

A Log-Linear Analysis of Job Mobility
of Agricultural Education Personnel

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For a number of years, the demand for vocational agriculture teachers at the secondary level far exceeded the supply. The enactment of the Vocational education Act of 1963 and its subsequent amendments brought about an expansion of secondary vocational agriculture programs. In addition to the demand for more teachers due to growth in the number of positions, the need for teachers certified in several specialized instructional areas in Ohio compounded the problem. Graduates were not immediately available to meet the technical agriculture requirements for certification in such areas as products processing, small animal care, or environmental management. Teacher education programs were unable to meet the immediate demand in the number of needed agricultural education personnel.

With changes in the state certification requirements, teacher education turned to alternative programs to help supply the state with vocational agriculture personnel. Recruiting persons from business and industry was the alternative adopted by the Ohio Department of Education to help meet the demand for teachers in a short period of time. Those persons possessed the required technical competence in agriculture obtained from a number of years of experience in the industry or from an undergraduate degree in a technical field of agriculture. The professional education preparation was provided during the first two years of teaching.

The growth of this alternative teacher certification program was rapid, providing a total of over 60% of entering personnel in 1976 (Barrick, Wardlow, & Warmbrod, 1983). Because the number of personnel recruited from business and industry had grown considerably since the study began in 1970, several questions began to arise regarding the type of professional preparation, years of service, and occupation entered upon leaving the agricultural education profession in Ohio. Further, the relationships among these three factors had not been investigated fully.

Objectives of the Study

The following research questions were investigated for those agricultural education personnel who entered and left the profession from 1971 through 1982:

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1. What is the relationship between the type of professional preparation of local agricultural education personnel and the occupation entered upon leaving the profession?

2. What is the relationship between the type of professional preparation of agricultural education personnel and the number of years that they remained in the profession before leaving?

3. What is the relationship between the occupation entered by agricultural education personnel leaving the profession and the number of years that they remained in the profession?

Several studies have investigated the supply and demand of vocational agriculture teachers including the annual studies that have been conducted by Woodin (1967-1974) and Craig (1975-1983). These studies detail the annual demand for vocational agriculture teachers and to what degree the yearly demand has been met in each state. The Woodin and Craig studies have shown that the demand has exceeded the supply of teachers each year for many years.

Methods and Procedures

The population for the study was all local agricultural education personnel in Ohio who entered the profession from the 1970-71 through the 1976-77 school years and had left the profession prior to the 1982-83 school year. Local agricultural education personnel was defined as all secondary and adult teachers and local supervisors of vocational agriculture programs. Data regarding the types of professional preparation and occupation entered upon leaving the profession were collected annually in the fall of each year from 1970 through 1982. The population included 454 persons. The entire population was studied.

The term "professionally prepared" describes personnel who are four-year college graduates of teacher education programs and hold a four-year professional certificate upon entering the profession. The term "non-professionally prepared" describes personnel who are not graduates of a teacher education program, who may or may not have a college degree, but have occupational experience related to their instructional area.

The data were analyzed using the log-linear analysis program of the BMDP4F package at the Instructional and Research Computer Center of The Ohio State University. Log-linear analyses, chi-square analysis was the commonly accepted procedure used to determine whether observed proportions differed significantly from theoretically derived expected proportions. The chi-square analysis, which is a test of association, is limited to the analysis of only two-dimensional contingency tables. Log-linear analyses allow for testing the association of multiple numbers of variables simultaneously (Kennedy, 1983).

To answer the research questions, likelihood-ratio chi-square values (L^2) were computed using the observed frequencies at an alpha level of .10. Kennedy (1983) cautions that it is somewhat difficult and perhaps unwise to state an exact numerical criterion for statistical significance in log-linear analyses with several variables because several procedures within the analysis are somewhat conservative in nature.

The data for this study were part of a larger long-term (13-year) data set maintained at The Ohio State University. To assist the reader in gaining perspective of the mobility situation, the following general trends were identified in previous studies.

1. The number of entering agricultural education personnel in Ohio increased from 1971 to 1977, then steadily decreased through 1982. The type of preparation gradually shifted from professionally prepared to non-professionally prepared.
2. The percent of the profession leaving annually remained relatively constant, although the number of personnel leaving the profession increased from 1971 to 1978, then decreased through 1982.
3. The type of occupation entered upon leaving the profession did not change dramatically over the period of the study.
4. The total number of personnel leaving the profession increased from 1971 to 1978, then declined through 1982.
5. The percent of new personnel leaving after one year increased from 18% (1971) to over 24% (1982). For most years of the study, 50% of new personnel had left the profession by the end of six years in the profession.

Findings

Type of Preparation and Occupation Entered Upon Leaving

The log-linear analyses indicated that a significant relationship existed between the type of professional preparation of local agricultural education personnel who left the profession and the occupation entered upon leaving the profession (Table 1). Non-professionally prepared personnel tended to enter business- and industry-related occupations at a much higher rate (55%) than professionally prepared personnel who tended to enter a wider range of occupations including other education-related jobs (16%), farming (30%), business and industry (40%) and other occupations (14%). It should be noted that business and industry was the occupation into which the highest percentages of both professionally and non-professionally prepared personnel entered upon leaving.

Table 1

Type of Preparation of Agricultural Education Personnel and Occupation Entered Upon Leaving the Profession

Occupation entered upon leaving	Type of preparation			
	Professional		Non-professional	
	n	%	n	%
Educational related	43	16.2	28	14.8
Farming	80	30.2	24	12.7
Business/industry	105	39.6	104	55.0
Other occupation	37	14.0	33	17.5
Total	265	100.0	189	100.0

Note. $L^2 = 21.65$, which denotes a significant relationship, $\alpha \leq .10$.

Table 2

Type of Preparation of Agricultural Education Personnel and Years in the Profession Before Leaving

Years of tenure	Type of preparation			
	Professional		Non-professional	
	n	%	n	%
One	60	22.6	55	29.1
Two to five	148	55.8	107	56.6
Six or more	57	21.6	27	14.3
Total	265	100.0	189	100.0

Note. $L^2 = 4.71$, which denotes a significant relationship, $\alpha \leq .10$.

The data support the conclusion that personnel who were recruited from business and industry and were not professionally prepared tended to return to that occupation upon leaving the agricultural education profession at a higher percentage rate than professionally prepared personnel. Professionally-prepared teachers entered farming upon leaving teaching at a much higher rate than non-professionally prepared teachers. These differences may be attributed to their area of specialization for teaching. Professionally-prepared teachers tended to be production agriculture teachers; non-professionally prepared teachers tended to teach subjects other than production agriculture.

Type of Preparation and Length of Time

Log-linear analysis indicated a significant positive relationship between the type of preparation of agricultural education personnel who left the profession and the number of years that they remained in the profession (Table 2). For both the professionally and non-professionally prepared personnel who left the profession, approximately 56% left after two, three, four, or five years in the profession. Non-professionally prepared personnel left at a higher rate (29.1%) after one year than professionally prepared personnel (22.6%). Professionally prepared personnel left at a higher rate after six or more years (21.6%) than non-professionally prepared personnel (14.3%).

Table 3

Years Completed in the Profession Before Leaving and Occupation Entered by Agricultural Education Personnel

Occupation entered upon leaving	Years in the Profession					
	One		Two to five		Six or more	
	n	%	n	%	n	%
Education related	18	15.6	41	16.1	12	14.3
Farming	26	22.6	56	21.9	22	26.2
Business/industry	58	50.4	114	44.7	37	44.0
Other occupation	13	11.4	44	17.3	13	15.5
Total	115	100.0	255	100.0	84	100.0

Note. $L^2 = 2.90$, which denotes no significant relationship, $\alpha \leq .10$.

Occupation Entered and Length of Tenure

The relationship between the occupation entered upon leaving the profession and the number of years that agricultural education personnel remain in the profession was not found to be significant (Table 3).

Conclusions and Implications

Local agricultural education personnel who left the profession and who are non-professionally prepared tend to leave the profession sooner than professionally prepared personnel and are more likely to return to business- and industry-related jobs. These people enter agricultural education from business and industry, teach for a relatively short period of time, and then return to business and industry at a higher rate than professionally prepared personnel. Further study needs to be done concerning this finding. Why do non-professionally prepared persons enter agricultural education initially? How do they feel about their professional experience and why do they leave? Do professionally prepared personnel experience greater job satisfaction, and does this aid in the retention of personnel? Is there a difference between each group in their relative effectiveness as agricultural education personnel? If the total demand for local agricultural education personnel in Ohio declines, the need for alternative types of professional preparation programs may no longer be necessary. Other studies do, however, indicate that the percentage of non-professionally prepared personnel entering agricultural education positions in Ohio has stabilized at around 45% of the total number of entering personnel annually (Barrick, Wardlow, & Warmbrod, 1983).

Since professionally prepared personnel enter the profession at a higher rate than non-professionally prepared personnel and non-professionally prepared personnel remain in the profession for shorter periods of time, then the number of non-professionally prepared personnel in the profession should decline over time.

The conclusion can then be drawn that the annual demand for new personnel should stabilize or slowly decrease as a percentage of the total population of personnel. A study by Barrick et al. (1983) supports this conclusion, indicating that the annual demand for entering personnel has approximated 11% for the past 12 years. The contention can then be supported that if teacher education programs can meet these demands for entering personnel, considering future annual decreases in total numbers of positions, then the non-professional certification program may no longer be necessary.

References

- Barrick, R. K., Wardlow, G. W., & Warmbrod, J. R. (1983). *Trends in the preparation, demand and mobility of local agricultural education personnel in Ohio, 1970-1983*. Paper presented at the Central States Research Conference, St. Paul, MN.
- Craig, D. (1975-1983). *Supply and demand for teachers of vocational agriculture in the United States*. Knoxville: University of Tennessee.
- Kennedy, J. J. (1983). *Analyzing qualitative data: Introductory log-linear analysis of behavioral research*. New York: Praeger Publications.
- Wardlow, G. W., Barrick, R. K., & Warmbrod, J. R. (1983). *The professional preparation, years of service and occupation entered upon leaving the profession by agricultural education personnel in Ohio: A log-linear analysis*. Paper presented at the National Agricultural Education Research Meeting, Anaheim, CA.
- Woodin, R. J. (1967-1974). *Supply and demand for teachers of vocational agriculture in the United States*. Columbus, OH: The Ohio State University and the University of Tennessee.

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- Rawls, W. (1980). Parental perceptions of the benefits vocational agriculture students derive from supervised occupational experience. *The Journal of American Association of Teacher Educators in Agriculture*, 21(3), 14-17.
- Ray, A. et al (1982). *The SAS user's guide: 1982 edition*. Cary: SAS Institute, Inc.
- Williams, D. L. (1979). Benefits received from supervised occupational experience programs as perceived by students. *The Journal of the American Association of Teacher Educators in Agriculture*, 20(2), 33-40.
- Williams, D. L. (1980). Students' perceptions of assistance received from parents and teachers with supervised occupational experience programs. *The Journal of the American Association of Teacher Educators in Agriculture*, 21(2), 21-28.