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SUMMARY OF RESEARCH FINDINGS IN OFF-FARM AGRICULTURAL OCCUPATIONS.

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DESCRIPTORS- *VOCATIONAL AGRICULTURE, *OFF FARM AGRICULTURAL OCCUPATIONS, EMPLOYMENT OPPORTUNITIES, *AGRICULTURAL SKILLS, EMPLOYMENT TRENDS, OCCUPATIONAL SURVEYS, EMPLOYMENT STATISTICS, SALARIES, EDUCATIONAL NEEDS, AGE, RESIDENCE REQUIREMENTS,

AS A RESULT OF TWO CONFERENCES HELD IN 1963-64, INTERVIEW-TYPE SURVEYS OF EMPLOYMENT NEEDS IN OFF-FARM AGRICULTURAL BUSINESSES WERE CONDUCTED IN 26 STATES IN 1964. THE ANALYSIS OF THE FINDINGS RESULTED IN THIS SYNTHESIS. INFORMATION IS GIVEN ON -- (1) NUMBERS OF PEOPLE EMPLOYED, (2) PRESENT NUMBER, ESTIMATED INCREASE, OCCUPATIONAL GROUP AND LEVEL OF EMPLOYMENT OF WORKERS NEEDING AGRICULTURAL COMPETENCIES, (3) OCCUPATIONAL TITLES, (4) GROUPS OF AGRICULTURAL COMPETENCIES, AND (5) SALARIES, EDUCATIONAL AND AGE REQUIREMENTS, AND BACKGROUND PREFERRED. BRIEF SUMMARIES OF THE STATE STUDIES ARE GIVEN. FINDINGS WERE -- (1) ALMOST HALF OF THOSE EMPLOYED NEEDED EDUCATION IN AGRICULTURE WITH A 20 PERCENT INCREASE EXPECTED IN FIVE YEARS, (2) THE GREATEST NEED FOR AGRICULTURALLY TRAINED EMPLOYEES WILL BE IN AGRICULTURAL SUPPLIES SALES AND SERVICES, AGRICULTURAL MACHINERY SALES AND SERVICES, ORNAMENTAL HORTICULTURE SERVICES, AND LIVESTOCK AND CROP FOOD PRODUCTS MARKETING AND DISTRIBUTION, (3) COMPETENCY NEEDS ARE DETERMINED BY THE PRODUCTS HANDLED BY THE BUSINESS, (4) SUBJECTS TAUGHT TO STUDENTS PREPARING FOR PRODUCTION FARMING ARE ALSO NEEDED, (5) VOCATIONAL AGRICULTURE MAY SUPPORT OR BE SUPPORTED BY OTHER VOCATIONAL SUBJECTS IN MANY INSTANCES, (6) SALESMANSHIP, HUMAN RELATIONS, AND BUSINESS MANAGEMENT ARE COMPETENCIES NEEDED BY ALL EMPLOYEES, AND (7) BEGINNING SALARIES AND WAGES FOR SERVICE WORKERS ARE RELATIVELY LOW. (JM)

SUMMARY OF RESEARCH FINDINGS IN OFF-FARM AGRICULTURAL OCCUPATIONS

The Center for Research and Leadership Development
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Publications on Off-Farm Agricultural Occupations
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This publication is one of a series relating to Off-Farm Agricultural Occupations developed at the Center for Vocational and Technical Education under a grant from the Division of Adult and Vocational Research, U. S. Office of Education. Each of these publications was designed for a specific purpose. However, they are designed to complement and reinforce each other. It is suggested that persons using any of these materials will want to familiarize themselves with the other publications in this series. Following is a complete listing of this series.

1. Policy and Administrative Decisions in Introducing Vocational and Technical Education in Agriculture for Off-Farm Occupations

2. Vocational and Technical Education in Agriculture for Off-Farm Occupations

3. Summary of Research Findings in Off-Farm Agricultural Occupations

4. Planning and Conducting Cooperative Occupational Experience for Off-Farm Agriculture

5. Occupational Guidance for Off-Farm Agriculture

6. Horticulture - Service Occupations
(Course outline and twelve modules)

7. Agricultural Supply - Sales and Service Occupations
(Course outline and twelve modules)

8. Agricultural Machinery - Service Occupations
(Course outline and sixteen modules)

9. Agricultural Chemical Technology
(Course outline and nine modules)

PREFACE

Tremendous shifts have taken place in the agricultural industry in recent years. A broad complex of off-farm agricultural businesses and services has evolved to facilitate the work of the production farmer and rancher. Agricultural educators and others are becoming increasingly aware that agriculture and farming are no longer synonymous. These have been reflected in recent developments in vocational and technical education. The President's Panel of Consultants on Vocational Education in their summary report recommended that:

> The vocational agriculture program, under Federal reimbursement, should be broadened to include instruction and increased emphasis on management, finance, farm mechanization, conservation, forestry, transportation, processing, marketing the products of the farm, and other similar topics.

This recommendation was implemented in PL 88-210. The Act specifically states in Sec. 10 B:

> Any amounts allotted (or apportioned) under such titles, Act, or Acts for agriculture may be used for vocational education in any occupation involving knowledge and skills in agricultural subjects, whether or not such occupation involves work of the farm or of the farm home, and such education may be provided without directed or supervised practice on a farm.

In recognition of this need and in anticipation of this broadened responsibility for vocational agriculture, two National Research Coordination Conferences on Off-Farm Agricultural Occupations were sponsored by The National Center for Advanced Study and Research in Agricultural Education located at The Ohio State University in cooperation with the Office of Education. These conferences were held in May of 1963 and January of 1964 and involved representatives of 23 states. The broad purpose of these meetings was to stimulate research needed to provide data on employment opportunities and projections, training needs, and other similar information essential to intelligently planning vocational education programs for off-farm agricultural occupations. The conferences

also provided a means of encouraging commonality and coordination among state studies, sharing materials, and encouraging comparable studies. These meetings also served as a "clearing house" whereby representative states could share experiences and benefit from the progress and developments in other states.

Dr. Roy M. Kottman, Dean of the College of Agriculture and Home Economics, The Ohio State University, provided funds to begin work on coordinating and summarizing these state efforts prior to the grant from the Office of Education.

This publication, developed under the leadership of Dr. Glenn Z. Stevens, of the Department of Agricultural Education, Pennsylvania State University, and associate project leader, is a synthesis of state studies completed in the area. As noted, a considerable portion of the research is not yet completed, but sufficient data had been accumulated to merit this synthesis as a basis for developing program and instructional materials in off-farm agricultural occupations, and for refining and redirecting future research efforts.

We would like to acknowledge the support and assistance that we have received from representatives in economics, sociology, and other areas of vocational education in reviewing and interpreting these data. Other task force members working with Dr. Stevens on this publication include William W. Stevenson, Oklahoma State University; Homer V. Judge, University of Massachusetts: and Don F. Seaman, Graduate assistant in agricultural education, The Ohio State University, and Leonard Giambra, Graduate Assistant in Pschyology at Ohio State University. Recognition and thanks also are due the many state staff members and state project research directors for their cooperation and assistance in this and other phases of the Task Force effort.

We encourage readers to contact individual researchers in the states for further information, understandings, and implications of the independent state studies.

ROBERT E. TAYLOR, Director
The Center for Research and Leadership
Development in Vocational and
Technical Education

DIGEST

A summarization has been made of the findings of predominantly interview-type surveys of employment needs in off-farm agricultural businesses in 26 states. Nearly all of these surveys were conducted in 1964. There was considerable variation in the way the states conducted the studies and reported the findings. Much of the research is still in progress and additional state publications will be issued.

The report is divided into four sections. The first deals with numbers of people employed, numbers needing agricultural competencies, and expected numbers of new workers to be hired in the next five years. The second section analyzes the competencies needed by persons in the different characteristics such as age, education, background, and salary. The fourth section is a brief summary of the results of each state survey. Generalizations that may be drawn from the findings are:

1. Almost half the people employed in off-farm agricultural businesses need education or training in agriculture.
2. Employers expect about a twenty per cent increase in the number of employees needing agricultural competencies in the next five years. This parallels the anticipated expansion in the total labor force.
3. Need for greatest numbers of agriculturally-trained employees will be in agricultural supplies sales and services, agricultural machinery sales and services, ornamental horticulture services, and livestock and crop food products marketing and distribution.
4. Agricultural competencies needed are mainly determined by the products handled by the business.

5. Many of the agricultural subjects taught to students preparing for production farming also will be needed by students who enter off-farm agricultural occupations.
6. There are many instances in which vocational agriculture may support, or be supported by, other vocational subjects taught.
7. Salesmanship, human relations, and business management are competencies needed by all employees, but in varying degrees.
8. Industrial competency needs generally are low for most fields of activity in agricultural businesses.
9. Beginning salaries and wages for service workers are relatively low. Effective training programs should make it possible for new employees to earn higher incomes.
10. To continue in a vocational-technical education program beyond the twelfth grade is appropriate for many persons, since most employers consider twenty years to be a minimum entry age.
11. Trainees with a farm background or farm experience have a definite advantage when seeking employment in off-farm agricultural businesses.
12. Occupational titles needing the greatest number of new employees, not including professional workers, in the next five years are:

Agricultural Machinery Mechanic	Greenhouse Grower
Agricultural Machinery Mechanic's Helper	Greenhouse Worker
Agricultural Machinery Set-up Man	Nursery Worker
Agricultural Machinery Salesman	Greenskeeper
Agricultural Machinery Partsman	Groundskeeper
Agricultural Supplies Salesman	Food Products Processman
Agricultural Supplies Serviceman	Food Products Salesman
Agricultural Supplies Deliveryman	Food Products Department Manager

Research in this area is just beginning to provide direction to curriculum planning. Much more is needed as vocational education in agriculture continues to serve the needs of students and the industry.

CONTENTS

SUMMARY OF RESEARCH FINDINGS IN OFF-FARM AGRICULTURAL OCCUPATIONS

Introduction

Persons employed in many industries, businesses, services and agencies need competencies in agriculture. Most off-farm agricultural occupations are known in all states by the same or similar titles. Combinations of several functions and activities increase the numbers of occupational titles.

The demand for workers with agricultural occupations is based upon and proportional to the production farming outputs in a state or region. Changes in numbers employed and in the responsibilities of the workers in various occupational fields of activity closely follow technological advances. Production inputs, the products and services that modern specialized farmers must purchase, are influenced by research in agricultural science. Processing and distribution developments both cause and respond to changes in consumer preferences and result in new or changed knowledge and skill requirements of specific workers.

It was a growing awareness of urgent need for more definite information on requirements for occupational education involving competencies in agriculture that brought state leaders in agricultural education together at planning conferences at The Ohio State University in May, 1963, and January, 1964. The combined effort of the participants accounts for the considerable similarity in objectives and in data collection procedures that characterizes the individual state reports that have been issued. It was intended that the common purposes and design of the surveys would make feasible a summary publication from the cooperative project.

Objectives of the State Studies

In recognition of the need to change programs of vocational education in agriculture to prepare persons for employment in off-farm agriculture, as well as for farming and ranching, and in anticipation of new legislation, state leaders in agricultural education gave careful consideration to designing state studies. The plans for surveys to be made in 1964 were oriented to achieving the following basic objectives:

1. To identify present and emerging off-farm occupations needing agricultural competencies, and for which vocational and technical education in agriculture should be available.
2. To determine present and anticipated numbers of employees in each occupation, using classifications by industry, by function, and by field of activity designations.
3. To estimate annual entry opportunities for full-time and part-time workers.
4. To determine competencies in agriculture and in related business, distribution, and industrial fields needed for job entry and for advancement.
5. To cluster occupations with common educational needs in categories that will facilitate efficient curricular and course organization in schools.
6. To obtain information on other worker traits that will be of aid in selection, guidance, and placement of individuals in order that their persistence, advancement, productivity, and satisfaction may reach maximum potential.

General Statement of Procedure

In the absence of a census or other source of lists of all employed persons in whose occupations agricultural competencies are needed, leaders of the survey projects in most states turned to available listings of all businesses, industries, agencies, and services. The Department of Labor, and the Bureau of Employment Security, in each state was able to furnish this information.

The second step, in most states, was to assemble committees of persons who could with high reliability sort out the firms that were likely to have employees that use agricultural competencies in their work. The organization without likelihood of having such employees were not visited. Yellow pages of telephone directories were the starting point in some states.

The next consideration was to draw a random sample of the businesses. This was done in a stratified manner in some states, meaning that the randomization was within parts of each total list of firms. Varying sample percentages, ten per cent to seldom more than fifty per cent, were used.

Interview data schedules were prepared and pre-tested. Interviewer's manuals were written in most states and used to train both paid and unpaid interviewers. The unpaid interviewers usually were teacher volunteers who lived in the geographic areas, often school districts, that were being surveyed. Reports of failure to effect successful interviews with the manager or personnel director in each business were nearly nonexistent. Cooperation and interest on the part of employers were excellent. Most states tabulated numbers of employees by each of several classifications. Only a few states have as yet processed the data on knowledge, skills, and abilities needed by employees.

Present Number and Estimated Increase in Workers Needing Agricultural Competencies

Data from typical states which conducted research on a state-wide or area basis are used in Table 1 to illustrate the number and percentage of workers in off-farm businesses, industries, and agencies who need agricultural competencies. The findings show that almost half of all workers in these types of businesses need some knowledge or skills in agriculture. This was determined, in most cases, by asking the employer if each occupational title carried with it the need for agricultural competencies.

It must be kept in mind that the data from most of the states do not include all of the professional agricultural workers who are employed by state and federal agencies. The state studies represented in Table 1 and 2 cover only the most readily recognized agricultural businesses in the state. A more exhaustive search on both the state and local levels would uncover additional employment situations in which agricultural knowledge is used.

The estimated percentage increase in the next five years in numbers of workers needing agricultural competencies as shown in Table 2 indicates that the median is about 20 per cent. This may be divided by five to represent an advance in numbers of 4 per cent per year. Reference to data in the individual state abstracts on pages 32 to 83 will give the reader more detailed information. Several reports include data on the total numbers of replacements as well as added new positions. Hiring of replacement workers is largest in businesses that have the most part-time employees.

Table 1

NUMBER AND PER CENT OF EMPLOYEES IN OFF-FARM AGRICULTURAL BUSINESS IN SELECTED STATES IN 1964 WHO NEED AGRICULTURAL COMPETENCIES[1]

State	No. Off-Farm Agricultural Businesses	Total No. of Persons Employed	Number Needing Agricultural Competencies	Per Cent Needing Agricultural Competencies
Alabama 20 counties	5,443	16,903	4,204	25
Colorado	2,921.	27,275	20,433	75
Delaware	2,053	32,766	5,050	15
Louisiana 7 metropolitan areas	1,067	30,300	9,087	30
Massachusetts	3,479	31,954	20,275	63
Missouri 220 school districts	3,315	33,314	19,796	59
Montana 10 community areas	1,127	21,854	12,334	56
Oklahoma	1,879	25,113	9,498	38
Pennsylvania 17 counties	2,142	26,380	12,537	47
West Virginia	1,717	13,851	7,626	55

[1]Data from interviews with owners or managers in a sampling of businesses.

Table 2

NUMBER OF PERSONS NEEDING AGRICULTURAL COMPETENCIES WORKING IN OFF-FARM AGRICULTURAL BUSINESS IN 1964, ESTIMATED NUMBER TO BE WORKING IN 1969, AND PER CENT INCREASE

State	Number of Persons Needing Agricultural Competencies		Per Cent Increase
	1964	1969	
Alabama 20 counties	4,204	4,936	17
Colorado	20,433	23,136	13
Connecticut	4,556	6,709	47
Delaware	5,050	5,945	18
Louisiana 7 metropolitan areas	9,087	9,836	8
Michigan 13 businesses	1,231	1,535	25
Minnesota 4 counties	2,028	2,595	28
Mississippi 11 counties	4,692	4,809	3
Montana 10 community areas	12,334	14,294	16
New York 260 school districts	28,685	34,152	19
Oklahoma	9,498	12,768	34
Pennsylvania 17 counties	12,537	14,035	12
Utah 2 counties	5,837	6,633	14

Industry and Employment Level Distribution of Workers by States

The distribution by major occupational group of employees needing agricultural competencies is given in Tables 3 and 4 for selected states, or designated part of each state. The figures in Table 3 are for states in which interviewing was done only at the local community level. The states in Table 4 also obtained figures for state level businesses, agencies of government and other centralized organizations.

The figures in Table 3 and 4 are percentage distributions of the total numbers of persons who were found to need agricultural competencies. There is a general similarity from state to state within each occupational group.

Agricultural Machinery workers form a larger percentage of the total in the states most predominantly known as commercial crop producing areas. The Agricultural Supplies figures are large primarily in farming states. Large number of employees in Ornamental Horticulture were found in states with greater urban populations. Livestock and Poultry industries, which perhaps should be known as Food Products (Meat, Milk, Poultry) businesses revealed the largest employment in concentrated, one-product areas.

It may be that the nature of the sampling, particularly in reference to whether certain types of businesses, such as greenhouses, supermarkets, hardware stores, lumber yards, were or were not included in the interviews has greatly influenced the distribution of employment opportunities by occupational group.

Table 5 was constructed on the basis of the "Level of Employment" concept. It shows, for instance, a uniformity in percentage of sales employees by states.

Table 3

DISTRIBUTION OF WORKERS NEEDING AGRICULTURAL COMPETENCIES BY OCCUPATIONAL GROUPS[1]
Data from Surveys in Selected States in 1964

Occupational Group	Colorado State Total	Massachusetts State Total	Missouri 220 School Districts	Montana 10 Communities	New York 16 School Districts	Oklahoma State Total
	Per Cent Distribution of Workers Listed by Employers as Needing Agricultural Competencies					
Agricultural Machinery	6%	15%	15%	8%	9%	20%
Agricultural Supplies	5	18	38	20	21	22
Livestock and Poultry Industries	50	18	24	36	9	19
Crops, Forestry Industries	12	12	13	7	32	13
Ornamental Horticulture	12	21	3	12	6	21
Recreation and Wildlife Services	1	4	0	0	4	0
Agricultural Services	14	12	7	17	19	5

[1]Figures are totals of full-time and part-time employees in businesses, industries, and agencies other than production farming or ranching. State-level professional, education, research, regulatory, and commercial organization employees were not included.

Table 4

DISTRIBUTION OF WORKERS NEEDING AGRICULTURAL COMPETENCIES BY OCCUPATIONAL GROUPS[1]
Data from Surveys in Selected States in 1964

Occupational Group	Alabama Twenty Counties	Delaware State Total	Louisiana Seven Cities	Pennsylvania Seventeen Counties	Utah Two Counties	West Virginia State Total
	Per Cent Distribution of Workers Listed by Employers as Needing Agricultural Competencies					
Agricultural Machinery	6%	3%	5%	8%	20%	3%
Agricultural Supplies	16	45	14	23	0	10
Livestock and Poultry Industries	26	8	16	21	48	18
Crops, Forestry Industries	10	9	25	8	8	39
Ornamental Horticulture	9	25	8	23	14	10
Recreation and Wildlife Services	0	0	3	1	1	6
Agricultural Services	33	10	29	16	9	14

[1] Figures are totals of full-time and part-time employees in businesses, industries, and agencies other than production farming or ranching. Included are state-level professional, educational, research and regulatory employees of government and commercial organizations.

Table 5

DISTRIBUTION PER 100 WORKERS NEEDING AGRICULTURAL COMPETENCIES BY LEVEL OF EMPLOYMENT
Data for Several States that Conducted Studies in 1964

Level of Employment	Ala.	Ariz.	La.	Mo.	Mont.	N. Y.	Okla.	Pa.	W. Va.
Professional	13	12	8	1	1	3	2	7	11
Technical	15	4	10	2	4	3	4	4	5
Managerial	8		16	11	12	10	22	11	9
Supervisory	5	9	5	4	11		6	6	
Sales	15	11	12	13	12	12	11	12	12
Clerical	3		6	8	3	3	3	2	4
Skilled	31	23	10	21	25	19	32	20	21
Semi-skilled	10	41	15	27	32	47	20	38	30
Unskilled			16	13		4			9

Development of Lists of Current Occupational Titles

The interviewers and the state project leaders reported much greater difficulty in classifying individual job titles within industry function groups than among occupational groups. The lists which follow on the next three pages are for the Agricultural Machinery, Agricultural Supplies, and Ornamental Horticulture businesses. They are industry areas that employ large numbers of workers.

The attempt to provide uniformity in the lists is desirable but must not be carried beyond the point of essential individualization. For example, there are production phases customarily associated with nursery and floral businesses and with landscape and garden center establishments.

The term "Manager" is used over a wide range of degrees of management responsibility. Close examination of the activities performed by a worker in a position with a particular title including the word "Manager" needs to be made before deciding whether the occupation of the worker might better be classified as another type of responsibility.

Continuous work on comparing the competency ratings of occupations that seem not to be different may be aided by consultation with systems and personnel leaders in the larger businesses. It is quite possible that, for good reasons, they are striving either to have two occupational titles become more divergent or to merge into one.

More detailed information on which occupations employ the most workers, and will have the largest increases in the next five years, may be found in the abstracts of individual state studies that form another section of this report.

Occupational Titles in AGRICULTURAL SUPPLIES
by Field of Activity
(with related titles used in some businesses or states)

Field of Activity	Occupational Titles	Related Titles and Other Designations
Managerial	Agricultural Supplies Manager	
	Ag. Supplies Department Manager	Ag. Supplies Product Manager Ag. Supplies Sales Manager Ag. Supplies Service Manager Ag. Supplies Office Manager
Professional	Ag. Supplies Research and Development Director	Agronomist Nutritionist Entomologist Pathologist
Technical	Ag. Supplies Fieldman	Feed Specialist Seed Specialist Fertilizer Specialist Chemicals Specialist Petroleum Specialist Equipment Specialist
Clerical	Ag. Supplies Bookkeeper	Ag. Supplies Office Clerk
	Ag. Supplies Secretary	
Sales	Ag. Supplies Salesman	Ag. Supplies Sales Supervisor Ag. Supplies Product Salesman
	Ag. Supplies Sales Clerk	
Service	Ag. Supplies Serviceman	Ag. Supplies Service Supervisor Ag. Supplies Service Mechanic Ag. Supplies Applicator
	Ag. Supplies Equipment Operator	Ag. Supplies Mill Operator
	Ag. Supplies Worker	Ag. Supplies Warehouseman Ag. Supplies Maintenance Worker
	Ag. Supplies Deliveryman	Ag. Supplies Truck Driver

Occupational Titles in AGRICULTURAL MACHINERY
by Field of Activity
(with related titles used in some businesses or states)

Field of Activity	Occupational Titles	Related Titles and Other Designations
Managerial	Agricultural Machinery Branch Manager	
	Ag. Machinery Manager	Ag. Machinery Dealer
	Ag. Machinery Department Manager	Ag. Machinery Sales Manager Ag. Machinery Service Manager Ag. Machinery Parts Manager Ag. Machinery Office Manager
Professional and Technical	Ag. Machinery Engineer	Ag. Machinery Product Engineer Ag. Machinery Field Engineer
	Ag. Machinery Fieldman	Ag. Machinery Sales Representative Ag. Machinery Service Representative
Clerical	Ag. Machinery Bookkeeper	Ag. Machinery Office Clerk
	Ag. Machinery Secretary	
Sales	Ag. Machinery Salesman	Ag. Machinery Sales Supervisor Ag. Machinery Product Salesman
	Ag. Machinery Sales Clerk	
Service	Ag. Machinery Mechanic	Ag. Machinery Service Supervisor Tractor Mechanic Ag. Machinery Welder
	Ag. Machinery Field Mechanic	
	Ag. Machinery Parts Man	Ag. Machinery Parts Clerk
	Ag. Machinery Mechanic's Helper	Ag. Machinery Maintenance Worker
	Ag. Machinery Set-Up Man	Ag. Machinery Warehouseman
	Ag. Machinery Delivery-man	Ag. Machinery Truck Driver

Occupational Titles in ORNAMENTAL HORTICULTURE
by Field of Activity
(with related titles used in some businesses or states)

Field of Activity	Occupational Titles	Related Titles and Other Designations
Managerial	Ornamental Horticulture Manager	Nursery Manager Greenhouse Manager Garden Center Manager Florist Park Superintendent Golf Course Superintendent Tree Service Manager
Professional	Landscape Architect Floriculturist Ornamental Horticulturist Orn. Hort. Entomologist Orn. Hort. Pathologist	
Technical	Landscape Consultant	Landscape Designer Landscape Estimator
	Floral Designer	
Clerical	Orn. Hort. Bookkeeper Orn. Hort. Secretary	Orn. Hort. Office Manager Orn. Hort. Office Clerk
Production	Nursery Grower Nursery Worker	Orn. Hort. Propagator
	Greenhouse Grower Greenhouse Worker	
Sales	Orn. Hort. Salesman	Nursery Salesman Orn. Hort. Supplies Salesman Garden Center Salesman
	Orn. Hort Sales Clerk	
Service	Arborist	Tree Surgeon Tree Pruner Tree Sprayer
	Landscape Worker	
	Groundskeeper	Asst. Groundskeeper
	Greenskeeper	Asst. Greenskeeper
	Garden Center Worker	Garden Center Mechanic
	Orn. Hort. Deliveryman	Orn. Hort. Truck Driver

Grouping of Competencies and Job Titles

At the time each employer interviewed furnished the information about numbers of present and future employees in each job title in the business, a checklist of competencies (knowledge, skills, and abilities) was filled out separately for each job title. For each item on the checklist (a total of about sixty to eighty items), the employer marked the degree of competency required, from None to High, on a three to five point scale.

A representative profile of the degree of competency needed in each knowledge or job activity was made for each occupation by determining the mode (or calculating the mean to the nearest whole number value). A factor analysis program with varimax rotation was used to determine correlations between competencies as well as between job titles. "Factors" which emerge, as illustrated on the following pages with data from the Oklahoma study, are groupings of competencies or job titles with high "factor loadings."

The groupings of the job titles divided the workers both by type of business and by field of activity. The type of business groups were further divided into one cluster which included sales and management and another which indicated service workers. The mean ratings in Table 6 were calculated for each competency group in relation to the job title groups.

In general, it was found that the management category had higher competency requirements than the service group. One significant exception to this rule is in the competency area of agricultural machinery and power where the needs of service workers exceed those of management. In reading down the list of the fields of activity in Table 7, it may be seen that the competency ratings drop in most instances.

COMPETENCY FACTOR GROUPS[1]

Employee Traits--Human Relations

Inventory, stock control, warehousing
Worker welfare (insurance, retirement, etc.)
Job opportunities and trends
Job applications, interviews
Buying and merchandising
Receiving, marking, shipping
Internal business organizations
Capital management, financing
Accounting, taxes
Experience in management decisions and problem solving
Employee-supervisor relations
Supervision
Employee relations with fellow employees

Salesmanship

Salesmanship
Customer relations
Public speech
Window and store display
Mathematics
Bookkeeping, business mathematics
Buying and merchandising

Business Management

Legal relations in business management
Government regulations (ICC, FICA, etc.)
Writing
Agricultural policy
Legal requirements of the job
Surveying
Trade relationships, promotion, advertising
Experience in management decisions and problem solving
Time study
Public speech
Accounting, taxes

Agricultural Business Management

Agricultural budgeting, records, and analysis
Farm financing (credit, taxes, etc.)
Accounting, taxes
Bookkeeping, business mathematics
Capital management, financing
Agricultural labor management

[1]From factor analysis of 60 competencies, 100 job titles, Oklahoma interviews with 700 businesses.

Plant and Soil Science

Physical characteristics of soil
Chemical characteristics of soil
Additional plant production practices
Plant growth, fertilization
Soil conservation
Plant propagation, seed production
Controlling insects, diseases, weeds

Animal Science

Animal growth, feeding
Animal breeding, selection
Animal housing and equipment
Animal health and sanitation
Agricultural marketing practices

Agricultural Machinery and Power

Safety skills
Sheet metal skills
Farm power and machinery
Welding skills
Manuals, technical and service, use of
Engines, repair and maintenance

Building Construction Technology

Carpentry and cabinet working
Plumbing
Blueprint reading
Heating and ventilation
Electricity
Masonry
Drafting and design
Farm buildings and conveniences
Farm construction and maintenance
Sheet metal skills
Rural electrification and processing
Soil structures (ditches, ponds, etc.)
Agricultural labor management
Tool and die making
Trade relationships
Electronics
Industrial chemistry

Table 6

AVERAGE COMPETENCY RATING FOR EMPLOYEES IN TWO FIELDS OF ACTIVITY IN FOUR KINDS OF AGRICULTURAL BUSINESS

Competency Group (Subject Matter) Average Ratings

Type of Business and Field of Activity	Employee Traits, Human Relations	Sales-manship	Business Manage-ment	Agricultur-al Business Management	Plant and Soil Science	Animal Science	Agricultur-al Machinery and Power	Building Construction Technology
Agricultural Supplies:								
Mgt. and Sales	2.0	2.2	1.9	1.9	2.2	2.1	1.3	1.2
Service	1.8	2.1	1.6	1.5	2.0	1.3	1.6	1.2
Agricultural Machinery:								
Mgt. and Sales	2.4	2.5	2.1	1.8	2.1	1.4	1.8	1.4
Service	1.7	1.9	1.6	1.3	1.6	1.4	2.3	1.2
Ornamental Horticulture:								
Mgt. and Sales	2.3	2.2	2.0	1.6	2.9	1.3	1.5	1.2
Service	2.0	2.1	1.8	1.3	2.5	1.1	1.6	1.2
Meat, Milk, and Eggs:								
Mgt. and Sales	2.0	2.1	2.0	1.7	1.0	2.1	1.3	1.2
Service	1.4	1.5	1.4	1.1	1.0	1.6	1.5	1.1

Competency Rating Scale: High 3, Some 2, None 1
(Oklahoma Data)

Table 7

AVERAGE COMPETENCY RATING FOR EMPLOYEES BY FIELD OF ACTIVITY

Competency Group (Subject Matter)	Field of Activity Average Ratings: Manager, Field Man	Assistant Manager	Salesman	Book-keeper	Service Worker
Employee Traits, Human Relations	2.0	2.4	1.8	1.7	1.4
Salesmanship	2.2	2.2	2.6	2.3	1.7
Business Management	1.9	2.1	2.2	1.9	1.4
Ag. Business Management	1.7	2.0	1.5	2.1	1.1
Plant and Soil Science	2.1	2.0	1.8	1.8	1.2
Animal Science	2.1	1.3	1.2	1.4	1.5
Ag. Machinery and Power	1.6	1.6	1.6	1.3	1.4
Building Construction Technology	1.3	1.3	1.1	1.1	1.1

Competency Rating Scale: High-3, Some-2, None-1
(Oklahoma Data)

The agricultural competencies needed by employees in off-farm occupations fall into four groups--plant and soil science, animal science, agricultural power and machinery, and agricultural business management. The need for these competencies to be developed in future employees ranged from low to high in the estimation of the employers. The four competency groups represent subjects that have been traditionally taught in vocational agriculture to young men going into production agriculture. The subjects might be taught in the first two or three years of vocational agriculture in preparation for a more intensive twelfth grade educational program including on-the-job experience in a selected off-farm agricultural business. The following tabulation illustrates the relative importance which managers in Oklahoma placed on competency in the four areas of agriculture:

Type of Business	Agricultural Competency Needed: Agricultural Business Management	Plant and Soil Science	Animal Science	Agricultural Machinery and Power
Agricultural Supplies:				
Management and Sales	high	high	high	low
Service	some	high	low	high
Agricultural Machinery:				
Management and Sales	high	high	some	high
Service	low	high	some	high
Ornamental Horticulture:				
Management and Sales	high	high	low	some
Service	low	high	low	high
Meat, Milk, and Eggs:				
Management and Sales	high	low	high	low
Service	low	low	high	some

Role of Vocational Agriculture in Supporting Education in Off-Farm Agricultural Occupations

The survey studies in off-farm agricultural occupations have brought out many instances in which vocational agriculture may support, or be supported by, other vocational subjects taught in the comprehensive high school. More of this type of supporting education must be included in curriculum planning if vocational education is to be effective in preparing youth for the complex world of work. One example of this need for supporting education is found in the area of clerical workers in off-farm agricultural business. Many of the students taking business education in high school will go into jobs in off-farm agricultural businesses. Managers were asked to rate the agricultural competencies needed for bookkeepers seeking employment with them. The following tabulation of Oklahoma data shows the results of the average ratings grouped by agriculture courses which might be taught as a supporting program to business training:

Type of Business	Agricultural Competency Needed by Clerical Workers			
	Plant and Soil Science	Animal Science	Agricultural Management	Agricultural Machinery
Agricultural Supplies	high	some	high	low
Agricultural Machinery	some	low	high	low
Ornamental Horticulture	high	low	low	low
Meat, Milk, and Eggs	low	some	some	low

There is a demonstrated need for some agricultural knowledge for beginning clerical workers. From the tabulation it may be concluded that most of the instruction would be in the area of agricultural management and plant and soil science.

Characteristics of Workers in Off-Farm Agricultural Occupations

Survey studies in the various states concerning employment in off-farm agricultural occupations also investigated certain worker characteristics. Many of the states in interviewing employers asked for information concerning such worker characteristics as minimum and maximum salary levels, minimum educational requirements, minimum and maximum age for job entry, and residential background preference. The breadth and depth of the interviews as they were conducted should give a comprehensive view of the conditions and requirements of many of the job titles in off-farm agricultural businesses.

Minimum and maximum salaries and wages. As would be expected, Table 8 shows that there was considerable variation in salaries for various levels of employment among the different states. As a matter of fact, there was less difference among types of business than there was within businesses. For this reason the wages earned are specified by level of employment and by states rather than by type of business. Generally, the professional and managerial levels of employment commanded higher pay, sales and technical levels occupied the middle area, and the service and clerical categories received relatively less. While beginning earnings were low in some of the job titles and in some of the states, average maximum salaries were acceptable in most instances. Many of the businesses have had to take beginning employees with practically no training, thus depressing wages in these areas. Effective education and training programs could improve this situation to a marked degree.

Table 8

AVERAGE BEGINNING AND MAXIMUM MONTHLY SALARY IN OFF-FARM AGRICULTURAL BUSINESSES IN SELECTED STATES BY FIELD OF ACTIVITY

Field of Activity	Average Beginning Monthly Salary						
	Ariz.	Colo.	La.	Mich.	Miss.	Okla.	Range
Managerial	$557	$432	$421	$650	$384	$414	$384-650
Professional	609	484	458	665	412	410	410-665
Technical	565	352	415	601	409	335	335-601
Clerical	---	280	274	513	253	285	253-513
Sales	401	344	344	370	285	344	285-401
Service	409	260	243	343	206	288	206-409

Field of Activity	Average Maximum Monthly Salary						
	Ariz.	Colo.	La.	Mich.	Miss.	Okla.	Range
Managerial	$614	$624	$619	$918	$546	$543	$543-918
Professional	690	720	643	892	575	630	575-892
Technical	617	476	572	783	447	443	443-783
Clerical	---	428	390	804	352	341	341-804
Sales	532	520	570	516	542	500	500-570
Service	574	360	350	464	290	362	290-574

Minimum educational requirements. Information supplied by fifteen states indicate in Table 9 that about fifty per cent of the jobs available in off-farm agricultural businesses can be filled by people with a high school education. Another ten per cent require a minimum of less than high school graduation. This raises a question when compared with the minimum age requirements as specified by the employers interviewed. In most cases, employers were unwilling to hire employees under about twenty years of age. This condition leaves a gap of two or three years which must be filled before the high school graduate can go to work. Additional education beyond high school seems to be logical in order to fill this gap. On the other hand, a more thorough training program on the high school level might lower the age minimum considerably.

Another consideration which the information naturally raises is the relatively low percentage of jobs requiring technical and/or college training (12 and 9 per cent, respectively). This would seem to indicate that employers simply have not had much experience with beginning employees trained in these ways. In states that have been providing technical training above the high school level, the per cent of employers requiring this type of experience was greater. The nation will for some time continue to be faced with the prospect of high school graduates who will be seeking immediate employment, and with employers who are willing to hire them provided their general preparation has been sufficient to meet job entrance requirements.

Minimum age to enter employment. It is logical to consider entry age by level of employment rather than by type of business. As would be expected, Table 10 shows that entry age advances as the training and responsibility associated with the job is increased. Entry into the

Table 9

PER CENT OF EMPLOYEES BY MINIMUM EDUCATION REQUIRED TO ENTER OFF-FARM AGRICULTURAL BUSINESSES IN SELECTED STATES

State	Per Cent of Employees by Minimum Education					
	Less than High School Graduate	High School Graduate	Post High School Tech. Ed.	Some College	College Degree	No Preference
Alabama	24%	50%	16%	---	10%	---
Arizona	--	66	--	9%	18	7%
California	--	34	--	36	29	1
Colorado	12	33	39	12	4	--
Kansas	21	62	--	14	3	--
Kentucky	13	56	6	7	9	9
Louisiana	10	44	4	15	21	6
Michigan	--	53	32	10	5	--
Minnesota	13	75	--	--	8	4
Mississippi	9	44	19	--	17	11
New York	17	57	10	4	4	8
Oklahoma	3	50	14	20	13	--
Pennsylvania	10	62	14	8	6	--
West Virginia	23	22	26	4	13	12

Table 10

MINIMUM AGE RANGE TO ENTER DIFFERENT LEVELS OF EMPLOYMENT IN OFF-FARM AGRICULTURAL OCCUPATIONS IN SEVERAL STATES

Level of Employment	Minimum Age Range Among Occupations			
	Michigan	Montana	Oklahoma	Louisiana
Professional	29-31	30-40	25-30	25
Technical	21-29	22-30	21-30	25
Managerial	25-35	25-35	20-40	28
Sales	21-28	20-27	18-32	16
Clerical	20-23	20-25	18-30	25
Skilled	17-36	25-35	18-40	27
Semi-skilled	20-30	28-25	16-30	25

service (skilled and semi-skilled) and clerical positions is at about twenty years of age, although in a few instances entry at sixteen to eighteen was possible. Sales and technical workers may enter in their early twenties, while the minimum age for managers and professional workers is mostly from twenty-five to thirty years of age.

Residential background preference. In twelve state surveys employer preferences for rural or urban residential background of new employees were recorded and reported. The data in Table 11 shows that the range among states was from thirty-eight to ninety-two per cent. Half of the states were within five per cent of the median of 63 per cent. Farm experience was considered to be an important asset and a definite advantage to beginning workers seeking employment in off-farm agricultural occupations.

Several reasons were given by employers for their preference for young men with farm experience. The farm youth has a store of marketable knowledge which educators and counselors might take for granted but which an employer values greatly. To the employers interviewed, another advantage of a farm background is that a young man with this background has learned to work. Through experience, business managers have learned that rural youth can and will work hard. They are punctual, have orderly work habits, and accept responsibility. Young men with a farm background know how to talk farmers' language. They respect farmers and are sympathetic to farm problems. For these reasons the owners and managers of businesses which deal with farmers and farm products are looking for men with a farm background.

It is significant to note that few off-farm agricultural business employers stated definite preference for workers with an urban background. Table 11 indicates that many employers had no preference as to residential background of new employees.

Table 11

PER CENT DISTRIBUTION OF EMPLOYEE RESIDENTIAL BACKGROUND PREFERENCE AS STATED BY MANAGERS OF OFF-FARM AGRICULTURAL BUSINESSES IN SELECTED STATES

State	Residential Background			
	Farm	Rural Non-Farm	Urban	No Preference
Alabama	63%	7%	1%	29%
Arizona	62	--	--	38
California	61	--	--	39
Colorado	63	16	2	19
Kentucky	92	--	--	8
Louisiana	38	4	1	57
Michigan	64	20	--	16
Minnesota	89	--	--	11
Mississippi	38	1	1	60
Montana	49	1	--	50
Oklahoma	78	4	--	18
Pennsylvania	58	14	1	27

Conclusions and Implications

Vocational educators in agriculture have obtained valuable experience through conducting state surveys of off-farm occupations. New educational programs will be initiated with confidence reculting from participation in and interpretation of the findings of the surveys of competencies needed by workers. Pilot programs will test promising alternatives in organization of the teaching-learning process. Citizens, industries, schools, and related agencies are aware of the potential contribution to the total effort in education for employment that can be made in the broad range of off-farm occupations needing competencies in agriculture.

In general the Agricultural Machinery, Agricultural Supplies, and Ornamental Horticulture industries show probability of hiring the largest numbers of persons needing knowledge in agriculture in the next five years. A large field which may soon require the greatest numbers of employees is that of Food Products Marketing and Distribution. The state studies in 1964 located many jobs in the marketing and distribution of Meat, Milk, and Poultry.

In specialized areas of the country, certain states may consider establishing a limited number of training programs in commodity marketing and processing of products such as grain, cotton, fruits and vegetables. Forest Products and Recreation are fields of expanding employment in some states.

Evidence was obtained that there will be an increase in hiring of persons with more than high school education. The surveys were not designed to separate needs for two years of education beyond high school from requirements of a bachelor's degree. Perhaps employers could not

at this time react to something their states and communities do not yet provide.

Some lower level positions pay wages insufficient to attract even young people to training programs. How to raise the efficiency and productivity of the worker in order that the wage scale may be reclassified higher was recognized as a challenge.

From data on numbers of production units in farming, it may be reasonable to conclude that in many states there are almost the same numbers of commercial farms as there are workers in off-farm occupations, when this classification is limited to those employees who need agricultural knowledge. Partly because there are substantial numbers of seasonal workers in fields as Ornamental Horticulture and in Fruit and Vegetable Marketing and Distribution, the annual requirements for new employees in these businesses are larger than in farming.

State studies uniformly found that advancement within an occupation required a higher average level of competency than was required to gain initial entry. This shows need for continuing adult education.

While only preliminary analysis has been made of specific competencies needed in each occupational group and employee field of activity, the general need for business education is clear. Product knowledge is specific to the several major areas of agriculture, including plant and soil science, animal science, agricultural mechanization, and agricultural business management.

It is quite certain that the findings of the series of state studies now being completed will have a marked effect on programs soon to be initiated. It is just as certain that there is urgent need to strengthen, to re-design, to advance the scope and intensity of research in the next several years.

Abstracts of Twenty-Six State Studies

The section of the report which follows contains a two-page abstract of each of the twenty-six state research studies of off-farm agricultural occupations.

The sub-headings in each abstract are (1) Purpose, (2) Method, (3) Findings and (4) Report. The last heading gives the names of the author(s), title of the report, place and date of publication.

In nearly all of the abstracts, a tabular presentation emphasizes some of the important results of the state survey.

ALABAMA

Purpose

The purpose of this study was to ascertain the nature and extent of off-farm agricultural employment opportunities.

Method

Interviews were made with representatives of agricultural businesses and agencies. The study used a modified random sample from 20 counties.

Findings

The extent of off-farm agricultural employment opportunities in the state by business and occupational group is shown below:

Business and Occupational Group	Employees Needing Agricultural Competencies[1]		
	Current Employment	Increase in 5 Years	Percent Increase in Next 5 Years
Agricultural Chemical Manufacture and Sales	352	121	34
Farm Machinery Sales and Services	622	96	15
Farm Supplies and Equipment	807	128	17
Livestock and Poultry	1,065	170	16
Crops, Forestry, and Soil Conservation	361	57	16
Ornamental Horticulture	754	108	14
Agricultural Service	243	52	21
Total	4,204	732	17

[1]Data for 474 payroll firms in 20 counties.

Alabama continued

There were 16,983 persons employed in the 474 payroll firms contacted. Of the total employees, 4,204 or 24.7 per cent were employed in an agricultural occupation. Of the 4,204 persons employed, 830 or 19.7 per cent were employed part-time. The categories with the largest numbers of persons employed had small percentages engaged in agricultural occupations. The largest numbers of part-time employees were engaged in horticulture and in livestock and crop food processing.

In addition to the 4,204 agricultural workers located by the local business interviews, state and federal government agencies reported 2,481 persons employed in agricultural services. Ten per cent were part-time workers. Most required college education. By function, the categories were: Education, 685; Education and Research, 223; Finance and Credit, 99; Regulatory, 424; Service, 1,050.

There were 184 different off-farm agricultural occupations found in the twenty sample counties. A factor analysis of job titles and competencies has been completed for this study.

Report

0 Baker, R. A., A Study of Employment Opportunities in Off-Farm Agricultural Occupations in Alabama, A Joint Study by the Agricultural Education Service, Alabama State Department of Education, Montgomery, and the Department of Vocational, Technical, and Practical Art Education, School of Education, Auburn University, Auburn, 1965.

ARIZONA

Purpose

The purposes of this study were (1) to determine the essential skills and knowledge needed by individuals for both initial employment and upgrading on the job in various competency areas, and (2) to determine the number of persons employed in the off-farm agricultural occupations by function of the company and by level of employment.

Method

Interviews were made with employers in 121 establishments providing some kind of agricultural service to farm operators. The study was conducted in one county of the state.

Findings

The present employment and future opportunities in the off-farm agricultural occupations are shown by level of employment below:

Level of Employment	Number of Companies	Employees Needing Agricultural Competencies		
		Current Employment	Employment in 5 Years	Number Increase
Professional	39	92	119	27
Technical	16	34	65	31
Supervisory	54	68	76	8
Sales	84	88	131	43
Service	124	497	546	49
Total	317	779	937	158

Arizona continued

A twenty per cent estimated increase in the next five years in the number of employees who need agricultural training was reported by the 121 establishments. Service personnel will be in greatest demand; sales personnel will be in the second greatest demand.

Of the 5,427 total employees in the establishments, 779, or 14.4 per cent currently needed training in agriculture. Of 3,174 employees engaged in processing functions, only 178 or 5.6 per cent needed agricultural competencies.

Report

Wagley, L. A., Educational Requirements for Off-Farm Agricultural Occupations in Yuma County, Arizona. Dissertation, D. Ed., 119 pages. Library, University of Arizona, Tucson, 1964.

CALIFORNIA

Purpose

The purposes of the study were (1) to determine the number and kinds of positions in agricultural businesses that seem to require agricultural training, and (2) to determine the training requirement, both agricultural and business, for workers in these positions.

Method

Interviews were conducted with representatives of 327 companies in 14 centers who had employees needing agricultural training.

Findings

1. The most common types of businesses employing agriculturally-trained persons were those engaged in sales and service of agricultural products and farm supplies.
2. About 20 per cent of the 24,305 persons employed by the companies needed agricultural training.
3. Over 1,400 new agriculturally trained employees will be needed in the near future to fill anticipated new positions in the companies.
4. High school graduation was desired for all levels of employment.
5. The need for actual farm experience was rated high by all employers.
6. Agricultural training ending at the high school level was adequate for a large portion of the semi-skilled and skilled groups, while more advanced training was needed for sales personnel. For consultants, supervisors, and managers, college agriculture was almost a must.

California continued

7. It was apparent that no clear-cut pattern existed for obtaining new employees who have agricultural and business training. The most popular procedure used to find qualified persons was to hire them from another company.

A study was conducted to identify technical workers in California agriculture and their needs in training programs. Some of the findings of the study were:

1. Over 85 per cent of all work activity by technicians was in general fields of work other than farming and ranching.
2. About one-half again as much work activity is engaged in by technicians in the field of agriculture services as in any other general field.
3. Workers engaged in the five general fields of agricultural services, agricultural industry, agricultural research, agricultural business, and farming and ranching account for almost four-fifths of the technical activity in agriculture.
4. Participation in many different activities is evidenced by technicians being engaged in 134 of the 165 possible entries.
5. A need was indicated for training in basic mechanical skills for about two-fifths of all technician positions reported.

Report

O Sutherland, S. S., and Thompson, O. E. The Training Required by Workers in Agricultural Business and Industry in California. California State Department of Education, Sacramento, 1957.

O Halterman, J. J. Technicians in Agriculture. California State Department of Education, Sacramento, 1962.

COLORADO

Purpose

The purposes of the study were (1) to identify present and emerging agricultural occupations in Colorado, other than farming and ranching, (2) to determine present and anticipated numbers of employees needed in the occupations, and (3) to determine job requirements and other characteristics of the occupations.

Method

Interviews were made in 1964 with employers in businesses, agencies, and organizations whose personnel use agricultural abilities in performance of their duties. The study used a 6.2 per cent state-wide sample.

Findings

The estimated increase in the state of employees needing agricultural competencies by number and per cent is shown below:

Business and Occupational Group	Employees Needing Agricultural Competencies: Current Employment	Employment in 5 Years	Per Cent Increase
Farm Machinery Sales and Service	1,155	1,350	16.9
Farm Supplies and Equipment	960	1,004	4.6
Livestock and Poultry Industries	10,132	10,504	3.7
Crops, Forestry, and Soil Conservation	2,366	2,834	19.8
Ornamental Horticulture	2,510	3,803	51.1
Wildlife and Recreation	242	250	3.3
Agricultural Service	3,068	3,391	10.5
Total	20,433	23,136	13.2

Colorado continued

An increase of 13 per cent in workers needing agricultural competencies during the next five years was anticipated. The largest increase is expected in Ornamental Horticulture. The employers interviewed preferred an employee with a "farm reared" residential background. Having had work experience on a farm is an equivalent.

The education level for initial employment desired of prospective employees was "high school plus special training." High school graduation was selected as a minimum requirement by more than 95 per cent of all employers interviewed.

The median weekly salary for beginning employees by levels of employment was as follows:

Level of Employment	Median Weekly Salary
Professional	$121.00
Technical	88.00
Managerial	108.00
Supervisory	87.00
Sales	86.00
Clerical	70.00
Service[1]	62.00

[1]Includes skilled and semi-skilled.

Report

0 Foster, Paul J., A Study of Agricultural Occupations Other Than Farming and Ranching in Colorado. (Preliminary Report), State Board for Vocational Education, Denver, 1965.

CONNECTICUT

Purpose

To identify occupations other than farming in which competencies in agriculture are needed, to estimate present and future numbers of workers, and to determine curricular offerings that should be considered in new programs.

Method

Teachers of agriculture interviewed firms identified from telephone directories. The sample of 43 towns was equivalent to a 25 per cent sample of the state.

Findings

The state-wide estimate showed full and part-time employment of 22,704 persons in 290 different job titles. The table lists full-time and part-time employees needing competencies in agriculture to be hired by 1970. Major conclusions were:

1. The opportunity to provide agriculturally oriented instructional programs for adults merits early consideration.
2. Most agricultural education departments may consider offerings oriented to the occupational families of livestock industry, ornamental horticulture and food handling and processing. Some departments may consider special programs in other areas.
3. Curricula which focus on agri-business, with secondary stress on agricultural and mechanical competencies seem indicated.
4. Part-time employment opportunities appear to afford good prospects for directed experience.

Connecticut continued

Occupational Family	Current Employment		Number of Employees to Be Hired by 1970	
	Full-Time	Part-Time	Full-Time	Part-Time
Agricultural and Farm Service	568	156	36	167
Crops, Forestry and Soil Conservation	1,200	29	88	15
Farm Machinery Sales and Service	949	146	196	165
Farm Supplies and Equipment	882	90	151	106
Food Handling and Processing*	1,108	510	603	1,149
Livestock Industry	5,852	717	1,705	610
Ornamental Horticulture	6,129	1,965	2,197	2,536
Wildlife and Recreation	512	1,891	328	776
Total	17,200	5,504	5,304	5,524

*Based on a total count of four major chain stores and eighteen wholesale fruit companies.

Report

O The data presented are from a preliminary report by W. H. Martin and Philip T. Masley, University of Connecticut, July, 1965.

DELAWARE

Purpose

The purposes of this study were (1) to identify present and emerging agricultural occupations by job title for which scientific, technical, and vocational agricultural education is needed in Delaware, (2) to list present numbers of workers and estimate numbers to be employed in these occupations in the future, (3) to determine competencies needed, and (4) to describe other characteristics of these occupations.

Method

A disproportionate random sampling method was used to select 267 businesses with employees that needed agricultural knowledge. The interviews conducted averaged a 13 per cent state-wide sample.

Findings

The estimated present total employment in the state in 2053 off-farm agricultural businesses, the number of present employees needing agricultural competencies, and the number to be hired during the next five years are shown in the tabulation on the next page. The 32,776 employees were 20 per cent of the total labor force in Delaware.

The occupational group having the greatest number of employees to be hired during the next five years was Food Marketing and Distribution, with 1,067 needed. Nearly half of them will be part-time workers. Occupational groups having small percentages of employees needing agricultural competencies were Livestock and Poultry; Crops, Forestry and Soil Conservation; and Agricultural Services.

For each seven farmers in the state, there were five workers in off-farm occupations needing agricultural competencies. Approximately

Delaware continued

three per cent of all workers employed in the state, excluding farming, needed agricultural competencies.

Business and Occupational Group	Total Employees in 2,053 Off-Farm Agricultural Businesses	Employees Needing Agricultural Competencies	
		Current (1964)	To Be Hired[1] in 5 Years
Farm Machinery	262	169	82
Farm Supplies	2,998	604	99
Livestock and Poultry	6,102	383	159
Crops, Forestry, and Soil Conservation	6,005	478	216
Ornamental Horticulture	2,663	1,209	385
Wildlife and Recreation	40	8	2
Agricultural Services	8,367	527	144
Food Marketing, Distribution	6,339	1,672	1,067
Total	32,776	5,050	2,154

[1]Employees to be hired during the next five years include additional employees and replacement employees.

Report

0 Barwick, R. P., Identification of Off-Farm Agricultural Occupations. Preliminary Report, Agricultural Education Publication No. 3., 38 pages, School of Agriculture, University of Delaware, Newark, 1965.

ILLINOIS

Purpose

The purpose of this study was to determine the need for technical education for persons living in and serving rural areas in Illinois.

Method

Interviews were conducted with representatives of businesses which were stratified by the following classifications:

Type 1 - Businesses that are agriculturally oriented

Type 2 - Businesses that are not agriculturally oriented, but often employ workers who must have competence in agricultural knowledge and skills

Type 3 - Non-agricultural businesses

The study used a random sample of 196 stratified businesses in 14 counties in east central Illinois.

Findings

The estimated numbers of workers currently employed who need a knowledge of agriculture and the increase expected in five years, in population centers of less than 25,000, are shown below:

Type of Business	Total Workers	Number Needing Agricultural Competencies	
		Current Employment	Increase in Next 5 Years
Type 1	8,896	5,487	2,471
Type 2	41,533	3,591	386
Type 3	27,439	558	768
Total	77,868	9,636	3,625

Illinois continued

An estimated 6,020 workers who need some post-high school technical education were employed in businesses of population centers of less than 25,000. Estimates indicate these accounted for 30 per cent of all employees in Type 1 businesses, 6 per cent in Type 2 businesses, and 4 per cent in Type 3 businesses.

After careful inspection of the data, 292 job titles were identified in which some degree of technical education was required. These 292 job titles included 454 technicians and workers needing some post-high school education.

Activities of workers may be used to infer the type of educational program needed. An attempt was made to cluster job titles in terms of the common activities performed by employees using a principal axis factor analysis with a varimax rotation. Twelve activity factors were obtained. For each job title, a factor score was obtained for each of the twelve activity factors.

Report

0 Phipps, L. J., Krebs, A. H., Hemp, P., Warmbrod, R., and Fuller, G. R., Technicians and Other Workers Who Need Technical Knowledge. Joint Study--Vocational and Technical Education Department, College of Education, and Bureau of Educational Research, University of Illinois, Urbana; and Vocational and Technical Education Division, Springfield, 1964.

0 Warmbrod, J. Robert, Workers Employed and Employment Opportunities for Workers Needing a Knowledge of Agriculture. 28 p. (mimeo) From Preliminary Report No. 2, Division of Agricultural Education, University of Illinois, Urbana, 1964.

IOWA

Purpose

The purposes of a group of studies of agricultural industires were to determine (1) the employment opportunities in selected off-farm occupations in agriculture, (2) the agricultural competencies needed by males employed in these occupations, and (3) the degree each competency was needed and possessed by employees in these occupations.

Method

The 15 most outstanding employers in selected off-farm agricultural occupation areas served as panels of specialists to develop lists of the agricultural competencies needed by males employed in these businesses. Each list of agricultural competencies, as prepared by the panel of specialists, was submitted to the top ten per cent of the businesses in each of the selected areas. Employers and selected employees in each of the businesses receiving the lists evaluated the degree each competency was needed by employees to effectively carry out their jobs, and the degree of competency employees actually possessed. In addition, employers typical of those in the industry being studied were asked to indicate the present and future manpower needs of their businesses. This information was used to establish future employment opportunities in each of the industries. The study of each of the selected occupational areas is part of an overall state-wide study of the off-farm occupations in agriculture.

Findings

1. The degree of competency needed among the occupational areas within the off-farm agricultural occupation industries varied

Iowa continued

according to the type of understanding, ability, and occupation level.

2. The agricultural competencies needed by sales and managerial employees were similar, but different from those of clerical or service employees.
3. Employer evaluations of employees and employee self-evaluations revealed that a greater degree of competency was needed in agriculture than employees possessed.
4. The smaller the business, the more competent employees needed to be in a greater number of knowledges and skills.
5. As years of farm background increased, the degree of competency needed and possessed by employees increased.
6. In the main, as years of vocational agriculture background increased, the degree of competency needed and possessed by employees increased.
7. As size of business increased, the degree of competency needed and possessed increased in the competencies characteristic of a level of employment.

Report

Bundy, C. E. and Blake, D. L. Competencies in Agriculture Needed by Males Employed in Off-Farm Agricultural Occupations. Cooperative Study - Department of Education, and Iowa Agriculture and Home Economics Experiment Station, Iowa State University of Science and Technology, Ames, and the Vocational Agriculture Section, State Department of Public Instruction, Des Moines, 1965.

KANSAS

Purpose

The purpose of this study was to locate and identify agriculturally oriented occupations in four types of businesses--farm implement, farm produce, farm supply, and farm service.

Method

Interviews were conducted with representatives of the selected businesses which were agriculturally oriented. The study used a 17 per cent random sample of the state which was stratified into four population groups.

Findings

1. From the employers interviewed, it was estimated that 6,787 persons had been employed during the past five years. It was also estimated that 2,823 additional employees would be needed in the State of Kansas in the next five years due solely to the growth in agricultural off-farm business. This figure is in addition to those needed for the normal turnover of employees.
2. A study was made of the special prerequisites for gaining employment in the various job titles. A variety of response was received for the various jobs. More than 88 per cent of the responses reflected a belief that the requirements could be met by a program of special training.
3. Employers were asked to state the minimum educational requirement for entry into the jobs. With two exceptions, the model measure of the responses was for the high school graduate.

Kansas continued

4. Employers were asked to identify those areas, strictly agricultural, with which employees in the various jobs should be familiar. The following are the most frequently selected subject matter areas in order of importance given them by the employers:

   a. General agricultural knowledge

   b. Salesmanship

   c. Tractor, power units, and mechanics

   d. Soils and crops

   e. Agricultural chemicals, insect and pest control

Report

Agan, R. J., A Study of Non-Farm Agricultural Occupations in Kansas. Cooperative Study--Kansas State Board for Vocational Education and The School of Education, Kansas State University, Manhattan, 1963.

KENTUCKY

Purpose

The purposes of this study were (1) to determine the agricultural occupations other than farming, with implications for vocational education, in the following type of businesses: farm machinery, farm supply, agricultural chemical, nursery, and livestock marketing, (2) to determine competency areas important for workers in the businesses, and (3) to determine other characteristics of workers in the businesses.

Method

Interviews were conducted with representatives of businesses and agencies employing workers needing off-farm agricultural competencies. The study covered ten counties in the state.

Findings

1. Farm machinery mechanic was one of the most significant occupations on the basis of frequency of occurrence, job openings, and number of people employed. Others included sales and managerial positions.
2. Farm supply store jobs most significant to vocational education were assistant manager, salesman, and mill operator.
3. Jobs in nursery and related-type businesses most significant were manager, landscape designer, and foreman, at the higher level, and greenhouse, nursery, and landscape crew workers at the lower level.
4. Job openings in agricultural chemical businesses and livestock marketing agencies were very limited in number.

Kansas continued

4. Employers were asked to identify those areas, strictly agricultural, with which employees in the various jobs should be familiar. The following are the most frequently selected subject matter areas in order of importance given them by the employers:

   a. General agricultural knowledge

   b. Salesmanship

   c. Tractor, power units, and mechanics

   d. Soils and crops

   e. Agricultural chemicals, insect and pest control

Report

Agan, R. J., A Study of Non-Farm Agricultural Occupations in Kansas. Cooperative Study--Kansas State Board for Vocational Education and The School of Education, Kansas State University, Manhattan, 1963.

Kentucky continued

5. High school completion was the proper level of education for job entry according to 57 per cent of the responses. Something below was adequate for 23 per cent of the job titles.
6. When four areas of background were studied for people who were planning to enter off-farm agricultural occupations, the rank order of importance was: farm background, prior work experience, high school agriculture, and college agriculture.
7. Dependability was rated more important than personal appearance, politeness, desire to learn, and personal character.

Report

0 Bingham, W. Agricultural Occupations Other Than Farming in Selected Kentucky Counties, With Implications for Vocational Education. Dissertation, Ph. D., Department of Agricultural Education, College of Education, University of Kentucky, Lexington, 1964.

LOUISIANA

Purpose

The purposes of this study were (1) to determine present numbers of different job titles according to occupational group and levels of employment, (2) to determine agricultural competencies needed for job entry and advancement, (3) to determine special job characteristics and requirements, and (4) to predict trends in occupational opportunities in agriculture.

Method

Interviews were conducted with representatives of businesses and agencies engaged in handling farm products or providing agricultural services. The study sampled seven metropolitan areas of the state.

Findings

The total employment in the businesses interviewed and the numbers of employees needing agricultural competencies are shown below:

Business and Occupational Group	Total Number of Employees	Employees Needing Agricultural Competencies	
		Current Employment	Employment in 5 Years
Farm Machinery Sales and Service	1,056	439	500
Farm Supplies and Equipment	6,128	1,308	1,438
Livestock and Poultry	5,326	1,451	1,519
Crops, Forestry and Soil Conservation	5,927	2,305	2,413
Ornamental Horticulture	872	748	845
Wildlife and Recreation	1,536	300	339
Agricultural Service	2,455	2,536	2,782
Total	30,300	9,087	9,836

Louisiana continued

Report

Mondart, C. L., and Curtis, C. M., Occupational Opportunities and Training Needs for Nonfarm Agricultural Jobs in the Metropolitan Areas of Louisiana, Vocational Agriculture Education No. 6, School of Vocational Education, College of Agriculture, Louisiana State University, Baton Rouge, 1965.

Separate reports have been published for the seven metropolitan areas. Partial summaries from three areas are as follows:

New Orleans

There were 253 businesses surveyed, employing 10,333 workers, of which 1,606 needed agricultural competencies. This number is expected to rise to 1,741 in five years. The present total of 241 different job titles is expected to increase to 278 in five years.

Baton Rouge

There were 153 businesses surveyed, employing 4,612 workers, of which 2,495 needed agricultural competencies. This number is expected to increase to 2,608 in five years. The 2,495 workers were found in 326 job titles, a total that is expected to increase to 388 in five years.

Alexandria-Pineville

There were 139 businesses surveyed, employing 3,048 workers, of which 913 needed agricultural competencies. This number is expected to increase to 975 in five years. The total of 224 job titles is expected to increase to 252 in five years.

MASSACHUSETTS

Purpose

The purposes of this study were (1) to determine employment opportunities in non-farm agricultural occupations in Massachusetts, (2) to determine competencies required by workers in those occupations, and (3) to determine the need for educational programs for entry and advancement in agricultural occupations.

Method

Interviews were conducted with selected employers of workers in agricultural businesses. The study used a 10 per cent state-wide sample.

Findings

The estimated employment and number of workers needing agricultural competencies by level of employment are shown below:

Level of Employment	Total Number of Employees	Number Needing Agricultural Competencies	Per Cent Needing Agricultural Competencies
Professional	2,178	2,150	99
Technical	921	884	96
Managerial	1,343	1,095	82
Sales	6,822	4,661	68
Clerical	2,648	1,557	59
Service	18,042	9,928	55
Total	31,954	20,275	63

Massachusetts continued

Over one-half of the firms interviewed listed sales as the main function of the firm. Over 60 per cent of the employers stated they would be willing to hire high school students as trainees in their firms.

There were 25,494 full-time and 6,460 part-time workers employed in agricultural businesses, compared with 17,000 persons engaged in production on farms in the state. Sixty-three per cent of the workers in the businesses needed agricultural competencies.

A list of 216 job titles was developed from those given by employers and recorded by the interviewers. A condensed list of job titles was then developed by combining the job titles in the original list which appeared to refer to essentially the same duties of employees, resulting in a list of 119 job titles used in the coding and in calculations of characteristics and competencies needed by workers.

Report

Judge, Homer V., Employment Opportunities and Needed Competencies in Off-Farm Agricultural Occupations in Massachusetts. Massachusetts Department of Education, Division of Vocational Education, Boston 16, Massachusetts.

MICHIGAN

Purpose

The purposes of this study were (1) to identify present and emerging agricultural occupations, other than farming and ranching, for which vocational-technical agricultural education should be available, (2) to determine present and anticipated numbers of employees in the occupations, (3) to estimate annual entry opportunities, (4) to determine competencies for entry and satisfactory performance, and (5) to determine other characteristics of the occupations, such as salary, age for entry, formal education, restrictions, etc.

Method

The Michigan Agricultural Conference appointed an Opportunities for Youth committee consisting of representatives from seventeen member firms and organizations. These member groups aided the Vocational Agriculture Service in preparing and testing survey forms. Thirteen firms supplied data for the study. For two of them, the data were expanded to be an estimate of employees on a state-wide basis. They were farm machinery sales and service, and ornamental horticulture (see numbers in parentheses).

Findings

The estimated number of workers needing agricultural competencies is shown on the next page.

Michigan continued

Business and Occupational Group	Employees Having Agricultural Job Titles: Current Employment	Employment in 5 Years	Per Cent Increase in 5 Years
Farm Machinery Sales and Service	238 (3,451)	314 (4,553)	32
Farm Supplies and Equipment	231	305	32
Livestock and Poultry	94	135	44
Crops, Forestry, and Soil Conservation	254	266	5
Ornamental Horticulture	1,058 (3,443)	1,470 (4,750)	38
Agricultural Service	414	515	24
Total	2,289	3,005	31

The firms surveyed employed a total of 4,974 persons, of which, 2,289 or 46 per cent had agricultural job titles. The firms expect to employ 3,005 agricultural workers in five years, an increase of 31 per cent. Eighty different agricultural job titles were identified.

The greatest number increase estimated is in agricultural service occupations. This is in line with Employment Service figures which predict greatest increases in service occupations and least increases in occupations that deal with the production of goods.

Report

Langdon, C. L., A Survey of Agricultural Occupations in Michigan, Vocational Agriculture Service, Michigan Department of Public Instruction, Lansing, and the Michigan Agricultural Conference, 1965.

MINNESOTA

Purpose

The purposes of this study were (1) to identify present and emerging off-farm agricultural occupations, (2) to determine opportunities for employment and competencies required in the occupations, (3) to determine the need for occupational training or retraining and the need for pre-employment vocational education for employees in off-farm agricultural occupations, and (4) to group job titles into occupational groups for which there are common technical education needs.

Method

Interviews were conducted with employers of off-farm agricultural businesses. The data represent four counties in the state.

Findings

The current employment and estimated increase in five years of employees needing agricultural competencies are shown below:

Business and Occupational Group	Employees Needing Agricultural Competencies		
	Current		To Be Hired in Next 5 Years
	Full-time	Part-time	
Farm Machinery	720	122	372
Crops, Forestry, and Soil Conservation	176	36	48
Livestock and Poultry	434	66	53
Ornamental Horticulture	31	69	12
Wildlife and Recreation	10	9	--
Agricultural Service	229	126	81
Total	1,600	428	566

Minnesota continued

The anticipated number of employees needed in the next five years is a conservative estimate. The interviewers found very few employers who kept a record of the number of employees hired during the past.

Weighted-frequency distribution indexes of competencies have been computed for some of the business and occupational groups. Job titles at various levels and product areas with like competencies are being consolidated for future use.

The total number of employees in relation to the employees needing agricultural competencies is considerably higher in rural counties.

Report

Freier, E. E., The Minnesota Agricultural Off-Farm Occupational Opportunities and Training Needs, Mankato Area Vocational-Technical School, Mankato, Minnesota, May, 1965.

MISSISSIPPI

Purpose

The purposes of this study were (1) to identify present agricultural occupations other than farming, (2) to determine employment opportunities in those occupations. (3) to determine needed competencies for employment and other characteristics of those agricultural occupations.

Method

Interviews were conducted with representatives of businesses, industries, and agencies whose employees use agricultural knowledge in their work. The study used a survey of three counties in the Mississippi Delta area.

Findings

The estimated total employment, number of persons needing agricultural competencies, and those needed in five years are shown below for the eleven counties of the Mississippi Delta area.

Business and Occupational Group	Total Employment	Employees Needing Agricultural Competencies	
		Current Employment	Employment in 5 Years
Farm Machinery Sales and Service	1,188	1,148	1,212
Farm Supplies and Equipment	173	139	149
Livestock and Poultry	176	153	166
Crops, Forestry, and Soil Conservation	29	16	16
Ornamental Horticulture	76	73	73
Agricultural Service	3,269	3,163	3,193
Total	4,911	4,692	4,809

Mississippi continued

The total expected increase of workers needing agricultural competencies during the next five years is 2.5 per cent of current employment numbers. Largest expected increases are in the areas of Farm Supplies and Equipment and Livestock and Poultry.

Report

Snowden, O. L., A Study of Employment Opportunities and Needed Competencies in Agricultural Occupations Other than Farming in Eleven Counties of the Mississippi Delta. Mississippi State University, State College, 1965.

MISSOURI

Purpose

The purposes of this study were (1) to identify present and emerging agricultural occupations other than farming, (2) to determine the trends of employment in the occupations, (3) to relate the predominance of certain types of occupations to different sections of the state, (4) to determine specific characteristics about the occupations, and (5) to determine specific characteristics about agricultural businesses.

Method

Interviews were conducted with agriculturally-related businesses which employed personnel where a knowledge of agriculture was beneficial in their job performance. The study was conducted in the communities of 220 school districts in the state.

Findings

The total employment of the firms surveyed and the number of workers that were oriented in agriculture are shown below:

Business and Occupational Group	Total Employment	Employees Oriented in Agriculture	
		Number	Per Cent
Farm Machinery Sales and Service	3,597	2,888	80
Farm Supplies and Equipment	11,090	7,513	68
Livestock and Poultry	10,031	4,801	48
Crops, Forestry, and Soil Conservation	4,287	2,621	61
Ornamental Horticulture	1,152	596	52
Wildlife and Recreation	48	40	83
Agricultural Services	3,157	1,337	41
Total	33,362	19,796	60

Missouri continued

Almost one-half of the firms surveyed were classified under the occupational group of farm supplies. No professional, federal, or state agencies are included in this report. A majority of the firms had been in business over 15 years. Almost 70 per cent of the firms would be willing to cooperate in a program of hiring high school students as trainees.

Most frequently used by employers for obtaining agriculturally oriented personnel were: friends' recommendations, persons dropping in seeking employment, and present employees' recommendations.

Report

Griffin, W. L., Agricultural Occupations Other Than Farming in Missouri, Joint Staff Study, State Department of Education, Jefferson City, Agricultural Education Department, University of Missouri, Columbia, and Teachers of Vocational Agriculture, State of Missouri, 1964.

MONTANA

Purpose

The purposes of this study were (1) to identify present and emerging agricultural occupations, other than farming and ranching, for which vocational and technical education are needed in Montana, (2) to determine present and anticipated numbers of employees by job titles, (3) to determine competencies needed for entry and advancement by occupational group and level of employment, (4) to determine other characteristics of the job titles and occupations, and (5) to identify a "core curriculum" for use in vocational and technical education at the high school, post-high school, and adult levels.

Method

Interviews were made with 161 randomly selected businesses in ten communities of Montana who have employees needing agricultural knowledge, skills and abilities. The study used a 14.4 per cent sample of the ten communities. It included urban as well as rural areas and sampled businesses needing agricultural competencies in hub cities of Montana where agriculture is very strong in the area around the city. The figures represent geographical areas in which one-fourth of the population lives.

Findings

The firms surveyed employed 3,122 persons. Of these, 1,762 or 56.4 per cent needed agricultural competencies. The businesses planned to hire 1,199 employees needing agricultural competencies in the next five years.

Montana continued

Business and Occupational Group	Employees Needing Agricultural Competencies[1] Current Employment	Expected in Five Years	Number To Be Hired
Farm Machinery Sales and Service	1,001	1,204	266
Farm Supplies and Equipment	2,450	2,597	1,344
Livestock and Poultry	4,466	5,362	1,617
Crops, Forestry, and Soil Conservation	840	1,001	952
Ornamental Horticulture	1,505	1,645	2,401
Agricultural Services	2,072	2,485	1,813
Total	12,334	14,294	8,393

[1]Data expanded from the 14.4 per cent sample to a 100 per cent estimate for the ten community areas.

Of the 1,762 total employees needing agricultural competencies, the greatest number of employees are in Livestock Occupations, followed by Farm Supplies and Equipment, and Farm Services.

Report

0 Heaney, D. S., Vocational and Technical Training Needed for Off-Farm Agricultural Occupations in Selected Communities of Montana. A report will be issued in cooperation with the State Department of Education in Montana and with the Montana State University.

NEVADA

Purpose

To determine numbers of present employees needing an agricultural background and to estimate entry opportunities due to expansion and replacement during the next five years. Also, to determine employee characteristics desired in future workers and to obtain employer judgments of types of schools and subject areas for training new employees.

Method

Names of non-farm business firms and government agencies classified in seven major occupational groups of economic importance in Nevada were obtained from telephone directories, state license lists, and from county agents and vocational agriculture teachers. The data for numbers of employees are for interviews with 363 of a total of 450 firms and for 39 agencies in the state. Employee characteristics by job titles were reported for 310 firms.

Findings

Data on employees in 363 firms interviewed classified by major occupational group, on an industry basis, are tabulated here:

Occupational Group	No. of Firms	Total Employees	Needing Agricultural Background	
			Number	Per Cent
Agricultural and Allied Mechanics	88	1,294	111	8.6
Animal Industry	66	1,027	172	16.7
Agricultural Business, Supply Service	134	15,170	287	1.9
Horticulture Crn. and Turf	46	427	70	17.8
Plant Industry	29	258	76	29.4

Nevada continued

In eight government agencies in Agricultural Mechanics, Animal Industry, Plant Industry and Agricultural Business, 80 per cent of 141 employees needed an agricultural background. Of 2,421 workers in 14 ornamental horticulture related agencies only 3.7 per cent needed agricultural knowledge. There were 17 educational, research, land and forest management, and wildlife and recreation agencies with 588 of 1,063 employees needing agricultural background.

In Nevada 9,362 of 163,262 total persons employed are engaged in agricultural production and 1,493 are in off-farm business occupations needing an agricultural background.

The greatest expansion in total employees in off-farm agricultural businesses in the next five years will be in the Las Vegas area (75 per cent) and the Reno area (46 per cent). In the other areas of the state a 23 per cent expansion is estimated.

Employers readily listed desirable worker traits. They desire ambition, dependability, honesty, and initiative. Potential for management and sales positions was sought in new employees.

Report

Christensen, Howard H., Employment Opportunities in Selected Non-Farm Businesses and Government Agencies as Related to Agricultural Training or Background, Nevada, 1965. 96 p. Agricultural Economics and Education Department, University of Nevada, Reno, 1965. (preliminary mimeo report)

NEW YORK

Purpose

The purposes of this study were (1) to identify the off-farm agricultural occupations, (2) to determine present employment and future employment opportunities in the occupations, (3) to determine the agricultural competencies needed by workers in the occupations, and (4) to determine other characteristics of the occupations.

Method

Interviews were conducted by teachers of agriculture in eighteen school districts with representatives of businesses and services which have employees needing agricultural competencies. The data were expanded to estimates for the 260 school districts offering instruction in agriculture in New York.

Findings

The estimated current full-time employment and the employment expected in five years by business and occupational groups is shown below:

Business and Occupational Group	Employees Needing Agricultural Competencies: Current Employment	Expected in Five Years	Per Cent Increase
Farm Machinery Sales and Service	4,879	6,181	27
Farm Supplies and Equipment	8,967	10,289	15
Livestock and Poultry	3,725	4,007	8
Crops, Forestry, and Soil Conservation	1,169	1,484	27
Ornamental Horticulture	871	1,049	20
Wildlife and Recreation	517	660	28
Agricultural Services	8,557	10,482	22
Total	28,685	34,152	19

New York continued

Based on employers' estimates, workers in the 213 off-farm agricultural occupations spend an average of 83 per cent of their work time on tasks requiring agricultural competencies. The proportion of time thus spent varied from 15 per cent for some job titles to 100 per cent for others.

In addition to the estimated 28,685 full-time employees needing agricultural competencies, it was further estimated that an additional 16,841 persons were employed part-time.

Employers reported that high school graduation was required for 57 per cent of the full-time workers and that 18 per cent needed education beyond high school. Seventeen per cent were reported to need less than high school education.

Report

0 Cushman, H. R., Christiansen, V. E., and Bice, G. R., Off-Farm Agricultural Occupations in New York State, A Cooperative Research Project of the Rural Education Division, New York State College of Agriculture, Cornell University, Ithaca, Bureau of Agricultural Education, State Education Department, Albany, Contributing Boards of Education, and Boards of Cooperative Educational Services in New York State, 1965.

NORTH CAROLINA

Purpose

The purposes of the study were (1) to determine the nature and extent of the need for providing training in agricultural technology for workers already employed in off-farm agricultural occupations, and (2) to determine the nature and extent of the need for providing training in agricultural technology for individuals who wish to prepare for entering off-farm agricultural occupations.

Method

Interviews and questionnaires were utilized with agricultural industry and business firms; questionnaires were administered to the boys of the 1961 graduating class and were sent to graduates and drop-outs of the 1959 and 1960 classes in vocational agriculture. The study used a nine-county area in the state.

Findings

1. Many agricultural industry and business firms have individuals employed who need additional training. Many of the firms do not have an organized training program.
2. It is evident that technical training should be provided for individuals who wish to be employed by agricultural industry and business firms. Relative to other types of employees, the need for training of the skilled plant worker is by far the greatest.

North Carolina continued

3. It is very apparent that a large per cent of the high school senior boys in 1961 do not plan to attend college, and need and desire an opportunity to take additional training of less than college grade. This also seemed to be true with vocational agriculture graduates and dropouts of 1959 and 1960.

Report

Blackmon, J. H., and Dawson, C. G., Need for Training for Non-Farming Agriculture Occupations. Vocational Division, North Carolina Department of Public Instruction, Raleigh, North Carolina, 1961.

OHIO

Purpose

The purposes of this study were (1) to determine the number of people working off the farm who need at least one agricultural competency in order to maintain their employment, and (2) to identify businesses who employ these workers.

Method

Mail questionnaries were sent to 6,750 businesses, firms, and agencies who employed any workers except farmers, 975 manufacturing firms, and to local governmental agencies, colleges and universities, for a total of 7,874. The study used a 10 per cent sample of the state.

Findings

The estimated number and per cent of Ohio off-farm employees by competency groups is shown in the following tabulation:

Competency Groups	Number of Employees	Per Cent
Industrial	997,276	32.2
Business and Service	860,401	27.7
Agricultural	165,262	5.3
Other	1,081,261	34.8
Total	3,104,200	100.0

Ohio continued

In addition to persons actively engaged in farming, 5.3 per cent of the workers in the state of Ohio need agricultural competencies. There will be 15,000 new off-farm employees having agricultural competencies needed for the next year (includes replacements).

Of all workers required to have competency in agriculture, employers preferred 6.5 per cent to have a farm background. Employers had no background preference for 88 per cent of their employees.

When compared with the Industrial or Business and Service competency groups, a higher per cent of the workers in the Agricultural competency group earned more than $80 per week.

Report

O Brum, H. D. Employment Opportunities and Needed Competencies for Workers in Ohio, Ohio Department of Education in cooperation with The Ohio State University and Agencies of the State and Federal Government, Columbus, 1964.

OKLAHOMA

Purpose

The purposes of this study were (1) to identify present and emerging off-farm agricultural occupations for which vocational, technical or higher education should be available, (2) to determine present numbers of employees, annual turnover and entry opportunities, and competencies needed for entry and advancement in the occupations, and (3) to determine other characteristics of the occupations.

Method

Interviews were conducted with representatives of agricultural industries and businesses. The study used a stratified random sample of the state. In interviewing 700 businesses, over 2,000 job-title interviews were made.

Findings

The estimated increase of employees in the state who need agricultural competencies is shown in the following tabulation:

Business and Occupational Group	Employees Needing Agricultural Competencies: Current Employment	Employment in 5 Years	Per Cent Increase
Farm Machinery	1,962	2,780	41.7%
Farm Supplies	2,205	2,775	25.9
Livestock and Poultry	1,659	2,243	35.2
Crops, Forestry, and Soil Conservation	1,029	1,236	20.1
Ornamental Horticulture	2,100	3,063	45.9
Agricultural Service	544	671	23.3
Total	9,499	12,768	34.4

Oklahoma continued

Of the businesses interviewed, the estimated percentage increase during the next five years of the total full-time workers is 32.2 per cent, and of the total part-time workers is 43.0 per cent. The three levels of employment with the greatest numbers of workers in jobs requiring agricultural competencies were service, managerial, and sales, in that order of importance.

A factor analysis of all job titles and competencies showed groupings which may be used in program planning.

Report

Edington, E. D., and Stevenson, B. W., Determining Training and Educational Needs for Persons Employed in Agricultural Occupations in Oklahoma. Cooperative Study--College of Agriculture, Oklahoma State University, and the Oklahoma State Department of Vocational Education, Stillwater, 1964.

PENNSYLVANIA

Purpose

The purposes of this study were (1) to identify agricultural occupations and job titles, (2) to estimate present numbers of employees and entry opportunities, (3) to list competencies needed for entry and advancement, (4) to determine other job characteristics, and (5) to group occupations and job titles for which there are common technical education needs.

Method

Interviews were conducted with representatives of businesses having employees needing agricultural competencies. The study used a random sample of 17 counties.

Findings

The estimated increase of employees needing agricultural competencies during the next five years is shown by the following:

Business and Occupational Group	Employees Needing Agricultural Competencies		
	Current Employment	Employment in 5 Years	To Be Hired During Next Five Years
Farm Machinery Sales and Service	1,056	1,252	444
Farm Supplies and Equipment	3,372	3,920	1,264
Livestock and Poultry	2,820	2,972	872
Crops, Forestry, and Soil Conservation	1,170	1,248	290
Ornamental Horticulture	3,344	3,784	2,180
Wildlife and Recreation	71	85	27
Agricultural Service	704	774	186
Total	12,537	14,035	5,263

Pennsylvania continued

Thirty-five job titles account for 85 per cent of the increase in numbers of workers expected in the next five years.

Seventy-five job titles account for 85 per cent of all workers expected to be hired in the next five years. Twelve service titles, mostly in horticulture, represent over 50 per cent of the turnover, not increase. In the largest occupational groups, salesmen, mill workers, mechanics, and delivery men account for most of the increase expected in full-time workers.

Factor analysis of competencies and of occupational titles by type of business is being done using profiles of competency ratings for classified job titles. Courses to be taught to high school students and to employed adults in off-farm agricultural businesses may be established on the basis of concentrations of degrees of need.

Report

Hoover, N. K., McClay, D. R., and Stevens, G. Z., Technical Education Needs of Persons Engaged in Agricultural Occupations. Joint study--Department of Agricultural Education, The Pennsylvania State University, University Park, and the Division of Agricultural Education, Pennsylvania State Department of Public Instruction, Harrisburg, 1965.

UTAH

Purpose

The purposes of this study were (1) to identify present and emerging agricultural occupations for which vocational and technical agricultural education should be available, (2) to determine present and anticipated numbers of employees, annual entry opportunities, and competencies needed for entry into the occupations, and (3) to determine other characteristics of the occupations.

Method

Interviews were conducted with managers of businesses employing workers who need agricultural competencies. The study used two counties in the state.

Findings

1. In September, 1962, the total work force for the two counties surveyed was 158,819. Approximately 5,729 or 3.6 per cent of the workers were employed in occupations related to farming.
2. The greatest demands for workers were in the areas of animal science, agricultural mechanics, and crops. The specific needs were in meats, trucking, and nursery work.
3. The needs for agricultural training were highest in meats and horticulture. Employers in these occupations are looking for trained employees.
4. The agricultural mechanics area needs experienced men in sales and service. Knowledge of farm equipment is essential to salesmen.

Utah continued

5. The demands are great in almost all fields of off-farm agriculture. Training should be provided for persons on both the high school and the post-high school levels.

Report

0 Schank, D. R., A Study of the Off-Farm Agriculture Occupations of Utah's Salt Lake and South Davis Counties to Determine Educational Needs. Department of Agricultural Education, Utah State University, Logan, Utah, 1964.

WASHINGTON

Purpose

The purpose of this study was to determine the number and kinds of positions in agricultural businesses that require an agricultural background of experience, or that require training in agriculture and business.

Method

Interviews were made with managers of businesses associated with agriculture. The study used a 17 per cent stratified random sample of the state.

Findings

1. The 241 businesses used in the study indicated that 1,836 or 13.6 per cent of 13,494 present employees needed training in agriculture.
2. When projecting future employment needs, three businesses expected a decrease, 112 expected to remain about the same, and 126, or 52.4 per cent will hire some 550 agriculturally-trained persons within the next five years.
3. It was estimated from the current agriculturally-trained persons in the 241 associated businesses that approximately 3,300 additional employees will be required in the State of Washington in the near future.
4. High school graduation was desired for all levels of employment and will become a must for persons planning to enter the field of agricultural business. Over two-thirds of the

Washington continued

employers asked four years of college preparation of prospective consultants, supervisors, and managers.

5. Starting salaries in agricultural businesses compared favorably with positions in other occupations requiring comparable training and experience

Report

Brown, B. L., Training Requirements of Workers in Business Associated with Agriculture, State Board for Vocational Education, Olympia, 1959.

WEST VIRGINIA

Purpose

The purposes of this study were (1) to identify the various agencies having employees required to possess agricultural competencies, (2) to determine the number of employees in various off-farm agricultural job classifications, (3) to determine some of the basic requirements for entering off-farm agricultural employment, and (4) to identify certain occupations for which training programs may be implemented at high school and post-high school levels for successful entrance.

Method

Interviews were conducted with representatives of a state-wide sampling of businesses with off-farm agricultural employees.

Findings

The present employment and estimated number of persons needed in five years in agricultural occupations are shown in the following:

Business and Occupational Group	Agricultural Occupations Workers		Added Number of Persons Needed in Five Years
	Number	Per Cent	
Farm Supplies and Equipment	1,773	12.8	34
Livestock and Poultry	2,507	18.1	64
Crops, Forestry, and Soil Conservation	5,416	39.1	586
Ornamental Horticulture	1,344	9.7	125
Wildlife and Recreation	831	6.0	122
Agricultural Service	1,980	14.3	140
Total	13,851	100.0	1,071

West Virginia continued

Of the 385,150 persons in the total labor force, 3.6 per cent were in off-farm agricultural occupations and 5.4 per cent in farming. For every two off-farm agricultural workers, there were three workers in production agriculture. Eighty-four per cent of the employing agencies employed less than ten agricultural workers. An eight per cent increase in off-farm agricultural employment was anticipated in the next five years. In the geographic regions where the percentage of workers in farming was higher than the state average, the percentage in off-farm agricultural occupations was also above average.

Report

Bailey, J. K., Non-Farm Agricultural Employment in West Virginia with Implications for Vocational Education Programs, Division of Vocational, Technical, and Adult Education, Charleston, 1965.

How to Obtain Copies of Individual State Reports and Further Information on Studies in Progress

Author(s), title, place and date of publication have been listed at the end of the two-page abstract of each of the twenty-six individual state studies on pages 33 to 85 in this report. A copy of a particular publication may be obtained by writing to the author, to the State University, Department of Agricultural Education, or to the office of the State Supervisor of Vocational Agriculture.

Many of the leaders of the state studies of off-farm agricultural occupations are continuing the analysis of data obtained on interview schedules. They intend to publish additional reports, with emphasis on competency groupings and course of study recommendations. Correspondence with a study leader may result in more rapid dissemination of findings and of research procedures worthy of adaptation to other states.

New research projects in occupations areas are being designed in several states that have completed one or more studies. Different theoretical considerations form the basic approach, and new data schedules have components not previously included.

States such as New Hampshire, Vermont, Rhode Island, New Jersey, Tennessee, Virginia, Florida, Indiana, and others for which information is not yet released will initiate and/or complete and publish studies in the near future. The Summaries of Studies in Agricultural Education series and other sources listing staff and thesis research will continue to report a steadily increasing output of valuable regional and local research on agricultural occupations.