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ADEQUACY OF FINANCE RESOURCE ALLOCATION AND THE USE OF PROJECT-BASED LEARNING IN THE IMPLEMENTATION OF AGRICULTURE CURRICULUM IN KENYAN SECONDARY SCHOOLS

(Research article)

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Abstract

Curriculum implementation is a complex process that requires integration of an array of resources; inclusive of finances especially for the case of vocational subjects such as Agriculture that entail a lot of hands-on activities. In a school set up, the procurement and maintenance of various resources and facilities entirely depends on the availability of finances. This study therefore sought to establish the relationship between level of adequacy of finance resource allocation towards Agriculture subject and the use of Project-Based Learning in the implementation of the Agriculture curriculum in Kenyan secondary schools. Simple survey research design was adopted. Using the Krejcie and Morgan table for determining sample sizes, 44 secondary schools were sampled. One teacher of Agriculture and one principal were purposively sampled from each of the schools giving a total of 88 respondents. The data collections tools used included questionnaires and an observation guide. Chi-square test of relationship was used to analyze the findings aided by the Statistical Package for Social Sciences (SPSS) version 26. The study established that there was a significant relationship between level of adequacy of finance resource allocation and use of the Project-Based Learning in the implementation of Agriculture subject curriculum in secondary schools in Kakamega North Sub-County, Kakamega County, Kenya.

Keywords: Agriculture curriculum; Curriculum implementation; Project based learning; Finance allocation; Agriculture teaching resources; Secondary schools

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1. Introduction

According to the United Nations Educational, Scientific and Cultural Organization (UNESCO) (2019), education is considered globally as the roadmap to achieving social, economic, scientific and technological advancement. The United Nations acknowledges the role of education to the human society and for this reason, its fourth Sustainable Development Goal (SDG) envisages to ensure inclusive and equitable quality education and promote life-long learning opportunities by the year 2030.

Kenya, like majority of the developing countries in Sub-Saharan Africa is still grappling with food insecurity thus still far from realizing the second SDG which envisages to end hunger, achieve food security and improved nutrition and improved nutrition. This seems ironical since the agriculture sector contributes to over 60% of the GDP based on data from the Food And Agriculture Organization (2018) report. Furthermore, it is worth noting that unemployment has soared over the last three decades with the Kenya Institute for Public Policy Research and Analysis [KIPPRA] (2020) report indicating that over 40 percent of Kenyan youth were unemployed by the year 2020, with a projected rise in the percentage over the next years which will most probably escalate the already existing socio-economic crisis such as crime. Njeru (2017) attributes this eminent problem to the inadequacy of skills and the more preference for white collar jobs which are rather becoming scarce. Practical implementation of the Agriculture curriculum equips learners with hands-on skills that are relevant in the world of work and for this reason, Njura, Kubai, Taaliu and Kakai. (2020) argue that proper investment in agricultural education can perhaps address such problems which are rather proving to be a quagmire towards the achievement of vision 2030.

Being vocational in nature, holistic implementation of the Agriculture curriculum demands incorporation of an array of resources and facilities as it entails a lot of out of classroom activities (Ndambuki, Kyule & Konyango., 2024). One of the most potent resources is finance which according to Eyasu and Berhanu (2019) helps in budgeting for, maintaining, procuring and utilizing other resources and facilities necessary for instructional purposes. It actually binds the other resources and facilities together for the smooth running of a learning institution.

The main source of finance in Kenyan secondary schools is capitation from the government following the implementation of the Free Day Secondary Education (FSDE) policy in 2008 which according to the (Ministry of Education, 2022) would facilitate the achievement of the fourth SDG. Getange (2019) however established that the funds disbursed to schools are rather insufficient and often delayed which in turn hampers the smooth operation in schools. Furthermore, Wakoli and Kitainge (2019), revealed that the meagre disbursements channeled to the secondary schools by the government are diverted to other purposes not related to curriculum implementation mainly due to poor financial management decisions by the school managements. This is most likely to impede the practical implementation of Agriculture due to its vocational nature. This study therefore sought to establish the relationship between financial resource allocation and the practical implementation of Agriculture curriculum in Kenyan secondary schools.

1.1. Relevant scholarship

Linking Financial Resource to the Implementation of Practical Agriculture Curriculum

According to UNESCO (2017) report, it was established that the quality of education is greatly determined by the array of resources availed to the process and the manner in which these resources are manipulated and managed. Another UNESCO (2018) report concluded that timely disbursement and sagacious allocation of the various resources in the delivery of education services to learners under proper governance are critical ingredients to tackling educational challenges amidst scarcity of resources.

Educational goals and objectives can be attained by use of resources as inputs. Among these resources, finance is ranked by the UNESCO (2018) report as the most crucial as it largely dictates the ability of a learning institution to acquire, utilize and maintain other resources as well as physical facilities. According to Irikana and Weli (2019), financial resources dictate to a large extend the quality and quantity of other resources required in the educational sector. It is actually the binding factor in any educational institution and without a strong financial base, it would be impossible to procure the right resources necessary in the teaching-learning process (Awuor, 2015).

Agriculture is one of the most financially demanding subjects owing to its vocational nature which according to Cheruiyot (2018) entails a lot of practical activities on the school farm. Operation of the school farm and its associated facilities is financially demanding. Mugambi, Kyule and Obara (2022) noted that a good quality farm should have both crop and livestock enterprises with the necessary tools and farm structures so as to allow effective teaching of the subject. In addition to this, the scholar further pointed out that the farm should also be of economic value so as to generate extra income for the school. However, despite the relevance of the school farm in the practical implementation of Agriculture curriculum, inadequacy of finance remains to be the major quagmire. Noordin, (2018) observed that in most cases schools lack quality farms due to inadequate funds.

Literature findings reveal that developed nations tend to invest a lot of financial resources to the teaching of vocational subjects, agricultural education inclusive at all levels with an aim of enhancing enrolment without necessarily compromising on the quality of teaching. In Bulgaria for instance, funding of vocational education is delivered in an equitable, effective and efficient manner to ensure high enrolment in vocational education (Bergseng, 2019).

In Sub-Saharan Africa, funding from the governments remains to be the chief source of finance resource in schools. A study by Eyasu and Berhanu (2019) acknowledged that other minor sources of finance exist such as the community, NGOs and internal income generation within schools. Financial allocation to schools by the governments depends upon various factors such as student population and school category. The government funding seems to neglect the existence of vocational subjects such as Agriculture whose implementation demands high levels of financial investment. Misappropriation of funds, high rates of inflation, and excessive enrolment have also proven to be major hitches towards the utilization of funds in implementation of Agriculture and other vocational subjects in Africa (Tapiwa, 2021; Noordin 2018). In Zimbabwe for instance, Agriculture was made to be compulsory in secondary schools

without considering the financial implication. With limited financial resource against the high enrolment, Tapiwa (2021) observed that teachers have resorted to the use of teacher-centered approaches due to the inability to procure other relevant resources necessary in the teaching and learning of Agriculture. In another separate study conducted in Ghana, Fuseini (2020) observed that inadequate funds have made the teaching of Agriculture purely theoretical leading to the churning out of unskillful youth, a factor that is aggravating unemployment and food insecurity. This paints a gloomy image towards the practical implementation of Agriculture for skill acquisition which is quite sardonic especially in a continent whose population mainly depends on agriculture as the main source of income.

Funding of Agriculture in Kenyan secondary schools is not a new concept as it can be traced back to the inception of the subject during the Chavakali pilot project in 1960 by Robert Maxwell. During this period, implementation of the principles and practices agriculture curriculum was funded by the American government through the United States Agency for International Development (USAID) (Maxwell 1967; GoK, 1970). The funding was aimed at equipping the rural youth with farming skills that would in turn steer rural development. Owing to the success of the pilot project, the Kenyan government rolled out vocational Agriculture in six more schools which according to Simiyu (2021) included; Rapogi, Kisii, Narok, Njoro, Kangaru and Bungoma High Schools. These were financed by the United States Agency for International Development (USAID) and the Kenyan government. During the period of 1965-1976, the collaboration between USAID and the Kenyan government provided adequate funds for setting up physical facilities such as workshops, farm machinery as well as maintenance of school farms. Owing to the stringent measures that were set for schools to meet before being allowed to offer Agriculture, only one thousand students were taking Agriculture in secondary schools by 1966 (Shikanga, Muyekho & Ouda., 2022). Expansion of the program continued with much success such that by 1980, just over one hundred schools out of the possible one thousand seven hundred and sixty were offering Agriculture for examinations. It is without any doubt that the funds channeled to the schools during the earlier were in tandem with the enrolment at that particular time. Based on findings from these existing literature, it can be conclusively judged that secondary school Agriculture had an auspicious start in terms of financial support. Table 1 below gives a brief summary of the level of funding and utilization of funds in secondary school Agriculture over the years.

Table 1: *Vocational Agriculture Level of Funding and Utilization by Year*
Source: Maxwell (1967) and GoK (1966-70 & 1970-74) Development Plans

Funding Source	Year	Number of schools	Expenditure towards Workshop (Kshs).	Tools and Equipment Funds (Kshs)	Running Costs Funds (Kshs)	Total Funding (Kshs)
Pilot Project	1959/64	1	-	2,330,137.50	2,330,137.50	
USAID	1963	6	1,198,125.00	43200.00	322,500.00	12,017,820.00
IDA/WB	1968/69	20	8,036,325.00	1,100,000.00	900.000.00	10,036,325.00
Kenyan Govt.	1970-74	75	9,000,000.	75,000	75,000	9,150,000.00
TOTALS	1984	**102**	**20,564587.50**	**1218200.00**	**1,297,500.00**	**33,534,282.50**

When the 8-4-4 system of education came into action in the year 1985, all public primary and secondary schools were required to offer Agriculture. The implementation of this proposed move however became a challenge to the government considering the fact that Agriculture curriculum implementation is an expensive affair. Consequently, in primary schools, Agriculture was taught and examined alongside Science while in secondary schools, it was not made compulsory, but chosen among the other optional subjects. By the time the first cohort of 8-4-4 students sat for exams in 1989, around two thousand six hundred schools were offering Agriculture both in Form One and Form Two (Ongang'a ,2016). Despite the fact that Agriculture was made optional, it is still popular among students thus characterized by a ballooning enrolment over the years. Based on data from the Kenya National Examinations Council (2022) report, the Agriculture candidature in the year 2017 stood at 247,265 out of a total nationwide candidature of 611952. In the year 2021, it rose to 317,692 out of a total nationwide candidature of 822,933. These ballooning enrolment in a financially demanding subject may have financial implication in the implementation of practical aspects of the subject. The meagre finances provided to schools by the government may not be sufficient to facilitate the practical implementation of the subject. This is worsened by the high rates of inflation over the years.

The introduction of the Free Day Secondary Education program (FDSE) in the year 2008 as well as the 100% transition policy resulted to an enormous transition rate from primary to secondary schools and consequently, mushrooming of public secondary schools under the Constituency Development Fund (CDF) became a common phenomenon (Ministry of Education, 2022). CDF money channeled to schools is spent mainly on construction of tuition blocks, dormitories, administration blocks and laboratories since it is one of the interventions the Kenyan government has put in place to expand school infrastructure (Ojuok et al., 2020). The funds availed to the schools are however still inadequate as Kyule (2017) points out that the funds are sent to schools without much consideration of the enrolment in financially demanding subjects like Agriculture which in turn may hamper practical curriculum implementation. With the rolling out of the 2-6-3-3-3 education system in secondary schools in 2025, the feasibility of implementation of Competence Based Agriculture which aims at

equipping learners with farming skills through exposure to project activities on the school farm will be greatly hinged on the amount of finance resource allocated towards Agriculture curriculum implementation.

Project-Based Method in the Implementation of Agriculture Curriculum

The combinations of teaching methods adopted by a teacher greatly impacts on the learner during the instructional process. For this reason, the teachers' role in curriculum implementation is paramount. Agriculture tends to be more of a vocational subject with much focus on the practical aspect. For this reason, Ndambuki et al. (2024) argue that Agriculture curriculum implementation cannot be solely achieved within a classroom setting as it entails much outdoor activities. This has an implication that for effective teaching of Agriculture, a diversity of teaching methodologies must be put into use. Kimotho (2020) broadly categorize teaching methods into two; teacher-centered and learner-centered. Among the learner-centered approaches, Project-Based Learning stands out to be the most relevant in the practical implementation of Agriculture curriculum at the secondary school level as Ogweno et al. (2021) argue that it enhances the acquisition of psychomotor, communication, problem solving, creativity and cognitive skills among learners especially when conducted in groups.

Developed nations have placed much emphasis on the incorporation of project-based learning of Agriculture through various means such as teacher training and allocation of funds. One of the main purposes of teaching Agriculture in schools in the USA is career preparation. Rice and Kitchel (2017) assert that in order to effectively prepare learners for agriculture-related careers, Agriculture teachers in the USA tend to develop pedagogical content knowledge that includes more manual skill learning outcomes than mere mastery of content. In Italy, the theme of Agricultural education dates back to the 18th century. Mazzotti and Fornasari (2021) points out that over the years, as Agricultural education evolved, the Italian government placed more emphasis on equipping teachers with pedagogical skills through seminars and conferences with attempts to ensure effective transmission of agricultural skills along the educational chain through use of effective teaching methods. In Africa, a lot still needs to be done with reference to the use of project-based learning so as to ensure better teaching of the subject. Inadequacy of instructional resources due to large class size, inadequate time allocation and poor teacher training have been cited by Cannon (2019) as some of the main reasons behind frequent use of inappropriate teaching methodologies such as lecture.

The secondary school Agriculture curriculum in Kenya covers topics broadly categorized into; livestock production, crop production, agroforestry, agricultural economics, farm power and machinery, soil and water conservation among others distributed throughout the four-year course (KIE, 2006). Basing on Agriculture Syllabus, learners at all levels should be involved in projects within the school farm which aim at assisting them to acquire useful agriculture skills. The syllabus clearly stipulates the various projects to be conducted by learners at various forms as per the Table 2.

Table 2: *Summary of Suggested Projects at Various Academic Levels*

Source: KIE Agriculture Syllabus (2006)

Form	Suggested Projects
One	(a) Crop production through irrigation (b) Preparation of compost manure
Two	(a) Select and prepare planting material, preparation of a nursery bed, (b) grafting on fruit trees, (c) carrying out field practices, (d) grow vegetable crops from nursery establishment to harvesting, (e) carry out disease control practices on animals, (f) identify different parasites
Three	(a) Carrying out livestock rearing practices, (b) Constructing and maintaining farm structures, (c) Carry out soil erosion control measures, (d) Design and construct a micro catchment, (e) Carry out general disease and pest control measures, (f) Raising of maize/sorghum/millet/and bean crop from seed bed preparation to harvesting, (g) Care and use appropriate livestock handling practices, (h) Selection of breeding stock
Four	(a)Poultry rearing, (b) Cattle rearing, (c) Agroforestry (d) Operation and maintenance of farm machinery and tractor-drawn implements

This study therefore sought to establish the contribution of finance resource towards the implementation of these projects in secondary schools in Kakamega North Sub-County, Kakamega County, Kenya.

Theoretical Analysis and Application

This study was hinged on the Resource Dependence Theory (RDT) that was theorized by Fathi in 2012. The underlying principle of this theory is that the functionality of any organization heavily relies on the availability of resources which always tend to be scarce. The theory therefore suggests that to ensure long-term sustainability amidst the scarcity of resources, organizations must develop means to effectively utilize these resources. This theory was deemed relevant to this study since finance resource which is arguably the most resource as far as running of an education system is concerned and whose main source is the government always seems to be scarce. However, with proper and sagacious allocation, the resource can sufficiently promote educational activities; inclusive of implementation of practical Agriculture curriculum.

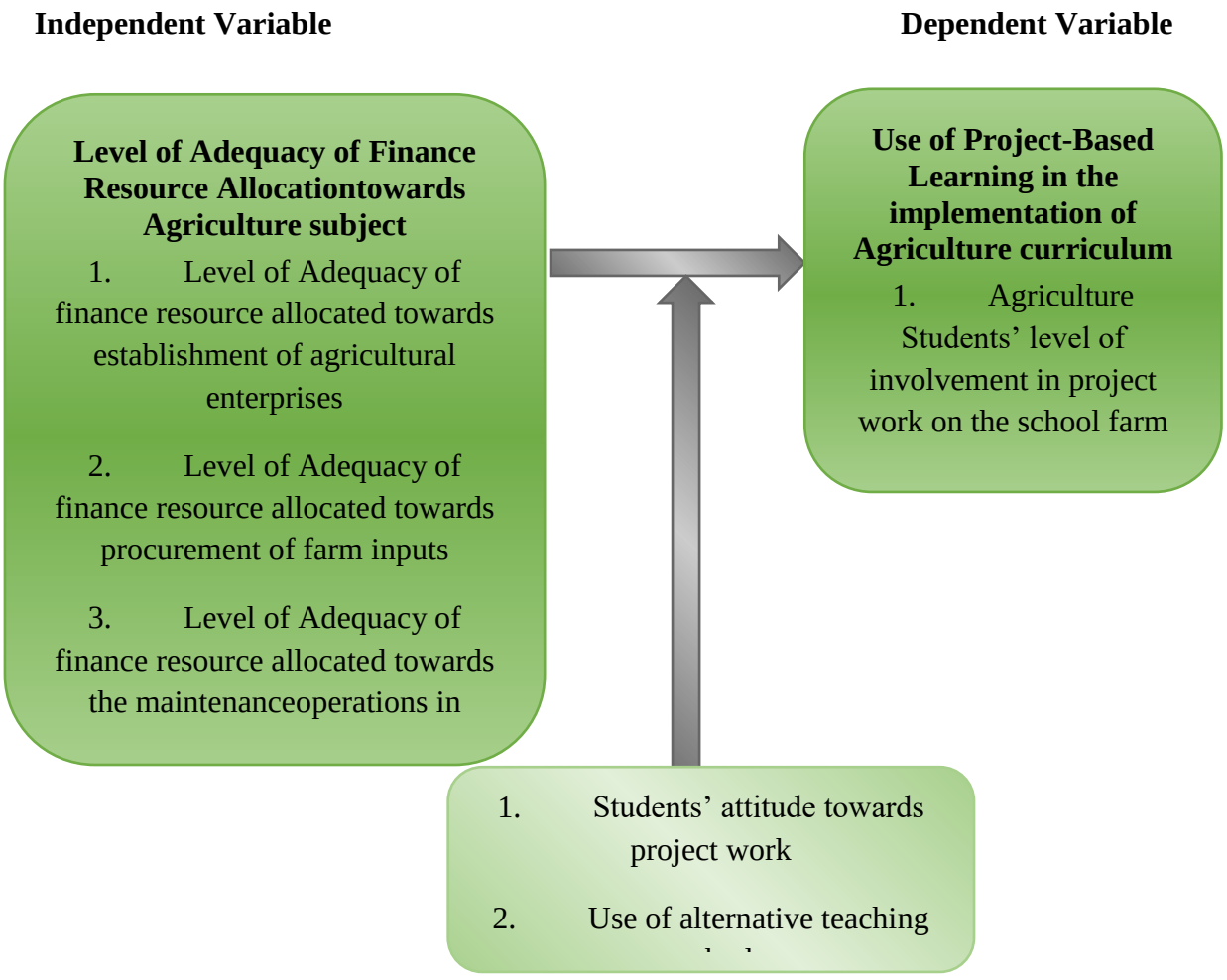

Figure 1: *Conceptual framework showing relationship between variables in the study*

In this study Level of Adequacy of Finance Resource Allocation towards Agriculture subject was the independent variable. It was indicated by; Level of Adequacy of finance resource allocated towards establishment of agricultural enterprises, procurement of farm inputs and maintenance operations in the school farm projects. The level of finance allocation towards agriculture subject would affect the use of Project-Based Learning in the implementation of Agriculture curriculum and therefore this formed the dependent variable. The intervening variables in this study were; students' attitude towards project work and use of alternative teaching methods. The effect of intervening variables on the relationship between dependent and independent variable was ignored and therefore it was not studied.

1.2. Objectives of the Study

The study was guided by the following research objectives;

i. Determine the relationship between level of adequacy of finance resource allocated towards the establishment of agricultural enterprises on the school farm and the use of Project-Based Learning in the implementation of Agriculture subject curriculum in Kenyan secondary schools.
ii. Determine the relationship between level of adequacy of financial resource allocated towards the procurement of farm inputs on the school farm and the use of Project-Based Learning in the implementation of Agriculture subject curriculum in Kenyan secondary schools.
iii. Determine the relationship between level of adequacy of finance resource allocated towards the maintenance operations on the school farm and the use of Project-Based Learning in the implementation of Agriculture subject curriculum in Kenyan secondary schools.

1.2.1 Research hypotheses

To meet the objectives, the study tested the following hypotheses;

i. There is no statistically significant relationship between level of adequacy of finance resource allocated towards the establishment of agricultural enterprises on the school farm and the use of Project-Based Learning in the implementation of Agriculture curriculum in Kenyan secondary schools.
ii. There is no statistically significant relationship between level of adequacy of finance resource allocated towards the procurement of farm inputs on the school farm and the use of Project-Based Learning in the implementation of Agriculture curriculum in Kenyan secondary schools.
iii. There is no statistically significant relationship between level of adequacy of finance resource allocated towards the maintenance operations on the school farm and the use of Project-Based Learning in the implementation of Agriculture curriculum in Kenyan secondary schools.

1.2.2 Research Questions

The study addressed the following research questions:

I. What is the relationship between level of adequacy of finance resource allocated towards the establishment of agricultural enterprises on the school farm and the use of Project-Based Learning in the implementation of Agriculture curriculum in Kenyan secondary schools?
II. What is the relationship between level of adequacy of finance resource allocated towards the procurement of farm inputs on the school farm and the use of Project-Based Learning in the implementation of Agriculture curriculum in Kenyan secondary schools?

III. What is the relationship between level of adequacy of finance resource allocated towards the maintenance operations on the school farm and the use of Project-Based Learning in the implementation of Agriculture curriculum in Kenyan secondary schools?

2. Method

2.1 Research Design

Simple survey research design was adopted for this study. This research design deemed appropriate for since both the variables under study are on-going. Creswell and Creswell (2017) recommend this type of research design for an on-going process. Furthermore, Leavy (2017) noted that simple survey design is essential while gathering information about prevailing conditions or situations for the purpose of description and interpretation. This design enabled the researcher to collect data from the Agriculture teachers and principals on the relationship between level of adequacy of finance resource allocation and the use of project-based learning in the implementation of Agriculture curriculum.

2.2 Participant (subject) characteristics

The target population for this study comprised of 171 registered teachers of Agriculture and 50 principals from all the 50 public secondary schools offering Agriculture as an examinable subject (Malava Sub-County Education Office, 2019). The accessible population comprised of the 171 Agriculture teachers and 50 principals from all the 50 schools. Secondary schools were targeted because it is at this level that Agriculture is taught as an independent subject. Agriculture teachers were targeted for this study because by virtue of being in charge of curriculum implementation, they have in-depth knowledge concerning the role of finance resource in the use of project based learning. The school principals were targeted since they play a key role in allocation of finances that are necessary for procurement and maintenance of other Agriculture teaching-learning resources.

2.3 Sampling Distribution and Sample Size

The Krejice and Morgan (1970) table for determining sample sizes from a given population was used to come up with 44 secondary schools. One teacher of Agriculture was purposively sampled. In schools with more than one teacher of Agriculture, the teacher with more teaching experience was selected due to their vast knowledge concerning project-based learning. In addition to that, 44 principals were also included in the study. This gave rise to a total sample size of 88 respondents.

2.4 Measures and Covariates

Closed ended survey questionnaires and an observation guide developed by the researcher were used as the data collection tools. The questionnaires solicited data from the respondents concerning the objectives under study while the observation guide enabled the researcher to solicit data regarding the use of project-based leaning in the implementation of the Agriculture curriculum. Reliability correlation coefficient of 0.83 for the principals' questionnaires and 0.77

for the teachers' questionnaires was attained using split-half method after conducting a pilot study involving 30 respondents in the neighboring Khwisero Sub-County. Validity aspect of the instruments was determined by subjecting them to expert data analysts from the department of Agricultural education and Extension at Egerton University prior to data collection.

3. Results and Discussions

The first objective was to determine the relationship between the level of adequacy of finance resource allocated towards the establishment of agricultural enterprises and the use of PBL in the implementation of Agriculture curriculum. The respondents were asked to indicate whether their schools had school farms. Based on the findings, 100% of the respondents reported having school farms. Having established that the schools had farms, the respondents were requested to indicate the specific types of enterprises that existed on the school farm. The findings were summarized in Table 3.

Table 3: *Types of agricultural enterprises on the school farms*

Type of enterprises established		**Response in frequencies and percentages**					
		Teachers' response			**Principals' response**		
		Yes	**No**	**Total**	**Yes**	**No**	**Total**
Vegetable production	Freq	19	25	44	19	25	44
	%	43.19	56.81	100	43.19	56.81	100
Horticulture	Freq	0	44	44	0	44	44
	%	0	100	100	0	100	100
Field crops	Freq	20	24	44	20	24	44
	%	45.45	54.55	100	45.45	54.55	100
Fruit production	Freq	4	40	44	4	40	44
	%	9.10	90.90	100	9.10	90.90	100
Mammalian livestock	Freq	19	25	44	19	25	44
	%	43.19	56.81	100	43.19	56.81	100
Apiculture	Freq	1	43	44	1	43	44
	%	2.28	97.72	100	2.28	97.72	100
Aquaculture	Freq	1	43	44	1	43	44
	%	2.28	97.72	100	2.28	97.72	100
Poultry farming	Freq	13	31	44	13	31	44
	%	29.50	70.50	100	29.50	70.50	100

It was quite surrealistic that none of the enterprises existed in more than 50% of the schools. The secondary school Agriculture syllabus comprises of 33 topics with main focus on

crop production, livestock production and farm machinery. From the findings in Table 3, livestock production enterprises were generally scarce as compared to crop production enterprises. Amidst the decline in the overall performance of the livestock industry attributed to the constantly changing agro-ecological conditions, Duval, Cournut and Hostiou (2021) argue that the emerging generation of farmers need to be well versed with these patterns to ensure sustainability in the sector. This is less likely to be achieved with such a gloomy picture of our school farms. With such a low drive in practical agricultural education in our secondary schools, the vision of steering Kenya into a middle economy through alleviating hunger and curbing unemployment is far from reality.

The enterprises were categorized into two groups; crop production (Vegetable production, field crops, horticulture and fruit production) and livestock production (Mammalian livestock, apiculture, aquaculture and poultry farming). The respondents were then requested to rate the level of adequacy of finance resource allocated towards the establishment of the enterprises. Majority of the respondents (65%) reported that the finance resource allocated towards establishment of the enterprises was very low, 25 reported it to be low and only 10% reported it to be average. To establish the relationship between the independent variable (level of adequacy of finance resource allocated towards the establishment of agricultural enterprises) and the dependent variable (use of PBL in the implementation of Agriculture curriculum), chi-square test of relationship was employed. The results are presented in Table 4.

Table 4: *Relationship between Level of Adequacy of Finance Resource Allocated towards Establishment of Agricultural Enterprises and the use of Project-Based Learning*

Scale	Value	Df	p-value
Pearson Chi-Square	5.432	5	.23
N	44		

Based on the findings, $p<0.5$ and for this reason, the null hypothesis was rejected in favor of the alternative hypothesis which states that there is a significant relationship between level of adequacy of finance resource allocated towards establishment of agricultural enterprises on the school farm and the use of PBL in the implementation of Agriculture curriculum. These findings resonate with those from Makokha and Wanyonyi (2015) which established a correlation between the diversity of resources availed to the teaching method adopted by the teacher.

Farm inputs play a crucial role in agriculture and are broadly categorized into two; fixed and variable inputs. Fixed inputs are re-used during the farming exercise and include; land, labor and farm tools and machinery while variable inputs are those that are completely consumed and the best example is feedstuff for livestock and agro-chemicals such as pesticides, insecticides, herbicides, rodenticides, fertilizers and many more others depending on the types of enterprises on the farm. The second objective of this study was to establish the relationship between level of adequacy of finance resource allocated towards procurement of farm inputs and the use of Project-Based Learning in the implementation of secondary school Agriculture curriculum. Both sets of respondents were asked to indicate whether requisitions towards procurement of farm inputs were made. Based on the findings, 70% of the principals acknowledged receiving

the requisitions while to the contrary, only 55.45% of the teachers of Agriculture indicated that they forward requisitions to the principals. The differences in opinions between the two sets of respondents may be accounted for by the fact that in some schools, school farm operations are done by farm managers rather than teachers of Agriculture as established in a study by Recha, Kule and Nkatha. (2024).

The study further sought to establish the frequency to which these requisitions were made. Figure 2 gives a summary of the findings

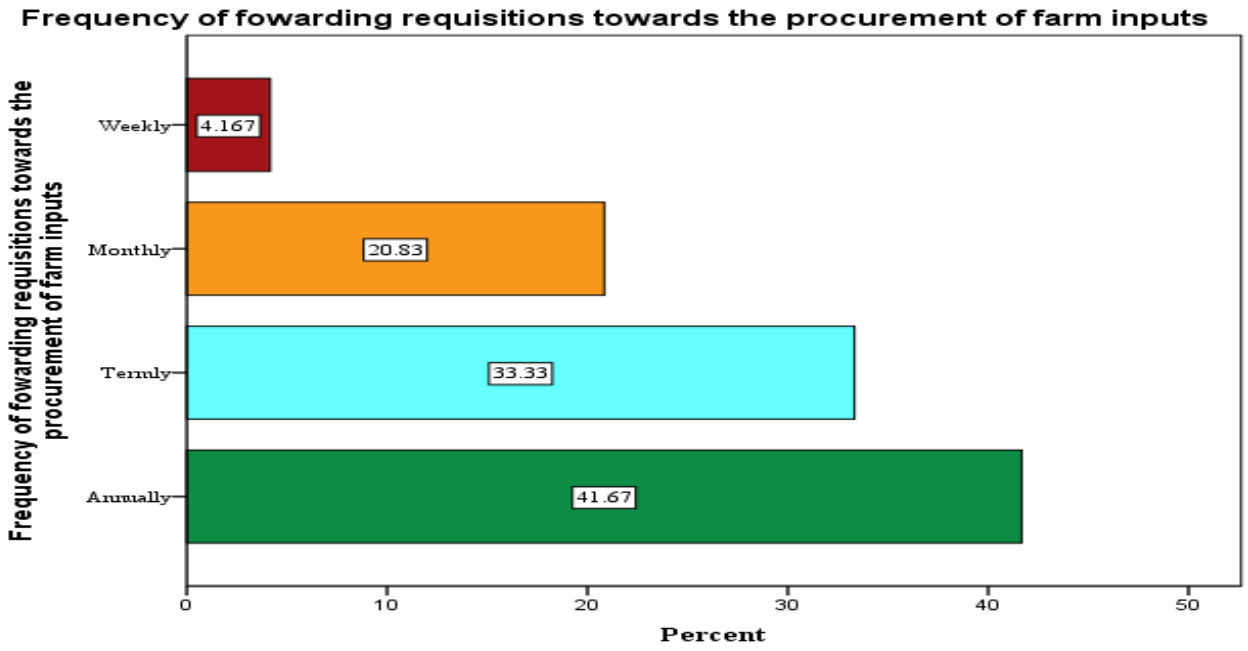

Figure 2: *Frequency of Requisitions towards the Procurement of Farm Inputs*

These findings portray a bleak image as far as the practical implementation of the Agriculture subject curriculum is concerned. According to KIE (2006) specifications, Agriculture students need to be exposed to practical activities on the school farm on a weekly basis. With majority of the respondents (41.67%) indicating that farm inputs are procured on an annual basis, it is most likely that students engage in project activities on a weekly basis as recommended by the KIE.

The researcher further sought to determine the specific types of inputs that schools procured. The respondents were therefore requested to indicate the inputs that were mostly procured. The findings are presented in Figure 3.

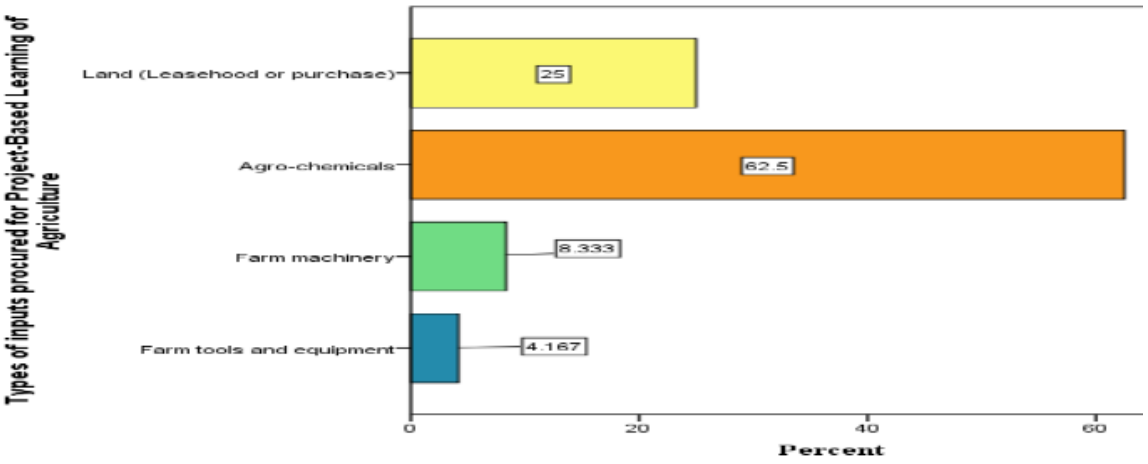

Figure 3: *Variations in the Procurement of Various Farm Inputs*

Agro-chemicals were rated to be the highest procured farm inputs while farm tools and equipment were the least procured inputs. Farm tools and equipment as well as farm machinery are very crucial in the implementation of practical aspects of Agriculture. For active participation of students in project activities on the school farm, students should have maximum interaction with farm tools such as *jembes*, mattocks, wheelbarrows, *pangas*, watering cans and many more others. In fact, in the form one Agriculture syllabus, the topic on farm tools and equipment has been extensively discussed with students expected to identify and make use of the tools under discussion (Kahuria, Otieno, Wachira, Muggah, & Njagi, 2018). With such low level of procurement of farm tools, it is more likely that the topic on farm tools and equipment is hardly implemented practically. These findings resonate with those from Noordin (2018) which established that inadequacy of farm tools impedes the hands-on teaching of Agriculture in schools.

In an effort to document the approximate expenditure towards various farm inputs, the principals were requested to indicate the approximate amount of money in Kenyan shillings spend on the procurement of farm puts on an annual basis. The summary of the findings is presented in Table 5.

Table 5: *Approximate Annual Expenditure in Kenyan Shillings towards Procurement of Farm Inputs*

Type of input	Minimum	Maximum	Average
Agro-chemicals	800	5,500	2,400
Farm tools	1,500	6,000	3,800
Farm machinery	0	150,000	52,300
Land (Leasehold or purchase)	0	730,000	140,000
Total	**2,300**	**891,500**	**198,500**

Land and farm machinery were the costliest farm inputs with an average annual expenditure of 140,000 and 52,300 Kenyan shillings respectively. Currently, one United States Dollar (USD) is equivalent to 130.61 Kenyan shillings. The total annual expenditure on land was therefore approximately 1,071.893 USD while that on farm machinery was approximately 326.243 USD. It was however quite sardonic that the total combined expenditure on agro-chemicals and farm tools was approximately 47.47 USD. The high cost in land prices can be attributed to the rapid increase in human population which has consequently resulted to the scarcity of land. With the continuous student enrolment, school managements have no option but to secure extra land for setting up buildings, playgrounds and school farms (Schreinemachers et al., 2019). A study by Recha et al. (2024) established that the community plays a very fundamental role in the practical implementation of school Agriculture through providing land to the school either through leasehold or as a donation and therefore this necessitates a good rapport between the school and the surrounding community. The zero expenditure on land in some of the schools substantiates the evidence that the land may have been donated by the community.

To decipher the level of adequacy of finance resource allocated towards project work on the school farm, it was first imperative to establish the student enrolment in Agriculture. Being an optional subject, only students at the form three and four levels have already done subject selection. A study by Onganga et al. (2016) established that subject selection exercise varies from school to school, with some schools carrying out the exercise at form one while others at form two. Class sizes always tend to be largest at the form one and two levels prior to the subject selection exercise as established by Waiganjo (2021) in Nakuru County. From the findings, the minimum enrolment was 432 students, maximum enrolment was 1523 with an average of 830 students. With respect to the student enrolment in Agriculture, the respondents were asked to rate the level of annual expenditure on farm inputs towards project based learning of Agriculture. Figure 4 gives a summary of the findings.

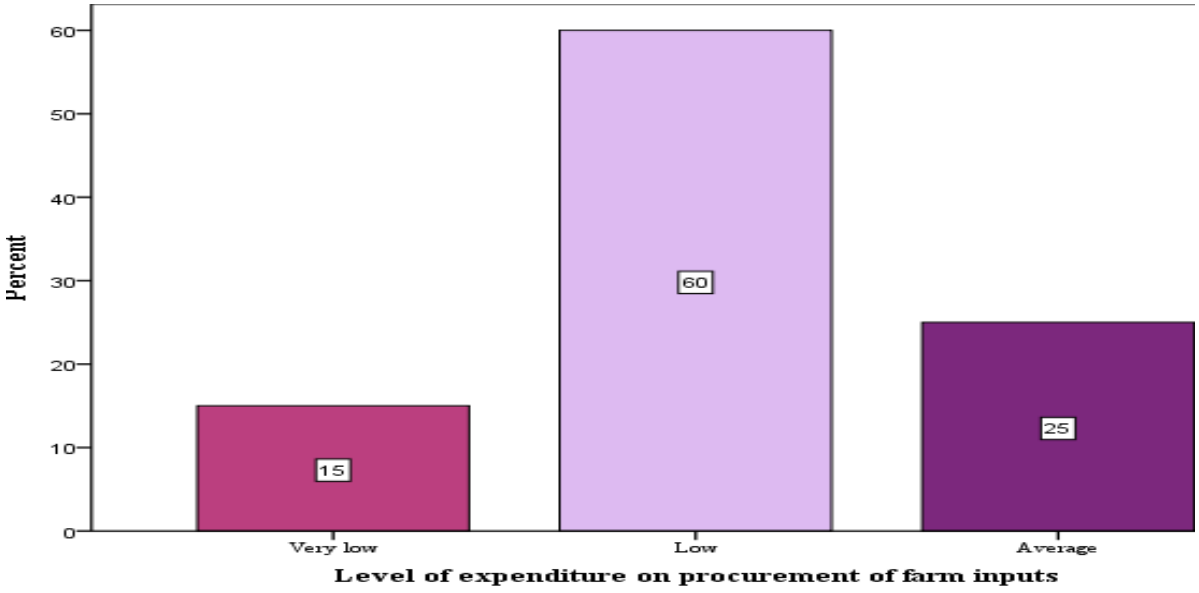

Figure 4: *Level of expenditure on procurement of farm inputs*

Based on the findings, majority of the respondents (60%) reported that the expenditure towards farm inputs was low with another 15% reporting very low expenditure. Such low levels of expenditure on farm inputs points out to the inefficiency in schools in schools with respect to implementation of practical aspects of Agriculture. These findings resonate with those from Wakoli and Kitainge (2019) which established that the main cause of inefficiency in school operations emanates from inappropriate allocation of funds.

To determine the relationship between the independent variable (Level of finance resource allocated towards procurement of farm inputs) and the dependent variable (Implementation of the Agriculture curriculum using Project-Based Learning), chi-square test of relationship was employed. The findings have been summarized in Table 6

Table 6: *Relationship between Level of Adequacy of Finance Resource Allocated towards Procurement of Farm Inputs and the use of Project-Based Learning*

Scale	Value	Df	p-value
Pearson Chi-Square	8.832	3	.39
N	44		

With the chi-square value being less than 0.5, the null hypothesis which stated that there was no statistically significant relationship between level of adequacy of finance resource allocated towards the procurement of farm inputs on the school farm and the use of Project-Based Learning in the implementation of Agriculture curriculum was rejected in favor of the alternative hypothesis.

The third objective sought to establish the relationship between the level of adequacy of finance resource allocated towards maintenance operations on the school farm and the implementation of the Agriculture curriculum using project-based learning. According to Karani et al. (2021), the school farm which is the main avenue for PBL does not exist in isolation but rather is made up of various accompanying structures and facilities. Operations on the school farm mainly revolve around livestock rearing and crop production activities which according to Mugambi et al. (2022) requires high levels of management and financial investment. In crop production such activities include; Land preparation, weed, pest and disease control. In livestock production, they include; routine management practices such as feeding, pest and disease control. To establish the annual expenditure towards these maintenance operations, the principals were asked to give the approximate annual expenditure towards the various operations. The findings were summarized in Table 7.

Table 7: *Approximate Annual Expenditure in Kenyan Shillings towards Maintenance Operations on the School Farm*

Maintenance operation	Minimum	Maximum	Average
Weed control	0	4,500	2,350
Parasite control	0	3,800	2,500
Repair of farm structures	0	30,000	3,800
Irrigation	0	0	0
Pest control	0	4,500	3,500
Land preparation	0	8,500	3,700
Remuneration of farm manager	0	10,000	5,000
Total	**0**	**61,300**	**20,850**

The average annual expenditure towards maintenance operations on the school farm was 20,850 Kenyan shillings which translated to approximately 160 USD. There was zero expenditure on irrigation operation. This can be attributed to the fact that Kakamega North-Sub County receives well distributed rainfall as established by Kinyangi (2014). All these maintenance operations have been discussed in the secondary school Agriculture curriculum with learners expected to carry them out practically. Based on the observation guide, 70 % of the schools had dilapidated farm structures characterized by leaking roofs which is deemed unsuitable for housing livestock. An operational school farm should have a farm manager just as it is the case of a laboratory technician in a school laboratory. Farm managers make plans, execute them and bear the risks or consequences which such plans entail (Kahuria et al., 2018). It worth noting that during school holidays when both teachers and learners are away from school, the management of the projects on the school farm is entirely dependent on the farm manager. Zero expenditure towards remuneration of a farm manager in some of the schools is a clear indicator the non-existence of projects especially during school holidays. When asked to rate the annual expenditure on maintenance operations within the school farm, majority of the respondents reported the expenditure to be very low, 30% reported low while only 10% rated the expenditure to be average. To decipher the relationship between the independent variable (level of finance resource allocated towards maintenance operations on the school farm) and the dependent variable (implementation of the Agriculture curriculum by use of PBL), chi-square test of relationship was used. The findings are summarized in Table 8.

Table 8: *Relationship between Level of Adequacy of Finance Resource Allocated towards Maintenance Operations on the School Farm and the use of Project-Based Learning*

Scale	Value	Df	p-value
Pearson Chi-Square	12.931	4	.41
N	44		

Based on the findings, p<0.5 and for this reason, the null hypothesis was rejected in favor of the alternative hypothesis which states that there is a significant relationship between level of adequacy of finance resource allocated towards maintenance operations on the school farm and the implementation of Agriculture curriculum using PBL. These findings are in line with those from Konyango and Mutisya (2017) which established that implementation of Agriculture for skill acquisition can only be achieved when adequate finance resources are availed through the government, donor agencies and other well-wishers as it was the case during the 1959-1984 period.

This was the dependent variable and was measured in terms of Agriculture Students' level of involvement in project work on the school farm. Teachers of Agriculture were deemed to be the most suitable respondents towards this variable since by virtue of being the curriculum implementers, they have a better understanding of matters pertaining to the use of PBL in the implementation of the Agriculture curriculum. The respondents were asked to indicate by ticking yes in case they made use of PBL during teaching of Agriculture. Figure 6 presents the summary of the results.

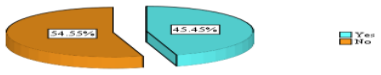

Figure 6: *Use of Project-Based Learning in the Implementation of Agriculture curriculum.*

Based on the findings in Figure 6, majority of the teachers do not make use of PBL in the implementation of Agriculture curriculum. Njura et al. (2020) affirms that the frequent use of learner-centered approaches in the teaching of Agriculture is the main contributing factor towards the escalating youth unemployment and food security in Kenya. The 45.45% respondents who had indicated to be using PBL were requested to indicate how frequently their learners were involved in project activities on the school farm. From the findings, the majority (63.64%) reported that their learners get involved in project work once per year, 15.91% reported once in a term, 11.36% reported once in a month and 9.091% reported once in a week. It was quite ironical that majority of the learners get involved in PBL once in a year despite the syllabus recommending various practical activities at the end of each topic studied.

To measure students' level of involvement in project work, a rating scale was developed by the scholar whereby, any score ranging from 1-2.4 was rated as low, 2.5-3.9 was average while 4.0-5.4 was high. The results were analyzed and presented in Table 9.

Table 9: *Frequency of students' involvement in project work*

	N	Minimum	Maximum	Mean	Std. Deviation
Frequency of learners' access to the school farm for project work	44	1.00	5.00	2.3182	1.25333
Valid N (listwise)	44				

As evident from Table 9, students' level of access to the school farm in Kakamega North was rated as low. This could be attributed to lack of enough time in regular lesson timetable allocated for teaching agriculture subject. In addition, this study noted that most secondary schools in Kenya lack extra land for setting the school farm and therefore learners in such schools may not have access to the school farm. Similar observation was made by Kyule (2017).

4. Conclusions and Recommendations

Based on findings, this study concluded that;

i. The Level of finance resource allocated towards the establishment and maintenance of Agriculture projects in secondary schools in Kenya was low which impedes practical implementation of Agriculture curriculum using project-based method.
ii. The Level of finance resource allocated towards the procurement of farm inputs in Kenyan secondary schools is low which impedes practical implementation of Agriculture curriculum using project-based method
iii. Majority of schools had no active enterprises in either crop or livestock production. This completely violates the objective of teaching Agriculture in secondary schools for skill acquisition.
iv. The status of projects in majority of the schools where they existed was very poor due to inadequacy of finance. Such dilapidated and outdated farm projects may not be convenient for practical implementation of the Agriculture curriculum.

This study therefore recommended that;

i. The Government of Kenya through the Ministry of Education should allocate enough finance resources to schools for use in procurement of farm inputs, establishment and maintenance of agriculture projects.
ii. The Kenyan government should train school principals through such sessions like conferences and seminars on financial management so as to equip them with financial management skills that will reduce on incidences of misappropriation of funds.
iii. Principals and the teachers of Agriculture should understand the importance of project based learning in Agriculture with regard to skill acquisition thus should allocate adequate finances for facilitating the practical implementation of the subject
iv. Teachers of Agriculture as the curriculum implementers should adhere to the Agriculture curriculum guidelines of implementing the practical aspects of the subject by setting up projects on the school farm and maintaining them.

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Declaration of Conflicting Interests and Ethics

The authors declare no conflict of interest.

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