

AN ABSTRACT OF THE THESIS OF

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Title JOB OPPORTUNITIES IN THE ORNAMENTAL HORTICULTURAL  
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This study seeks to identify six individual characteristics of job opportunities in the ornamental horticultural industry in the East Multnomah and North Clackamas County areas.

The six characteristics to be determined are:

1. Present and estimated future jobs in the ornamental horticultural industry in the area.
2. Entry level qualifications in regard to age and education.
3. The wage at entry, at six months, and after one year of employment.
4. The number of cooperative work experience stations that could be established in the area.
5. Which competencies employers deem most important for employees to possess and if a wage level increase would be granted employees with these

necessary competencies.

6. If agricultural background (rural background) is a factor in securing a job in the ornamental horticultural industry.

### Procedures

1. Interviews were conducted with businessmen in the ornamental horticultural industry who were willing to participate in the study.
2. An interview check list was developed and is located in Appendix A.
3. The businessmen interviewed were selected by using a table of random numbers.

### Findings

1. There will be a large number of job openings in the ornamental horticultural industry.
2. Preferred entry level age is 18 to 20 years. Minimum education is considered by most employers to be high school graduation.
3. Entry level wage averaged \$2.02 per hour for part time and \$2.24 for full time employment. There is considerable chance for rapid advancement.
4. Eighty-nine percent of the employers in the study area are willing to provide work experience stations for training high school students.

5. The competencies deemed most valuable in order of descending value are: (1) personal relations, (2) communications, (3) plant science knowledge, and (4) mechanical knowledge. Only 24 percent of the employers interviewed were willing to pay a higher entry level wage to those who possessed these competencies. A high percentage did indicate that a person with these competencies would progress up the wage scale more rapidly.
6. An agricultural background was deemed beneficial by 96 percent of the employers. Also, 100 percent indicated that a potential employee who had taken ornamental horticulture in school would receive preference when applying for a job.

### Summary

This study illustrates the economic value of the ornamental horticultural industry in the area studied. Students, administrators, and guidance personnel should be made aware of this industry and the job opportunities available. Wages ranged from \$1.77 per hour to \$4.23 per hour after one year on the job.

If an employee is to get and retain a job in this industry there are certain knowledge and skill competencies that will be beneficial to him.

## Recommendations

1. Each agricultural instructor should survey his own locale for information on competencies and for identification of potential work experience training stations.
2. Administrators and guidance personnel are to be informed of the availability of such information and should receive copies upon request.
3. Students should be made aware of career information in all fields of agriculture.
4. Information gathered from job studies should be used in curriculum development.

JOB OPPORTUNITIES IN  
THE ORNAMENTAL HORTICULTURAL INDUSTRY FOR  
STUDENTS OF VOCATIONAL AGRICULTURE

By

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JOB OPPORTUNITIES IN  
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CHAPTER I

INTRODUCTION

In a 1970 study done by Loewen in the state of Oregon dealing with curriculum development in ornamental horticulture, he stated that individual instructors should conduct interviews with business firms in their own local communities. Such interviews are to be used for the following purposes:

1. Instructors become aware of competencies needed by workers in the industry.
2. Instructors become acquainted with possible work experience stations in the industry.
3. Instructors discover possible placement opportunities for graduates of their programs (27, p. 111).

Investigators in other states who have surveyed statewide and local needs have also recommended that the individual instructor conduct interviews in his local community in order to establish the competencies needed by workers in a given industry, establish cooperative work experience training stations, and to provide pertinent up-to-date job information to his graduates.

The following is a small sample of the studies done which substantiate this stand: Mondart and Curtis (1965) in Louisiana, Judge (1965) in Massachusetts, Griffin (1964) in Missouri, Baily (1965) in West Virginia, Matthews (1968)

in California, Parsons (1966) in Michigan, Loreen (1967) in Washington State, Cushman (1965) in New York State, and Butler (1965) in Oklahoma.

A second reason such a study is necessary is that there is no specific, quantitative, readily available, up-to-date information on job opportunities in the wide field of ornamental horticulture within a given locale. Information which is available from such sources as The Dictionary of Occupational Titles (1965), Occupational Outlook Quarterly (1971), and Occupational Outlook Handbook (1970-71) is so general that it may cover the United States and give such examples as: in the next five years the United States will need 800 more Landscape Architects (Occupational Outlook Handbook, 1970-71). The information may be only state-wide but the general occupational trend is all that is really indicated. Examples include the Oregon Blue Book (1971-72), the 1967 Manpower Resources of the State of Oregon and its Metropolitan Areas, and the Oregon Statewide Study of Systematic Vocational Education Planning, Implementation, Evaluation, Exhibits A and B (1965). These studies cite the fact that in five years 576 grounds keepers would be needed in Oregon.

All of these wide-range resources indicate that there are jobs available. By not delineating them by local areas resources leave it up to individuals within the area to cover their own specific job information.

The only sources available to the individual investigator on a local basis are the local employment services. Upon visiting these sources the investigator finds that within the field of horticulture many of the jobs are not listed. Employers tell the employment services that most of their jobs are filled by recommendation or "walk in" job applicants.<sup>1</sup> This is substantiated in the Loewen (1970) study.

Also, information on employment opportunities in horticulture, available from local employment offices, does not delineate the value of high school training received within that specialty area.

Similarly, there is no indication that any wage benefit will be received by students with high school training in the specialty area. A study by Dillon (1966) in Kentucky indicates that employers are willing to start employees at a higher wage if they can demonstrate their competency.

Another important reason for the study is to determine the entry level wage at the various levels of competency, from unskilled to skilled, for which a high school student may qualify. In various studies throughout the United

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<sup>1</sup> Information received from conversations with employment personnel in the area under consideration in this study.

States the entry level wage ranged from 178 dollars per month for unskilled nursery laborers in Louisiana (Mondart and Curtis, 1965) to 782 dollars per month for skilled landscape maintenance personnel in Los Angeles (Matthews, 1968).

Closely associated with the wage issue is the question of what competencies are required if an employee is to graduate from one pay scale to the next in the ladder of succession. Hoover (1963), Phipps (1966), and Christensen (1965) all indicate that the agricultural competencies needed are mainly determined by the products handled by a business. Also, that many of the agricultural subjects taught to students preparing for production farming are of benefit to students preparing for off-farm agricultural occupations.

Loewen (1970) isolated 100 needed competencies of ornamental horticultural students in Oregon; however he weighted all divisions of the industry equally. This equal weighting of competencies for all divisions may not give an accurate indication of needed competencies within a given locale. Therefore, it is imperative that each instructor determine the weight he wishes to place on competency development for the job opportunities within his area.

## Background for Study

The value of horticultural specialty crops<sup>2</sup> increased 55 percent between 1954 and 1964 in the United States (Census of Agriculture, 1964).

The value of these crops increased in the Pacific region<sup>3</sup> for the same time period by 99 percent (Census of Agriculture, 1967).

In 1964 Oregon ranked number ten in the United States in total value of these horticultural specialty crops. Oregon also ranked number two in production of these crops in the Pacific region. Of the nine regions in the United States, the Pacific region had the highest percentage (30 percent) distribution value of horticultural crops sold and was the largest producer (Census of Agriculture, 1967).

According to Korzan (1968) the value of horticultural crops in Oregon increased 43 percent in the short time period between 1963 and 1967 and prices increased 15 percent, which means quantities sold increased about one-fourth.

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<sup>2</sup> Horticultural specialty crops include both commercial floriculture and commercial ornamental horticulture.

<sup>3</sup> Pacific region includes Alaska, California, Hawaii, Oregon, and Washington.

Coppedge (1971) states:

In 1969 ornamental horticultural crops totaled more than 27 million dollars, 32 percent of all miscellaneous crops. If these crops maintain this share, the 1980 constant dollar sales should range upwards from 35 million (11, p. 6).

In addition, Rolland Groder (1971), Horticultural Marketing Specialist, Oregon State University, and William Koesan (1971), Assistant Chief, Plant Division, Oregon Department of Agriculture, estimate that the total amount of land devoted to the production of ornamental horticultural crops has increased by 15 percent in the last 5 years.<sup>4</sup>

The State Department of Agriculture also registers an increase in the number of nurserymen producing ornamental crops (Oregon Licensed Nurseryman, 1971-72). This is completely contrary to national, state, and local trends in production agriculture which show decreased numbers of persons involved with the production of a given crop according to Coppedge (1971) and Korzan (1968).

When we restrict our views to only the two counties to be considered in this study we find large value increases within the five year period 1965 to 1969. Multnomah County's ornamental horticultural crop grew in value from six million dollars in 1965 to nine million in 1969.

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<sup>4</sup> Personal conversation with Rolland Groder and William Koesan.

Clackamas County's value for these same crops increased from about three and one-half million dollars in 1965 to over five and one-half million in 1969. These two counties account for approximately 54 percent of the total ornamental horticultural crop value in the state of Oregon (Oregon Commodity Data Sheets, 1970).

Rolland Groder (1971) indicated that Oregon is exporting large quantities of ornamental plants to other states, especially eastern states. Christensen (1965) reports that the ornamental horticultural industry in Nevada is primarily seasonal because the plants are purchased and imported from other states. Edsel Wood<sup>5</sup> (1971), past President, Oregon Association of Nurserymen, has stated that Oregon exports large quantities of plants to other states mainly because the quality of the Oregon product is so high. He concluded further that Oregon's share of the export market will continue to grow in the future. Wood also stated that qualified help is difficult to obtain and that once a person is trained and has had a wide range of experience in the production of ornamental horticultural crops he very often will start a business of his own because the market for the ornamental product is growing so rapidly that he can make

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<sup>5</sup> Statements made at Oregon Agricultural Teachers' Conference in Medford, Oregon (1971) and personal conversation after the conference.

more money being self-employed.

Additional job opportunities associated with the production of ornamental horticultural crops can be seen in the businesses which these products bring forth in an area. For example Pinney (1967) and Hoover (1969) list several job opportunities that are involved with the care or sale of ornamental horticultural crops. Examples of these occupational opportunities are as follows:

Garden center employee

Golf course employee

Greenhouse employee

Grounds maintenance employee

Landscape gardener

Tree pruner

Tree surgeon

This points the way to the increasing importance of the production of ornamental horticultural crops and associated job opportunities within the state as cited by the Oregon Blue Book (1971) and the 1967 Manpower Resources of the State of Oregon and its Metropolitan Areas (1967). Furthermore, the increased production and exportation of these crops in the state of Oregon leads to increased job opportunities in the field of ornamental horticulture throughout the nation, as cited in the Occupational Out-

look Quarterly (1971) and in Hoover's (1969) book,  
Handbook of Agricultural Occupations.

### Purpose of the Study

This study sought to gain information about six characteristics related to job opportunities in the ornamental horticultural industry in the East Multnomah and North Clackamas County areas.

The six characteristics to be determined were:

1. Present and future jobs in the ornamental horticultural industry in the area.
2. Age and educational requirements for employment in the industry.
3. The wage at entry, after six months, and after one year of employment.
4. The number of cooperative work experience stations that could be established in the area to aid in the educational advancement of high school students.
5. Which competencies employers deem most important for employees to possess and if a wage level increase would be received by employees with these necessary competencies.
6. If agricultural background is a factor in securing a job in the ornamental horticultural industry.

## Assumptions

The assumptions under which this study was conducted included the following:

1. There is a need for Vocational Agricultural programs in high school to be responsible for preparing students to be employed in off-farm as well as on-farm agricultural occupations.
2. Job opportunities in off-farm agricultural occupations exist for persons having an agricultural background and/or training in Vocational Agricultural programs in the high schools.
3. School administrators, guidance counselors, teachers, and students need to recognize that employment opportunities in off-farm agricultural occupations are available.
4. Reliable information concerning competencies required for employment in off-farm agricultural occupations can be obtained from employers.
5. A study of selected ornamental horticultural industries in the East Multnomah and North Clackamas County areas will provide valid and useful data for determining programs for Sandy High School.

6. All questions asked of the various employers will be explained and employers will understand the question before responding.

### Definition of Terms

Agricultural background -- The environment in which the individual was raised was of an agricultural nature. That is, part or all of the family income was from production agriculture.

Agricultural businesses -- Those individual establishments engaged in agricultural work including production, processing, distributing agricultural products and related services such as grounds maintenance and sales and repair of equipment.

Agricultural industry or ornamental horticultural industry -- Here industry refers to all groups of business servicing all the needs of a product from production through processing, distributing, and related services.

Agricultural occupation -- An occupation in which the workers need competencies in one or more of the primary areas of animal science, plant science, soil science, agricultural business management, agricultural engineering, and agricultural leadership.

Area -- The area of the study is North Clackamas and East Multnomah Counties. Maps in Appendix B delineate the area further.

Cooperative work experience station -- A location in industry in which a student receives on-the-job experience under the joint supervision of both the classroom instructor and the employer.

Entry level qualifications -- Those qualities about an individual which make him ready to assume his place in the world of work. These may include age, education, experience, background, and/or competencies.

Job title -- A descriptive name which denotes a particular occupation. The commonly used job title may differ somewhat from that listed in the Dictionary of Occupational Titles. To avoid confusing the employers during the interview the common job title will be used.

Occupational area or group -- These two terms are used to denote related job classifications within an industry. For example florists, landscapers, garden center employees, golf course greenskeepers, and park workers.

Off-farm agricultural occupation -- An agricultural occupation which generally requires agricultural knowledge but is not actually involved in the production of food or fiber.

On-farm agricultural occupation -- Those agricultural jobs which require firm agricultural knowledge involved with the actual production of food or fiber.

Trade association -- An organization of businesses within a specific industry on a local, state, and/or national basis.

Typical competencies -- Those skills required within a specific group or family of occupational titles in an industry.

### Limitations of Study

The following limitations are recognized in this study:

1. The ornamental horticultural industry is represented by landscape contractors and gardeners, greenhouse operators, florists, nurserymen, garden center operators, and park and turf management groups.
2. The typical employee of the ornamental horticultural industry is one generally considered below the professional level (less than a four-year academic degree).
3. The competencies identified will be considered primarily in terms of their significance in obtaining employment in the ornamental horticultural industry.

- tural industry. Here there are no measures of level of competence but merely an acknowledgement as to whether the competency can be exhibited.
4. All potential employers will not be interviewed. A random sample will be used.
  5. Due to the rapid growth of the ornamental horticultural market and the variables of market reaction, predictions of jobs by employers must be considered as tentative.
  6. Due to the inflation rate prevalent in this country the projections of wages will have to be considered as tentative.
  7. Due to advancing technology any predictions as to entry level competencies will have to be considered as tentative.
  8. Study is limited to a region composed of East Multnomah and North Clackamas Counties.

### Summary

It has been pointed out that Oregon's ornamental horticultural industry is growing very rapidly. With this rapid growth of the entire industry come many new and expanded occupational opportunities, both on-farm and off-farm. There is a problem getting reliable, up-to-date,

concise data from which schools can reorganize programs and offer students competencies they will need to obtain employment in this changing world of work.

This study will identify jobs, wages, and entry level requirements for this expanded world of work.

The following chapter delves into the works of other investigators to identify their findings as to qualifications of employees for work.

## CHAPTER II

## REVIEW OF RELATED LITERATURE

This chapter reviews the work of other investigators on the six problems stated in the Purpose of the Study.

Present and future job opportunities

National vocational educators recognize the changes in agriculture and occupational opportunities in the industry and show concern for their implications and implementation within vocational agricultural programs to meet these changes.

Kramer (1968) indicated this concern as follows:

Agriculture represents a broad, dynamic, ever changing, scientific and challenging group of occupations. Some 40 percent of the working class of people in the United States are employed in the production, processing or marketing of food and fiber (26, p. 58).

Stucky (1965) further substantiated this statement by adding that in 1965 there were 68 million workers; over seven million on farms, over six million in service occupations serving farmers, and well over ten million handling, storing, or processing farm products.

A key point was brought out in an old publication called Agriculture Is More Than Farming. (1963). The point is simply that urban schools must recognize this

growth in jobs requiring agricultural knowledge and instigate programs which train their students for, "--- gardening and landscaping needs of home owners, business establishments, and public facilities" (37. p. 2).

Hoover (1966) stated that ornamental horticulture, agricultural supplies and services, livestock, dairy, and poultry processing and marketing will account for 73 percent of the off-farm job demands.

It should be pointed out again here that Coppedge (1971) states that horticultural crop value will continue to increase rapidly through the year 1980.

Within the various states several investigators have indicated that within the field of ornamental horticulture tremendous growth has taken place and this field will remain one of the three fastest growing agricultural occupation areas. For example an Ohio study (1965) stated that the third greatest agricultural need was for trained people in ornamental horticulture.

Further evidence is found in California where Rodrigues (1967) stated that the landscape and nursery businesses have the largest demand for trained employees in the field of agriculture in Ventura County.

Finally, Loewen (1970) points out that in Oregon there were 4069 employees in ornamental horticulture in

1969 and there will be a need for 5937 by 1972, an increase of 1868 employees in only three years.

Oregon State University has recognized the growing need for professionals in agriculture and has moved from a 12th place ranking in total agricultural students enrolled throughout the United States in 1966-67 to a ninth place ranking in agricultural student enrollment in 1968-69 (Manley, 1969).

Determine entry level qualifications - age and education

In this study entry level qualifications will be considered as minimum age for entry into the occupation and minimum educational accomplishments for entry into employment. The study of age will be treated first and education will be treated following the age presentation.

One authority in agricultural education, Hoover (1969), suggests that the minimum age entry level is between 17 and 18 years of age. The prime reason being that this is the age of graduating high school seniors and Hoover feels it is imperative for an agricultural employee in today's world of work to have a high school education.

In a report from Michigan (1965) it was discovered that minimum age qualifications were considered to be in the 20 to 24 year old range. This would imply that a potential employee should seek further education at a

junior college before applying for work in Michigan.

Yetman (1965) states that in Massachusetts the minimum age for employment is considered to be 17 years while the minimum education needed for most off-farm jobs is high school graduation.

In Louisiana Mondart and Curtis (1965) observe that employees may be hired as early as age 14. It is also pointed out that these are very low paying jobs and that most employers prefer hiring persons four to five years older who have graduated from high school.

In Oregon three studies all arrived at the same conclusions in regard to age and educational requirements. Johnson (1965), Multanen (1966), and Davis (1969) all point to the fact that off-farm employers in the state prefer the employee's age to be at least 18 years and the minimal amount of education to be high school graduation.

#### Estimate wage level at entry into occupation

On a national scale there is very little information available as to entry level wages for specific job titles. The information that is available represents a national average in most cases and therefore may not apply to a given locale. An example of the type of information that is available through the Occupational Outlook Handbook (1970-71) and other sources is as follows: there is a

high demand for agricultural extension workers, especially with specialty areas. The average starting salary is 7200 dollars, the average salary is 10,500 dollars, and the average specialist's salary is 12,500 dollars.

In state studies more specific information can be obtained. In Louisiana, Mondart and Curtis (1965) found the average wage paid to unskilled, untrained employees at entry was 178 dollars per month in agricultural industries. Persons with skills or knowledge in the industry received 256 dollars per month for a starting wage.

An Ohio study (1965) illustrates the following scale of wages by educational level for agricultural employment at entry level:

<u>Amount of Education</u>	<u>Median Annual Income</u>
Less than eight years	\$ 2090
Eight years	3452
One-three years high school	3865
Four years high school	5052
One-three years college	5246
Four years college	7261
Five or more years college	7691

(39, p. 5)

In Kansas, Elson (1968) indicates that entry level wage for part-time employees in the ornamental horticultural industry was between one dollar and fifty cents and one dollar and ninety cents per hour. While higher rates were paid full-time employees for performing essentially the same tasks. Full-time entry level wages were between two dollars and ten cents and two dollars and fifty cents

per hour.

In southern California, Matthews (1968) states that entry level wage may range between 452 dollars per month and 782 dollars per month depending on years of experience and position for which an employee qualifies within the ornamental horticultural industry. It should be noted that the higher wages were paid to park superintendents and other experienced personnel who would have a high amount of responsibility.

Entry level wages in Oregon's ornamental horticultural industry have not been published. However, at the Oregon Agricultural Teachers' Conference held in Medford (1971), a panel of community college personnel gave reports on wages paid at entry level in various agricultural industries. It was noted that entry level wages as reported by Mt. Hood Community College and Clackamas Community College (of Multnomah and Clackamas counties respectively) were in the range of one dollar and seventy-five cents per hour to two dollars and ten cents per hour. These two community colleges are the only ones in the state of Oregon that offer a curriculum in ornamental horticulture. Also, it should be noted that no attempt was made to determine the value of employee competencies to their employers or the rate at which individuals generally progressed up

the wage scale.<sup>6</sup>

Estimate the number of cooperative work experience stations

Nationally there are two prominent men advocating the use of cooperative work experience stations in training students for employment. Both Bishop (1967) and Hoover (1965) strongly urge the development of such training stations within the off-farm agricultural industries.

In other states support is found for the development of training stations of this type. An Ohio report (1965) suggests that 30 hours be spent in the classroom and 36 hours be spent in a work experience training station in order to accomplish a teaching unit in Agricultural Salesmanship.

In South Carolina, Altman (1968) suggests that 100 percent of the agricultural industry employers interviewed were willing to cooperate in training students by providing a work station within their business.

Miller (1970), in Georgia, stated that accreditation is necessary in all forms of agricultural employment, and that one way to improve accreditation procedures and at

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<sup>6</sup> Information presented at Oregon Agricultural Teachers' Conference and not published in any document.

the same time improve the competencies of employees is to establish and use cooperative work experience training stations.

Within the state of Oregon three studies have indicated that Oregon employers are willing to provide work experience training in the field of off-farm agriculture. Multanen (1966), Davis (1969), and Loewen (1970), all state that over 60 percent of the employers surveyed were willing to provide such training stations.

Determine competencies necessary for potential employees

Nationally recognized authorities, Hoover (1966), Heady (1966), and Phipps (1964), all agree that approximately 50 percent of the off-farm agricultural workers need agricultural competencies. They further agree that the agricultural competencies needed are mainly determined by the products handled by the business in which the employee seeks employment.

Investigators in other states have worked on identifying competencies. Judge (1965) found in Massachusetts that 91 percent of the employees in the ornamental horticultural industry needed plant science competencies, 35 percent needed agricultural business competencies, and 38 percent needed agricultural mechanics competencies.

Dillon (1965) found in Kentucky that there would be

an estimated increase of 20 percent in people needing agricultural competencies to gain employment in off-farm agriculture.

Long (1968) delineated 27 individual competencies needed in ornamental horticultural occupations in Washington state.

Warmbrod (1969) stated that competencies which students needed in ornamental horticulture in Ohio centered around turf management, floriculture, and landscaping.

In Oregon, Straight (1968) stated that his advisory committee strongly recommended competencies be taught in the plant sciences when developing a program for the Salem metropolitan junior high schools in agricultural education.

Also in Oregon, Multanen (1966) points out that competencies are needed by off-farm agricultural employees in agricultural mechanics, agricultural business, and plant and animal sciences.

Finally, Loewen (1970) in studying the development of an ornamental horticultural curriculum model for the state of Oregon identified 100 individual competencies which were deemed necessary for employment by a panel of experts representing the industry and education.

Determine if a wage level increase would be granted if employees possess given competencies

Few investigators have made any effort to discover whether or not employers would pay a higher starting salary to persons possessing competencies deemed necessary in the performance of a given job.

Cobb (1967), in the New Mexico area, stated that employers in the ornamental horticultural industry were willing to pay a higher starting wage for persons having job competencies needed for a specific job. It should be noted that Cobb was referring to graduates of a two year post-high school institution.

Dillon (1966), in Kentucky, stated that employers in the ornamental horticultural industry have been faced with hiring untrained people and training the employees themselves. Dillon further stated that, "Employers indicate they would pay a higher wage to trained persons."

(15, p. 3-4)

In Louisiana, Mondart and Curtis (1965) have found that employers are willing to pay more for an employee in the ornamental horticultural industry if they do not have to train the employee themselves.

Determine if agricultural background increases the possibility of employment in off-farm agricultural industries

Nationally Bishop and Tolley (1963) indicate that persons with agricultural background will have an edge in obtaining jobs in the off-farm agricultural occupation area.

The same sentiment is found in most investigations throughout the 50 states. Barwick (1965), in Delaware; Rodrigues (1967), in California; an Ohio study (1965) and several others found essentially that employees with agricultural backgrounds have an advantage in gaining employment in off-farm agricultural occupations.

In a study in Oregon, Davis (1969) states that 81.8 percent of the employers participating in that study preferred employees with farm background for the jobs in off-farm agriculture.

Further Oregon evidence is found in the Multanen (1966) study which states, "An agricultural background and vocational agricultural instruction increase one's chance for employment." (36, p. 27)

Student interest

Another factor important to an instructor, who is trying to determine whether or not to include instruction

and on the job training in specialty areas like ornamental horticulture, is student interest.

Loewen (1964) reported that a student survey showed definite interest on the part of the students in participating in specialty classes, such as ornamental horticulture, forestry, wildlife management and others.

Streight (1968) shares this same point of view after surveying student interests in four junior high schools.

Altman (1968), in a study conducted in South Carolina, also states that there was a very high amount of interest in an ornamental horticulture class.

### Summary

It is evident from the related literature that there are numerous jobs available in the ornamental horticultural industry both in Oregon and throughout the United States. Furthermore there will be more jobs available in the future.

It also appears that age and educational requirements are somewhat analogous, in that the desired age is that point at which most seniors graduate from high school.

Wage estimates become difficult because of the state to state differences. Generally, however, wage is closely associated with cost of living.

Most employers are willing to cooperate in the train-

ing of youth.

Competency levels must be identified in order to train students to meet the needs of the employers, that both may benefit.

Wage level increments based on the stated competencies are difficult to identify. However, some employers have indicated they would rather pay more and hire a trained person than have to train the employee after he has started on the job.

Agricultural background seems to be helpful in procuring an off-farm agricultural job.

Finally, student interest should play a major role in the development of new course offerings in specialty areas such as ornamental horticulture.

## CHAPTER III

## PROCEDURE FOR CONDUCTING THE STUDY

Locale and Setting

The locale for the study is East Multnomah and North Clackamas Counties. Maps indicating the exact location are placed in Appendix B.

The tri-county area of Clackamas, Multnomah, and Washington Counties has the highest population density in the state of Oregon. In addition to population density within this tri-county area, of which the locale previously described is a major part, the value of the ornamental horticultural crop is approximately 73 percent of the state's entire ornamental horticultural crop value.

These facts make a study of occupational opportunities within this area of prime importance to the instructional program, guidance personnel, administrators, and students within the locale.

Method for Gathering Data

To gather the data for this study an interview check list was formulated. The questions on the check list were designed to provide information which would answer the six questions listed in the Purpose of the Study.

Part of the check list dealing with competencies deemed necessary for employment were the 100 competencies isolated by Loewen's (1970) panel of experts.

The check list was tested several times on members of Sandy High School's Advisory Committee and various agricultural instructors. After testing it was remodeled with test results taken into consideration and under the guidance of Oregon State University's Agricultural Education staff.

### Selecting respondents

In determining the population to be interviewed the following procedure was used:

1. Identified all ornamental horticultural businesses in the area to be surveyed.
2. Separated these businesses into the following categories:
  - a. Nurseries and Greenhouse operations
  - b. Florists
  - c. Garden centers
  - d. Golf courses
  - e. Parks (city, county, and state)
  - f. Landscape gardeners
3. Used a table of random numbers to select a representative portion of businesses within each

category. Forty-five businessmen were interviewed. This represents 25 percent of all the ornamental horticultural businesses in the study area.

4. Called each business and asked it to participate in the study.
5. Replaced those who did not wish to cooperate by using the table of random numbers again.
6. Interviewed all participants with the same interview check list.
7. Tabulated information.

#### Instruments Used

The instrument used to collect data for this study was an interview check list located in Appendix A.

## CHAPTER IV

## FINDINGS

This study sought to gain information about six characteristics related to job opportunities in the ornamental horticultural industry in the East Multnomah and North Clackamas County areas.

1. Present and Future Job Opportunities

The table below illustrates the number of jobs in the ornamental horticultural industry.

Table I  
Present and Future Jobs

Time	Number of Jobs	
	Part Time	Full Time
Present	2322	1432
1975	2862	1704
1980	4118	2164

This chart shows an increase of 272 full time and 540 part time jobs by 1975. It also shows an increase of 732 full time and 1796 part time jobs by 1980.

It was also revealed that 73 percent of the employers received employees primarily on a personal referral basis. Forty-seven percent had received employees on a "walk in" basis, and only 16 percent had received employees from the

department of employment.

## 2. Age and Educational Requirements for Employment

The preferred ages are given in the table below.

TABLE II  
Age Requirements

Preferred Age	
Age	Response Percent
15 - 17 years	14%
18 - 19	62
Over 25	2
Age unimportant	22

The primary reason given for the high percentage of employers preferring the 18 to 19 year old age group was that they had to be 18 or older to run equipment according to the Hazardous Occupations Act of 1970.

Over 71 percent of the study group considered high school graduation the minimum education for satisfactory performance and progression. Eleven percent indicated a community college graduate was preferred, and 18 percent stated they had no educational preference.

## 3. Wage at Entry, After Six Months, and After One Year

The average and range of wages paid during the three time periods stated are in the following table and are expressed in dollars per hour worked.

TABLE III

## Wages

Period of Employment	Average Wage		Range of Wage	
	Full Time	Part Time	Full Time	Part Time
Entry	2.24	2.02	1.85-2.55	1.77-2.45
Six Months	2.59	2.25	2.14-3.60	2.00-2.55
One Year	3.25	2.44	2.60-4.23	2.22-2.70

This table illustrates that a full time employee could expect an increase of one dollar per hour, while the part time employee would receive, on the average, less than fifty cents per hour increase in the same time period.

#### 4. Number of Cooperative Work Experience Stations

Eight-nine percent of the employers in the study were willing to open at least one cooperative work experience station for training students in their phase of the industry.

Eighty-four percent would take students part time on a yearly basis and 67 percent would take them on full time during the summer.

In addition, 62 percent indicated they preferred male students, while only five percent would employ only female students. The remaining 33 percent indicated that either sex would do well.

## 5. Important Competencies and Related Wage Increases

In rating the competencies only the responses of essential or important were counted. Below is a list of the competencies and personal characteristics which more than 75 percent of the interviewed persons rated as essential or important.

TABLE IV

### Highest Individual Competencies

<u>Competency</u>	<u>Percent of Employers Indicating Essential or Important</u>
1. Maintain good personal relations	100 %
2. Get others to work effectively	100
3. Reading (orders, labels, etc.)	100
4. Writing (orders, sales slips, etc.)	100
5. Speaking clearly	100
6. Listening and observing	100
7. Willingness to learn	100
8. Accept responsibility	100
9. Good appearance	98
10. Know effects of environment on plants	96
11. Recognize plant pest problems	93
12. Select chemicals for disease and insect control	93

TABLE IV  
(continued)

<u>Competency</u>	<u>Percent of Employers Indicating Essential or Important</u>
13. Determine correct rates of application	93 %
14. Mix and handle chemicals safely	89
15. Select herbicides for weed control	87
16. Identify common herbaceous plants	87
17. Physical strength and stamina	87
18. Select fertilizers	80
19. Correct poor drainage	80
20. Operate and maintain spray equipment	80
21. Know plant life cycle	78
22. Know soil composition and characteristics	78
23. Operate and service small power equipment	78
24. Identify common woody plants	76
25. Select soil conditioners	76
26. Correct acid soils	76
27. Condition garden hand tools	76

In Appendix C there is a complete list of competencies and personal characteristics rated on a percentage of essential or important responses from all interviewed persons.

Group headings rated on the composite of all interviews are listed below in descending order of importance.

TABLE V

## Group Headings of Competencies

<u>Group Heading</u>	<u>Percent Response</u>
1. Human Relations	100 %
2. Communication	100
3. Personal Characteristics	96
4. Plant Pests	89
5. Plant Identification	77
6. Plant Growth Principles	73
7. Soils and Fertilizers	72
8. Records	64
9. Nursery Management	63
10. Plant Propagation	56
11. Business and Related Information	55
12. Horticultural Mechanics	46
13. Landscaping	45
14. Turf Establishment and Maintenance	31
15. Greenhouse Management	24
16. Floral Design	14

In Appendix D there is a list of competencies as they were listed in the interview check list. The number of responses given as important or essential is indicated under each of the industrial categories.

Twenty-four percent of the employers interviewed indicated that they would grant higher wages to prospective employees who had taken ornamental horticulture in high school. The amount ranged from 25 cents per hour to 75 cents per hour. The remaining 76 percent indicated they would watch the employee closely and would raise wages soon after hiring if the employee merited the raise.

6. Agricultural Background as a Factor in Securing Employment in the Ornamental Horticultural Industry

Ninety-six percent of the employers in this study indicated that an agricultural background would be beneficial to employees in their business.

The most common reasons given included (in descending order of importance): plant background, equipment background, and personal character.

One hundred percent of the employers interviewed indicated that if a potential employee had ornamental horticulture in high school he would receive preference when applying for a job.

## CHAPTER V

## SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This study was undertaken to supply information which is necessary to formulate an effective curriculum in ornamental horticulture. It also supplies realistic information to students making vocational choices.

Conclusions

1. There will be 732 full time jobs and 1792 part time jobs available to interested qualified persons in ornamental horticulture.
2. The wage ranges from 1.77 to 4.23 dollars per hour.
3. Advancement will be rapid for qualified, ambitious personnel.
4. To become known as a qualified employee one must be familiar with (1) basic plant growth characteristics, (2) soil composition and drainage, (3) fertilizer materials, (4) pest control, and (5) basic record keeping.
5. Good personal relations is an essential in ornamental horticulture just as it is in any other industry.
6. In addition to plant and business competencies

an employee who strives for a management position must be well versed in communications skills.

7. As in any industry, the employee who is willing, enthusiastic, responsible, and dependable will advance rapidly.
8. Clean-cut appearance will be a definite asset.
9. Maintenance and equipment background would be beneficial in the majority of the ornamental horticultural occupations.
10. Physical strength and stamina are required to fulfill the working role in the majority of the ornamental horticultural occupations.

### Recommendations

1. Each instructor should conduct a job opportunity survey for the purpose of identifying work experience stations, placing graduating students, and altering instructional materials to meet the needs of the students in obtaining work.
2. Studies should also include present and future job numbers along with wage levels and rate of advancement. The student could then formulate an opinion as to the advisability of selecting the industry for a livelihood.

3. Similar studies should be done for other agricultural occupational areas such as; Forestry, Agricultural Processing, Agricultural Equipment Sales and Service, Agricultural Supplies and Services, Production Agriculture, and Food and Fiber Processing.
4. Students, administrators, and guidance personnel should be made aware of all occupational information.
5. Information gathered should be used in curriculum construction to provide the most meaningful curriculum possible for students in vocational classes.
6. Specialized programs in ornamental horticulture should include work experience for students interested in a future in that industry.

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## **APPENDICES**

## APPENDIX A

Check List for Interviewing Employers  
Concerning Job Information for Workers  
in the Ornamental Horticultural Industry

This survey is being conducted to determine job qualifications and job information in the ornamental horticultural industry for the East Multnomah and North Clackamas County areas.

The results of this study will be threefold. First, the information can be used by local school guidance personnel and agricultural instructors in presenting a realistic view of the industry to students interested in pursuing a career in ornamental horticulture. Second, this information will aid the agricultural instructor in developing suitable curriculum for studies in ornamental horticulture. Third, as a result of the information gained in the survey you should benefit by receiving job applicants with better qualifications for performing the necessary job tasks.

In answering these questions about typical jobs in your business (agency) please consider those jobs concerned with selecting, propagating, growing, maintaining, using, and marketing plant materials and/or handling horticultural supplies.

In answering these questions please keep in mind ideal employee performance. For example, what types of tasks would the ideal employee be able to perform without much previous explanation on your part.

Please be assured that whatever you say will be absolutely confidential. There is no way individuals can be identified with particular answers.

Check List for Interviewing Employers  
Concerning Job Information for Workers  
in the Ornamental Horticultural Industry

I. Classification Information

A. Title of respondents:

- (1) \_\_\_\_\_ Owner                      (4) \_\_\_\_\_ Foreman  
 (2) \_\_\_\_\_ Owner-Manager        (5) \_\_\_\_\_ Other \_\_\_\_\_  
 (3) \_\_\_\_\_ Manager

B. Industry or service category: \_\_\_\_\_

C. Length of time in present business or agency (years):  
 \_\_\_\_\_

D. Major function(s) of the business (or agency):

- (1) \_\_\_\_\_  
 (2) \_\_\_\_\_  
 (3) \_\_\_\_\_  
 (4) \_\_\_\_\_

E. Number of employees:

	<u>Full time</u>	<u>Part time</u>
(1) 1 to 5	_____	_____
(2) 6 to 10	_____	_____
(3) 11 to 15	_____	_____
(4) 16 to 20	_____	_____
(5) Over 20	_____	_____

F. How many employees do you expect to have in 1975 and in 1980?

1975

	<u>Full time</u>	<u>Part time</u>
(1) 1 to 5	_____	_____
(2) 6 to 10	_____	_____
(3) 11 to 15	_____	_____
(4) 16 to 20	_____	_____
(5) Over 20	_____	_____

1980

	<u>Full time</u>	<u>Part time</u>
(1) 1 to 5	_____	_____
(2) 6 to 10	_____	_____
(3) 11 to 15	_____	_____
(4) 16 to 20	_____	_____
(5) Over 20	_____	_____

G. Major source of employees:

- (1) \_\_\_\_\_ Department of Employment  
 (2) \_\_\_\_\_ Walk in  
 (3) \_\_\_\_\_ Personal referral  
 (4) \_\_\_\_\_ Other \_\_\_\_\_

H. Would you be willing to serve in an advisory capacity with officials of you local school to help develop a program of training which would be

effective in meeting the needs of you business?

(1) \_\_\_\_\_ Yes

(2) \_\_\_\_\_ No

I. Would you be willing to hire a student in your business who is enrolled in a horticultural program for purposes of providing work experience and job training in the horticultural industry?

(1) \_\_\_\_\_ Yes

(6) \_\_\_\_\_ Male student

(2) \_\_\_\_\_ No

(7) \_\_\_\_\_ Female student

(3) \_\_\_\_\_ Summer (part time)

(8) \_\_\_\_\_ Either sex

(4) \_\_\_\_\_ Summer (full time)

(5) \_\_\_\_\_ During the year (part time)

J.. When you screen applicants for employment in your business what major problems do you find in these people?

(1) \_\_\_\_\_

(2) \_\_\_\_\_

(3) \_\_\_\_\_

(4) \_\_\_\_\_

K. Would an agricultural (rural) background be beneficial to employees in your business?

(1) Yes \_\_\_\_\_

(2) No \_\_\_\_\_

Specify why if yes \_\_\_\_\_

L. What job categories are entering employees filling?

(1) \_\_\_\_\_

(2) \_\_\_\_\_

(3) \_\_\_\_\_

(4) \_\_\_\_\_

M. Approximately what salary range do entry level employees receive per hour of work?

	<u>Part time</u>	<u>Full time</u>
(1) Less than \$1.50	_____	_____
(2) \$1.50 to 1.75	_____	_____
(3) 1.76 to 2.00	_____	_____
(4) 2.01 to 2.50	_____	_____
(5) Over 2.50	_____	_____

N. How much of a wage increase (per hour) in six months of employment?

	<u>Part time</u>	<u>Full time</u>
(1) Less than \$ .10	_____	_____
(2) \$ .10 to .25	_____	_____
(3) .26 to .50	_____	_____
(4) .51 to .75	_____	_____
(5) Over .75	_____	_____

O. How much of a wage increase (per hour) in one year of employment?

	<u>Part time</u>	<u>Full time</u>
(1) Less than \$ .25	_____	_____
(2) \$ .25 to .50	_____	_____
(3) .51 to .75	_____	_____
(4) .76 to 1.00	_____	_____
(5) Over 1.00	_____	_____

P. If a potential employee had ornamental horticulture in high school would he receive preference in applying for a job?

(1) \_\_\_\_\_ Yes \_\_\_\_\_ No

Would you pay him a high entry level wage?

(2) \_\_\_\_\_ Yes \_\_\_\_\_ No

If No, why? \_\_\_\_\_

If Yes, approximately how much per hour?

(1) \$ .10 to \$ .25 \_\_\_\_\_

(2) .26 to .50 \_\_\_\_\_

(3) .51 to .75 \_\_\_\_\_

Q. What age level is the employee you prefer to hire?

(1) 15 - 17 \_\_\_\_\_ (4) 23 - 25 \_\_\_\_\_

(2) 18 - 19 \_\_\_\_\_ (5) Over 25 \_\_\_\_\_

(3) 20 - 22 \_\_\_\_\_ (6) Age unimportant \_\_\_\_\_

R. What is the minimum education standard for gaining employment in your business (agency)?

(1) Grades 8 - 11 \_\_\_\_\_

(2) High school graduate \_\_\_\_\_

(3) Community college graduate \_\_\_\_\_

(4) College graduate \_\_\_\_\_

(5) Education unimportant \_\_\_\_\_

## II. Knowledge and Skills

Now may I read you a list of Knowledge and Skill items and ask you about their importance according to the four choices on this card? (hand card) This isn't any kind of test, and there aren't any right answers. We just want to know how you feel about these things.

Knowledge and Skill Items

The first item is "identifying common woody plants."  
According to the four choices on the card, how important  
is     (item)     to good performance on the job?

	Essential	Important	Useful	Not Needed
<b>A. Plant Identification</b>				
1. Identifying common woody plants (shrubs, trees, vines)	( )	( )	( )	( )
2. Identifying common herbaceous plants (annuals, perennials, turf grasses, ground covers)	( )	( )	( )	( )
3. Identifying common greenhouse plants (flowers, foliage, flowering plants)	( )	( )	( )	( )
4. Selecting common plant materials according to growth habits and uses	( )	( )	( )	( )
<b>B. Plant Propagation</b>				
1. Selecting and preparing propagating media	( )	( )	( )	( )
2. Propagating by seed (sexually)	( )	( )	( )	( )
3. Propagating by plant part (asexually)	( )	( )	( )	( )
4. Potting plants	( )	( )	( )	( )
5. Selecting and using plant growth substances	( )	( )	( )	( )
6. Retarding and forcing plants	( )	( )	( )	( )
7. Storing and handling seeds, bulbs and corms	( )	( )	( )	( )

	Essential	Important	Useful	Not Needed
<b>C. Plant Growth Principles</b>				
1. Knowing the life cycle of plants	( )	( )	( )	( )
2. Knowing cell and tissue structures of plants				
3. Knowing plant parts and their functions (stems, roots, leaves, flowers)	( )	( )	( )	( )
4. Knowing plant processes (photosynthesis, transpiration, translocation, respiration)	( )	( )	( )	( )
5. Knowing effects of environmental factors on plant growth (light, heat, moisture, aeration, fertility)	( )	( )	( )	( )
<b>D. Soils and Fertilizers</b>				
1. Knowing soil composition and characteristics	( )	( )	( )	( )
2. Selecting fertilizer materials	( )	( )	( )	( )
3. Selecting soil conditioners	( )	( )	( )	( )
4. Maintaining organic matter	( )	( )	( )	( )
5. Taking soil samples for analysis	( )	( )	( )	( )
6. Correcting acid soils	( )	( )	( )	( )
7. Correcting poor drainage	( )	( )	( )	( )
8. Controlling erosion	( )	( )	( )	( )
<b>E. Plant Pests</b>				
1. Recognizing plant pest problems	( )	( )	( )	( )
2. Selecting weedicides for weed control	( )	( )	( )	( )

	Essential	Important	Useful	Not Needed
3. Selecting chemicals for disease, insect, and rodent control	( )	( )	( )	( )
4. Mixing and handling chemicals safely	( )	( )	( )	( )
5. Determining correct rates of application	( )	( )	( )	( )
6. Operating and maintaining spray equipment	( )	( )	( )	( )
<b>F. Turf Establishment and Maintenance</b>				
1. Grading the site	( )	( )	( )	( )
2.. Preparing the topsoil for seeding	( )	( )	( )	( )
3. Seeding the lawn	( )	( )	( )	( )
4. Renovating old lawns	( )	( )	( )	( )
5. Caring for the new lawn	( )	( )	( )	( )
6. Fertilizing and liming the lawn	( )	( )	( )	( )
7. Mowing and edging	( )	( )	( )	( )
8. Irrigating turf	( )	( )	( )	( )
9. Aerating and removing thatch	( )	( )	( )	( )
10. Reseeding and patching the lawn	( )	( )	( )	( )

	Essential	Important	Useful	Not Needed
<b>G.. Nursery Management</b>				
1. Preparing and managing nursery soils	( )	( )	( )	( )
2. Planting and transplanting nursery stock	( )	( )	( )	( )
3. Pruning nursery stock	( )	( )	( )	( )
4. Irrigating nursery stock	( )	( )	( )	( )
5. Preparing nursery stock for the market	( )	( )	( )	( )
<b>H. Greenhouse Management</b>				
1. Preparing growing media for greenhouse plants	( )	( )	( )	( )
2. Culturing bedding plants	( )	( )	( )	( )
3. Culturing potted plants and cut flowers	( )	( )	( )	( )
4. Preparing greenhouse plants for sale	( )	( )	( )	( )
5. Operating and servicing greenhouse equipment	( )	( )	( )	( )
<b>I. Floral Design</b>				
1. Knowing the principles of floral design	( )	( )	( )	( )
2. Designing floral pieces (weddings, funerals, all occasions)	( )	( )	( )	( )
3. Constructing floral arrangements	( )	( )	( )	( )
4. Caring for and storing live plant materials	( )	( )	( )	( )

	Essential	Important	Useful	Not Needed
5. Packing and packaging plants and arrangements	( )	( )	( )	( )
<b>J. Landscaping</b>				
1. Knowing the principles of landscape design	( )	( )	( )	( )
2. Making client and site analysis	( )	( )	( )	( )
3. Sketching and layout of landscape plan	( )	( )	( )	( )
4. Preparing the site for landscaping	( )	( )	( )	( )
5. Interpreting the landscape plan	( )	( )	( )	( )
6. Protecting trees from construction work	( )	( )	( )	( )
7. Installing plant materials	( )	( )	( )	( )
8. Removing trees	( )	( )	( )	( )
9. Maintaining trees and shrubs	( )	( )	( )	( )
10. Constructing non-plant landscape features	( )	( )	( )	( )
<b>K. Horticultural Mechanics</b>				
1. Measuring land	( )	( )	( )	( )
2. Surveying land	( )	( )	( )	( )
3. Mixing and pouring concrete	( )	( )	( )	( )
4. Cutting, threading and fitting pipe	( )	( )	( )	( )
5. Painting wood and other surfaces	( )	( )	( )	( )

	Essential	Important	Useful	Not Needed
6. Cutting and replacing glass	( )	( )	( )	( )
7. Making simple electrical repairs	( )	( )	( )	( )
8. Making simple welding repairs	( )	( )	( )	( )
9. Constructing wood projects	( )	( )	( )	( )
10. Maintaining electric motors	( )	( )	( )	( )
11. Conditioning garden (hand) tools	( )	( )	( )	( )
12. Operating and servicing small power equipment	( )	( )	( )	( )
13. Operating and servicing large power equipment	( )	( )	( )	( )
14. Operating and servicing automatic systems (watering, heating, ventilating, lighting)	( )	( )	( )	( )
15. Installing and maintaining sprinkler system	( )	( )	( )	( )
<b>L. Human Relations</b>				
1. Maintaining good relations with customers, employers and fellow employees	( )	( )	( )	( )
2. Getting others to work effectively	( )	( )	( )	( )
<b>M. Communications</b>				
1. Reading (directions, product information)	( )	( )	( )	( )
2. Writing (orders, reports, letters)	( )	( )	( )	( )

	Essential	Important	Useful	Not Needed
3. Speaking (person-to-person, in groups, on telephone)	( )	( )	( )	( )
4. Listening and observing	( )	( )	( )	( )
N. Records				
1. Keeping simple records of expenses and receipts	( )	( )	( )	( )
2. Keeping simple records of materials used	( )	( )	( )	( )
3. Keeping employee time records	( )	( )	( )	( )
4. Keeping equipment and service records	( )	( )	( )	( )
5. Keeping inventory and stock records	( )	( )	( )	( )
6. Extimating bill of materials	( )	( )	( )	( )
O. Business and Related Information				
1. Understanding basic business operation	( )	( )	( )	( )
2. Selling horticultural products and services	( )	( )	( )	( )
3. Marketing and tagging products	( )	( )	( )	( )
4. Displaying products for sale	( )	( )	( )	( )
5. Transporting, storing and shipping products	( )	( )	( )	( )
6. Determining market outlets and trends	( )	( )	( )	( )
7. Obtaining product and service information	( )	( )	( )	( )

	Essential	Important	Useful	Not Needed
8. Operating a cash register (handling money)	( )	( )	( )	( )

When you screen applicants for \_\_\_\_\_ job what knowledge and skills, including those we hve just read and others, do you consider most important?

- (1) \_\_\_\_\_
- (2) \_\_\_\_\_
- (3) \_\_\_\_\_
- (4) \_\_\_\_\_
- (5) \_\_\_\_\_

### III Personal Characteristics

How would you rate the following personal characteristics, using the same rating scale used for knowledge and skills.

	Essential	Important	Useful	Not Needed
A. Willingness to learn	( )	( )	( )	( )
B. Accepts responsibility	( )	( )	( )	( )
C. Good appearance	( )	( )	( )	( )
D. Physical strength and stamina	( )	( )	( )	( )

Are there any others you would consider essential or important?

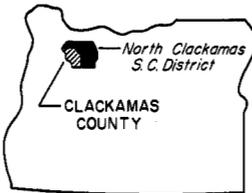
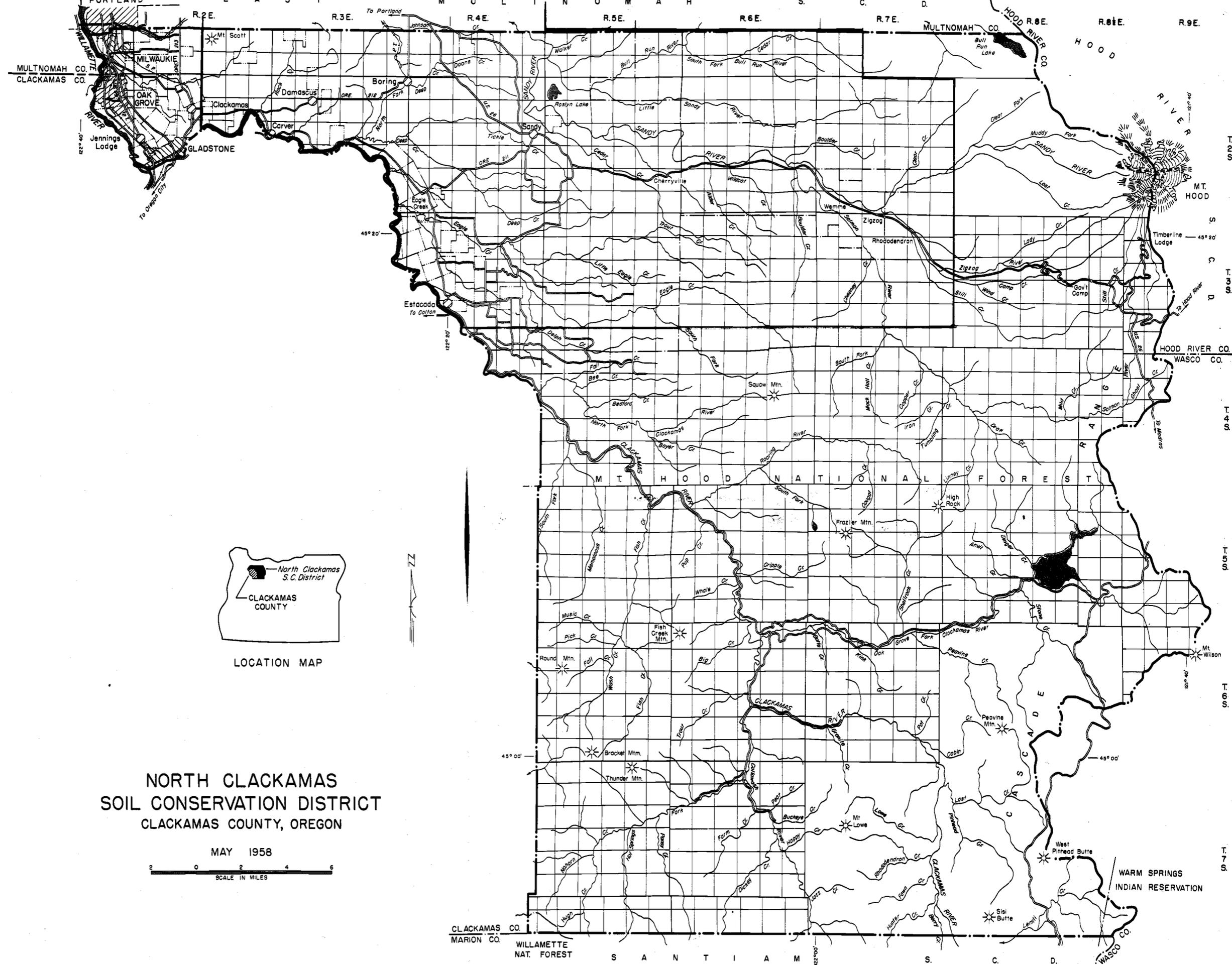
- (1) \_\_\_\_\_
- (2) \_\_\_\_\_
- (3) \_\_\_\_\_
- (4) \_\_\_\_\_

That completed the questionnaire. Thank you for your cooperation in sharing information about job requirements and expectations. We hope the results of this study will assist you and the ornamental horticultural industry with better qualified employees in the not too distant future.

**APPENDIX B**

### Maps of the Study Area

1. A map of the North Clackamas Soil Conservation District. The area outlined in red designates the southern, eastern, and western limits of the study.



LOCATION MAP

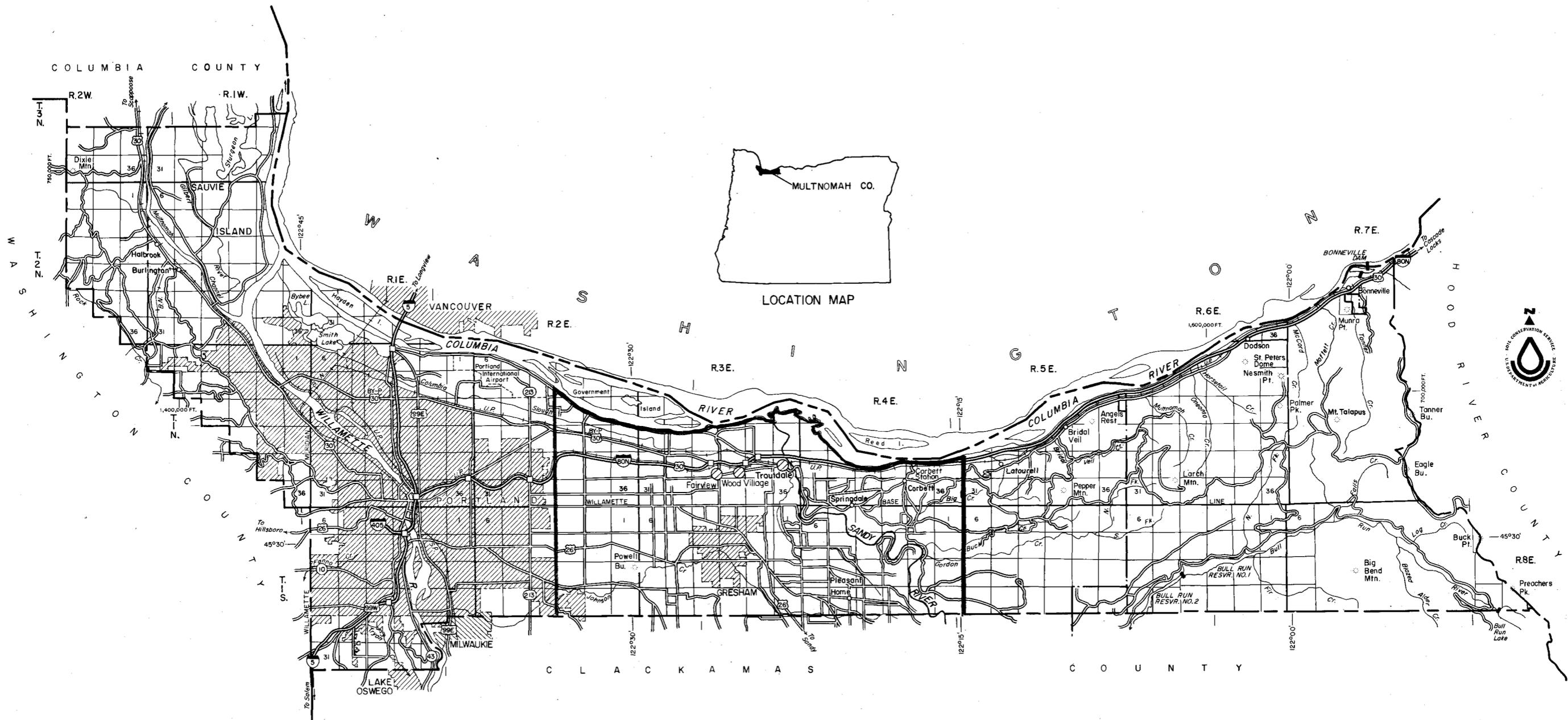
**NORTH CLACKAMAS  
SOIL CONSERVATION DISTRICT  
CLACKAMAS COUNTY, OREGON**

MAY 1958



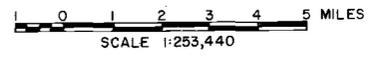
### Maps of the Study Area

2. A map of the Multnomah County Soil Conservation District. The area outlined in red designates the northern boundaries of the study.



**MULTNOMAH COUNTY**  
**OREGON**

JULY 1971



## APPENDIX C

List of Competencies Arranged in Descending  
Order of Importance Based on the Composite  
of All Interviews with Percentage Designations

<u>Competency</u>	<u>Percent of Employers Indicating Essential or Important</u>
1. Maintaining good personal relations	100 %
2. Getting others to work effectively	100
3. Reading correctly	100
4. Writing legibly	100
5. Speaking clearly	100
6. Listening and observing	100
7. Willingness to learn	100
8. Accept responsibility	100
9. Good appearance	98
10. Know effects of environment on plants	96
11. Recognize plant pest problems	93
12. Select chemicals for disease and insect control	93
13. Determine correct rates of application	93
14. Mix and handle chemicals safely	89
15. Select herbicides for weed control	87

<u>Competency</u>	<u>Percent of Employers Indicating Essential or Important</u>
16. Identifying common herba- ceous plants	87 %
17. Physical strength and stamina	87
18. Select fertilizers	80
19. Correct poor drainage	80
20. Operate and maintain spray equipment	80
21. Know plant life cycle	78
22. Know soil composition and characteristics	78
23. Operate and service small power equipment	78
24. Identify common woody plants	76
25. Select soil conditioners	76
26. Correct acid soils	76
27. Condition garden hand tools	76
28. Select common plant materials accor- ding to growth habit and uses	73
29. Operate and service large power equipment	73
30. Keep simple records of expenses and receipts	73
31. Understand basic business operation	73
32. Identify common greenhouse plants	71
33. Know plant parts and functions	71
34. Know plant processes	71

<u>Competency</u>	<u>Percent of Employers Indicating Essential or Important</u>
35. Transporting, storing and shipping plants	71 %
36. Pruning nursery stock	69
37. Irrigate nursery stock	69
38. Know principles of landscape design	69
39. Marketing and tagging products	69
40. Controlling erosion	67
41. Planting and transplanting nursery stock	67
42. Keeping simple records of materials used	67
43. Keeping employee time records	67
44. Keeping inventory of stock records	67
45. Propagating by plant part	64
46. Maintain organic matter	64
47. Operate and service automatic systems	64
48. Select and prepare propagating media	62
49. Take soil samples for analysis	62
50. Interpret landscape plans	62
51. Install and maintain sprinkler systems	62
52. Potting plants	60
53. Using plant growth substances	60

<u>Competency</u>	<u>Percent of Employers Indicating Essential or Important</u>
54. Preparing nursery stock for market	60 %
55. Keep equipment and service records	58
56. Estimate bill of materials	58
57. Installing plant materials	56
58. Constructing wood projects	56
59. Propagating by seed	53
60. Making simple weld repairs	53
61. Maintaining trees and shrubs	51
62. Preparing and managing nursery soils	51
63. Know cell and tissue structure	49
64. Operate a cash register (handle money)	49
65. Sell horticultural products	49
66. Sketch and lay out a landscape plan	47
67. Determine market trends and outlets	47
68. Obtain product and service information	47
69. Retarding and forcing plants	44
70. Storing and handling seeds, bulbs and corms	42
71. Display products for sale	42
72. Construct non-plant landscape features	40

<u>Competency</u>	<u>Percent of Employers Indicating Essential or Important</u>
73. Measure land	40 %
74. Paint wood and other surfaces	38
75. Prepare topsoil for seeding	36
76. Fertilize and lime lawns	36
77. Prepare the site for land- scaping	36
78. Protect trees from construction	36
79. Remove trees	36
80. Seed lawn	33
81. Cut, thread, and fit pipe	33
82. Simple electric repair	33
83. Grade site	31
84. Care for new lawn	31
85. Irrigate turf	31
86. Operate and service green- house equipment	31
87. Aerate and remove thatch	29
88. Reseed and patch lawn	29
89. Prepare greenhouse plants for sale	29
90. Renovate old lawns	27
91. Mow and edge lawns	27
92. Prepare growing media for greenhouse plants	27
93. Survey land	24

<u>Competency</u>	<u>Percent of Employers Indicating Essential or Important</u>
94. Mix and pour concrete	24 %
95. Maintain electric motors	24
96. Make client and site analysis	20
97. Culture bedding plants	18
98. Culture potted plants	18
99. Care for and store live plants	16
100. Packing and packaging plants and arrangements	16
101. Know principles of floral design	13
102. Constructing floral arrangements	13
103. Design floral pieces	11
104. Cut and replace glass	11

## APPENDIX D

Competencies Listed in Original  
Order and Indicating the Number  
of Responses from each Service Category

	(23)	(4)	(3)	(4)	(4)	(7)	(45)
	Nursery	Governmental Agencies	Golf Courses	Florists	Landscape Gardeners	Garden Centers	Total
<b>A. Plant Identification</b>							
1. Identifying common woody plants	(20)	(4)	(2)	(0)	(4)	(4)	(34)
2. Identifying common herbaceous plants	(20)	(4)	(3)	(3)	(4)	(5)	(39)
3. Identifying common greenhouse plants	(17)	(2)	(0)	(4)	(4)	(5)	(32)
4. Selecting common plant materials	(17)	(4)	(3)	(1)	(4)	(4)	(33)
<b>B. Plant Propagation</b>							
1. Selecting and preparing propagating media	(23)	(0)	(0)	(1)	(0)	(4)	(28)
2. Propagating by seed	(22)	(0)	(0)	(1)	(0)	(1)	(24)
3. Propagating by plant part	(23)	(1)	(0)	(0)	(0)	(5)	(29)
4. Potting plants	(21)	(0)	(0)	(3)	(0)	(3)	(27)
5. Selecting and using plant growth substance	(19)	(1)	(0)	(1)	(3)	(3)	(27)

<u>Competency</u>	<u>Responses</u>						
	(23)	(4)	(3)	(4)	(4)	(7)	(45)
	Nursery	Governmental Agencies	Golf Courses	Florists	Landscape Gardeners	Garden Centers	Total
6. Retarding and forcing plants	(16)	(1)	(0)	(1)	(1)	(1)	(20)
7. Storing and handling seeds, bulbs and corms	(17)	(0)	(0)	(0)	(0)	(2)	(19)
<b>C. Plant Growth Principles</b>							
1. Knowing the life cycle of plants	(22)	(2)	(2)	(3)	(2)	(4)	(35)
2. Knowing cell and tissue structures of plants	(16)	(1)	(2)	(0)	(2)	(1)	(22)
3. Knowing plant parts and their functions	(21)	(3)	(3)	(1)	(3)	(1)	(32)
4. Knowing plant processes	(21)	(3)	(2)	(0)	(4)	(2)	(32)
5. Knowing effects of environmental factors on plant growth	(23)	(4)	(3)	(4)	(4)	(5)	(43)
<b>D. Soils and Fertilizers</b>							
1. Knowing soil composition and characteristics	(22)	(2)	(3)	(1)	(4)	(3)	(35)

CompetencyResponses

	(23)	(4)	(3)	(4)	(4)	(7)	(45)
	Nursery	Governmental Agencies	Golf Courses	Florists	Landscape Gardeners	Garden Centers	Total
2. Selecting fertilizer materials	(22)	(4)	(2)	(1)	(4)	(3)	(36)
3. Selecting soil conditioners	(21)	(3)	(2)	(1)	(4)	(3)	(34)
4. Maintaining organic matter	(20)	(2)	(2)	(0)	(3)	(2)	(29)
5. Taking soil samples for analysis	(19)	(1)	(3)	(0)	(4)	(1)	(28)
6. Correcting acid soils	(22)	(2)	(3)	(0)	(4)	(3)	(34)
7. Correcting poor drainage	(22)	(3)	(3)	(0)	(4)	(4)	(36)
8. Controlling erosion	(19)	(2)	(2)	(0)	(3)	(2)	(30)
<b>E. Plant Pests</b>							
1. Recognizing plant pest problems	(23)	(3)	(3)	(4)	(4)	(5)	(42)
2. Selecting weedicides for weed control	(23)	(3)	(3)	(1)	(4)	(5)	(39)
3. Selecting chemicals for disease, insect, and rodent control	(23)	(3)	(3)	(3)	(4)	(6)	(42)
4. Mixing and handling chemicals safely	(22)	(4)	(3)	(1)	(4)	(6)	(40)

CompetencyResponses

	(23)	(4)	(3)	(4)	(4)	(7)	(45)
	Nursery	Governmental Agencies	Golf Courses	Florists	Landscape Gardeners	Garden Centers	Total
5. Determining correct rates of application	(23)	(4)	(3)	(3)	(4)	(5)	(42)
6. Operating and maintaining spray equipment	(21)	(4)	(3)	(1)	(4)	(3)	(36)
<b>F. Turf Establishment and Maintenance</b>							
1. Grading the site	(4)	(3)	(2)	(0)	(4)	(1)	(14)
2. Preparing the topsoil for seeding	(4)	(3)	(3)	(0)	(4)	(2)	(16)
3. Seeding the lawn	(2)	(4)	(3)	(0)	(4)	(2)	(15)
4. Renovating old lawns	(1)	(3)	(3)	(0)	(4)	(1)	(12)
5. Caring for the new lawns	(1)	(4)	(3)	(0)	(4)	(2)	(14)
6. Fertilizing and liming the new lawn	(3)	(4)	(3)	(0)	(4)	(2)	(16)
7. Mowing and edging	(1)	(4)	(3)	(0)	(4)	(0)	(12)
8. Irrigating turf	(2)	(4)	(3)	(0)	(4)	(1)	(14)
9. Aerating and removing thatch	(1)	(3)	(3)	(0)	(4)	(2)	(13)
10. Reseeding and patching the lawn	(1)	(3)	(3)	(0)	(4)	(2)	(13)

<u>Competency</u>	<u>Responses</u>						(45)
	(23)	(4)	(3)	(4)	(4)	(7)	
	Nursery	Governmental Agencies	Golf Courses	Florists	Landscape Gardeners	Garden Centers	Total
<b>G. Nursery Management</b>							
1. Preparing and managing nursery soils	(22)	(0)	(0)	(0)	(0)	(1)	(23)
2. Planting and transplanting nursery stock	(21)	(3)	(1)	(0)	(4)	(1)	(30)
3. Pruning nursery stock	(21)	(2)	(1)	(0)	(4)	(3)	(31)
4. Irrigating nursery stock	(22)	(2)	(1)	(0)	(3)	(3)	(31)
5. Preparing nursery stock for the market	(22)	(0)	(0)	(0)	(1)	(4)	(27)
<b>H. Greenhouse Management</b>							
1. Preparing growing media for greenhouse plants	(10)	(0)	(0)	(1)	(0)	(1)	(12)
2. Culturing bedding plants	(5)	(0)	(0)	(3)	(0)	(0)	(8)
3. Culturing potted plants and cut flowers	(5)	(0)	(0)	(3)	(0)	(0)	(8)
4. Preparing greenhouse plants for sale	(7)	(0)	(0)	(4)	(1)	(1)	(13)
5. Operating and servicing greenhouse equipment	(12)	(0)	(0)	(1)	(1)	(0)	(14)

CompetencyResponses

(23) (4) (3) (4) (4) (7) (45)

Nursery	Governmental Agencies	Golf Courses	Florists	Landscape Gardeners	Garden Centers	Total
---------	--------------------------	--------------	----------	------------------------	-------------------	-------

**I. Floral Design**

1. Knowing the principles of floral design	( 1)	(0)	(0)	(4)	(0)	(1)	( 6)
2. Designing floral pieces	( 0)	(0)	(0)	(4)	(1)	(1)	( 6)
3. Constructing floral arrangements	( 0)	(0)	(0)	(4)	(1)	(1)	( 6)
4. Caring for and storing live plant materials	( 1)	(0)	(0)	(3)	(1)	(2)	( 7)
5. Packing and packaging plants and arrangements	( 1)	(0)	(0)	(4)	(1)	(1)	( 7)

**J. Landscaping**

1. Knowing the principles of landscape design	(14)	(4)	(3)	(1)	(4)	(5)	(31)
2. Making client and site analysis	( 3)	(0)	(0)	(0)	(4)	(2)	( 9)
3. Sketching and layout of landscape plan	(10)	(2)	(3)	(0)	(4)	(2)	(21)
4. Preparing the site for landscaping	( 6)	(3)	(3)	(0)	(4)	(0)	(16)
5. Interpreting the landscape plan	(13)	(3)	(3)	(0)	(4)	(5)	(28)
6. Protecting trees from construction work	( 4)	(3)	(3)	(0)	(4)	(2)	(16)

CompetencyResponses

	(23)	(4)	(3)	(4)	(4)	(7)	(45)
	Nursery	Governmental Agencies	Golf Courses	Florists	Landscape Gardeners	Garden Centers	Total
7. Installing plant materials	(11)	(4)	(3)	(0)	(4)	(3)	(25)
8. Removing trees	( 7)	(2)	(2)	(0)	(4)	(1)	(16)
9. Maintaining trees	(11)	(3)	(2)	(0)	(4)	(3)	(23)
10. Constructing nonplant landscape features	( 8)	(2)	(2)	(0)	(4)	(2)	(18)
<b>K. Horticultural Mechanics</b>							
1. Measuring land	( 8)	(2)	(3)	(0)	(3)	(2)	(18)
2. Surveying land	( 6)	(2)	(1)	(0)	(2)	(0)	(11)
3. Mixing and pouring concrete	( 4)	(2)	(2)	(0)	(3)	(0)	(11)
4. Cutting, threading and fitting piper	( 8)	(2)	(2)	(1)	(2)	(0)	(15)
5. Painting wood and other surfaces	( 8)	(2)	(2)	(1)	(3)	(1)	(17)
6. Cutting and replacing glass	( 3)	(0)	(0)	(1)	(1)	(0)	( 5)
7. Making simple electrical repairs	( 7)	(1)	(2)	(1)	(3)	(1)	(15)
8. Making simple welding repairs	(15)	(2)	(2)	(1)	(4)	(0)	(24)
9. Constructing wood projects	(14)	(2)	(2)	(1)	(4)	(2)	(25)

<u>Competency</u>	<u>Responses</u>						
	(23)	(4)	(3)	(4)	(4)	(7)	(45)
	Nursery	Governmental Agencies	Golf Courses	Florists	Landscape Gardeners	Garden Centers	Total
10. Maintaining electric motors	( 3)	(1)	(2)	(1)	(3)	(1)	(11)
11. Conditioning garden (hand) tools	(21)	(4)	(3)	(1)	(4)	(1)	(34)
12. Operating and servicing small garden equipment	(20)	(4)	(3)	(1)	(4)	(3)	(35)
13. Operating and servicing large power equipment	(19)	(4)	(3)	(1)	(4)	(2)	(33)
14. Operating and servicing automatic systems	(15)	(3)	(3)	(1)	(4)	(3)	(29)
15. Installing and maintaining sprinkler systems	(16)	(3)	(2)	(1)	(4)	(2)	(28)

#### L. Human Relations

- |  |      |     |     |     |     |     |      |
|--|------|-----|-----|-----|-----|-----|------|
| 1. Maintaining good relations with customers, employers and fellow employees | (23) | (4) | (3) | (4) | (4) | (7) | (45) |
| 2. Getting others to work effectively  | (23) | (4) | (3) | (4) | (4) | (7) | (45) |

CompetencyResponses

	(23)	(4)	(3)	(4)	(4)	(7)	(45)
	Nursery	Governmental Agencies	Golf Courses	Florists	Landscape Gardeners	Garden Centers	Total
<b>M. Communications</b>							
1. Reading correctly	(23)	(4)	(3)	(4)	(4)	(7)	(45)
2. Writing legibly	(23)	(4)	(3)	(4)	(4)	(7)	(45)
3. Speaking clearly	(23)	(4)	(3)	(4)	(4)	(7)	(45)
4. Listening and observing	(23)	(4)	(3)	(4)	(4)	(7)	(45)
<b>N. Records</b>							
1. Keeping simple records of expenses and receipts	(14)	(3)	(3)	(4)	(4)	(5)	(33)
2. Keeping simple records of materials used	(14)	(2)	(3)	(3)	(4)	(4)	(30)
3. Keeping employee time records	(14)	(2)	(3)	(2)	(4)	(5)	(30)
4. Keeping equipment and service records	(13)	(2)	(3)	(0)	(4)	(4)	(26)
5. Keeping inventory and stock records	(13)	(2)	(3)	(3)	(3)	(6)	(30)
6. Estimating bill of materials	(11)	(2)	(3)	(2)	(4)	(4)	(26)
<b>O. Business and Related Information</b>							
1. Understanding basic business operation	(17)	(2)	(3)	(3)	(3)	(5)	(33)

CompetencyResponses

	(23)	(4)	(3)	(4)	(4)	(7)	(45)
	Nursery	Governmental Agencies	Golf Courses	Florists	Landscape Gardeners	Garden Centers	Total
2. Selling horticultural products and services	(13)	(0)	(0)	(3)	(1)	(5)	(22)
3. Marketing and tagging products	(20)	(0)	(0)	(4)	(1)	(6)	(31)
4. Displaying products for sale	(8)	(0)	(0)	(4)	(1)	(6)	(19)
5. Transporting, storing and shipping products	(19)	(0)	(0)	(4)	(4)	(5)	(32)
6. Determining market outlets and trends	(13)	(0)	(0)	(3)	(0)	(5)	(21)
7. Obtaining product and service information	(12)	(0)	(0)	(3)	(1)	(5)	(21)
8. Operating a cash register(handling money)	(12)	(0)	(0)	(4)	(1)	(5)	(22)
<b>P. Personal characteristics</b>							
1. Willingness to learn	(23)	(4)	(3)	(4)	(4)	(7)	(45)
2. Accepts responsibility	(23)	(4)	(3)	(4)	(4)	(7)	(45)
3. Good appearance	(23)	(3)	(3)	(4)	(4)	(7)	(44)
4. Physical strength and stamina	(23)	(3)	(2)	(3)	(4)	(4)	(39)