Developing School-Based Agriculture Education Through School Gardens

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Introduction/Need for Research

School-based agriculture education (SBAE) is a formal learning pedagogy that is among the approaches to disseminating agricultural information to communities from students. It is a well-rounded, learn-by-doing pedagogy (Kolb, 2015) that includes three components that define the American elementary and high school education; class instruction, entrepreneurship experience, and leadership development (Easterly III & Myers, 2017; Eck et al., 2019). SBAE offers two overarching goals of creating: successful lifelong learners who are agriculturally literate citizens, and a skilled agricultural workforce, all of which develop a pool of responsible development experts. Earlier, agriculture educators indicated a need for early exposure of students to agriculture education (Trotter, 1977). This knowledge was required for students to change their attitude toward agriculture which awakens their future desire in the field.

Conceptual Framework

This study was based on the School gardens (SGs) concept, which is among the approaches to promoting SBAE in schools. The SGs approach is a concept of the Europeans and Americans, that was started in the early 1800s by Friedrich Froebel (Sobel, 2016). The popularization of SGs in the U.S. was after World War I (WWI) in 1918 when the Federal Bureau of Education established the U.S. School Garden Army [USSGA] (Dooley, 2017; Hayden-Smith, 2014). The USSGA adopted the motto "A Garden for Every Child. Every Child in a Garden" (Dooley, 2017; Hayden-Smith, 2014, p. 11). The goal of these SGs was two-fold (i.e., providing food to the veterans and as a form of patriotic movement). Students who participated in the SGs were in the range of 9-15 years of age under the slogan- I "consecrate my head, heart, hand and health through food production and food conservation to help the World War and world peace." (Dooley, 2017). During WWII, the U.S. victory rebranded the SGs into Victory Gardens (VGs) with over 20 million gardens planted, where students produced 40% of the U.S. vegetables, with an overall land estimated at 169,000 acres (Carr & Mallam, 1943).

In Uganda, SBAE has been implemented through SGs as learning laboratories within schools and pupils' home gardens for skills transfer to communities (Ikendi, 2019; 2022; Kugonza et al., 2015; Nonnecke et al., 2015). Specifically, in Kamuli district, Uganda, the SGs concept was introduced in 2006 through the service-leaming program of the Center for Sustainable Rural Livelihoods (CSRL) based at Iowa State University (ISU) in partnership with Makerere University [MAK] (Nonnecke et al., 2015). It was operationalized under the name "*Creating a school garden: Service-learning in Uganda*" which was derived from its main activity. Pupils are engaged in various garden activities to increase food supplies of vegetables and root crops like orange-fleshed sweet potatoes within the school lunch program (Byaruhanga, 2016; Kugonza et al., 2015). This practical learning closes the gap between classroom concepts and real field application. The purpose of this study was to determine the rate of pupils' participation in SG clubs and assess whether club members practice learned practices at home and their benefits.

Methodology

A cross-sectional survey was utilized to determine what impact participation in SG clubs had on the pupils' knowledge acquisition and use. The sample was drawn from 355 pupils who had participated in school clubs in the four primary schools (P/S) (i.e., Namasagali, Nakanyonyi, Naluwoli, and Namasagali College Staffs' Children (NCSC) supported by the CSRL through ISU-Uganda Program (ISU-UP) in Kamuli district, Uganda by the year 2018. Using a 95%

confidence interval, we established a sample size of 185 participants. Approval to conduct the study was obtained from the Institutional Review Board at ISU under IRB #18-356-01. Participants were presented with the parental consent and child assent forms, written and read in both “English” and "Lusoga," the native language of the investigator and research assistants. Since the study was conducted in a school environment, the school principals and teachers appended their signatures on behalf of the parents. Pupils who accepted to participate assented and signed or put a Thumbprint on assent forms. A total of 139 pupils were interviewed. Bivariant analysis was conducted at a 5% significance on the variables to determine whether there existed any significant associations among pupils. Data are presented as percentages.

Results/Findings

Overall, 109 (78.4%) of the 139 children surveyed were members of the SGs club. Of the 109 children, 30.3, 29.4, 23.9, and 16.5 percent were pupils of Naluwoli, Namasagali, Nakanyonyi, and NCSC P/S respectively. By sex, more girls (56.9%) than 43.1% of boys participated in SGs club. Most children (56.9%) were between 11-14 years old. Most children (63.3%) were in the upper elementary grade from five to seven, and the rest were from grades three and four. In terms of activeness, 95.4% reported as active in the SGs activities, and 4.6% reported having left the club to join other clubs like agroforestry and orchards; beekeeping; livestock; school feeding; grain storage; hygiene and sanitation; composting; holiday program; art and craft; music, dance and drama; and sports and games. Children had spent 4.20(±3.61) academic terms in the SGs.

Regarding practice, 23.9% of SGs clubs were more likely to possess sack gardens than 6.7% of their counterparts. Similarly, 82.6% of the members had field vegetable gardens than 73.3% of non-members. Most vegetables in sack gardens were collards, onions, and yams. In the field vegetable gardens, amaranths, collards, eggplants, tomatoes, cowpeas, pumpkins, cabbages, pepper, beans, and garden eggs were mostly grown. In sales, 47.8% of the SGs club members had made sales by 2018. The proceedings were used to purchase school items – books, uniforms; home items – foods, soap; personal – like clothes, sanitary towels; and livestock – goats, hens.

Conclusion

Based on the findings, SGs Clubs have had the potential to promote SBAE in schools. Members of the clubs attained the knowledge and put it into practice by growing the vegetables in their homes using sack gardens, a land-sparing technique due to the limited acreage of land in Kamuli district. Almost the same vegetables grown in sack gardens were grown in their field gardens because of the need to share seeds and seedlings. Children were able to secure some of their school, home, personal, and livestock items from vegetable sales which awakened their desire and attitude in practicing agriculture to gain skills, knowledge, food, and income. Engagement in SGs activities leads to social growth, academic achievements, good health, and community engagement as students work in their clubs at schools and home with parents and outreach staff.

Implications

Learning through SGs as an approach in SBAE should be well planned and incorporated into the school curriculum. This is an experiential learning approach that links theoretical classroom concepts into practice in gardens both at school and at home. These SGs have the potential for knowledge transfer to students’ homes and communities, as well as communities visiting SGs during annual field days at school for knowledge exchange – reciprocity. Children need support from their parents, outreach personnel, and teachers to monitor their gardens. Parents should be educated on the academic importance of SGs through their parent-teacher meetings at school.

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