

Advancing Professional Development Among Secondary Agricultural Education Teachers in Uganda

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Abstract

In 2020, Uganda's Ministry of Education and Sports implemented a Competence-Based Curriculum (CBC) for lower secondary education to equip students with practical skills for the 21st century. Despite its potential for socio-economic transformation, past research revealed that many Ugandan secondary agricultural education teachers lack the necessary pedagogical skills to successfully implement this curriculum and seldom participate in Continuous Professional Development (CPD) programs during their teaching careers. We sought to identify the CPD programs in which these teachers engage, assess their perceptions of available CPD programs in Uganda, determine their professional needs, and recommend strategies for providing high-quality CPD training. This mixed-methods study involved 52 participants, with 88% of the male majority having a bachelor's degree in agricultural education and an average of 3.7 years of teaching experience. Most participants attended 3 to 4 CPD trainings in an academic year and indicated the need for CPD training, particularly in subject content areas, preferably conducted in-person, infused with hands-on training, and conducted before the start of each academic term. We recommend the operationalization of the CPD Framework by the Ugandan government and the decentralization of CPD training programs to elevate the professional quality of agricultural education teachers and consequently enhance their students' academic outcomes.

Introduction

Over the years, the Ugandan government, through the Ministry of Education and Sports (MoES), has implemented numerous educational policies and programs. Such policies and programs have included Universal Primary Education (UPE), Universal Post-Primary Education and Training (UPPET) policy, and the Higher Education Students' Financing Board (HESFB), which, at some level, were geared toward providing primary education to children, increasing accessibility to basic education through the construction of primary and secondary schools at every sub-county, and providing a student loan program for higher education for students from low-income family backgrounds (MoES, n.d.; Mubangizi, 2020; Obiero, 2020). However, these policy changes and programs have not yielded tangible results apart from slightly increasing the number of primary and secondary school graduates (Teachers Initiative in Sub-Saharan Africa [TISSA], 2013, p. 16). The education system has been criticized for failing to adequately prepare learners with the skills needed to be employable. Concerns have been raised in Uganda over the years about graduates' preparedness for the workforce, particularly regarding employable skills and both intrapersonal and interpersonal competencies. This is often attributed to the predominantly theoretical

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nature of Uganda's secondary education system, which has faced challenges in effectively facilitating a smooth school-to-work transition (Mubangizi, 2020, p. 4). The system is also criticized for providing a poor-quality education, having poor school infrastructure, low-quality teachers, high rates of student attrition, and contributing to the high levels of unemployment in the country (Nakabugo et al., 2014; TISSA, 2013).

To combat this, MoES and the National Curriculum Development Center (NCDC) introduced a competence-based curriculum loosely called the new lower secondary school curriculum in January of 2020 (NCDC, 2019; Chemonges, 2020). According to the NCDC 2019 press release, the new curriculum is aimed at:

Promotion of effective learning and acquisition of skills, reduction of subject and content overload, addressing the needs of all students and laying a foundation for improved pedagogy and assessment procedures, addressing the social and economic needs of the country, provision of flexibility to absorb emerging fields of knowledge in the areas of Science and Technology, addressing the 21st-century skills required in the world of work, and lastly, addressing issues of wastage with regard to utilization of resources (teachers, school facilities/space, and instructional materials) to ensure efficiency. (NCDC, 2019, p. 2)

With 21 subjects, all designed to provide practical and meaningful education to students, implementation of this competence-based curriculum mainly targets providing learners with the needed 21st-century practical skills or those skills needed in the world of work (Chemonges, 2020; NCDC, 2019). Uganda's secondary education system tends to emphasize theoretical learning, making it difficult for students to transition from school into the workforce seamlessly. The new curriculum has been recognized for streamlining subjects and content while emphasizing practical, skills-based learning. MoES and its regional and international stakeholders believe that this new policy is the right step in the right direction (MoES, 2019).

However, concerns and questions exist about the skills of secondary school teachers in Uganda. Past research about Ugandan teacher issues indicates that many secondary school teachers receive poor pre-service teacher training at teacher preparation colleges and receive little to no in-service training during their teaching careers (Mulkeen et al., 2007; Nakabugo et al., 2014; Okiror et al., 2017; TISSA, 2013). Consequently, these teachers have inadequate teaching or pedagogical skills, affecting their teaching quality and students' academic outcomes. The low standards and limited teaching competencies among teachers in Uganda have been linked to the absence of a nationally defined set of minimum standards and a competency framework specifically for teacher education, which would help ensure consistency and quality in teacher preparation and training (MoES, 2019). If the new curriculum is implemented without retraining and continuous training of teachers, there are fears that the education sector, especially secondary education, will obtain the same poor learning outcomes (Chemonges, 2020).

Literature Review

Across the globe, teachers are considered the engine and centerpiece of an education system. Education officials, politicians, and policymakers understand that teachers determine and define what should be taught, how it should be taught, and how learning should be assessed (Basheka et al., 2017). Because of their central role and importance in education, governments and partner stakeholders invest considerable resources in pre-service and in-service training of the teacher workforce (Sims et al., 2022). Each country has agencies or organizations responsible for pre-service and in-service teacher training, and these set the agenda for teacher training, identify gaps in teacher programs, devise solutions, and allocate resources to teacher training colleges/universities. In Uganda, such teacher training mandates have been mainly coordinated by Kyambogo University through the National Teacher Colleges (NTCs) for secondary

school teachers and Primary Teacher Colleges (PTCs) for primary school teachers (MoES, 2019). However, with the liberalization of education in Uganda, over 25 public and private universities offer education degrees to pre-service teachers. This development has led to an increased number of trained teachers but has compromised the quality of teacher education received at these institutions due to the absence of a Quality Assurance Framework in teacher education (MoES, 2019). This compromised quality has led to significant competency gaps among secondary school teachers, which include a lack of skills in the use of educational technologies, low pedagogical skills, low content and subject knowledge, and little to no counseling and career guidance skills (Malunda, 2019; MoES, 2019; Nakabugo et al., 2014; TISSA, 2013).

Uganda's six-year lower secondary education system, with four years of ordinary level (O-level) and two years of advanced level (A-level) structure, is challenged by quality issues and attainment of low academic outcomes. For instance, 50% of students who sat for the Uganda Certificate of Education (UCE), which is a national examination for transiting to the upper secondary level (high school), failed their examinations and repeated senior four (S4) classes the following academic year (MoES, 2017). If focusing on secondary agricultural education in Uganda, a blurrier picture emerges. As highlighted by the Uganda National Examinations Board [UNEB] 2022, 198,055 of 345,444 (57.3%) students registered for the agricultural education national examination at the Uganda Certificate of Education (UCE) level, indicating an increase in uptake and enrollment in agricultural education by schools and students, respectively. However, most of these candidates scored the minimum grade attainable at this level of education. UNEB officials attributed this to weaknesses in handling practical tests, making and recording observations, drawing conclusions, poor mathematical skills, and poor interpretation of test results (UNEB, 2022). Okiror et al. (2017) attributed this situation to secondary agricultural education teachers' failure to engage students well enough for skills acquisition due to their lecture-based teaching methods, which hindered active and experiential learning in classrooms.

To address these critical teacher issues in secondary school education, the MoES and its partner agencies developed several policy frameworks, including the Harmonized Framework for Initial Teacher Training, a Competency Profile for Secondary School Teachers, the Continuous Professional Development Framework, a National Teacher Policy, and the Competency Profile for Teacher Educators in Higher Institutions (NCDC, 2019; Chemonges, 2020). In addition, the government of Uganda introduced the new lower secondary school curriculum framework at the beginning of 2020. This curriculum focuses on offering students a comprehensive education that meets the needs of the 21st-century workplace ecosystem, recognizes diverse academic aspirations, addresses three learning domains, and focuses on the education of citizens who can utilize Uganda's resources to transform their communities and country at large (NCDC, 2019). With recent changes in classroom instruction, such as the introduction of project-based learning, criteria-based assessment, and the implementation of a new lower secondary school curriculum, there is an increased demand for a highly skilled teacher workforce. We conducted this study to identify the available in-service teacher training opportunities in Uganda and examine teachers' perceptions of these CPD programs. Well-designed and effectively delivered CPD programs offer a critical means of addressing pedagogical gaps stemming from inadequate pre-service training. They also equip in-service agricultural educators with the necessary skills to deliver high-quality instruction aligned with the revised curriculum.

Theoretical Framework

This study incorporated two theoretical frameworks, the adult learning theory by Knowles (1980) and Rogers' diffusion of innovation theory (2003). As Njenga (2022) explained, teacher CPD is a complex learning activity influenced by a complex set of interacting personal, institutional, and contextual factors. Thus, a dual theoretical framework helped capture the varied goals, content areas, and learning methods that define teacher CPD (Njenga, 2022). Adult learning theory (Knowles, 1980)

views teacher CPD as a self-directed and goal-oriented activity, while the diffusion of innovation theory situates teacher CPD in Uganda as an innovation or new educational practice that requires agricultural educators to adopt the new CPD ideas through the innovation-decision process (Njenga, 2022; Rogers, 2003).

As highlighted by Knowles (1980), an adult learner finds specific situations or needs concerning their teaching behaviors that call for adjustment or change, and these needs act as motivators of their need for education or the adoption of professional practice. With this notion, adult learners are expected to be more motivated to learn to address their perceived professional needs (Cannon et al., 2012). Such perceived professional needs have been highlighted in previous studies in Uganda to include instructional strategies, subject content knowledge, classroom management, project-based learning approaches, student motivation techniques, counseling, and career guidance (Malunda, 2019; MoES, 2016; Nakabugo et al., 2014).

Adopting new ideas or innovations, such as participation in CPD programs in any population or social system, such as schools, usually begins with a few innovators (Rogers, 2003). This small population is closely followed by early adopters, followed by an earlier majority and later majority, and lastly, by the laggards. The contemporary situation of CPD attainment among agricultural educators fits into the five categories proposed by the diffusion of innovation theory. This alignment is because peer-to-peer interactions and communities of practices are vital in knowledge transfer and, in this case, important in influencing other teachers to take part in CPD programs (Okiror et al., 2017). Therefore, as described by Wenger's (1998) Communities of Practice, using the adult learning and diffusion of innovation theories provided tools to indicate how, why, and how fast CPD programs achieve or fail to achieve their intended goals.

Purpose of the Study

The purpose of this study was to identify existing CPD programs attended by secondary agricultural education teachers in Uganda and describe their perceptions of these programs. Recommendations from this study aim to improve the effectiveness and relevance of ongoing CPD efforts for secondary agricultural education teachers in Uganda. As such, three research objectives guided this study:

1. Profile the educational backgrounds of Ugandan secondary agricultural education teachers;
2. Identify the kind of CPD programs Ugandan secondary agricultural education teachers participated in; and
3. Examine teacher perceptions of CPD programs, including challenges, improvement areas, and recommendations for institutional support.

Methodology

A concurrent mixed methods case study design was employed to investigate this multifaceted issue within a condensed timeframe by integrating both quantitative and qualitative data collection strategies (Creswell & Creswell, 2018). This approach enabled the researcher to gather a broad range of perspectives from a diverse population of agricultural education teachers. Consistent with the QUAN → qual paradigm (Morse, 2010), quantitative data were collected and analyzed prior to the qualitative phase, which served to elaborate and contextualize initial findings. Participants included 71 purposively selected secondary agricultural education teachers from the Agriculture Educators WhatsApp group, a social network of in-service agricultural educators across Uganda who share resources, CPD opportunities, and teaching strategies to enhance their instructional practices. After removing incomplete responses, 52 completed questionnaires were retained for analysis. Respondents represented various teaching contexts, including the ordinary level, advanced level, or both, and were drawn from urban, peri-urban, and rural schools located in Uganda's four major regions: Central, Eastern, Northern, and Western.

To address the study's objectives and following Dillman et al.'s (2014) tailored design method, Institutional Review Board (IRB) approval was secured to administer a researcher-modified questionnaire via the Qualtrics online platform through email and WhatsApp, incorporating both closed- and open-ended items across three sections aligned with the research objectives. Following Gall et al.'s (1996) recommendations for determining the internal consistency of the modified instrument, Cronbach's alpha coefficients were calculated post-hoc for each of the constructs: technical skills ($\alpha = 0.901$), teaching management ($\alpha = 0.901$), PD attendance and quality ($\alpha = 0.851$); PD knowledge ($\alpha = 0.931$); PD interest ($\alpha = 0.909$); PD delivery ($\alpha = 0.695$); and PD timing ($\alpha = 0.236$). Construct reliabilities were mostly above the commonly acceptable level of $\alpha = 0.80$; however, according to Ary et al. (2006), preference variables, such as PD delivery, often present challenges in achieving high reliability, so these assessments tend to demonstrate only moderate levels of consistency (0.60 to 0.70). The lower reliability estimate for the PD timing construct may be attributed to the response format, which used discrete month-based categories rather than a traditional Likert-type scale. This format likely introduced greater variability in participant interpretations and preferences, thereby reducing internal consistency relative to other constructs. To improve internal consistency in future studies, researchers could identify and remove items with low item-total correlations while incorporating items that demonstrate stronger reliability within the scale (Ary et al., 2006). An ANOVA was used to determine if there was a significant difference among professional development constructs across teachers' levels of education.

Section I of the questionnaire corresponded with Objective One and gathered demographic and educational background data to develop a profile of participating teachers. Section II, aligned with Objective Two, examined CPD participation trends, availability of school-level CPD support, and the frequency of engagement. Respondents also rated their level of interest in 17 identified CPD areas using a 5-point Likert-type scale (1 = *not interested* to 5 = *extremely interested*). Section III, aligned with Objective Three, assessed perceptions of current CPD programming, perceived quality, applicability, and barriers to implementation. A separate 5-point Likert-type scale (1 = *strongly disagree* to 5 = *strongly agree*) gathered participant views on program relevance and effectiveness. In addition, three open-ended questions were included to gather qualitative insights on CPD challenges, individual professional development needs, and recommended forms of institutional support from the Ministry of Education and Sports, universities, and schools.

With respect to qualitative analysis, Creswell's data analysis spiral (2013) was used to identify general themes and categories for reporting. Our approach involved semi-structured interviews with 15 purposively selected teachers representing three distinct tiers of academic qualification. The interviews were conducted via the WhatsApp platform and focused on challenges inhibiting CPD implementation, suggestions for program improvement, emerging CPD needs, and institutional strategies to enhance access and support for in-service teacher development. Quantitative data were analyzed using Qualtrics' statistical tools and Microsoft Excel, generating descriptive statistics including means, standard deviations, percentages, and frequency distributions. Qualitative data were analyzed through thematic content analysis, identifying emergent themes, patterns, and conceptual categories (Creswell, 2013). This process facilitated the triangulation of findings and integration of results during interpretation.

Multiple strategies were implemented to ensure methodological rigor and establish credibility, reliability, dependability, and confirmability. Following the initial review by the research committee, the questionnaire was evaluated by a panel of experts with research backgrounds in agricultural teacher professional development. The panel assessed the instrument for content validity to ensure it accurately aligned with and measured the intended research objectives (Dillman et al., 2014). Further, the questionnaire and interview protocol were subjected to expert review by the developer of the original survey instrument, thereby ensuring content alignment and construct validity (Zohrabi, 2013). Finally, the

triangulation of data sources and methods mitigated potential biases and enhanced the trustworthiness of the study's findings (Creswell, 2013).

Results

Objective One sought to profile the educational backgrounds of Ugandan secondary agricultural education teachers. Results indicated that most participants were male ($n = 46$, 88.0%) with either a diploma, a bachelor's degree, or a master's degree in agricultural education. Participants taught in agricultural education programs located in urban ($n = 12$), peri-urban ($n = 23$), and rural ($n = 17$) areas across the nation. Most teachers with a diploma taught agricultural education at O-level ($n = 19$, 45%) and in rural schools ($n = 9$, 45%). Teachers with a bachelor's degree mainly taught agricultural education at A-level ($n = 20$, 65%) and in peri-urban schools ($n = 13$, 52%), while all participants with a master's degree taught agricultural education at A-level ($n = 7$). Approximately half of the female participants held a bachelor's degree in agricultural education and taught in rural schools ($n = 3$).

Table 1

Summary of Participants' Demographics (n = 52)

Categories	n	%
Gender		
Male	46.0	88.5
Female	6.0	11.5
Teacher's highest level of education		
Diploma	20.0	38.5
Bachelor's degree	25.0	48.0
Master's degree	7.0	13.5
Ph.D.	0.0	0.0
Years of teaching		
Less than 1 year	1.0	1.0
1 to 2 years	6.0	12.0
3 to 5 years	16.0	31.0
6 to 10 years	15.0	29.0
More than 10 years	14.0	27.0
School location by area		
Urban (5,000 ⁺ people/km ²)	12.0	23.0
Peri-urban (2,000 – 4,999 ⁺ people/km ²)	23.0	44.0
Rural (<2,000 people/km ²)	17.0	33.0
School location by region		
Central	36.0	69.0
Eastern	5.0	10.0
Northern	9.0	17.0
Western	2.0	4.0

Research Objective Two sought to identify the type of CPD programs in which Ugandan secondary agricultural education teachers participated. Most participants ($n = 38$, 73%) indicated their schools offered CPD training, with many attending at least one CPD training a year ($n = 51$, 98%). Additionally, most diploma holders (65%) attended 1 to 2 trainings, 56% of bachelor's degree holders attended 3 to 4 trainings, and 50% of master's degree holders attended more than five trainings in an academic year. Furthermore, as displayed in Table 2, results indicated that the mean ranks of all secondary agricultural teachers' interest in the 17 listed CPD training areas ranged from the lowest mean of 4.00 (curriculum mapping) to the highest mean of 4.38 (subject content areas). Results also showed that teachers with different levels of education expressed varying interests in attending the listed CPD

training areas with the performance of one-factor ANOVA test at $p < .05$ level and a post hoc analysis showing a statistically significant difference in mean interest toward attending CPD training among teachers with different levels of higher education (see Table 3 and Table 4).

Table 2

Summary of Teachers' Interests in Identified CPD Areas by Their Level of Education (n = 52)

Areas of CPD training interest	<i>M</i>	<i>SD</i>	Mean Scores		
			Diploma (<i>n</i> = 20)	Degree (<i>n</i> = 25)	Master's (<i>n</i> = 7)
New lower secondary curriculum	4.31	0.77	4.35	4.24	4.43
21st-century skills	4.31	0.67	4.20	4.36	4.43
Competence-based learning	4.37	0.71	4.30	4.32	4.71
Best teaching practices	4.33	0.70	4.25	4.40	4.29
Development of activities of integration and their rubrics	4.23	0.87	4.35	4.12	4.29
Student experiential learning opportunities	4.25	0.68	4.20	4.24	4.43
Classroom management	4.33	0.70	4.05	4.56	4.29
Collaborative teaching	4.27	0.76	4.00	4.36	4.71
Curriculum mapping	4.00	0.98	3.70	4.08	4.57
Project development	4.37	0.65	4.20	4.52	4.29
Establishment of an agriculture club like YoFFA in your school	4.23	0.87	4.10	4.24	4.57
Formative and summative assessment	4.21	0.93	4.00	4.40	4.14
Student leadership development	4.17	0.89	4.00	4.20	4.57
Personal management (time, stress, work-life balance, career development, etc.)	4.37	0.79	4.25	4.56	4.00
Educational technology and integrated instruction	4.35	0.78	4.05	4.56	4.43
Subject content areas (animal science, agronomy, tools, etc.)	4.38	0.88	4.20	4.52	4.43
DIT courses, assessment, and certification for senior three students	4.21	0.99	4.05	4.28	4.43

Note. Interest Scale: 1 = not interested, 2 = slightly interested, 3 = moderately interested, 4 = very interested, and 5 = extremely interested.

Table 3

One-Factor ANOVA Analysis of Teachers' Mean Interest Scores on CPD Training by Level of Education

Sources	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>P</i> value
Between groups	2	0.736	0.368	12.860	<.001
Within groups	48	1.373	0.029		
Total	50	2.109	0.042		

Table 4

Group	<i>M</i>	<i>n</i>	<i>SS</i>	<i>df</i>	q-crit
Diploma	4.132	17	0.430		
Bachelor's degree	4.351	17	0.386		
Master's degree	4.412	17	0.558		
		51	1.373	48	3.420

Post Hoc Analysis of Teachers' Mean Interests on CPD Training by Level of Education

Note. *n* represents the listed areas of interest in CPD training in Uganda.

Objective Three sought to analyze the perceptions of Ugandan secondary agricultural education teachers toward the available CPD programs. Respondents answered five questions about the quality of CPD programs and their ability to apply the acquired knowledge in their classrooms and professional careers. A Likert-type scale with five response options ranging from *strongly disagree* (1) to *strongly agree* (5) was used. Participants indicated mean ranks for the quality of available CPD training, ranging from 4.25 (*attended training was high quality and met my expectations*) to 4.38 (*attended training helped me to help my students in the classroom better*). The lowest standard deviation ($SD = 1.10$) was evident within *attended training that was of high quality and met my expectations*, and the highest standard deviation ($SD = 1.33$) was evident in *the training content relevant to my teaching roles perspective* (see Table 5).

Table 5

Summary of Teachers' Perceived Quality of Available CPD Training Topics

Questions	<i>M</i>	<i>SD</i>
The attended trainings were of high quality and met my expectations.	4.25	1.10
Training content is relevant to my teaching roles.	4.28	1.33
The attended trainings have helped me do my teaching job better.	4.29	1.26
The attended training helped me to help my students in the classroom better.	4.38	1.18
The attended trainings have helped me prepare for career advancement.	4.35	1.19

The ANOVA test and subsequent post hoc analyses were performed on the group mean scores in relation to participants' highest levels of education. ANOVA results indicated a significant difference at $p < .05$ in mean scores among the three educational levels [$F(2,12) = 22.30, p < .001$]. Similarly, the post hoc analysis revealed a statistically significant difference among mean scores (see Table 6).

Table 6

Post Hoc Analysis of Teachers' Mean Scores on CPD Quality Depending on Levels of Education

Group	<i>M</i>	<i>n</i>	<i>SS</i>	<i>df</i>	q-crit
Diploma	4.402	5	0.108		
Bachelor's degree	4.140	5	0.042		
Master's degree	4.732	5	0.086		
		15	0.236	12	3.773

Note. *n* represents the number of questions on CPD program quality in Uganda.

Analysis of Teacher Interviews

To address Research Objective Three, qualitative data were collected to identify challenges or barriers affecting teachers' accessibility to CPD programs, describe teachers' perceptions of available

CPD programs, and identify suggestions for improving CPD programs regarding quality and accessibility. Fifteen selected teachers, with five individuals representing each identified highest level of teacher education, participated in the semi-structured WhatsApp interviews. Respondents answered three questions: Is professional development important to you as a teacher, and why? What challenges do you have accessing professional development in Uganda? What can be done to make professional development worthwhile? Qualitative data were analyzed, and emerging themes were identified. This process revealed 10 broad themes and 73 subthemes (see Table 7).

For question one, all respondents, regardless of their highest level of education, mentioned that continuous professional development was personally meaningful to them. They gave reasons that were summarized into three broad themes and 20 subthemes. The identified themes included skills development (pedagogical and professional skills), self-development (personal growth), and transferable benefits. For question two, respondents outlined challenges hindering them from accessing professional development programs. Respondents mentioned personal and structural challenges at the school administrative level and some at the national level. The identified challenges were organized into four themes and 26 subthemes. The themes included accessibility, administrative and financial constraints, personal and technological constraints, and time constraints. For question three, respondents highlighted strategies at individual, school, and national levels that can be implemented to make the acquisition of professional development among Ugandan secondary agricultural education teachers successful. The identified solutions for implementing a successful CPD program in Uganda were organized into three themes: institutionalization of CPD programs, administrative support, and personal initiatives.

Table 7

Summary of Identified Themes and Subthemes from Teacher Interviews

Questions	Themes and Subthemes
Is professional development important to you as a teacher, and why?	<p><i>Skill development:</i> Effective learner engagement, effective pedagogy, staying professionally abreast, problem-solving skills, classroom management, curriculum interpretation, lesson plan development, and motivation for service.</p> <p><i>Self-development:</i> Career growth, competence, confidence, credibility, commitment, and life-long learning.</p> <p><i>Transferable benefits:</i> Educational technology, employment, promotion, and networking opportunities.</p>
What challenges do you have accessing professional development in Uganda	<p><i>Accessibility:</i> No national CPD program, long distances, lack of continuity, inadequate skilled human resources, lack of online CPD programs, lack of training info, and few training programs.</p> <p><i>Administrative and financial constraints</i> include low teacher pay, lack of funding, higher education costs, lack of financial support, no paid leave days, and a lack of scholarship opportunities.</p> <p><i>Technological constraints:</i> Lack of computers, no clear CPD goals, high internet costs, unreliable internet service, computer illiteracy, and poor teacher attitude toward CPD programs.</p> <p><i>Time constraints:</i> Long travel distances, conflicting schedules during academic terms, and poor scheduling of CPD programs.</p>

Questions	Themes and Subthemes
What can be done to make professional development worthwhile?	<p><i>Institutionalization of CPD programs:</i> Mandatory CPD requirements, sensitization, decentralization, and scheduling CPD during school breaks.</p> <p><i>Attitude of importance for teachers and school leaders:</i> Financial support, early communication, merit-based promotions, school-based CPD, better teacher pay, and close monitoring.</p> <p><i>Personal initiatives:</i> Self-ownership of CPD, embracing digital literacy, attaining advanced education, and utilizing the Internet for professional development.</p>

Conclusions, Implications, and Recommendations

We aimed to identify the CPD programs that secondary agricultural education teachers attended in Uganda. The average respondent was a male teacher with a bachelor's degree in agricultural education, had 3.7 years of teaching experience, and taught at either the O-level or A-level in rural, peri-urban, and urban schools in central Uganda. Diploma holders primarily taught at the O-level and in rural schools, teachers with a bachelor's degree mainly taught at the A-level and in peri-urban schools, and master's degree holders mainly taught at the A-level, and none of them taught in rural schools. Based on participants' demographics, it can be concluded that more female agriculture education teachers need to be trained and recruited in schools across Uganda. According to Banks (2008), this representation will create female teacher role models, positively impact students' academic performance and personal development, and assist in breaking barriers and stereotypes that seem to exist among Ugandan communities. In addition, the low average years of teaching experience and relatively high number of teachers with a diploma indicate the need to provide CPD for agricultural educators. Okiror et al. (2017) and TISSA (2013) noted that providing CPD could enhance the professional capacity of these teachers to deliver the new curriculum and help bridge the professional skills gap between teachers with different levels of education.

Further, most teachers indicated that they would participate in at least one CPD training in an academic year, mainly offered by their schools. On average, participants ranked attending CPD training on subject content areas such as crop science, animal science, farm tools, among others, the highest, followed by training on competence-based learning, project development, and personal management. In addition, teachers with different education levels had varying preferences and interests for attending the 17 CPD training areas. These differences in preference for the training areas indicated that teachers with different levels of education have different CPD needs. Because of this, organizers of CPD training workshops or activities need to conduct needs assessments for their target agricultural education teachers to identify their actual CPD needs instead of offering generalized training. This conclusion aligns with Okiror et al.'s (2017) findings, which found that teachers with a diploma had a higher need for teaching and delivery of hands-on agricultural learning activities than bachelor's and master's degree holders. It is also supported by Ezati et al.'s (2014) recommendation for adopting the cascade model of CPD training, where training is more concerned with identifying and satisfying teachers' content and pedagogical knowledge needs and provides a platform where teachers learn through communities of practice.

Participants also indicated mixed feelings about the quality of available CPD training in Uganda. For instance, quantitative data analysis revealed that teachers with a bachelor's degree highlighted that available CPD programs were of low quality. In contrast, those with a master's degree and diploma viewed the available CPD programs as of high quality. However, during teacher interviews, regardless of the level of education, teachers seemed to agree that available CPD programs were of "poor quality." With this finding and in consistency with past studies (Nakabugo et al., 2014; TISSA, 2013), we

concluded that most of the available CPD training in Uganda are ad hoc and broad-based programs in the form of workshops and seminars, mainly organized at the beginning of the school year or the beginning of each academic term. Past studies in Uganda showed that such programs have little effect on teachers' professional skills and suggest that effective CPD programs should be subject-matter specific, conducted over several days, and should consider individual teachers' professional needs (Arinaitwe et al., 2019; Nakabugo et al., 2014).

Based on the earlier conclusions, we recommend several strategies for providing quality CPD training to secondary agricultural education teachers in Uganda. To begin with, an urgent need exists to operationalize the CPD Framework and the National Teacher Policy in Uganda. As outlined by MoES (2017, 2018), this framework would provide a clear structure for organizing and managing CPD so that it contributes to improvements in teaching and leadership quality and professionalizes the teaching profession to levels comparable with other professions. We also recommend that organizers of CPD training consider teachers' preferences to promote uptake and attendance of organized CPD training programs across the country. As Knowles (1980) noted, adult learners, including in-service teachers, view continuous professional development programs as self-directed and goal-oriented. Therefore, organizers of CPD training must understand teachers' preferences regarding what, when, how, and where the training should be conducted. Past research indicates that this is important in diffusing teacher CPD in Uganda, which is currently an innovation or a new educational practice (Njenga, 2022).

Lastly, we recommend that schools implement content-specific school-based CPD programs and allocate funds to facilitate provision for their secondary agricultural education teachers. Undertaking such specific CPD training in the form of workshops and seminars on specified topics leads to professional improvement among teachers (Okiror et al., 2017). Budget allocations will ensure regular and relevant CPD training opportunities in various formats: in-person workshops, online courses, virtual webinars, and collaborative learning experiences with other teachers across Uganda and worldwide. It is also essential that school leaders empower their directors of studies or deputies in charge of academics to conduct in-class teacher observations, conduct surveys to assess teacher needs, and recommend needs-based professional development for their teachers.

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