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BRIDGING THE GAP BETWEEN CLASSROOM AND FARM: EFFECTIVENESS OF SCHOOL FARMS IN SENIOR HIGH SCHOOLS IN THE EASTERN REGION OF GHANA

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ABSTRACT
The Senior High School (SHS) Agricultural Science curriculum in Ghana requires the inclusion of School farms. However, their effectiveness in linking theory instruction and farm skills is not yet fully assessed on the ground, especially on a regional level. The study looks at the effectiveness of School Farms in the 8 purposively selected Senior High Schools (SHS) in the 4 study districts of the Eastern Region of Ghana namely, New Juaben Municipal, Birim Central Municipal, Nsawam-Adoagyiri Municipal and Kwaebibirem District. This study utilized a descriptive survey design, concurrent mixed methods approach with the validated five point likert scale questionnaires and semi-structured interviews with 200 students, 30 agriculture science teachers and 12 school administrators. Both quantitative and qualitative data were analysed with descriptive statistics and thematic analysis, respectively, was performed on the interview data. The results show that school farms are generally effective in providing practical skills on crop cultivation (M = 4.24, SD = 0.61), connecting classroom farming knowledge to farm practice (M = 4.13, SD = 0.69) but not very successful in agribusiness training (M = 3.18) and post harvest handling (M = 3.09). The factors that hinder the farming are poor farm implements (81%), lack of qualified teachers (75%), and lack of suitable land (67%). The study recommends that a budgetary allocation be made to targeted areas of study, school–community farm partnerships be enhanced, and curriculum change be undertaken to include agribusiness modules. Findings add to the increasing body of evidence in support of the need for agricultural education policy reform in Ghana and similar sub-Saharan African settings.

KEYWORDS: Agricultural Education, School Farm, Senior High School, Eastern Region, and Practical Skills.

INTRODUCTION

Agriculture continues to play a key role in the socioeconomic landscape of Ghana, accounting for around 20% of the country's gross domestic product (GDP), and employing almost 44% of the national labour force (Ghana Statistical Service [GSS], 2023). Despite its structural centrality, the agriculture sector is still facing serious productivity problems, partly due to a lack of practical training for the agricultural workforce. The Senior high school (SHS) level is a key point in Ghana's pre-tertiary education system where a nation's future farm practitioners may be prepared or not for formal agricultural education. School farms are required to fill this important gap between theory and practice.

The Ghana Education Service (GES, 2022) mandates that all SHSs that teach Agricultural Science have functional farm plots as part of the practical curriculum. The rationale for this directive is that good agricultural education cannot be delivered in the classroom, but needs to be supported by appropriate and supervised agricultural experience on the farm. However, with the increasing body of evidence from the national WASSCE performance evaluation reports and reports from the GES inspectors, a serious underperformance in the practical aspects of agricultural science assessments appear to be a problem that may be related to the inadequate operationalization of school farms.

The Eastern Region in Ghana is a very instructive case in which such a study could be conducted. The region's economy is largely agrarian, and its cocoa, oil palm, maize, cassava, and citrus farming will determine its economic future, depending on the quality of agriculture knowledge and skills acquired in the educational institutions (Eastern Regional Coordinating Council [ERCC] 2022). There are a significant number of SHSs located in the region, some of which are in the peri-urban and rural areas where school farm activities could have a great impact on the farming activities within the community. Notwithstanding this background, there is no empirical study of the effectiveness of school farms in the Eastern Region in general.

The study aimed to fill this void by examining the perceived effectiveness of school farms in some selected Eastern Region SHSs, as well as the challenges faced and the recommendations that could be evidence-based. The research has three specific objectives namely,

i. to establish the perception of the students and teachers of the effectiveness of school farm in cultivating agricultural competencies,
ii. to find out the major challenges facing school farm in the Eastern region and the entire country of Ghana, and

iii. to make policy and curriculum recommendations for enhancing the outcomes of school farm in the Eastern region and Ghana in general.

2. LITERATURE REVIEW

2.1 Theoretical Framework

The study is based on three complementary theories that come together to describe school farms as effective learning environments. First, the theory of "Experiential Learning" [ELT] proposed by Kolb will be used as a basis. Kolb (1984) portrays learning as a four-part cyclical process involving concrete experience, reflective observation, abstract conceptualisation and active experimentation. This cycle is built into the activities of the school farm and can be seen in the following sequence: students plant crops (concrete experience); the students observe the growth and make notes on the results (reflective observation); the students relate their observations with concepts they have learned in the classroom (abstract conceptualisation); the students use their new understanding to make future revisions to the crops they plant (active experimentation). This way, the farm becomes a self-reinforcing learning space.

Second, Bandura (1977) provided an alternative where he put forward the Social Learning Theory, which focuses on observation learning and modelling during skill acquisition. Students learn practical skills in school farm partly through observation and simulation in farm by experienced agricultural teachers, peer and community farmers. Relevant too are the motivational aspects of Bandura's theory, especially the concept of self-efficacy: As students finish their farm tasks, they build self-confidence in agricultural skills which helps to maintain engagement and motivation.

Third, Vygotsky's (1978) Zone of Proximal Development (ZPD) has a strong emphasis on scaffolding. At the school farm it means that teachers will take students one step further than they can do on their own, gradually fading out to allow students to master it on their own. These three frameworks collectively shape the conceptual framework explored for the study, which is discussed in Section 4.

2.2 School Farms in International Agricultural Education

There is a wide range of international experience and research on farm-based learning. Supervised Agricultural Experiences (SAEs) and school-based enterprise models have been a part of secondary school Agricultural Education programmes for many years in the United States and research has consistently shown that these opportunities positively influence students' career intentions, engagement, and skills in agriculture (Ricketts & Ricketts, 2018; Roberts & Ball, 2009). Beyond the knowledge of agriculture, Croom (2008) claimed that school farm activities also help to cultivate critical thinking, problem solving and entrepreneurial orientations.

School gardens and farm to classroom programmes in Europe have shown positive impact on food literacy, environment awareness and engagement in STEM among secondary school students in the United Kingdom, Germany, and Holland (Ozer, 2007; Sabiha et al., 2021). These programs are not the same as the model of education in Ghana where emphasis is placed on agriculture production instead of peri-urban and food systems education, but they share the pedagogical principle of integrating the formal learning process in real agricultural environments.

School farms have a more prominent place in the secondary agricultural science curriculum in Africa. In Nigeria, the school farms participation was found to significantly predict the students' practical score in the West African Senior School Certificate Examination (WASSCE) (Ugwoke et al., 2019). Mwangi and Kariuki (2021) found that there was an average difference of 18% between schools with functional well-resourced farms and those with non-functional farms in Practical agricultural examination scores in Kenya. Siewe et al. (2018) found in a regional study covering the three countries, Cameroon, Côte d'Ivoire and Ghana, that being engaged in farming significantly predicted agricultural career aspirations. Common structural factors, funding, staffing and equipment, however, tempered these effects.

2.3 School Farms in the Ghanaian Context

In Ghana, Asante and Appiah (2018) analysed the school farm's contribution to practical knowledge in the Brong-Ahafo Region and found that while the school farm has contributed significantly in crop production skills, education and training on agribusiness and value addition had remained weak. Oppong-Mensah et al. (2020) undertook a survey of agriculture teachers in Greater Accra Region with a view to understanding the state of school farm infrastructure and the associated problems. They noted that there was a general lack of satisfaction with the condition of agriculture school farms with reference to the availability of modern farm tools and irrigation facilities. Adomako and Boateng (2021) conducted a study in school farms in the Northern Region and found that funding constraints and lack of specialist teachers were the most common challenges facing the effectiveness of school farms.

Although there is now a literature on the subject of school farms in the region, there is no study that has specifically focused on examining the effectiveness of school farms in the Eastern Region of Ghana. This region has a mainly agrarian economy and a variety of agroecological conditions, which makes it an ideal case region to study. This study seeks to fill that void and help build the body of knowledge to help develop a more geographically holistic picture of the school farm's effectiveness in Ghana.

3. METHODOLOGY

3.1 Research Design

This study used a descriptive survey design in a concurrent mixed methodology (Creswell & Creswell, 2018). Both quantitative and qualitative data were collected at the same time and the results were triangulated and mutually validated across data streams. The quantitative approach is based on the positivist tradition, and the qualitative approach on

interpretivism, as is consistent with the pragmatist philosophy which emphasizes the research question rather than epistemological purity (Tashakkori & Teddlie, 2010).

3.2 Study Area

The study was carried out in the Eastern Region of Ghana, an important agricultural area of the nation, which is renowned for cocoa, cassava, maize, oil palm, and citrus fruits production, and one of the sixteen administrative regions of Ghana. It's an area of about 19,323 km2 with a population of about 2.9 million, of which a large percentage is involved in agriculture (GSS, 2021). Four districts were purposefully selected, namely New Juaben Municipal (urban-peri-urban), Birim Central Municipal (peri-urban-rural), Nsawam-Adoagyiri Municipal (transitional) and Kwaebibirem District (predominantly rural), representing the agroecological and socioeconomic diversity of the region. Overall these districts represent the forest and transition zones of agroecological regions in the area.

3.3 Population and Sampling

The target population included all SHS students offered Agriculture as an elective, all Agriculture Science teachers and Agriculture Science school administrators in the four selected districts. Multi stage sampling technique was used. In the first stage, the two SHSs per district with school farm and Agriculture Science in the senior secondary level were purposively selected resulting to the selection of 8 SHSs. The second stage involved simple random sampling of 200 students (that is about 25 students from each programme) from the Agriculture, General Science and the Home Economics programmes. The Agriculture teachers and the 12 school administrators were identified using purposive sampling in the study. The demographic make-up of the student sample is described in Table 1.

Table 1. Demographic Profile of Student Respondents (n = 200)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	136	68.0
	Female	64	32.0
Year Group	Year 1	68	34.0
	Year 2	66	33.0
	Year 3	66	33.0
Programme	Agriculture	98	49.0
	General Science	62	31.0
	Home Economics	40	20.0
District	Koforidua/New Juaben	60	30.0
	Akim Oda (Birim Central)	52	26.0
	Nsawam-Adoagyiri	48	24.0
	Kade (Kwaebibirem)	40	20.0
Total		200	100.0

Note. Source: Field Survey (2025). Four districts of the Eastern Region of Ghana.

3.4 Research Instruments

The main method of data collection used was a structured questionnaire with three sections. The information on the demographics of the respondents was collected in section A. A 20 item, 5-point Likert type scale instrument measuring 8 dimensions of school farm effectiveness was used in Section B. (Strongly Disagree = 1; Strongly Agree = 5). The challenges were listed in Section C. The questionnaire was adapted from the existing questionnaires used by Asante and Appiah (2018), Ugwoke et al. (2019) and Mwangi and Kariuki (2021) with some modifications to suit the context for the Eastern Region. Content was found to be valid based on the opinions of three lecturers of Agricultural Education and Measurement at UEW. For the pilot study, 25 students from two schools not in the sample were used to obtain a Cronbach's alpha of $\alpha = 0.86$, which is high. Semi-structured interviews were also conducted with 10 purposively selected teachers and eight administrators, and were recorded and conducted in English with participants' consent, and lasted for 30–45 minutes each.

3.5 Data Collection Procedure

Data collection took place between June and September 2025. Research assistants trained by the principal investigator administered questionnaires at each school, with written permission from the GES Eastern Regional Directorate and informed consent from participants. Interviews were conducted individually, audio-recorded, transcribed verbatim, and member-checked by participants.

3.6 Data Analysis

Quantitative data were analysed using IBM SPSS Statistics (Version 27). Descriptive statistics, including means and standard deviations, were computed for all Likert-scale items. Mean scores were interpreted using a decision rule adapted from Asante and Appiah (2018): 4.50–5.00 = Very Effective; 3.50–4.49 = Effective; 2.50–3.49 = Moderately Effective; 1.50–2.49 = Ineffective; 1.00–1.49 = Very Ineffective. Qualitative data were subjected to reflexive thematic analysis following the six-phase approach of Braun and Clarke (2006), encompassing familiarisation, code generation, theme

development, review, definition, and reporting. Illustrative participant quotations are presented verbatim throughout the results section.

4. CONCEPTUAL FRAMEWORK

The study adapts an Input-Process-Outcome (IPO) framework, originally proposed by Scheerens (2000) for educational effectiveness research, and contextualises it to the school farm environment of the Eastern Region. As depicted in Figure 1, the effectiveness of school farms is conceptualised as a product of the quality and adequacy of inputs feeding into instructional processes, with moderating constraints acting at multiple points along the chain. This framework guided instrument design, data collection, and the interpretation of findings.

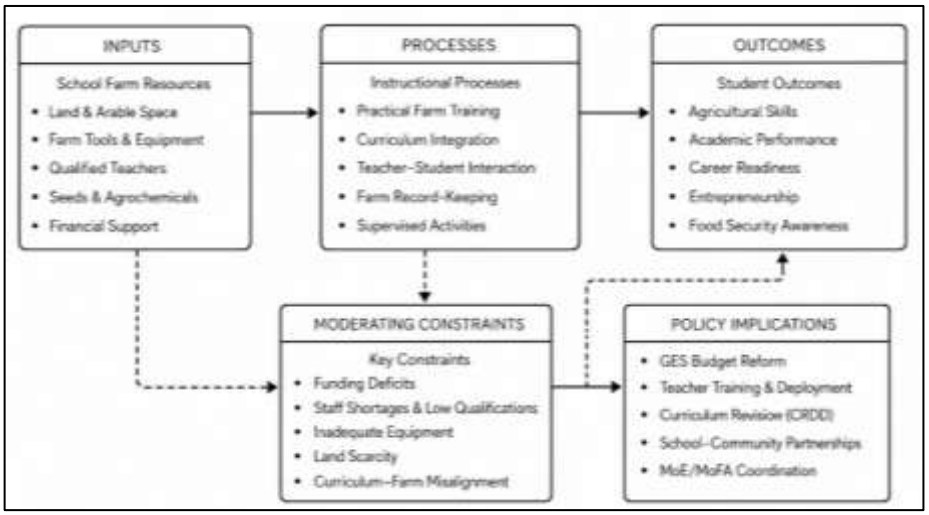

Figure 1. Conceptual Framework for School Farm Effectiveness in Eastern Region SHSs

Note. Adapted from Scheerens (2000) And Contextualised by the Authors (2025). GES = Ghana Education Service; MoE = Ministry of Education.

The capacity of school farm resources (land, tools, seeds, teacher and financial resources) is the principal input that initiates the educational process that is the core of the framework. The inputs to the instructional process are delivered during practical training, the various activities of the farm that are associated with the curriculum and teacher–student interactions on farm. They shape and influence the nature and extent of outcomes that students can attain such as agricultural literacy, academic success, career preparedness, and food security awareness. Several factors may affect the input-process-output sequence, such as funding constraints, staffing constraints, equipment constraints, and curriculum differences that can affect the overall effectiveness.

5. RESULTS AND DISCUSSION

5.1 Perceived Effectiveness Of School Farms

Table 2 presents the mean scores, standard deviations, and effectiveness interpretations for each of the eight school farm effectiveness indicators, as rated by student and teacher respondents combined.

Table 2. Perceived Effectiveness of School Farms Across Eight Indicators (n = 230)

Effectiveness Indicator	Mean	SD	Rank	Interpretation
Practical crop cultivation skills gained	4.24	0.61	1	Very Effective
Linking classroom theory to farm practice	4.13	0.69	2	Very Effective
Motivation and interest in agriculture	4.01	0.74	3	Effective
Understanding of soil science concepts	3.90	0.81	4	Effective
Animal husbandry knowledge	3.67	0.88	5	Effective
Farm record-keeping and documentation	3.41	0.97	6	Moderately Effective
Agribusiness and entrepreneurship awareness	3.18	1.04	7	Moderately Effective
Post-harvest handling and processing	3.09	1.10	8	Moderately Effective
Overall Mean	3.83	0.86	—	Effective

Note. Scale: 4.50–5.00 = Very Effective; 3.50–4.49 = Effective; 2.50–3.49 = Moderately Effective. Source: Field Survey (2025).

The overall mean effectiveness score of 3.83 (SD = 0.86) is within the ‘Effective' band, meaning that the respondents from the Eastern Region consider their school farms as effective learning environments. This could be attributed to the studies

by Asante and Appiah (2018) and Ugwoke et al. (2019) and their findings of moderate – high effectiveness ratings for school farm activities in similar secondary school setting in Brong-Ahafo Region and Nigeria respectively.

Practical crop cultivation skills gained (M = 4.24, SD = 0.61) was the highest rated indicator, in the 'Very Effective' band. This result confirms that Eastern Region school farms are most effective in the main objective of hands-on crop production competencies. The activities students engaged in routinely under teacher supervision included the cultivation of maize, cassava, plantain and vegetables (secondary activities). One student in Year 3 (Agriculture) commented,

"I have learned more about planting and weeding on the school farm in three terms than I could have from reading alone. We actually do it ourselves."

The second ranked indicator which is "connecting classroom theory to farm practice" (M = 4.13, SD = 0.69) also supports the contextualisation role of school farms. In the Birim Central and Kwaebibirem Districts, teachers interviewed reported the use of purposeful lessons in which the topics of soil pH, nutrient needs of the crops and pest management were immediately followed with a trip to the farming field where the theoretical material was confirmed or contradicted. As one of the Senior Agriculture Teachers in Kwaebibirem said:

'When we teach about nitrogen fixation, I take the students to the farm immediately after, show them the root nodules of the cowpea plants, and let them connect the theory with what they are seeing. That is when real understanding happens.'

On the other hand, the two lowest rated indicators, agribusiness and entrepreneurship awareness (M = 3.18) and post-harvest handling and processing (M = 3.09) both were within the 'Moderately Effective' range, indicating huge gaps in the value-chain components of agricultural training. The results of these findings are especially alarming in the backdrop of the Government's Planting for Food and Jobs (PFJ) campaign and the overall goal of establishing viable agricultural business among the youths. The Nsawam-Adoagyiri District's school administrator said:

"The school farm stops at the point of harvest. We have never systematically sold produce, nor have we taught students how to price their output or access markets. The curriculum does not push us that far."

This gap in agribusiness education risks producing graduates who are technically proficient in production but unprepared for the commercial realities of modern farming.

5.2 Challenges Confronting School Farm Operations

Table 3 summarises the principal challenges identified by respondents, ranked by frequency of mention and severity rating.

Table 3. Challenges Confronting School Farm Effectiveness in Eastern Region SHSs (n = 200)

Challenge	Frequency (n)	% (n=200)	Severity Rating
Inadequate farm tools and equipment	162	81.0	Very High
Insufficient qualified agriculture teachers	150	75.0	Very High
Limited farm land in the school premises	134	67.0	High
Irregular government funding and support	120	60.0	High
Students' negative attitudes to farm work	112	56.0	High
Poor school farm management practices	100	50.0	Moderate
Lack of irrigation and water supply	94	47.0	Moderate
Curriculum-farm activity alignment gaps	86	43.0	Moderate

Note. Multiple responses permitted. Percentages calculated on total student respondents (n = 200). Source: Field Survey (2025).

Lack of adequate tools and equipment on the farms was the most widespread problem mentioned by 162 respondents (81%). This is consistent with previous studies by Oppong-Mensah et al. (2020) and Adomako and Boateng (2021), who reported that equipment deficiency is a structural, cross-regional challenge in the SHS school farm system in Ghana. However, during interviews in the Kwaebibirem District, it was found that in some schools, the new farm equipments from the GES had not been received since 2019. The use of household items by teachers and asking the students to provide their own tools were reported by teachers as being not standardised and would not lead to equal opportunities in instruction.

Insufficient qualified agricultural science teachers, reported by 75% of the respondents, is a reported human resource problem in Ghana's education system. The non-specialist teachers have not undergone tertiary level training in agricultural science, according to the records of the GES Eastern Regional Directorate (2022), which shows about 35% of the Agriculture teachers in the four sampled districts have not been trained at tertiary level in agricultural science. This mismatch has direct impact on the quality of farm supervision, where teachers who are not farmers are less likely to be able to deliver accurate, up-to-date and evidence-based teaching during the farm sessions.

The availability of limited farm land was particularly noted in schools in the urban and peri-urban areas of Nsawam-Adoagyiri and New Juaben as the school expands, new blocks are built and communities encroaches the school land ceasing farm activities. In some instances, the entire farm field was being used for building sites, or car parking areas, with no compensatory land made available. At Nsawam, one of the agriculture teachers said:

"Our farm was reduced from two acres to half an acre when the new dormitory was built. We now have barely enough space to run meaningful demonstrations for all students."

The negative attitudes of students towards farm activities reported by 56% of the respondents was noted as a socio-cultural constraint. It was found that this attitude was more strongly expressed amongst students from urban backgrounds and students enrolled in General Science programmes, with manual farm labour being linked to social immobility. A finding

that aligns with the attitude issue documented by Siewe et al. (2018) in West Africa, which noted that the social stigma on farming in post-colonial educational cultures is a major challenge for delivering agricultural education.

5.3 Discussion: Implications for Agricultural Education Policy

This study provides a complex picture of the effectiveness of schools' farms in the Eastern Region, Ghana. On the other hand, schools are succeeding in their primary goal of fostering practical crop production skills and bridging theory to reality.The school farms are working towards their original purpose of imparting practical crop production skills and contextualising theory in the classroom, and are doing so on both sides. At the same time, they are very deficient in the agribusiness and post-harvest aspects of agricultural training, as well as value chains. This gap is not only pedagogical, but pedagogical in structure, arising from the design of curriculum not reflecting the commercial and entrepreneurial aspect of modern Ghanaian agriculture.

The issues that have been identified, including lack of adequate equipment, lack of qualified teachers, lack of suitable land, and funds irregularity, indicate that under-investment at the system level is affecting the ability of school farms to be effective in the Eastern Region and not a lack of the intrinsic effectiveness of the school farm model. The diagnosis clearly identifies the need for targeted policy measures at the national and regional level.

6. Recommendations

Drawing on the quantitative findings, qualitative insights, and the study's conceptual framework, the following recommendations are proposed for key stakeholders in Ghana's agricultural education system. Table 4 summarises these recommendations by responsible party and time frame.

Table 4. Evidence-Based Recommendations for Improving School Farm Effectiveness

#	Recommendation	Responsible Party	Time Frame
1	Increase budgetary allocation to school farms	GES / MoE	Short-term (1–2 yrs)
2	Deploy qualified agriculture science teachers to under-served schools	Ghana Education Service	Short-term
3	Establish school–community farm partnership programmes	School Authorities / District Assemblies	Medium-term (2–3 yrs)
4	Integrate agribusiness and entrepreneurship into the school farm curriculum	CRDD / WAEC	Medium-term
5	Install boreholes and drip irrigation facilities in all study schools	District Water Authority / GWCL	Medium-term
6	Develop a school farm supervision and evaluation framework	GES Inspectorate Division	Long-term (3–5 yrs)
7	Link SHS school farm outputs to national food security and Planting for Food and Jobs programme	MoFA / MoE	Long-term

Note. GES = Ghana Education Service; MoE = Ministry of Education; CRDD = Curriculum Research and Development Division; WAEC = West African Examinations Council; GWCL = Ghana Water Company Limited; MoFA = Ministry of Food and Agriculture. Source: Authors' Recommendations (2025).

The most pressing is the need to allocate more budgets for school farms. Most of the SHSs in the Eastern region currently collect most of the necessary finances for running farms from the Parent-Teacher Association (PTA) levies, which are not equally distributed across the schools located in rich and poor farm communities. A school farm sub-fund (based on the school enrolment size and farm acreage) within the GES Annual Composite Budget will offer a more equitable and sustainable financing model. Concurrently, the recruitment of competent Agriculture Science teachers to poorly resourced schools, especially in rural areas like Kwaebibirem, is vital to help improve the quality of teaching and learning in agriculture.

Perhaps the most important change required is the adoption of agribusiness/entrepreneurship modules in the school farm curriculum. The CRDD, together with the West African Examinations Council (WAEC) and private sector agribusiness groups should design modules for practical activities in agribusiness farm businesses which involve planning, budgeting, production, harvest, processing and marketing of agribusiness farm outputs in a simulated agribusiness environment. Consideration could be given to the use of digital tools like mobile based farm record keeping applications to embed the students' entrepreneurial learning in the fast-changing digital farm environment in Ghana.

7. CONCLUSION

The study has presented comprehensive empirical evidence of the general effectiveness of school farm in the development of core competencies in the Eastern Region of Ghana in particular in the Senior High Schools. The training of agribusinesses, post-harvest handling and farm record keeping, however, do not have a significant effectiveness gap, which are areas critical to the production of commercially viable agricultural graduates who can meaningfully contribute to Ghana's agricultural development agenda.

The study result shows that the major structural problems limiting the effectiveness of the school farms are equipment inadequacy, inadequacy of teacher's qualifications, scarcity of land and irregularity of funding. These are not specific to the Eastern Region but are general issues in the Ghanaian SHS agricultural education system. The model of Input-Process-Outcome used in this study helps illuminate the location within the educational value chain where these constraints have their greatest effect and the design of interventions to address them.

Long-term impacts of school farm involvement on students' agricultural career paths and earnings should be explored in future studies. The ability to make causal inferences about the effectiveness of specific farm-based interventions would be enhanced by studies using quasi-experimental or experimental designs. Policy-relevant insights could also be drawn from comparative research for each of the sixteen regions in Ghana or within the ECOWAS sub-region of the continent.

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