

The Status of U.S. Agricultural Teacher Education: A Review of Capacity

Rebecca Lawver, Utah State University
Daniel Foster, Pennsylvania State University
Amy Smith, University of Minnesota

Abstract

Agricultural teacher education has occurred in the United States since the early 1900s. A supply of highly qualified school-based agriculture teachers is critical to sustain school-based agricultural education. Although agricultural teacher education programs at the post-secondary level are at historic highs, the number and nature of full time equivalent (FTE) positions in post-secondary agricultural education is changing. The majority of agricultural education faculty, and both undergraduate and graduate academic programs in agricultural education are affiliated with colleges of agriculture. Academic opportunities in agricultural education at both the undergraduate and graduate levels are unevenly distributed across the nation. Further studies are recommended to describe the activities and workload of post-secondary agricultural education faculty involved in agriculture teacher preparation.

Introduction and Conceptual Framework

Since 1965, the National Supply and Demand for Agricultural Education project has been supported by the American Association for Agricultural Education (AAAE) and utilized by its members. The study has historically provided a great deal of valuable information to those engaged in the agricultural education profession. Particularly, determining who is teaching school-based agricultural education and whether or not there is an appropriate supply to meet demand is important to agriculture teacher educators, school-based agriculture students, parents, school administrators, policy makers and other stakeholders in agricultural education. Prior to efforts of the current National Supply & Demand project team, the most recently report prepared by Adam Kantrovich (2010) stated:

Leaders of the profession need current, accurate estimates of the numbers of and demand for teachers of Agricultural Education to provide for meaningful policy decisions at all levels. Teacher organizations and teacher educators need current, accurate supply and demand information to use in recruitment activities and in counseling potential teachers of Agricultural Education. Yet, detailed data of that nature, specific to Agricultural Education, are not available outside this study (p. 8).

Bricker (1914) discussed common sources for agriculture teachers. He identified four main sources: 1) nature-study teachers; 2) agricultural college graduates; 3) high school science teachers; and 4) people raised on farms. While he was critical of all four sources to a degree, he was most critical of sourcing agriculture teachers from individuals raised on farms. Bricker stated, "They are persons who have been 'raised on the farm' and who therefore think themselves amply qualified to teach agriculture" (p 121). Less criticism was directed toward agricultural college graduates, but Bricker noted that such individuals do "not understand children" (p. 118). He continued, noting that "Association for a period of four or more years with adults has given him the point of view in education in which only matured minds, bodies, experiences and lives have entered" (p. 118). The

attitude of high school science teachers was the main criticism suggested by Bricker, as agriculture is “more than a science: it is an art and a business” (p. 119).

Given limitations or challenges with each of these identified sources, where then are agriculture teachers to come from? Bricker proposed a then novel idea – agriculture teachers should come from agricultural education departments at normal schools and agricultural colleges; such programs would be designed to give training in the theory and practice of teaching within agriculture. Interestingly, several such departments existed near to that time. The Smith-Hughes Act of 1917 mandated that training of vocational teachers would be supervised by the State board for vocational education and outlined specifications which were to be followed in the training programs (Swanson, 1942). True (1929) reported 20 departments functioning at the time of the passage of Smith-Hughes. Stimson and Lathrop (1942) reported agricultural teacher preparation existed prior to 1917 at Iowa State University, Pennsylvania State University, and Texas A & M University.

Since the very beginning, there have been concerns about the professional capacity to prepare an adequate supply of school-based agricultural educators. According to Kruse (1915),

This sudden and rapid growth and the resulting demand for teachers has created a serious, if not the most serious problem in the training of teachers... Nobody knew what should be taught in secondary agriculture, much less what qualifications the agricultural teacher should have, and least of all, how to train them (p. 2).

Swanson (1942) continued, “The initiation of vocational agriculture under the vocational education acts created a problem of teacher supply” (p. 526). True (1929) acknowledged that fluctuating demand was difficult for any one state to estimate. He continued, “The ideal would be to have production well in advance of the probable annual need, perhaps 10 to 20 percent. This would provide for emergency years and in average years allow for culling” (True, 1929).

Still, today shortages are occurring in a variety of areas for reasons ranging from a decrease in teachers entering the profession, an increase in student enrollment, and new positions and courses being added to better prepare students for life beyond graduation (Berry & Shields, 2017). The shortage is exacerbated by factors including public perception of the profession influenced by federal and state legislation, the teacher evaluation process (Goldhaber, 2015), and increased workload, paperwork, and the amount of classroom time lost to standardized testing (Thibodeaux, Labat, Lee, & Labat, 2015). As such, the need to explore policy interventions to address the desirability of the profession becomes acute.

While the teacher shortage is an issue facing the entire nation, the issue does not affect all content areas or geographic regions with the same magnitude. Repeatedly, it has been shown that “dearth of qualified teachers is felt more acutely in schools serving more low-income and minority students” (Darling-Hammond, Furger, Shields & Sutchter, 2016). Additionally, the shortage is most significant in highly urban and rural areas, Title I Schools, and certain geographic areas, such as “the American West” due to geographic isolation (Martin & Mulvihill, 2016).

Within agricultural education, ongoing conversations have occurred at regional and national meetings of the American Association for Agricultural Education (AAAE) as well as in school-based agriculture stakeholder organizations. The profession has challenged individuals to tackle the ongoing recruitment and retention issues head on. While agricultural education has identified and

monitored the appropriate supply of school-based agricultural education graduates since the 1960s, as a profession we are not unique in concern regarding supply and demand of qualified teachers.

The central mission of post-secondary agricultural education programs is the preparation of licensed educators in agriculture, with teaching and learning applications extending beyond that into a variety of settings (Barrick, 1993). Recognizing the capacity of post-secondary agricultural education programs for preparing licensed educators is essential for identifying challenges, opportunities and next steps with regard to the current shortage. This study directly addresses two of the core mandates outlined within the national research agenda for agricultural education (Roberts, Harder, & Brashears, 2016), by addressing the following priorities: *Research Priority Area 3: Sufficient Scientific and Professional Workforce That Addresses the Challenges of the 21st Century* and *Research Priority Area 5: Efficient and Effective Agricultural Education Programs*. Describing the status of the capacity of post-secondary teacher preparation programs to supply licensed school-based agriculture teachers can lead to more nuanced conversations around recruitment and retention best practices, interventions, and policy. It is the task of the leaders within the profession to identify contextually relevant and appropriate applications of these strategies with help from partners and stakeholders of school-based agricultural education.

The conceptual framework presented in Figure 1 guided this study. The framework identifies factors contributing to school-based agricultural educator supply and demand. Greater knowledge regarding the sources impacting supply and the factors influencing demand is necessary to reduce or eliminate the chronic teacher shortage issue within agricultural education.

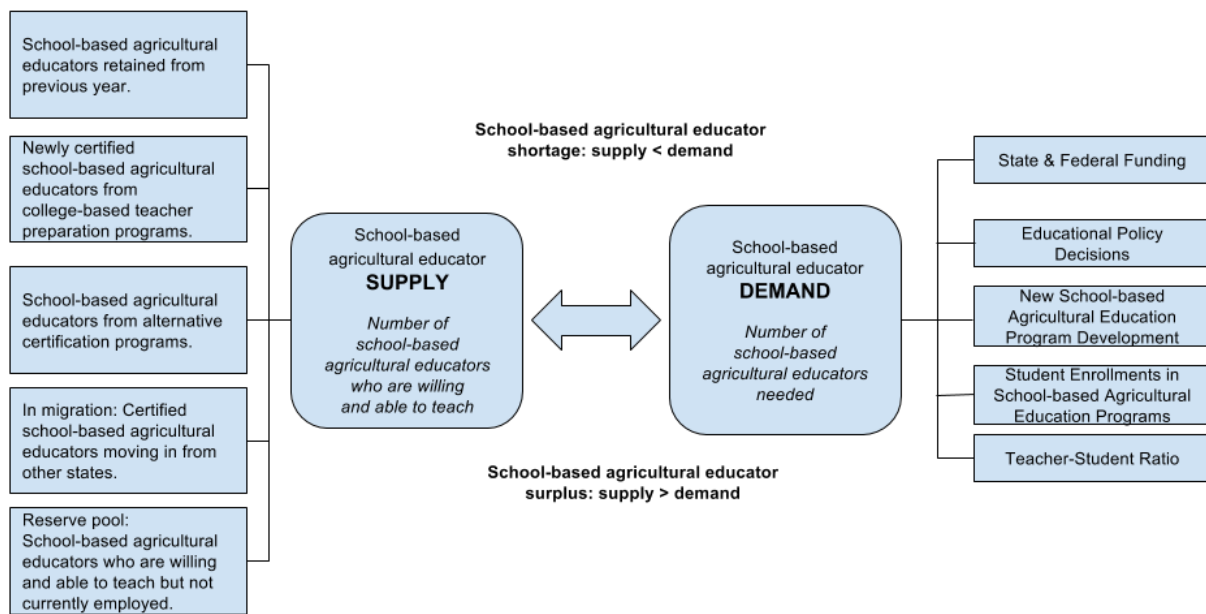


Figure 1. Conceptual framework of School-based Agricultural Education National Supply and Demand Study. Adapted from Lindsay et al. (2009).

Purpose & Objectives

The purpose of the study was to describe the capacity of school-based agricultural teacher education in the United States. The following objectives provided guidance for the development summary of data collected annually from 2014-2016:

1. Describe historical trends of agricultural teacher education in the United States.
2. Describe agricultural teacher education full time equivalent positions in higher education the United States.
3. Describe college affiliation of faculty, undergraduate programs and graduate programs in agricultural education in the United States.
4. Describe academic opportunities within agricultural education across the United States.

Methods

This study built upon existing processes and protocols in place for the National Agricultural Education Supply and Demand research. The project team worked to strengthen and streamline data collection methods for both supply and demand aspects of the study. The parameters for the study (#4564) were approved by the Institutional Review Board for Human Subjects Research at the Pennsylvania State University. Specifically, this segment of the research highlights data collected related to supply. The population included agricultural teacher educators from each institution that offers a school-based agricultural education program leading to teacher licensure. The original frame was developed from membership in AA AE, with additions being made as a result of key stakeholder input. Each year, prior to the start of data collection, the frame of institutions and institutional contacts was scrutinized to ensure accurate and up-to-date information. To stay informed of changes to institutional contacts, the last question of the supply survey requested the name and contact information for individual who should be asked to provide the following year's data; this allowed for anticipated changes to be noted within the frame. To assist with trustworthiness of data collection, an informational email was sent prior to the start of data collection to each institutional contact. This email provided a state snapshot of data reported the previous year and indicated who would be contacted in the coming weeks.

Data Collection and Instrumentation

As this is a legacy study, the starting point for the supply instrument was the list of items asked in previous iterations of the National Agricultural Education Supply and Demand study. Items were added and revised based on literature and feedback from a panel of expert agricultural teacher educators who reviewed the instrument for face, content, and construct validity. Reliability was checked annually and found to be appropriate for a descriptive study.

Data was collected using Qualtrics, in accordance with Dillman's (2014) guiding principles for Internet and mixed-methods data collection. Following dissemination of individual survey links and reminders by email, researchers followed up with individual phone calls to non-respondents. Individual links were resent or data was collected by phone.

The initial data collection occurred in 2014. This study reflects three years of data collection (2014, 2015, 2016). In 2014, initial contact was made in May, with data collection closing in August. In subsequent years, the timeline for data collection was altered so that initial contact occurred in August, with data collection closing in December. This adjustment was made in response to concerns expressed by teacher educators who were unable to provide accurate and complete data regarding program completers in the spring. All data were treated with confidentiality.

Handling potential survey error

There are four general sources of survey error: Sampling Error, Measurement Error, Coverage Error and Non-Response Error (Dillman et al, 2014). Below are the methods utilized to control for error. As a census of possible respondents was desired, sampling error was not applicable to this study. Measurement error was mitigated through the use of panel of experts to review and evaluate validity of the instrument. This included review for face, content, and construct validity. Similar to sampling error, a census approach controlled for coverage error. Recognizing that 17 institutions failed to respond to Kantrovich (2010), additional efforts were made to reduce non-response. Institutions who failed to respond were contacted in person via telephone. Due to familiarity with the population as well as the manageable frame size, researchers were aggressive in reaching out via multiple communication modes to obtain representative data. Table 1 reports the number of respondents, response rate and identifies non-respondent institutions. It should be noted that as of 2016, the following five states and territories do not have an agricultural teacher preparation program: Hawaii, Maine, Rhode Island, Vermont and the Virgin Islands.

Table 1

Supply Non-Respondents 2014-2016

| | 2014 | 2015 | 2016 |
|-------------------------|------|------|-------|
| Responding Institutions | 91 | 96 | 101 |
| Response Rate | 88 % | 97 % | 100 % |

Note. Non-Respondents in 2014: Univ. of Arkansas – Pine Bluff, Fort Hays State Univ., Univ. of Maryland – College Park, Univ. of Massachusetts, College of the Ozarks, Missouri State Univ., Univ. of New, Hampshire Delaware Valley College, Middle Tennessee State Univ., Angelo State Univ., Prairie View A&M & Univ. of Wisconsin – Platteville. Non-Respondents in 2015: Delaware State Univ., Univ. of Arkansas – Pine Bluff & Univ. of Georgia - Tifton

Data Analysis

Once data were collected, efforts were made to ensure the accuracy of data; the researcher team reviewed data reported for inconsistencies and errors. When issues were found, personal phone calls to institutional contacts were made to verify or correct the data. Data were analyzed primarily using excel database features for simple descriptive statistics. A longitudinal analysis of historical data was also conducted. Frequencies and percentages were used to describe historical trends. This included data analysis and utilization of historical research methods. Historical data prior to 2014 was obtained from previous National Agricultural Education Supply & Demand reports. Descriptive statistics including frequencies and percentages were used to describe agriculture teacher education programs including FTE, college affiliation, etc. Decisions regarding presentation of data were made with consideration of preserving the integrity for longitudinal analysis, building from previous reports.

Limitations

Data can only be taken at face value, as reported by each respective institutional contact. Each individual academic institution has disparate and unique data collection systems and processes. Ideally, increased fiscal resources would allow for human resources to verify data with state/federal data warehouses.

Findings

Objective 1: Describe Historical Trends of Agricultural Teacher Education in the United States

The importance of a well-prepared teacher and the role that teacher training played in that process is evidenced in the provisions of the Smith-Hughes Vocational Education Act of 1917, a significant piece of legislation impacting school-based agricultural education. For example, states participating were required to use the minimum amount appropriated for the training of teachers in order to secure other benefits of the act (Swanson, 1942). Evidence of agricultural teacher education programs exists starting as early as 1907 (Bailey, 1908) with numerical reports of newly qualified candidates existing as of 1920 (Jarvis, 1921, Federal Board for Vocational Education, 1921). Table 2 shows the number of institutions with agricultural teacher preparation programs as reported from 1907 to 2016. These numbers are pulled from historical reports (Jarvis, 1921; Swanson, 1942), past supply studies (Camp, 2000; Camp, Broyles, & Skelton, 2002; Kantrovich, 2007; Kantrovich, 2010) and current collected data from 2014-2016 (Foster, Lawver, Smith, 2014; Foster, Lawver & Smith, 2015; Smith, Foster, & Lawver, 2016).

Table 2
Historical Perspective of Reported U.S. Agricultural Teacher Education Programs

| Year | Number of U.S. Institutions | Year | Number of U.S. Institutions |
|------|-----------------------------|-------------------|-----------------------------|
| 1907 | 1 | 1922 | 69 |
| 1908 | 1 | 1923 | 78 |
| 1909 | 3 | 1924 | 68 |
| 1910 | 6 | 1925 | 70 |
| 1911 | 7 | 1941 | 72 |
| 1912 | 9 | 1989 | 88 |
| 1913 | 13 | 1995 | 84 |
| 1914 | 17 | 1998 | 78 |
| 1915 | 18 | 2001 | 79 |
| 1916 | 19 | 2006 | 92 |
| 1917 | 30 | 2009 | 92 |
| 1918 | 47 | 2014 | 103 |
| 1919 | 60 | 2015 | 99 |
| 1920 | 64 | 2016 | 101 |
| 1921 | 69 | 2017 ¹ | 101 |

¹Note: Reflects preliminary data collected.

Objective 2: Describe Agricultural Teacher Education Full Time Equivalent Positions in Higher Education the United States

Data has been collected regarding the total full time equivalent positions dedicated to agricultural teacher education since 2001. From 2001 to 2014, the profession has experienced approximately a 20% decrease (n=48.95) in total FTE dedicated to agricultural teacher education. Table 3 presents the full time equivalent faculty dedicated to all instruction in agricultural teacher education as compared to the FTE accounted for by tenure track faculty. Since 2001, the FTE

accounted for by tenure track faculty has been consistently near 2/3 of all agricultural teacher education positions (range of 60.84% to 72.23%). The data presented in Table 4 presents full time equivalent faculty of agricultural teacher education programs, by region and nationally, as reported in 2014. Data presented in Table 5 displays a historical perspective of full time equivalent faculty, tenure track faculty, instructors, graduate students, and clinical professors dedicated to agricultural teacher education.

Table 3

Full Time Position Equivalents Dedicated to Agricultural Teacher Education Since 2001

| Year | Tenure Track | Total FTE | % of Positions |
|-------------------|--------------|-----------|----------------|
| 2001 ¹ | 166.4 | 249.7 | 66.64 % |
| 2004 ¹ | 132 | 185.5 | 71.16 % |
| 2006 ¹ | 167.5 | 231.9 | 72.23 % |
| 2009 ¹ | 143.4 | 235.7 | 60.84 % |
| 2014 | 142 | 200.75 | 70.73 % |

¹Note: Data presented in 2001, 2004, 2006, 2009 was collected by Kantrovich (2010).

Table 4

2014 Agricultural Education Full Time Equivalent (FTE) Positions by Region & U.S. Totals

| | Total FTE | Asst./ Assoc./ Full Professor | Instructor | Graduate Assistant | Clinical Faculty/ Professor of Practice | Other |
|-------------------------|-----------|-------------------------------|------------|--------------------|---|-------|
| North Central Region | 48.00 | 29.80 | 10.25 | 5.50 | 2.20 | 0.25 |
| Southern Region | 106.30 | 81.55 | 11.00 | 11.50 | 1.25 | 1.00 |
| Western Region | 46.45 | 30.65 | 7.30 | 7.50 | 1.00 | 0.00 |
| U.S. Total | 200.75 | 142.00 | 28.55 | 24.50 | 4.45 | 1.25 |
| U.S. 2009 ¹ | 235.70 | 143.40 | 29.80 | 61.50 | Not collected | 1.00 |
| U.S. 2006 ¹ | 231.90 | 167.50 | 21.50 | 39.00 | Not collected | 4.00 |
| U.S. 2004 ¹ | 185.50 | 132.00 | 12.50 | 35.00 | Not collected | 6.00 |
| U. S. 2001 ¹ | 249.70 | 166.40 | 18.00 | 60.80 | Not collected | 4.50 |

¹Note: Data presented in 2009, 2006, 2004, 2001 was collected by Kantrovich (2010).

Table 5

Historical Perspective of Agricultural Education Full Time Equivalent (FTE) Positions in U.S.

| Year | Reporting Institutions | Total FTE | Asst./ Assoc./ Full Professor | Instructor | Graduate Assistant | Clinical Faculty/ Professor of Practice | Other |
|-------------------|------------------------|-----------|--|------------|-----------------------|--|-------|
| 2017 ¹ | 93 | 171.96 | 135.71 | 25.7 | 16.1 | 14.55 | 3.85 |
| 2014 | 91 | 200.75 | 142.00 | 28.55 | 24.50 | 4.45 | 1.25 |
| 2009 ² | 92 | 235.70 | 143.40 | 29.80 | 61.50 | NA | 1.00 |
| 2006 ² | 92 | 231.90 | 167.50 | 21.50 | 39.00 | NA | 4.00 |
| 2004 ² | n/a | 185.50 | 132.00 | 12.50 | 35.00 | NA | 6.00 |
| 2001 ² | 79 | 249.70 | 166.40 | 18.00 | 60.80 | NA | 4.50 |

¹ Preliminary data collected by Smith, Lawver & Foster (2018).

² Note: Data presented in 2009, 2006, 2004, 2001 was collected by Kantrovich (2010). Clinical faculty were not reported.

Objective 3: Describe College Affiliation of Faculty, Undergraduate Programs and Graduate Programs in Agricultural Education in the United States

Table 6 reports the college home for agricultural teacher education faculty, undergraduate programs and graduate programs. The majority of faculty lines are housed in colleges of agriculture (n=72) with nine residing in colleges of education. Responses for institutions at which faculty are not affiliated with a college of agriculture or college of education (n=10) are listed in Table 7.

Table 6

College Affiliations of Agricultural Education Faculty, Undergraduate Programs and Graduate Programs as Percentages of Reporting Programs (N=91)

| | College of Agriculture | College of Education | Other | No Response |
|-----------------------|---------------------------|-------------------------|-------|-------------|
| Faculty | 79% | 10% | 11% | 0% |
| Undergraduate Program | 69% | 16% | 14% | 1% |
| Graduate Program | 50% | 13% | 8% | 29% |

Note. Data as reported in 2014.

The majority of undergraduate students completing licensure programs in agricultural education received degrees through colleges of agriculture (n=61), while a smaller number of undergraduates receive degrees from colleges of education (n=14). Fewer than 1% (n=4) of students complete agricultural education licensure programs at institutions where the degree is only offered at the graduate level. Responses for institutions at which undergraduate programs are not affiliated with a college of agriculture or college of education (n=12) are presented in Table 7.

The majority of graduate programs are housed within colleges of agriculture (n=46), while 8% (n=12) of graduate degrees are offered in colleges of education. Twenty-six institutions reported offering no graduate program. Responses for those with graduate programs not affiliated with a college of agriculture or college of education (n=7) are presented in Table 7.

Table 7

Listing of Other College Affiliations for Faculty Appointment, Undergraduate Degree, and Graduate Degree (N=91)

| <u>Faculty Other</u> | <u>Undergraduate Degree Other</u> | <u>Graduate Degree Other</u> |
|---|--|---|
| <ul style="list-style-type: none"> • Arts and Sciences • Business • Collaborative Agreement • College of Applied Arts • College of Applied Sciences • College of Business and Technology • College of Natural Sciences • College of Sciences • College of Science and Engineering • Department of Agriculture | <ul style="list-style-type: none"> • Arts and Science • Business • College of Applied Arts • College of Applied Sciences and Technology • College of Business • College of Natural Science and Mathematics • College of Sciences • College of Science and Engineering • Different University Campus • Either BA of Education or BS of Agriculture • Science and Engineering | <ul style="list-style-type: none"> • Arts and Science • Business • College of Applied Arts • College of Applied Sciences and Technology • College of Business • College of Education • College of Graduate Education • College of Science and Engineering |

Note. Data as reported in 2014.

Objective 4: Describe Academic Opportunities in Agricultural Education in the United States

In 2016, the third year of data collection, there were 101 reporting institutions (Smith, Lawver, & Foster, 2017). When analyzed by AAAE region, the Southern Region has the most reporting institutions (n=46; 45.5%), followed by the North-Central Region (n=38; 37.6%), and the Western Region (n=17; 16.8%). In 2014, 91 programs responded to data collection. Table 8 presents the academic degree opportunities available at each institution. Of the 91 programs identified in 2014, the academic calendar was predominately semester based. Five programs (1 in the Southern Region and 4 in the Western Region) operated on quarters with the remaining 86 programs being semester based. Other Master's degree programs offered at reporting institutions included a Masters of Agricultural Leadership Masters of Arts and Teaching and General Agriculture. Of the institutions reporting undergraduate programs (N=91) in 2014, 65.6% (n=59) require all agricultural education majors to complete teacher licensure requirements as opposed 34.4% (n=31) which provide a non-teaching option.

Table 8

Type of U.S. Post-Secondary Degrees Offered in Agricultural Education (N=91)¹

| | B.S. | B.A. | M.S. | M.A. | M.Ag. | M.Ed. | Other Masters | Ed.S. | Ed.D. | Ph.D. |
|-------------------------|------|------|------|------|-------|-------|------------------|-------|-------|-------|
| North Central Region | 25 | 2 | 13 | 3 | 0 | 6 | 1 | 0 | 0 | 7 |
| Southern Region | 42 | 0 | 24 | 1 | 5 | 6 | 3 | 1 | 5 | 8 |
| Western Region | 15 | 0 | 7 | 1 | 3 | 3 | 0 | 0 | 0 | 1 |
| U.S. Total | 82 | 2 | 44 | 5 | 8 | 15 | 4 | 1 | 5 | 16 |

¹ *This data was not previously collected in the Supply and Demand Project.*

Conclusions, Implications, Recommendations

For over a century, teacher preparation has been an integral part of post-secondary agricultural education programs. Through collaborative efforts of agriculture teachers, state supervisors, and university faculty, agricultural teacher preparation has served as the major source of school-based agriculture teachers across the United States. Currently, the number of agricultural teacher education programs is at a historic high. Nonetheless, the number of full-time equivalent positions and tenure-track positions in agricultural teacher education have decreased. The composition of faculty in agricultural education has steadily shifted from ranked, tenure-track positions to contingent positions, including instructors, clinical faculty/professors of practice, and graduate assistants. This shift is in alignment with observations in all areas of higher education. There has been significant growth in the number of faculty that are employed in part-time or full-time non-tenure track positions at U.S. colleges and universities over the last twenty-years (Anderson, 2002; Baldwin & Chronister 2001; Conley, Lesley, & Zimble, 2002; Ehrenberg, 2004; Ehrenberg & Zhang, 2004). The hiring of contingent faculty in lieu of, or in addition to, tenure-track faculty is often due to budget constraints, decreasing state support, retirements, and changing enrollment patterns (Green, 2007). Critics charge that universities exploit contingent faculty and graduate students, engaging in a type of bait and switch, promoting institutional standing based on distinguished faculty who seldom teach undergraduates (Cross & Goldenberg, 2011). As a result, some suggest that undergraduates may be provided an inadequate educational experience (Cross & Goldenberg).

This shift away from ranked, tenure-track faculty in agricultural teacher education may create challenges within the profession. Ehrenberg and Zang (2005) suggests the use of part-time and full-time non-tenure track faculty adversely affects undergraduates enrolled at four-year universities by reducing their five- and six- year graduation rates. While expanding the use of non-tenure track faculty may be beneficial in allowing tenure track faculty to focus on research, Ehrenberg and Zang found a small positive effect on the volume of external research and development expenditures for tenure track faculty with the addition of full-time non-tenure track faculty and no effect with the addition of part-time non-tenure track faculty.

The future of agricultural teacher preparation programs requires additional tenure-track faculty to support the training of future agriculture teachers. One of the preeminent concerns of the

general public and policymakers is the effectiveness of educators in leading students to high and ever-increasing levels of achievement (APA, 2014). While the increase in contingent hires in agricultural teacher preparation may have a positive influence on budgets, increased program enrollment, and research productivity of tenure-track faculty, it is recommended that institutions carefully consider the addition of non-tenure track faculty. Departments must ensure quality instruction, encourage instructional standards of the institution as well as school-based agricultural education, and promote research in agricultural education to remain current with national trends in education.

Colleges of agriculture across the U.S. appear to be the primary home of affiliation for faculty and both undergraduate and graduate academic programs in agricultural education. At the same time, there are a number of agricultural teacher preparation programs and faculty housed in other colleges. There are regionally disparate opportunities to access agricultural education academic programs in the United States, with the majority 52% of all undergraduate and graduate degrees are offered by the Southern Region, 31% by the North Central Region and only 17% by the Western Region of AAEE. Further examination of the supply and demand of agricultural education should compare the opportunities available for degrees and the shortage of teachers in each region. Eighty-four institutions offer undergraduate degrees in agricultural education, 76 masters degrees are available and 22 doctoral degrees. Due to the decrease in tenure-track faculty positions and increase in contingent faculty, what is the true demand for advanced degrees in agricultural teacher education? An exploration of graduate programs across the U.S. should occur to determine degree type and job placement of graduate degree completers.

Overall, continued collection of supply and demand data within school-based agricultural education is essential. Data including faculty full-time equivalent, college affiliation of faculty, undergraduate and graduate programs, and academic opportunity availability is necessary to anticipate and prepare for the future of agricultural teacher education. Future research could also investigate the impact of degree programs in colleges of education, impact of tenure-track and non-tenure track positions on recruitment, retention, graduation rates, and research productivity and supply and demand of doctoral candidates in agricultural education.

References

- American Psychological Association (APA) (2014). *Assessing and Evaluating Teacher Preparation Programs*. Retrieved from <http://www.apa.org/ed/schools/teaching-learning/teacher-preparation-programs.pdf>
- Anderson, E. L. (2002). *The new professoriate: Characteristics, contributions, and compensation*. Washington D.C.: American Council on Education, Center for Policy Analysis. Retrieved from <http://www.acenet.edu/bookstore>
- Bailey, L. H. (1908). *On the training of persons to teach agriculture in the public schools (U.S. Bureau of Education Bulletin No. 1)*. Washington, DC: U.S. Government Printing Office.
- Baldwin, R. G., & Chronister, J. L. (2001). *Teaching without tenure: Policies and practices for a new era*. Baltimore Md.: Johns Hopkins
- Barrick, K. R. (1993). A Conceptual Model for a Program of Agricultural Education in Colleges and Universities. *Journal of Agricultural Education* 34 (3), 10-16.
- Berry, B., & Shields, P. M. (2017). *Solving the teacher shortage: Revisiting the lessons we've learned*. Phi Delta Kappan, 98(8), 8-18. doi:10.1177/0031721717708289
- Bricker, G. A. (1914). *Agricultural education for teachers*. New York: American Book Company.
- Conley, V. M., Leslie, D. W., & Zimbler, L. J. (2002). *Part-Time Instructional Faculty and Staff: Who They Are, What They Do, and What They Think*. Washington D.C.: U.S. Department of Education.
- Camp, W. G. (2000). *The 33th volume of a national study of the supply and demand for teachers of agricultural education 1996-1998*. Blacksburg, VA: Virginia Polytechnic Institute and State University. American Association for Agricultural Education.
- Camp, W. G., Broyles, T., & Skelton, N. S. (2002). *The 34th volume of a national study of the supply and demand for teachers of agricultural education 199-2001*. Blacksburg, VA: Virginia Polytechnic Institute and State University. American Association for Agricultural Education.
- Cross, J. G. & Goldenberg, E. N. (2009). *Off-track profs: Non-tenured teachers in higher education*. Massachusetts Institute of Technology.
- Darling-Hammond, L., Furger, R., Shields, P., Sutchter, L. (2016). *Addressing California's emerging teacher shortage: An analysis of sources and solutions*. Retrieved from www.learningpolicyinstitute.org/addressing-ca-teacher-shortage
- Dillman, D. A., Smyth, J. D., Christian, L. M., & Dillman, D. A. (2014). *Internet, mail, and mixed-mode surveys: The tailored design method*. Hoboken, N.J: Wiley & Sons.

- Ehrenberg, R. G. (2004). Don't blame faculty for high tuition: The annual report of the status of the profession. *Academe*, 90(2), 19-103.
- Ehrenberg, R. G. & Zhang, L. (2004). *The Changing Nature of Faculty Employment*. Cornell Higher Education Research Institute Working Paper No. 44. Ithaca N.Y.: Cornell Higher Education Research Institute (available at www.ilr.cornell.edu/cheri)
- Ehrenberg, R. G. & Zhang, L. (2005). Do tenured and Tenure-track faculty matter? *The Journal of Human Resources*, 40(3), 647-659.
- Education, U. S. F. B. f. V. (1921). *Annual Report to Congress of the Federal Board for Vocational Education*: U.S. Government Printing Office.
- Foster, D. D., Lawver, R. G., & Smith, A. R. (2014). *National Agricultural Education Supply and Demand Study, 2014 Executive Summary*. Retrieved from <http://aaaeonline.org/Teacher-Supply-and-Demand>
- Foster, D. D., Lawver, R. G., & Smith, A. R. (2015). *National Agricultural Education Supply and Demand Study, 2014 Executive Summary*. Retrieved from <http://aaaeonline.org/Teacher-Supply-and-Demand>
- Goldhaber, D. (2015). Exploring the potential of value-added performance measures to affect the quality of the teacher workforce. *Educational Researcher*, 44(2), 87-95.
doi:10.3102/0013189X15574905
- Green, D.W. (2007). Adjunct faculty and the continuing quest for quality. *New Directions for Community Colleges*, 2007(140). 29-39.
- Jarvis, C. D. (1921). *Agricultural education, Bulletin 1921, No. 40*. Washington, DC: Department of the Interior.
- Kantrovich, A. J. (2007). *The 35th volume of a national study of the supply and demand for teachers of agricultural education 2004-2006*. West Olive, MI: Michigan State University. American Association for Agricultural Education.
- Kantrovich, A. J. (2010). *The 36th volume of a national study of the supply and demand for teachers of agricultural education 2006-2009*. West Olive, MI: Michigan State University. American Association for Agricultural Education
- Kruse, S. A. (1915). *The Work of the Agricultural Colleges in Training Teachers of Agriculture for Secondary Schools*. (Master of Arts), University of Wisconsin--Madison, Madison, WI.
Retrieved from <https://books.google.com/books?id=xGQ0AAAAMAAJ>

- Lindsay, J. J., Wan, Y., & Gossin-Wilson, W. (2009). *Methodologies used by Midwest Region states for studying teacher supply and demand (REL 2008–080)*. Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Midwest.
<http://www.eric.ed.gov/?id=ED506631>
- Martin, L. E., & Mulvihill, T. M. (2016). Voices in Education: Teacher Shortage: Myth or Reality? *The Teacher Educator*, 51(3), 175-184. doi: 10.1080/08878730.2016.1177427
- Roberts, T. G., Harder, A., & Brashears, M. T. (Eds.). (2016). *American Association for Agricultural Education national research agenda: 2016-2020*. Gainesville, FL: Department of Agricultural Education and Communication.
- Smith, A. R., Lawver, R. G., & Foster, D. D. (2017). *National Agricultural Education Supply and Demand Study, 2016 Executive Summary*. Retrieved from <http://aaaeonline.org/Teacher-Supply-and-Demand>
- Swanson, H. B. (1942). Teacher training in agriculture. In R. W. Stimson & F. W. Lathrop (Eds.), *History of agricultural education of less than college grade in the United States* (p. 516), Washington D. C.: Government Printing Office.
- Stimson, R. W., & Lathrop, F. W. (1942). *History of agricultural education of less than college grade in the United States: A cooperative project of workers in vocational education in agricultural and in related fields*. Washington, DC: Federal Security Agency, U.S. Office of Education.
- Thibodeaux, A. K., Labat, M. B., Lee, D. E., & Labat, C. A. (2015). The effects of leadership and high-stakes testing on teacher retention. *Academy of Educational Leadership Journal*, 19(1), 227.
- True, A. C. (1929). *A history of agricultural education in the United States: 1785-1925*. Washington, DC: U.S. Government Printing Office.