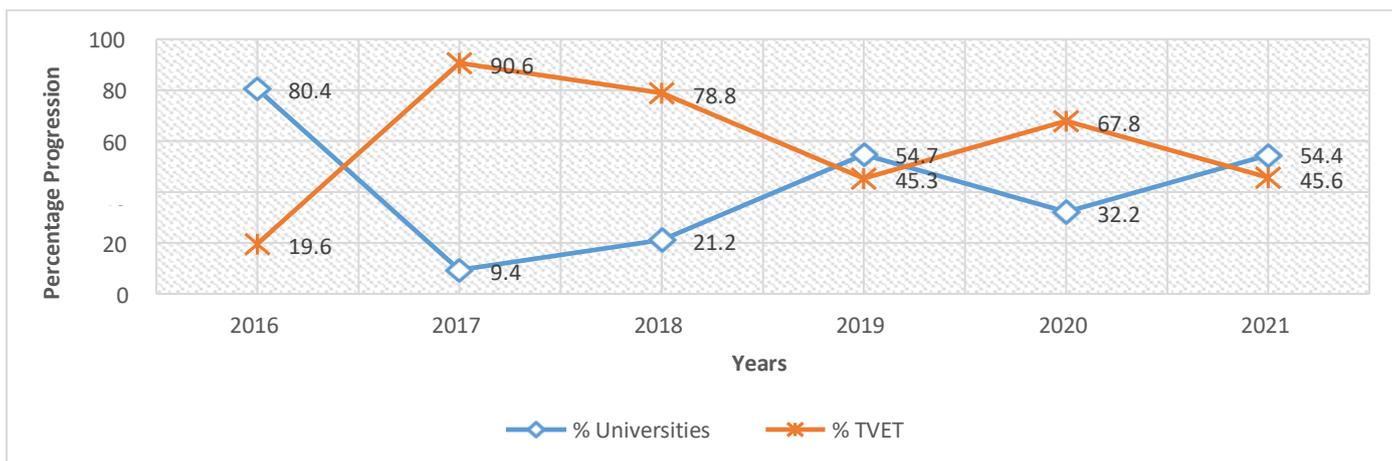


Figure 3
Progression Trend to Universities and TVETs in Bungoma County
 Source: KUCCPS data (2022).

The findings from Figure 3 shows that, in the year 2016, the total number of students who progressed to universities, 80.4% was high compared to those who progressed to TVETs, 19.6%. However, in the subsequent years, there was high progression to the TVET institutions except for 2019. For instance, in the year 2017, percentage progression to the TVET institutions was 90.6% while universities was 9.4%, This declined in TVETs in the year 2018 to 78.8% while that of the university increased to 21.2%. The findings show that in 2019, university progression increased to 54.7% while that of TVETs decreased to 45.8%, increased to 67.8% in theyear 2020 and again decreased to 45.6% in the year 2021. For university progression, the percentage decreased to 32.2% in 2020 and again increased to 54.4% in 2021. This implies that although the percentage of students who progress in agriculture to TVETs is higher, the gap between the agriculture students who qualify to progress in agriculture programs offered in TVETs and in universities is narrowing over the years. The percentage between those who enroll in TVETs and those who enroll in universities is closing up hence positive progression. According to Chemjor (2016), agriculture in Kenya is given a prominent place in tertiary colleges as a technical discipline that prepares students for employment, such as at Bukura College, Egerton University, and Kabete School of Agriculture and Veterinary Technology.

4.5 Percentage Progression in Kakamega and Bungoma Counties

A trend analysis was carried out for Percentage progression in Kakamega and Bungoma Counties. The findings are presented as shown in Figure 4.

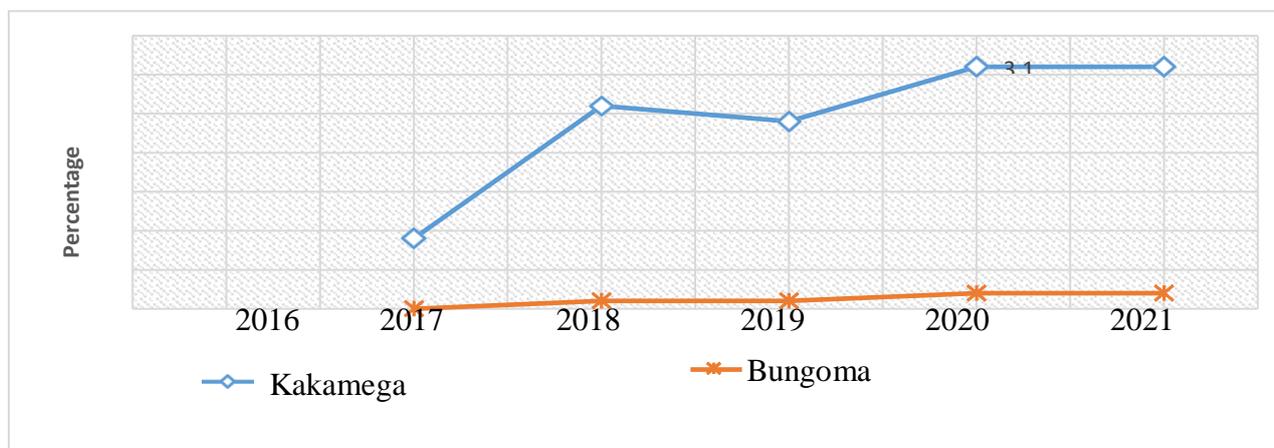


Figure 4
Trends in Progression in Kakamega and Bungoma
 Source: KUCCPS data (2022)

From the findings in Figure 4, it can be observed that generally, the percentage progression for agriculture students from Kakamega County was higher than that for students from Bungoma County. For instance, in 2017, Kakamega County had 0.9% progression compared to that of Bungoma which was less than 0.1. In 2018, progression for students from Kakamega County further increased by 2.6% but decreased in 2019 to 2.4% but again increased to 3.1% in 2020 and 2021. That for Bungoma county increased to 0.1% in 2018 and 2019 and thereafter to 0.2% in 2020 and 2021. This implies that in both counties, agricultural students' progression is to same direction and though not at the same rate.

4.6 University Placement to Agricultural Programs in Bungoma and Kakamega Counties

Further analysis was done to show placement of students to university institutions between Bungoma and Kakamega. The findings are presented in Figure 5.

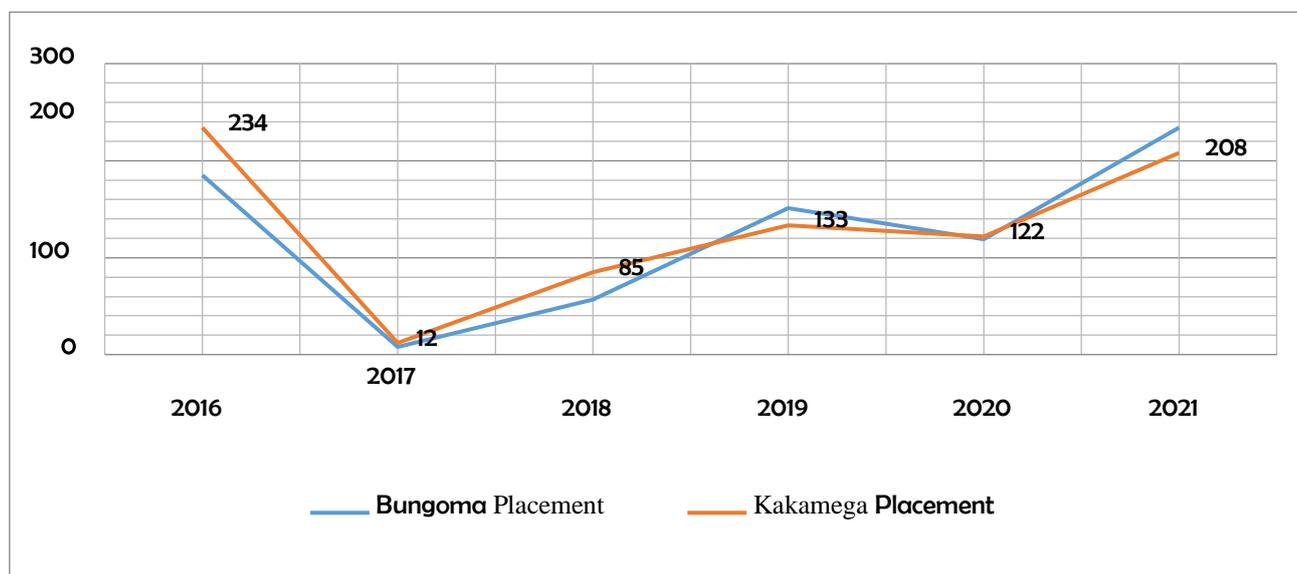


Figure 5
University Placement to Agricultural Programs in Bungoma and Kakamega Counties.
 Source: KUCCPS data (2022)

Figure 5 shows that, in the year 2019 and 2021, there were higher university progression in Bungoma county than to Kakamega. However, in the year 2016, 2017, 2018 and 2020, there was high progression in Kakamega County to universities as compared to Bungoma County. There, was averagely 132 placements to universities in Kakamega county and 125 in Bungoma County. The progression trend is therefore positive implying that the number of students progressing in agriculture increase over years.

4.7 Progression in Agricultural Programs to TVETs in Bungoma and Kakamega Counties

Further analysis was carried out understand the progression to TVETs among Kakamega and Bungoma Counties students. The findings are presented as shown in Figure 6.

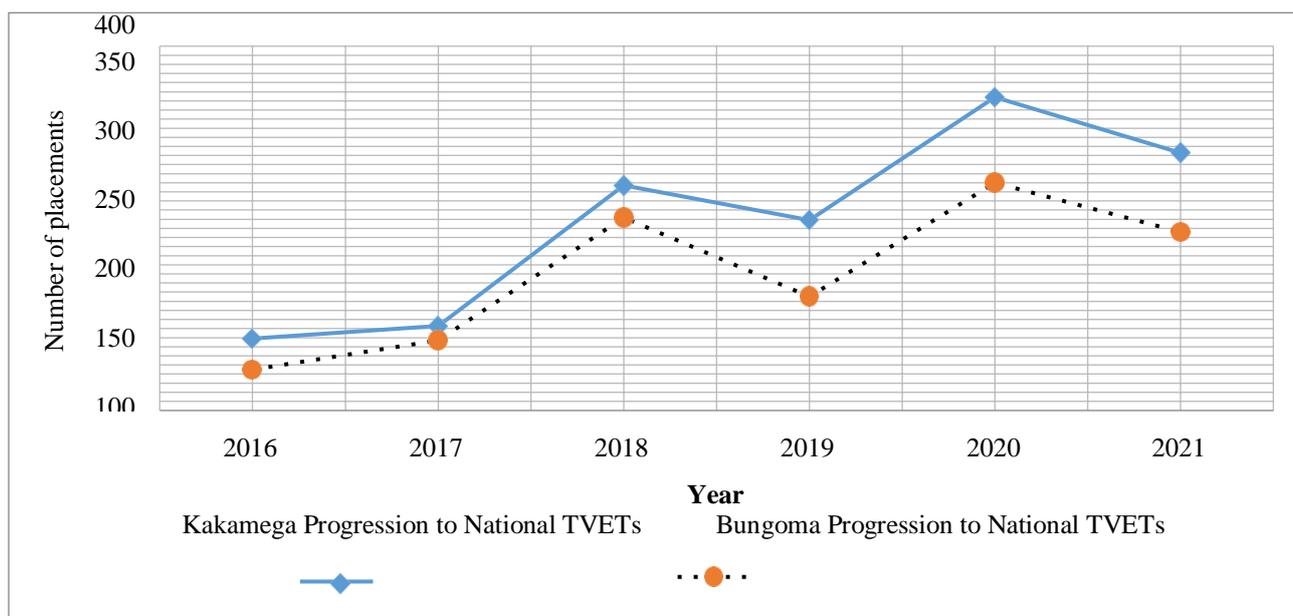


Figure 6
Progression to TVETs among Bungoma and Kakamega Counties students

Source: KUCCPS data (2022)

Analysis revealed increasing progression in both Bungoma and Kakamega counties

4.8 Total Progression in Agriculture Career Across Bungoma and Kakamega Counties

Students who selected agriculture subject in secondary school and joined agricultural Colleges to register for agricultural programs were operationalized to have progressed in agriculture career. Data on progression in KCSE agriculture from both Bungoma and Kakamega counties across the years and data on placement of agriculture students from the two counties in universities and agricultural colleges was obtained from Kenya Universities and College Central Placement Services. It was analyzed and the findings presented in Table 7.

Table 7
Total Progression from Bungoma and Kakamega Counties

| Year | Total progression in Agriculture progression Bungoma andKakamega | Total Placement in Bungoma and Kakamega | Percentage Progression in Bungoma and Kakamega |
|------|------------------------------------------------------------------|-----------------------------------------|------------------------------------------------|
| 2016 | 22,902 | 543 | |
| 2017 | 25,149 | 270 | 1.2 |
| 2018 | 28,421 | 601 | 2.4 |
| 2019 | 30,631 | 618 | 2.2 |
| 2020 | 32,983 | 735 | 2.4 |
| 2021 | 34,591 | 921 | 2.8 |

From Table 7, there were only 1.2% of the students that progressed in agricultural programs out of those who sat for secondary examination in the year 2016. From those that sat for examination in the year 2017, only 2.4% progressed to tertiary institutions. As indicated in the findings, 2.2% progressed in agricultural programs in 2020 from 2019, 2.4% in 2021 from 2020, 2.8% in 2022 from 2021. The progression ratio computed shows that for every 84 students that enrolled for agriculture subject in 2016, only 1(one) progressed (was placed) to tertiary institution but by the year 2021, for every 36 students that enrolled for agriculture subject 1(one) was placed in tertiary institutions in agriculture programs, Analysis implies that there is a positive progression ratio

whereby as years increase from 2017 to 2021, the ratio of those enrolled for KCSE agriculture subject to those placed in tertiary institutions is declining hence this is positive progression, since in the near future, there is a possibility of 100% placement of KCSE agriculture subject students in agricultural programs.

4.9 Trends in progression in agriculture career in tertiary institutions of Kakamega and Bungoma Counties, Kenya from 2016 to 2021?

The study sought to establish the trends in progression in agriculture career among agriculture students from secondary schools of Kakamega and Bungoma counties of Kenya to agricultural programs in tertiary institutions. The results for the analysis are displayed Table 8;

Table 8
Paired sample statistics

| | | Mean | N | Std. Deviation | Std. Error Mean |
|--------|------------------------------------------------------------|-------------|---|----------------|-----------------|
| Pair 1 | Total KCSE agriculture enrolment in Kenya | 279258.3333 | 6 | 36162.00357 | 14763.07614 |
| | Total Agriculture enrolment in universities | 271.3333 | 6 | 140.06808 | 57.18255 |
| Pair 2 | Total KCSE agriculture enrolment in Kenya | 279258.3333 | 6 | 36162.00357 | 14763.07614 |
| | Total Agriculture enrolment in National colleges(TVESTs) | 360.0000 | 6 | 185.03513 | 75.54028 |
| Pair 3 | Total KCSE agriculture enrolment in Bungoma | 14641.3333 | 6 | 2553.40037 | 1042.42134 |
| | Bungoma agriculture progression to Universities in Kenya | 125.6667 | 6 | 83.07025 | 33.91329 |
| Pair 4 | Total KCSE agriculture enrolment in Kakamega | 14471.5000 | 6 | 1981.28653 | 808.85684 |
| | Kakamega agriculture progression to Universities in Kenya | 132.3333 | 6 | 81.10405 | 33.11059 |
| Pair 5 | Total KCSE agriculture enrolment in Bungoma | 279258.3333 | 6 | 36162.00357 | 14763.07614 |
| | Student agriculture progression national TVETs in Bungoma | 150.8333 | 6 | 81.16013 | 33.13348 |
| Pair 6 | Total KCSE agriculture enrolment in Kakamega | 279258.3333 | 6 | 36162.00357 | 14763.07614 |
| | Student agriculture progression national TVETs in Kakamega | 209.1667 | 6 | 105.35733 | 43.01195 |

Table 8 shows descriptive statistics for each of the two groups as defined by the pair of variables. For instance, in pair 1, N = 6 where 6 stands for the number of years the data was collected, the total KCSE agriculture enrolment in Kenya has the mean of 279258.33 with a standard deviation of 36162.00. The total agriculture enrolment in the universities has a mean of 271.33 with a standard deviation of 140.07.

The above analysis implies that more students of KCSE agriculture enroll for agriculture programs in TVETs standard deviation (185.0) than in universities standard deviation (140.0). More students from Kakamega county standard deviation (105.35) join national TVETs for agriculture courses meaning higher progression in Kakamega county than those in Bungoma county standard deviation (81). More agriculture students of Bungoma county standard deviation (83.0) progress in agriculture programs to the university than those from Kakamega county Standard deviation (81.1)

Paired sample correlation was done to show correlation between total KCSE agriculture enrolment and total agriculture enrolment various institutions and results indicated as shown in Table 9.



Table 9
Paired Sample Correlation

| | | N | Correlation | Sig. |
|--------|--------------------------------------------------------------------------------------------------------------------|---|-------------|------|
| Pair 1 | Total KCSE agriculture enrolment in Kenya & Total Agriculture enrolment in universities | 6 | .198 | .707 |
| Pair 2 | Total KCSE agriculture enrolment in Kenya & Total Agriculture enrolment in National colleges(TVESTs) | 6 | .889 | .018 |
| Pair 3 | Total KCSE agriculture enrolment in Bungoma & Bungoma student agriculture progression to Universities in Kenya | 6 | .384 | .453 |
| Pair 4 | Total KCSE agriculture enrolment in Kakamega & Kakamega student agriculture progression to Universities in Kenya | 6 | .154 | .771 |
| Pair 5 | Total KCSE agriculture enrolment in Bungoma & Bungoma Student agriculture progression national TVETs in Bungoma | 6 | .837 | .038 |
| Pair 6 | Total KCSE agriculture enrolment in Kakamega & Kakamega Student agriculture progression national TVETs in Kakamega | 6 | .916 | .010 |

Table 9 shows the correlation between the two variables for observation of 6 years. The p-value for the correlation coefficient is also given whereby if the p-value is less than or equal to alpha value (0.05), then the correlation is significant i.e. there is sufficient evidence to conclude that the total KCSE agriculture enrolment and total agriculture enrolment in the universities is different for a case of pair 1.

4.10 Statistical Differences in the Means of Enrolment in Agriculture Programs

A paired sample t-test was then carried out to reveal a statistically reliable difference between the mean number of the total KCSE agriculture selection and the total agriculture enrolment in tertiary institutions and the results shown in Table 10.

Table 10
Paired Samples Test

| | | Paired Samples Test | | | | | t | Df | Sig. (2-tailed) |
|--------|----------------------------------------------------------------------------------------------------------|---------------------|----------------|-----------------|-------------------------------------------|-----------|--------|----|-----------------|
| | | Paired Differences | | | | | | | |
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | | Lower | Upper | | | |
| Pair 1 | Total KCSE agriculture enrolment in Kenya - Total Agriculture enrolment in universities | 278987.00 | 36134.52 | 14751.86 | 241066.15 | 316907.85 | 18.912 | 5 | .000 |
| Pair 2 | Total KCSE agriculture enrolment in Kenya - Total Agriculture enrolment in National colleges(TVESTs) | 278898.33 | 35997.67 | 14695.99 | 241121.10 | 316675.57 | 18.978 | 5 | .000 |
| Pair 3 | Total KCSE agriculture enrolment in Bungoma - Bungoma agriculture progression to Universities in Kenya | 14515.67 | 2522.68 | 1029.88 | 11868.27 | 17163.06 | 14.095 | 5 | .000 |
| Pair 4 | Total KCSE agriculture enrolment in Kakamega - Kakamega agriculture progression to Universities in Kenya | 14339.17 | 1970.45 | 804.43 | 12271.30 | 16407.03 | 17.825 | 5 | .000 |

| | | | | | | | | | |
|--------|--------------------------------------------------------------------------------------------------------|-----------|----------|----------|-----------|-----------|--------|---|------|
| Pair 5 | Total KCSE agriculture enrolment in Kenya - Student agriculture progression national TVETs in Bungoma | 279107.50 | 36094.09 | 14735.35 | 241229.04 | 316985.92 | 18.941 | 5 | .000 |
| Pair 6 | Total KCSE agriculture enrolment in Kenya - Student agriculture progression national TVETs in Kakamega | 279049.17 | 36065.53 | 14723.69 | 241200.71 | 316897.62 | 18.952 | 5 | .000 |

A paired sample t-test in Table 10 failed to reveal a statistically reliable difference between the mean number of the total KCSE agriculture enrolment in Kenya (mean = 279258.33, SD = 36134.52) and the total agriculture enrolment in the universities (mean = 271.33, SD = 140.06808). The results also show that total KCSE agriculture enrollment in Kenya and total agriculture enrolment in universities were weakly and positively correlated ($r = 0.198$, $p = 0.707$). Though the results also revealed that the average difference between total KCSE agriculture enrolment in Kenya and total agriculture enrolment in the universities was significant ($t(5) = 18.912$, $p < 0.05$),

The results also show that the average difference between total KCSE agriculture enrolment in Kenya and total agriculture enrolment in the TVET was significant ($t(5) = 18.978$, $p < 0.05$). The results also show that the average difference between total KCSE agriculture enrolment in Bungoma and Bungoma agriculture progression to the universities in Kenya was significant ($t(5) = 14.095$, $p < 0.05$). The results also show that the average difference between total KCSE agriculture enrolment in Kakamega and Kakamega agriculture progression to the universities in Kenya was significant ($t(5) = 17.825$, $p < 0.05$).

Pelco & Ball (2018) argue that awareness of the occupational identity statuses of a population and understanding the theory of operation are helpful to instructors who are involved in the career development of youth. During this stage, it is expected that students explore agriculture as a career and commit progress in it to college by selecting a program in agriculture. (Mberia & Midigo, 2018) found that people intentionally pursue educational paths that bring them to their chosen professions. This means that before entering a certain field of employment, each individual must create a profile outlining the specific qualities, abilities, and knowledge necessary to succeed in that line of work (Kazi & Akhlaq, 2017).

According to Ochuodho (2016), students admitted to degree programs and universities that are not of their choosing, struggled to change the course or discontinue their studies, leaving some programs without students. Hence, the introduction of TVETs in every sub county acted as motivation to study agricultural programs. Some students can now enroll in certificate courses, while others enroll in diploma courses. Students realized opportunities to progress in agriculture after failing to meet the qualifications to join universities. The qualification framework also indicates that students can progress to a bachelor's degree after completing a diploma course. Though these have been done, the results of this study task the ministry of education to devise more motivational strategies to ensure progression in agriculture among students.

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusion

Whereas there is a high selection of agriculture subjects, those who progress in agriculture are very few and of a very small percentage compared to the yearly total number of agricultural students who undertake KCSE. There is sufficient evidence to conclude that the total KCSE agriculture enrolment in Kenya and the total agriculture enrolment in the universities are different; that is, on average, the total KCSE agriculture enrolment in Kenya score (278987.00) is higher than the total agriculture enrolment in the universities. The total KCSE agriculture enrolment in Kenya and the total agriculture enrolment in the TVET are different, that is. On average, the total KCSE agriculture enrolment in Kenya (278898.00) is higher than the total agriculture enrolment in the TVET. The total KCSE agriculture enrolment in Bungoma and Bungoma agriculture progression to the universities in Kenya is different, that is. On average, the total KCSE agriculture enrolment in Bungoma (14515.67) is higher than Bungoma agriculture progression to the universities in Kenya. The total KCSE agriculture enrolment in Kakamega and Kakamega agriculture progression to the universities in Kenya are different; that is, on average, the total KCSE agriculture enrolment in Kakamega (14339.17) is higher than Kakamega agriculture progression to the universities in Kenya.

5.2 Recommendations

The study recommends that the Ministry of Education policies be re-aligned to enable students to progress in agricultural programs. It's noted that the total KCSE agriculture enrolment in Kenya and the total agriculture enrolment in tertiary institutions are different. To fill the gap, the national government and county government should work together to devise strategies to ensure that students are learning agriculture right from a tender age so that they develop agricultural skills and interests that help them cope with the agricultural programs offered in the tertiary colleges of agriculture.

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