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# Evaluating the Local, State and National Economic Impact of Supervised Agricultural Experiences: A National Perspective

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**Abstract**

*Supervised Agricultural Experience (SAE) has been a critical component of School-Based Agricultural Education (SBAE) for decades. Formally called the 'home project', Rufus Stimson developed the concept of SAE in the early 20th century. This work-based learning concept provides students with experiential instruction that strengthens their employability and technical skills. While SAE has a long-standing tradition in SBAE, little is known about its national economic impact. This study utilized data collected through the Agricultural Experience Tracker (AET) system to assess the economic impact of SAE nationally. Overall, there are approximately 8,690 agricultural education programs nationwide, with 6,752 of those programs utilizing the AET system. Upon further analysis, 1,932 programs only utilized AET for FFA award applications and did not input SAE records into the system. These programs were removed from the study, and data from 4,820 SBAE programs were analyzed for economic impact. It was determined that the average SBAE program has $98,672 in investments and $64,212 in income annually. In addition, students' SAEs account for approximately $857 million in direct spending. These figures were utilized to derive national economic impact estimates utilizing the IMPLAN Type II Model. Overall, it is estimated that student SAE projects have an economic impact of approximately $1.6 billion nationally. This impact has implications for agricultural education professionals nationally and should be leveraged with key stakeholders including legislative officials, educational administrators, and other CTE professionals to advance the mission and goals of SBAE.*

## Introduction

The concept of Supervised Agricultural Experience (SAE) has been a staple of agricultural education since its inception in the early 20th century (Dyer & Osbourne, 1995). While the concept has evolved, it still provides agricultural education students an avenue to develop critical employability skills (Haddad & Marx, 2018), explore potential career options (Haddad & Marx, 2018), and develop technical skills in agriculture (Ramsey & Edwards, 2012). While SAE significantly benefits students (Haddad & Marx, 2018; Ramsey & Edwards, 2012), it also substantially impacts the local, state, and national economy (Hanagriff et al., 2010; Hanagriff et al., 2014; Riley, 2014). Hanagriff et al. (2010) determined that SAEs

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contributed $163 million to the Texas economy, and Hanagriff et al. (2014) suggested that agricultural mechanics SAEs produce $5.5 million in economic impact on the Texas economy. Riley (2014) estimated the national economic impact of SAE to be $694 million. Over the past decade, inflation has significantly impacted the global economy, mainly due to the COVID-19 pandemic (Bureau of Labor Statistics, 2024). According to the Bureau of Labor Statistics (2024), there was an average inflationary increase of 2.84% per year between 2014-2024, totaling an increase of 28.4% over that decade. In addition, the landscape of agricultural education changed during this period due to the COVID-19 pandemic (McKim et al., 2021). McKim et al. (2021) determined that one of the agricultural education operations disrupted by the pandemic was SAE implementation. The participants in McKim et al.'s study noted that most placement SAEs were halted due to business shutdowns, and many school-based projects were halted due to the transition to virtual learning. The last study to analyze the national economic impact of SAEs was Riley (2014), which was conducted before these significant changes to agricultural education and SAE occurred. These programmatic changes and the timespan between economic studies warrant a robust analysis of the national economic impact of SAE.

## Review of Literature

Since School-Based Agricultural Education's (SBAE) inception, the concept of the 'home project', now known as a Supervised Agricultural Experience (SAE), has encouraged the application of knowledge learned through agricultural education instruction (Dyer & Osbourne, 1995; Moore, 1988; Rank & Retallick, 2016; Smith & Rayfield, 2016). This educational philosophy of experiential learning, derived from the instructional principles of John Dewey (Dyer & Osbourne, 1995), purported that as authentic and relevant experiences are used in the learning process, the quality of learning would be increased (Dewey, 1938). Rufus Stimson, an agricultural educator in the early 20th century and an original proponent of this instructional method, urged his students to organize a 'home project' to apply the agricultural skills taught in his courses (Moore, 1988). Stimson (1919) published a book on his home project method entitled *Vocational Agricultural Education by Home Projects*, which would later be adopted by agricultural education stakeholders and integrated into the modern three-component model (Croom, 2008).

### *Historical SAE Implementation*

The passage of the *Smith-Hughes Act of 1917* marked the first federal legislation to require a home project from students of agricultural education (Dyer & Osbourne, 1995). This bill mandated that "…education in agriculture of less than college grade…" (Smith-Hughes Act, 1917, p. 934) should require a "…directed or supervised practice in agriculture, either on a farm provided by the school or other farm, for at least six months per year" ((Smith-Hughes Act, 1917, p. 934). This direct inclusion of experiential learning in agricultural education has resonated with the profession throughout its subsequent evolution (Dyer & Osbourne, 1995; Moore, 1988; Rank & Retallick, 2016; Roberts & Harlin, 2007; Smith & Rayfield, 2016; Wilson & Moore, 2007). Legislation following the Smith-Hughes Act would not affect SAE implementation significantly until the passage of the Vocational Education Act of 1963 (Phipps & Osbourne, 1988). While the concept of SAE was popularized throughout the twentieth century, many agricultural education historians mark the passage of the *Vocational Education Act of 1963* as the pivotal point in the decline of SAE implementation (Phipps & Osbourne, 1988). To broaden SAE into other areas of agriculture beyond 'farming', this legislation would state that agricultural education "…may be provided without directed or supervised practice on a farm…" (Vocational Education Act, 1963, p. 559). While many agricultural education stakeholders interpreted this as an expansion of supervised experiences, many understood this as the removal of the requirement (Phipps & Osbourne, 1988; Smith & Rayfield, 2016). In the latter half of the twentieth century, the implementation of SAE would decline significantly to the point of professional concern (Miller, 1980; Wilson & Moore, 2007).

The application of SAE in agricultural education would decline throughout the second half of the twentieth century (Miller, 1980; Wilson & Moore, 2007). In the 1990s, a resurgence in the emphasis placed on SAE was mounting (Wilson & Moore, 2007). The National Council for Agricultural Education (NCAE) released an SAE handbook, *SAE: Experiencing Agriculture* (Wilson & Moore, 2007), and the National FFA Organization updated the accounting principles used in SAE record keeping, expanded the recognition for SAE-based awards, and issued the *Decisions and Dollars* curriculum to encourage SAE implementation in local programs (Wilson & Moore, 2007).

### *Modern SAE Implementation and Economic Valuations*

Overall, agricultural educators agree that SAE is an integral part of agricultural education and that it is beneficial for students (Blackburn & Ramsey, 2014; Dyer & Williams, 1997; Rubenstein et al., 2023; Rubenstein & Scott, 2021; Shoulders & Toland, 2017; Wilson & Moore, 2007). While educators understand the value of SAE, Doss and Rayfield (2019) determined that agricultural educators need to be more confident in their knowledge of SAE and its categories. Lewis et al. (2012) found the instructional focus on SAE varies widely and that between nine and thirty-four days of instructional time were utilized to teach SAE concepts. According to Rank and Retallick (2016), agricultural educators agreed with SAE conceptually, but needed help implementing it in their instructional practice. Additionally, Shoulders and Toland (2017) purported that SAE was the least emphasized area of agricultural education.

While educators spend a relatively small amount of time on SAE, the main factor determining the quality of its implementation is the knowledge and dedication of the educator (Rubenstein & Thoron, 2015). The main barriers to educators dedicating more time to SAE include "(a) changing demographics and societal attitudes, (b) mechanics and structure of schools, (c) resource availability, (d) image, and (e) the agricultural education system" (Retallick, 2010, p. 64). SAE program values, such as economic results, are likely linked to the previously mentioned barriers of funding structure in schools to support SAE, resource availability, and the local image of the agricultural education program.

Christiansen (1999) reviewed SAE values in Georgia and indicated that in times of program funding needs, researching the economic values from SAE engagement offers valuable benefits to share. West and Iverson (1999) evaluated Georgia agricultural education programs and derived that the economic value from SAEs per program was estimated at $71,344. Retallick and Martin (2005) identified the economic values of placement SAEs in Iowa, with students earning incomes averaging $75,266 per program, which offers expanded financial support for students. Economic impact values from industry engagement can be measured using the Impact Analysis for Planning (IMPLAN), which is an input-output database and helps connect spending to local additional economic values (Mulkey & Hodges, 2003). Hanagriff et al. (2010) found that the average agricultural education program in Texas during the 2007-08 school year had a direct investment in SAE spending of $93,222. The researchers further extended the values using the IMPLAN model value of $1.9 (Type II Multiplier) and estimated that these SAE spending values contributed $163 million to the Texas economy. In additional research on SAEs in Texas, Hanagriff et al., (2014) found that SAEs for agricultural mechanics projects involved $5.5 million in state SAE spending, which then contributed $10 million in economic impact.

### *Evolution of SAE*

Agricultural education programs have evolved since Rufus Stimson envisioned the home project's role in agricultural education (NCAE, 2024). While SBAE began to educate rural youth involved in agriculture on modern farming practices (True, 1929), modern agricultural education programs have a diverse group of students who often do not have backgrounds in agriculture (NCAE, 2024). According to the U.S. Department of Agriculture (2023), only 10.4% of the population is employed in some aspect of the industry, with 1.2% of the population employed in an on-farm position. This large sector of the population

not involved with agriculture has increased the importance of agricultural education's mission to produce informed consumers (FFA, 2024). In the early days of agricultural education, the majority of SBAE students had direct experiences with agriculture (True, 1929), and the agricultural educator was required to visit each student's SAE project (Bird et al., 2013). This evolution of SAE has required some modifications to the concept (NCAE, 2024). The primary evolution of SAE has come from the introduction of the 'SAE for All' model (NCAE, 2024) and the acceptance of electronic record books through the Agricultural Experience Tracker (AET; Price et al., 2023; Toombs et al., 2022).

### *SAE for All*

In response to declining SAE participation, the National Council for Agricultural Education developed the new 'SAE for All' model (NCAE, 2024). The model was designed to broaden the definition of SAE, better demonstrate the evolution of the project throughout a student's agricultural education experience, provide agricultural educators with a framework to improve SAE participation, and onboard students into project development (NCAE, 2024). This novel SAE model begins students with a foundational project that includes five key elements: 1) Career exploration and planning, 2) Employability skills for college and career readiness, 3) Personal financial management and planning, 4) Workplace safety, and 5) Agricultural literacy (NCAE, 2024). Foundational projects are tailored to beginning agricultural education students (NCAE, 2024). The model emphasizes that agricultural educators should include each element of the foundational project as a graded assignment in all agricultural coursework (NCAE, 2024). As students progress through their agricultural education experience, the expectation is for them to transition into an immersion SAE, which includes five types of projects: 1) Entrepreneurship, 2) Placement, 3) Research/Experimental, 4) School-based enterprise, and 5) Service learning (NCAE, 2024). This process can help agricultural educators onboard students into an SAE project and, therefore, increase participation in work-based learning (NCAE, 2024). This rededication to SAE should allow SBAE students to become immersed in the full agricultural education experience in ways that are impossible without the real-world application that SAE provides. This pivotal modification to SAE implementation is depicted in Figure 1.

**Figure 1**

*Framework for SAE for All Model*


*Note*. NCAE, 2024

### *Agricultural Experience Tracker*

Historically, maintaining detailed financial records has been a critical aspect of SAEs, achieved through written record books that students maintained on their projects (Bird et al., 2013; Moore, 1988; Smith & Rayfield, 2016; Wilson & Moore, 2007). The introduction of the Agricultural Experience Tracker (AET), an online record-keeping system for SAE projects, has further increased the quantifiability of SAE's impact on student success (AET, 2024). The AET system was developed in 2007 to provide agricultural educators with a digital alternative to written record books (AET, 2024). As the world has become increasingly digital, the popularity of the AET system has subsequently increased (Price et al., 2023). While many states have adopted the AET as their official record-keeping system, many educators report feeling uncomfortable in their ability to implement AET into instructional practice (Ferand et al., 2020; Price et al., 2023; Sorensen et al., 2014; Toombs et al., 2022). This ambiguity in educators' confidence to implement AET in their classrooms is contrasted with over 78% of SBAE programs utilizing the system (Hanagriff, 2023).

### *Student and Teacher Motivation to Participate in SAE*

As agricultural education continues to evolve to serve a diverse population of students who often do not have a background in agriculture (NCAE, 2024), the motivation for students to participate in SAE has subsequently changed (Retallick, 2010). Since SAE's inception in agricultural education, SAE-based FFA awards (i.e., Proficiency Awards, Agriscience Fair, American Stars, FFA Degrees, etc.) have served as an extrinsic motivator for students (Bible, 1941; Retallick, 2010). Bible (1941) stated that "[t]he opportunity for degree advancement provides the single strongest drive for the boy to develop a strong supervised farm practice program… if he works hard enough to build a record of scholarship and leadership and a long-time farming program" (p. 117). Retallick (2010) identified the three main motivators for educators to promote SAE to students, including 1) utilizing financial management, record keeping, and record analysis to assist in employability skill development, 2) assisting students in developing a portfolio of FFA awards to promote accomplishments, and 3) SAE's inclusion as an essential component of the complete agricultural education experience.

### *Impact of SAE*

According to the National Association of Agricultural Educators (2024), there are over 1,000,000 students enrolled in agricultural education courses nationally. This expansive program has a profound impact on students' employability skill development (Haddad & Marx, 2018), technical skill acquisition (Ramsey & Edwards, 2011; Ramsey & Edwards, 2012), and financial management abilities (Retallick, 2010). While this impact has been well documented (Haddad & Marx, 2018; Ramsey & Edwards, 2011; Ramsey & Edwards, 2012; Retallick, 2010), there is a lack of literature on the economic impact of SAE on the local, state, and national economy.

## Purpose and Objectives

The purpose of this study was to describe the economic impact of SAE in the U.S. The results of this study have potential implications for agricultural educators, school administrators, state staff, and other agricultural education stakeholders. The following research objective guided this study:

1.) Describe the economic impact of SAE in the United States.

## Conceptual Framework

The conceptual framework that guided this study describes the input-output analysis of the IMPLAN Type II model utilized to estimate economic impact. As a result of the Rural Development Act of 1972 (UWCC, 2024), the IMPLAN model illustrates direct spending's impact on the larger economy (Slovachek, 2023a). This direct spending within agriculture creates a ripple effect throughout other industries through the supply chain (Slovachek, 2023a). This ripple effect is represented in the IMPLAN model by a unitless measure of economic impact called a multiplier (Slovachek, 2023a; Kim & Miller, 2017). The agriculture multiplier measures the industry's connection to the larger economy via an input-output analysis- this analysis utilizes matrix algebra to estimate economic effects (Slovachek, 2023a). The IMPLAN model has several methodologies to calculate economic multipliers, including Types I-IV, indirect, induced, and the Social Accounting Matrix (SAM) multipliers (Slovachek, 2023a). The researchers chose to utilize the Type II multiplier for this study because it introduces direct, indirect, and induced effects into the input-output analysis but does not introduce unnecessary or irrelevant factors that are utilized in other types of IMPLAN multipliers (i.e., Type I, Type IV, Type SAM).

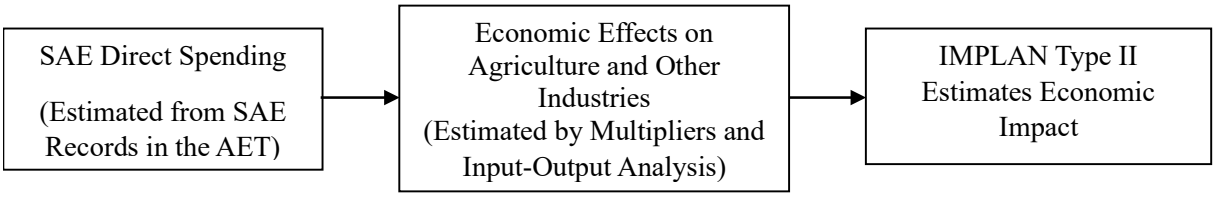
While the IMPLAN Type II model is the most accurate, conservative, and robust model for this study, it does have several assumptions and limitations. The IMPLAN model assumes that specific

parameters are accurate within the analysis, including a constant return to scale, industry homogeneity, fixed technology, a static model, and a fixed input structure (Slovachek, 2023b). These assumptions create some limitations to the IMPLAN model (Slovachek, 2023b). This model only analyzes backward linkages rather than forward linkages on how an industry's production is used as input for other production, also known as downstream effects (Slovachek, 2023b). The IMPLAN is also limited by the time the economy needs to settle after an introduced change (Slovachek, 2023b). Furthermore, this model does not consider inputs such as socio-political impacts, effects of innovation, or opportunity costs and does not forecast future economic activity (Slovachek, 2023b).

In the context of this study, direct spending through SAE activities can be estimated from financial data documented by agricultural education teachers and students in the Agricultural Experience Tracker (AET). This study utilized the AET data to estimate the national economic impact of SAE activities in the United States. This record-keeping system allows students to enter financial information, including cash/non-cash expenditures for current and non-current expenses, entrepreneurial income, placement income, and inventory management. These detailed financial records allowed us to estimate SAE spending accurately and extrapolate that information into national economic impact. The analytical process between SAE direct spending and the IMPLAN model analysis is depicted in Figure 2.

**Figure 2**

*Conceptual Framework on IMPLAN Model Economic Analysis*




## Methods

### *Participants*

Participants in this study included agricultural education programs that utilized the Agricultural Experience Tracker (AET) system for record keeping. The researchers found inconsistency in the reporting of the quantity of SBAE programs in the U.S. The Official FFA Manual reported 8,611 FFA chapters in 2018-2019 (FFA, 2020) and 8,817 FFA chapters nationally in 2020-2021 (FFA, 2023). The researchers were cautious to base national estimates on these figures because the number of FFA chapters is not necessarily indicative of the number of SBAE programs. The figures reported in the Official FFA Manual were contrasted with the estimates from Smith et al. (2019) in the National Agricultural Education Supply and Demand study, which reported 9,071 SBAE programs nationally. The National Agricultural Education Supply and Demand study (Foster et al., 2021) also reported 8,466 programs in 2020, which would indicate a loss of programs between 2018-2020. This is the opposite of what the National FFA Organization reports in its manual (FFA, 2020; FFA, 2023). While inconsistencies from Smith et al. (2019), Foster et al. (2020), and Foster et al. (2021) are likely from missing states, the response rates ranged from 89% to 98% and the researchers deemed this to be the most accurate way to develop a conservative estimate. To accurately determine a conservative estimate of the number of agricultural education programs in the U.S., the figures reported in the 2018-2020 National Agricultural Education Supply and Demand studies were averaged (See Table 1).

**Table 1**

*Average Number of SBAE Programs Nationally*

| Citation | # of SBAE Programs Nationally |
|---|---|
| Smith et al., 2019 | 9,071 |
| Foster et al., 2020 | 8,504 |
| Foster et al., 2021 | 8,466 |
| Average | ≈ 8,690 |

*Note*. Figures Based on National Estimates in the National Agricultural Education Supply and Demand Studies.

There were 6,752 agricultural education programs that utilized the AET record-keeping system during the 2021 calendar year (Hanagriff, 2023). This represents approximately 77.7% of SBAE programs nationally. Upon further analysis, 1,982 programs utilized the AET for SAE-based FFA award applications but did not keep student SAE records in this system. This left a total sample of 4,820 agricultural education programs that utilized the AET for student records, representing 54.4% of agricultural education programs nationally. Furthermore, the data was based on 619,077 students from 45 states within 4,820 programs.

### *Data Collection and Analysis*

All data utilized in this study was collected through student and teacher entries in the AET record-keeping system during the 2022 calendar year. The AET is a privately owned educational company specializing in SAE management and record-keeping for student projects (AET, 2024). The data was analyzed utilizing percentages, central tendencies, and national estimates of SAE's economic impact. The economic impact of SAE was estimated utilizing the IMPLAN model for economic value. This IMPLAN model is a set of multipliers that estimate the economic value of a project (Kim & Miller, 2016). The most comprehensive of the IMPLAN models is Type II (Kim & Miller, 2016). This model is used to estimate the economic impact of education, government, and tourism impact studies (Kim & Miller, 2016). The IMPLAN Type II multiplier for the agricultural industry utilized for this study was 1.90, suggesting that for every $1 invested, it generated $1.90 in economic impact (Hanagriff, 2023).

### *Limitations*

This study attempted to estimate the economic impact of SAEs on local, state, and national economies. The estimation analysis was limited because it is based on the 4,820 agricultural education programs that utilized the AET record-keeping system. It is possible that programs utilizing this system emphasized SAE more than the programs not implementing the AET. Furthermore, it was estimated that there were 8,690 agricultural education programs in the U.S. While this is a conservative estimate, any deviation from this figure could influence the estimations of economic impact and value.

## Results

The number of SAE projects per SBAE program varies greatly by numerous factors, including student population size, school size, the familiarity of the agricultural educator with SAE, etc. (Rubenstein & Thoron, 2015). The average program in this study had 1.92 teachers with 128 students per program (See Table 2).

**Table 2**

*Descriptive Statistics for Average SBAE Program in the United States*

| Program Demographics | 2022 Averages Per Program |
|---|---|
| Number of Teachers | 1.92 |
| Active Students (All Grades) | 128 |
| % of Students with SAEs (Active) | 52.3% |
| % of Students with Journals (Active) | 66.4% |

*Note*. *n* = 4,820 SBAE Programs

In addition, the average SBAE program had approximately 52.3% of its students engaged in an SAE. While many students have multiple projects, it was determined that the average program had approximately 67 students with those students having approximately 100 SAEs. Additionally, the average SBAE program had 28 foundational projects and 72 immersion projects. Within the immersion SAE category, entrepreneurship SAEs accounted for 26 projects (35.9%), placement SAEs accounted for 39 projects (54.1%), and research SAEs accounted for 7 projects (10.0%). This results in an estimate of approximately 865,245 SAEs nationally (See Table 3).

**Table 3**

*Student SAE Involvement Per-Program by Primary SAE Type*

| SAE Descriptive Area | # of SAEs Per Program | % | National Estimate (*N* = 8,690 Programs) |
|---|---|---|---|
| Total Foundational SAEs | 28 | | 243,744 |
| Total Immersion SAEs | 72 | | 621,501 |
| Entrepreneurship SAEs | 26 | 35.9 | 222,895 |
| Placement SAEs | 39 | 54.1 | 336,094 |
| Research SAEs | 7 | 10.0 | 62,512 |
| Total SAEs Per Program | 100 | 100.0 | **865,245** |

*Note*. *n* = 4,820. Averages per program have been rounded to the nearest whole figure. National estimates are based on unrounded per program averages to reduce rounding errors.

The average SBAE program had students earning $64,212 in financial income. This financial income primarily consisted of Paid Work Income ($36,325, 56.6%), Awards/Scholarships/Premiums ($8,119, 12.6%), Stock Show Sales ($7,435, 11.6%), SAE Labor Exchange ($6,405, 10.0%), Used at Home ($2,153, 3.4%), Cash/Market Sales ($1,677, 2.6%), Rental Income ($1,294, 2.0%), and Research Funding ($803, 1.3%). Paid Work Income was the highest value aligning with the largest SAE area (Placement SAE, 54%; See Table 3). Nationally, SAE income totaled approximately $558 million in student earnings. This provided earned financial support as students continued their career paths (See Table 4).

**Table 4**

*Income Values from SAE Engagement in Agricultural Education Programs*

| Area of SAE Income | Average Per Program | % | National Estimate ($N$ = 8,690 Programs) |
|---|---|---|---|
| Paid Work Income | $36,325 | 56.6% | $315,661,125 |
| Awards/Scholarships/Premiums | $8,119 | 12.6% | $70,552,060 |
| Stock Show Sale | $7,435 | 11.6% | $64,610,256 |
| SAE Labor Exchange | $6,406 | 10.0% | $55,668,116 |
| Used at Home | $2,153 | 3.4% | $18,705,814 |
| Cash/Market Sale | $1,677 | 2.6% | $14,573,668 |
| Rental Income | $1,294 | 2.0% | $11,248,350 |
| Research Funding | $803 | 1.3% | $6,980,241 |
| Total Vale | **$64,212** | 100.0% | **$557,999,629** |

*Note*. $n$ = 4,820. Averages per program have been rounded to the nearest whole figure. National estimates are based on unrounded per program averages to reduce rounding errors.

SAE projects conducted by students often require financial investments in current assets (operating expenses), such as inventory for resale, feed, fertilizer, etc., to make the income detailed in Table 4. These investment values were reported by students in their electronic AET record books with corresponding dates for each transaction. In 2022, the average SBAE program had students investing $73,158. The top SAE investments included Inventory for Resale ($23,875, 32.65%), Feed ($13,015, 17.8%), and Other Expenses ($6,756, 9.2%). Furthermore, there was approximately $635 million invested in operating expenses nationally (See Table 5).

**Table 5**

*SAE Investments in Operating Expenses*

| Expenditure Area | Average Per Program | % | National Estimate ($N$ = 8,690 Programs) |
|---|---|---|---|
| Inventory for Resale | $23,875 | 32.6 | $207,470,908 |
| Feed | $13,015 | 17.8 | $113,096,652 |
| Other Expenses | $6,756 | 9.2 | $58,711,261 |
| Rent | $5,514 | 7.5 | $47,913,612 |
| Fertilizer/Chemicals | $5,500 | 7.5 | $47,797,091 |
| Contract/Custom Hire | $4,563 | 6.2 | $39,648,549 |
| Supplies | $3,154 | 4.3 | $27,409,956 |
| Seed | $2,719 | 3.7 | $23,630,781 |
| Repairs/Maintenance | $1,948 | 2.7 | $16,929,098 |
| Paid Work Expense | $1,877 | 2.6 | $16,308,011 |
| Fuel | $1,530 | 2.1 | $13,297,698 |
| Veterinary Medicine | $1,364 | 1.9 | $11,854,754 |
| Entry Fees/Commissions | $1,344 | 1.8 | $11,675,443 |
| Total Value | **$73,158** | 100.0 | **$635,743,814** |

*Note.* $n$ = 4,820. Averages per program have been rounded to the nearest whole figure. National estimates are based on unrounded per program averages to reduce rounding errors.

SAE spending is estimated to be $635 million nationally, significantly supporting local, state, and national economies. This spending value excluded non-current assets (long-term assets) such as breeding animals, machinery, buildings, and land. These items are critical to an SAE's success and are additional drivers to local, state, and national economies. In 2022, SAE noncurrent item investing averaged $25,514 per SBAE program (See Table 6). Many of these investments are associated with students purchasing non-current assets for entrepreneurship SAEs to operate their enterprises. Overall, the average SAE investments for current assets and non-current assets total to $98,672 per SBAE program. Once total SAE investments were measured (operating expenses and non-current assets), additional impacts can be derived using economic multiplier factors ($1.90 per $1 in spending IMPLAN Type II Multiplier; See Table 6).

The economic impact of operating SAE expenses per SBAE program is estimated to be approximately $139,000 and non-current asset expenses are estimated to be $48,476. Overall, the economic impact of SAEs per program is estimated to be approximately $187,476 (See Table 6).

**Table 6**

*Direct Investments and Economic Impact Values from SAE Engagement*

| Area of Economic Activities (SAE Investments) | Average Program Value Direct Spending (Per Program) | Average Program Economic Value (IMPLAN 1.90, Type II) |
|---|---|---|
| Total Operating SAE Expenses | $73,158 | $139,000 |
| Non-Current Asset Purchases | $25,514 | $48,476 |
| Total Value | **$98,672** | **$187,476** |

*Note*. $n$ = 4,820

The average SBAE program has SAE investments of $98,672. These expenditures created $187,476 in total economic impact for the local, state, and national economy. This economic impact from agricultural education programs with SAE activities can also be extrapolated into national economic impact estimates. The national SAE spending of $857 million creates approximately $1.6 billion in economic impact (See Table 7).

**Table 7**

*National Direct Investments and Economic Impact Values from SAE Engagement*

| Area of Economic Activities (SAE Investments) | Average Direct Spending | National Economic Value (IMPLAN 1.90, Type II) |
|---|---|---|
| Total Operating SAE Expenses | $635,743,814 | $1,207,913,246 |
| Non-Current Asset Purchases | $221,713,515 | $421,255678 |
| Total Value | $857,457,328 | **$1,629,168,924** |

*Note*. $n$ = 4,820

## Conclusions and Implications

The results of this study suggested that SAEs contributed significantly to the national economy, with an estimated national economic impact of $1.63 billion. This economic impact was produced by approximately 865,245 SAE projects, with an estimated $857 million in direct spending. This study also suggested that the average agricultural education program had approximately 52% of students engaged in

SAE, with 100 SAE projects among 67 students and 128 students in the SBAE program. Within these 100 SAE projects, 72% were immersion and 28% foundational. Immersion SAEs included 35.9% entrepreneurship projects, 54.1% placement SAEs, and 10.0% research experiences. Additionally, the average SBAE program had $187,476 in estimated economic impact. The majority of these SAE projects require financial investments and, in many cases, financial income from the enterprise.

The results of this study noted that the average SBAE program had $64,212 in SAE income, with $36,325 of this income resulting from placement SAEs (paid work income). However, the average SBAE program incurred $98,672 in current and non-current entrepreneurial expenses, suggesting that most SAEs, outside of placement projects, are not profitable enterprises. This is concerning because Talbert et al. (2005) purported that learning financial management was one of the top purposes of SAE, and financial management is one of the core principles of the 'SAE for All' initiative (See Figure 1). While a negative financial return on the average SAE may be concerning, agricultural education manifests itself positively in the long-term lives of SBAE students (McKim et al., 2018). McKim et al. (2018) determined that each Carnegie unit of agricultural education results in an average of $1,850.67 in additional annual income for secondary graduates and $457.40 in additional annual income for postsecondary graduates.

In addition to financial management, Talbert et al. (2005) also suggested that developing employability skills is a primary purpose of SAE. Currently, many employers claim that students exiting secondary education are not prepared for the workforce and lack essential employability skills such as communication, work ethic, and self-motivation (Institute of Student Employers, 2018; Ramsey & Edwards, 2011). Plasman and Thompson (2023) suggested that WBL is an effective tool for teaching employability skills. Ramsey and Edwards (2011) found that agricultural industry leaders expected students to learn these skills through their SAE projects. With the resurgence of Work-Based Learning (WBL) in the recently passed Perkins V legislation (Plasman & Thompson, 2023), agricultural education stakeholders will have to rededicate their commitment to WBL opportunities such as SAE.

The economic value of SAE has significant implications for promoting the impact of agricultural education to its stakeholders, including educators, administrators, legislators, etc. The economic benefits of SAE provide SBAE professionals with an additional route to advertise the impact of SBAE and showcase its importance. Norris et al. (2023) determined that CTE administrators value employability skills education in agricultural education, and Plasman and Thompson (2023) suggested that WBL learning opportunities, such as SAE, were highly effective at instilling students with employability skills. The economic and educational value of SAE are critical tools in communicating SBAE's role in CTE and the overall educational system, which can ultimately help secure support and resources from SBAE stakeholders.

## Recommendations for Future Practice and Research

To ensure agricultural education's success in the future, the effective implementation of SAE is critical (Croom, 2008). The passing of the *Strengthening CTE for the 21st Century Act* (Perkins V) marks a resurgence in the commitment to WBL throughout CTE, including agricultural education (Plasman & Thompson, 2023). Plasman and Thompson (2023) further purported that "WBL opportunities (i.e., job shadowing, mentoring, etc.) incorporate key aspects of informal learning such as opportunities for spontaneous learning, self-pacing, and unstructured at a micro-level which encourage sustained participation and growth" (p. 320). This commitment to 'College and Career Readiness' prompts the researchers to recommend that agricultural education stakeholders find innovative ways to engage a larger group of SBAE students in SAE. Additionally, the researchers recommend that the agricultural education profession report the impact of SAE to its stakeholders, including its economic impact of $1.63 billion.

The development of the 'SAE for All' model is an attempt to engage a broader audience in SAE. In addition, Rubenstein and Thoron (2015) suggested that the agricultural educator is the primary driver of

successful SAE implementation. Considering that only 53% of agricultural teacher preparation programs offer undergraduate courses in SAE implementation (Rank & Retallick, 2017), the researchers suggest that teacher preparation programs ensure they are providing quality instruction on SAE implementation so preservice educators are knowledgeable and confident in their skills to integrate SAE into professional practice.

The researchers also recommend that further studies be conducted to evaluate the economic impact of SAE by region of the U.S. Additionally, SAE's impact on other areas, such as technical skills development, employability skills development, etc. should be assessed. Furthermore, with only 52.3% of SBAE students participating in SAE, research should evaluate which demographics of students are not participating in SAE and barriers to their inclusion.

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