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ABSTRACT

A job opportunity-based curriculum planning model was developed for high school vocational agriculture programs. Three objectives were to identify boundaries of the geographical area within which past program graduates obtained entry-level position, title and description of position, and areas of high school specialization; number and titles of job-entry positions, average annual openings for such positions, and projected future needs of agricultural businesses in the geographical area; and competencies required for job entry-level positions. Two instruments were developed to sample 1,198 one-, two- and three-year graduates of 35 Pennsylvania high schools (to provide five samples of each of seven instructional areas of vocational agriculture) and 31 agricultural businesses. The end product was an eight-stage job opportunity planning model: (1) survey graduates; (2) determine miles to first job, graduates' programs, graduates' first job; (3) survey employers in area including at least 80% of the graduates; (4) determine labor and student occupational needs; (5) determine skills and skill levels needed for meaningful jobs in industry; (6) match skills with courses and course requirements; (7) teach students skills and competencies; (8) place students in jobs. Information was also obtained regarding graduates' employment history, methods used to secure entry-level employment, and adequacy of vocational training. (Instruments are appended.) (YLB)

DATA BASE FOR A JOB OPPORTUNITY VOCATIONAL AGRICULTURAL PROGRAM PLANNING MODEL

A PAPER PRESENTED AT THE ANNUAL MEETING

OF

THE AMERICAN EDUCATIONAL RESEARCH ASSOCIATION

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CONTENT

SECTION I:	Introduction	1
	Previous Studies	1
	Geographic Areas	1
	Job Titles and Competencies	2
	Definitions of Job Analysis Terms	3
	Instructional Program	4
	Need for the Model	5
SECTION II:	Methodology	7
	General Design	7
	Sequence in Data Collection	8
	Instruments Used	9
	Collection of Data	10
SECTION III:	Selected Findings and Discussion	10
	Characteristics of Graduates	10
	Distance Traveled from School to First Job	17
	Geographic Patterns of Employment Areas	20
	Work Status of Graduates	24
	Method of Locating Jobs	26
	Survey of Agricultural Businesses	27
	Response to Survey	27
	Current and Projected Positions	29
SECTION IV:	Summary of Skeletal Model	31
SECTION V:	Concluding Remarks	35
	Bibliography	36
	Appendices	38

LIST OF TABLES

TABLE 1.	Instructional Areas, Schools, Number of Students and Agricultural Businesses Surveyed for Data Base in Job Opportunity Based Planning Model Study.	12
TABLE 2.	Chi Square Analysis of Entry Year, Years of Study of Graduates by Sex.	13
TABLE 3.	Chi Square Analysis of Program Field by Sex	14
TABLE 4.	Chi Square Analysis of Roles of Graduates by Sex	15
TABLE 5.	Chi Square Analysis of Sex Distribution of Vocational Agricultural Graduates by Type of School.	16
TABLE 6.	Miles From School to First Job, for Vocational Graduates by Instructional Field.	18
TABLE 7.	Distance in Miles from School to First Job for Graduates by Instructional Field, Within a 50 Mile Radius of the School.	19
TABLE 8.	Work Status of Vocational Agriculture Graduates by Type of School.	25
TABLE 9.	Method by Which Vocational Graduates Located First Job by Type of School.	28
TABLE 10.	Responses to Survey of Agricultural Businesses by Instructional Field.	29
TABLE 11.	Summary of Agricultural Employment Positions by Instructional Fields.	30

LIST OF FIGURES

Figure 1.	Geographic Patterns of Employment.	21
Figure 2.	Geographic Patterns of Employment Points.	22
Figure 3.	Geographic Patterns.	23
Figure 4.	Planning Model for High School Agricultural Programs	34

Appendices

Form 1.	Career Survey For Graduates of Vocational Agriculture Programs
Form 2.	Job Titles for Entry-Level Agricultural Occupations
Form 3.	Job Opportunity Survey of Agricultural Businesses
Form 4.	Projected Job Openings

INTRODUCTION: Statement of the Problem

High school vocational programs are frequently based on findings from county business census figures or from surveys of businesses within community or county boundaries. These findings may bear little relationship to the geographical area within which high school graduates actually seek employment. This lack of a firm basis on which to develop vocational programs can result in inappropriately trained graduates, poorly defined programs, or in severe cases, inappropriate abandonment of vocational agriculture programs.

Graduates of high school vocational agriculture programs are prepared for job entry-level positions or for short-term post-secondary training; yet few schools survey the geographical regions in which their vocational graduates find entry-level positions.

Previous Studies

Previous studies that relate to this one include descriptions of geographic areas of employment for high school graduates, job descriptions and competency lists, program recommendations, and placement services.

Geographic Areas

A search of the literature has uncovered only one study, by Thompson, in which a survey was used to determine the opportunities and training needs for career positions in a geographical area served by a particular school. There was a noteable absence of studies seeking to survey agriculture related employment opportunities for high school graduates of vocational programs by first defining the geographical areas where students actually seek entry level employment.

Cameron of Pennsylvania and Griffin of Missouri have conducted local (community or county) surveys to determine the prospects for off-farm job

opportunities in agriculture. McGee completed a survey of similar job opportunities in seventeen Pennsylvania counties. These types of studies give a detailed picture of employment opportunities for rigidly defined areas, like community or county boundaries, and have the underlying assumption that entry level employment is limited to community or county boundaries. The studies do not attempt to define the geographical areas within which students actually seek entry level employment. Individuals who seek entry level employment are likely to cross community and county or state boundary lines to seek employment in their fields of occupational training. Topography, aquatic barriers (e.g. rivers and lakes), and the accessibility of good highways may have a strong influence on the configuration of a geographical area where graduates, from a particular high school, seek entry level employment.

McGee in high study, The Identification and Analysis of Agricultural Occupations in Seventeen Pennsylvania Counties, made the follow recommendation based upon his findings:

> The vocational agriculture courses in the local districts should be evaluated to see if they are meeting the needs of students. .....an evaluation should be made to see if the school is educating the student in the competency areas that prepare him for his desired employment and in the areas where there are employment opportunities.

Job Titles and Competencies

McGee compiled a list of 346 job titles in agriculture related businesses and recommended that "teachers of agriculture, guidance counselors, and others should be made aware of this vast array of titles and information about the various jobs so that they can help students choose careers in which they are interested."

Paul identified 194 entry level agricultural occupations, which were extracted from the Dictionary of Occupational Titles.

McGee recommended the development and use of a more comprehensive set of competencies "so that the requirements for individual job titles can be more clearly defined."

Webb and Johnson emphasize the importance of course content based on occupational competencies and profess that the most valid source of content is the business or occupation for which training is being offered. Other studies by Paul, Smeltz, Grant, Korona, and Love have determined occupational competencies needed for employment within specific areas of agriculture. Research by Matteson and Bjoraker identified the some of the important functions, tasks and competencies needed to adequately enter and continue in selected agricultural occupations in Wisconsin.

Currently an extensive national research study involves identification of the competencies required for each of the job titles with each of the seven instructional areas of vocational agriculture education. Teacher-educators are involved in this comprehensive work.

Definitions of Job Analysis Terms

It is important to distinguish between a "position" and a "job". A "job" may be thought of as a "duty", within which there are "tasks", each having "elements." A worker may have a position which carries the responsibility of just one "job" ("duty"), for example, a "meat trimmer"; or he may have a position involving several "jobs" (duties), for example, a "Maintenance Mechanic II." Competencies may be listed as a description of duties or may be given as greater detail as "tasks." The following definitions of job analysis are from the Dictionary of Occupational Titles. U. S. Department of Labor and Off-Farm Agricultural Occupations in Pennsylvania by Norman K. Hoover.

1. Position: group of jobs sufficiently alike to be covered by a single job analysis.

2. Duties, (jobs): groups of tasks making up the total work assignment of a single worker.

3. Task: one of more elements of distinctive activities in the necessary steps in performance of work by a worker. (A task is credited whenever human effort, mental or physical, is exerted to accomplish a specific purpose.)

4. Element: the smallest step into which it is practicable to subdivide any work activity without analyzing separate motions, movements, and mental processes.

Instructional programs

Phelps in his study, A Descriptive Overview of the Cluster-Based Occupational Curriculum Development Model, emphasizes the importance of career clustering for curriculum development in guiding the student through career exploration and career orientation.

Martin B. McMillion of Virginia Polytechnical Institute and State University concluded that subject matter covered in Vo-Ag programs has important implications in the agricultural curriculum. McMillion empirally documented the use of skill obtained in the Vo Ag program and used in jobs across the state of Virginia. Some of these skills included plant breeding, milk testing, seed certification, soil testing and many other skills commonly taught in the Vo Ag program. He concluded by emphasizing the role of guidance and placement in order that students may make worthy use of the new skills developed through vocational agricultural school programs.

Alfred J. Mannebach of the University of Connecticut asked several questions important to this study in A Survey of Community Resources and Emplyment Opportunities Having Implications for Programs of Vocational Agriculture. Mannebach's questions were 1) What areas of the vocational agriculture programs should be added or re-emphasized? 2) What areas of the Vo Ag program should be phased out or de-emphasized? 3) What community resources were identified whereby the program of Vo Ag could be enriched? 4) What services would the farmers and agribusinessmen like the Vo Ag centers to provide for them?

One area of the vocational agriculture program that has received praise is individualized supervised instruction. However, flexibility is still the key note. Bruce Carpenter indicated that programs must be flexible enough to 1) accept students at different levels, 2) serve students with different abilities, 3) teach students at different speeds, 4) allow students to complete or terminate at different job levels and time intervals, and 5) describe students' abilities in terms of performance on a job. It is essential that the best curriculum vehicle be identified and implimented.

Placement

Geingerich in his research report, School-Based Job Placement Service Model, recognized the schools responsibility for job placement. He states that "a first step to be undertaken in initiating any new educational program is the development of a philosophy for the program. In this case, a philosophy should be developed providing a theoretical framework for a commitment to establish and operate a job placement service."

This philosophy is gaining increased acceptance by educators throughout the country. The passage of the Vocational Education Act and its amendments has spurred research to develop models to assist schools in planning job entry level oriented programs and job placement services.

Need for the Data Base Model

A review of the literature indicates that data is urgently needed, which, for a particular school, can clearly distinguish the job entry level opportunities in vocational agriculture for its graduates, together with a description of the competencies required for each position. With this data base as a guide, a curriculum program can be planned that fills the interest, needs, and abilities of students, as well as realistically preparing them for known job opportunities.

A data base was established through surveys of graduates and agricultural businesses, which, combined with job titles and lists of job competencies, provided the material for development of a job opportunity based program planning model. A model has been written, tested and explained.

II - METHODOLOGY

General Design

The general design of the study was to develop and test a job opportunity based curriculum planning model for high school vocational agriculture programs in Pennsylvania offering instruction in the seven areas of agriculture outlined in the United States Government publication, Descriptions of Occupational Titles.

1. Agricultural Mechanics
2. Production Agriculture
3. Agricultural Products, Processing, Marketing
4. Renewable Natural Resources
5. Agricultural Supplies/Services
6. Forestry
7. Horticulture

The development of this model was based on information gathered through:

1. surveys of recent graduates of selected high school vocational programs in Pennsylvania to determine the boundaries of the geographical area within which each graduate obtained his first entry level position, the title and description of the position, and the area of specialization while a student in high school
2. surveys of agricultural businesses within the geographical area where the students for a particular school found their first employment to determine; numbers and titles of job-entry positions, average annual openings for these positions, and projected future needs of the businesses,
3. a review of research studies and references to determine the competencies required for job-entry level positions secondary level education and
4. a review of the literature to identify relevent sources of information which could aid in the development of a job opportunity based curriculum planning model.

Sequence In Data Collection

The following steps were used in carrying out this study:

a. A selection of 35 Pennsylvania high schools was made to provide five samples of each of the seven instructional areas of vocational agriculture.

b. A survey of the three years of graduates of these programs was conducted to determine the distances of first employment from the school. Additional related information was requested.

c. The resulting geographical patterns were studies to determine the size and shape of the employment area for each school, schools by instructional areas, and all schools combined.

d. To provide bases for development of instructional programs, a list of duties for positions in each of the seven instructional areas were developed.

e. A planning model for high school vocational agriculture programs, based on employment opportunities was written to include the following:

   1) A model survey form for high school graduates.

   2) A model for analyzing the survey results to determine the geographical area of graduate employment.

   3) A model surey form for employers in this geographical area, to determine job opportunities.

   4) A comprehensive list of job duties for each instructional area.

f. The planning model was tested with one area vocational technical school to further refine it.

g. The planning model was explained to vocational agriculture teachers.

Instruments Used

Two survey instruments were developed for this study. One was a survey form,(Appendix Form 1) Questionnaire for Career Survey for Graduates of Vocational Agriculture Programs. The form was developed and field tested with one school. Several minor adjustments to gain clarity were made and it was used in it's present refined form for distribution to graduates from 35 selected schools,5 schools representing each of the 7 instructional areas of vocational agriculture.

The second survey form,(Appendix Form 3) Questionnaire for Job Opportunity Survey of Agricultural Businesses, was tested and distributed to the agriculture related businesses after the geographic area for each school had been defined from the survey of high school graduates. Following returns for the first school, the form was slightly modified to make some questions clearer.

The third source of information was the job descriptions in the Dictionary of Occupation Titles, (Appendix Form 2), and related literature.

Collection of Data

The 35 schools involved in the study were contacted in order to obtain lists of the vocational agriculture graduates for the years 1972, 1973, and 1974. Most schools requested confirmation of the confidentiality of the information to be gathered. One school declined to provide a list on the grounds that to do so would invade the privacy rights of graduates; another school was sutstituted for it. Questionnaires were mailed to a total of 1198 students, 70 percent were returned.

With the information in hand that 85 percent of graduates sought employment within 15 miles of their school, a sample of businesses representing each of the seven instructional areas were surveyed to determine job opportunities (current and projected, Appendix Form 4)for a particular school. The employment area for the selected school was surveyed for only one of the instructional areas.

Table 1, Instructional Areas, Schools, and Numbers of Students and Agricultural Businesses Surveyed for Data Base, indicates in coded form the schools involved in the study, together with other pertinent information. Because there were 464 agricultural businesses within 15 miles of the school selected for the instructional area "Ornamental Horticulture," a 30 percent randomized sample was used in the survey.

Survey Procedure

The survey form for graduates was mailed to 1198 graduates, and 702 responded. The majority of the students reported traveling less than fifteen miles to their first place of employment. Nearly half of the students respondening were employed in the occupational field they studied while in school. Of the total instructional areas, horticulture showed the highest percent of students working in the area of which they were trained.

Disregarding the number of miles traveled did not make any appreciable difference in number of graduates working outside of the occupational field for which they were trained.

III - Selected Findings and Discussion

Characteristics of the graduates by sex, program, and employment, a cross tabulation.

A Chi Square analysis of entry year, years in program, and sex is presented in Table 2, (questions 1, 6, and 9 in survey of graduates). No significant difference were found. There were more males in the study than

female, 80 and 20 percent, respectively. Table 2 shows that males exceeded females in the number of students in each year of study in agriculture in all areas except the junior year, where 33 percent of the juniors were males and 67 percent were females. In this table, junior high, sophomore, junior, senior, and mini course designations indicate the point of entry into agriculture of students for that year. Two, three, four years on the right side of that table indicate the total number of years the respondent had taken agricultural courses. As indicated, 36 percent of the students had studied agriculture four years.

Table 3 compares the program field with male or female student status in a Chi Square analysis, (question 1 and 2 in the survey). No significant differences were found. Here again, very few females were found in the traditionally male areas of study. Females enrollments showed a very high percentage in floriculture which is trationally a female dominated area. Male student enrollments were distributed throughout the range of fields with the highest percent, 38, in general agriculture.

Table 4 shows Chi Square analysis of jobs and roles that agriculture graduates assumed after completing high school. No significant differences were found. It was interesting to see that 64 percent of all students surveyed were working full time. About 53 percent of those working were males while about 11 percent were females. Another interesting fact was that about 16 percent of all male graduates went on for additional education as full time students, which was slightly less than that of the females at about 18 percent. Only about 10 percent of the females listed homemaking as their role after graduation. A higher percentage of female graduates, 11.2 percent, than males, 6.5 percent, did indicate unemployment. The unemployment for graduates in the entire study was 7.4 percent which is considerable lower than national average of 20 percent for this age group.

Table 1. INSTRUCTIONAL AREAS, SCHOOLS, NUMBER OF STUDENTS AND AGRICULTURAL BUSINESSES SURVEYED FOR DATA BASE IN JOB OPPORTUNITY BASED PLANNING MODEL STUDY

	Graduate Survey		Business Survey	
Instructional Field	School Code	Number of Graduates*	Number of Businesses	School Code**
Agricultural Mechanics	1	45	6	29
	2	30		
	3	46		
	4	30		
	5	30		
		181		
Production Agriculture	6	37		
	7	35		
	8	24	42	36
	9	17		
	10	28		
		141		
Agricultural Products, Processing, Marketing	11	35		
	12	32		
	13	28	21	16
	14	14		
	15	14		
		123		
Renewable Natural Resources	16	28	NOTE:	
	17	16	The primary employers were	
	18	16	federal & state governments	
	19	9	requiring skill levels higher	
	20	27	than those taught in H. S.	
		96		
Agricultural Supplies/ Services	21	15		
	22	50	22	23
	23	48		
	24	96		
	25	52		
		261		
Forestry	26	14		
	27	35	84	28
	28	31		
	29	32		
	30	41		
		153		
Horticulture	31	29		
	32	21	140	33
	33	59		
	34	65		
	35	69		
		243		
TOTAL		1,198	305	

* Graduates for the years, 1972, 1973, and 1974

** Non-matching numbers are for schools with multi-field programs.

Table 2. CHI SQUARE ANALYSIS OF ENTRY YEAR, YEARS OF STUDY OF GRADUATES, BY SEX

COUNT ROW PCT COL PCT TOT PCT	NO.ANS.	JR. HIGH	SOPH	JR.	SR.	MINI	2YRS	3 YRS	4 YRS	ROW TOTAL
MALE	70 12.5 82.4 10.0	2 0.4 66.7 0.3	4 0.7 100.0 0.6	12 2.2 33.3 1.7	26 4.7 81.3 3.7	2 0.4 100.0 0.3	106 19.0 61.6 15.1	105 18.8 89.0 15.0	231 41.4 92.4 32.9	558 79.5
FEMALE	15 10.5 17.6 2.1	1 0.7 33.3 0.1	0 0.0 0.0 0.0	24 16.8 66.7 3.4	6 4.2 18.8 0.9	0 0.0 0.0 0.0	65 45.5 37.8 9.3	13 9.1 11.0 1.9	19 13.3 7.6 2.7	143 20.4
COLUMN TOTAL	85 12.1	3 0.4	4 0.6	36 5.1	32 4.6	2 0.3	172 24.5	118 16.8	250 35.6	702 100.0

Chi Square = 117.09885 with 8 degrees of freedom significance < 0.01

Table 3. CHI SQUARE ANALYSIS OF PROGRAM FIELD BY SEX

COUNT ROW PCT COL PCT TOT PCT	NO. ANS.	AG.MECH.	AG. PROD., PROC.,MKG.	FLOR.	ORN.HORT.	FORESTRY	PROD.AGR.	REN. NAT. RES.	AG. SUP.	GEN. AGRI.	ROW TOTAL
MALE	81 14.5 84.4 11.5	41 7.3 97.6 5.8	22 3.9 91.7 3.1	53 9.5 39.8 7.5	24 4.3 85.7 3.4	7 1.3 100.0 1.0	58 10.4 71.6 8.3	1 0.2 25.0 0.1	4 0.7 100.0 0.6	267 47.8 94.3 38.0	558 79.5
FEMALE	15 10.5 15.6 2.1	0 0.0 0.0 0.0	2 1.4 8.3 0.3	80 55.9 60.2 11.4	4 2.8 14.3 0.6	0 0.0 0.0 0.0	23 16.1 28.4 3.3	3 2.1 75.0 0.4	0 0.0 0.0 0.0	16 11.2 4.7 2.3	143 20.4
COLUMN TOTAL	96 13.7	42 6.0	24 3.4	133 18.9	28 4.0	7 1.0	81 11.5	4 0.6	4 0.6	283 40.3	702 100

CHI SQUARE = 211.08601 with 9 degrees of freedom significance $<$ 0.01

Table 4. CHI SQUARE ANALYSIS OF ROLES OF GRADUATES, BY SEX

COUNT ROW PCT COL PCT TOT PCT	WORK FULLTIME	WORK PARTTIME	UNEMPLOY-ED	MILITARY	HOMEMAKING FULLTIME	STUDENT FULLTIME	NO ANS	ROW TOTAL
MALE	371 66.5 83.2 52.8	34 6.1 75.6 4.8	36 6.5 69.2 5.1	25 4.5 96.2 3.6	0 0.0 0.0 0.0	91 16.3 77.8 13.0	1 0.2 50.0 0.1	558 79.5
FEMALE	75 52.4 16.8 10.7	11 7.7 24.4 1.6	16 11.2 30.8 2.3	0 0.0 0.0 0.0	14 9.8 100.0 2.0	26 18.2 22.2 3.7	1 0.7 50.0 0.1	143 20.4
COLUMN TOTAL	446 63.5	45 6.4	52 7.4	26 3.7	14 2.0	117 16.7	2 0.3	702 100.0

CHI SQUARE= 95.66820 with 6 degrees of freedom significance < 0.01

A Chi Square test was run comparing males and females in vocational agriculture programs in the Area Vocational and Technical Schools (AVTS) and the Comprehensive schools in the study. It is important to note that 11 of 35 schools in the study were AVTSs. Results presented in Table 5 indicate a significant difference between the schools with females representing 44.4 percent of the students in vocational agriculture programs in AVTS schools contrasted with 10.5 percent in comprehensive schools. Since a relatively higher percentage of Pennsylvania AVTSs offer horticulture, which is often more appealing to females than other agricultural fields, this result may not be surprising.

Table 5 CHI SQUARE ANALYSIS OF SEX DISTRIBUTION OF VOCATIONAL AGRICULTURE GRADUATES BY TYPE OF SCHOOL.

COUNT ROW PCT COL PCT TOT PCT	MALE	FEMALE	NO ANSWER	ROW TOTAL
COMPREHENSIVE SCHOOL	444 89.3 79.6 63.2	52 10.5 36.4 7.4	1 0.2 100.0 0.1	497 70.8
AVTS	114 55.6 20.4 16.2	91 44.4 63.6 13.0	0 0.0 0.0 0.0	205 29.2
COLUMN TOTAL	558 79.5	143 20.4	1 0.1	702 100.0

CHI SQUARE = 103.19324 WITH 2 DEGREES OF FREEDOM SIGNIFICANE = 0.05

Distance from school to first job by instructional field

The study was interested in the distance from school to the first job for the majority of the graduates, (Question 4 in survey of graduates), Table 6. The survey showed that 87.3 percent held jobs within 15 miles of their school. Of the instructional areas studied, Agriculture Products, Processing, Marketing, showed the largest percent of graduates, 96.2 percent, held jobs within 15 miles of the school.

Of all graduates responding, about 9.6 percent traveled no more than one mile from the school, 32.5 percent traveled from two to five miles, 31.7 percent traveled from six to ten miles, and 13.5 percent from eleven to fifteen miles. Because over 85 percent of respondants indicated that their first employment was within 15 miles of the school they had attended, this fifteen miles radius is used throughout the report to define circular boudaries from the school.

In this study, 91.5 percent of responding graduates were employed in their first job within 20 miles of the school, while 96.0 percent were within 30 miles of the school.

It is also interesting to see that 98 percent, or 410 of the 421 graduates, were employed within 50 miles of the school from which they graduated. Although only 11 graduates were employed more than 50 miles from the school in which they studied, the percentage of them employed in the instructional area in which they studied were consistent with the figures for graduates who worked within the 50 mile radius.

An analysis of variance by field of study was conducted on the distance from school that high school vocational agriculture graduates worked in their first job. Although it was not indicated in the survey form, many graduates wrote in "General agriculture" as their field of study, so it was added as an eighth field in the analysis. Some graduates neglected to indicate a field of study.

Table 6 MILES FROM SCHOOL TO FIRST JOB, FOR VOCATIONAL AGRICULTURE GRADUATES, BY INSTRUCTIONAL FIELD

	0-1	2-5	6-10	11-15	16-20	21-25	26-30	Over 30	No Resp.	Total
Agricultural Mechanics										
# Students	6	19	17	5	3	0	2	2	15	69
% Students	11.1	35.2	31.5	9.5	5.5		3.7	3.7		
Cum percentage	11.1	46.3	77.8	87.1	92.3	92.6	96.3	100		
Production Agriculture										
# Students	3	16	35	9	3	3	1	2	18	90
% Students	4.2	22.2	48.6	12.5	4.2	4.2	1.4	2.8		
Cum percentage	4.2	26.4	75.0	87.5	91.7	95.9	97.3	100		
Agricultural Products, Processing, Marketing										
# Students	9	24	13	5	0	0	0	2	17	70
% Students	17.0	45.3	24.5	9.4				3.8		
Cum percentage	17.0	62.3	86.8	96.2	96.2	96.2	96.2	100		
Renewable Natural Resources										
# Students	5	6	6	3	2	0	0	1	13	36
% Students	21.7	26.1	26.1	13.0	8.7	0	0	4.3		
Cum percentage	21.7	47.8	73.9	86.9	95.6	95.6	95.6	100		
Agricultural Supplies/Services										
# Students	9	44	43	31	7	5	3	12	70	224
% Students	5.8	28.6	27.9	20.1	4.6	3.3	1.9	7.8		
Cum percentage	5.8	34.4	62.3	82.4	87	90	92.2	100		
Forestry										
# Students	6	15	18	3	2	1	2	1	29	77
% Students	12.5	31.3	37.5	6.3	4.2	2.0	4.2	2.0		
Cum percentage	12.5	43.8	81.3	87.6	91.8	93.8	98.0	100		
Horticulture										
# Students	12	45	33	14	6	3	3	0	20	136
% Students	10.3	38.8	28.4	12.1	5.2	2.6	2.6			
Cum percentage	10.3	49.1	77.5	89.6	94.8	97.4	97.4	100		
Combined Totals										
# Students	50	169	165	70	23	12	11	20	182	702
% Students	9.6	32.5	31.7	13.5	4.2	2.3	2.2	4.0		
Cum percentage	9.6	42.1	73.8	87.3	91.5	93.8	96.0	100		

Table 7 DISTANCE IN MILES FROM SCHOOL TO FIRST JOB FOR GRADUATES BY INSTRUCTIONAL FIELD, WITHIN A 50 MILE RADIUS OF THE SCHOOL.

Group	Field	Count	Mean Miles	Standard Deviation
All Employed Graduates	No answer	36	8.3	8.8
	Ag. Mechanics	34	6.9	4.8
	Prod. Agriculture	44	8.9	6.6
	Agr. Prod., Proc., Mrktg	22	9.5	4.9
	Renew. Nat. Resources	3	6.6	7.2
	Agri. Sup./Services	3	4.6	4.7
	Forestry	5	8.0	4.8
	Horticulture	97	7.3	6.4
	Gen Voc. Agriculture	202	8.8	7.9
	TOTAL	446	8.3	7.1
Graduates Employed In Field of Study	No answer	19	9.1	10.2
	Ag. Mechanics	16	6.0	3.5
	Prod. Agriculture	20	7.4	5.6
	Agri. Prod., Roc., Mrktg	10	7.1	3.2
	Renew. Nat. Resources	1	15.0	0.0
	Agr. Sup/Services	2	2.0	1.4
	Forestry	3	5.6	3.8
	Horticulture	39	7.3	6.4
	Gen Voc. Agriculture	110	8.2	7.6
	TOTAL	220	7.8	7.0
Graduates Employed Outside Field of Study	No answer	17	7.4	7.3
	Agr. Mechanics	18	7.8	5.7
	Prod. Agriculture	24	10.3	7.2
	Agr. Prod., Proc.,Mrktg	12	11.7	5.2
	Renew. Nat. Resources	2	2.5	0.7
	Agri. Sup/Services	1	10.0	0.0
	Forestry	2	11.5	4.9
	Horticulture	58	7.4	6.5
	Gen Voc. Agriculture	92	9.6	8.3
	TOTAL	226	8.9	7.3

Because 11 of the 460 graduates were employed beyond 50 miles from the school, (some over 100 miles away), the data from them contributed unreasonable variation, only the analysis for those within a 50 mile radius is presented in Table 7.

Geaographic patterns of employment areas

Since a computer program had beed developed at The Pennsylvania State University which would permit printing of geopraphic points identified by latitude and logitude, it was possible to produce scattergrams of the locations of first employment of graduates for each of the 35 schools in this study. Because of space limitations, and the fact that most of the 35 schools had similar patterns, only a few were reproduced here.

Figure 1. shows the strong influence of highly populated areas on the pattern of points where students were employed. For Lehigh County AVTS in Schnecksville, over half the graduates were employed in one city, Allentown.

Figure 2. shows that pattern for employment points of graduates of a school in a rural area. It should be noted that in the ridge and valley part of Pennsylvania, transportation across the ridges may be very restricted and strongly influence the geographic patterns of employment for a particular school.

Figure 3. shows the patterns that may develop in a well populated county served by many schools. This figure represents Lancaster County, with one city, many small communities, diversified agriculture, and virtually no transportation hinderences.

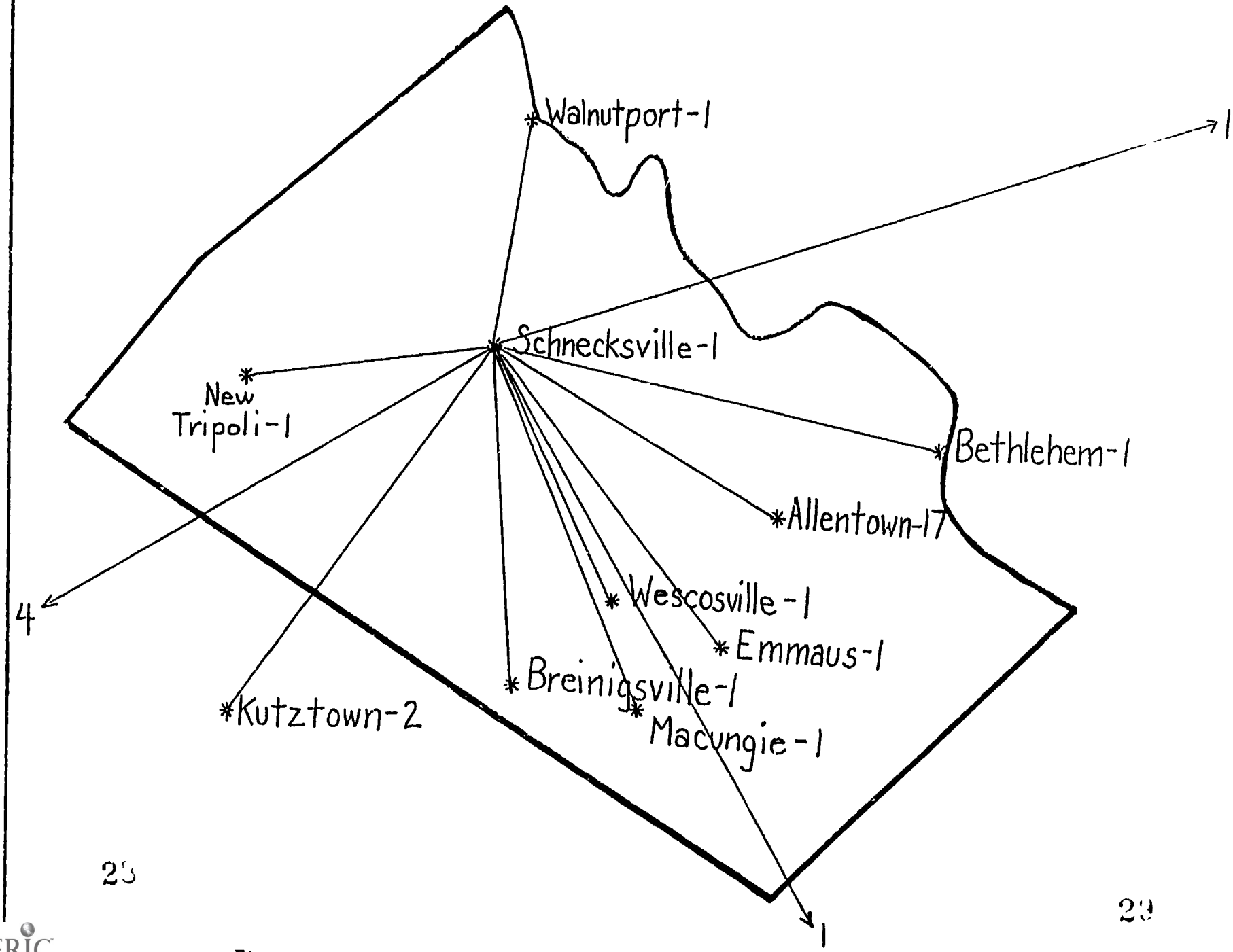

Figure 1 Geographic Patterns of Employment

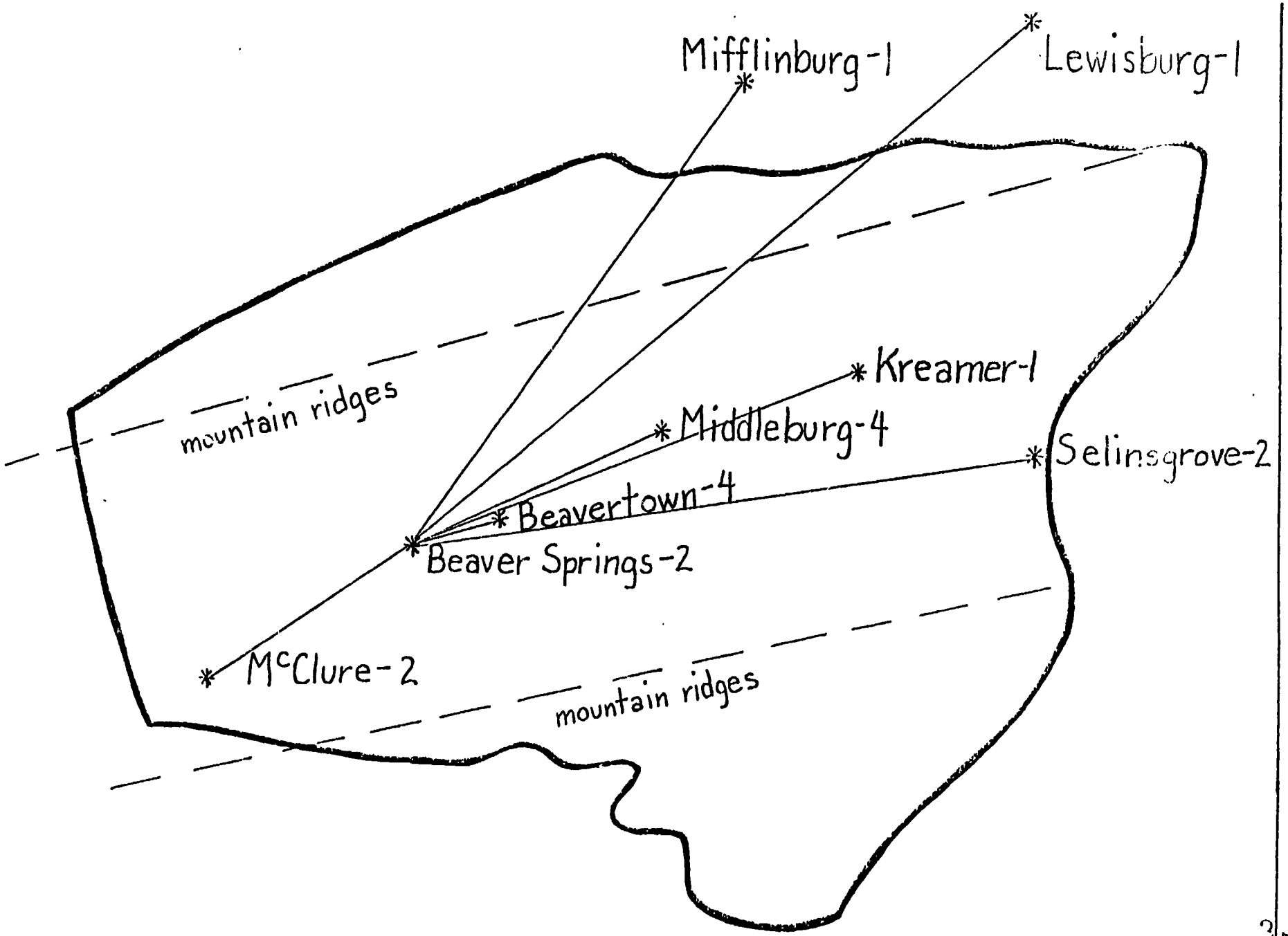

Figure 2 Geographic Patterns of Employment Points

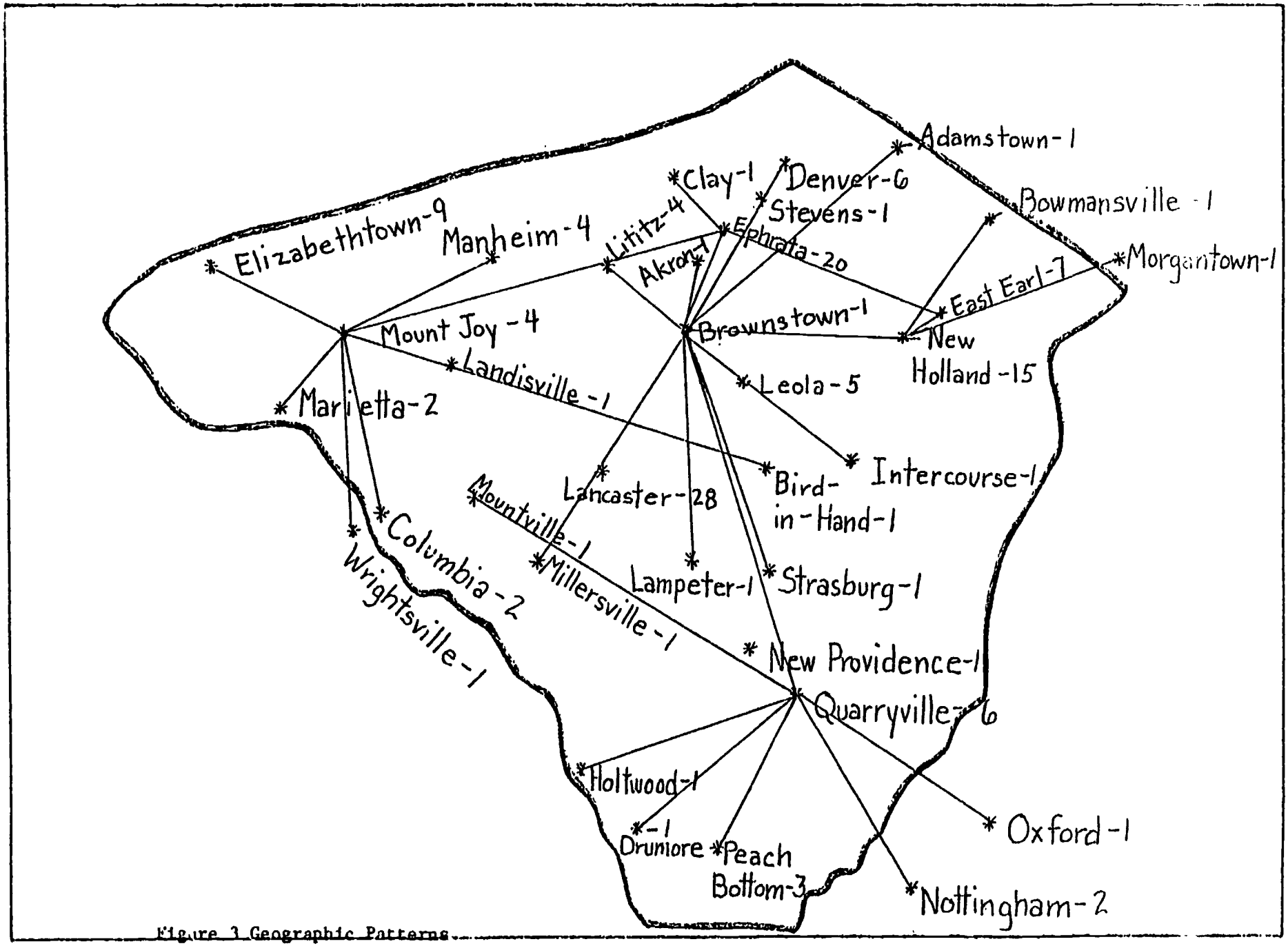

Figure 3 Geographic Patterns

Work Status of Graduates and Type of School

Chi Square analysis of work status of graduates by type of school revealed significant differences, Table 8. It is noted that a higher percentage of AVTS graduates were employed full time, 65.4 percent, as compared with 62.8 percent of Comprehensive school graduates. Part time employment percentages for graduates of the two kinds of schools were almost identical with those for full time employment. Comprehensive schools had nearly twice as many graduates in the unemployed and military service statis compared with AVTS's. The homemaker versus further schooling categories were nearly reversed for the two types of schools, with 85.5 column percent of the comprehensive school graduates involved in further schooling, and 85.7 column percent of AVTS graduates in the homemaker group. The count in the homemaker status is rather low, therefore, conclusions from the calculations may be unwarranted.

Table 8 WORK STATUS OF VOCATIONAL AGRICULTURE GRADUATES, BY TYPE OF SCHOOL

	COUNT ROW PCT COL PCT TOT PCT	EMPL. FULL TIME	EMPL. PART TIME	UNEMPL-OYED	MILITARY SERVICE	HOME MAKER	FURTHER SCHOOL	NO ANS	ROW TOTAL
COMPREHENSIVE SCHOOL		312 62.8 70.0 44.4	32 6.4 71.1 4.6	33 6.6 63.5 4.7	18 3.6 69.2 2.6	2 0.4 14.3 0.3	100 20.1 85.5 14.2	0 0.0 0.0 0.0	497 70.8
AREA VOCATIONAL AND TECHNICAL SCHOOL		134 65.4 30.0 19.1	13 6.3 28.9 1.9	19 9.3 36.5 2.7	8 3.9 30.8 1.1	12 5.9 85.7 1.7	17 8.3 14.5 2.4	2 1.0 100.0 0.3	205 29.2
COLUMN TOTAL		446	45	52	26	14	117	2	702
COLUMN PERCENT		63,5	6.4	7.4	3.7	2.0	16.7	0.3	100.0

CHI SQUARE = 40.19730 WITH 6 DEGREES OF FREEDOM SIGNIFICANCE = 0.01

Methods of Locating Jobs

The method by which graduates located their first jobs, as it related to type of school is presented in Table 9. Graduates of both AVTS and comprehensive schools listed friends and advertisements as the most frequently used vehicle, in addition to remaining in jobs held while in school. It is worthy to note, however, that graduates of comprehensive schools used the occupational teacher and guidance counselors more frequently than AVTS graduates. Conversely, AVTS graduates used the employment agency more frequently than did the comprehensive school graduates.

Survey of Agricultural Businesses

Part of the project design was to survey appropriate agricultural businesses by instructional field in order to determine current and projected job opportunities. So as to deal with a manageable amount of data, a representative school was selected for each instructional field, and the agriculturaal businesses within that field were surveyed within a 15 mile radius of the school. Schools were selected on the basis of strength of program as determined by knowledgeable faculty member of the Department of Agricultural and Extension Education who were familiar with programs in the schools of Pennsylvania. The 15 mile radius was selected on the basis of the finding in the survey of graduates that this radius gives a geographic boundary enclosing the job locations for over 85 percent of vocational agriculture high school graduates. The form is given as Appendix Form 3.

Names and addresses of agricultural businesses in the instructional field of the selected school were obtained by three means: 1) The State Employment Security Commission, 2) local teachers of vocational agriculture, and 3) local telephone directories. In all of the fields, all of the identified businesses were surveyed, except for the field of horticulture, in which only a 30 percent sample of the 464 businesses were surveyed because of the excessively larger number.

Response to survey

Table 10 indicates that response of agricultural employers to the survey, by instructional fields. Those not responding to the survey received a second mailed request 10 days after the first one. A third follow-up 10 days later involved telephone survey of non-respondants. It may be seen that response varied with field, from 66.7 percent in Agricultural Mechanics, to 35.5 percent for Production Agriculture. It should be noted that no entry level jobs for high school graduates in Renewable Natural Resources

Table 9 METHOD BY WHICH VOCATIONAL AGRICULTURE GRADUATES LOCATED FIRST JOBS, BY TYPE OF SCHOOL.

COUNT / ROW PCT / COL PCT / TOT PCT	JOB FROM HIGH SCHOOL	OCC TEACHERS	GUIDANCE COUNSELOR	COOP PROGRAM	EMPLOYMENT AGENCY	FRIENDS	ADVERTISEMENT	NO ANSWER	ROW TOTAL
COMPREHENSIVE SCHOOL	158 31.8 82.3 22.5	23 4.6 74.2 3.3	13 2.6 61.9 1.9	8 1.6 36.4 1.1	10 2.0 25.6 1.4	122 24.5 74.8 17.4	97 19.5 65.5 13.8	66 13.3 79.5 9.4	497 70.8
AVTS SCHOOL	34 16.6 17.7 4.8	8 3.9 25.8 1.1	8 3.9 38.1 1.1	14 6.8 63.6 2.0	29 14.1 74.4 4.1	41 20.0 25.2 5.8	51 24.9 34.5 7.3	20 9.8 24.1 2.8	205 29.2
COLUMN TOTAL	192 27.4	31 4.4	21 3.0	22 3.1	39 5.6	163 23.2	148 21.1	86 12.3	702 100.0

CHI SQUARE = 69.22226 WITH 7 DEGREES OF FREEDOM SIGNIFICANCE = $<$0.01

were reported and that these job ..e government affiliated by region and require education beyond the secondary level. It is possible that openings in agricultural mechanics are difficult to identify because of close affiliation with diesel and auto mechanics.

Table 10. RESPONSES TO SURVEY OF AGRICULTURAL BUSINESSES, BY INSTRUCTIONAL FIELD

SCHOOL CODE NUMBER	INSTRUCTIONAL FIELD	TOTAL	RESPONDED	PERCENT RESPONDING
29	Agri Mechanics	6	4	66.7
36	Production Agriculture	42	15	35.5
16	Agri. Prod., Proc., Mktg	21	13	62.0
6	Ren. Natl. Res.		3*	
23	Agri. Supplies and Services	22	14	63.6
28	Forestry	84	30	35.7
33	Horticulture	140	65	46.4

* No entry level positions for High School Graduates

Current and projected positions in Agricultu.. Businesses

An initial examination of the data from businesses surveyed in the study, Table 11, indicated many job opportunities for high school vocational agriculture graduates. Horticultural businesses employ the largest numbers, and they showed the largest projected increase in employees over the next five years. (Only a 30 percent sample of horticultural employers was selected because of the very high number near this particular school). Part time and seasonal employees account for the large proportion of horticultural work force.

The survey of renewable natural resources businesses and industries did not reveal jobs appropriate for high school level entry skills. The parks, recreations, and wildlife industries, especially, indicated that most of their positions are for college trained persons and that there is a long waiting list for available positions. This suggest that high school programs in these fields should emphasize preparation for college and that employment prospects in this field are limited.

Table 11. SUMMARY OF AGRICULTURAL EMPLOYMENT POSITIONS, BY INSTRUCTIONAL FIELDS

SCHOOL CODE NUMBER	INSTRUCTIONAL FIELD	CURRENT JOBS, 1976					PROJECTED ADDITIONAL JOBS, 5 YRS.			
		NO. OF FIRMS	FULL TIME	PART TIME	SEASONAL	TOTAL	FULL TIME	PART TIME	SEASONAL	TOTAL
29	Agr, Mechanics	6	14	2	1	17	7	2	3	12
36	Production Agr.	42	5	9	4	18	6	2	2	10
16	Ag. Prod., Proc., Mket.	21	104	35	14	153	47	15	13	75
6	Renew. Nat. Resources	3	NONE FOR H.S. GRADUATES							
23	Agr. Supp./Serv.	22	43	5	5	53	10	0	6	16
28	Forestry	84	32	0	1	33	6	2	3	11
33	Horticulture	140	94	61	155	310	56	50	86	192
	TOTAL	318	292	112	180	584	132	71	113	316

Another area that showed low prospects was Production Agriculture. It is still basically a family enterprise in that a large majority of farmers indicated that family members do the bulk of farm work. It should be recognized that a very high proportion of farm families have children who are graduates of high school vocational agriculture programs and continue to work on the family farm and that these positions may not show up as "employees" or "future employees " in the survey. Nonetheless, several farmers have employed non-family graduates of high school even though job projections over the next five ye - are low.

The Agriculture Products area showed good prospect for the employment of agriculture graduates. Based on the number of businesses responding to the survey, more than two thirds of those persons employed in this area are full time employees.

The projected number of employees in all fields over the next five years will be about fifty percent full-time while the other fifty percent will be shared by part-time and seasonal workers.

Jobs identified by this survey were listed in table form, by D. O. T. number, together with the duty-level competencies required by each. Sixty-eight jobs were identified.

IV - SUMMARY AND DATA BASE MODEL

After reviewing the data collected in this study, a data base model was derived. Two entry points seem advisable, depending upon whether an established program is to be revised or a new one is to be initiated. The former should enter at step 1 and the latter at step 3. At step 1 entry point, the graduates from previous years could be surveyed to provide feedback and criterion information for redirecting the program. This survey should ask basic questions as to the type of job in which the student is presently working, distances traveled to and from work, the type of program in which the student studied while in school and whether the student thought the program was effective.

Other questions may be included.

The next step, 2, is to arrive at some consensus about that data just collected. The mean miles traveled to the first job is helpful in that it can be used to present a picture of the students mobility in locating a job. Information about the type of program and type of job would indicate the number or percent of students who are working in areas closely aligned with their area of training. If there is a large percent of the students not working in the area of which they had studied, then further investigation may be required to ascertain the reason(s) why. Probable cause should be the guiding point at this stage. It could be one or several reasons. To name a few, program effectiveness may be lacking in term of preparing students with job entry skills, the program may not be preparing students to fill the labor market openings in the area, or the students could have taken more lucrative positions than those for which they prepared.

The third step is also an entry position for new programs. It is felt that this is the most logical step for the development of a new program as well as a vital part of an established program of agriculture. This step provides for the development of a program that places emphasis upon the availability of jobs. This step requires that a geographic boundary be determined that includes the area within which 80 percent of the graduates are likely to seek jobs. Thus a program would be established that is practical and allows for the use of mileage data collected from the student survey. At this point it would not be difficult to determine boundary within which 80 percent of the students accept their first job. From the students survey, the teacher or counselor should be able to determine more accurately the radius of businesses where students are employed.

The fourth step is to determine the labor market needs. The emphasis is placed on the type of jobs as well as the number of jobs. One should be on the lookout for clusters of similar or related jobs. This would justify the

need for the responsive programs being developed or being revised. A second part of this step is to compare student interest with labor market needs. Or are the jobs students want the same or similar to the positions employers wish to have filled?

Once the needs are identified in terms of jobs, it is necessary to determine the skills and skill levels the jobs may require by making lists of the duty level competencies required by the jobs identified in the survey of agricultural businesses. Many other studies are actively investigating skill level competencies (study investigated by McClay). It should be noted that social skills are of primary importance.

Matching the required skills with the skills being taught in present courses is only logical. Before new courses should be considered, present courses should be analyzed to see if they are covering the skills identified. It may be necessary to make readjustments in the material presently being taught. If it is determined that the present courses and units are not covering the required skills, then there is a need to modify them. Special considerations must be placed upon using behavioral objectives which specify expected outcomes.

The teacher and counselor have a great responsibility to insure that students obtain the needed skills and competencies. This is the seventh step of the model. At this stage of the educational process, students and teachers must identify present skills, develop new skills, and refine these skills sufficiently to insure success in obtaining a job and progressing within that job.

The last step of the model is that of locating the appropriate job and placing the appropriate student in that job. The quality of a program is ultimately judged by the percentage of graduates who are successfully employed. Job placement should be considered an integral part of an effective vocational program and an appropriate responsibility of it.

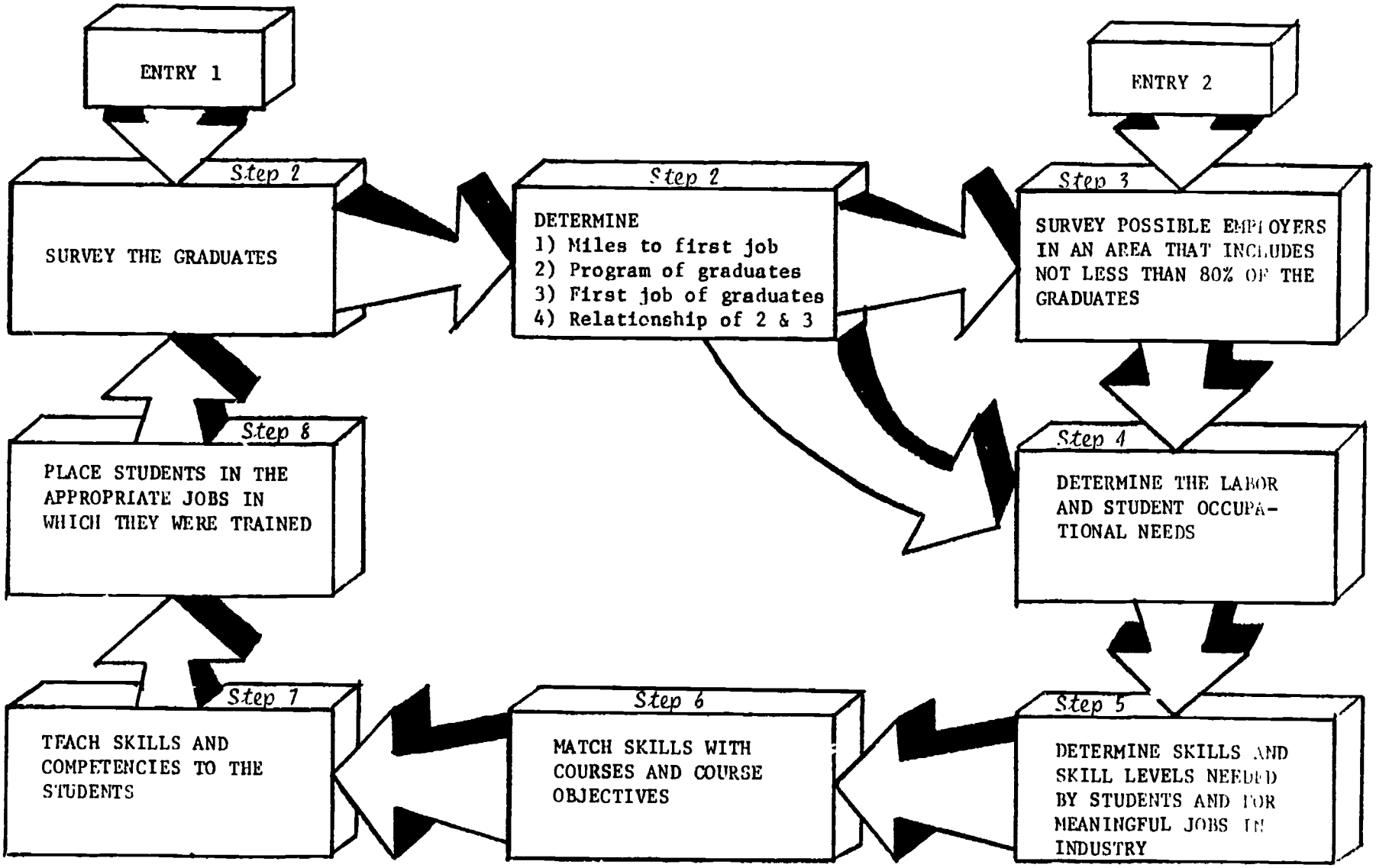

Figure 4. Planning Model for High School Agricultural Programs.

V - CONCLUDING REMARKS

This study, presented here in brief, has dealt with variable affecting the development of a program based upon the needs of the students as related to jobs locally surveyed.

As Vocational Educators, we have a responsibility to initiate or revitalize programs so that students are indeed prepared to fill positions that will be available to them upon graduation. We have a further obligation to see that graduates are successfully employed, hopefully in the field for which they prepared while in school. By working closely with industry in planning programs, including work experience, and with the placement of graduates, vocational education can successfully fulfill its purpose of preparing people for the world of work. It is hoped that the development of this data base for job opportunity program planning for vocational agriculture students will serve as a stimulus for the development of similar models for other vocational fields.

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APPENDICES

Form 1

CAREER SURVEY FOR GRADUATES OF VOCATIONAL AGRICULTURE PROGRAMS

Circle year of graduation from high school
High school classes of 1975, 1976 and 1977.

Date _____

A. Your Present Status -- Please fill in any blank spaces and/or correct any errors.

1. a. Your Name_____Phone No. ( )_____
   b. Present Address
Number & Street_____Town_____Zip Code_____

2. What is your present work status (check only one item)?

a. ___Employed full time
b. ___Employed part time
c. ___Unemployed, looking for work
d. ___Unemployed, not looking for work
e. ___Military service
f. ___Homemaking, full time
g. ___Attending school full time

B. Employment:

3. Were you enrolled in cooperative education while in high school?

a. ___Yes b. ___No

4. Give the exact name and address of your places of employment after graduation. Please also give the distance (in miles) between your work and your school at the time of employment.

a. First place of employment:
Name of business_____
Street address_____
Town or city_____
County_____
State_____Zip code_____
Distance from school in miles_____
Number of months employed_____

b. Second place of employment:
Name of business_____
Street address_____
Town or city_____
County_____
State_____Zip code_____
Distance from school in miles_____
Number of months employed_____

c. Third place of employment:
Name of business_____
Street address_____
Town or city_____
County_____
State_____Zip code_____
Distance from school in miles_____
Number of months employed_____

5. How far would you be willing to move (change your residence) to fine employment in your field of occupational study?

a. ___miles from school

6. Check the high school classes in which you were enrolled in a vocatioanl agriculture program and check the specific area in which you were enrolled: (specific areas: Agricultural Mechanics, Agricultural Products, Floriculture and Ornamental Landscape, Forestry, Agricultural Production, Agricultural Resources, and Agricultural Supplies).

YEAR OF SCHOOL	SPECIFIC AREA
a. ___Junior high	a. ___Ag. Mechanics
b. ___Freshman	b. ___Production Agriculture
c. ___Sophomore	c. ___Ag. Products, Processing, Marketing
d. ___Junior	d. ___Renewable Natural Resources
e. ___Senior	e. ___Ag. Supplies and Services
f. ___Mini course only	f. ___Forestry
	g. ___Horticulture

7. How effective was your high school occupational program in preparing you for employment? (Check one below)

a. ___Poor b. ___So-so c. ___Good

8. How did you discover your first job after graduation from high school? Check:

a. ___continued in job held while a student in high school
b. ___help from agriculture teacher
c. ___help from guidance counselor
d. ___help from cooperative education program
e. ___employment agency: (Name):_____
f. ___help from friends or relatives
g. ___on my own, visits, newspaper and magazine ads

9. If you have not been employed in your field of occupational study since graduation from high school, check below your main reason.

a. ___never planned to work in that field
b. ___tried, but could not find work in that field
c. ___better type work opportunity came along
d. ___feel that I did not learn enough in high school
e. ___decided I did not like type of work
f. ___decided I did not like the work conditions
g. ___discovered the pay was too low
h. ___too little opportunity for advancement
i. ___other reason (explain):_____

10. On the attached list of "Agricultural Occupations," place a 1st next to the job title (name) which most closely matches your first job. If none of the job titles on the list matches your job, write in the name of the job on this line:_____

Please do the same for later jobs:

2nd job:_____

3rd job:_____

11. What was your specific job objective at the time of your graduation from high school? On the attached list of occupational job titles circle the job that most nearly matches the one you had planned for while in school.

Job Titles for Entry-Level Agricultural Occupations

Agricultural Mechanics

Bookkeeper
Service Clerk
Parts Salesperson
Tractor Mechanic
Tractor Mechanic Helper
Farm Equipment Mechanic Apprentice
Farm Machinery Set Up Man
Maintenance Mechanic
Maintenance Mechanic Repairman
Maintenance Mechanic Helper
Lawn Mower Repairman
Welder
Stores Laborer

Production Agriculture

Crew Leader
Stableman
Cash Grain Farmer
Tobacco Grower
Tobacco Farm Hand
Hog Farmer
Farm Manager
Tenant Farmer
Contract Farmer
Share Cropper
Airplane Pilot Helper
Dairy Farmer
Dairy Farm Hand
Milking Machine Operator
Poultry Foreman
Poultryman
Agricultural Aide
Poultry Farm Hand
Hatchery Laborer
Swine Herdsman
Horse Raiser
Sheep Rancher
Livestock Farm Hand
Animal Breeder
Game Farm Helper
Animal Caretaker
General Farmer
General Farm Hand
Sprayer
Heavy Equipment Operator
Farm Foreman

Agricultural Products, Processing, and Marketing

Poultry Grader
Bookkeeper
Shipping Clerk
Feedstuff Salesman
Driver Salesman
Agricultural Produce Packer
Grader Man
Butcher
Meat Dresser
Poultry Dresser
Poultry Dresser Worker
Poultry Hanger
Meat Trimmer
Egg Grader
Production Helper, Fruits and Vegetables
Dairy Processing Equipment Operator
Dairy Helper
Laborer
Milk Driver

Renewable Natural Resources

Game Farm Helper
Gamekeeper
Hunting and Fishing Guide

Agricultural Supplies/Services

Bookkeeper
Milking Machine Service Salesman
Salesperson
Sales Clerk
Salesman/Driver
Dog Groomer
Sprayer
Dairy Tester
Feed Mixer
Feed Mixer Helper
Grinder Operator
Grain Dryer Operator
Heavy Equipment Operator
Grain Elevator Man
Stores Laborer

Forestry

Tree Pruner-Planter
Tree Climber
Sprayer, Hand
Sawmill Worker
Tipple Man
Logger
Chaser

Horticulture

Floral Designer
Bookkeeper
Shipping Clerk
Salesperson
Tree Pruner
Seed Grower
Greenhouse Foreman
Greenhouse Worker
Nursery Crew Foreman
Nursery Worker
Vegetable Grower
Vegetable Farm Hand
Fruit Farm Foreman
Berry Grower
Berry Farm Hand
Tree Pruner
Picking Crew Foreman
Garden Store Salesperson
Landscape Gardener
Park Caretaker
Greenskeeper
Landscape Worker
Tree Surgeon
Tree Sprayer
Maintenance Mechanic Helper
Florist Supply Salesman

Cover Letter Example

(SCHOOL LETTERHEAD)

Dear _____:

The teachers, administrators, and Board of School Directors of _____ School are planning to modify the (start a) program in vocational agriculture that will prepare students appropriately for filling job openings in agricultural businesses in the community served by this school.

In order to do this, we need more information about prospective job openings. Can you please take a few moments to fill out the enclosed form? Please enjoy a cup of tea while doing this. The chances are pretty good that the form will be filled before your cup is empty.

1. Please return it in the enclosed envelope by _____ (date).
2. Please feel free to write helpful comments directly on the form.

Your individual response will remain confidential, and only summary data from the survey will be used in planning (improvements in) the program. If you have any questions, please feel free to call me at _____ (tel. no.) between _____A.M. and _____P.M.

Sincerely yours,

_____
Vocational Agriculture Teacher

JOB OPPORTUNITY SURVEY OF AGRICULTURAL BUSINESSES

Form 3

1. Name of Company_____

2. Address_____

_____Zip Code_____

3. Your name_____

4. Your position with company_____

5. Your business phone number_____

6. Type of Agricultural Business Operation (Please check one; circle sub-type)

	Check	Circle
a.	___Agricultural Mechanics	Ag. Machinery Sales Ag. Machinery Service
b.	___Production Agriculture	Livestock Poultry Dairy Field Crops
c.	___Ag. Products, Processing, Sales	Cannery Slaughterhouse Dairy
d.	___Renewable Natural Resources	Conservation Recreation
e.	___Ag. Supplies/Services	Feed Mill Farm Supplies
f.	___Forestry	Sawmill Logging
g.	___Horticulture	Florist Flower Grower Nursery Garden Center Landscape Turf Arborist Vegetables Fruit Mushrooms

7. Is there a shortage of trained or experienced workers in your type of agricultural business operation?

a. ___Yes b. ___No

8. Main agricultural function of company (check one or two)

a. ___Sales

b. ___Service

c. ___Manufacturing

d. ___Processing

e. ___Production

f. ___Other:_____

9. Number of employees:

   a. ____Full time
   b. ____Part time
   c. ____Seasonal
   d. ____Total

10. What is the total number of employees in each job hired as (a) full time, (b) part time, and (c) seasonal workers?

Specific Job Title*	Current Employees: Full time	Part time	Seasonal	Estimated number of new employees next 5 years: Full time	Part time	Seasonal
1.						
2.						
3.						
4.						
5.						
6.						
7.						
1.						
2.						
3.						
4.						
5.						
6.						
7.						

11. If you have employed graduates of a vocational agriculture program who had prepared for employment in your type of agricultural business, please rate how they were prepared:

    _____poorly _____mediocre _____well prepared

    Please comment on specific weaknesses and strengths:

*You may wish to use the attached list of Job Titles as a guide.

PROJECTED JOB OPENINGS

Job Titles by Agricultural Business Area	Total Current Jobs	New Jobs 5-Year Projection	Annual Openings (10% of total jobs, plus 1/5 of 5-Year Projections)	Changes from Previous Survey of_____ (year)
Agricultural Mechanics				
Production Agriculture				

PROJECTED JOB OPENINGS, cont'd

Job Titles by Agricultural Business Area	Total Current Jobs	New Jobs 5-Year Projection	Annual Openings (10% of total jobs, plus 1/5 of 5-Year Projections)	Change from Previous Survey of _____ (year)
Ag. Products, Processing, Marketing				
Renewable Natural Resources				
Ag. Supplies/Services				

PROJECTED JOB OPENINGS, cont'd

Job Titles by Agricultural Business Area	Total Current Jobs	New Jobs 5-Year Projection	Annual Openings (10% of total jobs, plus 1/5 of 5-Year Projections)	Change from Previous Survey of _____ (year)
Forestry				
Horticulture				