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EMPLOYMENT OPPORTUNITIES AND NEEDED COMPETENCIES IN OFF-FARM  
AGRICULTURAL OCCUPATIONS IN MASSACHUSETTS.

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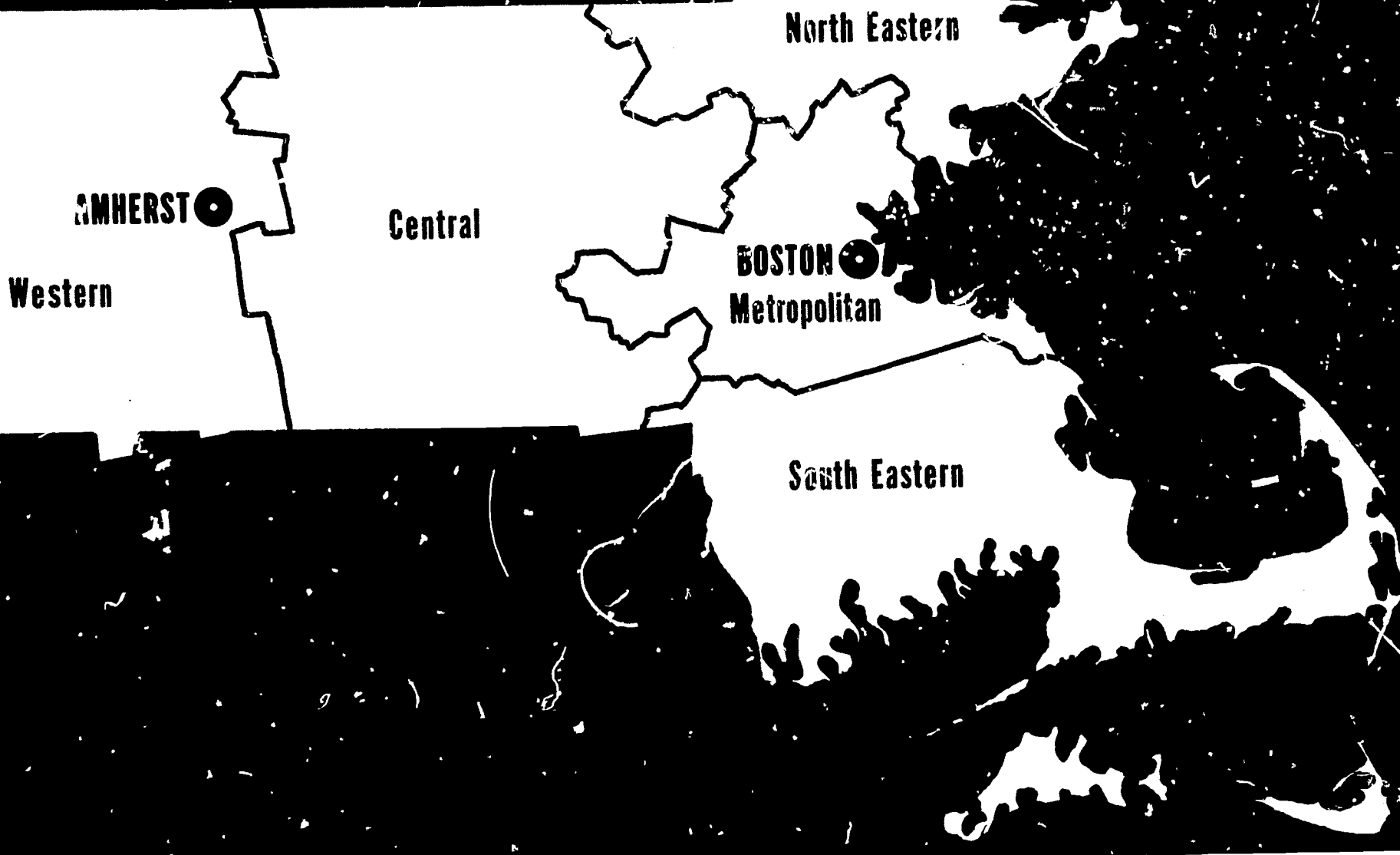
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THE CHANGING NATURE AND PURPOSES OF VOCATIONAL EDUCATION  
IN AGRICULTURE PROMPTED THIS STUDY OF OCCUPATIONS IN OFF-FARM  
AGRICULTURE. OBJECTIVES WERE TO DEVELOP INFORMATION IN REGARD  
TO EMPLOYMENT OPPORTUNITIES, REQUIRED COMPETENCIES, AND  
VOCATIONAL EDUCATION NEEDS FOR JOB ENTRY AND ADVANCEMENT.  
REPRESENTING A 10 PERCENT RANDOM SAMPLE OF EACH OF 13  
OCCUPATIONAL GROUPS IN FIVE GEOGRAPHICAL AREAS IN THE STATE,  
378 EMPLOYERS WERE INTERVIEWED BY TEACHERS, TEACHER-TRAINEES,  
AND GRADUATE STUDENTS USING TWO INTERVIEW SCHEDULES. FINDINGS  
WERE--(1) 20,275, OR 63 PERCENT, OF THE 25,509 FULL-TIME  
OCCUPATIONAL WORKERS NEEDED AGRICULTURAL COMPETENCY, (2) OVER  
ONE-HALF OF THE FIRMS HAD SALES, AND 14 PERCENT HAD SERVICE  
AS THEIR PRINCIPAL FUNCTION, (3) NEARLY ONE-HALF OF THE FIRMS  
EMPLOYED HIGH SCHOOL GRADUATES, AND 60.3 PERCENT WOULD BE  
WILLING TO COOPERATE IN HIGH SCHOOL TRAINING PROGRAMS, (4)  
MOST OF THE EMPLOYERS EXPRESSED A NEED FOR TRAINING PROGRAM  
CHANGES, (5) THE THREE LARGEST AREAS OF OFF-FARM AGRICULTURAL  
EMPLOYMENT WERE HORTICULTURE, HARDWARE AND FARM EQUIPMENT AND  
SUPPLY, AND FOOD DISTRIBUTION AND PROCESSING, (6) MOST  
EMPLOYERS EXPRESSED NO PREFERENCE AS TO EMPLOYEE'S  
RESIDENTIAL BACKGROUND, AND (7) MOST EMPLOYERS PREFERRED THAT  
EMPLOYEES GRADUATE FROM HIGH SCHOOL. RECOMMENDATIONS FOR  
PROGRAM CHANGES ARE INCLUDED. (JM)

EDU 17036



# **EMPLOYMENT OPPORTUNITIES AND NEEDED COMPETENCIES IN OFF-FARM AGRICULTURAL OCCUPATIONS IN MASSACHUSETTS**

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**HOMER JUDGE**

**Massachusetts Department of Education  
Division of Vocational Education**

**Boston 16, Massachusetts**

**June 1965**

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**EMPLOYMENT OPPORTUNITIES AND NEEDED COMPETENCIES  
IN OFF-FARM AGRICULTURAL OCCUPATIONS IN  
MASSACHUSETTS**

**U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE  
OFFICE OF EDUCATION**

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*A Research Report*

by

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In Cooperation With

**COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF EDUCATION**

Owen B. Kiernan, Commissioner  
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**DIVISION OF VOCATIONAL EDUCATION**

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## FOREWORD

This publication is the result of a State-wide research study to determine educational needs of workers in off-farm agricultural jobs. The study has provided an opportunity to appraise the nature and extent of employment in a segment of the work force in the Commonwealth of Massachusetts which is connected with the agriculture industry.

The data contained in this publication suggest significant opportunities for broadening and extending programs. It is now evident that increasing emphasis needs to be placed upon the establishment of training programs based upon detailed job descriptions, "mixing" such training with other vocational offerings according to the demands of the job. Employers contacted have indicated a demand first for a well-educated person, and secondly for a person trained for an occupation.

This study reflects one of the most ambitious research projects ever undertaken in the interests of vocational education in agriculture in Massachusetts. It is the result of cooperative action of many persons and organizations: the Massachusetts Vocational Agricultural Teachers Association; the State Employment Security Division; the Division of Vocational Education, State Department of Education and the U.S. Department of Health, Education and Welfare.

Grateful acknowledgment is also made to the persons who served as Interviewers and to the Management of 378 agricultural businesses.

Employers have pointed out a need for more Vocational Education programs at both the high school and post-high school levels to provide adequately trained workers for entry into off-farm agricultural occupations. The import of the recommendations from this study lies in lending perspective to educators who face the challenging requirements of agriculture.

Jesse A. Taft

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## INTRODUCTION

The nature and purposes of vocational education in agriculture are changing. Programs of vocational education in agriculture in the past have been largely concerned with preparation for entrance into production agriculture. The concepts embodied in the Smith-Hughes Act of 1917 that the purpose of vocational education in agriculture was to "meet the needs of persons over 14 years of age who have entered upon or are preparing to enter upon the work of the farm or of the farm home"<sup>1</sup> is no longer valid to meet the needs of today's youth who are interested and needed in careers in agriculture.

The Vocational Education Act of 1963 has charged vocational education with the responsibility of educating people for any occupation involving knowledge and skills in agricultural subjects. This act provides for the development of new programs of vocational education in addition to maintaining, improving, and extending existing programs. The act also broadens the concept of vocational education in agriculture to include much more than farming. It specifically provides that "amounts allotted for agricultural education may be used for vocational education in any occupation involving knowledge and skills in agricultural subjects, whether or not such occupations involve work of the farm or the farm home".<sup>2</sup>

## NEED FOR RESEARCH IN AGRICULTURAL OCCUPATIONS

Much more needs to be known about the nature of off-farm agricultural occupations. For many years vocational educators in agriculture have been training people for proficiency in farming. Many of the same skills needed by farmers are also thought to be essential or at least useful in performing the duties involved in off-farm agricultural occupations. Many jobs which were performed primarily on farms one, two, or three decades ago are today performed with greater efficiency at off-farm locations.

The agricultural industry of Massachusetts includes not only the production of agricultural commodities but also involves the processing and marketing of food, wood, fine turf, flowers, and landscape materials. Developments in technology and automation have resulted in an increased number of people needed to provide goods and services to the production phase of agriculture.

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<sup>1</sup>Administration of Vocational Education, Vocational Education Bulletin No. 1, General Series No. 1, U. S. Department of Health, Education and Welfare, (Washington: Government Printing Office, 1958), p. 27.

<sup>2</sup>Committee on Labor and Public Welfare, United States Senate, Selected Education Acts of 1963, (Washington, D. C.: U. S. Government Printing Office, 1963), pp. 75-76.

The estimate has been made that the Massachusetts agricultural industry provides 185,000 jobs, or 9 percent of all employment in Massachusetts including:<sup>3</sup>

3,000 employees providing goods and services to farmers  
17,000 people engaged in production on the farm  
165,000 employees assembling, processing and servicing food needs

If agricultural educators are to provide programs to meet the needs of youth who have an interest in and expect to enter off-farm agricultural occupations then these occupations must be identified and additional information secured concerning their nature. Successful occupational educational programs for youth preparing to enter these off-farm occupations will depend upon an understanding of the competencies, skills, and knowledge needed for entry and advancement in these occupations.

### PLANNING THE STUDY

This research study was conducted by the Division of Vocational Education, Massachusetts Department of Education with cooperation from the School of Education, University of Massachusetts. The study was designed to develop information in regard to employment opportunities, the nature of the occupations, and competencies needed for job performance in the off-farm agricultural occupations in Massachusetts.

A way was needed to determine where off-farm agricultural workers were located in the Commonwealth of Massachusetts. People and firms who employ workers appeared to be the best source of information in regard to workers, their job classifications, and competency needs in the performance of their jobs. We looked to the one agency in Massachusetts which has a complete list of employers in Massachusetts, the Division of Employment Security. The Division of Employment Security cooperated to the fullest and agreed to make their employer files available for obtaining names and addresses of employers for use in the study.

Employers are classified by the Division of Employment Security according to the Standard Industrial Classification Manual. This manual<sup>4</sup> and supplement

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<sup>3</sup>A Five Billion Dollar Asset to the Commonwealth's Economy, Extension Publication 411, College of Agriculture, Cooperative Extension Service, University of Massachusetts.

<sup>4</sup>Standard Industrial Classification Manual, Executive Office of the President, Bureau of the Budget, (Washington, D. C.: U. S. Government Printing Office), 1957.

of 1963<sup>5</sup> were carefully studied to determine which groups of employers operated businesses which were more agriculturally oriented. The following thirteen occupational groups were selected for inclusion in the study: 1. Miscellaneous agriculture, 2. Agricultural services, 3. Horticultural services, 4. Meat products, 5. Dairy products, 6. Logging and sawmills, 7. Public warehousing, 8. Hardware and farm equipment, 9. Meat and fish markets, 10. Fruit and vegetable markets, 11. Miscellaneous food stores, 12. Farm and garden supply, and 13. Sports. These thirteen occupational groups were determined to be the groups of employers who operated businesses most closely related to agriculture and therefore most appropriate for inclusion in the study.

### OBJECTIVES OF THE STUDY

The specific purposes of this study were to develop information in regard to:

1. Employment opportunities in off-farm agricultural occupations in Massachusetts.
2. Competencies required of workers in off-farm agricultural occupations.
3. The need for vocational education for entry and advancement in off-farm agricultural occupations.

### RESEARCH DESIGN

The population for this research study included all employers listed with the Division of Employment Security of the Commonwealth of Massachusetts in the thirteen occupational groups which were determined to be most closely related to agriculture and therefore most appropriate for this study. Names and addresses of all employers included in the thirteen occupational groups were secured from Employment Security files and each placed on an individual card. The state was divided into the five following geographical areas: 1. West, 2. Central, 3. Northeast, 4. Metropolitan, and 5. Southeast. The cards listing employers in each of the thirteen occupational groups were then divided on the basis of their location into these five areas. A ten percent random sample was then taken from each of the thirteen occupational groups according to their location in one of the five geographical areas of the state.

Data for the study was then collected by personal interview with employers or managers in each of the businesses in this ten percent stratified random sample. Table 1 shows the number of employers in the research study by both occupational

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<sup>5</sup>Supplement to the 1957 Edition Standard Industrial Classification Manual, Executive Office of the President, Bureau of the Budget, (Washington, D. C.: U. S. Government Printing Office), 1963.

group and geographical area of the state. It will be noted from this table that there was a total of 3479 firms taken from Division of Employment Security files. A total of 378 employers were interviewed to collect data for this study. This is slightly greater than ten percent due to increased sampling in the smaller cells as shown in Table 1. No less than two employers were randomly selected per cell.

Data for the study was processed by the Research Computing Center, University of Massachusetts. Information from forms I and II was coded and punched on I. B. M. cards and calculations made by computer at the Research Computing Center.

TABLE I  
NUMBER OF EMPLOYERS IN RESEARCH STUDY

Area of Massachusetts	Occupational Family													Number of Employers
	01 Miscellaneous Agriculture	02 Agricultural Services	03 Horticultural Services	04 Meat Products	05 Dairy Products	06 Logging and Sawmills	07 Public Warehousing	08 Hardware and Farm Equipment	09 Meat and Fish Markets	10 Fruit and Veg- etable Markets	11 Miscellaneous Food Stores	12 Farm and Gar- den Supply	13 Sports	
Population 1-West	10	24	94	3	35	51	18	79	26	14	8	32	34	428
Sample	2	3	9	2	4	5	2	8	3	2	2	4	4	50
Population 2-Central	13	32	93	7	47	16	24	95	36	32	9	23	32	459
Sample	2	4	9	2	5	2	3	10	4	4	2	3	4	54
Population 3-Northeast	10	23	115	1	38	6	14	95	95	32	13	21	25	488
Sample	2	3	11	1	4	2	2	10	10	4	2	3	3	57
Population 4-Metropolitan	24	49	311	16	36	4	94	307	318	207	33	26	51	1476
Sample	3	5	31	2	4	2	9	30	31	20	4	3	5	149
Population 5-Southeast	16	33	202	4	39	21	15	110	60	38	15	30	45	628
Sample	2	4	20	2	4	3	2	11	6	4	2	3	5	68
Population TOTAL	73	161	815	31	195	98	165	686	535	323	78	132	187	3479
Sample	11	19	80	9	21	14	18	69	54	34	12	16	21	378



## DEFINITION OF TERMS

1. **Agricultural Occupation** - An occupation in which workers need competencies in one or more of the primary areas of plant science, animal science, agricultural business management and marketing, and agricultural mechanization.
2. **Off-farm Agricultural Occupation** - An agricultural occupation which is performed primarily in a location other than a farm.
3. **Level of Employment** - Classification of employees into the following eight categories on the basis of level and function of the jobs they perform.
  - a. **Professional** - occupations which require extensive academic background or a combination of education and experience and a high degree of mental activity.
  - b. **Technical** - occupations which require post-high school specialized training and carry out details of projects conceived by professional and engineering workers plus the "know-how" of skilled craftsmen and occupational personnel.
  - c. **Proprietors and Managers** - occupations that involve policy-making, planning, supervising, guiding work activity of others, usually through intermediate supervisors.
  - d. **Sales** - occupations concerned with sale of commodities, investments, real estate, and services, and occupations closely identified with actual sales transactions.
  - e. **Clerical** - occupations concerned with preparing, transcribing, transferring, filing, and preserving communications and records.
  - f. **Skilled Workers** - includes craft and manual occupations requiring thorough knowledge of processes involved in the work, exercise of independent judgement, usually a high degree of manual dexterity, responsibility for valuable product or equipment, usually qualified by apprenticeship or extensive training.
  - g. **Semi-skilled Workers** - includes manual occupations requiring dexterity but limited to well-defined work routine; important decisions made by others.
  - h. **Unskilled** - occupations not requiring a high degree of training, such as maintenance of grounds, stock handling, deliveries, etc.

## LIMITATIONS OF THE STUDY

This research study is limited to workers employed in Massachusetts in the thirteen occupational groups included in the study. This limitation allowed a complete listing of all employed workers for firms in these categories and therefore a complete and accurate random sampling of the population thus used in the study. This limitation excludes all persons who are self employed and who do not employ other workers in their businesses. It also excludes workers who are employed by governmental agencies. It is also recognized that there are many employed workers who work for firms not within the classification of the thirteen occupational groups chosen for the study who need some degree of agricultural competency in

the performance of their jobs. Some of these workers will have the same job titles as some of the workers included in the study and will be performing essentially the same operations.

### COLLECTION OF DATA

Data for the study was collected by means of personal interviews with employers in the selected businesses. Two interview schedules were developed for recording information collected through these personal interviews. Copies of these two instruments, Form I and Form II are included in the Appendix of this report. One copy of Form I was completed for each employer included in the study to record information about all employees in the firm. Form I listed job titles for all full-time and part-time workers employed by the firm. Form II was designed to collect information about workers in specific job titles. One copy of Form II was completed to record information in regard to workers in each job title found in the cooperating firms.

Interviewers for the research team were selected on the basis of their knowledge and understanding of both the broad field of agriculture and the program of Vocational Education in Agriculture in Massachusetts. Persons selected for interviews included teachers of vocational agriculture, apprentice teachers of vocational agriculture, and graduate students in the College of Agriculture at the University of Massachusetts. An interview manual was developed and used for training all persons who interviewed employers for the study. Orientation and training sessions were held with every member of the interviewing team prior to their conducting interviews with the employers. Supervision of interviewers through constant, almost daily, contact was maintained by the researcher. Every possible effort was made to eliminate differences which might exist between data collected by different members of the research team.

All data used in this study was collected through personal interviews with persons of authority and responsibility in their firms. Efforts were made in all cases to interview the owner, manager, personnel director or at least some person in a top level managerial position who was familiar with total personnel requirements of the firm. In a few cases Forms II were completed by interviewing more than one person in the firm. People in these top level managerial positions were very generous in giving of their time for these interviews. The positions of the persons interviewed to collect data for this study are shown in Table II.

TABLE II

## Position of Person Interviewed

<u>Position</u>	<u>Number</u>	<u>Percent</u>
Owner	81	21.5
Owner-Manager	161	42.7
Manager	60	15.7
Personnel Director	6	1.6
Sales Manager	2	.5
Office Manager	13	3.4
Supervisor (Dist., area, etc.)	8	2.1
Other	47	12.4
Total	378	100.0

It will be noted from the information given in Table II that 80% of the interviews were conducted with the owner, manager, or owner-manager of the firm.

## KINDS OF BUSINESSES STUDIED

Table III below lists the thirteen occupational families selected for the study and gives the number of employers in Massachusetts in each of the categories as determined from Employment Security files and also the number of employers selected at random and interviewed.

TABLE III

Number of Agricultural Businesses by Occupational Family  
in Massachusetts

<u>Family</u>	<u>Number in Population</u>	<u>Number in Sample</u>
Miscellaneous agriculture	73	11
Agricultural services	161	19
Horticultural services	815	80
Meat products	31	9
Dairy products	195	21
Logging and sawmills	98	14
Public warehousing	165	18
Hardware and farm equipment	636	69
Meat and fish markets	535	54
Fruit and vegetable markets	323	34
Miscellaneous food stores	78	12
Farm and garden supply	132	16
Sports	187	21
Totals	<del>3179</del> 3429	378



The three largest occupational groups included in the study in order of numbers were (1) horticultural services, (2) hardware and farm equipment, and (3) meat and fish markets. These three occupational groups account for more than one-half of all employers in the thirteen occupational groups included in the study.

Table IV shows the length of time the firms included in the study had been in business.

TABLE IV

Number of Years Firms in Business

<u>Years</u>	<u>Number</u>	<u>Percent</u>
Less than 5 years	32	8.5
5 to 10 years	173	45.8
11 to 30 years	104	27.5
31 and over	69	18.2
Total	<u>378</u>	<u>100.0</u>

More than ninety percent of all of the firms interviewed had been in business for at least five years. Approximately one-half of them had been in business between five and ten years time. Over forty percent of the firms had been in business for more than eleven years.

Table V shows the main function of the firms included in the study.

TABLE V

Main Function of Agricultural Businesses

<u>Function</u>	<u>Number</u>	<u>Percent</u>
Sales	204	54.0
Service	53	14.0
Manufacturing	5	1.3
Processing	21	5.6
Specialized agriculture	27	7.1
Recreational enterprises	19	5.0
Professional services	15	4.0
Other	34	9.00
Total	<u>378</u>	<u>100.0</u>

Many of the firms included in the study performed not one but a combination of the functions listed in Table V. The main function was determined by a response from the employers interviewed. As shown in the table, 204 of 378, over one-half of the firms interviewed listed sales as the main function of the firms. Many of these firms also performed one or more of the other functions listed.

## EMPLOYMENT OF HIGH SCHOOL STUDENTS

The persons interviewed in each of the 378 firms included in the study were asked if they hired any high school students. Almost one-half (184 of 378 or 48.7 percent) of the firms were found to be hiring high school students. The persons interviewed were also asked if their firms would be willing to hire high school students as trainees. Over one-eighth of all firms indicated willingness to hire high school students as trainees in their businesses even though they do not now hire any high school students. This indicates that most firms are willing to cooperate with school systems in educating youth for positions in off-farm agricultural occupations. A total of over sixty percent (60%) of all employers interviewed indicated that they would be willing to hire high school students as trainees.

Table VI below shows the number of firms who were employing high school students, the number who would be willing to hire high school students in the operation of their businesses, and the number who would prefer students who were studying vocational agriculture as high school student employees.

TABLE VI

### Employment of High School Students

	<u>Yes</u>	<u>No</u>	<u>Percentage</u> <u>Yes</u>	
Firms employing high school students	184	194		48.7
Firms which would employ high school students as trainees	228	150		60.3
			<u>No</u> <u>Response</u>	
Firms which would prefer students studying vocational agriculture	212	132	34	56.1

Over one-half (56.1 percent) of the employers indicated that they would prefer students who were in a vocational agriculture program if they were hiring students to work in their firms. However, interviewers had to explain in a number of instances that high school programs of vocational agriculture operated occupational placement programs in connection with the vocational education of students. Improved channels of communications need to be developed between programs of vocational education in agriculture and employers and potential employers of students and graduates of these programs.

A tremendous potential of placement situations for high school students in occupational experience training programs is indicated by the large number of employers willing to hire high school students as trainees. A majority of these employers indicated a preference for students of vocational agriculture.

## NUMBER OF WORKERS BY OCCUPATIONAL FAMILY

Estimates of the number of workers in various categories were made on the basis of the ten percent random sample. The estimated number of persons employed full and part-time in each of the thirteen occupational families is given in Table VII.

TABLE VII

### Estimated Number of Workers by Occupational Family in Massachusetts

<u>Occupational Family</u>	<u>Estimated Number of Employees</u>	
	<u>Full time</u>	<u>Part time</u>
Miscellaneous agriculture	336	203
Agricultural service	280	168
Horticultural service	4630	2420
Meat products	547	45
Dairy products	2732	1135
Logging and sawmills	1265	56
Public warehousing	2466	235
Hardware and farm equipment	3330	540
Meat and fish products	1500	770
Fruit and vegetable products	1400	810
Miscellaneous food markets	318	102
Farm and garden supply	4212	248
Sports	971	872
Totals	<u>25,509</u> <i>23,987</i>	<u>6,460</u> <i>7,604</i>

The estimate of 31,969 full and part time workers employed in these thirteen occupational families is considerably more than the estimated 17,000 persons engaged in production on the farms of Massachusetts.<sup>6</sup>

### WORKERS WHO NEED AGRICULTURAL COMPETENCY

Table VIII shows the estimated number of employers in the occupational families included in the study according to their level of employment. It also shows the number and percentage in each of the eight levels of employment who were determined to need agricultural competencies in the performance of their jobs.

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<sup>6</sup>A Five Billion Dollar Asset to the Commonwealth's Economy, Extension Publication 411, College of Agriculture, Cooperative Extension Service, University of Massachusetts.

TABLE VIII

Estimated Employment and Number of Workers Needing Agricultural  
Competency by Level of Employment

Occupational Level	Estimated Number of Employees		Number Needing Agricultural Competency	Percent Needing Agricultural Competency
	<u>Full time</u>	<u>Part time</u>		
PROFESSIONAL	2160	18	2150	99
TECHNICAL	891	30	884	96
PROPRIETORS AND MANAGERS	1334	9	1095	82
SALES	4995	1827	4661	68
CLERICAL	2414	234	1557	59
SKILLED	4709	531	3445	66
SEMI-SKILLED	6525	2727	5709	62
UNSKILLED	2466	1084	774	22
Totals	<u>25,509</u> <i>25,494</i>	<u>6,460</u>	20,275	Average 63

Information presented in Table VIII shows a total of 20,275 workers who need some degree of competency in agriculture in order to perform their jobs. This is 63% of all persons employed by firms in the thirteen occupational families included in this study.

#### JOB TITLES OF WORKERS BY OCCUPATIONAL GROUPS

Job titles for employees in the firms included in this study were determined by asking the person interviewed to list all employees by job title. Many of the employers did not have definite and concise job titles for their employees. Some of them grouped workers together and assigned job titles during the interview. There is considerable range in the duties and responsibilities of persons in a given job title. This can be true for workers of the same job title working in the same firm. When the workers are employed by firms engaged in different types of business there is often a considerable variation between the knowledge, competencies, and skills required for entry and advancement in a given job title.

A list of 216 job titles was developed from those given by employers and recorded by interviewers on the interview schedules. Only slight changes were made in title designations in this original grouping. A condensed list of job titles was then developed by combining these job titles in the original list which appeared to refer to essentially the same duties of employees. This condensed list contained 119 job titles and was used in the coding for I. B. M. cards and in calculations of characteristics and competencies needed by workers.

Tables IX A through M, which are presented on the following pages, list the number of full time and part time workers by job title according to level of employ-

ment for each of the thirteen occupational groups.

TABLE IX

Number of Workers by Level of Employment

A - MISCELLANEOUS AGRICULTURE

B - AGRICULTURAL SERVICES

	Number Workers			Number Workers	
	<u>Full Time</u>	<u>Part Time</u>		<u>Full Time</u>	<u>Part Time</u>
PROFESSIONAL	0	0	PROFESSIONAL		
			Veterinarian	48	0
TECHNICAL			TECHNICAL	0	0
Superintendent	7		PROPRIETOR &		
Propagater	7		MANAGER	0	0
Foreman	14		SALES		
Asst. Supt.	14		Office Manager	8	0
PROPRIETOR &			CLERICAL		
MANAGER			Bookkeeper	16	16
Salesman	21	77	Secretary	8	
Sales Mgr.	7		SKILLED		
CLERICAL			Animal Caretaker	56	0
SKILLED			Horseman	8	
Foreman	14		Nurse	8	
Traffic Mgr.	7		Kennel Mgr.	8	
Animal Caretaker	14	7	SEMI-SKILLED		
Florist	14		Kennelman	32	32
Kennel Mgr.	7		Hospital Asst.	8	32
Landscape &			Receptionist	8	8
Nursery Man	56	14	Worker	48	24
SEMI-SKILLED			Worker & Operator	8	
Groom	7		UNSKILLED		
Kennel Man	14	7	Helper	8	16
Maintenance Man	77		Laborer	8	16
Tree Climber	14		Vegetable Packer		24
UNSKILLED			TOTALS	280	168
Laborer	35	14			
Helper		21			
TOTALS	<del>336</del>	<del>203</del>			
	329	140			



TABLE IX (continued)

Number of Workers by Level of Employment

C - HORTICULTURAL SERVICES

	Number Workers			Number Workers	
	<u>Full Time</u>	<u>Part Time</u>		<u>Full Time</u>	<u>Part Time</u>
<b>PROFESSIONAL</b>			<b>SEMI-SKILLED (continued)</b>		
Lawyer	10	0	Worker	420	540
<b>TECHNICAL</b>			Maintenance Man	30	30
Architect	70	0	Tractor Driver	110	
<b>PROPRIETOR &amp; MANAGER</b>			Tree Climber	200	
Pres. & Treasurer	10	0	Truck Driver		10
Supervisor	20		<b>UNSKILLED</b>		
Manager	320		Helper	70	20
<b>SALES</b>			Laborer	300	280
Salesman	50	110	<b>TOTALS</b>	<del>4630</del>	<del>2420</del>
Clerk	150	40		4650	2370
<b>CLERICAL</b>			<b><u>D - MEAT PRODUCTS</u></b>		
Bookkeeper	100	0	<b>PROFESSIONAL</b>	0	0
Secretary	10		<b>TECHNICAL</b>	0	0
Clerk	20		<b>PROPRIETOR &amp; MANAGERS</b>		
<b>SKILLED</b>			Manager	36	0
Landscape & Nursery Men	250	90	<b>SALES</b>		
Foreman	360	100	Clerk	6	24
Florist	60		Salesman	51	
Vice President	50		Sales Manager	12	
Mechanic	10		<b>CLERICAL</b>		
Operator	130		Bookkeeper	18	9
Asst. Foreman	10		Clerk	9	
Mason	20		<b>SKILLED</b>		
Arborist	20		Sausage Maker	24	
Superintendent	10		Foreman	3	
Tree Surgeon	120		Butcher	174	
<b>SEMI-SKILLED</b>			Superintendent	10	
Laborer	1660	1150			
Groundman	60				

TABLE IX (continued)

Number of Workers by Level of Employment

D - MEAT PRODUCTS (continued)

	Number Workers	
	<u>Full Time</u>	<u>Part Time</u>
<b>SEMI-SKILLED</b>		
Laborer	9	6
Meat Wrapper	3	6
Barn Man	3	
Dockman	33	
Worker	84	
Truck Driver	45	
Maintenance Man	12	
<b>UNSKILLED</b>		
Laborer	12	0
Helper	3	
<b>TOTALS</b>	<b>547</b>	<b>45</b>

E - FRUIT AND VEGETABLE MARKETS

<b>PROFESSIONAL</b>	0	0
<b>TECHNICAL</b>	0	0
<b>PROPRIETOR &amp; MANAGERS</b>		
Manager	140	0
<b>SALES</b>		
Salesman	30	70
Clerk	700	510
Delivery Man	30	
<b>CLERICAL</b>		
Bookkeeper	10	10
Clerk	80	
<b>SKILLED</b>		
Butcher	130	70

	Number Workers	
	<u>Full Time</u>	<u>Part Time</u>
<b>SEMI-SKILLED</b>		
Laborer	90	120
Truck Driver	90	
Worker	80	
Ice Cream Maker	10	
Delivery Man		10
<b>UNSKILLED</b>		
Helper	10	10
Laborer		10
<b>TOTALS</b>	<b>1400</b>	<b>810</b>

F - DAIRY PRODUCTS

<b>PROFESSIONAL</b>	0	0
<b>TECHNICAL</b>		
Pasteurizer	126	0
Lab Technician	117	
<b>PROPRIETOR &amp; MANAGERS</b>		
Manager	45	0
<b>SALES</b>		
Delivery Man	207	36
Salesman	171	
Sales Manager	270	
<b>CLERICAL</b>		
Bookkeeper	9	9
Secretary	54	27
Clerk	108	18
Treasurer	9	
<b>SKILLED</b>		
Mechanic	9	9



TABLE IX (continued)

Number of Workers by Level of Employment

F - DAIRY PRODUCTS (continued)

	Number Workers		Number Workers	
	<u>Full Time</u>	<u>Part Time</u>	<u>Full Time</u>	<u>Part Time</u>
<b>SKILLED (continued)</b>				
Foreman	45			
Milk Chest Worker	90			
Milk Receiver	36			
Operator	216			
Checker	180			
Section Leader	200			
Lead Man	150			
<b>SEMI-SKILLED</b>				
Dairy Plant Employee	315	18		
Worker	81	9		
Refrigerator Box Controller	9			
Platform Loader	27			
Dairy Plant Processor	108			
Milker	18			
Sanitation Man	72			
Truck Driver	234			
Delivery Man	99			
<b>UNSKILLED</b>				
Laborer	27	9		
<b>TOTALS</b>	<b>2732</b>	<b>135</b>		

**PROPRIETOR & MANAGERS (continued)**

Manager	40	
<b>SALES</b>		
Salesman	12	6
Clerk	24	24
<b>CLERICAL</b>		
Bookkeeper	12	
Clerk	36	6
<b>SKILLED</b>		
Candler	12	
Cook	36	12
Landscape & Nursery Man	6	
<b>SEMI-SKILLED</b>		
Truck Driver	12	6
Laborer	6	6
Worker	12	36
Maintenance Man	18	
Warehouse Man	6	
Poultry Processor	42	
Delivery Man	12	

**UNSKILLED**

Laborer	72	6
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<b>TOTALS</b>	<del>318</del> 366	102
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G - MISCELLANEOUS FOOD STORES

<b>PROFESSIONAL</b>	0	0
<b>TECHNICAL</b>	0	0
<b>PROPRIETOR &amp; MANAGERS</b>		
Treasurer	8	0

TABLE IX (continued)

Number of Workers by Level of Employment

H - PUBLIC WAREHOUSING

	Number Workers	
	<u>Full Time</u>	<u>Part Time</u>
PROFESSIONAL	0	0
TECHNICAL		
Forester	7	0
PROPRIETOR & MANAGERS		
President and Treasurer	7	7
Manager	21	
SALES		
Clerk	7	0
Sales Manager	7	
Office Manager	7	
CLERICAL		
Bookkeeper	7	0
SKILLED		
Operator	35	7
Woodsman	14	
Foreman	21	
SEMI-SKILLED		
Laborer	28	0
Truck Driver	28	
Worker	21	
Tractor Driver	21	
Machine Operator	112	
Nailer	21	
Edgeman	7	
Delivery Man	7	
Tally Man	20	
Lumber Sawyer	20	
UNSKILLED		
Helper	7	

	Number Workers	
	<u>Full Time</u>	<u>Part Time</u>
UNSKILLED (continued)		
Lumber Stacker	14	
Laborer	826	
TOTALS	1265	<del>56</del> 14

I - LOGGING AND SAWMILLS

PROFESSIONAL		
Manager	18	9
Engineer & Treas.	9	9
TECHNICAL		
Refrigerator Engineer	18	1
Foreman		10
PROPRIETOR & MANAGERS		
Supervisor	9	0
Manager	90	
SALES		
Salesman	36	0
Office Manager	27	
Field Engineer	63	
CLERICAL		
Clerk	423	9
Bookkeeper	81	
Secretary		9
SKILLED		
Engineer	18	36
Welder	9	9
Foreman	81	
Sheet Metal Worker	18	
Dispatcher	9	
Checker	486	
Candler		18

TABLE IX (continued)

Number of Workers by Level of Employment

I - LOGGING AND SAWMILLS (continued)

	Number Workers	
	<u>Full Time</u>	<u>Part Time</u>
<b>SEMI-SKILLED</b>		
Truck Driver	234	
Dockman	18	
Machine Operator	108	
Watchman	27	18
Maintenance Man	45	
Freight Handler	189	
Moving Helper	54	
Warehouseman	90	
Worker		81
<b>UNSKILLED</b>		
Laborer	288	18
Helper	18	
Custodian		9
<b>TOTALS</b>	2466	<del>235</del> 236

J - HARDWARE AND FARM EQUIPMENT

<b>PROFESSIONAL</b>	0	0
<b>TECHNICAL</b>		
Junior Executive	20	
Purchasing Agent	20	
Lab Technician		20

**PROPRIETOR & MANAGERS**

President	10	0
Buyer	10	
Manager	360	

**SALES**

Salesman	490	160
Clerks	850	230
Hardware		
Consultant	10	

**SALES (continued)**

Delivery Man	10	
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**CLERICAL**

Clerk	790	40
Bookkeeper	120	
Secretary	40	
Treasurer	10	

**SKILLED**

Foreman	10	
Mechanic	130	10
Repair Man	30	

**SEMI-SKILLED**

Truck Driver	200	10
Delivery Man	50	10
Laborer	30	
Worker	10	
Warehouse Man	90	

**UNSKILLED**

Laborer	40	50
Custodian		10

**TOTALS**

3330 540

K - MEAT AND FISH MARKETS

**PROFESSIONAL**

0 0

**TECHNICAL**

0 0

**PROPRIETOR & MANAGERS**

President	10	0
Vice President	10	
Manager	70	

TABLE IX (continued)

Number of Workers by Level of Employment

K - MEAT AND FISH MARKETS (continued)

	Number Workers			Number Workers	
	<u>Full Time</u>	<u>Part Time</u>		<u>Full Time</u>	<u>Part Time</u>
<b>SALES</b>			<b>PROPRIETOR &amp; MANAGERS</b>		
Salesman	50	140	Pres. & Treas.	8	0
Sales Manager	20	250	Manager	40	
Clerk	310	10			
<b>CLERICAL</b>			<b>SALES</b>		
Bookkeeper	50	10	Salesman	688	24
Clerk	80	30	Clerk	72	144
			Sales Manager	16	
<b>SKILLED</b>			Sales Supervisor	144	
Butcher	570	60	Office Manager	368	
Cook	10	50	Field Engineer		8
Foreman	10				
<b>SEMI-SKILLED</b>			<b>CLERICAL</b>		
Laborer	40		Bookkeeper	24	8
Truck Driver	30	10	Secretary	8	
Worker	20	60	Clerk	264	16
Waitress	30	10			
Vegetable Man	10		<b>SKILLED</b>		
Herdsmen	40		Foreman	24	0
Delivery Man		50	Mechanic	32	
			Supervisor	112	
<b>UNSKILLED</b>			<b>SEMI-SKILLED</b>		
Helper	30	70	Worker	16	40
Laborer	110	20	Truck Driver	64	
			Maintenance Man	64	
<b>TOTALS</b>	<b>1500</b>	<b>770</b>	<b>UNSKILLED</b>		
			Helper	16	8
<b><u>L - FARM AND GARDEN SUPPLY</u></b>			<b>TOTALS</b>	<b>4212</b>	<b>248</b>
<b>PROFESSIONAL</b>					
Manager	1840	0	<b><u>M - SPORTS</u></b>		
<b>TECHNICAL</b>			<b>PROFESSIONAL</b>	0	0
Foreman	0	0	<b>TECHNICAL</b>	0	0
Manager	416				

TABLE IX (continued)

Number of Workers by Level of Employment

M - SPORTS (continued)

	Number Workers			Number Workers	
	<u>Full Time</u>	<u>Part Time</u>		<u>Full Time</u>	<u>Part Time</u>
<b>PROPRIETOR &amp; MANAGERS</b>			<b>SEMI-SKILLED</b>		
President	9	0	Golf Pro	18	
Supervisor and Manager	27		Greenskeeper	45	99
			Laborer	99	
			Worker	18	99
			Maintenance Man	72	27
<b>SALES</b>			Waitress	63	171
Clerk	9	9	Bartender		45
			Riding Instructor	18	
<b>CLERICAL</b>			<b>UNSKILLED</b>		
Secretary	9	0	Helper	207	639
			Laborer	99	405
<b>SKILLED</b>					
Foreman	118	0			
Mechanic	9		<b>TOTALS</b>	<del>971</del>	<del>872</del>
Asst. Supt.	54			974	1494
Superintendent	100				

DEGREE OF AGRICULTURAL COMPETENCY REQUIRED BY WORKERS

Employers rated the degree of competency needed by their employees both for entry and advancement by job title in each of the major agricultural areas of (1) plant science, (2) animal science, (3) agricultural business management and marketing, and (4) agricultural mechanics. Employers rated each competency on the basis of none, some, or high competency being needed by those workers in the job title employed in their respective firms.

Indexes of competency needed by workers in each of the job titles was then calculated. A response of none was assigned a rating of 0, a response of some competency needed a 1, and a response of high competency needed a 2. An index of competency required was then figured for the various groups of competency items by figuring a simple average of the zero's, one's, and two's and multiplying by one hundred. The competency index then becomes a percentage of a perfect score of high competency need.

A competency index of 100 would indicate that employers stated every employee must have high competency in every one of the listed items in the performance of his job. A rating of 50 would be the equivalent of every worker needing some competency in every one of the items in the category.

Table X lists number of workers found, number of workers who needed agricultural competencies in the performance of their jobs, and also gives the competency index for each of the four agricultural competency areas and an average agricultural competency index for all of the agricultural competency items. It will be noted that there is a wide variation between competency indexes in the different agricultural areas for some of the job titles. For example employers indicated that high competency in plant science was required of all plant propagators but they did not think that any competency in animal science was required for satisfactory job performance. Care needs to be taken in interpreting average agricultural competency needed without a determination of what needed competencies contribute to this average score. A given job title may have a relatively low average agricultural competency index and still require a very high degree of competency in one or more agricultural areas.

TABLE X

INDEX OF AGRICULTURAL COMPETENCIES REQUIRED BY  
WORKERS IN AGRICULTURAL BUSINESSES IN MASSACHUSETTS

COMPETENCY INDEX

JOB TITLE	Number of Workers	Number Needing Agric. Competency	Plant Science Competency	Animal Science Competency	Agric. Business Management Competency	Agric. Mechanics Competency	Average Agric. Competency
<b>PROFESSIONAL</b>							
Veterinarian	54	54	19	80	18	0	29
Lawyer	9	0	0	0	0	0	0
Manager	2088	2078	71	70	99	45	71
Engineer & Treasurer	18	9	0	0	0	20	5
<b>TOTAL PROFESSIONAL</b>	<del>2178</del> 2169	<del>2150</del> 2141					
<b>TECHNICAL</b>							
Superintendent	9	9	50	0	10	40	25
Propagator	9	9	100	0	0	0	25
Foreman	28	28	30	0	20	10	15
Architect	63	63	100	0	9	41	38
Pasteurizer	126	117	3	50	26	16	24
Lab Technician	137	127	1	16	12	33	15
Forester	9	9	100	0	50	70	55
Refrigerator Engineer	18	0	0	0	0	0	0
Jr. Executive Purchasing Agent	18	18	50	50	0	50	38
Manager	468	468	61	63	86	66	69
Asst. Supt.	18	18	50	0	0	20	18
<b>TOTAL TECHNICAL</b>	921	884					
<b>PROPRIETORS &amp; MANAGERS</b>							
President	27	27	30	80	67	53	69
Vice President	9	9	0	90	100	30	55
President & Treasurer	27	27	43	0	33	17	23
Supervisor	36	27	75	0	18	25	29



TABLE X (continued)

INDEX OF AGRICULTURAL COMPETENCIES REQUIRED BY  
WORKERS IN AGRICULTURAL BUSINESSES IN MASSACHUSETTS

COMPETENCY INDEX

JOB TITLE	Number of Workers	Number Needing Agric. Competency	Plant Science Competency	Animal Science Competency	Agric. Business Management Competency	Agric. Mechanics Competency	Average Agric. Competency
PROPRIETORS & MANAGERS (cont.)							
Manager	1234	995	28	8	33	11	20
TOTAL PROPRIETORS & MANAGERS	<del>1343</del> 1333	<del>1095</del> 1085					
SALES PERSONNEL							
Salesman	2304	1407	42	3 31	33	22	32
Clerk	3159	2163	30	43	29	39	36
Sales Mgr.	369	369	4	8	7	2	5
Sales Supervisor	162	83	46	46	41	41	44
Office Mgr.	45	27	10	20	22	24	19
Field Engineer	486	486	53	54	11	80	49
Hardware Consultant	9	0	0	0	0	0	0
Hostess	9	0	0	0	0	0	0
Delivery Man	279	126	1	14	12	1	7
TOTAL SALES PERSONNEL	6822	4661					
CLERICAL WORKERS							
Bookkeeper	468	322	12	2	37	3	14
Secretary	243	74	2	9	13	3	7
Clerk	1899	657	3	0	18	0	5
Treasurer	18	18	25	25	15	25	23
TOTAL CLERICAL WORKERS	2628	1071					
SKILLED WORKERS							
Traffic Mgr.	9	9	10	0	0	30	10

TABLE X (continued)

INDEX OF AGRICULTURAL COMPETENCIES REQUIRED BY  
WORKERS IN AGRICULTURAL BUSINESSES IN MASSACHUSETTS

COMPETENCY INDEX

JOB TITLE	Number of Workers	Number Need- ing Agric. Competency	Plant Science Competency	Animal Science Competency	Agric. Business Management Competency	Agric. Mechanics Competency	Average Agric. Competency
<b>SKILLED WORK- ERS (cont.)</b>							
Animal							
Caretaker	90	90	11	92	20	3	29
Florist	72	72	88	0	0	0	22
Horseman	9	9	20	50	0	20	23
Nurse	9	9	0	35	5	0	10
Kennel Mgr.	18	18	0	70	73	0	36
Arborist	20	20	50	50	50	30	45
Vice President	45	45	100	0	14	24	35
Mechanic	298	135	6	1	0	17	6
Mason	9	9	10	0	0	0	3
Tree Surgeon	120	40	19	0	18	15	13
Butcher	1269	707	0	28	7	2	9
Sausage Maker	72	72	0	90	30	30	38
Repair Man	45	45	24	2	2	32	23
Milk Chest Worker	90	90	0	30	30	10	18
Landscape & Nursery Man	405	405	91	0	35	38	41
Milk Receiver	36	36	0	70	40	50	40
Section Leader	200	0	0	0	0	0	0
Lead Man	150	0	0	0	0	0	0
Superintendent	120	110	76	0	35	50	40
Woodsman	18	18	15	0	10	15	10
Operator	423	323	9	29	8	19	16
Tally Man	20	0	0	0	0	0	0
Engineer	54	0	0	0	0	0	0
Sheet Metal Worker	18	0	0	0	0	0	0
Welder	18	0	0	0	0	0	0
Dispatcher	9	0	0	0	0	0	0
Checker	666	515	0	15	11	7	8
Cook	126	45	0	6	11	11	7

TABLE X (continued)

INDEX OF AGRICULTURAL COMPETENCIES REQUIRED BY  
WORKERS IN AGRICULTURAL BUSINESSES IN MASSACHUSETTS

COMPETENCY INDEX

JOB TITLE	Number of Workers	Number Needing Agric. Competency	Plant Science Competency	Animal Science Competency	Agric. Business Management Competency	Agric. Mechanics Competency	Average Agric. Competency
<b>SKILLED WORKERS (cont.)</b>							
Supervisor	126	126	0	20	50	20	23
Foreman	657	388	34	2	11	13	15
Asst. Supt.	63	53	72	0	44	40	39
Lumber Sawyer	20	20	0	0	10	10	5
Condler	36	36	0	15	15	10	10
<b>TOTAL SKILLED WORKERS</b>	<del>5240</del> 5340	3445					
<b>SEMI-SKILLED WORKERS</b>							
Greens Keeper	144	117	45	2	2	25	19
Golf Professional	18	0	0	0	0	0	0
Groom	9	9	0	50	0	40	23
Kennel Man	99	99	4	72	11	4	23
Worker & Operator	9	9	10	0	0	0	3
Hospital Asst.	45	30	0	17	0	0	4
Receptionist	18	18	0	100	20	0	30
Groundsman	54	38	36	4	0	13	13
Barman	9	9	0	40	10	10	15
Dockman	117	117	2	45	40	28	28
Truck Driver	1053	426	1	5	10	2	4
Meat Wrapper	27	27	0	20	10	0	8
Laborer	3049	2675	24	0	0	6	8
Dairy Plant Employee	333	180	9	11	6	14	10
Ref. Box Controller	9	9	20	60	60	40	55
Dairy Plant Processor	108	108	0	51	24	40	20
Milker	18	18	0	40	0	20	15

TABLE X (continued)

INDEX OF AGRICULTURAL COMPETENCIES REQUIRED BY  
WORKERS IN AGRICULTURAL BUSINESSES IN MASSACHUSETTS

## COMPETENCY INDEX

JOB TITLE	Number of Workers	Number Needing Agric. Competency	Plant Science Competency	Animal Science Competency	Agric. Business Management Competency	Agric. Mechanics Competency	Average Agric. Competency
<b>SEMI-SKILLED</b> (cont.)							
Worker	1746	688	10	2	3	6	4
Tractor Driver	126	108	29	0	9	13	11
Machinery Operator	252	173	1	0	6	32	10
Nailer	27	27	0	0	0	20	5
Edgeman	9	9	0	0	0	50	13
Maintenance Man	540	339	15	7	2	10	2
Watchman	45	0	0	0	0	0	0
Freight Handlers	189	0	0	0	0	0	0
Moving Helper	54	0	0	0	0	0	0
Warehouse Man	180	30	0	4	5	5	3
Waitress	270	0	0	0	0	0	0
Vegetable Man	9	0	0	0	0	0	0
Herdsman	36	36	0	50	0	0	13
Ice Cream Maker	63	63	0	3	20	26	12
Poultry Processor	117	40	0	27	0	0	7
Bartender	45	0	0	0	0	0	0
Sanitation Man	72	72	0	60	40	0	25
Delivery Man	135	19	7	0	0	0	2
Riding Instructor	18	18	0	60	0	0	15
Tree Climber	198	198	17	0	3	9	7
<b>TOTAL SEMI-SKILLED WORKERS</b>	<del>9252</del> 9250	5709					
<b>UNSKILLED</b>							
Helper	553	391	29	18	2	5	13
Laborer	2952	383	4	5	0	3	3

TABLE X (continued)

INDEX OF AGRICULTURAL COMPETENCIES REQUIRED BY WORKERS IN AGRICULTURAL BUSINESSES IN MASSACHUSETTS

COMPETENCY INDEX

JOB TITLE	Number of Workers	Number Needing Agric. Competency	Plant Science Competency	Animal Science Competency	Agric. Business Management Competency	Agric. Mechanics Competency	Average Agric. Competency
UNSKILLED (cont.)							
Custodian	18	0	0	0	0	0	0
Vegetable Packer	27	0	0	0	0	0	0
TOTAL UNSKILLED WORKERS	3550	774					

JOB TITLES WITH LARGER NUMBERS OF WORKERS REQUIRING AGRICULTURAL COMPETENCY

There were 31,969 full and part time workers identified by job titles who were employed in the thirteen occupational families included in this research study. A total of 20,275, or 63%, of these worker's employers indicated that they considered some degree of agricultural competency essential for these employees. Table XI lists job titles by level of employment for workers in job titles where there are 100 or more workers who require agricultural competency in the performance of their jobs. The 17,927 workers in thirty-three job titles in Table XI accounts for 88% of the workers in the study who were identified as needing agricultural competencies.

TABLE XI

JOB TITLES IN WHICH THERE ARE 100 OR MORE OFF-FARM AGRICULTURAL WORKERS WHO NEED AGRICULTURAL COMPETENCY

<u>Level of Employment</u>	<u>Job Title</u>	<u>Number Workers Needing Agricultural Competency</u>
PROFESSIONAL	Manager	2078
TECHNICAL	Pasteurizer	117
	Lab Technician	127
	Manager	468
PROPRIETORS & MANAGERS	Manager	995

TABLE XI (continued)

JOB TITLES IN WHICH THERE ARE 100 OR MORE OFF-FARM AGRICULTURAL WORKERS WHO NEED AGRICULTURAL COMPETENCY

<u>Level of Employment</u>	<u>Job Title</u>	<u>Number Workers Needing Agricultural Competency</u>
SALES PERSONNEL	Salesman	1407
	Clerk	2163
	Sales Manager	369
	Field Engineer	486
	Delivery Man	126
CLERICAL WORKERS	Bookkeeper	322
	Clerk	657
SKILLED	Mechanic	135
	Butcher	707
	Landscape & Nursery Man	405
	Superintendent	110
	Operator	323
	Checker	515
	Supervisor	126
	Foreman	388
SEMI-SKILLED	Greens Keeper	117
	Dockman	117
	Truck Driver	426
	Laborer	2675
	Dairy Plant Employee	180
	Dairy Plant Processor	108
	Worker	688
	Tractor Driver	108
	Machinery Operator	173
	Maintenance Man	339
	Tree Climber	198
UNSKILLED	Helper	391
	Laborer	383
	TOTAL	17,927

THREE MAJOR GROUPS OF OFF-FARM AGRICULTURAL OCCUPATIONS

Three major groups of workers in off-farm agricultural occupations were identified. These three groups were in the following three areas (1) Horticultural, (2) Hardware and farm equipment and supply, and (3) Food distribution and processing. Jobs in these three areas accounted for more than three-fourths of all em-



employees in the study. Table XII lists the number of employees in each of the three major groups by occupational level of employment.

TABLE XII

NUMBER OF EMPLOYEES BY OCCUPATIONAL LEVEL IN THREE MAJOR GROUPS OF OFF-FARM AGRICULTURAL OCCUPATIONS

<u>Occupational Level</u>	<u>Number of Employees</u>			<u>Total in 3 Groups</u>
	<u>Horticultural</u>	<u>Hardware and Farm Equipment</u>	<u>Foods</u>	
Professional	10	1840	0	1850
Technical	91	476	243	810
Proprietors & Managers	347	428	359	1134
Sales	350	3214	2963	6527
Clerical	130	1320	540	1990
Skilled	1605	368	2046	4019
Semi-Skilled	4526	580	1591	6697
Unskilled	926	124	311	1361
<b>TOTAL</b>	<b>7985</b>	<b>8350</b>	<b>8053</b>	<b>24,388</b>

It will be noted from Table XII above that each of the three major groups as identified as (1) Horticultural, (2) Hardware and farm equipment and supply, and (3) Food Processing and distribution each have an almost equal number of workers. It will also be noted that the composition of the workers according to level of employment varies considerably in comparing the three groups.

PREFERRED METHODS OF TRAINING EMPLOYEES

Employers interviewed were asked for the number of their employees they thought needed supplemental training, the preferred method of training employees, and the extent to which they thought adequate training programs were presently available. Employers indicated that 14,810 full time and 2,890 part-time employees needed supplemental training in performance of their jobs. This total of 17,700 employees who needed supplemental training in job performance represents more than half of all employees. Table XIII shows the methods of training of workers which were preferred by employers.



TABLE XIII

PREFERRED METHODS OF TRAINING EMPLOYEES

<u>Method of Training</u>	<u>Number of Employees Represented</u>	<u>Percent of Employees</u>
In Business or Industry	1060	5.1
On-the-job Training	13970	66.8
Public School	1730	8.3
Agricultural College	1540	7.4
Private School	380	1.8
Other Methods	2220	10.6
<b>TOTAL</b>	<b>20900</b>	<b>100.0</b>

AVAILABILITY OF ADEQUATE TRAINING PROGRAMS

Employers were asked the extent to which they considered training programs were available to meet needs for training employees. Table XIV below summarizes their answers in terms of number of employees for whom they were reporting.

TABLE XIV

AVAILABILITY OF ADEQUATE TRAINING PROGRAMS

<u>Employer's Opinion of Training Programs</u>	<u>Number of Employees Represented</u>	<u>Percent of Employees</u>
Sufficient to Meet Needs	2150	7.4
More Programs Needed	12440	43.1
Programs Need to Be More Available	2940	10.2
Programs Need Change in Emphasis	4280	14.8
New Types of Programs Needed	7070	24.5
<b>TOTAL</b>	<b>28880</b>	<b>100.0</b>

Table XIV shows clearly that employers do not think adequate training programs are available for training workers of the kind they employ in their businesses. These employers indicated that they considered training programs completely adequate for less than ten percent of their employees. Over forty percent thought more training programs were needed and approximately another fifty percent thought to be adequate that training programs needed to be more available to workers or to undergo a change in type of program or emphasis.

## COMPETENCIES REQUIRED BY WORKERS IN MAJOR JOB TITLES

Agricultural competency indexes were calculated for each of the job titles as previously described in this report. Competency indexes were similarly calculated for a selected group of competencies in the areas of both business and distribution, and trade and industry. Table XV lists the average competency indexes in (1) Agricultural, (2) Business and Distributive, and (3) Trade and Industrial Competencies, determined by employers to be needed by employees in performance of their jobs for each of the 33 job titles found in the study where there were 100 or more workers employed. The degree of competency required of workers according to job title in each of these three areas is indicated by the number of X's recorded in the table. One X indicates a competency value of 0 to 15, two X's a competency value of 16 to 30, three x's a competency value of 31 to 45, and four X's a competency value greater than 45.

TABLE XV

### COMPETENCY INDEX FOR JOB TITLES IN WHICH THERE ARE 100 OR MORE OFF-FARM AGRICULTURAL WORKERS

<u>Level of Employment</u>	<u>Job Title</u>	<u>Competency Index</u>		
		Agricultural	Business and Distributive	Trade and Industrial
PROFESSIONAL	Manager	XXXX	XXXX	XXX
TECHNICAL	Pasteurizer	XX	XXXX	XXX
	Lab Technician	XX	XXX	X
	Manager	XXXX	XXXX	XXXX
PROPRIETORS & MANAGERS	Manager	XX	XXXX	XX
SALES PERSONNEL	Salesman	XXX	XXXX	X
	Clerk	XXX	XXX	XX
	Sales Manager	X	XX	X
	Field Engineer	XXXX	XXXX	XXXX
	Delivery Man	X	XX	X
CLERICAL	Bookkeeper	XX	XXX	X
	Clerk	XX	XX	X
SKILLED	Mechanic	X	X	X
	Butcher	XX	XX	X
	Landscape & Nursery Man	XXX	XXX	XX

TABLE XV (continued)

COMPETENCY INDEX FOR JOB TITLES IN WHICH THERE ARE 100 OR MORE  
OFF-FARM AGRICULTURAL WORKERS

<u>Level of Employment</u>	<u>Job Title</u>	<u>Competency Index</u>		
		Agricultural	Business and Distributive	Trade and Industrial
SKILLED (cont.)	Superintendent	XXX	XXX	XX
	Operator	XXX	XX	XX
	Checker	X	XX	X
	Supervisor	XX	XXX	XX
	Foreman	XXX	XXX	X
SEMI-SKILLED	Greens Keeper	XX	X	X
	Dockman	XX	XXX	XX
	Truck Driver	XX	XX	X
	Laborer	XX	X	X
	Dairy Plant Employee	XX	XX	X
	Dairy Plant Processor	XX	XX	X
	Worker	XX	XX	X
	Tractor Driver	XX	X	X
	Machinery Operator	X	X	XX
	Maintenance Man	XX	X	X
	Tree Climber	XX	X	X
UNSKILLED	Helper	XX	X	X
	Laborer	XXX	X	X

RESIDENTIAL BACKGROUND PREFERRED BY EMPLOYERS

All employers interviewed were asked the residential background they would prefer for their workers in each job title. Their responses were classified as (1) Farm background, (2) Rural, non-farm background, (3) Urban background, or (4) No preference. Table XVI shows the percentages of respondents preferring workers with residential backgrounds in each of these four categories.

TABLE XVI

RESIDENTIAL BACKGROUND PREFERENCE OF EMPLOYERS OF OFF-FARM AGRICULTURAL WORKERS

<u>Residential Background Preferred of Workers</u>	<u>Percentage of Respondents</u>
Farm Background	20.9
Rural, Non-Farm Background	4.6
Urban Background	3.2
No Preference	71.3
<b>TOTAL</b>	<b>100.0</b>

A large majority (71.3 percent) of respondents indicated no preference of residential background for their employees. Approximately one-fifth (20.9 percent) indicated a preference for workers from a farm background while only 3.2 percent favored workers coming from an urban background.

MINIMUM EDUCATIONAL REQUIREMENTS FOR ENTRY IN OFF-FARM AGRICULTURAL OCCUPATIONS

Employers were asked the minimum educational level they would prefer for workers employed in each job title. Their responses are recorded in Table XVII.

TABLE XVII

MINIMUM EDUCATION PREFERRED BY EMPLOYERS OF OFF-FARM AGRICULTURAL WORKERS

<u>Minimum Preferred Educational Level</u>	<u>Percentage of Respondents</u>
Less than high school graduation	26.9
High school graduation	56.3
Post high school technical education	4.4
Some college education	4.6
College baccalaureate degree	7.8
<b>TOTAL</b>	<b>100.0</b>

Approximately three-fourths (73.1 percent) of all respondents preferred that their workers have a minimum of a high school education. The small number of respondents (4.4 percent) indicating a preference for workers with a minimum educational level of post high school technical education is probably due, at least in part, to the lack of training programs designed to prepare workers for agricultural positions at this level. The 7.8 percent of respondents who indicated a preference for

workers with a minimum of a college degree is a substantial number in view of the fact that no effort was made to include professional workers in the study.

## SUMMARY

This research study in off-farm agricultural occupations was conducted by the Division of Vocational Education, Massachusetts Department of Education in cooperation with the School of Education, University of Massachusetts to develop information in regard to employment opportunities, the nature of the occupations, the competencies needed for job performance, and the training needs for workers in off-farm agricultural occupations in Massachusetts.

It is hoped that information developed through this study will be useful and will help stimulate the development of Vocational Education Programs in Agriculture to train persons for entry and advancement in off-farm agricultural occupations.

The stated purposes of the study were to develop information in regard to:

1. Employment opportunities in off-farm agricultural occupations in Massachusetts
2. Competencies required of workers in off-farm agricultural occupations
3. The need for vocational education for entry and advancement in off-farm agricultural occupations

The population for the study was composed of all employers in thirteen occupational groups as listed with the Division of Employment Security of the Commonwealth of Massachusetts. A 10 percent random sample of these employers was taken stratified according to both the thirteen occupational groups and five geographical regions of the state.

Data for the study was collected by interviewers who were selected on the basis of their familiarity with the field of agriculture and programs of vocational education in agriculture and given special training for their work as interviewers. Interviews were conducted with people of authority in 378 firms. The quality of persons used as interviewers and the responsible positions held by the persons interviewed attest to the validity of the data collected.

Data was processed by placing the information from forms I and II on I. B. M. cards and processed by computer by the Research Computer Center of the University of Massachusetts.

A total of 25,509 full time and 6,460 part time workers were found to be employed in firms in the thirteen occupational groups included in the study. A total of 20,275, or 63%, of these workers were found to need agricultural competency in the performance of their respective jobs. The degree of agricultural competency needed by workers varied considerably between job titles. Most people in higher level jobs were found to need a fairly high degree of competency not only in agriculture



but in other areas as well. The number of workers identified who need agricultural competencies in the performance of their jobs is greater than the total number of persons engaged in production farming in Massachusetts.

Sales was the principal function of more than one-half of the firms interviewed for the study. The next highest function in terms of numbers was service which accounted for 14 percent of the firms. Almost half, 48.7 percent, of the firms were employing high school students in the conduct of their business. An even greater number, 60.3 percent, indicated that they would be willing to hire high school students to work in their firms on a part time basis as trainees.

Employers expressed the opinion that present training programs were inadequate to meet the needs of their workers. Employer opinions were that more training programs were needed for 43 percent of their employees, that programs needed to be more available for 10 percent, that programs for 15 percent need change in emphasis and that new types of programs for 24 percent of all workers needed to be established. Employers speaking for the needs of only 7.4 percent of their workers thought that present training programs were adequate to meet all of the needs of their present and prospective employees. Employers reported that 55.4 percent of their present employees needed supplemental training for efficiency in the operation of their jobs.

Three of the largest areas of off-farm agricultural employment according to numbers of workers was found to be (1) Horticultural, (2) Hardware and farm equipment and supply, and (3) Food distribution and processing. Each of these three areas accounted for approximately eight thousand workers employed by firms in the thirteen occupational groups included in the study.

A majority of employers had no preference in regard to residential background of their employees. However, over twenty percent expressed a preference for workers with a farm background and only three percent preferred workers from an urban background.

Approximately three-fourths of employers responding preferred workers with a minimum education level of high school graduation. Seventeen percent of these respondents preferred workers with a minimum educational achievement beyond high school with eight percent preferring employees with a minimum of a college degree.



## CONCLUSIONS AND IMPLICATIONS

On the basis of information developed by this study the following conclusions and implications seem to the researcher to be warranted:

1. There are by far more employment opportunities available in off-farm agricultural occupations in Massachusetts than there are adequately trained workers.
2. Employers want better trained workers in off-farm agricultural occupations and want many of their present employees to undergo supplemental training in performance of their jobs.
3. Employers are willing to cooperate with schools in occupational training programs.
4. The high number of employers indicating that they preferred on-the-job training of employees, indicates the importance of supervised occupational experience programs in vocational education programs to train for these off-farm agricultural occupations.
5. The higher level jobs tend to require many and diverse competencies in their performance. This indicates training programs must educate and develop competencies in a broad area for the person to reasonably expect to reach a top level job in one of these off-farm agricultural businesses.
6. Employers of off-farm agricultural workers lack information concerning present programs of vocational education in agriculture.
7. A majority of employers of off-farm agricultural workers have no preference between farm and urban background of employees. There are more (approximately 20%) who prefer employees with a farm background than there are (less than 5%) who prefer employees with an urban background.
8. Most employers of off-farm agricultural workers prefer that their workers have a minimum educational level of at least graduation from high school.
9. There are jobs available in off-farm agricultural occupations at all levels of employment.

## RECOMMENDATIONS

The following recommendations are made in regard to vocational education programs in agriculture for the Commonwealth of Massachusetts.

1. Programs of vocational education to train workers for off-farm agricultural occupations be developed based on accurate information in regard to job opportunities and competencies needed for the specific jobs or cluster of jobs for which the programs are designed. More research is needed.
2. Pilot programs be established in strategic locations in the Commonwealth to educate workers in selected agricultural occupational areas.
3. Training programs be developed to train workers especially in the following specific areas: (1) Ornamental horticulture, (2) Agricultural mechanics, and (3) Food processing and distribution.
4. Administrators and teachers of vocational education in agriculture work more closely with employers of off-farm agricultural occupations. An informational and public relations program should be established to acquaint these employers with present programs of vocational education in agriculture. Realistic programs for training off-farm agricultural workers to meet present and future needs should be developed in cooperation with employers.
5. A program of supervised occupational experience be made a part of any program of vocational education for off-farm agricultural occupational training. Care must be taken in selection of establishments and training conditions for placement of youth for such on-job training. The on-job training program of occupational experience must be directed by the teacher of vocational agriculture.
6. Educational programs be established to upgrade off-farm agricultural workers through training programs for employed workers both to improve performance in present jobs and to prepare workers for job advancement.
7. Leadership training be included in all programs of vocational education in agriculture. The Future Farmers of America has proven an excellent device for leadership training of boys preparing for production agriculture. Programs which will incorporate such leadership training need to be made an integral part of vocational educational programs for off-farm agricultural occupations.
8. Training programs be broad enough in scope and content to give students sufficient understanding as well as needed competencies and abilities for successful job entry and advancement. Scientific principles

should be emphasized.

9. Some units of study and experience in salesmanship be made a part of the training programs for all off-farm agricultural occupations.
10. Increased emphasis be given to guidance of students in agricultural education programs. Programs must be designed to fit students as well as to fit job opportunities. Proper selection of students is essential to success as we develop new and different programs of training for the off-farm agricultural occupations.
11. Business principles and management be included in all vocational education programs for training in the off-farm agricultural occupations.
12. Programs be developed for graduates of off-farm agricultural training programs to assist them in continued learning and job advancement.

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APPENDIX

Interviewer \_\_\_\_\_

Date of Interview \_\_\_\_\_

EMPLOYMENT OPPORTUNITIES AND NEEDED COMPETENCIES  
IN  
AGRICULTURAL OCCUPATIONS OTHER THAN FARMING  
IN  
MASSACHUSETTS

FORM I

I. BUSINESS or SERVICE

A. Name of Firm .....

Address .....

B. Name of person interviewed .....

Telephone .....

Position of person interviewed: 1. .... Owner 2. .... Owner-Manager 3. .... Manager

4. .... Personnel Director 5. .... Sales Manager 6. .... Office Manager 7. .... Supervisor (dist., area, etc.)

8. .... Other

C. Main function of firm, organization, or agency: 1. .... Sales (Buying and/or Selling) 2. .... Service

3. .... Manufacturing 4. .... Processing 5. .... Specialized agriculture 6. .... Recreational enterprises

7. .... Prof. services 8. .... Other-Specify.....

.....

D. Number of years in business in this locality.....

E. Agricultural functions of business or service.....

F. Percent of gross income that is agriculturally oriented.....

II. EMPLOYEES

A. Total number of persons working in firm.....

1. Do you employ any High School students? Yes ..... No .....

2. Would you employ High School students as trainees? Yes ..... No .....

3. If you employed High School students would you prefer students studying Vocational Agriculture?

Yes ..... No .....

## APPENDIX

### B. Present job titles

Existing job titles	No. of employees		Level of Employment
	Full-time	Part-time	
1. ....	.....	.....	.....
2. ....	.....	.....	.....
3. ....	.....	.....	.....
4. ....	.....	.....	.....
5. ....	.....	.....	.....
6. ....	.....	.....	.....
7. ....	.....	.....	.....
8. ....	.....	.....	.....

### C. New job titles foreseen in this firm in the next five years:

Anticipated new job titles	No. of employees		Level of Employment
	Full-time	Part-time	
1. ....	.....	.....	.....
2. ....	.....	.....	.....
3. ....	.....	.....	.....
4. ....	.....	.....	.....
5. ....	.....	.....	.....

#### Level of Employment Code

- |                             |             |                        |
|-----------------------------|-------------|------------------------|
| 1. Professional             | 4. Sales    | 7. Semi-skilled        |
| 2. Technical                | 5. Clerical | 8. Service (unskilled) |
| 3. Proprietors and Managers | 6. Skilled  |                        |

**APPENDIX**

Interviewer \_\_\_\_\_

Date of Interview \_\_\_\_\_

**EMPLOYMENT OPPORTUNITIES AND NEEDED COMPETENCIES  
IN AGRICULTURAL OCCUPATIONS OTHER THAN FARMING  
IN MASSACHUSETTS**

**FORM II**

**I. Identification of Business or Service, Level of Employment and Job Title**

- A. Name of business or service.....  
 Address ..... County .....
- B. Level of employment from Form I .....
- C. Job title from Form I .....

**II. Employees in This Job Title**

A.	Employment Status	Number of Person Presently Employed	Number Expected to be Employed in Next Five Years			
			To Replace Present workers		In Addition to Present workers	
	Full - time	.....	.....	.....	.....	.....
	Part - time	.....	.....	.....	.....	.....

B.	Employment Status	Average Weeks Paid per Year	Beginning Wage or Salary		Highest Wage or Salary	
			Per hour	Per week	Per hour	Per week
	Full - time	.....	.....	.....	.....	.....
	Part - time	.....	.....	.....	.....	.....

**C. Activities and duties of persons with this job title**

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**APPENDIX**

**III. Agricultural Production enterprises associated with job title**

(Which agricultural enterprises are most nearly associates with this job title?)

- ..... 1. Beef cattle, ..... 2. Dairy cattle, ..... 3. Swine, ..... 4. Sheep.  
 ..... 5. Horses, ..... 6. Poultry, ..... 7. Corn, ..... 8. Vegetables, ..... 9. Tobacco.  
 10. Cranberries, ..... 11. Gresses, ..... Hay crops, ..... 13. Silage.  
 14. Small fruit, ..... 15. Tree fruit, ..... 16. Floricultural products.  
 ..... 17. Nursery products, ..... 18. Forest Products, ..... 19. Other (List other enterprises). .....

**IV. Competencies associated with this job title.**

Check degree of competency needed

	To enter this job as a beginning employee			To advance in this job title or to a related position		
	None	Some	High	None	Some	High
<b>1. <u>Plant Science</u></b>						
Plant propagation, seed production .....						
Plant growth, fertilization .....						
Controlling insects, diseases, weeds .....						
Soils, types and conservation .....						
Additional production practices .....						
<b>2. <u>Animal Science</u></b>						
Animal breeding, selection .....						
Animal growth, feeding .....						
Health and sanitation .....						
Housing and equipment .....						
Additional production practices .....						
<b>3. <u>Agricultural Business Management and Marketing</u></b>						
Budgeting, records and analysis .....						
Farm financing (credit, taxes, etc.) .....						
Labor management .....						
Marketing practices .....						
Agricultural policy .....						
<b>4. <u>Agricultural Mechanics and Automation</u></b>						
Farm power and machinery .....						
Farm buildings and convenience .....						
Rural electrification and processing .....						
Soil structures (ditches, ponds, etc.) .....						
Farm construction and maintenance .....						



## APPENDIX

	Check degree of competency needed					
	To enter this job as a beginning employee			To advance in this job title or to a related position		
	None	Some	High	None	Some	High
<b>5. Occupational Information and Regulations</b>						
Job opportunities and trends .....						
Job applications, interviews .....						
Personal qualifications, preferences .....						
Worker welfare (insurance, retirement, etc.) .....						
Legal requirements of the job .....						
<b>6. Duties of Employees</b>						
Receiving, marking, shipping .....						
Window and store display .....						
Salesmanship .....						
Customer relations .....						
Bookkeeping, business mathematics .....						
<b>7. Business Organization and Supervision</b>						
Employee - supervisor relations .....						
Employee relations with fellow workers .....						
Buying and merchandising .....						
Inventory, stock control, warehousing .....						
Internal business organizations .....						
<b>8. Management and Economics of Business</b>						
Capital management, financing .....						
Accounting, taxes .....						
Trade relationships, promotion, advertising .....						
Legal relationships .....						
Government regulations .....						
Buying and merchandising .....						
<b>9. Building Trades</b>						
Masonry .....						
Carpentry and cabinet work .....						
Blueprint reading .....						
Plumbing .....						
Heating and ventilation .....						
<b>10. Machine Tool Trades</b>						
Drafting and design .....						
Tool and die making .....						
Engines, repair and maintenance .....						
Manuals, technical and service .....						
Mathematics .....						
<b>11. Technicians</b>						
Electronics .....						
Electricity .....						
Industrial chemistry .....						
Quality control .....						
Time study .....						

**APPENDIX**

	Check degree of competency needed					
	To enter this job as a beginning employee			To advance in this job title or to a related position		
	None	Some	High	None	Some	High
<b>12. Skills and Other Trades</b>						
<u>Welding</u> .....						
Sheet metal .....						
Surveying .....						
Supervision .....						

**V. For persons in this job title agricultural knowledge and competency is:**

- ..... 1. Essential
- ..... 2. Highly desirable
- ..... 3. Useful
- ..... 4. Unnecessary

**VI. Characteristics desired in those who enter this job title.**

**A. Age:** Minimum ..... Maximum .....

**B. Educational level—Minimum preferred (check one)**

- ..... 1. Less than high school graduation
- ..... 2. High school graduation
- ..... 3. Post high school technical education
- ..... 4. Some college education but less than a baccalaureate degree
- ..... 5. College baccalaureate degree

**C. Residential background**

- ..... 1. Farm background
- ..... 2. Rural, non - farm background
- ..... 3. Urban background
- ..... 4. No preference

**D. Experience required to enter this job title** ..... ( ) Yrs. ( ) Mos.

**VII. Limitations on entering this job title (Check)**

- ..... A. Labor union restrictions
- ..... B. Labor Law restrictions
- ..... C. Licensing or Certification
- ..... D. Other (specify) .....



APPENDIX

VIII. Education needed in this job title

A. Number of employees needing supplemental training

- 1. Number of full - time employees .....
- 2. Number of part - time employees .....

B. Preferred Method of Training:

- 1. .... Your business of the industry as a whole
- 2. .... On - the - job training
- 3. .... A public school
- 4. .... An agricultural college
- 5. .... A private school
- 6. .... Other (specify)

C. Extent to which training programs are available

(Check all which apply)

- 1. .... Sufficient to meet all needs.
- 2. .... More training programs are needed.
- 3. .... Training programs need to be established which are available to employees.
- 4. .... Existing training programs need change in emphasis to meet present and future needs.
- 5. .... New types of training programs would be desirable.