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RESEARCH ARTICLE

TEACHER RELATED FACTORS AND ENROLMENT OF STUDENTS IN AGRICULTURE IN SECONDARY SCHOOLS IN KENYA

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Abstract

Agriculture is one of the optional subjects done in secondary schools in Kenya. This suggests that students' enrolment in the subject is influenced by a number of factors. This study aimed to establish teacher related factors influencing enrolment in agriculture in secondary schools in Kakamega North Sub-county, Kakamega County, Kenya. The study which was anchored on Behaviorism learning theory and Connectivism learning theory adopted correlational research design and descriptive survey design. The population for the study consisted of school principals, school career masters, agriculture teachers, form three students and Parents. Purposive and stratified random sampling was used to select twenty (20) schools, twenty (20) Principals, twenty (20) career masters, twenty (20) agriculture teachers, 300 form 3 students and twenty (20) Parents Teachers Association (PTA) members. Data from the respondents was collected using questionnaires and interview schedules, while observing the necessary ethical considerations. Data collected was analyzed using Statistical Packages for Social Sciences (SPSS) for windows version 25. Qualitative data was analyzed thematically and findings presented. The study established that teaching approach (63.6%) was major teacher related factor influencing enrolment of students in agriculture. The Chi-square test of independence [χ^2 (36, N=7) = 42.00, p = .007], at $p \leq 0.05$ level of precision, indicated that there is a statistically significant relationship between teacher related factors and enrolment of students in agriculture. The study therefore recommended that agriculture teachers should employ right instructional approaches in teaching and learning of agriculture to inspire more students to pursue agriculture related careers.

Introduction:-

Agriculture has immense contribution to the wellbeing of humanity in terms of global food supplies, hunger alleviation, economic development and financial advancement through provision of employment (Nova, 2016). It also remains critical for the achievement of SDGs of poverty alleviation and zero hunger. This is through employment creation and food supply respectively (UN, 2017). The Au agenda of 2063 aims at transforming the

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African continent into a global powerhouse of the future (AU, 2015).To achieve this, adoption of modern agriculture has been identified as a key pillar to enable the continent to feed itself and be a major player as a net food exporter. This has also been embraced in other countries. For instance, a country like Kenya aims to achieve the vision 2030 and the big 4 agenda through food security and job creation putting agriculture at the centre stage (KIPPRA, 2017). These instances points out that agriculture remain pivotal for human survival and for a country's economic growth (Nova, 2016).

Developed economies like China, Brazil and U.S.A, agriculture education is ranked highly and offered as a compulsory subject in the curriculum (Mustapha and Greenan, 2007). In U.S.A, agriculture is delivered at secondary schools, tertiary colleges and universities through a Competency Based Curriculum (Lioyd and Osborne, 2014). This is also replicated in some countries such as Cuba where agriculture is taught from basic educational level to tertiary level with an inclusive of voluntary agricultural activities (Ritzen, 1999). This strategy has hastened the individual and government perception of the subject ultimately leading to high agricultural production in the country.

For the case of African countries especially in Sub-saharan Africa, the agriculture sector is still the prime provider of employment and thus remaining crucial for economic growth. Conversely, food security in Africa is still a crisis and therefore a major focus of agricultural education is on increased food supply (Vandenbosch, 2006). Egypt, though being a desert has put a lot of weight in agriculture education particularly on irrigation due to robust water supply from river Nile. This has made Egypt to be self-sufficient in food production. Moreover, this has led to creation of requisite skills in water management and soil conservation (Alabu, 2001). Developing countries such as Kenya and Ghana depend heavily on agriculture for economic development. However, in these Countries, the study of agriculture as a technical subject has been made optional. This is a matter of concern especially in Kenya where agriculture is the backbone of the economy by contributing to about 25 percent to the Gross domestic product, 19 percent to formal wage employment and guarantees food security to the nation (KIPPRA, 2009; GOK, 2007).

In Kenya, the implementation of 8-4-4 system in 1985 led to introduction of the new curriculum that emphasized self- reliance through based and practice oriented education (Republic of Kenya, 1981). Agriculture subject was therefore placed in the curriculum on the rationale of countering the apparent negative attitude to farming by many students whose occupational choices are limited and thus exposing them to knowledge and skills which will help them secure opportunities in agriculture consequently changing their attitude towards the subject (Abalu, 2001). Agriculture subject was therefore categorized among the technical subjects in group four subjects (KICD, 2006).This is has been the case to the present. Subjects in group four are not compulsory only that student take them in the first two years of secondary school education thereafter given a chance to choose the subject they are comfortable with. The after effect of this is that enrolment patterns continue to vary over the years depending on a number of factors. It is upon this basis that the study was conceived and conducted on teacher related factors influencing students' enrolment in agriculture in secondary schools of Kakamega-North Sub-county, Kakamega County, Kenya.

Statement of the Problem:-

In Kenya, agriculture is the main contributor to the GDP by about 25%. Some parts of Kenya including Kakamega North Sub-county in Kakamega County are high potential areas for Agricultural production. Agriculture in secondary schools is an optional subject. However, there has been a concern about the dwindling enrolment of students in the subject. This is precarious for a country like Kenya which is struggling to be food secure and in the process create jobs for its population. If this trend is not reversed, the achievement of Vision 2030, Kenya's blue print for development will remain a mirage. It is therefore critical to investigate the root cause of the current enrolment trends with the aim of suggesting sustainable solutions for increased enrolment of students in agriculture. It has been hypothesized that there are several factors that could be contributing to the variation in enrolment of students in agriculture in secondary schools, but there is no sufficient literature to support the hypothesis. This study therefore sought to fill this gap. The study investigated teacher related factors influencing enrolment of students in agriculture in secondary schools of Kakamega North Sub-County, Kakamega County, Kenya. The study also suggests solutions to increase enrolment of students in agriculture.

Objective of the Study:-

To assess teacher related factors influencing enrolment of students in agriculture in secondary schools of Kakamega North Sub-county, Kakamega County, Kenya.

Research Hypothesis:-

Ho1: There is no statistically significant relationship between teacher-related factors and the enrolment of students in agriculture in secondary schools of Kakamega North Sub-county, Kakamega County, Kenya.

Conceptual Framework:-

Figure 1.1shows the interaction between teacher related factors and enrolment in agriculture subject.

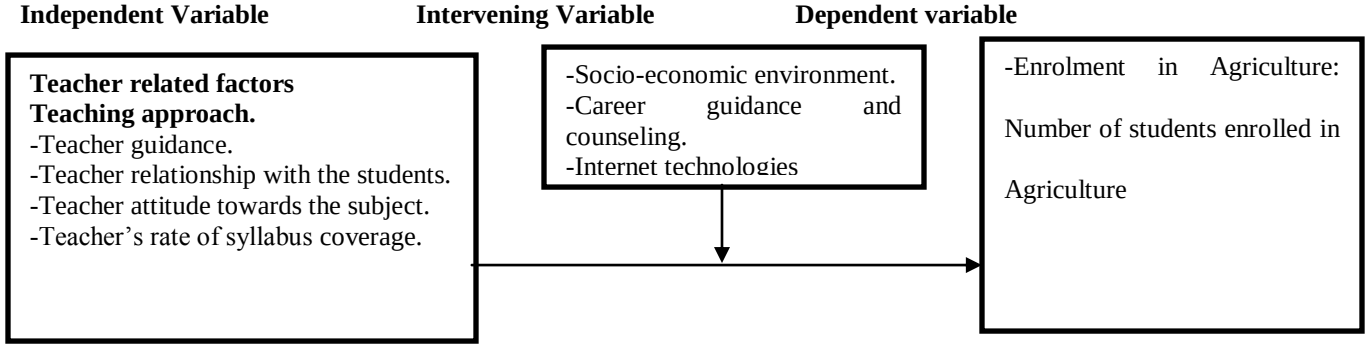


Figure 1.1:-Conceptual Framework.
Source: Author conceptualization (2022).

Theoretical Framework:-

This study was grounded on Behaviorism learning theory and Connectivism learning theory. Behaviorism learning theory was developed by Skinner, an American psychologist and a professor at the University of Havard. It is based on the idea that a student behavior is influenced by the interaction with the environment. It suggest that behaviors are influenced and learned from external forces rather than internal forces i.e. innate or inherited characters. This points directly to student enrolment in an agriculture class that it may be as a result of their interaction with the agriculture teachers. From literature perspective, a student attitude about an instructor has a large impact on the attitude towards a class (Curan and Rosen, 2006). Students develop a tendency to choose subjects taught by teachers who are enthusiastic, well spoken, knowledgeable, caring and helpful as opposed to instructors who are dry, inflexible and unclear (Smith et al. 2006).

Connectivism learning theory was proposed by George Siemens who was a professor of psychology at the University of Texas in South Australia. It stands on the idea that people learn and grow when they form connections. This can be connections with their roles and obligations in their lives. Hobbies, goals and people comprise connections that influence learning. Ability to see connections between fields, ideas and concepts is a core skill in teaching and learning. Basing on this theory, agriculture teachers can utilize connectivism by helping students to make connections to things that excites them and therefore making them to learn better.

Agriculture teachers who apply different learning styles helps to reach different students, creating teaching that focuses directly on student's needs and aptitudes. On the other hand, teachers may be disengaged with their students hence bringing a problem at the end (Okumbe, 2009).Creation of a dynamic engagement strategy by the teacher with the students motivates a student to take the first step in terms of enrolling into a particular subject (Josh, 2021). Therefore, teachers who create high-personal touch to students create connections thus providing a higher chance for students to enroll and remain in subjects they choose. On this basis, the study sought to establish teacher related factors influencing enrolment of students in agriculture in secondary schools of Kakamega-North sub-county, Kakamega County, Kenya.

Research Methodology:-

In this study, correlational and descriptive survey research designs was adopted. Correlational research design is appropriate as it makes attempt to establish the relationship between two or more variables (Orodho, 2009). However, correlational research design is not applicable to qualitative data hence the need for descriptive survey research design. Orodho (2009) asserts that descriptive survey is a technique of collecting information through interviewing or administering questionnaires to a given sample of individuals. The population of the study comprised 50 public secondary schools in Kakamega-North Sub-county. This included 50 principals, 50 career

masters, 50 agriculture teachers, 10,000 form three students who take agriculture and those who don't take agriculture and 50 PTA representatives.

Stratified random sampling was used to select twenty (20) schools. The stratification was based on category of schools as well as gender. Purposive sampling was used to select 20 agriculture teachers, 20 career masters, 20 PTA members and 20 school principals. Fifteen (15) form three students from each school were selected using stratified random sampling. The stratification was based on the subject as well as gender. In total, the study had 380 respondents. According to Krejcie and Morgan (1970) a sample size of 370 from a population of 10,000 is representative.

A combination of questionnaires and interview schedules were used to derive data from the respondents for triangulation purposes. The tools were designed by the researcher in conformity with the research objectives and research questions of the study. The study relied on primary and secondary sources of data. A pilot study was conducted at St. Teresa's Isanjiro girls' secondary school, Malava boys' high school and St. Antony Kakoyi secondary school in Kakamega North Sub-county. The rationale behind the pilot study was to reveal logistical deficiencies with regard to instructions to the respondents, vague or ambiguous items, timing of data collection and average time taken for each instrument. The study established reliability of questionnaires, through Test-retest technique criteria.

From the results, teacher related factors had an alpha value of 0.823. Given the Cronbach Alpha coefficient was above the recommended 0.7, the data was deemed reliable and suitable for further analysis. The data collected was subjected to SPSS version 25 for analysis. The information was interpreted qualitatively and quantitatively.

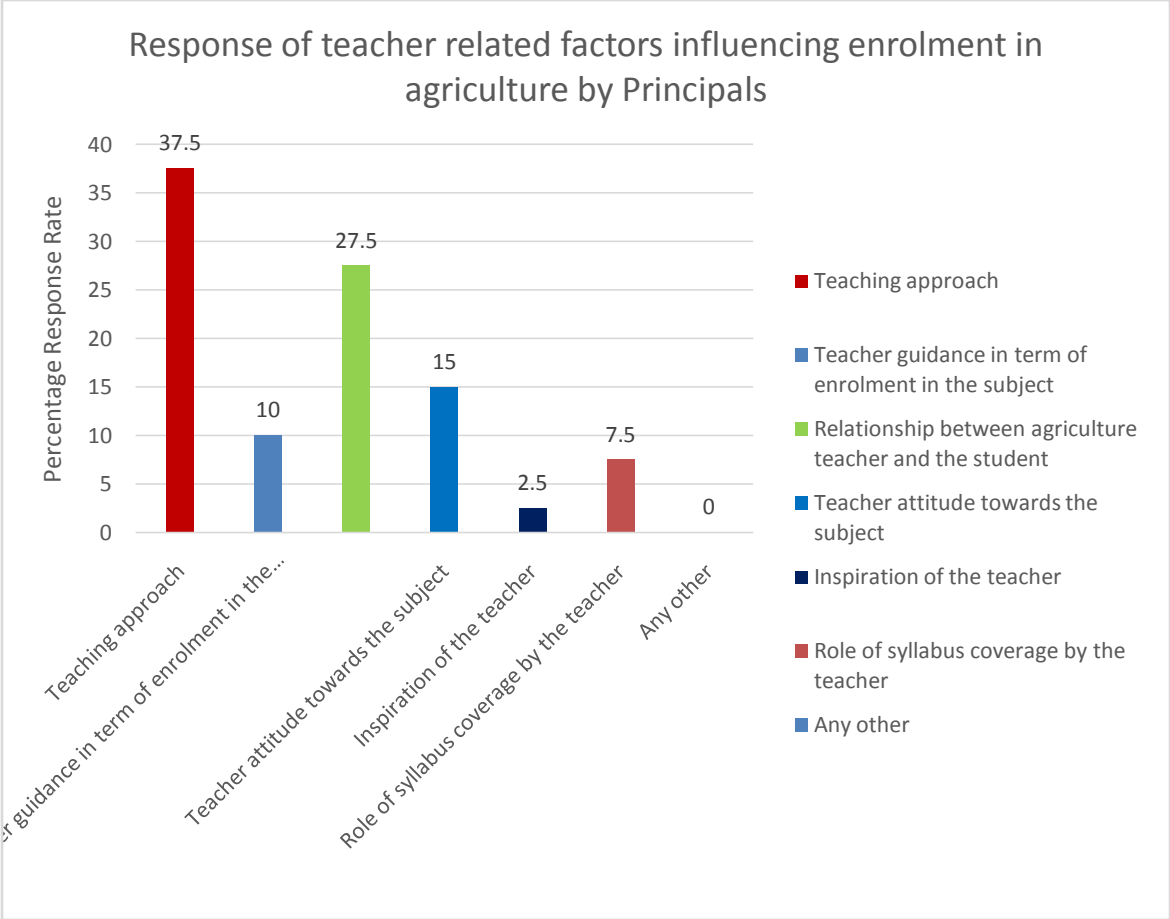
Study Findings:-

The study objective was to assess teacher related factors influencing enrolment of students in agriculture in secondary schools of Kakamega North Sub-county, Kakamega County, Kenya. The response was from principals, career masters, agriculture teachers, PTA members and the students themselves. The findings have been discussed in the sub-sections below.

Principals' Response:-

The principals were requested to highlight teacher related factors that influence student enrolment in agriculture. The respondents were to tick out of the options they were given. The options were; Teaching approach, teacher guidance in terms of enrolment in the subject, relationship between agriculture teacher and the student, teacher attitude towards the subject, inspiration of the teacher, rate of syllabus coverage by the teacher and any other that respondents were to specify.

Summary of the findings was as presented in Figure 1.2



Key: X –Axis: 0.01 unit represents 10% of response
Y –Axis: Teacher related factors influencing enrolment by principals
Figure 1.2:- Response of teacher related factors influencing enrolment in Agriculture by Principals.
Source: Field Data, 2022

The information from Figure 1.2 showed that majority of the principals singled out teaching approach as the most prominent factor that influenced enrolment in agriculture given that it was mentioned 15 times (37.5%). This was followed closely by the relationship between the agriculture teacher and the student that was highlighted 11 times (27.5%). Teacher attitude towards the subject was mentioned 6 times (15%) and teacher guidance in terms of enrolment in the subject was mentioned 3 times (10%). The findings supported prior research which contented that the methodology employed by the teacher in teaching of agriculture and the relationship between the agriculture teacher and the student correlates positively with selection of agriculture (Makori, 2019; Grosson, 1990). This an indication that students under the instruction of an agriculture teacher who engages right instructional approach may probably enroll in agriculture.

Career Masters' Response:-
The second category of the respondents were the career masters. They were asked to indicate the teacher related factors that influence enrolment in agriculture. Information in Figure 1.3 represents the summary of data analysis results.

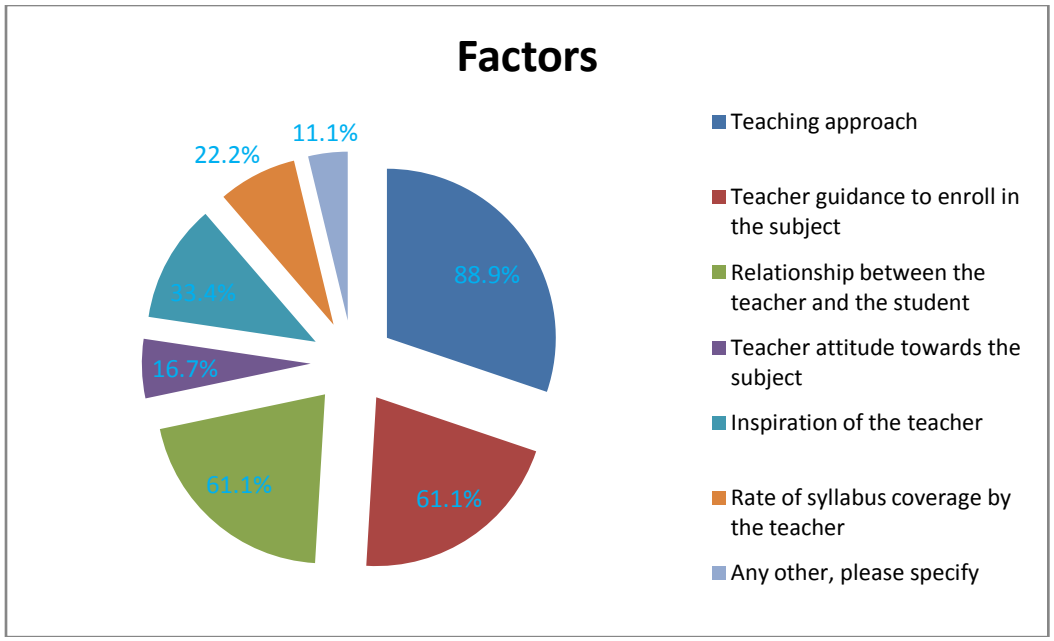


Figure 1.3:- Response of teacher related factors influencing enrolment in Agriculture by Career Masters.
Source: Field Data, 2022

Results in Figure 1.3 revealed that majority of the career masters noted that teaching approach was the greatest factor influencing enrolment of students in agriculture as denoted by 88.9 %. This was followed by teacher guidance to enroll in the subject and the relationship between the agriculture teacher and the student (61.1 %) respectively. Inspiration of the teacher, rate of syllabus coverage by the teacher and teacher attitudes towards the subject were also mentioned by a smaller group of respondents. Other factors that were specified included lack of enough instructional material and inadequate teachers of agriculture. The career masters' opinions reflected principals' responses under section 4.4.1 above. The findings agreed with earlier research conducted by Chemjor (2016) and Mulamula (2016) which stated that the skill the agriculture teacher exhibit in teaching and learning of agriculture influence enrolment in the subject. It is therefore imperative for agriculture teachers to constantly review their pedagogical techniques to motivate more students to enroll into their classes.

Agriculture Teachers' Response:-
Agriculture teachers were also part of the respondents that participated in the study. They were asked whether they encourage students to enroll in agriculture subject. Summary of the findings was presented in Table 4.1.
Table 1.1:-Whether Agriculture Teachers encourage students to enroll in the Subject.

Response	Frequency	Percent	Cumulative Percent
Yes	19	95.0	95.0
No	1	5.0	100.0
Total	**20**	**100.0**	

Source: Field Data, 2022

Results in Table 1.1 showed that almost all the respondents 19 (95 percent) except 1 (5 percent) encourage their students to enroll in agriculture.

From the interview schedule carried out, the respondents who respondent 'yes' were asked to explain their response and the findings were summarized as follows:

"Instilling positive attitude towards the subject for students by advising them on the importance of advancing in agriculture…, Employing right instructional approaches…, Inviting agriculture mentors to talk to students on agriculture related careers..,Motivating them if they perform well in the subject…,"

One of the agriculture teacher reported that:

Provision of career guidance and counselling is one of the ways he encourages his students to take agriculture. Through this, he creates awareness amongst students about agriculture careers hence are encouraged to enroll in the subject (Agriculture teacher 1, 2022).

Another teacher commented that:

She encourages her students to take agriculture by being friendly to the students (Agriculture teacher 3, 2022).

She went further by stating that:
This makes her students to develop positive attitude towards her and definitely the subject (Agriculture teacher 3, 2022).

Probing on how teaching approach affects enrolment of students in agriculture, one of the respondents smiled and continued by saying that:
Motivating teaching approach stimulates students' interest in agriculture (Agriculture teacher 4, 2022).

Asked on how talks from agriculture mentors enhance enrolment in agriculture, another agriculture teacher said that:

Agriculture mentors helps to inform students that successful undertaking of agriculture courses leads to more rewarding careers. This helps students to develop positive attitude in the subject and choose agriculture-related careers. (Agriculture Teacher 6, 2022).

The outcomes of Agriculture teachers' responses in general agreed with Berry (2002) who concluded that teachers' advice and the teaching method used by teachers contributes to subject selection. This points out to the need for agriculture teachers to deliver the content appropriately and have a positive attitude towards their subject and their learners

Parents Teachers Association Members' Response (PTA):-
Interview schedule were also carried out on PTA members. The respondents were asked to indicate whether there were any teacher related factors that influence enrolment of students in agriculture subject. The response was as recorded in Table 4.2.

Table 1.2:- Response on teacher related factors influencing enrolment of students in agriculture subject by PTA representatives.

Response	Frequency	Percent	Cumulative Percent
Yes	20	100.0	100.0
No	0	0.0	100.0
Total	**20**	**100.0**	

Source: Field Data, 2022

From the results in Table 1.2, all the PTA respondents (100 percent) noted that there are teacher related factors that influence enrolment of students in agriculture.

The interview schedule carried out from PTA members towards explaining the response was as summarized:
"Teaching methodology.., commitment of the teacher towards teaching agriculture and the relationship between the teacher and the student…, teacher attitude towards agriculture…, teaching technique used by the teacher.., the teaching technique employed by the teacher…,"

Commenting on the issue of teacher commitment, one of the PTA representative reported that:
A committed agriculture teacher assures learners of success in the subject thereby convincing them to enroll in agriculture. Moreover, agriculture teachers who perform their duties with passion are role models and therefore they influence learners to take their class (PTA representative 1, 2022).

Asked to elaborate on how the relationship between the agriculture teacher and the student influence enrolment in agriculture, the PTA representative removed his spectacles, leaned back on the chair and continued by saying that:

Agriculture teachers who develop a cordial relationship with their students makes them to develop interest towards agriculture (PTA representative 1, 2022).

When asked to respond on the issue of agriculture teacher attitude towards the subject. Another PTA representative reported that:
Agriculture teacher personality dictates the learning experience mostly employed by the teacher (PTA representative 4, 2022).

Probed for him to elaborate on his statement, the PTA said that:
Agriculture teacher personality determines selection, development and organization of teaching and learning resource for effective teaching of agriculture (PTA representative 4, 2022).

Similar sentiments were expressed by a parent who felt that:
Teacher personality and teacher experience are potential predictors of teaching effectiveness (PTA representative 6, 2022).

Touching on teaching technique employed by the agriculture teacher, another PTA representative reported that:
The way the agriculture teacher presents the subject matter to the learner makes a student like or dislike the subject (PTA representative 8, 2022).

After pausing for a little, he continued:
Students under the poor instruction of an agriculture teacher are less motivated to enroll on the subject (PTA representative 8, 2022).

The outcomes to a larger extent were consistent with the principals' responses and career masters' responses under section 4.4.1 and 4.4.2 respectively. This suggest that agriculture teachers who perform their duties diligently and passionately influence students to choose their classes.

Students Response:-
The study further sought to get student views (agriculture and non-agriculture students) on teacher related factors influencing enrolment in agriculture. The students were requested to tick where appropriate. Their views for agriculture were as shown in Figure 1.4.

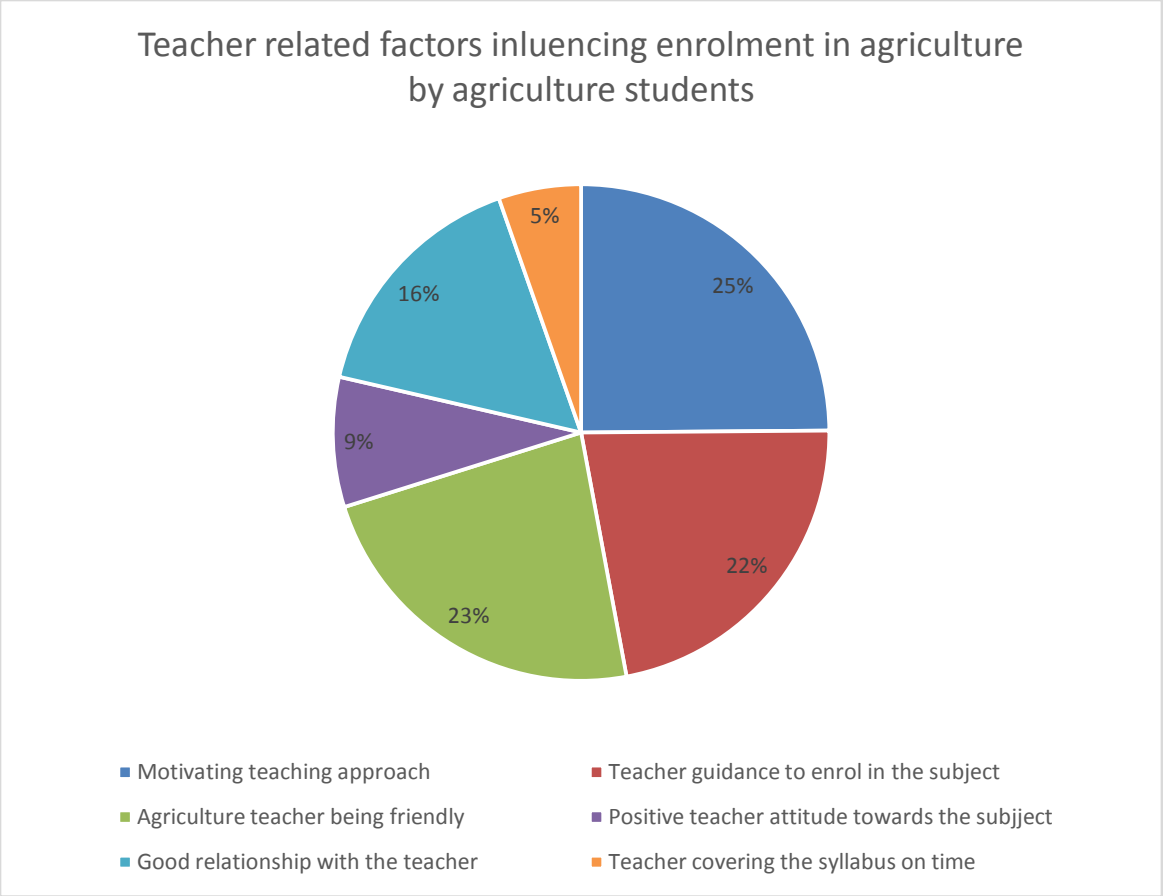
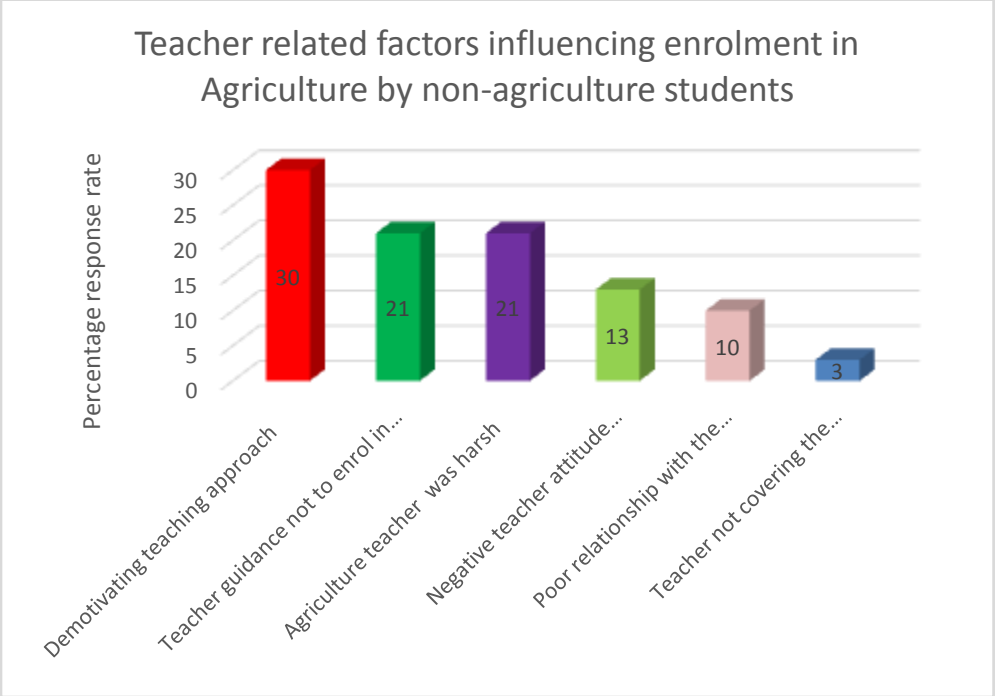


Figure 1.4:-Teacher related factors influencing enrolment in agriculture subject.
Source: Field Data, 2022

Data analysis results in figure 1.4 indicated that motivating teaching approach was scored as the top most teacher related factor influencing enrolment given that it was mentioned 140 times which is equivalent to 25 %. Teacher guidance to enroll in the subject which was mentioned 125 times (22.3 %), agriculture teacher being friendly was mentioned 130 times (23.2)%, positive teacher attitude towards the subject was mentioned 45 times (8.5 %), good relationship with the teacher mentioned 90 (16.1%) times while teacher covering the syllabus on time was mentioned 30 times. The respondents were therefore of the opinion that motivating teaching approach and teacher guidance to enroll in the subject were most influential factors that affected their enrolment in agriculture. The results on students' responses confirmed principals' and career masters' responses who also felt the same. These findings agreed with World Bank report (1997) which stated that learners learn better, learn more and remember more if they find pleasure in the learning experience which correlates positively with the teaching methodology of the teacher.

The study further established from non-agriculture students on teacher related factors influencing enrolment in agriculture subject. Figure 1.5 provides summary of the findings.

Figure 1.5:- Teacher related factors influencing enrolment in agriculture subject by non-agriculture students.



Key:
X Axis: 1 unit represents 5% of the response
Y Axis: Teacher related factors influencing enrolment in agriculture by non-agriculture students; I unit represent the response of teacher related factors
Figure 1.5:- Response of teacher related factors influencing enrolment in agriculture subject by non-agriculture students.
Source: Field Data, 2022

From the results in Figure 1.5, demotivating teaching approach was the highest teacher related factor influencing enrolment in agriculture given that its score was 30 %. The second factor was teacher guidance not to enroll in the subject and agriculture teacher being harsh with a score of 21 %. These was followed by negative teacher attitude towards the subject with a score of 13 %, poor relationship with the agriculture teacher with a score of 10 % while teacher not covering the syllabus on time had a score of 3%. In summary, majority of non-agriculture students indicated demotivating teaching approach and teacher guidance not to enroll in agriculture as leading factors influencing enrolment in agriculture. The findings concurred with Smith et al.2006 who found out that students develop a tendency to choose subject taught by teachers who are enthusiastic, well spoken, knowledgeable, caring and helpful as opposed to instructors who are dry, inflexible and unclear. The findings suggests that agriculture teachers ought to employ abroad array of techniques to stimulate students' interests in agriculture.

Further, the study performed Chi-square test of independence to find out if there was a link between teacher related factors and enrolment of students in agriculture in secondary schools of Kakamega North Sub-county, Kakamega County, Kenya. The test was conducted at 95% confidence interval testing the following hypothesis:

Ho1: There is no statistically significant relationship between teacher-related factors and the enrolment of students in agriculture in secondary schools of Kakamega North Sub-county, Kakamega County, Kenya.

The results of the Chi-square test of independence to assess teacher related factors influencing enrolment of students in agriculture in secondary schools of Kakamega North Sub-county, Kakamega County, Kenya was presented in Table 1.3

Table 1.3:- Chi-square Test of Independence.

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	42.000[a]	36	.007
Likelihood Ratio	27.243	36	.003
Linear-by-Linear Association	.233	1	.040
N of Valid Cases	7		
a. 7 cells (14.28%) have expected count less than 5. The minimum expected count is .14.			

Source: Field Data, 2022

From Table 1.3, the results that emanated from the Chi-square test of independence [χ^2 (36, N=7) = 42.00, p = .007] indicate that there is a statistically significant relationship between teacher related factors and enrolment of students in agriculture subject. The chi-square test of independence reveals that at $p \leq 0.05$ level of precision, teacher related factors is associated with enrolment of students in agriculture.

Therefore, the null hypothesis was rejected. The study concluded that teacher related factors significantly influence enrolment in agriculture.

Conclusion:-

Based on the findings on teacher related factors influencing enrolment in agriculture; the study concluded that teaching approach is an important teacher related factor influencing enrolment in agriculture in secondary schools of Kakamega-North Sub-county, Kakamega County, Kenya. This is because the way the teacher presents the content make students like or dislike the subject. This further implies that agriculture teachers who have the ability to instruct effectively enhances the probability of their students to enroll in agriculture on anticipation of success in the subject.

Recommendation:-

Agriculture teachers should employ right instructional approaches which encompasses present day agribusiness endeavours, agri-science research, agricultural service learning opportunities and involving them in successful agricultural activities like smart farming to make the subject more interesting and realistic. This can be in the form of modern teaching like use of videos and slides to meet the demand of varied students' interests hence encouraging them to enroll in the subject.

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