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ABSTRACT

A study was conducted to identify competencies needed by workers in new and emerging occupations in agriculture; to identify occupations in agriculture that are on the decline and occupations that may no longer be needed; to work toward the elimination of sex bias in preparation for entry into occupations in agriculture; and to assess the attitudes and opinions of employees on the future of women and minorities in agriculture. Questionnaires were used to interview representative samples of employers in agricultural enterprises in Yolo County, California: fifty interviews of owner-operators of commercial farms and fifty employers and employees in agriculturally related businesses (such as chemicals, farm equipment, and food processing). Two end products resulted: a report on employment in agriculture in Yolo County, and a description of forty-one jobs in agriculture (contained in CE 021 372). Among the findings are the following: (1) speaking and writing skills, knowledge of production agriculture, and business management were all highly rated competencies; (2) the decline in the need for laborers continues but is expected to level off; and (3) over half of the employers indicated that those of Mexican ancestry could be trained/educated to handle any job in agriculture, whereas less than a quarter felt that women could. (CT)

Final Report

Project No. 57-30023-3-8-819

EMERGING OCCUPATIONS IN AGRICULTURE: IMPACT UPON CURRICULA AND PEOPLE, PART I

YOLO COUNTY, 1979

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O. E. Thompson
Project Director

EMERGING OCCUPATIONS IN AGRICULTURE: IMPACT UPON CURRICULA AND PEOPLE

INTRODUCTION

Few if any businesses and industries in Yolo County are not affected by agriculture and its related activities. Certainly agriculture is the dominant employer and is the major creator of new wealth in Yolo County. As agriculture has moved from a labor-intensive industry to a less extensive use of labor, other problems have arisen. Technological development, accompanied by mechanization, has had a twofold effect.

First, technology has dramatically reduced the need for the part-time seasonal workers of low skill. This change in agriculture, where anyone could formerly find work for a day, a week, or a month, particularly in spring and summer, has left a residuum of individuals from that labor force who can find few if any alternatives. And society has not yet assumed responsibility for those casualties of technolgical development.

Second, a nearly opposite effect is found at the other end of the agricultural labor continuum. There has been a major increase in need for a labor force with a high level of technical training. Such individuals make the technological revolution possible by manning, assembling, modifying, adjusting, aligning, synchronizing, and repairing sophisticated farm equipment that now uses minicomputers, electronic sensors, and sorter devices comparable to those found elsewhere in modern industry.

The labor force in agriculture has drawn much press and political attention as it has grappled with organizing, labor contracts, seniority, and employee benefits--issues faced by other industries since the beginning of the labor movement, many decades ago.

Farmers deal in a marketing system that is basically free, giving them little control over the price. The consequence is that they must produce a commodity at as low a cost per unit as possible and hope that the price they receive will be more than their cost. Labor costs are often their only controllable variable. In periods of uncertainty then, the farmer will substitute capital for labor through further mechanization in the hope of reducing unit costs. Since the farmer views that as his only option for survival, he minimizes uncertainties and costs in labor by any reasonable

means at his disposal.

Nevertheless, farming still needs sizable numbers of farm workers below the highly skilled group but nonetheless important, having combinations of skills above the pickers, hoers, and thinners. The numbers in this last category of employee have decreased as tractors and other machines have become larger, as irrigation becomes more mechanized and automated, and as most of the manual labor formerly associated with forage, row crops and grain crops has been replaced by machine. No further decline in the number of professional farm workers is anticipated.

In summary, then, the relative newcomers in the industry are highly skilled technicians who may work at the farm but are most likely to be employed by a large service company. The more or less professional farm workers who keep the seeding, cultivating, harvest, and transportation systems operating are believed to be fewer than previously, although still a substantial labor force and possibly stabilized. The major casualty in the industry, then, is the seasonal worker, often migrant, who was needed and available to perform critical short-term tasks, often on a piece-rate basis. Few predict that these workers will vanish completely but peak demands for labor are being reduced as many farmers adjust their operations to do more with a year-around or long-term labor force.

Purpose of Study

This study is a response to numerous requests for an updating of "The Determination of Proper Allocation of Functions and Responsibilities of Institutions Providing Education in Agriculture," a study compiled in 1970 by the senior researcher.

That study provided information on needs in 1970 for employees in agriculture, emerging competencies needed for employees, and guidelines for curricula needed to prepare workers for agriculture. The study included interviews with nearly 5,000 employees state-wide, to determine the major functions and activities performed by workers in 76 different agricultural jobs.

This report is the result of a pilot study in Yolo County that essentially updates that information and works toward elimination of barriers to the employment of women and minorities in agriculture.

The objectives of the project are:

- To identify competencies needed by workers in new and emerging occupations in agriculture.
- To identify occupations in agriculture that are on the decline and occupations that may no longer be needed.
- To work toward the elimination of sex bias in preparation for entry into occupations in agriculture.
- To assess the attitudes and opinions of employees on the future of women and minorities in agriculture.

One of the end products of these objectives is this report on employment in agriculture in Yolo County, findings that may, with discretion, be generalized to other parts of California. A second report, Part II, Functions and Activities of Agricultural Personnel in Yolo County, 1979, describes forty-one jobs in agriculture. These two reports are considered generalizable to other counties with like agricultural production.

The Agricultural Environment in Yolo County

The cliche is not far from true that "any crop that grows anywhere in the world grows everywhere in Yolo County." Located midway--east to west and north to south--in the Central Valley adjacent to the Sacramento River, the county boasts some of the richest farmland in the state. The county is bordered on the west by the Vaca Mountains with fertile valleys and foothills, and on the east by the river and delta. To the north and south are expanses of level fertile farmland. Thus, agricultural production ranges from livestock grazing (in the foothills) to intensive row-crop agriculture (in the flat lands and the delta). Income from agricultural crops in 1977 approached 190 million dollars, placing the county among the leaders in the state. In fact, this income surpasses that of agriculture for some entire states. The county has predominantly large commercial farms, and many of the operators are two or more generation farmers. Food processing, in terms of canning of fruits and refining of sugar, is an extensive industry in the area, and the county has a deep-water port that handles much of the state's export of agricultural products, including rice and other grains.

Agricultural production can be characterized as diversified although dominated by field and vegetable crops, which account for over 82% of the

agricultural income. Fruit and nut crops bring in 9% of the income, and livestock and poultry bring in 6%. Seed crops and other miscellaneous crops make up the remaining 3%. The most important crop is processing tomatoes, which in 1977 accounted for 46% of the agricultural income in the county. These were grown on 60,000 acres, making the county the largest producer of tomatoes in the state. In fact, in 1978 the county produced 20% of the processing tomatoes grown in the United States. The second crop in dollar income was wheat, followed by corn and sugar beets, each amounting to over ten million dollars. Of the 662,000 acres in the county, 436,000 is cropland, over half of which is irrigated (266,000 acres).

The population of the county increased 10% between 1970 and 1976 and now exceeds over 100,000. Of those, 40% live in rural unincorporated areas. Of the workforce of 46,000, over 5,900 are employed in agricultural production. The Employment Development Department (1979) estimates that people of Mexican ancestry constitute about 16% of the total population and 14% of the labor force, making them the largest minority group in Yolo County. The 1975 Census indicated that less than 20% of the Mexican Americans within the county were not fluent in English. That estimate is considered low by county adult educators, who find 25 to 30% deficient in spoken English and a larger percent deficient in written English.

Education in agriculture has a long history in Yolo County. The University Farm (founded in 1908), now the University of California, Davis, is the second-largest Land-Grant college in the United States, with nearly 5,000 students in the College of Agriculture and Environmental Sciences. Instruction in agriculture is offered in five of the six high schools in the county, and courses in agriculture have recently been initiated in the Yuba College attendance center in Woodland.

Agriculture, then, with the many businesses that support the production of crops, is the central industry in the county. This report focuses on employers and employees in this great industry.

Agricultural Enrollments in California Schools

For discussion of the future of agricultural employment and possible emerging and declining trends, it is necessary to investigate what the future labor force may be. Patterns in agricultural-program enrollments at the various educational levels provide insight into the status and prepared-

ness of future employees.

The past five years have seen major changes in agricultural programs throughout the state. Agricultural enrollments in educational institutions have increased dramatically, outstripping by severalfold the overall growth in enrollments. One of the most dramatic changes in recent years has been in the enrollments of women. Specifically:

- In public secondary schools, colleges, and universities, both female and male enrollments in agricultural programs have grown several times as fast as have overall enrollments.
- Enrollments of women in agricultural programs in all levels of educational institutions have increased at least three times as fast as enrollments of men. Women now make up about one-third of those studying agriculture, yet few women are employed in agriculture.

Few realize the effects that these changes will have on agriculture and agribusiness. The influx of females into the traditionally male labor force in agriculture has many implications for employers, managers, and supervisors in agricultural business concerns and agricultural institutions.

Especially affected by these changing patterns is Yolo County, which has the major agricultural campus of the University of California within its boundaries. Agricultural programs exist also at all secondary schools in the county.

Table 1 shows that enrollments in agriculture in secondary schools have grown annually by over 25% for females and nearly 4% for males, while total enrollments in secondary schools grew by less than 1% annually. Community colleges have experienced an annual growth since 1973 of 13% for females and 3% for males. During the same period, enrollment in agriculture programs grew annually by nearly 38% for females and 9% for males. In the same period, enrollments of females in California State University and Colleges increased by 5% annually, while enrollment of males decreased slightly (-0.44%). Those electing the study of agriculture show a different picture. Enrollments in agriculture increased annually by 44% for women and by close to 9% for men. At the University of California, Davis and Berkeley, the trend was in the same direction, although less dramatic. There, enrollment of all males decreased annually since 1975 by an average of -1%, while enrollment of females increased by 2%. In agriculture, the annual

Table 1

COMPARISON OF AVERAGE ANNUAL GROWTH RATE BY SEX FOR AGRICULTURE AND TOTAL ENROLLMENT IN CALIFORNIA SECONDARY SCHOOLS, COMMUNITY COLLEGES, FOUR-YEAR COLLEGES, AND UNIVERSITIES

School level	Average annual growth rate			
	Agricultural programs		Total enrollment	
	Male	Female	Male	Female
Secondary schools (1973-1977)	3.75%	25.44%	0.71%	0.50%
Community colleges (1973-1977)	9.37%	37.70%	3.31%	13.38%
State university and colleges (1973-1977)	8.59%	43.88%	-0.44%	4.99%
University of California, undergraduates, Davis/Berkeley (1973-1979)	3.80%	8.07%	-1.05%	1.79%
University of California, graduates, Davis (1976-1979)	1.86%	15.95%	0.50%	7.89%

Source: Data compiled from the following publications:

1) VEA Form 250, 1973-1977 California State Department of Education, Vocational Education Section, Sacramento, CA.
2) "Full- and Part-time Enrollment by Major, Fall Term," 1969 to 1978. Institutional Research Office, Office of the Chancellor, State University and Colleges, Long Beach, CA.
3) "Summary of Students, " 1975 to 1979, Office of the Registrar, University of California, Davis, CA.
4) "Graduate Student Headcount Report," 1975-1979, Planning and Analysis Office, University Office, University of California, Davis, CA.
5) "Campus Statistics," Table 6, Undergraduate and Graduate Students by Department, Fall 1975 to 1979, Office of Institutional Research, University of California, Berkely, CA.
6) "Active Enrollment in California Elementary and Secondary Public Schools," Fall 1973 to 1976, Bureau of School Apportionments and Reports, Division of Financial Resources and Distribution Aid, California State Department of Education, Sacramento, CA.
7) Postsecondary Education in California. Information in Digest, 1978. California Postsecondary Commission, Sacramento, CA.

growth has been 8% for females and about 4% for males.

Participation of females in agricultural programs in state institutions prior to 1973 is difficult to determine since few enrollment statistics were compiled by sex. It is common knowledge that, ten years ago, few if any women were in agricultural programs. A major contribution to the recent increase in females in this once-male-dominated field was a 1968 court ruling mandating that the National Future Farmer of America Organization be integrated. That precipitated an influx of females, at first in the secondary schools, and that growth has now reached graduate education. For example, at the University of California, Davis, the proportion of females in graduate programs in agriculture reached 31% in 1979, up from 23% in 1975. That is an annual growth of 16% for females, compared with slightly under 2% growth for males.

Enrollment in agriculture in secondary schools and four-year colleges and universities now totals over 100,000. Table 2 shows that the annual rate of growth of female enrollment during the past five years ranged from 8% (at the University of California, Davis and Berkeley) to 44% (at California state universities and colleges), compared with a range for males from about 2% (University of California, Davis, graduates) to 9% (community colleges). Obviously, the major portion of the growth in agriculture in recent years is accounted for by females. (For more extensive program data by subject matter area for the various levels of California public schools, see Appendix A.)

Table 2

AVERAGE ANNUAL CHANGE IN ENROLLMENT OF MALES AND FEMALES IN AGRICULTURE IN PUBLIC SECONDARY SCHOOLS, COMMUNITY COLLEGES, FOUR-YEAR COLLEGES, AND UNIVERSITIES DURING A FIVE-YEAR PERIOD

Level of institution	AGRICULTURE ENROLLMENTS 1973	1974	1975	1976	1977	1978	1979	Average annual percent change
Secondary schools								
Male	35,297	38,204	43,743	42,777	40,586	----	----	3.75%
Female	9,852	13,403	16,765	17,828	19,893	----	----	25.48%
Community colleges								
Male	14,563	14,767	18,627	19,479	20,019	----	----	9.37%
Female	3,504	4,559	7,273	7,943	8,789	----	----	37.70%
State university and colleges								
Male	4,095	4,039	4,741	4,787	5,502	----	----	8.59%
Female	936	1,243	1,640	2,021	2,579	----	----	43.88%
University of California, undergraduates, Davis/Berkeley								
Male	----	----	2,162	2,631	2,702	2,655	2,491	3.80%
Female	----	----	1,973	2,378	2,592	2,542	2,610	8.07%
University of California, graduates, Davis Campus only								
Male	----	----	712	771	751	762	765	1.86%
Female	----	----	210	274	294	316	344	15.95%

NOTE: Enrollment data for secondary schools, community colleges, and state university and colleges not available for 1978 or 1979 at date of publication; also University of California data on enrollment by sex not available before 1975.

Source: Data compiled from the following publications:

1) VEA Form 250, 1973-1977 California State Department of Education, Vocational Education Section, Sacramento, CA.
2) "Full- and Part-time Enrollment by Major, Fall Term," 1969 to 1978. Institutional Research Office, Office of the Chancellor, State University and Colleges, Long Beach, CA.
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4) "Graduate Student Headcount Report," 1975-1979, Planning and Analysis Office, University Office, University of California, Davis, CA.
5) "Campus Statistics," Table 6, Undergraduate and Graduate Students by Department, Fall 1975 to 1979, Office of Institutional Research, University of California, Berkeley, CA.

EMPLOYERS IN AGRICULTURE AND AGRIBUSINESS IN YOLO COUNTY

Study Methodology

Obtaining a representative sample of employers in agricultural enterprises in Yolo County is no small undertaking. Since commercial farms and agriculturally related businesses in the county were about equal in numbers, it was decided to sample fifty from each group. A listing of growers was obtained from the Agri-Land Plat Book and Guide, which lists property ownerships by township (1978). This was compared with the mailing list of farmers used by Cooperative Extension of Yolo County, and meetings were held with the county agricultural commissioner, the Farm Bureau, and California Women for Agriculture to add to the master list of farmers. The first drawing took every sixth owner-operator, and a second drawing took of every eighth owner-operator. Even with this listing, errors were found and alternate owner-operators were drawn. Other evidence (which follows) confirms that the sample is a representative cross-section of this very diverse group of owner-operators of farms in the county.

A list of agriculturally related businesses in the county was derived from a directory compiled by the Industrial Service Committee of the Woodland Chamber of Commerce, as well as the West Sacramento District Chamber of Commerce Business and Professional Directory. This list was supplemented by listings in the yellow pages of each of the towns and cities in the county. The master list was then stratified by major product categories, such as agricultural chemicals, farm equipment, and food-processing firms. A proportional sample was drawn for each category, resulting in the final sample of fifty. Each employer was asked for permission also to interview one or more of his employees. Cooperation of both growers and agribusiness personnel was excellent. Questionnaires were developed with the following objectives in mind:

- To monitor changes in competencies needed by workers in the major categories of agricultural employment and identify new and emerging jobs.
- To identify agricultural occupations that are on the decline.
- To look for and identify barriers to the entry of women and minorities into agricultural employment at levels other than low-skilled jobs.

Employer Profile

In addition to demographic information, growers and agribusiness persons responded to questions about their labor force--the educational needs of their workers, and trends and concerns relating to the employment of women and other minorities, especially those of Mexican ancestry. Also addressed were issues of fringe benefits for employees, computerization of business records, and job training.

The sample of growers appears to represent the major agricultural production units in the county. Five were basically livestock operations, six were a combination of livestock and crops, eight were all field crops, six were exclusively row crops, and three were tree crops only. The most prevalent farming operation in the county is a combination of field and row crops, and 16 were sampled from this group. The combination of field and tree crops makes up the remaining four in the sample of 48. As to the agribusiness sample, ten were in sales of supplies such as seeds and fertilizers, ten were in manufacturing and sales of equipment, nine provided services such as custom harvest and fertilizer application, six dealt with the processing of agricultural products, six were nursery outlets, four were consulting groups, and five dealt with the financing of agricultural production (Table 3).

The farming enterprises were mostly large operations. Over one in three farmed more than 1,000 acres. Both the farming operation itself and the person on the farm interviewed had long tenure. Only three farm operations were less than five years old, whereas three-fourths had been in business over 20 years. Interestingly, 15% had been in the same family for over 60 years. The farm operators likewise were experienced. Sixty percent had over 20 years on the farm, and nearly half of this group had been operating that farm for over 30 years. Only one in four had less than five years with the farm. Most farm operators had never worked elsewhere.

The agricultural businesses in the sample were mostly well established although not as old as the farming operations. Thirty percent had been operating for less than 20 years, and only three had been in business for over 50 years. Likewise, the agribusiness manager/owner had less experience than farm owners. In fact, two in three had less than ten years with the company. As expected, then, farms in Yolo County have a long history, with

Table 3

NATURE OF THE BUSINESSES IN THE EMPLOYER SAMPLE

Function of business	Number of businesses in sample
Production - field crops	8
- row crops	6
- tree crops	3
- livestock	5
- field and row crops	16
- field and tree crops	4
- plants and livestock	6
Marketing and consulting	4
Processing/packaging/shipping	6
Supply - fertilizers, chemicals, seeds	10
Equipment sales/repair/manufacturing	10
Nurseries - wholesale and retail	6
Credit and lending	5
Production services (crop dusting, irrigation services, custom harvesting, labor contractors)	9
TOTAL	98

few changes in ownership. The agribusiness sector serving the farms is of more recent origin and has expanded in recent years. Consequently, the operators are generally younger than the growers. As one would expect, a high proportion of the growers interviewed (85%) were full owners or partner-owners; others were the managers. Only 35% of those in agribusiness were owners; most (64%) were managers.

Education beyond high school was characteristic of the employers in both farming and agribusiness. Only three of the 98 had not completed high school and another 26% had stopped with high school. Of those with only a high school education, two-thirds were farm operators. Nearly 42% of the sample held bachelor's degrees, and a fourth of those also held graduate degrees. At least a bachelor's degree was held by 29% of the farm operators and 54% of the agribusiness employers. Of these, two-thirds of the degrees were in agriculture, and the other third in a wide variety of majors. One-third of the farm operators had attended the University of California, Davis, compared with one in five agribusiness persons. A California state university or college was the alma mater for nearly 30% of the agribusiness group and 12% of the farm operators. Surprisingly few (only five in the sample) had terminated education at the community college level. It is not appropriate to generalize from the Yolo County data on educational level of employers in agriculture, since the mere presence of a college of agriculture and environmental sciences in the county undoubtedly creates a bias. The absence of a full community-college program in agriculture may account for the low number who had terminated at that level.

In summary, the agricultural employers in the sample were well established individuals, most had long tenure in agriculture and their level of education was far above that of the population in general, emphasizing that farming and agricultural business in Yolo County require a high level of preparation, similar to the requirements of large corporate enterprises.

Nature of the Labor Force In the Firms

While seasonal laborers are associated with farming in California, over half (52%) of the growers in the sample employed no seasonal workers. One-fifth had ten or fewer employees, while one-fourth employed over ten. Only a few agribusinesses (14%) employed any seasonal laborers. A few (ten) farm operators and two agribusiness firms employed seasonal equipment-repair persons.

Only one in eight of the farm operators had year-around laborers, and this was similar for the agribusinesses. About one in four farmers had year-around farm hands, and a like proportion employed equipment operators all year. Over 42% of the agribusiness concerns had year-around equipment operators, and 60% employed all the full-time sales and service personnel in the sample. A few (one in six) farm operators had hired a manager/supervisor, whereas two-thirds of the agribusinesses had such employees. Also, all of the 14 concerns employing professional agriculturists were agribusinesses.

Employers saw work experience as important preparation for almost all categories of employees. Only three saw high school as sufficient preparation for the job, while seven recommended special training programs, such as those sponsored by industry. No special educational preparation was seen as important for farm workers, nor was specific preparation recommended for livestock workers. At least high-school graduation was recommended by the 28 employers with sales and field personnel. Work experience was viewed as the most beneficial prerequisite by ten of these businesses. Seven recommended a college degree, and only one listed a special training program for sales and field persons.

Twenty of the employers had manager/supervisors on their work force. Five saw a college degree as mandatory, and three recommended work experience. Surprisingly, eight saw no special educational needs for their management personnel.

In general, then, employers saw work experience as the most important prerequisite for employment at most of the levels. Work experience generally meant working for another farmer or industry. Company training programs were considered important. Few, however, saw the secondary school or community college as important in training workers for their companies.

Source of Employees

The farm operators and agribusinesses used no single source in seeking new employees. Of the total, only seven looked to the high school for employees, while 22 listed the college placement center. As one might expect, those looking to college did so for more highly trained persons for sales, management, and professional positions. The local state employment office was listed as a source by 25 companies, although primarily for equipment-repair persons and office workers. Fifty-four companies used

and those were primarily for equipment-repair persons, office workers, and laborers. When it came to jobs in the management or professional area, most filled the position from within the company.

Most employers, regardless of the kind of position they were attempting to fill, used an informal network consisting of word-of-mouth, direct contact, or hiring someone they knew in another company. Of the 56 companies that employed laborers, 36 used that procedure. Half of those seeking equipment-repair persons (32) also used the informal system. In fact, of the 317 responses to sources that employers contacted for new employees in the 12 job categories, 177 (56%) used the informal system. Half of those using the informal system simply let it be known they had a vacancy, and applicants somehow learned of it. This means of recruitment may be influenced by the times--more job-seekers than jobs. This raises many questions about equality of opportunity, especially for minorities such as Mexican Americans and women.

In-service Education for Employees and Employers

A never-ending task for employers is keeping employees abreast of changes brought about by new technologies, research findings, and governmental regulations. To accomplish this, a number (one-third) of the firms provide their own in-service programs and on-the-job training for employees on a regular basis, and another 21 hold sessions when needed. Thus, half the employers had their own in-service programs. This was more common for farm operators, with 60% providing in-service education, compared with 50% for agribusinesses. Farmers often carried out in-service training in a one-to-one informal situation. In contrast, 28% of the agribusinesses have their employees involved in industry sponsored workshops compared with 5% of farm operators. Of particular interest is the fact that less than 10% of either the agribusinesses or farm operators looked to the educational institutions in the community for in-service education for their workers.

Employers themselves were also involved in in-service education. Trade journals, bulletins, and other publications were the most common source of information for 80% of the farm operators and agribusiness managers. Next in popularity were Cooperative Extension advisors and fields/sales personnel. Nearly all farm operators (80%) and half of the agribusiness managers used these two groups frequently. Agricultural

schools were sources of information for nearly 20% of the farm operators and the agribusiness managers.

Other sources used significantly were trade and professional associations, although the use was more extensive by agribusinesses (50%) than by farm operators. Neither indicated that radio or television was of value as a source of technical information.

Opportunities to Advance Within the Organization

Over half (60%) of the employers said they had a plan for advancing employees within the organization. Some companies (22%) gave increased pay with greater responsibility but without a change in job category; some (10%), might promote into management; and some (25%) provided merit pay increases with continuation on the job.

Employee Benefits

Employees in agriculture are among the last categories of workers to become eligible for the mandated coverage through workman's compensation and unemployment insurance. Now they are beginning to obtain other benefits that have been common to employees in most other categories of employment. In fact, over 70% of the firms provided health coverage for their employees. Half of the farm operators had health plans for employees, while 88% of the agribusiness concerns provided such coverage. Paid sick leave and vacations are now common benefits (see Table 11). A third of the firms provided a life-insurance plan. Disability insurance was provided by 35% of the farm operators and 52% of the agribusiness concerns.

A small proportion (10% of the farm operators and 36% of the agribusinesses) have profit-sharing plans for their employees.

Although farm operators trail in fringe benefits for their employees, there is believed to have been a marked improvement in the past decade. The obvious trend for the future is for both farms and agribusiness to move closer to the benefits now common especially with employee groups who are under union contract.

Future Employment Situation in Agriculture

The general employment situation is not optimistic across the nation nor is it in agriculture. In the study ten years ago, employers in agriculture were desperate for qualified workers. This year, no such crisis was

found Employers did feel there would be growth, but finding workers qualified to serve this growth was not a major concern.

Responses to questions of growth in employment by job category give direction to trends (Table 4). Employers saw the greatest increase in demand to be for equipment operators and repairers. The second-largest demand was for laborers, followed by sales and field personnel. Office/ business staff, managers/supervisors, and professionals were expected to increase, though more slowly.

Thirteen employers foresaw a decrease in the number of production laborers, and six saw a decline in numbers of equipment operators and repairers. Most other categories were expected to stay about the same.

The total number of farm laborers in the county has declined in recent years. The introduction of the electronic sorter on the tomato harvester, several years ago, drastically cut this employment in Yolo County, probably stabilizing the number of laborers at a lower level.

Anticipated Changes in Job Functions

Few industries in recent years have had as much change created by technological advances as has agriculture. The major impact on employees has passed, although employers foresee further changes in functions and activities for certain groups of their employees. For example, of the 39 firms employing equipment and repair personnel, nearly half envision major changes in these jobs within the next five years (Table 5). Also, half of the firms employing farm workers anticipate major changes in the functions they will perform. Less radical changes are expected in the category of sales/field personnel; the expected changes will be mostly in jobs dealing directly with the mechanical and technological aspects of farming and agribusiness.

Computer Technology in Agriculture

Over one-fourth (26%) of the firms had brought the computer into use in their business operation, and another 15% anticipated obtaining some type of computer service soon. Of the agricultural business concerns, 44% had access to a computer and 9% planned on using a computer within five years. Of the farm operators, 8% used a computer and 10% planned to do so. All used the computer for payroll. The second-most common use was for ordering and inventory by agribusiness concerns. Computers were used in management

TABLE 4

CHANGES IN NUMBER OF YEAR-AROUND EMPLOYEES IN FIRMS

Job category	EMPLOYER RESPONSES		
	Increase	Decrease	No change
Labor, production agriculture	18	13	24
Equipment-related	22	6	19
Landscape and nursery	5	--	--
Sales/field	17	1	10
Technical/quality control	2	--	2
Business/office	10	2	19
Managerial/supervisorial	7	2	17
Professional	6	1	6

TABLE 5

NUMBER OF FIRMS EXPECTING CHANGES IN EMPLOYEE JOB FUNCTIONS IN THE NEXT THREE TO FIVE YEARS

Job category	Firms hiring year-around employees	Firms expecting changes[1] in three to five years	
		Number	Percent
Labor, production agriculture	22	11	50.0%
Equipment-related	39	19	48.7%
Landscape and nursery	5	3	60.0%
Sales/field	30	7	23.3%
Technical/quality control	4	6	100.0%
Business/office	44	5	11.4%
Managerial/supervisorial	42	1	2.4%
Professional	14	1	7.1%

[1] In some cases, firms responded to the question even though they may not hire employees in a particular category.

decision making by all farm operators with machines, and by half (12) of the agribusinesses.

Computers are making inroads into the business of agriculture. Six businesses contracted for services from a bank, while eight of the businesses leased their computer hardware and 11 owned computer equipment. Few if any foresaw that the computer would affect the numbers of employees they needed, and most envisioned using existing employees in any expansion of computer use.

Major Problems Encountered by Firms

The statewide study of over 5,000 agricultural firms ten years ago found that personnel matters were their major management problem, and the same was true in this sample of 98 employers. Further, the problem was of equal significance for both farm operators and agribusiness firms. About 40% in each group identified personnel matters as their major management problem. Second among their major problems was governmental regulations, listed first by one-fourth of each group of employers. This problem is expected to intensify as emphasis increases on limitations in the use of chemicals in agriculture. Other problems of major concern for certain other firms were inflation and the instability of markets for agricultural products.

EMPLOYEES IN AGRICULTURAL OCCUPATIONS IN YOLO COUNTY

Study Methodology

Most of the employee interviewees were with the labor force of the farm operators and agribusiness firms in the sample. Although not all firms had employees available at that time, most requests to interview employees were granted.

Two hundred interviews were obtained from employees in the following major job categories: labor, equipment operation and repair; landscape and nursery; sales, technical and quality control; business and office; management/supervisorial; and professional. Forty different job titles were identified within these eight categories. Table 6 lists the number of respondents in each job category. Appendix B gives a complete listing of the job titles.

Most of the interviews were conducted on the job site. Interviews were conducted in either English or Spanish, as appropriate. All employees identified by employers cooperated, and their attitude during the interview was excellent.

The basic objectives of the interviews were:

- To identify competencies and job skills needed by employees in the major agricultural job areas;
- To identify new and emerging jobs as well as jobs on the decline and jobs no longer needed;
- To obtain information on worker job satisfaction and benefits;
- To assess the attitudes and opinions of employees on the future in agriculture of women and people of Mexican ancestry.

A copy of the questionnaire is in Appendix C.

Profile of Employees

The sample included 28 females and 172 males, 20% of whom were of Mexican ancestry. One-half were under 30, and 14% were over 50 years old. Most (70%) were married, and most (65%) were parents. Four families had eight children, while most (78%) had no more than three. The average number of children per family was 2.8.

The educational attainment of employees varied from eighth grade or less to graduate education. As shown in Table 7, 12% had eighth grade or less, 8% had some high school, 14% had terminated a high-school diploma,

TABLE 6

AGRICULTURAL EMPLOYEE INTERVIEWS BY JOB CATEGORY, 1978

Job category	Number of interviews	Different job titles identified
Labor, production agriculture	26	5
Equipment operation and repair	32	5
Landscape and nursery	17	4
Sales/field	12	2
Technical/quality control	21	6
Business/office	25	6
Managerial/supervisorial	51	7
Professional	16	5
TOTAL	200	40

TABLE 7

EDUCATIONAL LEVELS OF EMPLOYEES BY ETHNIC BACKGROUND

Educational levels	Mexican ancestry (n=40) Percent	Non-Mexican ancestry (n=160) Percent	TOTAL (n=200) Percent
Eighth grade or less	60.0%	---	12.0%
Some high school	75.0%	6.3%	8.0%
High-school diploma	10.0%	15.0%	14.0%
Some college or formal training	10.0%	30.0%	26.0%
Bachelor's degree	5.0%	27.5%	23.0%
Graduate work/degree	---	21.2%	17.0%
TOTAL	100.0%	100.0%	100.0%

and 40% had four-year college degrees (including 8 employees with graduate degrees). Most (83%) of the employees of Mexican ancestry were reared in Mexico and had had limited opportunity for formal education. Of these, 60% had no high school while 25% had graduated from high school. Only two of the forty Mexican-ancestry employees had a four-year college degree. Most of those with a high-school education or better had been born in Yolo County.

Employees who had attended a college were divided about equally among the University of California (16%), California State University (16%), and out-of-state colleges (15%).

As one would expect, the job category in which the individual works is related to the educational level attained by the employees. Nearly 60% of the laborers had not graduated from high school, and the same general pattern of educational attainment is found for equipment-related employees. Landscape and sales-related employees had similar educational attainments--more than half have four-year college degrees. Technical/quality control personnel were mostly college trained, and a number (24%) had graduate-level preparation. Business/office personnel also tended to have preparation beyond high schools. Managers/supervisors as a group had a wide range in educational preparation. Most with high school or less were foremen. The professional group, as one would expect, had graduate preparation in most instances (Table 8).

Employment situation. Some 20% of the employees were seasonal--all in the laborer or equipment-operator category. Half of the seasonal employees were of Mexican descent. Most (85%) of the seasonal workers returned to the same employer year after year.

The employees had a much shorter tenure than did the employers. Nearly 20% of the employees had been in their job for one year or less, and two-thirds for five years or less. Only 15% had over 20 years on the job. The median tenure was about four years for employees and 15 years for employers.

In spite of the seemingly low tenure on their jobs, job satisfaction was high and 75% said they wanted to stay in agriculture, either in their present job or in a more advanced position.

Educational Requirements for Employment

Interestingly, nearly 60% of the employees indicated that education was

TABLE 8

EDUCATIONAL ATTAINMENT OF AGRICULTURAL EMPLOYEES BY MAJOR JOB CATEGORY

Job categories	EDUCATIONAL LEVEL				
	Some high school or less	High school diploma	Some college/formal training program	Bachelor's degree	Graduate work/ graduate degree
Laborers, production agriculture (n=26)	15	5	6	0	0
Equipment-related (n=32)	15	5	11	1	0
Landscape/nursery (n=17)	0	4	4	8	1
Sales/field (n=12)	1	2	3	5	1
Technical/quality control (n=21)	1	1	7	7	5
Business/office (n=25)	0	3	11	8	3
Managerial/supervisorial (n=51)	8	7	9	16	11
Professional (n=16)	0	1	1	1	13
TOTAL (n=200)	40	28	52	46	34

not a major factor in obtaining their jobs (although it may well have been a contributing one). Also, many felt they had more education than was needed for their work. In Table 9, the level of education that the job holder perceived to be needed for the job is compared with the level of education actually attained by the holder of the job. In several categories the perceived educational requirements approximate the respondents' educational attainment, i.e., sales and managerial/supervisorial. Respondents in the business office and technical and quality-control areas show major discrepancies between what their educational training was and the level they felt was needed. Thus, over 80% have some college preparation yet 50% felt a high-school education was adequate preparation for the job they held at the time. In the technical area, 24% have done college graduate work, yet no one felt it to be necessary for employment.

During the interviews, employees were asked what general subject-matter areas were necessary for job entry. Thirteen subjects were identified, and employees who felt that education was necessary for their jobs were asked to rank each subject as to how necessary it was in preparation for their present job. A rank order was assigned to the three subject-matter areas in each job classification that received the greatest percentage of "highly necessary" responses. Because of the differences in educational needs between the production and business sectors of the managerial/supervisoral category, their answers are shown both separately and as an aggregate (Table 10).

Overwhelmingly, speech ranked either first or second as a highly necessary subject area by all categories, ranging from 100% of the respondents in the sales category to 71% of the professional category. Agricultural production was ranked very important by four of the occupational areas: sales, technical and quality control, management/supervisorial, and professional. In the equipment-related and business-office categories, mathematics was ranked highly necessary for job entry. English or written skills were ranked number one for professional employees, number two for business-office personnel, and number three for both sales and landscape and nursery personnel.

As mentioned earlier, both employers and employees ranked background and job (work) experience as highly important in obtaining agricultural

TABLE 9

COMPARISON OF LEVEL OF EDUCATION ATTAINED BY EMPLOYEES AND EDUCATION NEEDED, BY JOB CATEGORIES

Job category	High school or less		Some college or formal training		Bachelor's degree		Graduate work/degree	
	Needed	Attained	Needed	Attained	Needed	Attained	Needed	Attained
Laborers, production agriculture n=26	100.0%	76.9%	--	23.1%	--	--	--	--
Equipment related n=32	87.5%	62.5%	9.4%	34.4%	3.1%	3.1%	--	--
Landscape and nursery n=17	35.3%	23.5%	41.2%	23.5%	23.5%	47.1%	--	--
Sales/field n=12	33.3%	25.0%	33.3%	25.0%	33.3%	41.7%	--	8.3%
Technical/ quality control n=21	42.9%	9.6%	23.8%	33.0%	33.3%	33.3%	--	23.8%
Business/office n=24	50.0%	12.0%	16.7%	44.0%	33.3%	32.0%	--	12.0%
Managerial/supervisorial								
Production n=21	72.2%	52.3%	14.3%	14.3%	9.5%	19.0%	--	14.3%
Business n=30	26.7%	13.3%	26.7%	20.0%	43.3%	40.0%	3.3%	26.7%
Professional n=16	6.3%	6.3%	--	6.3%	43.8%	6.3%	50.0%	81.3%
TOTAL n=200	55.3%	34.0%	17.1%	26.0%	23.1%	23.0%	4.5%	17.0%

TABLE 10

SUBJECT AREAS RANKED HIGHLY NECESSARY FOR EMPLOYMENT BY WORKERS BY JOB CATEGORY

	OCCUPATIONAL CATEGORIES								
						Managerial/Supervisorial			
Subject-matter areas	Equipment-related (n=7) % Rank	Landscape/nursery (n=16) % Rank	Sales (n=8) % Rank	Technical/quality control (n=16) % Rank	Business/office (n=23) % Rank	Production (n=5) % Rank	Business (n=27) % Rank	Total (n=32) % Rank	Professorial (n=14) % Rank
English	43%	63% 3	75% 3	44%	78% 2	20%	56%	47%	79% 1
Speech	83% 2	75% 1	100% 1	75% 1	78% 2	40%	78% 1	72% 1	71% 2
Mathematics	87% 1	63%	75% 3	25%	87% 1	20%	41%	38%	57%
Cultural background	17%	13%	13%	---	9%	---	7%	6%	---
Physical sciences	14%	13%	50%	25%	---	40%	30%	31%	79% 1
Biological sciences	43%	50%	75% 3	44% 3	18%	60% 3	48%	50%	71% 2
Business	17%	69% 2	63%	6%	73% 3	40%	70% 3	66% 3	29%
Business management	50%	50%	33%	25%	65%	60% 3	74% 2	72% 1	29%
Labor management	67%	31%	25%	25%	27%	80% 1	52%	56%	29%
Labor contracts	17%	33%	---	---	29%	20%	26%	25%	7%
Ag. production	67%	20%	78% 2	56% 2	52%	40%	74% 2	69% 2	64% 3
Engineering-mechanics	80% 3	20%	29%	---	9%	75% 2	30%	34%	36%
Language	20%	7%	---	---	4%	75% 2	15%	22%	21%

NOTE: The laborer job category was not included, because such jobs have minimal educational training needs.

employment. Over 50% of the employees indicated that work experience was necessary for their present job. A number (19%) cited an agricultural background, especially growing up in an agricultural environment, as important if not essential in their present work.

Employee Benefits

Benefits to employees other than workman's compensation and unemployment insurance varied. As expected, laborers seemed to be eligible for fewer fringe benefits. State-mandated benefits--unemployment and disability insurance--were listed most frequently by laborers as being available with their jobs. Unemployment insurance was identified by 70% of the laborers, and disability insurance by 65%. Health insurance was the only other benefit that over 50% of the laborer respondents indicated they received (Table 11).

Fewer benefits are offered to laborers; one explanation may be that this category includes many seasonal workers. Employees in the sales category listed the greatest number of benefits: health insurance, paid vacations, holidays, sick leave, pension plans, profit sharing, life insurance, and transportation were all received by over 50% of these respondents. Table 11 also indicates the rank order of the benefits received by the eight occupational categories.

Description of Job Categories of Employees

An analysis by eight major occupational categories follows. Included are employee responses as to the educational skills needed in their particular job and the general outlook for the future of their jobs. For a detailed analysis of the various functions and activities of the job titles, see Functions and Activities of Agricultural Personnel in Yolo County, 1979. For comparison and review purposes, that publication also includes the functions of like jobs from a 1970 study.

Laborers in production agriculture. Of 200 employees interviewed, 26 were laborers. The following job titles were represented: farmworker, diversified crop; farmworker, general; farmworker, livestock; irrigator; and irrigation-system installer. Half of the labor employees were seasonal, working four to ten months each year. All but two of the seasonal workers had worked for the same employer each year. Farmworker and irrigator are two job titles that were about equally divided between being year-around and

TABLE 11

PERCENT AND RANK ORDER OF BENEFITS BY MAJOR JOB CATEGORY

Employee benefits	AGRICULTURAL JOB CATEGORIES							
	Laborers (n=26)	Equipment related (n=32)	Landscape nursery (n=17)	Sales (n=12)	Technical quality control (n=21)	Business office (n=25)	Managerial/supervisorial (n=51)	Professional (n=16)
Health insurance	61.5% 3	68.8% 1	41.2% 3	83.3% 1	85.7% 2	88.0% 2	92.2% 1	68.8% 2
Life insurance	34.6%	25.0%	17.6%	58.3% 3	33.3%	52.0%	54.9%	50.0%
Dental insurance	11.5%	21.9%	--	--	47.6%	20.0%	37.3%	31.3%
Paid sick leave	11.5%	37.5% 3	41.2% 3	75.0% 2	81.0% 3	72.0% 3	64.7%	62.5% 3
Paid vacation	34.6%	43.8% 2	70.6% 1	83.3% 1	81.0% 3	92.0% 1	78.4% 2	81.3% 1
Paid holidays	26.9%	34.4%	47.1% 2	83.3% 1	90.5% 1	88.0% 2	74.5% 3	81.3% 1
Pension plan	26.9%	25.0%	17.6%	75.0% 2	81.0% 3	36.0%	43.1%	50.0%
Profit sharing	19.2%	21.9%	5.9%	58.3% 3	4.8%	28.0%	35.3%	12.5%
Transportation	34.6%	21.9%	--	58.3% 3	14.3%	28.0%	62.7%	18.8%
Maternity leave	3.8%	--	--	8.3%	14.3%	16.4%	--	--
Housing	26.9%	25.0%	5.9%	--	--	4.0%	3.9%	--
Disability insurance	64.5% 2	43.8% 2	23.5%	41.7%	33.3%	32.0%	37.3%	37.5%
Unemployment insurance	69.2% 1	23.3%	5.9%	41.7%	23.8%	24.0%	37.3%	12.5%
Workman's compensation	34.6%	12.5%	17.6%	41.7%	33.3%	24.0%	23.5%	12.5%
Share of crop	11.5%	--	--	--	4.8%	--	3.9%	--

NOTE: Figure below percent is rank order by major job category.

seasonal employment. The job title of irrigation-system installer appears to be a year-around job. Half of the employees in the laborer job grouping were of Mexican ancestry.

Little formal education is required for the jobs in this grouping. Sixty percent of these employees had less than a high-school education. None of these employees stated that completion of high school was necessary for their jobs, and 80% reported that educational level had no part in obtaining their jobs. Traditionally, educators have ignored this job grouping, yet, given the technological advances in agriculture, this job classification must not be overlooked in the future. Over one-third of the laborers said they hoped to move up to better jobs at their places of employment, specifically to jobs such as equipment operator or repairer. Both require additional training. Employees also expressed interest in similar jobs with greater responsibilities.

About half of the laborers expected the major job changes in the next three to five years to be a result of technology. A move to more year-around and less seasonal employment was noted as the number of seasonal workers was decreasing. Few laborers saw their jobs as disappearing totally.

The major employers of jobs in this grouping are found to be farm operators in field, tree, and row crops or combinations thereof.

Equipment repair, assembly, and operation personnel. The jobs in this category involve repair, assembly, operation, and construction of equipment and machinery, both on and off farms. The predominant titles found were equipment operator, general farm machinery; tractor operator; equipment welder and assemblyman; general mechanic and diesel mechanic; and shop foreman. Thirty-two equipment-related employees were interviewed.

Over 60% of the employees in the equipment-related category worked year-around. Of the seasonal employees, over half were tractor or equipment operators, most of whom average 8 months of work each year. Most seasonal employees in this category worked for the same employer each year. Year-around employees averaged 7 years on the job (range 1-28 years). Half of this group of 32 equipment-related workers were of Mexican ancestry.

Few employees in this category had formal education beyond high school. A few had attended formal training programs. Although the educational level was higher for this job category than for laborers, few of the employees

felt that their education was needed to obtain their jobs; in fact, over 70% indicated that some high-school education was adequate for the job of equipment operator or repairer. Educational requirements differed between the subgroups of equipment operators and/or tractor operators, and repairers and/or mechanics. In general, tractor and equipment operators did not feel that completion of high school was necessary, whereas employees with jobs relating to repairing machinery and equipment did feel a need to complete high school. These findings agree with those of the 1970 study.

Over one-third of the equipment related workers commented on a need for practical work experience. In fact, 65% had had on-the-job training, and nearly 20% had held apprenticeships.

Sixty percent of the employees foresaw that technological changes would affect their jobs in the next three to five years. They saw a need for additional technical training in operation and repair of new advanced equipment. No one felt his job would disappear as a result of technological changes.

Forty-four percent expected to move on to better jobs, either with their present employer or with another agricultural employer. Sixty percent chose to stay in agriculture when asked, "if given a choice, would you stay or leave the agricultural field?"

Employees in the category are in both farm and nonfarm operations. Most seasonal and year-around equipment and tractor operators are in farming operations, while repair workers are found in related businesses, primarily equipment sales.

Landscape and nursery workers. Although the landscape and nursery business is a major agricultural employer within California, that is not true of Yolo County. Seventeen employees were interviewed representing three different job titles: nursery worker; gardener or landscape worker; and landscape designer and contractor. Although these workers were employed year-around, tenure was short. Only one had been working at the same job for more than five years, seven employees had been working one year or less, and 11 had been working for the same firm for two to five years. This pattern suggests a flow through nature of employment for landscape and nursery workers.

Educational preparation for this job category was considerably different

from that needed by the laborer and equipment-related groups. Completion of high school appears to be a necessity. Three-fourths had some college, half had four-year college degrees, and one person had completed some college graduate work. Two employees had attended the University of California, three were from a state university, and three attended California community colleges. Most (76%) of the landscape and nursery employees felt that education was a factor in obtaining their jobs, although many felt they were overeducated for their present position. For example, nearly half had college degrees but only 24% felt that level to be necessary.

The subject-matter areas considered most important by those interviewed were English, speech, mathematics, and business. Agricultural production, especially propagation and disease control, also was felt to be somewhat necessary.

About 60% of the interviewees said they were already at the highest level possible in their job. Many hoped to be owners of their own firms. Only two employees in this category said they would leave agricultural employment if given the choice. Fifty-eight percent said they wished to continue in the same job, and 30% wished to move to better jobs in their field. Little change was foreseen in landscape and nursery jobs other than the growth effects of business expansion.

Sales personnel. The majority of jobs in this category are found in farm-related businesses such as chemical, seed, and equipment sales companies, horticultural businesses, and agricultural service businesses. The predominant titles are field representative, sales; and field or route salesperson. Twelve employees were interviewed, and all but one worked the year around. One sales employee was of Mexican ancestry.

The educational level of sales employees was quite varied: 42% had four-year college degrees, 25% had some college or a formal training program, 17% had only high school, and one employee had less than a high-school education. As a group, sales personnel feel that preparation for their work requires a formal education. Ninety percent said that at least high school was required, with 33% favoring a community college or formal training program and an equal number indicating that a college degree was essential. In California, chemical salespersons must be licensed, which requires the completion of specified college courses. Many employees noted the

importance of agricultural background and experience for agricultural sales.

Academic requirements for sales work were extensive, with almost all subject areas considered somewhat to highly necessary for job entry. Speech, English, mathematics, physical and biological sciences, business, and agricultural production were all rated highly necessary by more than half of the respondents.

Job satisfaction was not universal in this category. Nearly 40% of the group said that, if given the opportunity, they would look for the same type of work. Fifty-five percent said they would like to obtain a better job in agriculture. Many (50%) of the sales persons were looking to management work in the future.

Future changes in sales work seem related mostly to new and additional governmental regulations (especially for pesticide and chemical sales and application businesses) and technology as it relates to new types of farm-related equipment. No one felt their jobs were in danger of disappearing as a result of these changes.

Technicians and quality-control personnel. Two types of workers are included in this category. An overlap in the functions and activities of technician and quality-control jobs makes them difficult to separate. Both groups of employees take samples, make tests, and evaluate results.

Six titles are included in this job category: sampler; technician--laboratory, plant, research; quality-control specialist; agricultural biologist; field-crop inspector; and quality-control supervisor. The quality-control specialist, agricultural biologist, and field-crop inspector have about the same functions and activities. The title used seems to depend on the company.

Twenty-one employees in this category were interviewed, of whom three were seasonal workers. The job title field inspector is basically a seasonal job, mainly requiring a high-school diploma and previous agricultural-industry experience. In Yolo County, this type of job is often held by college students during the growing season.

The educational attainment of these employees is quite high. One-third had some college or formal training, a like number had four-year college degrees, and 24% had done some graduate work or earned a graduate degree.

Only two had only a high-school diploma. Many felt overqualified for their jobs. Forty-three percent felt that high school was adequate preparation for their present jobs, but one-fourth indicated that some college or formal training was necessary. One-third mentioned a four-year college degree. No employee felt that college graduate study was necessary for his/her job. This wide discrepancy between educational attainment and perceived requirements may well be due to the educational institutions located in Yolo County and the surrounding counties, which provide an aggressive pool of student labor seeking technical and quality-control work.

The subject matter preparation considered most important by 75% in this job category was in speech, agricultural production, English, mathematics, physical sciences, and biological sciences. The type of agricultural production considered most valuable was knowledge of crop production, plant diseases, and plant growth.

One-half of the technicians and quality-control workers see no change in their work in the coming years. The other half see changes resulting from the growing number of government regulations. No employee felt that future changes in their jobs would lead to elimination of the job.

Most of the technicians and quality-control personnel were employed by state and county agricultural regulatory agencies or by private product-development firms. Several technicians were employed in research activities at public institutions.

Business/office personnel. Although business/office personnel are usually not considered "agricultural workers," employers and employees consider knowledge about agricultural production to be important for business-office personnel on farms or in agribusinesses.

Twenty-five employees were interviewed, representing the following titles: secretary; bookkeeper; office manager; buyer; grain merchant; and agricultural loan officer.

Related agribusiness jobs outnumbered on-farm jobs in this category. Most jobs are found in larger operations in both areas, although it is not uncommon for a wife to perform an office type of job in a small operation.

Most (90%) of those in the office-job titles were women, the sole category in which women were the majority. The only other categories with more than one or two women employees were laborer (4), landscape/nursery

(3), and quality-control technicians (3). All employees in this category worked the year-around.

Nearly all of this group (88%) had attended some college, and, of those, one-third had four-year college degrees. Three had done some graduate work or held a graduate degree. Only three had terminated schooling at the secondary level. As one might expect, those in the business aspect of companies were more likely to have attended college than those in clerical jobs. Education was considered a major factor for job entry for those in the business sector.

Of the office personnel, about half felt that education was a major factor for job entry. When asked how much education was needed for their present job, 75% said high school or less. The remaining 25% saw either some college or a college degree necessary--these employees had bookkeeping and management responsibilities.

The subject-matter areas considered most necessary for this category were mathematics, speech, English, and business. Over 70% of the respondents considered business management, labor management, and agricultural production also highly or somewhat necessary.

Business personnel expressed a high degree of job satisfaction. All would stay in agriculture if allowed to. All also were interested in progressing into better jobs with their firms. Job satisfaction for office personnel was considerably less, for nearly 40% would move out of their jobs in agriculture if given the opportunity.

No major job changes were anticipated by the respondents in this category. Some wished to move into jobs with more authority and responsibility.

Managerial/supervisorial personnel. The managerial/supervisorial job category is the largest, with 51 employees in either farm production or related agribusiness. Job titles in farm production were: crew foreman and farm/ranch manager. In the business-related sector, the titles were: general foreman; field representative, processing plant; manager, agriculture-related business; parts manager; and service manager.

Although the functions of the jobs listed are similar, the number and level of activities differ. Twenty-one employees were from the production sector, of which one-third held seasonal jobs. Most seasonal jobs (ranging from 5 to 11 months) were held by crew foremen. Although seasonal, all

employees worked for the same employer each year, with tenure from 4 to 32 years. No other title within this category was seasonal.

Those employed as foremen have less education than managers and feel that less education is required for their jobs. All but two foremen had no more than a high-school diploma. In contrast, over 50% of the managers had college degrees or college graduate level education, and the remainder had had some college work. One-third of the foremen and none of the managers were of Mexican ancestry.

Thirty employees were interviewed in the related agribusiness sector. Their educational attainment and the level of education required were substantially greater than in the production sector. Twenty-seven percent had done graduate work, 67% had four-year college degrees, 20% had some college or formal training program, and 13% had no more than a high-school diploma. Only one felt that graduate-level education was required; 43% said a college degree; 27% , said some college or formal training; and 27% felt that a high-school diploma was adequate. Nearly half of the business-sector personnel indicated that education was a major factor in obtaining their jobs, nearly double the one-fourth indicating that in the production sector.

The respondents in this category rated business management, speech, agricultural production, and business as highly necessary academic subjects for job entry. Spanish was considered necessary by over 60% of the respondents, specifically the crew foremen. Labor management was also considered highly necessary by the crew foremen.

Job satisfaction was generally high among these employees. Most said they would rather stay in agriculture than move into another field. Nearly half planned to continue in their present job, and a like number said they would consider a better job providing it was in agriculture.

Seventy-six percent of the respondents foresaw changes in their jobs in the next three to five years. Thirty percent felt these changes would be a result of technological factors, and a like number indicated business expansion as the cause. Technological factors included new developments in chemical application, advanced equipment and machinery, and computer business-management skills.

The most frequent answers to the question "What do you like about your job?" were freedom, challenge, and variety of job functions. Another

popular answer was "being outdoors rather than confined to an office." Field representatives most frequently commented about freedom and travel; managers liked the variety of activities they performed and the challenge of the job. Love of agriculture and farming was a common characteristic of all in this category.

Professional agricultural personnel. Professional workers in agriculture complete the scope of occupational categories in this study. Although this category was not included in the previous study, it is necessary to give a complete picture of the various levels and types of occupations in agriculture.

Sixteen professional employees were interviewed representing the areas of engineering, developmental research, and agronomy. Specific titles included: agronomist; agricultural engineer; equipment designer; plant breeder; and agricultural research scientist.

Professional-level jobs imply substantial educational preparation, and that was true in this situation. Thirteen of the sixteen had graduate-level education. Only one had ended his formal education with high school. Half indicated that graduate preparation was necessary for their job, and about half indicated a need for a four-year college degree.

Fourteen of the 16 responded that education was a major factor in obtaining their present positions. Subject-matter areas necessary for job entry were physical sciences, English, speech, biological sciences, and agricultural production.

Seventy-five percent of the professional employees expected changes in their jobs in the near future. The changes included the effects of new technologies on equipment, greater use of computers in management decisions (planting schedules and product marketing), effects of new energy sources, and unforeseen changes in research emphases and/or directions.

WOMEN AND MINORITIES IN AGRICULTURE

One of the major goals of this project was to study the future of women and minorities in agriculture. In this study the "minorities" are basically people of Mexican ancestry, the largest minority group involved in agricultural work in Yolo county. To assess the work environment for women and minorities, both employers and employees were asked questions about work relationships, employment opportunities, and general abilities to perform work. Some of the most revealing information was gleaned from respondents' comments to open-ended questions.

Emerging Role of Women in Agriculture

Although women have historically been associated with agriculture in Western culture, only in recent years have they had equal opportunity for academic and vocational preparation in agriculture. In California in 1977, over 100,000 students were engaged in the study of agriculture, over one-third of them were women. While the average yearly increase of students in secondary schools was less than 1%, the number of females enrolling in agriculture between 1973 and 1977 increased over 25% annually, compared with a 4% annual increase for males. The rate of increase of female enrollees in agriculture is three to ten times as fast in community colleges and four year colleges and universities as the overall growth of female enrollees in these institutions. (See Appendix A for detailed tables.)

Employee perspective on women in agriculture. Employers and the population in general have only recently become aware that women with vocational and academic credentials in agriculture will be vying, more and more, for positions both on farms and in agribusinesses. Some have already broken the barrier. Of the 73 firms with female employees, 43 have one to five females, 11 employ six to ten females, and 19 employ over ten. The majority of those with over ten females are farm operations that employ thinning and harvest crews. Forty-three firms employed women in clerical positions, the most common category of employment, followed by laborers (in 18 companies). Seven firms had females in managerial/supervisorial positions, and six had females in the sales/field staff. While female employees are becoming visible, most are in the traditional areas of laborer and clerical. A few have broken the barrier into the professional areas, which have the prerequisite of a college degree.

Most employers (71%) saw no reason why their present female employees, with further training and experience, could not move into better jobs within the firm. The common excuse that women lacked the physical strength necessary for the job was seen as justifiable by many employers. Few limitations to employment in agriculture were identified by employees.

Likewise, employers identified only a few changes that would be necessary within the firm in order to employ more women. Some expected there would be initial resistance from male employees. Some expected a need for more supervision initially, and a few anticipated a need to modify physical facilities. Five employers speculated that more females in their labor force would improve the entire working environment in the firm.

Two-thirds of employers had favorable attitudes toward present female employees. Only six reported problems associated with employing females. While the overall expressed feelings of employers toward women employees was positive, there was reason to doubt that the agricultural industry is yet ready for the many females who are becoming qualified for work in these areas. One farm operator was reported to have said, "There will never be a female worker on this farm as long as I'm boss." But then he had second thoughts: Reflecting that although he was far too traditional in his ways to hire women, he felt his daughter was very qualified and capable in farm management skills, so he conceded that possibly women would be hired in the future.

All employers but six foresaw no problem for females becoming employed in agriculture. About 20% felt that females could work in any of the job categories (Table 12). They predicted that the greatest opportunity for females was in sales, technical areas of quality control, equipment operation, and clerical/business. In fact, when stratified between production agriculture and agribusiness, the production group saw the more positive opportunity for women, particularly in the professional/owner category and as laborers. It is our hypothesis that production personnel may not yet feel the job-competition crunch of this new source of employees and/or they may be more confident of women who have had a history of being hired for farm labor and as helpers to husband/father farmers.

Employee perspectives on hiring women. As stated earlier, 28 of 200 employees interviewed were women, and half of those were employed in the

TABLE 12

OCCUPATIONAL AREAS IN WHICH EMPLOYERS BELIEVE MEXICAN AMERICANS

AND WOMEN WILL BE EMPLOYED IN AGRICULTURE

Agricultural occupational areas	In which occupational areas will Mexican Americans and women be finding employment in the future? MEXICAN AMERICANS			WOMEN		
	Production agriculture (n=48)	Related businesses (n=50)	Total (n=98)	Production agriculture (n=48)	Related businesses (n=50)	Total (n=98)
Labor, production agriculture	81.3%	82.0%	81.6%	64.6%	26.0%	44.9%
Equipment-related	87.5%	74.0%	80.6%	58.3%	40.0%	49.0%
Processing	52.0%	58.0%	55.1%	36.6%	32.0%	35.7%
Landscape and nursery	50.0%	56.0%	53.0%	31.3%	34.0%	32.7%
Livestock	50.0%	54.0%	52.0%	35.4%	22.0%	28.6%
Sales	50.0%	58.0%	54.1%	66.7%	56.0%	61.2%
Technical/quality control	47.9%	54.0%	51.0%	58.3%	42.0%	50.0%
Business/office	50.0%	54.0%	52.0%	54.2%	48.0%	51.0%
Managerial/ supervisorial	58.3%	62.0%	60.2%	47.9%	48.0%	47.9%
Professional/ owner	52.0%	56.0%	54.0%	60.4%	42.0%	51.0%
ALL CATEGORIES	47.9%	52.0%	50.0%	25.0%	18.0%	21.4%

office-occupation category. Few women are employed in what are considered traditionally male-oriented occupations. Technical, landscape and nursery, and labor jobs have often been held by women, whereas other agricultural occupations have been entered by females only recently. Our sample included four women who were laborers, and three each in technical/quality control work and managerial/ supervisorial work. Only one woman held what is considered a nontraditional job--field representative--and this was a seasonal position, receiving no job benefits.

Although well over 80% of the employees felt that a woman would be able to do his/her job (see Table 13), prejudices against women were freely expressed. Most commonly, it was felt that women had physical limitations preventing them from performing agricultural work and that women were taking "men's work away from men--leaving their place." Many respondents in sales businesses or client-contact work felt that women employees would be unacceptable to many farmer-customers. Respondents relayed feelings of mistrust toward women, saying that farmers didn't think they were knowledgeable or competent. One agribusiness employee commented "[women should do]...nothing with exposure to clients--farmers hate women, especially the guys over 50." One grain merchant simply recommended women to stay away from agriculture, that agriculture is too slow and resistant to change, too conservative, and too sexist.

Changes in agriculture to incorporate more women in employment were foreseen by many employees. Many asserted that if a woman was qualified and knowledgeable, she should be employed. One agribusinessman summarized many respondents' comments in saying that growers are becoming "a more business-oriented breed and the old style red-necked farmer is disappearing." He warned, "...women simply need to withstand the transition, because things are changing--unfortunately now [for example], women field representatives have to take a lot of garbage from some farmers."

Interestingly, when employees were queried about having a female as a supervisor, nearly 90% said they "would not mind" as long as she was qualified. Employees in sales, management, and professional work were most resistant to women supervisors. As a group, Mexican Americans were more accepting of women supervisors than were the others (Table 14).

Nearly 50% of the employees felt that employment of women would have

TABLE 13

EMPLOYEES WHO FELT WOMEN COULD DO THE SAME

WORK THEY THEMSELVES ARE REQUIRED TO PERFORM

Job category	Percent affirmative
Labor, production agriculture (n=24)	66.7%
Equipment-related (n=32)	78.1%
Landscape and nursery (n=17)	82.4%
Sales/field (n=12)	91.7%
Technical/quality control (n=21)	90.5%
Business/office (n=25)	100.0%
Managerial/supervisorial	
Production (n=21)	95.2%
Business (n=30)	76.7%
Professional (n=16)	75.0%
TOTAL (n=200)	83.3%

TABLE 14

EMPLOYEE OPINIONS ON WOMEN AS THEIR SUPERVISORS

Employees	How would you feel about having a woman as a supervisor? Favorable	Unfavorable/ refuse to work
Ethnic background		
Mexican ancestry (n=40)	95.0%	5.0%
Non-Mexican ancestry (n=160)	86.0%	14.0%
Job category		
Labor, production agriculture (n=24)	91.7%	8.3%
Equipment-related (n=32)	90.6%	9.4%
Landscape and nursery (n=17)	94.1%	5.9%
Sales/field (n=12)	75.0%	25.0%
Technical/quality control (n=21)	95.2%	4.8%
Business/office (n=25)	96.0%	4.0%
Managerial/supervisiorial		
Production (n=21)	71.4%	28.6%
Business (n=29)	82.8%	17.2%
Professional (n=16)	87.5%	12.5%

no effect on employee-employer relations. About 25% felt that women employees would improve relations. Unfortunately, their prediction of "a better work environment" reflected views of a female stereotype. The "better work environment" included: cleanliness, improved sanitation facilities, orderliness, comfort, and more civilized language patterns. These comments imply naive opinions and conceptions of women workers (seemingly simply transferring to the work arena what they felt the woman's role was at home). A few felt that the introduction of woman workers would improve men's attitudes toward women. On the other hand, some indicated that production would decline.

Thus, while well over three-fourths of the employees saw women as able agricultural employees, their future in agriculture at this point appears marginal. The major barriers appear to be traditional role stereotyping, the male "old boy" fraternity, and a mistrust and lack of confidence in women's competencies. These barriers are a type that is slow to change.

Future of Employees of Mexican Descent

Mexican Americans have been much a part of California agriculture, and there is reason to believe that more and more of the work in production agriculture in the future will be done by those of Mexican ancestry. One study shows that the proportion of the labor force in agriculture is now 90% Mexican American, up from less than half that figure a decade earlier. With the maturing of the labor force in agricultural production and agribusiness, the future role that employers see for Mexican Americans takes on greater significance.

The employer perspective. Over half the employers see no limits on the employment of Mexican Americans in any job classification providing they are qualified. As stated elsewhere in this document, those of Mexican descent in this study had discouragingly low educational attainments. Over three-fourths had not graduated from high school and many had had no high school at all. Only ten (25%) were high-school graduates, in strong contrast to the other employees (over 90% high-school graduates and nearly 50% college graduates). It is obvious that the Mexican-American employees in agriculture in this study are under a serious educational handicap in competing for better jobs.

Employers tend to see the greatest portion of Mexican Americans in the traditional role of laborer or equipment operator, yet nationality is no bar to advancement providing they are qualified--including being fluent in English.

While the sample of employees contained 20% Mexican Americans, two-thirds of the employers had Mexican Americans on their payrolls. In fact, over 70% of the farm operators indicated that they employed Mexican Americans at some time during the year, and over 40% hired six or more people of Mexican ancestry. A like percentage of agricultural businesses employ Mexican Americans, although they tend to have fewer per firm. Only 30% employ over six.

As expressed by employers of Mexican Americans, the most common work category is that of laborer. Thirty-six firms had such employees, and 21 firms employed over six regularly. Next in frequency was equipment operator and repair, found in 30 firms. Mexican Americans were found also in other job categories--in sales, in managerial/supervisorial positions, and in the professional/owner group.

Ability to speak English was a requirement for employment by over half the companies, and most employers (70%) were willing to move Mexican Americans to better jobs as they became qualified.

The employee perspective. Of the 200 employees interviewed, 40 were of Mexican descent. Most (73%) were employed in either the laborer or equipment-related occupational categories. Seven of the 21 in the managerial/supervisorial subgroup who were foremen in farm operations were Mexican American. No Mexican Americans appeared in the business and office, or professional categories (Table 15).

The future in agriculture appears brighter for Mexican Americans than for women. Most employees felt that Mexican Americans would be more likely to be employed than women. Fifty-four percent saw no reason why Mexican Americans would not be employed in all occupational categories, whereas only about 37% felt that women would find jobs in all categories. The only category in which employees saw more women than Mexican Americans was in the technical and quality-control field, an area with a history of employing women as laboratory and research technicians.

Interestingly, Mexican Americans differed greatly from other employees

TABLE 15

EMPLOYEES BY JOB CATEGORY, RACE, AND SEX

Job category	RACE		SEX	
	Mexican Americans	Non-Mexican Americans	Female	Male
Labor, production agriculture	13	13	4	22
Equipment-related	16	16	0	32
Landscape and nursery	1	16	1	16
Sales/field	1	11	2	10
Technical/quality control	1	20	3	18
Business/office	0	25	14	11
Managerial/supervisorial				
Production	7	14	3	18
Business	1	29	1	29
Professional	0	16	0	16
TOTAL	40	160	28	172

in responses to the question about areas where Mexican Americans would find employment. The employment expectations of the Mexican Americans were lower than others expectations for them. Thus, most (87%) Mexican Americans see themselves staying in labor and equipment-related work, whereas over 60% of the other employees think that, with proper training, experience, and language facility, Mexican Americans could move into any and all areas of agricultural employment. Only one in four of the Mexican Americans foresaw an opportunity to find work in any and all categories in the future (Table 16). It is not clear whether these responses reflect low aspirations and/or low self-esteem or a more realistic grasp of the work sitaution. One Mexican-American field representative commented, "I don't see many Mexican Americans in college who are interested in agriculture; most [who] want to advance do not stay in agriculture." Another respondent, a Mexican American laborer, expressed a similar view, saying that although he felt "people of any race could do anything they wanted, with training and opportunity," he would like his children to go to college and get out of the fields.
Some non-Mexican American employees regretfully felt that the long-held stereotypes would prevail of Mexican Americans being employed primarily in production-type jobs. For instance, 84% of the non-Mexican employees still saw the Mexican Americans employed in labor work and 83% saw them in equipment operation and repair, with a lesser percent in areas such as professional agriculture (65%), livestock (66%), business (66%), or sales (69%). The old cliche of "pulling themselves up by their bootstraps" was quite evident in many of the respondent's comments:

> "If they have the desire to work and get the education--they can do all things."
>
> "They could do whatever they want: most employers are more than anxious to use them [Mexican Americans]."

Language and education were felt to be the most common barriers to employment. As one business employee commented, "They're putting themselves out of work by not trying [to learn English]." A few respondents cited personal drive and cultural barriers, and others cited farmer prejudices that had emerged with the farmworker union movement.

As to work aspirations, those Mexican Americans and other employees who had hopes of moving on to better jobs were in about the same proportion,

TABLE 16

COMPARISON OF MEXICAN AMERICAN AND NON-MEXICAN AMERICAN EMPLOYEES' RESPONSES TO THE FUTURE OF MEXICAN AMERICANS IN AGRICULTURE

	In which occupational areas will Mexican Americans be finding employment in the future?		
	EMPLOYEES		
Occupational areas	Mexican American (n=40)	Non-Mexican American (n=160)	Total (n=200)
Labor, production agriculture	85.0%	83.8%	84.0%
Equipment-related	67.5%	82.5%	79.5%
Processing	45.5%	69.4%	64.0%
Landscape and nursery	30.0%	68.8%	61.0%
Livestock	27.5%	65.6%	58.0%
Sales/field	30.0%	68.8%	61.0%
Technical/quality control	27.5%	70.0%	61.5%
Business/office	30.0%	65.6%	58.5%
Managerial/supervisorial	32.5%	70.6%	63.0%
Professional	30.0%	65.0%	58.0%
Owner	25.0%	65.0%	57.0%
All categories	25.0%	61.3%	54.0%

respectively 43% and 40%. Yet when queried as to the type of "better" job envisioned, the two groups differed widely. Three times as many non-Mexican Americans expected to move into management or ownership positions as did Mexican Americans. One-third of non-Mexican Americans felt they had reached the top level of their job potential, whereas none of the Mexican Americans felt that way. The most common reason given by Mexican Americans was that they would soon be leaving the job, and hence had no plans for advancement. This may reflect the fact that a larger proportion of Mexican Americans held seasonal jobs.

Thus, most (80%) of the employees view Mexican Americans as future coworkers. The only stated barriers to agricultural employment appear to relate to skills--poor or nonexistent English skills and insufficient education. These lacks are generally easily rectifiable by existing public programs. Few comments of a prejudicial nature were noted. The barriers to women, however, are less easily surmounted, for they are erected by a deep-rooted role concept. Women in men's agricultural occupations are apparently considered to be out of their historical role and "place," and present a new competitive foe threatening both convention and individual sources of livelihood.

FINDINGS

The following applies to the sample of growers (48), agribusinesses (50), and employees in agriculture (200) in Yolo County. There is reason to believe they are representative of others in Yolo County, but generalization beyond the sample must be approached with proper caution.

Employers

1) Farms in Yolo County are generally large, and three-fourths of them have been in operation for over twenty years. Most operators had been on the farm for over 20 years.
2) Agricultural businesses in the county are well established, although of more recent origin than farms.
3) Both farm operators and agribusiness managers have educational achievement far beyond that of the general population. Only three employers had not graduated from high school. Nearly one-third of the farm operators and over half the agribusiness managers held bachelor degrees.
4) Only half of the growers used seasonal workers in their farms, generally laborers or equipment operators. Taking advantage of new production technology, farmers are organizing their operations to reduce dependence upon seasonal workers.
5) Operators of farms and of agribusinesses both wanted new employees to have work experience, often rating that above formal education. At this time, few looked to the secondary school or colleges for employees or for in-service training for themselves or their employees.
6) Few employers looked to public educational institutions for new employees except for the high-level, technically prepared person or a professional agriculturist. Most employees in the other six categories were obtained through an informal network--usually word of mouth.
7) Employers in this study were far less uneasy about finding high-quality employees than were those interviewed ten years ago. Nevertheless, they still viewed personnel management to be their number-one problem in operating their farm or business. Motivation was a major concern.

8) About half the employers provided some form of in-service education for their employees. Industry-sponsored in-service training was used extensively by agribusinesses.

9) Employers were very sensitive to the need to provide upward job mobility for their employees. Some did so by promotions from within the organization; others increased responsibility (and pay) for the individual within the present job.

10) Trade journal bulletins and technical publications were the important sources of new information for both the farmers and agribusinessmen. Nearly all farmers and half the agribusinessmen used Cooperative Extension farm advisors as sources of information. Trade associations also were important sources of information for both groups.

11) The use of computers by farmers and agribusinessmen is going to increase. About one-fourth of the employers used a computer, and a substantial number of others had future plans for this service. The most common use of computers was for payrolls.

Employees

1) Employees were generally quite satisfied with their jobs, and most wanted to stay in agriculture even if they were to change jobs. Those in sales were the least satisfied. Many appreciated working in an outdoor environment, and many felt they had considerable freedom in their work.

2) The jobs held by employees fitted into eight major categories. Tenure by category was long term except in landscape and nursery work, where only one of the seventeen interviewed had had over five years on that job. Many had less than one year of experience on the job held when interviewed.

3) Employees hired on a seasonal basis were generally laborers or equipment operators. Of the seasonal employees (40), half were of Mexican ancestry. Most seasonal workers returned to the same employer each year.

4) Many employees felt they were overeducated for the positions they held, and most wanted upward mobility. There was a distinct relation between level of education and employment category of the

individuals.

5) The employees saw work experience as essential for the positions they held.
6) Educational subject areas that employees of all categories found necessary were speech and English, i.e., speaking and writing skills. Knowledge of production agriculture was rated highly necessary by employees in sales, quality control, management, and professional agriculture. Business management received a high rating by employees in business/office jobs and management.
7) Changes in function are expected to be greatest in equipment-related employment and in jobs of laborers and sales personnel. Their skills will change largely as they keep step with new technology and with increasing local, state, and federal regulations.
8) Farmers foresaw a need for more equipment operators and repairers. Agribusinesses foresaw an expansion in repairers and sales personnel. Although some foresaw a continued decline in laborers, many felt that the recent dramatic decline in numbers of laborers is leveling off since the harvest is now virtually all mechanized, at least in Yolo County.
9) Agriculture has lagged behind other industries in providing employee benefits. Only recently has unemployment insurance been available to farm workers. Health insurance is now provided by half the farm operations and most (88%) of the agribusinesses. Paid sick leave, vacation, and holidays are becoming increasingly common, especially in agribusiness.

Women and Minorities in Agriculture

1) Women now account for one-third of those studying agriculture in California public schools, colleges, and universities. Yet, that is not reflected in the labor force in agriculture. Of the 28 females in the sample, half were in office occupations, four were laborers, and there were three each in sales and management/supervision. Women were 14% of the employee sample, far below the 33% enrollment of women in agricultural education programs.
2) Women have only begun to break the barrier into male dominated occupations in agriculture. In the sample of 98 firms, only seven

had women in managerial/supervisorial positions, and six had females in sales/field positions. Only 20% of the employers felt that women would have a future in all the various agricultural occupations. Part of the barrier is tradition and mistrust. Some question the competence of women in this field long dominated by males.

3) The future for employment in agriculture was brighter for Mexican Americans than for women. Over half of the employers indicated that those of Mexican ancestry could be trained/educated to handle any job in agriculture, whereas less than a quarter felt that women could.
4) Workers of Mexican ancestry, particularly those reared in Mexico, had a low educational achievement. Most had eighth-grade education or less and only 6 of the 40 had gone beyond high school. Two held college degrees. Obviously, then, most Mexican Americans are laborers or equipment operators. They have limited upward job mobility beyond that of crew foreman.
5) The major barrier for those of Mexican ancestry is lack of proficiency in written and oral English. That also relates to low educational attainment. Yet, most of their co-workers feel they have a potential for an increasingly important role in agriculture.
6) Employers indicated they would hire a Mexican American in any position for which he/she was qualified. The Mexican Americans, however, see very little future for themselves in agriculture, although they enjoy their work. Lack of education undoubtedly accounts for much of their lack of self-esteem.

CONCLUSIONS AND IMPLICATIONS FOR AGRICULTURAL EDUCATORS

1) The need for education in agriculture in Yolo County is increasing with the advances in agricultural technology. While total numbers employed in agriculture have decreased, this reduction can be attributed primarily to the loss of many hand-labor jobs, on thinning, hoeing, and sorting crews. Those lost jobs have little impact on agricultural education, however, since they required no education and were largely held by migrant workers not native to the area.

2) Employers in agriculture have the same general employee needs as in other industries. Regardless of job category, employers and employees agree that a good command of English (written and oral) is essential for performance and promotion. Most employees in agriculture also need an understanding of production agriculture so that they can adjust to new developments in agriculture. Curricula in agriculture must also prepare certain prospective employees for interpreting and complying with the many regulations recently placed upon the use of chemicals in agriculture.

3) While no dramatic increase in employment in agriculture is foreseen, there will be continued growth in numbers of equipment operators and repair persons in landscape work and in sales and service. These are generally positions that interface between technology and the production of crops. Specific needs are in areas of electronics, hydraulics, welding, and other skills needed in the operation and maintenance of new equipment. Preparation for employment in areas of sales/service, equipment operation and repair, as well as landscaping should be an integral part of the curriculum in agriculture at secondary and community-college levels.

4) Institutions providing education in agriculture appear to have a relatively low visibility with both employers and employees in Yolo County. If the mission of vocational agriculture at the secondary level is to prepare youth for employment in agriculture, more must be done to inform both employers and employees in agriculture of the opportunities available. For example, very few farmers or agribusiness persons look to the public school for new employees, nor do they think of using agricultural programs in the schools for in-service education for themselves or their employees. Also, educators in agriculture must seek work experience for their students, since employers rate experience as essential for new employees, and, in

agreement, most employees felt that the experience they had had was more critical than their formal education in obtaining work. Evidence suggests that there is an untapped resource for work experience for students on farms and in agricultural businesses.

5) More and more farm operators are working toward a stable, permanent labor force. They are adjusting their cropping patterns, equipment inventory, and other aspects of their business to minimize peak needs for labor and to have year-around employees. In situations where employment is for six to nine-months, attempts are made to make it attractive for the employee to return to the same job year after year; and that was found to be working. Farm operators, then, are looking for ways to provide their employees with career ladders, and in addition they are rapidly adding employee benefits such as health insurance, paid holidays, and vacations. Educators in agriculture should be working with farmers and agribusiness persons to find how the school or college, through adult school/workshops, can assist employees who wish to qualify for better-paying jobs on farms and in agribusinesses.

6) Operating a farm or an agricultural business has been a male-dominated field, with most males Caucasians. This will change with females now making up one-third of those studying agriculture in California schools, colleges, and universities. For the first time, qualified women will be available for almost any kind of position/job in agriculture. Educators in agriculture must be prepared to assist in the transition. Since they are involved in the educational programs in which future female agriculturists are enrolled, it is incumbent upon them to help prepare females for their futures in this traditionally male-dominated environment. During the transition period, females must be conditioned to deal with inevitable discrimination, either obvious or subtle. Concurrently, agricultural educators and others must help employers who have difficulty in incorporating women into their labor force, from management through labor levels. They will often be helping employers identify obvious as well as unintentional forms of discrimination inherent in any changes as dramatic as this will be.

7) Employees, regardless of category of employment, were usually interested in remaining in agriculture. That is contrary to the traditional

pattern of movement of workers from rural to urban areas to improve their opportunities for employment. This job satisfaction can be attributed, at least in part, to improved wages in agriculture, the improvement in working conditions and opportunities, and the emergence of benefits for employees in agriculture. In other words, there is now an identifiable movement to "career status" for jobs in agriculture. Employers are concerned with in-service education for employees, with career ladders, and with the same benefits that employees have in other industries. Educators in agriculture should help employers in this movement. With this movement, educators must work with communities to afford "first-class citizenship" for employees in agriculture as they move toward career status including permanent housing, equal educational opportunities for children and others, and social services that workers in agriculture have too frequently been denied in the past.

8) Workers of Mexican ancestry have been the backbone of the labor force in California agriculture from the beginning. Unfortunately, they have not moved upward in agriculture. Now, we see a concerted effort to provide opportunity for these workers as well as workers of other races to compete on an equal basis. Evidence from this study and others indicates that workers of Mexican ancestry, particularly immigrants from Mexico, are severely handicapped educationally. Few have graduated from the eighth grade, and few are fluent in spoken and written English. Unless corrected, this lack will remain a barrier to job mobility beyond equipment operator or crew foreman. Employers find those of Mexican ancestry to be excellent workers and consider that education could make them capable of holding any position on the farm or in the firm. Educators, then, should support programs of English as a second language and other educational efforts for educationally disadvantaged workers in agriculture. Research on the functions-and-activities approach to curriculum development could be used in preparing workers for upward mobility in the job market in agriculture.

APPENDIX A

Agricultural Program Enrollments in

California Public Educational Institutions

TABLE A

AVERAGE ANNUAL GROWTH RATE OF SCHOOL ENROLLMENTS BY SEX AND EDUCATIONAL LEVEL IN CALIFORNIA PUBLIC SCHOOLS 1973-1978

Total School Enrollments

Educational Level	A. 1973	B. 1974	C. 1975	D. 1976	E. 1977	F. 1978	Average Annual[1] Growth Rate
High Schools (Grades 9-12)							
Male	675,051	678,638	688,546	689,607	n.a.[2]	n.a.[2]	0.71%
Female	653,403	656,476	662,355	663,292	n.a.[2]	n.a.[2]	0.50%
California Community Colleges							
Male	468,928	513,171	597,125	534,659	531,127	n.a.[3]	3.31%
Female	383,889	446,536	504,423	538,445	589,393	n.a.[3]	13.38%
California State University & Colleges (Undergraduates)							
Male	127,774	125,881	132,326	125,632	125,500	n.a.[2]	-0.44%
Female	95,356	99,857	106,725	108,230	114,395	n.a.[2]	4.99%
University of California, Undergraduates Davis							
Male	6,208	6,419	6,718	6,428	6,310	6,361	0.49%
Female	5,336	5,490	5,834	6,023	6,100	6,213	3.28%
Berkeley							
Male	12,395	12,067	12,120	11,570	11,258	11,462	-1.50%
Female	8,496	8,538	8,665	8,349	8,128	8,611	0.27%
University of California, Graduates Davis[4]							
Male[4]	2,008	2,006	2,072	2,032	2,079	2,059	0.50%
Female[4]	770	841	975	1,006	1,004	1,074	7.89%
Berkeley							
Male	6,539	6,525	6,327	6,341	5,848	5,936	-1.84%
Female	2,631	2,820	2,870	3,084	2,966	3,106	3.61%

[1] Average Annual Growth Rate is calculated by determining the percent change for the number of years observed then dividing by the number of years minus one, for example the high school formula is $\left(\frac{(D-A)}{A}\right) \div 3$; UC - Undergraduates $\left(\frac{(F-A)}{A}\right) \div 5$.

[2] Data unavailable by male/female after school year ending 1976.

[3] Data not available at time of publication.

[4] Veterinary and medical school students not included.

Source: Data compiled from the following publications:

1) "Active Enrollment in California Elementary and Secondary Public Schools," Fall 1973 to 1976, prepared by Bureau of School Apportionments and Reports, Division of Financial Resources and Distribution of Aid, California State Department of Education, Sacramento, California.
2) Postsecondary Education in California, Information Digest 1978, published by the California Postsecondary Education Commission, Sacramento, California.
3) "Summary of Students," Fall Quarter 1973 to 1978. A Report of the Registrar, University of California, Davis.
4) "Campus Statistics," Table 6-Undergraduate and Graduate Students by Department, Fall 1973 to 1978, Office of Institutional Research, University of California, Berkeley.

TABLE B

ENROLLMENT IN AGRICULTURE BY SEX AND SUBJECT MATTER
CALIFORNIA SECONDARY SCHOOLS 1973-1977

VEA[1] Code	Subject Matter Area	Student Headcount Enrollment A. 1973	B. 1974	C. 1975	D. 1976	E. 1977	Average Annual[2] Growth Rate
01.00	Introduction to						
01.08	Agriculture						
	Male	--	394	442	250	1,653	106.51%
	Female	--	17	284	180	1,112	2,147.06%
01.0100	Agriculture						
01.0199	Production						
	Male	15,386	15,352	17,671	16,076	14,398	-1.61%
	Female	5,503	6,746	7,666	8,202	7,857	10.70%
01.0101	Animal Science						
	Male	272	771	666	179	337	5.98%
	Female	157	637	636	198	479	51.28%
01.0102	Plant Science						
	Male	61	101	100	113	81	8.20%
	Female	18	20	51	61	87	96.83%
01.0104	Farm Business						
	Management						
	Male	--	61	40	11	21	-21.86%
	Female	--	7	17	14	13	28.57%
01.02	Agricultural						
	Supplies/Services						
	Male	438	638	666	728	747	17.64%
	Female	145	301	397	500	600	78.45%
01.03	Agricultural						
	Mechanics						
	Male	9,189	10,442	10,873	10,631	10,271	2.94%
	Female	516	582	524	510	1,094	28.00%
01.04	Agricultural						
	Products						
	Male	111	152	260	205	227	26.13%
	Female	56	39	47	34	52	-1.79%
01.05	Ornamental						
	Horticulture						
	Male	6,440	7,257	9,616	10,632	9,960	13.67%
	Female	2,739	3,789	5,908	6,183	6,497	34.30%
01.06	Agricultural[3]						
	Resources						
	Male	1,892	1,545	1,477	1,648	1,536	-4.71%
	Female	331	496	603	685	718	29.23%
01.07	Forestry						
	Male	795	602	1,395	1,140	880	2.67%
	Female	116	139	262	308	225	23.49%
01.99	Agriculture, Other						
	Male	713	889	537	1,164	475	-8.35%
	Female	271	630	370	956	1,141	80.26%
	TOTAL						
	MALE	35,297	38,204	43,743	42,777	40,586	3.75%
	FEMALE	9,852	13,403	16,765	17,828	19,875	25.44%
	Total	45,149	41,607	60,508	60,605	60,461	8.48%

[1] VEA = Vocational Education Act.

[2] Average Annual Growth Rate is calcultated by determining the percent change for the number of years observed then dividing by the number of years minus one, i.e. $\left(\frac{E-A}{A}\right) \div 4$.

[3] Includes program areas such as natural resources, conservation, utilization and services.

Source: Data compiled from "Department of Education, Vocational Education, Student Enrollment Recap," (VEA Form #250), 1973 to 1977. Data reports obtained from Vocational Education Field Operation Department.

TABLE C

ENROLLMENT IN AGRICULTURE BY SEX AND SUBJECT MATTER
CALIFORNIA COMMUNITY COLLEGES 1973-1977

Student Headcount Enrollment

VEA[1] Code	Subject Matter Area	A. 1973	B. 1974	C. 1975	D. 1976	E. 1977	Average Annual[2] Growth Rate
01.0100 01.0199	Agricultural Production						
	Male	1,917	1,592	2,112	2,644	2,505	7.67%
	Female	417	431	735	926	1,024	36.39%
01.0101	Animal Science						
	Male	1,167	894	1,534	1,352	1,493	6.98%
	Female	341	542	1,223	1,375	1,543	88.12%
01.0102	Plant Science						
	Male	711	809	911	773	763	7.31%
	Female	153	253	277	242	307	25.16%
01.0104	Farm Business Management						
	Male	308	487	594	610	525	17.16%
	Female	69	115	146	156	148	28.62%
01.02	Agricultural Supplies/Services						
	Male	1,128	1,111	1,145	1,065	1,459	7.34%
	Female	188	289	202	232	486	39.63%
01.03	Agricultural Mechanics						
	Male	1,457	1,404	1,395	1,456	1,470	0.22%
	Female	141	49	77	88	149	1.42%
01.04	Agricultural Products/Processing						
	Male	375	337	391	355	369	-0.40%
	Female	396	232	206	239	175	-13.95%
01.05	Ornamental Horticulture						
	Male	4,624	4,904	6,348	6,718	7,020	12.27%
	Female	1,295	1,989	3,135	3,295	3,571	43.94%
01.06	Agricultural[3] Resources						
	Male	1,229	1,675	1,960	2,930	2,051	16.72%
	Female	238	397	651	954	758	54.62%
01.07	Forests Services						
	Male	1,431	1,181	1,184	609	1,311	-2.10%
	Female	208	222	236	122	246	4.57%
01.99	Agriculture, Other						
	Male	216	360	1,053	967	1,053	96.88%
	Female	58	35	385	314	382	139.66%
	TOTAL						
	MALE	14,563	14,767	18,627	19,479	20,019	9.37%
	FEMALE	3,504	4,559	7,273	7,943	8,789	37.30%
	Total	18,067	19,326	25,900	27,422	28,808	15.00%

[1] VEA = Vocational Education Act.

[2] Average Annual Growth Rate is calcultated by determining the percent change for the number of years observed then dividing by the number of years minus one, i.e. $\left(\frac{E-A}{A}\right) \div 4$.

[3] Includes program areas such as natural resources, conservation, utilization and services.

Source: Data compiled from "Department of Education, Vocational Education, Student Enrollment Recap," (VEA Form #250), 1973 to 1977. Data reports obtained from Vocational Education Field Operation Department.

TABLE D

UNDERGRADUATE ENROLLMENT IN AGRICULTURE BY SEX AND SUBJECT MATTER AREA CALIFORNIA STATE UNIVERSITIES AND COLLEGES 1973-1978

HEGIS[1] Code	Subject Matter Area	Student Headcount Enrollment A. 1973	B. 1974	C. 1975	D. 1976	E. 1977	F. 1978	Average Annual[2] Growth Rate
01011	Agriculture, General							
	Male	384	736	409	395	339	295	-4.63%
	Female	38	143	113	160	77	66	14.73%
0199	Agricultural Biology							
	Male	33	39	45	57	65	62	17.57%
	Female	3	3	17	17	14	12	60.00%
01101 01111 01121	Agricultural Economics							
	Male	654	617	714	784	893	938	8.68%
	Female	95	105	143	183	246	304	44.00%
01161	Agricultural Mechanics							
	Male	146	81	123	119	126	133	-1.78%
	Female	1	0	2	0	0	0	n.a.
01012	Agricultural Education							
	Male	22	44	38	35	69	141	108.18%
	Female	1	2	5	7	41	82	100.00%
01013 01021 01031 01081	Agronomy							
	Male	477	357	583	564	904	728	10.52%
	Female	33	43	78	76	183	113	48.48%
01041 01051 01061 01071 01072 01171	Animal Sciences							
	Male	1200	1130	1235	1212	1296	1277	1.28%
	Female	555	662	818	903	1134	1144	21.22%
01131	Food Industries							
	Male	68	53	92	77	102	96	8.23%
	Female	45	31	33	41	72	87	18.66%
01141	Forestry							
	Male	383	410	476	439	496	510	6.63%
	Female	12	18	49	62	111	130	196.66%
01151	Natural Resource Management							
	Male	382	401	478	481	477	517	7.06%
	Female	49	92	132	186	214	268	89.38%
01091	Ornamental Horticulture							
	Male	346	441	548	624	735	705	20.75%
	Female	104	144	250	386	487	506	77.30%
	TOTAL							
	MALE	4,095	4,039	4,741	4,787	5,502	5,402	6.38%
	FEMALE	936	1,243	1,640	2,021	2,579	2,712	37.94%
	Total	5,031	5,282	6,381	6,808	8,081	8,114	12.26%

[1] HEGIS = Higher Education General Information System

[2] Average Annual Growth Rate is calculated by determining the percent change for the number of years observed then dividing by the number of years minus one, i.e. $\left(\frac{(F-A)}{A}\right) \div 5$.

Source: Data compiled from data processing report "Full- and Part-time Enrollment by Major 1968 to 1978, Fall Term," Institutional Research Office of the Chancellor, State Universities and Colleges, Long Beach.

TABLE E

UNDERGRADUATE ENROLLMENT IN AGRICULTURE BY SEX AND SUBJECT MATTER AREA UNIVERSITY OF CALIFORNIA, DAVIS 1975-1979

HEGIS[1] Code	Subject Matter Area	Student Headcount Enrollment A. 1975	B. 1976	C. 1977	D. 1978	E. 1979	Average Annual[2] Growth Rate
0110	Animal Sciences						
0104	Male	352	380	351	336	299	-3.77%
0106	Female	298	344	403	407	402	8.73%
0499							
0111	Agricultural						
0199	Economics						
	Male	150	207	289	324	314	27.33%
	Female	29	56	95	117	113	72.41%
0113	Food & Nutrition						
0424	Male	152	168	154	155	167	2.46%
	Female	332	393	385	362	390	4.36%
0421	Pest and Disease						
0426	Management						
	Male	1	14	34	28	20	475.00%
	Female	2	5	13	13	7	62.50%
0107	Plant Sciences						
0117	Male	160	202	205	233	190	4.69%
0404	Female	90	139	154	142	133	11.95%
0406							
0499							
0115	Resource Sciences						
0199	Male	98	130	118	93	106	2.04%
	Female	49	52	49	54	49	no change
0119	Biological Sciences						
0199	Male	475	500	494	526	538	3.32%
	Female	364	366	419	440	523	10.92%
0899	Other Behavioral Sciences						
	Male	160	153	151	146	121	-6.09%
	Female	120	102	122	152	128	1.67%
	Other[3]						
	Male	157	253	290	231	220	10.03%
	Female	206	315	358	317	344	16.75%
	TOTAL						
	MALE	1,705	2,007	2,086	2,072	1,975	3.96%
	FEMALE	1,490	1,772	1,998	2,004	2,089	10.05%
	Total	3,195	3,779	4,084	4,076	4,005	6.80%

[1] HEGIS = Higher Education General Information System.

[2] Average Annual Growth Rate is calculated by determining the percent change for the number of years observed then dividing by the number of years minus one, i.e., $\left(\frac{(E-A)}{A}\right) \div 4$.

[3] This category includes students with the following status or major: pre-forestry; individual, exploratory, or limited status.

Source: Data compiled from "Summary of Students, Fall Quarter 1975 to 1979." A Report of the Registrar, University of California, Davis.

TABLE F

GRADUATE ENROLLMENT IN AGRICULTURE BY SEX AND SUBJECT MATTER AREA
UNIVERSITY OF CALIFORNIA, DAVIS 1974-1979

HEGIS[1] Code	Subject[2] Matter Area	Student Headcount Enrollment A. 1974	B. 1975	C. 1976	D. 1977	E. 1978	F. 1979	Average Annual[3] Growth Rate
0110	Animal Sciences							
0104	Male	94	97	96	86	101	108	2.98%
0106	Female	22	26	37	45	53	41	17.27%
0111	Agricultural							
0199	Economics							
	Male	53	62	67	66	58	48	-1.89%
	Female	5	10	8	11	12	14	36.00%
0113	Food, Nutrition,							
0429	& Consumer Sciences							
	Male	78	84	90	90	78	63	-3.85%
	Female	54	57	75	66	56	63	3.33%
0421	Pest & Disease							
0426	Management							
	Male	73	82	93	95	94	107	9.32%
	Female	6	8	7	17	23	29	76.67%
0107	Plant Sciences							
0117	Male	139	152	181	173	168	167	4.03%
0404	Female	18	15	18	25	32	37	21.11%
0499								
0406								
0115	Resource							
0199	Sciences							
	Male	73	91	92	95	108	115	11.51%
	Female	12	6	23	27	23	33	35.00%
0119	Biological							
0199	Sciences							
	Male	70	92	98	91	109	102	9.14%
	Female	18	36	43	45	43	55	41.11%
0299	Environmental							
	Sciences							
	Male	31	28	39	35	22	30	-0.65%
	Female	6	7	7	7	6	11	16.67%
0899	Other Behavioral							
	Sciences							
	Male	24	24	15	20	24	25	0.83%
	Female	54	45	56	51	68	61	2.59%
	TOTAL							
	MALE	635	712	771	751	762	765	4.09%
	FEMALE	195	210	274	294	316	344	15.28%
	Total	830	922	1045	1045	1109	1109	6.72%

[1]HEGIS = Higher Education General Information System.

[2]Enrollments displayed according to home departments, rather than declared subject matter area.

[3]Average Annual Growth Rate is calculated by determining the percent change for the number of years observed then dividing by the number of years minus one, i.e. $\left(\frac{(F-A)}{A}\right) \div 5$.

Source: Data compiled from "Graduate Headcount Report - Fall Quarter," 1973 to 1978, Planning and Analysis Office, Davis Campus.

TABLE G

UNDERGRADUATE ENROLLMENT IN AGRICULTURE BY SEX AND SUBJECT MATTER AREA
UNIVERSITY OF CALIFORNIA, BERKELEY 1975-1979

HEGIS[1] Code	Subject Matter Area	Student Headcount Enrollment A. 1975	B. 1976	C. 1977	D. 1978	E. 1979	Average Annual[2] Growth Rate
0115	Conservation & Resource Sciences						
	Male	128	187	197	227	205	15.03%
	Female	127	226	211	197	188	12.00%
0114	Forestry & Resource Management						
	Male	152	231	251	224	202	8.22%
	Female	39	62	69	68	83	28.20%
0424	Nutritional Sciences						
	Male	--	--	--	--	6	n.a.
	Female	--	--	--	--	10	n.a.
0115	Resource Sciences						
	Male	24	83	92	75	85	63.54%
	Female	115	189	207	223	214	21.52%
0199	Other Agricultural Sciences						
	Male	--	123	76	57	18	-21.34%
	Female	--	129	107	50	26	-19.96%
	Unclassified/Limited						
	Male	253	--	--	--	--	n.a.
	Female	202	--	--	--	--	n.a.
	TOTAL						
	MALE	457	624	616	583	516	3.22%
	FEMALE	483	606	594	538	521	1.96%

[1] HEGIS = Higher Education General Information System.

[2] Average Annual Growth rate is calculated by determining the percent change for the number of years minus one, i.e., $\left(\frac{E-A}{A}\right)^{\frac{1}{4}}$

TABLE H

GRADUATE ENROLLMENT IN AGRICULTURE BY SEX AND SUBJECT MATTER AREA
UNIVERSITY OF CALIFORNIA, BERKELEY 1974-1979

HEGIS[1] Code	Subject Matter Area	Student Headcount Enrollment A. 1974	B. 1975	C. 1976	D. 1977	E. 1978	F. 1979	Average Annual[2] Growth Rate
0111	Agricultural Economics							
	Male	31	32	42	36	36	30	-0.64%
	Female	5	7	6	7	11	11	24.00%
0421	Entomology							
	Male	67	62	78	65	57	54	-3.88%
	Female	15	12	12	10	162	20	20.00%
0115	Forestry & Conservation							
	Male	--	98	79	70	64	73	-6.37%
	Female	--	10	14	19	23	23	26.00%
0422	Genetics							
	Male	22	24	22	20	20	22	no change
	Female	17	14	14	16	14	19	2.35%
0424	Nutritional Sciences							
	Male	10	9	11	14	19	16	12.00%
	Female	29	27	29	32	34	37	24.13%
0404	Plant Pathology							
	Male	13	12	16	17	13	16	4.61%
	Female	7	9	9	9	8	8	2.85%
0103	Soil & Plant Nutrition							
	Male	15	13	19	16	15	17	2.66%
	Female	2	4	5	5	5	6	16.00%
	TOTAL							
	MALE	158	250	267	238	224	228	8.86%
	FEMALE	75	83	89	98	111	124	13.06%

[1] HEGIS = Higher Education General Information System.

[2] Average Annual Growth rate is caluclated by determining the percent change for the

APPENDIX B

List of Job Titles Identified and Number of Employees Interviewed Per Title

LIST OF JOB TITLES IDENTIFIED AND NUMBER

OF EMPLOYEES INTERVIEWED PER TITLE

JOB CATEGORY AND TITLE	NUMBER OF EMPLOYEES
Laborers, Agricultural Production	
Farmworker, diversified crop (DOT #407.687)	6
Farmworker, general (DOT #407.663)	8
Farmworker, livestock (DOT #402.664)	4
Irrigator (DOT #409.684)	5
Irrigation System Installer (DOT #851.303)	4
Equipment Operation, Repair, Assembly Personnel	
Equipment operator, general (DOT #409.683)	6
Tractor operator, general (DOT #929.683)	9
Equipment welder/assemblyman (DOT #819.384/819.687)	6
Mechanic, general and diesel (DOT # 624.281/625.281)	8
Shop foreman (DOT #624.131)	3
Landscape and Nursery Personnel	
Nursery worker (DOT #405.687)	9
Gardner/Landscape worker (DOT #408.687)	2
Landscape designer/contractor (DOT #408.161/182.167)	6
Sales Personnel	
Field representative, sales (DOT #162.117)	4
Salesperson, field or route (DOT #272.357)	8
Technicians and Quality Control Personnel	
Sampler (DOT #922.687)	3
Technicians-laboratory, plant, research (DOT #029.261)	6
Quality control specialist, agricultural biologist, field crop inspector (DOT #168.287)	7
Quality control supervisor, inspector (DOT #408.137)	5

JOB CATEGORY AND TITLE	NUMBER OF EMPLOYEES
Business-Office Personnel (Continued)	
Secretary (DOT #201.362)	6
Office Manager (DOT #169.167)	2
Buyer/Grain merchant (DOT #162.167/162.157)	4
Loan officer/Analyst, agricultural (DOT #186.767)	5
Managerial/Supervisorial Personnel	
Foreman, crew (DOT #180.167)	9
Foreman, general (DOT #407.131)	8
Ranch/Farm manager (DOT #180.167)	5
Field representative, processing plant (DOT #163.267)	10
Manager, agriculturally related businesses (DOT #183.167)	14
Parts manager (DOT #185.167)	3
Service manager (DOT #187.167)	2
Professional Agricultural Personnel	
Agronomist (DOT #040.061)	5
Engineer, agricultural/Equipment designer (DOT #013.061)	6
Plant breeder/Research scientist (DOT #041.061/040.061)	5
TOTAL	200

NOTE: D.O.T. - Dictionary of Occupational Titles code number. For a description and definition of this coding system, see page 4, "Functions and Activities of Agricultural Personnel in Yolo County, California, 1979."

APPENDIX C

Questionnaires

- Firm-Employer
- Employee with Functions and Activities Descriptor Sheets

FORM 1
Firm Interviews (Employers)

A Study of Emerging Occupations in Agriculture:
Implications for Curricula and People

(1/1-3) ___ ___ ___

(1/4) ___

(1/5-28) ___ ___ 1. Major function of firm (include list of products, goods, and/or services: number of acres per crop, number of livestock; nature of operation, sole proprietor partnership, leasee, etc.):

_____

_____

_____

(1/29-30) ___ ___ ___ 2. Number of years firm has been in business in county: _____

(1/31-32) ___ ___ 3. Position title: _____

4. Years of work in agriculture:

(1/33-34) ___ ___ _____ present position
(1/35-36) ___ ___ _____ other positions
(1/37) ___ ___ _____ (list) _____

(1/38) _____ 5. Age:

(1) _____ 20 - 30
(2) _____ 31 - 40
(3) _____ 41 - 50
(4) _____ 51 - 60
(5) _____ over 60

(1/39) _____ 6. Sex: M _____ F _____

(1/40) _____ 7. Highest grade completed in school:

(1) _____ less than high school
(2) _____ high school graduate
(3) _____ training program
(4) _____ some college
(5) _____ college degree
(6) _____ some graduate work
(7) _____ graduate degree

(1/41) ___ If college, name institution(s): _____

8. To run your operation how many employees do you hire and how long have they worked for you? (Y-R for year-round and S for seasonal)

		Employees	Number	Number of Years with Firm
(1/43-50)	___ ___ ___ ___ ___	Laborer, Ag production	____	____
(1/51-58)	___ ___ ___ ___ ___	Equipment & Repair	____	____
(1/59-66)	___ ___ ___ ___ ___	General Farmwork	____	____
(1/67-74)	___ ___ ___ ___ ___	Processing Plant	____	____
(1/75-2/8)	___ ___ ___ ___ ___	Landscaping/Nursery	____	____
(2/9-16)	___ ___ ___ ___ ___	Livestock	____	____
(2/17-24)	___ ___ ___ ___ ___	Sales/Fieldman	____	____
(2/25-32)	___ ___ ___ ___ ___	Technicians & Quality Control	____	____
(2/33-40)	___ ___ ___ ___ ___	Office	____	____
(2/41-48)	___ ___ ___ ___ ___	Managerial/Supervisorial	____	____
(2/49-56)	___ ___ ___ ___ ___	Professional	____	____
(2/57-64)	___ ___ ___ ___ ___	Other _____	____	____

9. What agricultural education requirements are needed for your employees?

	Employees		
(2/65) ____	Laborer, Ag production	____	1. High school program
(2/66) ____	Equipment & Repair	____	2. Some college work
(2/67) ____	General Farmwork	____	3. College degree
(2/68) ____	Processing Plant	____	4. Training program
(2/69) ____	Landscape & Nursery	____	5. Apprenticeship
(2/70) ____	Livestock	____	6. Work experience
(2/71) ____	Sales/Fieldman	____	7. Other _____
(2/72) ____	Technicians & Quality Control	____	
(2/73) ____	Office	____	
(2/74) ____	Managerial/Supervisorial	____	
(2/75) ____	Professional	____	
(2/76)	Other _____	____	

(3/1-3) ___ ___ ___ 10. When you have a vacancy, what is your firm's primary source of employees? (Please place the appropriate number in left column.)
(3/4) ___

(3/5-7) ___ ___ ___	Laborer, Ag production	____	
(3/8-10) ___ ___ ___	Equipment & Repair	____	1. Word of mouth
(3/11-13) ___ ___ ___	General Farmwork	____	2. High school placement center
(3/14-16) ___ ___ ___	Processing Plant	____	3. College placement center
(3/17-19) ___ ___ ___	Landscape & Nursery	____	4. Direct personal contact
(3/20-22) ___ ___ ___	Livestock	____	5. Within the company
(3/23-25) ___ ___ ___	Sales/Fieldman	____	6. From similar companies
(3/26-28) ___ ___ ___	Technicians & Quality Control	____	7. State employment department
(3/29-31) ___ ___ ___	Office	____	8. Labor contractors
(3/32-34) ___ ___ ___	Managerial/Supervisorial	____	9. Advertising
(3/35-37) ___ ___ ___	Professional	____	10. Other _____
(3/38-40)	Other		

11. In what areas is your firm using computers? Or anticipating using computers?

	Using	Anticipating	
(3/41) ___	____	____	record keeping
(3/42) ___	____	____	payroll
(3/43)			ordering

(3/47) ___ 11b. If anticipating using a computer, when? _____

12. If you are using or anticipate using computer services, where will you seek such services?

(3/48)____ (1) commerical firm
(3/49)____ (2) bank
(3/50)____ (3) purchase hardware
(3/51)____ (4) presently own hardware
(3/52)____ (5) other

13. If your firm anticipates the use of computer services will this necessitate employee changes in your firm?

(3/53)____ (1) lay-off employees
(3/54)____ (2) hiring new employees
(3/55)____ (3) retraining present employees
(3/56)____ (4) other (list) _____
(3/57)____ (5) not applicable/not answered

14. What type(s) of training programs does the firm offer its employees?

(3/58)____ (1) conducts own program on regular basis
(3/59)____ (2) conducts own program on irregular basis
(3/60)____ (3) sends employees to company training program
(3/61)____ (4) provides for employee participation in public school programs
(3/62)____ (5) none
(3/63)____ (6) other (list)_____

15. What are the sources that the people in this firm use to obtain information to assist them in keeping up-to-date in their work? (Rate in order of importance, i.e., 1, 2, 3, etc.)

(3/64)____ agricultural schools (including night classes)
(3/65)____ extension service/farm advisor
(3/66)____ company training programs
(3/67)____ fieldmen or salesmen
(3/68)____ agricultural consultants (private)
(3/69)____ magazines or trade publications
(3/70)____ radio or T.V.
(3/71)____ trade or professional organizations
(3/72)____ other (list) _____

(3/73) ____ 16. Is there an advancement ladder for your workers in your firm?_____

(3/74) ___ If yes, please explain: _____

_____

(4/1-3) ___ 17a. Are you exploring any changes in your operation that would increase or decrease the number of your employees in the next 3-5 years?

(4/4) ___

	(1) Increase	(2) Decrease	(3) No Change
(4/5) ___ Laborer, Ag production	_____	_____	_____

		(1) Increase	(2) Decrease	(3) No Change
(4/11) ____	Sales			
(4/12) ____	Technicians & Quality Control			
(4/13) ____	Office			
(4/14) ____	Managerial/Supervisorial			
(4/15) ____	Professional			
(4/16) ____	Other _____			

17b. If you see the number of your employees decreasing in the next 3-5 years, what do you attribute this decrease to:

(4/17)____ (1) mechnaization/automization
(4/18)____ (2) change in volume of business
(4/19)____ (3) licensing regulations
(4/20)____ (4) fringe benefits increases
(4/21)____ (5) unemployment insurance
(4/22)____ (6) union contracts
(4/23)____ (7) OHSA
(4/24)____ (8) no change/increase
(4/25)____ (9) other (list) _____

(4/26-40) ____ 18. Which of the firm's current job functions do you expect will change within the next 3-5 years?

_____

_____

(4/41-47) ____ 18a. What do you see happening to the employees of these jobs?

_____

(5/1-3) ___ ___ ___
(5/4) ____ _____

(5/5-6) ___ ___ 19. What new jobs do you see emerging within the next 3-5 years?

_____

_____

(5/7) ____ 20. Will these jobs be filled by presently employed personnel?_____ (yes/no)

If yes, will they need retraining through:

(5/8) ____ on-the-job training
(5/9) ____ trade schools (3/22)
(5/10)____ extension services
(5/11)____ agricultural schools (including night school)
(5/12)____ no retraining necessary
(5/13)____ other _____

21. Given that there has been a significant increase in the number of females entering agricultural programs in high schools, two-year colleges, and four-year colleges, where would you say women will be

(5/14) ____ Laborer, Ag production
(5/15) ____ Equipment & Repair
(5/16) ____ General Farmwork
(5/17) ____ Processing Plant
(5/18) ____ Landscape & Nursery
(5/19) ____ Livestock
(5/20) ____ Sales
(5/21) ____ Technicians & Quality Control
(5/22) ____ Office
(5/23) ____ Managerial/Supervisorial
(5/24) ____ Professional
(5/25) ____ Owner
(5/26) ____ Other _____

(5/27-28) ___ 22. How many women do you employ? _____

a) How many are employed in each of the following jobs?

(5/29-30) ___ ____ Laborer, Ag production
(5/31-32) ___ ____ Equipment & Repair
(5/33-34) ___ ____ General Farmworker
(5/35-36) ___ ____ Processing Plant
(5/37-38) ___ ____ Landscape & Nursery
(5/39-40) ___ ____ Livestock
(5/41-42) ___ ____ Sales
(5/43-44) ____ Technicians & Quality Control
(5/45-46) ____ Office
(5/47-48) ____ Managerial/Supervisorial
(5/49-50) ____ Professional
(5/51-52) ____ Owner
(5/53-54) ____ Other _____

(5/55) ____ 23. With the proper training, would you employ women in other jobs than their present ones? _____Yes _____No

a) If not, why?

(5/56) ____ family responsibilities would interfer with job functions
(5/57) ____ lack of physical strength
(5/58) ____ lack of mechanical abilities
(5/59) ____ lack of ability to understand job
(5/60) ____ women do not work as hard as men
(5/61) ____ women are undependable
(5/62) ____ pregnancy and maternity leave would be too disruptive
(5/63) ____ other (list) _____

24. With the introduction of women workers do you see any possible changes in the work relationships between:

(5/64-65) ___ ___ Employer/Employee_____
_____

(5/66-67) ___ ___ Worker/Worker_____
_____

(5/68) ____ 25. Your experience with women employees has thus far been:

(1) ____ favorable
(2) ____ average

26. Where do you think those persons of Mexican ancestry will be finding jobs in agriculture?

(5/69) _____ Laborer, Ag production
(5/70) _____ Equipment & Repair
(5/71) _____ General Farmworker
(5/72) _____ Processing Plant
(5/73) _____ Landscape & Nursery
(5/74) _____ Livestock
(5/75) _____ Sales
(5/76) _____ Technicians & Quality Control
(5/77) _____ Office
(5/78) _____ Managerial/Supervisorial
(5/79) _____ Professional/Owner
(5/80) _____ Other _____

(6/1-3) ___ ___ ___
(6/4) _____
(6/5-7) ___ ___ ___ 27. How many people of Mexican ancestry do you employ?_____

a) How many are employed in each of the following jobs?

(6/8-9) ___ ___ _____ Laborer, Ag production
(6/10-11) ___ ___ _____ Equipment & Repair
(6/12-13) ___ ___ _____ General Processing
(6/14-15) ___ ___ _____ Processing Plant
(6/16-17) ___ ___ _____ Landscape & Nursery
(6/18-19) ___ ___ _____ Livestock
(6/20-21) ___ ___ _____ Sales
(6/22-23) ___ ___ _____ Technicians & Quality Control
(6/24-25) ___ ___ _____ Office
(6/26-27) ___ ___ _____ Managerial/Supervisorial
(6/28-29) ___ ___ _____ Professional/Owner
(6/30-31) ___ ___ _____ Other_____

(6/32) _____ 27b. Is fluency in English essential for your employees? ____ Yes ____ No

(6/33) _____ 28. With proper training, would you employ persons of Mexican ancestry in other jobs than their present ones? _____ Yes _____ No

a) If not, why?

(6/34) _____ _____ language problems
(6/35) _____ _____ lack of ability to understand job
(6/36) _____ _____ he would not work as hard
(6/37) _____ _____ he is undependable
(6/38) _____ _____ others (list)_____

(6/39) _____ 29. Your experience with those persons of Mexican ancestry has thus far been:

(1) _____ favorable
(2) _____ average
(3) _____ poor
(4) _____ no opinion

(6/40)___ (6/50)___ 30. What benefits are available to your employees?
(6/41)___ (6/51)___ Insurance: Health(40) Paid: Sick Leave(49)
(6/42)___ (6/52)___ Life(41) Vacations(50)
(6/43)___ (6/53)___ Dental(42) Holidays(51)
(6/44)___ (6/54)___ Disability(43) Housing(52)
(6/45)___ (6/55)___ Unemployment(44) Bonus(53)
(6/46)___ (6/56)___ Profit Sharing(45) Pension Plans(54)
(6/47)___ (6/57)___ Share of Crop(46) Workman's Compensation(55)
(6/48)___ (6/58)___ Transportation(47) Child Care(56)
(6/49)___ Maternity Leave(48) Meals(57)
Other(58)_____

(6/59) ____ 31. To what extent have increased benefits affected your hiring practices?

(1) ____ no change
(2) ____ hire few full-time employees
(3) ____ hire fewer casual employees
(4) ____ have tried to reduce turnover of employees
(5) ____ other (please explain)_____

(6/60-61) ___ ___ 32. What are your major problems in running your business?

_____

_____

_____

_____

_____

FORM 2
Employee Interviews

A Study of Emerging Occupations in Agriculture:
Implications for Curricula and People

(1/1-3) ___ ___ ___

(1/4) ____

(1/5) ___ 1. Sex: ____

(1/6) ___ 2. Age:
(1) ___ less than 19
(2) ___ 20-30
(3) ___ 31-40
(4) ___ 41-50
(5) ___ 51-60
(6) ___ over 60

(1/7) ___ 3. Marital Status:
(1) ___ married
(2) ___ single
(3) ___ separated/divorced

(1/8-9) ___ ___ 4. Number of children: _____

5. Age of children:
(1/10) ___ ___ _____ 0 - 4 yrs.
(1/11) ___ ___ _____ 5 - 8 yrs.
(1/12) ___ ___ _____ 9 - 12 yrs.
(1/13) ___ ___ _____ 13 - 16 yrs.
(1/14) ___ ___ _____ 17 - 20 yrs.
(1/15) ___ ___ _____ 21 - 24 yrs.
(1/16) ___ ___ _____ 25 over

(1/17-18) ____ 6. What kind of work are you doing now (job title)? _____
_____

(1/19-20) ____ 7. How long have you been working at your present job? _____

(1/21-22) ___ ___ 8. How many months out of a year do you work? _____

(1/23) ____ 9. Do you work for thesame employer(s) every year? ____yes ____no

(1/24) ____ 10. What is the highest grade completed in school and where did you go to school?

(1/25) _____ (location)

Grade		Place
(1) ____	8th grade or less	_____
(2) ____	some high school	_____
(3) ____	high school graduate	_____
(4) ____	some college	_____
(5) ____	college degree	_____
(6) ____	some graduate work	_____
(7) ____	graduate degree	_____

(1/27) ____ 12. Was your education a major factor in you getting your job?

_____ yes
_____ no

a) If yes, please select how necessary the areas listed below were when you first started your job.

		(1) Highly Necessary	(2) Somewhat Necessary	(3) Unnecessary
(1/28) ____	a. English (written)			
(1/29) ____	b. Speech (oral)			
(1/30) ____	c. Mathematics			
(1/31) ____	d. Cultural background (literature, history)			
(1/32) ____	e. Physical sciences (chemistry, physics)			
(1/33) ____	f. Biological sciences (biology, botany)			
(1/34) ____	g. Business/Marketing			
(1/35) ____	h. Business management			
(1/36) ____	i. Labor management			
(1/37) ____	j. Labor contractual agreements			
(1/38) ____	k. Agricultural production (plant or animal science)	*	*	
(1/39) ____	l. Engineering or mechanics			
(1/40) ____	m. Language (list)_____			
(1/41) ____	n. Other (list)_____			

*What part of agricultural production is necessary, and what is it about your job that makes it necessary?

_____
_____

13. How did you get the experience necessary to get your job?

(1/42) _____ farm/ag background
(1/43) _____ from previous job experience
(1/44) _____ on-the-job training
(1/45) _____ apprenticeship/internship (e.g. CETA)
(1/46) _____ education
(1/47) _____ other (identify) _____

14. To get your job did your employer require you to have:

(1/48) ____ _____ license or certificate
(1/49) ____ _____ labor union membership
(1/50) ____ _____ physical strength
(1/51) ____ _____ knowledge of English
(1/52) ____ _____ knowledge of Spanish

a) ...or to be of a certain:

(1/53) ____ _____ age
(1/54) ____ _____ sex
(1/55) ____ _____ race

(1/56-60) ____ b) ...or other qualifications? (list)

_____

(1/61) ____ c) _____None

(1/62-79) ___ ___ 15. Give a brief description of your job:

_____

_____

Identify functions performed in job title (see attached pages):

_____

_____

_____

_____

_____

_____

_____

_____

_____

(1/80) _____ 16. On your job how many decisions about your work do you make?

(1) _____ all
(2) _____ most
(3) _____ half
(4) _____ some
(5) _____ none

(2/1-3) ___ ___ ___
(2/4) ___

(2/5) _____ 17. Do you expect to go on to a better job with this company? _____

(2/6) _____

a) If yes, specify the job and why it is better. If no, give reasons. _____

_____

_____

_____

_____

(2/7) ___ (2/11) ___
(2/8) ___ (2/12) ___
(2/9) ___ (2/13) ___
(2/10) ___ (2/14) ___

(2/18-24) _____ 18. What changes do you think will happen in your job in the next 3-5 years?

_____

_____

_____

19. What kind of benefits do you get with your job?

(2/25) ___ ___ (2/34) Insurance: _____ Health (25)
(2/26) ___ ___ (2/35) _____ Life (26)
(2/27) ___ ___ (2/36) _____ Dental (27)
(2/28) ___ ___ (2/37) _____ Disability (28)
(2/29) ___ ___ (2/38) _____ Unemployment (29)
(2/30) ___ ___ (2/39) _____ Profit Sharing (30)
(2/31) ___ ___ (2/40) _____ Share of the Crop (31)
(2/32) ___ ___ (2/41) _____ Transportation (32)
(2/33) ___ ___ (2/42) _____ Maternity Leave (33)

Paid: _____ Sick Leave (34)
_____ Vacations (35)
_____ Holidays (36)
_____ Pension Plans (37)
_____ Workman's Compensation (38)
_____ Housing (39)
_____ Meals (40)
_____ Child Care (41)
_____ Other (list) _____ (42)

(2/43) ___20. If you were going to look for another job, what kind of job would you look for?

(1)___the same type of job in agriculture
(2)___a better job in agriculture
(3)___a job outside of agriculture

21. How many women (men) do you know wh old a job similar to yours?

(2/44-46)___ ___women
(2/47-49)___ ___men

(2/50) ___22. If a woman had the same training you have, could you see her working at a job like yours? ____yes ____no

a) If not, why?

(2/51) ___family responsibility
(2/52) ___lack of physical strength
(2/53) ___lack of mechanical abilities
(2/54) ___lack of ability to understand the job
(2/55) ___women do not work as hard
(2/56) ___women are undependable
(2/57) ___pregnancy and maternity leave would be too disruptive
(2/58) ___other (list) _____

23. Given that there has been a significant increase in the number of females entering agricultural programs in high schools and colleges, where would you think women will be finding jobs in agriculture?

(2/59) ___Labore Production Ag
(2/60) ___Equipn and Repair
(2/61) ___Gene armworker
(2/62) ___Proc ng Plant
(2/63) ___Landscape and Nursery
(2/64) ___Livestock
(2/65) ___Sales
(2/66) ___Technicians and Quality Control
(2/67) ___Office
(2/68) ___Managerial/Supervisorial
(2/69) ___Professional
(2/70) ___Owner
(2/71) ___Other _____

24. With the introduction of women workers, what kinds of changes may there be in the work relationships between:

(2/72-80) Employer/Employee: _____
(3/1-3) ___ _____
(3/4) ____
(3/5-13)___ ___ Worker/Worker: _____
_____

(3/14) ____25. How would you feel about having a woman as your supervisor?

(1)____I would not mind
(2)____I would dislike it
(3)____I would not work for a woman
(4)____I already work for a woman
(5)____no opinion

(15-16)_ _ _26. How many people of Mexican ancestry do you know who hold a job similar to yours?

_____

(3/18) ____27. If a person of Mexican ancestry had the same training you have and language fluency, could you see him/her working at a job like yours?

____yes
____no

a) If not, why?

(3/19) ____language problems
(3/20) ____lack of ability to understand the job
(3/21) ____he would not work as hard
(3/22) ____he is undependable
(3/23) ____other (list) _____
_____

28. Where do you think people of Mexican ancestry will be finding jobs in agriculture?

(3/24) ____Laborer, Production Ag
(3/25) ____Equipment and Repair
(3/26) ____General Farmworker
(3/27) ____Processing Plant
(3/28) ____Landscape and Nursery
(3/29) ____Livestock
(3/30) ____Sales
(3/31) ____Technicians and Quality Control
(3/32) ____Office
(3/33) ____Managerial/Supervisorial
(3/34) ____Professional
(3/35) ____Owner
(3/36) ____Other _____

(37-46) 29. What do you like most about your work?

_____
_____
_____

(47-56) 30. What do you dislike most about your work?

_____
_____
_____

Employee Questionnaire

Functions and Activities Descriptor Sheets

Job functions as defined in this study are the kinds of actions proper to a person's normal work. Activities are the tasks conducted to carry out these actions. This system is a way of describing and classifying work. The following functions and activities sheets were used during interviews with agricultural employees. Activities for each function are listed in number sequence--a brief description of each activity is also included.

I. ADMINISTRATION AND MANAGEMENT

1. Making or formulating policy: Creating or developing governing principles, plans, or guidelines.
2. Promoting: Stimulating and encouraging programs, projects, and related activities.
3. Planning: Formulating goals, objectives, and guidelines for future action; devising, designing, and projecting methods, systems, manners, arrangements, ways and means.
4. Coordinating: Relating and integrating various aspects of programs and activities.
5. Organizing: Allocating resources and arranging elements into a functioning unit--systematizing.
6. Evaluating: Determining the value of--assessing, rating, judging.
7. Financing: Providing or arranging for funds, capital, or credit for firm or customers.
8. Negotiating: Conferring with another so as to arrive at the settlement of some matter--bargain, contract.

II. SUPERVISION OF PERSONNEL

1. Interviewing prospective employees.
2. Hiring new employees.
3. Orienting new employees to their jobs.
4. Training new employees.
5. Retraining experienced employees.
6. Directing the efforts of others.
7. Developing and maintaining a high level of morale.
8. Hearing and processing worker grievances.
9. Informing personnel regarding firm policy, plans.
10. Improving the level of worker performance and stimulating growth and development of workers.
11. Rating (evaluating) personnel in terms of performance.
12. Terminating employment of workers when necessary.

III. CONSULTATION AND ADVISEMENT

Providing others (in another firm or business) with expertise and information, recommending, informing, and counseling regarding:

A. Planning and decision-making (policies, procedures, programs, and techniques):

1. Formulating policy to guide overall actions.
2. Defining purpose of program.
3. Setting goals and objectives.
4. Determining ways and means.

III. CONSULTATION AND ADVISEMENT (CONTINUED)

A. Planning and decision-making (policies, procedures, programs, and techniques) (continued):

5. Identifying and taking inventory of resources (human, material, natural, capital).
6. Recognizing limitations, problems, and obstacles.
7. Establishing priorities.
8. Allocating and organizing resources.
9. Evaluating.

B. Knowing operational and technical details regarding:

10. Production.
11. Agricultural mechanics and engineering.
12. Handling, transporting, and marketing of agricultural products.
13. Conserving, developing, and improving air, land, and water for agricultural purposes.
14. Developing and maintaining rural recreation and aesthetic resources.
15. Agricultural business management.
16. Accounts, records, bookkeeping budgets.
17. Finance, credit, taxes, banking, insurance.
18. Public relations.
19. Human relations.
20. Labor.
21. Law.
22. Management.
23. Real estate.
24. Education.
25. Researching

IV. RESEARCH AND DEVELOPMENT

A. Identifying problems and setting goals of research:

1. Identifying problem areas.
2. Planning a course of action.
3. Preparing guidelines for research development.
4. Determining and assigning priorities.

B. Designing and developing the research proposal:

5. Identifying assumptions, presuppositions, value judgements implicit in the treatment of the problem.

IV. RESEARCH AND DEVELOPMENT (CONTINUED)

B. Designing and developing the research proposal (continued):

6. Developing criteria of evaluation and of admissible evidence.
7. Selecting methods appropriate to investigation.
8. Determining the basis for selection and interpreting relation of data.

C. Conducting research:

9. Developing new techniques, procedures, and devices.
10. Using physical, chemical, and biological principles and techniques to create new applications of service or product.
11. Determining why there has been success or failure.
12. Seeing if something works by experiment or trial.
13. Identifying and recognizing various elements of situations, conditions, and circumstances.
14. Obtaining pertinent information relevant to particular situations, conditions, items and circumstances.
15. Determining the extent, size, nature, and value of.
16. Making an examination, checking or testing against established standards.
17. Making determinations by mathematical means.

D. Evaluating--critical study of ideas [illegible], or methods involving appraising, rating, or [illegible]valuating results:

18. Appraising the results of resear[illegible].
19. Recommending action as a result of evaluation.

V. COMMUNICATIONS AND WRITING

A. Gathering, preparing, editing, and disseminating general agricultural information and news:

1. Written form--newspapers, magazines.
2. Audio form--radio, television, telephone, records, tapes.
3. Pictorial form--television, film strips, slides, movies, paintings, photographs, sketches, graphs.

B. Gathering, preparing, editing, submitting and disseminating technical agricultural information, findings, data, etc.:

4. Written form--reports and accounts; texts and reference books; circulars, pamphlets, brochures, and bulletins; articles for technical journals; study guides, outlines, handbooks, and training manuals.
5. Audio form--radio, television, telephone, records, tapes.

V. COMMUNICATIONS AND WRITING (CONTINUED)

B. Gathering, preparing, editing, submitting and disseminating technical agricultural information, findings, data, etc. (continued):

6. Pictorial form--television, film strips, slides, movies, paintings, photographs, sketches, overlays, graphs.

C. Gathering, preparing, editing, and submitting field data:

7. Gathering and recording field data.
8. Writing reports for submission to higher authority.

D. Making public talks, lectures, and educational visits:

9. Making public talks, lectures, and/or educational visits.

VI. SALES

A. Setting goals and developing sales program:

1. Planning a course of action.
2. Preparing guidelines for sales program.
3. Acquiring product knowledge or skill competence.
4. Identifying target groups and individuals.
5. Developing information regarding prospective customers' needs for product or service.
6. Learning and using selling techniques based on accepted principles and practices.

B. Promoting and encouraging the adoption and use of specific goods and services:

7. Advertising--displaying, exhibiting, publicizing.
8. Demonstrating--showing, explaining, illustrating.
9. Estimating and interpreting the needs of the prospective buyer.
10. Diagnosing the opportunities for sales.

C. Closing the deal:

11. Completing financial transactions.
12. Providing for continued service, education, and goodwill.

D. Following-up and evaluating:

13. Checking on results obtained by customers.
14. Providing complete and acceptable records of sales program.

VII. PURCHASING

1. Setting goals: Planning a course of action for purchasing.
2. Determining needs: Identifying requirements and spelling out specifications of acceptability.
3. Choosing: Considering the alternatives and selecting according to specifications, rejecting sub-standard goods and services.
4. Purchasing: Procuring goods and services.
5. Determining: Estimating price based on market reports, grades, transportation differential, supplies, etc., and determining prices to offer.
6. Delivering: Arranging for delivery and mode of transportation.

VIII. INSPECTION, ENFORCEMENT, REGULATION, AND CONTROL

1. Inspecting: Examining agricultural products.
2. Standardizing agricultural products.
3. Controlling agricultural products.
4. Certifying agricultural products.
5. Quarantining of agricultural products.
6. Grading of agricultural products.
7. Analyzing agricultural programs.
8. Regulating agricultural programs.
9. Enforcing agricultural programs.
10. Researching agricultural programs.
11. Developing agricultural programs.
12. Administrating agricultural programs.
13. Promoting and protecting: Engaging in activities which enhance and safeguard California's agriculture.
14. Servicing: Providing California agriculturalists with specialized services.
15. Protecting the consumer: Guarding against deception and fraud by those who sell agricultural products and services.

IX. EDUCATION-EXTENSION WORK

A. Educating: Providing schooling, instruction, guidance and training

1. General education and citizenship training.
2. Vocational education.
3. Technical education.
4. Professional education.
5. In-service education (upgrading).
6. Retraining.
7. Avocational.
8. Training for disadvantaged, culturally deprived.

IX. EDUCATION-EXTENSION WORK (CONTINUED):

B. Extension work:

9. Transmitting research results to producers, handlers, consumers of farm products.
10. Conducting educational programs to increase the knowledge and improve the skills of California citizens.
11. Demonstrating and conducting adaptive research.

X. CLERICAL-OFFICE

1. Preparing correspondence and communications.
2. Preparing office reports, records, inventories.
3. Preparing financial accounts, books, budgets, and operating statements.
4. Keeping materials and production records.
5. Keeping employee records.
6. Duplicating and reproducing written or printed materials.
7. Operating office machines and communication devices.
8. Acting as receptionist and scheduling appointments.
9. Purchasing and/or requisitioning office supplies.
10. Engaging in office sales.
11. Handling money and making deposits.

XI. PUBLIC RELATIONS

A. Developing Public Relations Programs:

1. Determining what results are desired from involvement in public relations activities.
2. Formulating goals and objectives.
3. Deciding upon ways and means.
4. Taking inventory and allocating resources for effective public relations program.

B. Conducting Public Relations Program (promoting, publicizing):

5. Preparing and releasing information for dissemination by means of public communications media.
6. Preparing and releasing reports of activities and events including purpose, procedure used, and evaluation of results.
7. Making public appearances: Presenting talks, lectures, demonstrations.
8. Visiting agriculturalists in field of related endeavor and learning the relationships which exist.
9. Meeting and cooperating with others in developing solutions to agricultural problems.

XI. PUBLIC RELATIONS (CONTINUED)

B. Conducting Public Relations Program (promoting, publicizing) (continued):

10. Initiating, planning, sponsoring, and/or conducting meetings, seminars, conferences or discussions on appropriate topics.
11. Assisting in the promotion, preparation, distribution, and use of informational materials.
12. Recommending names of persons available as resource persons in agriculture.
13. Other.

C. Engaging in Informal Public Relations Activities:

14. Meeting potential business associates socially.
15. Providing non-business services to business associates.

D. Evaluating:

16. Determining effectiveness of efforts.

XII. GROWING OF PLANTS (Soil Preparation to Harvest)

1. Soil tilling and land preparing.
2. Propagating, planting, transplanting of plants.
3. Irrigating and draining.
4. Preventing, erradicating, and controlling weeds, pests, and diseases.
5. Pruning, thinning, and training.
6. Soil fertilizing--plant nutrition.
7. Plant breeding, selecting, reproducing.
8. Harvesting.
9. Weather modifying for plant production.

XIII. LIVESTOCK AND POULTRY PRODUCTION

1. Deciding on amounts and kinds of feed.
2. Feeding livestock.
3. Deciding on action to take for insects, disease, and parasite prevention, control and eradication.
4. Taking action to prevent, control, and eradicate insects, disease, and parasites.
5. Animal altering.
6. Selecting breeding stock.
7. Providing breeding services.
8. Solving problems of physiology and reproduction.
9. Caring for livestock for meat production.

XIII. LIVESTOCK AND POULTRY PRODUCTION (CONTINUED)

10. Caring for livestock for milk production.
11. Caring for livestock for wool production.
12. Caring for birds for egg production.
13. Training of livestock for special performance.
14. Cleaning of livestock facilities.
15. Building and/or maintaining livestock facilities.
16. Grooming and clipping livestock.
17. Providing specialized care for young livestock.
18. Milking cows.
19. Specializing in care of horses.

XIV. CONSTRUCTION, MAINTENANCE, REPAIR, AND OPERATION OF AGRICULTURAL MACHINERY, EQUIPMENT, AND FACILITIES

1. Maintaining and minor repairing of electrical motors.
2. Maintaining and minor repairing of small gas engines.
3. Maintaining large gas engines.
4. Maintaining diesel engines.
5. Performing major overhaul of diesel engines.
6. Performing major overhaul of gas engines.
7. Adjusting and calibrating field equipment for proper operation.
8. Operating small gas engine equipment.
9. Operating large gas engine equipment.
10. Operating diesel engine equipment.
11. Designing equipment.
12. Designing structures.
13. Constructing structures and facilities.
14. Constructing equipment.
15. Setting up equipment for use (install, establish, and service).
16. Determining suitability of equipment for particular jobs.
17. Establishing and maintaining a record system for maintenance, service, operation, and repair.

XV. HANDLING AGRICULTURAL MATERIALS (Transference, Packaging, and Storage)

A. Transferring of Agricultural Materials:

1. Conveying (continuous or intermittent forward movement--continuous drive).
2. Lifting and hoisting (reversing vertical or lateral movement).
3. Positioning, weighing, and controlling.
4. Transporting (carrier handling).

B. Packaging:

5. Packing of industrial products.

XV. HANDLING AGRICULTURAL MATERIALS (Transference, Packaging, and Storage) (CONTINUED)

B. Packaging (continued):

6. Packing of semifinished and finished products (including sorting of fruits and vegetables).

C. Storing and Warehousing:

7. Receiving.
8. Storing.
9. Shipping.

XVI. PROCESSING AND PACKAGING AGRICULTURAL PRODUCTS

1. Planning--setting goals and objectives, determining ways and means of processing program.
2. Interpreting USDA, state, local, and firm requirements, regulations, specifications, standards, controls, tests.

Performing such processing operations as:

3. Mixing, compounding, blending, kneading, shaping, and related work.
4. Separating, crushing, milling, chopping, grinding, and related work.
5. Culturing, melting, fermenting, distilling, saturating, pickling, aging, and related work.
6. Heating, rendering, melting, drying, cooling, freezing, and related work.
7. Slaughtering, breaking, curing, and related work.
8. Processing of food, tobacco, and related products not classified above.
9. Operating and adjusting all processing equipment and machinery.
10. Maintaining and servicing--keeping equipment in operational condition.
11. Trouble shooting problems as they arise.
12. Keeping records, accounts, and reports pertinent aspects of processing operation.
13. Analyzing and evaluating--reviewing [illegible] program and recommending improvements.

XVII. MARKETING AGRICULTURAL PRODUCTS

1. Advertising agricultural products.
2. Retail selling of agricultural products.
3. Wholesale selling of agricultural products.

XVII. MARKETING AGRICULTURAL PRODUCTS (CONTINUED)

4. Forecasting prices of agricultural products.
5. Selecting market outlets for agricultural products.
6. Cooperative marketing--contract farming.

XVIII. DEVELOPMENT OF AIR, LAND, AND WATER RESOURCES

A. Developing water resources:

1. Planning irrigation systems.
2. Installing irrigation systems.
3. Servicing irrigation systems.
4. Constructing dams and/or ponds.
5. Planning drainage systems.
6. Constructing drainage systems.
7. Testing water quality.
8. Assessing water needs.
9. Measuring water use.

B. Developing land resources:

10. Surveying.
11. Land leveling.
12. Adjusting pH of soil.
13. Leaching of soil.
14. Assessing suitability of soil for various purposes.
15. Taking soil samples.
16. Testing soil.

C. Developing air resources:

17. Testing extent of pollution.
18. Testing effects of pollution.
19. Controlling pollution.

XIX. ENVIRONMENTAL HORTICULTURE (Landscape, gardens, flowers, ornamentals)

1. Growing of plants for ornamental horticultural use. (Ground cover, shrubs, flowers, trees, vines, succulents, cacti, turf, potted plants, bedding plants, bulbs.)
2. Operating and managing a greenhouse.
3. Using landscape architecture.
4. Landscape contracting.
5. Landscape designing.
6. Landscape gardening (locating, planting, maintaining).
7. Operating and managing a nursery.
8. Turf managing.

XIX. ENVIRONMENTAL HORTICULTURE (Landscape, gardens, flowers, ornamentals) (CONTINUED)

9. Caring for plants in containers outdoors.
10. Caring for plants in containers indoors.
11. Caring for cut plant material (including flowers).
12. Arranging cut plant materials.

XX. FORESTRY, RANGE, AND WILDLIFE

1. Surveying forest, range, and wildlife resources.
2. Propagating forest trees and range plants and reproducing wildlife.
3. Preserving, conserving, re-vegetating, stocking, and improving practices.
4. Developing recreational resources.
5. Utilizing and managing forest, range, and wildlife resources.
6. Protecting forest, range, and wildlife resources.

XXI. RECREATION, PARKS, AND SCENIC BEAUTY

A. Planning and designing of:

1. Arboretums, botanical gardens, and natural areas of scenic beauty.
2. Golf courses and other outdoor sports areas.
3. Parks, picnic areas, camp sites, and playgrounds.
4. Fishing areas.
5. Hunting areas.

B. Developing and establishing of:

6. Arboretums, botanical gardens and natural areas of scenic beauty.
7. Golf courses and other outdoor sports areas.
8. Parks, picnic areas, camp sites, and playgrounds.
9. Fishing areas.
10. Hunting areas.

C. Maintaining and upkeeping of:

11. Arboretums, botanical gardens and natural areas of scenic beauty.
12. Golf courses and other outdoor sports areas.
13. Parks, picnic areas, camp sites, and playgrounds.
14. Fishing areas.
15. Hunting areas.

XXI. RECREATION, PARKS, AND SCENIC BEAUTY (CONTINUED)

D. Operating and managing of:

16. Arboretums, botanical gardens and natural areas of scenic beauty.
17. Golf courses and other outdoor sports areas.
18. Parks, picnic areas, camp sites, and playgrounds.
19. Fishing areas.
20. Hunting areas.

XXII. FINANCE AND LENDING

1. Preparing loans.
2. Recommending loans.
3. Approving loans.
4. Rejecting loans.
5. Appraising properties and chattels for security.

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