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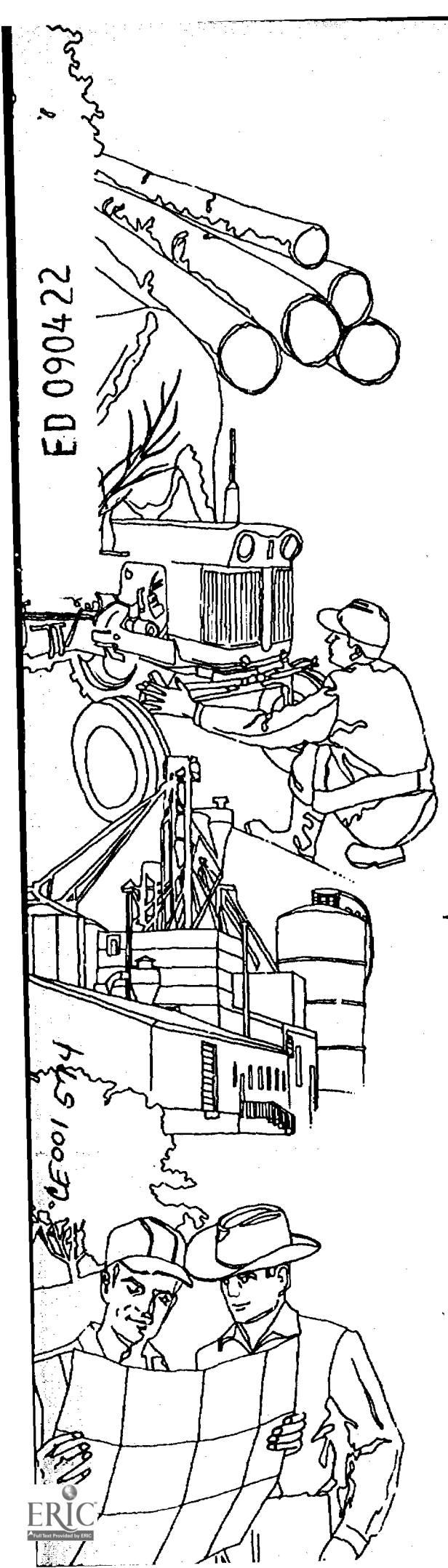
ABSTRACT

One of a series of surveys constituting a statewide study being conducted to obtain a comprehensive analysis of the total field of agricultural occupations in Montana and the competencies needed to enter, perform, and advance in these jobs, this report identifies the knowledge, skills, and attitudes needed by employees in agricultural production occupations. Interviews with employers were used to compile ranked lists of competencies for 18 occupations in the area of agricultural production. It is hoped that this information will be of value for evaluating programs and counseling students, and also provide program planners with the necessary material for developing appropriate and meaningful curricula in agricultural education. (SA)



A study to determine

Competencies Needed by Employees Entering Agricultural Production Occupations

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ERATA SHEET

A STUDY TO DETERMINE COMPETENCIES NEEDED BY EMPLOYEES ENTERING AGRICULTURAL PRODUCTION OCCUPATIONS

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Department of Agricultural and Industrial Education
Montana State University
Bozeman, Montana

A STUDY TO DETERMINE COMPETENCIES NEEDED BY EMPLOYEES ENTERING AGRICULTURAL PRODUCTION OCCUPATIONS

by

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The work presented herein was performed by the Montana Agricultural Experiment Station and Supported by the Office of the Superintendent of Public Instruction, Vocational and Occupational Skills Component

The Montana State University
Department of Agricultural and Industrial Education
Room 313, Linfield Hall, Bozeman, Montana
June, 1973

PREFACE

In the spring of 1970, the staff of the Department of Agricultural and Industrial Education of Montana State University initiated a state-wide study to determine the nature and extent of rural youth and adult educational and employment opportunities associated with agri-business and agricultural production. Four reports were published during 1972 as a result of Phase I of the Agricultural Manpower Study and are available from the Office of the Superintendent of Public Instruction, Helena, Montana, 59601. The four reports are also available on micro-fiche in the library reference source, Educational Resource Information Center (ERIC), and appear as follows:

ED 069 874 - Ag-Business Manpower Project Manual

ED 069 872 - Ag-Business Manpower Project Report

ED 069 875 - Agricultural Producer's Manpower Report Manual

ED 069 873 - Agricultural Production Manpower Report

Phase II of the study concerns itself with the knowledges, skills and attitudes needed by potential employees in order to qualify for available jobs in agri-business and agricultural production. This phase of the study began in the fall of 1972. The result of research conducted during this phase will be a series of reports in particular job clusters.

Each report is a composite of competency interviews and a compilation, evaluation and analysis of the data. A section on research methodology is also included.

This report is in keeping with the major objective of the study which is to provide essential information for curriculum development and ultimately the institution of agricultural education programs to meet manpower demands for agriculture in Montana.

ACKNOWLEDGEMENTS

In a research effort of this magnitude, it was necessary to enlist the assistance of many organizations and individuals throughout the state of Montana and the nation.

Several agencies have made specific contributions and are worthy of appreciation and acknowledgement: The Office of the Superintendent of Public Instruction, the Montana Experiment Station, the Montana State University's Departments of Agriculture, Animal and Range Science, Mathematics, Library, Sociology, and the Center for Interdisciplinary Studies, The United States Department of Forestry and the Montana Crop and Livestock Reporting Service.

The cooperation and assistance from the personnel of these agencies greatly facilitated the progress of this study.

Mrs. Barbara Agocs, research aid, Mrs. Erma Relden and Mrs. Carolyn Manley, secretarial personnel of the Department of Agricultural and Industrial Education were instrumental in the preparation of this report.

The author wishes also to express gratitude to the Vocational Agricultural teachers in the state and other personnel who served aptly in the role of interviewers and to the businesses and producers whose cooperation as respondents supplied the data.

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I

INTRODUCTION*

In the past years, before the scientific revolution in agriculture, farm operation was fairly simple. When to plant or harvest, knowledge of the patterns of crop and livestock production, mastery of the simple agricultural arts and skills, the basic ability to buy and sell, these understandings sufficed. It was a reasonably safe guess that most farm-raised boys would have or could obtain the requirements for successful farm operation; a bit of capital, suitable manual skills, and modest managerial ability. The combination of these resources in one man was the necessary cornerstone of the family farm. The family farm became a tradition, deeply imbedded in our economic, political and social structure. This tradition still has its prevalence in the structure of the Montana farm picture where 98% of the farms are classified as family enterprises. The commitment to this form of agricultural organization is tremendous.

The agricultural knowledge which an up-to-date farmer must master to run his business is much broader than the knowledge required of most businessmen with equal investment. The capital needed to operate a modern farm seems monumental to most farm-raised youth. It is becoming increasingly difficult to combine in one man the financial resources, the technical knowledge and the managerial ability needed to operate a

* Adapted from an address by Don Paarlberg, Director of Agricultural Economics, USDA.

modern farm. Nor do we generally find in one man or in one small producing unit the vision and the capability needed to meet the marketing opportunities provided by modern mass merchandising.

Managerial innovators have developed a far-reaching technique. Instead of simply accepting what the economists call "the factors of production" (land, labor, capital and management) as they happen to be combined in one man -- the family farm operator -- the new concept is to split up the factors of production and re-combine them in optimum form. There is nothing really new about this. Non-farm businessmen have been doing it for a long time. But its application to agriculture on a wide scale is relatively new. The economic efficiency latent in this organizational change is, in certain cases, very great indeed. Managerial ability can be recruited and trained and given responsibility not just for a small unit but for a large one. Capital can be brought in from the outside, not in conventionally sized chunks but in aggregations suited to the capability of the managerial concept. Farms can be consolidated or operated as associated units making maximum use of new mechanical equipment and managerial techniques. Production can be scheduled as to quantity, grade and time. Markets can be organized, developed and managed. Labor can be hired and given certain well specified tasks to perform as in factory labor. The organizational farm can be corporate, cooperative, partnerships or sole proprietorship.

The major factors that distinguish the new emerging forms in agriculture are:

1. Large scale instead of small scale operations.
2. The breakup of the old combination of land, labor, capital and management as these were found in a single individual

and their optimum recombination with management in the key role.

3. The gradual elimination of the old distinctions between production, marketing, processing and distribution.

The family farm is a durable and resilient institution. It has survived war, depressions and natural disaster. For most American agriculture, the family farm can continue to be the major organizational form if it is permitted the flexibility that will allow the efficient use of modern technology and management, if it is provided with good research, education and credit, if it makes wise use of the principles of cooperation, if it continues to enjoy the good will of the public; all of these things are possible if we decide that we want it that way.

Certainly with these national and local changing agricultural trends, Montana must keep pace with the demands for skilled and competent labor. Educators are often accused of impracticality and lack of realism in the design of their programs of agricultural education especially at the undergraduate level. The need to provide realistic, job oriented programs in agricultural production and agri-business provides an important challenge for educators to be innovative and precise in their planning of agricultural education programs that will prepare students as potential employees in the world of work in today's changing agriculture.

Rationale For The Study

This study is being conducted by the Department of Agricultural and Industrial Education in order to obtain a comprehensive analysis of the total field of agricultural occupations in Montana and the competencies needed to enter, perform and advance in these jobs. Both off-farm and on-farm opportunities are being studied to determine employment opportunities and training needs in the broad spectrum of agricultural occupations.

The objective of this Phase of the study (Phase II-B) is to obtain information to identify the knowledge, skills and attitudes needed by agricultural employees in agricultural production. In order to keep agricultural education up-to-date it is essential that program planners have current information about the types of work actually performed by workers engaged in agricultural production and about the knowledge and capabilities required for effective work.

A specific extension of this study objective is the documentation of a survey research model. One of the major goals of the Department of Agricultural and Industrial Education of Montana State University is to construct and test research models which hopefully will provide improved employment for citizens in Montana.

Assumptions

The assumptions accepted by the researchers at the beginning of the study were as follows: (1) that agricultural producers would be interested in the potential outcome of the study and would cooperate with the interviewers by providing information as to the employment tasks of their hired help and would also make their personnel available to be interviewed regarding their tasks; (2) that the persons being interviewed would be able to place an importance rating (0-5) on the validated competency statements; (3) that ratings would lend themselves to statistical analysis, thus competency statements could be ordered; and (4) that a more accurate competency rating would result if the interviewer sought the person actually performing the job competency.

Definition Of Terms

Agricultural Production - Defined

To insure a common understanding among participants regarding the many and varied meanings of the term Agricultural Production the following definition was accepted:

> Agricultural production includes those activities associated with the principles and processes involved in the planning related to and the economic use of facilities, land, machinery, chemicals, finance and labor. These components are involved primarily in the production of plant and animal products. Agricultural production also includes, to varying degrees, the preparation of these products on farms or ranches for man's use and their disposal by marketing.

Agricultural Occupations - Defined

An Agricultural Occupation means an occupation involving knowledge and skills in agricultural subjects, which have the following characteristics:

a. The occupation includes the functions of producing, processing and distributing agricultural products and includes services thereto;

b. The occupation requires competencies in one or more of the primary areas of plant, soil, and animal science, farm management, agricultural mechanization and agricultural leadership.

For the purposes of the report, those occupations involved in the area of agricultural production will be considered.

Review Of Related Research And Literature

Much of the related research and literature reviewed in connection with the present study was used in quest of specific methodology, relevant approaches and competency statements. The identification of accurate competency statements was a critical factor in conducting the study. Consequently, much study and review of literature related to characteristics of competency statements. In addition, the training and use of interviewers precipitated a research effort in this area for the preparation of the interviewers' manual and subsequent incentive and motivational ideas to aid interviewers in their important role as data collectors.

The resources of the library at Montana State University and especially the Educational Resources Information Center (ERIC) material provided the main source of reference for the literature that was reviewed.

Review of Research and Literature Related to the Feasibility, Need and Importance of the Study

Hensel (1968) states that there is a need for definite information concerning the occupations for which a student is being trained. He suggests that there is a need to insure future instructional programs in agricultural education which are sound and of high quality. He continues by stating that the character of the agricultural industry has changed from an almost total agrarian complex to an agrarian-industrial complex which requires new patterns of education and training.

This continuing need for technical training and services during the next 12 to 20 years to fulfill farmers' requirements in production, harvesting and marketing is further supported by the remarks of Campbell.

A narrative of the changes in the structure of agriculture resulting in the increase of farm firms with a decrease in the amount of labor used in relation to capital and land in the production of farm commodities is found in remarks by Bishop and Tolley, (1968). Further credence to the attitude that agriculture is rapidly changing and will thereby require new agricultural education programs is found in the research of Heady and Arcus whose study estimated the manpower requirements for the nation for 144 regions relating the types of skills and work abilities required by agriculture in the next 15 years. Present projections show an eventual domination of agriculture by two or three man farms, with a manager and one or two permanent hired personnel who will require different kinds of vocational agriculture training (Heady and Arcus, 1966).

Review of Research and Literature Relating to Methodology and Competency Statements

Perhaps the most useful material uncovered in this area was the effort of Gilbert Long whose study objective was to obtain up-to-date facts about clusters of tasks performed by Washington State farm operators engaged in seven production areas. This study was heavily relied upon in the initial stages of the second phase. Some thought was given to adopting the methodology used by Long. However, the Long study used a mailed questionnaire and we preferred to use interviewers for the collection of data. Competencies compiled in this study were reviewed. However, the researchers felt that they were too general to aid in the

curriculum development process. Other studies were reviewed to ascertain the general character of the competency statements such as those for welding which appeared in the study done by Hansen (1970) and a similar perusal of the competency statements in the studies of Lockwood and Morrow (1954). In addition, the methodology was reviewed and significant points were considered such as the inclusion of a self-rating system as to how well the person performed the job which appeared to be part of the evaluation in the study by Riedel (1970).

The rating sheets ultimately used in this project were an adaptation of the rating sheets used in the California study (Thompson, Beckett, 1971).

Review of Literature and Research Relating to the Training and Use of Interviewers

To prepare an interviewer's manual which would contain the necessary information regarding their role as data collectors, several references were used and were extremely helpful.

The importance of the role of the interviewer and the concept that interviewing is a form of communication was expressed by Adams (1958). Practically the entire outline of the interviewers' manual was written from a perusal of Adams' book. (Adams, 1958)

An interesting discussion of the personality of field workers was found in Richardson, Dohrenwend and Kline (1965). The competencies for interviewers were obtained from this source.

II

METHODOLOGY

The methods involved in Phase II of the Agricultural Manpower Project were largely dictated by the central purpose and specific objectives established in the rationale for the study. It was necessary to accomplish the following tasks in order to collect and analyze data pertaining to this research effort:

1. Define, stratify and sample the population for the study;
2. Develop competency statements which express the knowledge, skills, and attitudes needed by potential employees for entry level employment in identified job titles;
3. Arrange the competency statements into a logical sequence and a usable and efficient form;
4. Establish a rating system to standardize responses;
5. Develop a training plan for interviewers;
6. Hold interviewer training sessions;
7. Validate the instrument with the aid of consultants;
8. Refine the competency statements and instructions as a result of the reactions and advice of the consultants and suggestions made by interviewers during the training sessions;
9. Develop procedures for the collection of data;
10. Devise a coding system for the data in preparation for machine processing which would enhance the optium yield of information;
11. Determine methods of analysis which would effectively yield the information necessary to assist in the establishment of agricultural education courses and curriculums.

12. Interpret results of data analysis into a final report ready for distribution.

A detailed discussion of each of these items follows.

Selection Of The Sample

The information on page 48 of the Agricultural Production Manpower Report, Phase I (see Appendix A., p. 146) presents in detail the changes in full-time agricultural employees for 1971 and predicted to 1974 as indicated by Montana agricultural producers. These data were used as a basis to determine the job titles to be studied. This table lists the job titles, tabulations for the years 1971 and 1974 and the number of changes as well as the percent change. In order to ascertain where these job titles fell in the population, ownership and acreage tables for each job title were constructed.

The steps in determining the sample were as follows:

a. For each job title the number of expected employees (1974) was displayed in a two-way table showing type of farm ownership and farm size by acreage.

b. A full list of agricultural producers was made showing each producer's ownership classification and listing all expected employees by job title.

c. The occupied cells were identified for each job title in the two-way table and were sampled at random.

d. When a producer reported employees under a second or third job title they were also interviewed.

e. The sample size for each cell in a job title was proportional to the producers in that cell with approximately one producer sampled for every four employees listed. An exception was made when cells contained only one or two employees, resulting in a necessarily higher sample size.

Unfortunately, this system did not prove to be accurate as the employees used in the preparation of the two-way sample table were based on the figures predicted for 1974. In many cases these were prospective employees and did not exist in the employment picture at the time of the study. Obviously in these instances there was no one to interview.

With deference to this fact, another system of sampling had to be developed. Using the identification numbers of those producers selected in the above method the research assistant returned to the questionnaire that had been completed in Phase I and verified the presence of full-time employees from the information given. This yielded a large range of job titles covering all of the significant job titles in agricultural production and employees present in ranches with varying types of ownership and acreage classifications. Table 1, p. 13 delineates the type of ownership and acreage and the number of operations sampled in each cell.

The total number of producers sampled was 177. Valid returns were received from 134 contacts resulting in a 75% return. From the 177 producers selected, 35 could not be contacted; 1 was deceased; 6 were not able to give the data necessary because there were no employees or they did not hire full-time help (only part-time) and 1 return was not used since the information provided was incomplete. These producers were then identified by locale by returning to the master sheet used in Phase I of the project and their addresses and identification numbers were supplied to interviewers located throughout the state.

Each agricultural producer was assigned a six digit identification number to identify the type of ownership and the size of the operation in acreage.

TABLE 1

SAMPLE SELECTION RESPONSES CLASSIFIED
BY TYPE OF OWNERSHIP AND ACREAGE

Code	Type of Ownership	Code	Size (Acres)	Number Sampled	Number Responding
1-00	Owner Operator (Operator operates and owns at least part of the land)	11	51- 100	1	0
		12	101- 300	5	4
		13	301- 500	4	4
		14	501- 1,000	6	4
		15	1,001- 2,000	4	4
		16	2,001- 4,000	14	11
		17	4,001- 6,000	2	2
		18	6,001-10,000	10	9
		19	10,001 Plus	19	14
2-OP	Operator (Operates but someone else owns it)	22	101- 300	5	3
		23	301- 500	5	4
		24	501- 1,000	7	6
		25	1,001- 2,000	12	10
		26	2,001- 4,000	11	5
		27	4,001- 6,000	8	6
		28	6,001-10,000	11	8
		29	10,001 Plus	12	9
3-OPJ	Joint Operator (Two or more operators, land not owned)	35	1,001- 2,000	2	2
		39	10,001 Plus	1	0

TABLE 1 --Continued

Code	Type of Ownership	Code	Size (Acres)	Number Sampled	Number Responding
4-OPC	Corporation (Operates farm - business registered as a corporation)	42	101- 300	1	1
		44	501- 1,000	2	2
		45	1,001- 2,000	2	2
		46	2,001- 4,000	1	1
		48	6,001-10,000	5	4
		49	10,001 Plus	1	1
5-OPP	Partner (More than one person operating, does not own land)	54	501- 1,000	2	0
		55	1,001- 2,000	1	0
		56	2,001- 4,000	2	2
		57	4,001- 6,000	2	2
		58	6,001-10,000	1	1
6-OOJ	Joint Owner Operator (Operates a partnership on one or more of the income producing farm enterprises)	62	101- 300	1	0
		66	2,001- 4,000	1	0
7-OW	Owner (Owns land but does not farm land)	74	501- 1,000	1	1
		75	1,001- 2,000	1	0
		76	2,001- 4,000	1	0
		78	6,001-10,000	1	1

TABLE 1 --Continued

Code	Type of Ownership	Code	Size (Acres)	Number Sampled	Number Responding
8-OCC	Owns some of land - is operator and is incorporated	84	501- 1,000	2	1
		86	2,001- 4,000	1	1
		87	4,001- 6,000	3	3
		88	6,001-10,000	2	2
		89	10,001 Plus	3	3
9-OOP	Owns some of land being farmed, is in a partnership	95	1,001- 2,000	1	1
TOTALS				177	134

Development Of Competency Statements

The most tedious and challenging aspect of Phase II-B was the creation and compilation of valid competency statements. The Dictionary of Occupational Titles was used to establish the initial competency statements. From there, other references were used to compile and refine the competencies. Each competency was assigned a number. No two competencies had the same number. The numbers started in Farm and Ranch Foreman - General at 800 and continued consecutively through all of the job titles. This was done for the purpose of competency identification and to facilitate the use of the rating sheet (Appendix B, p. 151).

Validation Of The Instrument

Several consultants were used in reviewing competency statements. They were asked to add to or delete and offer their opinions as to the relevancy of the vocabulary. These consultants were students in the Agricultural and Industrial Education Department of Montana State University and faculty in the College of Agriculture whose experience in certain aspects of agriculture qualified them to judge the competencies. In addition, several ranchers, ranch managers, bank representatives and producers with expertise in special areas were asked to react to the competencies. Their reactions suggested revisions were incorporated into the final copy of the competencies.

Competency Statements' Instrument Format

Once the competency statements were validated, several different formats were entertained. An example of the final format appears in (Appendix C, p. 153). It was decided to collate the validated competency statements into a tabbed book for use in the field. This was done

and several books were supplied to each interviewer with the expectation that he would give a copy of the book to the respondent to follow or read from and have one for himself. Because of the volume of paper required for each interview, it was deemed necessary to devise a rating sheet for the responses. This is discussed under this heading.

Rating System

In order to standardize responses and have a constant "N" factor a rating system was devised with values from 0 to 5, denoting 0 - No Response, 1 - No Importance, 2 - Some Importance, 3 - Average Importance, 4 - Very Important, 5 - Essential. The respondent was instructed to rate each competency by telling the interviewer the number that he believed rated the importance of each knowledge, skill or attitude. The interviewer would then record the response on the rating sheet by inscribing the competency number and circling the number provided to designate the value given. If a respondent could not rate the statement or did not understand the statement the interviewer was instructed to circle "0" for "No Response." This permitted the researchers to account for all possible responses.

Training of Interviewers

Interviewers were obtained from contacting other agencies who used such persons in the course of their work. The Sociology Department, the Department of Inter-disciplinary Studies and the Montana Crop and Livestock Reporting Service provided interviewer information and personnel suggestions.

During the week of January 25th through 28th, interviewing training sessions were conducted in Billings, Miles City, Wolf Point, Great

Falls and Missoula. Prior to these sessions, interviewers were sent an Interviewers' Manual (Appendix D, p. 158). The manual was reviewed in the training session and additional points were made. The other instuments were distributed and discussed and a practice session was conducted, giving the interviewers an opportunity to use the material and to ask any questions regarding its use. An example of the additional materials and the entire package was demonstrated. A contract for interviewing was obtained from those in attendance at the dinner meeting.

Payscale

The interviewers were paid on the basis of the number of job titles that were covered or on the number of persons that they interviewed within one ranch. For instance, if the Farm and Ranch Foreman rated the job titles of all of his employees and there were five employees, the interviewer was paid $15 for this interview. He would also have been paid $15 if he had seen each of the employees and there were five employed. In an interview situation where the interviewer either handled 6 or more job titles or saw 6 or more persons employed on the ranch, he would receive $30 for the interview. Thus the pay scale was based on the number of job titles covered; $15 for 1 to 5 job titles and $30 for 6 or more job titles. In special instances per diem and/or mileage was provided for those traveling greater distances. Interviewers were also paid for their long distance phone calls to respondents and calls to the supervisors were on a collect basis.

Data Collection

Personal interview was deemed the advisable approach for collecting data since the complexity and bulk of such a questionnaire being mailed out would have resulted in a very low return. Selected interviewers were trained as mentioned previously and equipped with the necessary materials for interviewing. A rating sheet printed on carbon sensitive paper was for the recording of respondents' ratings. These rating sheets (Appendix B, p. 151) were designed for easy and rapid recording of responses and the interviewers were instructed to use the spaces consecutively as long as the person that was being interviewed remained the same. This was done to cut down on the amount of paper needed to complete an interview. The interviewer was instructed to mail the rating sheets in to the supervisor using provided stamped envelopes. He was instructed to mail in the original and keep the carbon copy for his own files to be mailed in at the close of his employment. The research aids served as supervisors in the Bozeman office, maintaining a telephone for accepting collect calls from interviewers. Contact cards (Appendix E, p. 169) were also provided to be filled out and mailed after each interview was completed. These contact cards were invaluable in figuring the interviewers expenses as well as determining progress of the interviews in the field.

A letter from the Dean of Agriculture at Montana State University (Appendix F, p. 171) was sent to all respondents requesting their continued participation in the project and stated that an interviewer would be calling on them shortly. Many interviewers related that this letter greatly facilitated their entry into the interviewing place of business and enhanced the atmosphere and rapport of the interview session.

Coding Rationale

Some discussion ensued regarding the best way to handle the data for analysis. We were advised that the Sociology Department of the University had devised computer programs that would be helpful in the analysis of the data. Upon visiting Dr. Gilchrist of that Department it was learned that we could merge two programs thereby producing the mean, median, mode and standard deviation, as well as frequencies and also have a computer print-out of the variables (competency statements) above the table. It was felt that this would be a desirable plan to follow and thus designed the coding rationale around this basis.

For the rating sheets, the identification number, the number of employees, the person giving the ratings (job title) and the job title being rated as well as the interviewer's identification number were assigned columns and small sheets were attached to the rating sheets with columns designated and appropriate codes for the above information. A columnar account of the coding details appear in (Appendix G., p. 173).

This information was then key punched, verified and prepared for computer analysis.

Methods Of Statistical Analysis

Chi Square

In the initial statistical analysis, the chi square statistical test was applied to the competencies of General Farm Worker - Livestock

as rated by themselves and as rated by "others." This statistical test was used since it permitted the evaluation of two or more differences at the same time as well as data expressed in frequencies. In the application of chi square to the frequencies ascribed to each of the variables (competency statements) as rated by General Farm Worker - Livestock and as rated by "others," a null hypothesis of no significant difference between the responses of the two groups was stated.

In a chi square problem degrees of freedom are determined generally by the use of the following formula:

$$df = (r-1)(c-1)$$

where r = the number of rows in the contingency table
c = the number of columns in the contingency table

The degrees of freedom determined for this study were 5 (df = (2-1)(6-1).

Thus, as the information was fed into the computer, each variable was considered as to the frequencies reported and the researcher entered the number of rows and the number of columns in the table. The computer was programmed with the chi square tables and converted the chi square table for the proper degree of freedom affixing a probability for that particular variable. A probability lower than .05 indicated that there is a difference and a probability higher than .05 indicated that there is no difference in the way the two groups rated the variable at the 95 percent confidence level. No further statistical tests were used to determine the nature or extent of the differences observed.

A review of the chi square value attributed to the 47 competencies (GFW - Livestock competencies) revealed that there was no significant difference in the value placed on the competency statements by those who rated themselves and by others who rated the competencies. The only

competency statements that were significantly different using the chi square test were as follows:

887.	Remove needle teeth of pigs.	Chi square = 15.7912 (Prob. = .0077)
891.	Pregnancy test livestock.	Chi square = 15.6647 (Prob. = .0081)
907.	Fill feed troughs with grain and roughage.	Chi square = 14.2887 (Prob. = .0139)

Since there were only three competencies of 47 that yielded a chi square of significance, the decision was made not to separate the rators into groups of "Self" and "Others" but combine all of the rators into one group rating each set of competencies. In addition, the General Farm Worker-Livestock job title was the only job title which there was a sufficient number of responses which positively could be identified as "Self" or "Others" to compare the responses statistically. Thus, for the other job titles the chi square test was not applied. The results on preceeding tables will be presented showing the aggregate, (self combined with others) mean and weighted score ratings.

Weighted Score

Competencies were ranked within job titles by means of a weighted score. The weighted score was determined by assigning a weight of 5 when a competency was rated "Essential," 4 when rated "Very Important," 3 when rated "Average Importance," 2 when rated "Some Importance," and 1 when rated "No Importance." The highest rated score given any competency was computed by multiplying the value of the rating as described above by the number of persons rating the competency. An inspection of each section gives the answer as to how each group of respondents ranked each competency.

Preparation Of The Final Report For Phase II

All during the course of the study, a diary was kept logging the activities of project events. Cooespondence, minutes of staff and consultation meetings were also documented to facilitate the writing of the report.

The primary purpose of this report is to make the findings of the study available to those interested and to assist in the establishment of agricultural education programs. The report is being published and distributed by the Office of the Superintendent of Public Instruction, Helena, Montana, 59601, and will be submitted for inclusion in the Educational Resource Information Center (ERIC) material so that it is available on microfiche.

III

ANALYSIS OF DATA

Comparison of Competency Statements

The Agricultural Production Manpower Report published in 1972 reported jobs existing and predicted among Montana Agricultural Producers. Data were based on 1,495 returns. The 1,495 returns in this study were used as the population for this study. As Table 1, p. 13 indicates, a sample of 177 farmers and ranchers was randomly drawn. From this sample, 134 (75%) valid returns were received. The study will not attempt to determine the differences which may exist on the basis of the two sampling variables, type of operation, or farm size. A later in-depth analysis of these data, however, may prove valuable for persons establishing educational programs.

Research indicates when different persons react to the competencies performed by a worker, they view the knowledge and skills needed by the worker somewhat differently. In some instances, it was not possible in this study to interview the worker performing the job title being studied. In those cases the person's supervisor was interviewed. To determine whether or not the perceptions of the worker and his supervisor were different enough to warrant reporting the data separately, the differences for the job title General Farm Worker were tested; the chi square test was used. The 95 percent confidence level was predetermined as to whether or not the data would be reported separately or in aggregate.

As indicated on page 21-22, of the 47 competencies to which the two groups replied, only three competency statements were viewed significantly different by the two groups responding. Because there were significant differences on only three of the 47 competencies combined (self and others) they will be reported in the aggregate on all subsequent tables.

Table 2 shows the rank order of competencies for General Farm Workers - Livestock as rated by persons in this job title and by "others."

The following tables show the rank order given competencies in each of the job titles in agricultural production. Competencies were rank ordered on the basis of weighted scores which was in keeping with the style of preceding agricultural manpower studies.

The mean scores were also reported as another measure of the relative importance of each competency for each job title.

TABLE 2

A COMPARISON OF COMPETENCY STATEMENTS FOR GENERAL FARM WORKER-LIVESTOCK AS RATED BY LIVESTOCK WORKERS AND OTHERS

Comp. No.	Competency	S.N=43 O.N=96	Frequency 0	1	2	3	4	5	Chi Sq.	Prob.
880.	Manage livestock in stalls, pens or houses for confinement.	Self	1	5	8	8	9	12	6.43106	.2655
		Other	1	4	23	31	19	18		
881.	Clean livestock pens and housing.	Self	1	3	6	8	12	13	3.71868	.5928
		Other		5	18	19	32	22		
882.	Detect livestock ready to lamb, calve or farrow.	Self			1	3	17	22	1.82039	.8738
		Other	1	2	3	5	41	44		
883.	Assist livestock in lambing, calving or farrowing.	Self			1	2	15	25	2.45515	.7853
		Other	1	1	2	9	37	46		
884.	Assist in the delivery of new born livestock.	Self			1	4	12	26	1.43776	.9195
		Other	1	1	1	9	30	54		
885.	Alter animals by castration.	Self		6	6	17	7	7	10.0796	.0722
		Other	2	4	17	23	26	24		
886.	Construct appropriate quarters for lambing, calving, farrowing.	Self	1	2	10	18	8	4	4.33146	.5042
		Other	2	6	15	30	26	17		
887.	Remove needle teeth of pigs.	Self	10	24	2	3		4	15.7912	.0077*
		Other	31	29	10	9	14	3		

* Significant at the .05 level using Chi Square Test

TABLE 2 —Continued

Comp. No.	Competency	S.N=43 O.N=96	Frequency 0	1	2	3	4	5	Chi Sq.	Prob.
888.	Control herd or flock on range or pasture by tending them with trained dogs, horses, or herders.	Self	3	9	7	7	8	9	7.83672	.1644
		Other	6	16	8	30	26	10		
889.	Move herd or flock about areas assigned for grazing.	Self	1	4	5	12	12	9	8.09732	.1499
		Other	5	3	13	16	45	14		
890.	Mark livestock for identification.	Self		4	3	9	13	14	6.88851	.2280
		Other	2	1	7	18	33	35		
891.	Pregnancy test livestock.	Self	6	23	5	5	2	2	15.6647	.0081*
		Other	8	24	25	13	18	8		
892.	Clamp metal rings into nostrils of animals for ease of handling.	Self	8	24	7	3		1	2.90780	.7170
		Other	16	46	18	8	5	3		
893.	Block animals by docking or clipping.	Self	4	24	10	4		1	10.1518	.0702
		Other	16	34	16	18	7	5		
894.	Wash animals.	Self	5	26	5	5	1	1	3.82849	.5764
		Other	15	45	22	8	3	3		
895.	Fit animals by grooming or clipping.	Self	4	26	5	4	2	2	3.59788	.6111
		Other	15	43	16	13	6	3		
896.	Cut up animals into retail cuts.	Self	8	27	2	3	2	1	6.17065	.2891
		Other	15	47	20	7	5	2		

* Significant at the .05 level using Chi Square Test

TABLE 2 --Continued

Comp. No.	Competency	S.N=43 O.N=96	Frequency 0	1	2	3	4	5	Chi Sq.	Prob.
897.	Determine the most economical weights to market livestock.	Self	4	11	6	11	5	6	7.48324	.1860
		Other	4	17	15	19	30	11		
898.	Determine when livestock are ready for market.	Self	5	8	6	10	8	6	6.84748	.2311
		Other	4	15	14	14	34	15		
899.	Set up appropriate creep feeders.	Self		8	12	11	10	2	4.53615	.4765
		Other	6	19	19	23	20	9		
900.	Determine when animals should be bred.	Self	4	6	7	7	9	10	7.55297	.1816
		Other	2	9	13	13	38	21		
901.	Determine when pastures should be rotated.	Self	4	2	5	8	15	9	4.06117	.5423
		Other	3	10	10	15	32	26		
902.	Read brands and animal identification systems.	Self	1		3	10	13	16	4.11597	.5345
		Other	1	3	7	13	38	34		
903.	Dispose of dead livestock in accordance with present health standards.	Self	1	3	6	10	11	12	1.20138	.9435
		Other	2	7	14	26	28	19		
904.	Prepare trucks, railroad cars for livestock shipment.	Self	4	8	11	7	10	3	8.58945	.1256
		Other	2	10	18	29	28	9		

TABLE 2 --Continued

Comp. No.	Competency	S.N=43 O.N=96	Frequency 0	1	2	3	4	5	Chi Sq.	Prob.
905.	Determine feed needs in terms of nutrients for growth, production and reproduction.	Self	3	3	9	11	5	12	7.94145	.1585
		Other	2	8	16	21	30	19		
906.	Mix feed additives to insure proper nutrition.	Self	4	5	7	11	6	10	7.22398	.2034
		Other	2	8	15	22	29	20		
907.	Fill feed troughs with grain and roughage.	Self			1	16	12	14	14.2887	.0139*
		Other	2	6	14	16	34	24		
908.	Determine the amount of water needed for livestock.	Self	1	2	3	8	13	16	1.75974	.8815
		Other	1	6	11	18	32	28		
909.	Plan and develop mechanical feeding systems.	Self	5	10	13	8	6	1	2.80117	.7333
		Other	8	26	20	27	12	3		
910.	Balance rations for different types of livestock of various ages.	Self	3	7	6	11	11	5	3.81499	.5784
		Other	2	10	20	23	28	13		
911.	Modify feeding practices to increase livestock value.	Self	4	5	6	9	13	6	6.00787	.3047
		Other	1	11	14	25	31	14		
912.	Compute weight losses and gains of livestock.	Self	4	7	10	9	10	3	2.82925	.7290
		Other	5	13	17	25	23	13		

* Significant at the .05 level using Chi Square Test

TABLE 2--Continued

Comp. No.	Competency	S.N=43 O.N=96	Frequency 0	1	2	3	4	5	Chi Sq.	Prob.
913.	Read and understand the meaning of the ingredients listed on a feed tag.	Self	1	3	2	10	15	12	.186464	.9982
		Other	3	6	5	24	33	25		
914.	Determine the form (pelleted, rolled, ground, etc.) in which feed should be fed to livestock.	Self	4	7	7	8	10	7	3.14344	.6807
		Other	4	17	9	21	27	18		
915.	Identify symptoms in animals suffering from deficiencies of essential nutritive elements in feeding rations.	Self	3	4	3	10	16	7	5.09748	.4047
		Other	3	4	9	20	31	29		
916.	Determine the general condition of livestock.	Self	2			12	15	14	5.69004	.2223
		Other	1		6	20	41	28		
917.	Administer medicine through feeds.	Self	2	5	4	17	11	4	8.23673	.1426
		Other	3	5	15	22	32	19		
918.	Administer simple medication to animals by mouth or by use of a syringe or hypodermic needle.	Self		1		7	16	19	2.53708	.7731
		Other	1	1	2	17	41	34		
919.	Apply medication to cuts and bruises.	Self	1	1	1	14	15	11	4.41422	.4930
		Other	3	2	6	17	38	30		

TABLE 2--Continued

Comp. No.	Competency	S.N=43 O.N=96	Frequency 0	1	2	3	4	5	Chi Sq.	Prob.
920.	Spray livestock with insecticide repellents.	Self		4	3	15	15	6	2.81988	.7304
		Other	2	7	8	29	28	22		
921.	Dip livestock.	Self	8	9	6	11	3	3	6.85848	.2303
		Other	6	22	20	19	17	12		
922.	Adjust thermostats to insure proper temperature and humidity for livestock confined in housing.	Self	6	13	6	7	9	2	2.22094	.8193
		Other	13	31	9	14	18	11		
923.	Keep fences, buildings and equipment in a good state of repair.	Self	1		1	5	22	14	1.09796	.8941
		Other	1		4	12	43	36		
924.	Set up hospital quarters for weak, injured or ill livestock.	Self		1	4	10	17	11	1.45463	.9176
		Other	2	3	11	24	32	24		
925.	Identify symptoms in animals suffering injury, common diseases or other problems.	Self	1	1	2	5	19	15	.664015	.9828
		Other	3	3	6	13	43	28		
926.	Keep records on livestock to assist a veterinarian in injury, sicknesses and/or other problems.	Self	2	5	7	12	9	8	1.84517	.8709
		Other	7	15	11	21	24	18		

Tables and Their Analyses

The data in Table 3 indicates that ninety-five persons responded to the 72 competencies making up the Farm and Ranch Foreman job title.

Competencies ranking highest on the weighted score basis were those dealing with the supervision of farm and ranch activities; specifically, the competency with the highest rated score, 410, was the timeliness of conducting farm and ranch operations. Following were competencies dealing with the complex of knowledge and skills involved in the management of other labor and of those operational competencies which result in increased profits to the farm or ranch.

Management competencies associated generally with determining or planning machinery cost per acre, management returns, labor accountability, enterprise returns, depreciation, and lease agreements ranked lowest. The lower ratings as given to management competencies seem reasonable to the researcher since foremen generally serve in a subordinate role to persons in an ownership-management capacity.

TABLE 3

AGGREGATE RANK ORDER OF COMPETENCIES
FOR FARM AND RANCH FOREMAN - GENERAL AS RATED
BY FARM AND RANCH FOREMEN AND OTHERS

Rank Order No.	Comp. No.	Farm & Ranch Foreman Competencies Rated by F&RF and Others N=95	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
1	804.	Realize the importance of the timeliness of operations in crop and livestock production.	2		1	9	34	49	4.41	410
2	809.	Recognize the conditions and circumstances requiring immediate attention and labor.	4	1	1	7	34	48	4.40	400
3	811.	Use production practices and equipment which save labor and increase profits.	3	1	3	8	34	46	4.32	397
4	868.	Make definite arrangements and agreements with hired workers about working conditions (hours, wages, days off, meals).	1	1	4	8	42	39	4.21	396
5	866.	Lead but not needlessly dominate workers.		3	1	13	46	32	4.08	388
6	858.	Give instructions to workers quickly and clearly.	3	3	1	11	40	37	4.16	383

TABLE 3 --Continued

Rank Order No.	Comp. No.	Farm & Ranch Foreman Competencies Rated by F&RF and Others N=95	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
7	861.	Supervise workers engaged in maintenance of farm machinery and equipment.	2	3	2	16	34	38	4.10	381
8	805.	Recognize the need to change managerial practices when necessary.	4	1	4	9	41	36	4.18	380
9	850.	Observe safety precautions in general to avoid potential loss of man-hours of labor.	3	2	2	14	38	36	4.13	380
10	865.	Exercise patience and tolerance with workers resulting in minimum labor turnover.	3	1	3	14	40	34	4.12	379
11	800.	Plan short and long term goals for the farm.	4		6	11	37	37	4.15	378
12	842.	Anticipate and prepare for peak work loads in the farm work schedule.	3	1	6	10	42	33	4.09	376
13	862.	Hire and fire farm labor.	1	6	2	12	43	31	3.97	373
14	864.	Execute the employer responsibilities for Social Security, withholding taxes, insurance and comply with regulatory laws related to hired workers.	2	8	1	12	33	39	4.01	373

TABLE 3 --Continued

Rank Order No.	Comp. No.	Farm & Ranch Foreman Competencies Rated by F&RF and Others N=95	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
15	867.	Allow workers to use their own judgement when necessary to complete a job.	3	2	1	15	46	28	4.05	373
16	856.	Assign jobs to workers according to their abilities and interests.	2	2	5	16	39	31	3.99	371
17	815.	Determine when the farm operator's time is more profitably utilized in management activities than as labor.	3	4	5	10	39	34	4.02	370
18	851.	Train workers to perform their jobs efficiently.	3	3	2	17	38	32	4.02	370
19	857.	Evaluate workers ability to perform various jobs.	3	1	4	14	46	27	4.02	370
20	801.	Use records as an aid in measuring goal achievement.	3	3	6	10	41	32	4.01	369
21	808.	Distinguish the difference of highest yield and most efficient yield in production.	3	2	4	16	43	27	3.97	365
22	855.	Assign appropriate priorities to the farm work to be done.	4	4	3	15	35	34	4.01	365

TABLE 3 --Continued

Rank Order No.	Comp. No.	Farm & Ranch Foreman Competencies Rated by F&RF and Others N=95	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
23	813.	Arrange labor, buildings and other facilities as well as land and field layout to save labor and increase profits.	3	2	5	18	38	29	3.95	363
24	812.	Recognize the volume required for a successful farm business.	2	2	4	15	43	29	4.00	362
25	843.	Plan the daily work schedule.	5	5	5	14	27	39	4.00	360
26	853.	Recognize and emphasize the important aspects of a job.	6	2	2	15	42	28	4.03	359
27	802.	Set up a farm record system and center in the home.	2	7	10	11	30	35	3.82	355
28	860.	Judge the qualifications of prospective workers.	4	1	4	21	42	23	3.90	355
29	854.	Analyze routine jobs to eliminate travel and motion.	5	2	5	19	38	26	3.90	351
30	863.	Determine labor use in various enterprises.	1	1	6	25	48	14	3.72	350
31	845.	Plan the overall farm work schedules.	6	7	3	12	35	32	3.92	349

TABLE 3 —Continued

Rank Order No.	Comp. No.	Farm & Ranch Foreman Competencies Rated by F&RF and Others N=95	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
32	859.	Use labor productively during slack periods of the regular work schedule.	3	4	3	22	42	21	3.79	349
33	810.	Plan the cropping and livestock programs to distribute labor throughout the year.	3	3	10	21	30	28	3.76	346
34	841.	Estimate the amount of work to expect of workers in a working day.	4	6		20	45	20	3.80	346
35	871.	Provide for the housing needs of workers and their families.	3	6	6	21	32	27	3.74	344
36	826.	Figure the cost of gain on feeding livestock.	6	8	5	11	35	30	3.83	341
37	844.	Observe and act upon the changes in labor requirement per unit as the size or volume of each farm enterprise increases or decreases.	4	4	6	23	37	21	3.71	338
38	820.	Prepare an income (profit-loss)statement from the current year's business transacted.	3	11	7	14	32	28	3.64	335

TABLE 3 --Continued

Rank Order No.	Comp. No.	Farm & Ranch Foreman Competencies Rated by F&RF and Others N=95	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
39	847.	Establish the size or volume of farm business necessary to employ full-time year-round labor on the farm.	2	9	5	23	33	23	3.60	335
40	819.	Determine the net farm income on a cash or accrual basis.	5	10	6	14	32	28	3.69	332
41	806.	Gather and use agricultural outlook information.	3	3	7	28	41	13	3.59	330
42	823.	Measure the financial progress by reviewing and comparing records from previous years.	5	9	5	15	41	20	3.64	328
43	824.	Figure the costs and the returns from using farm machinery to save or substitute for labor.	3	8	7	21	39	17	3.54	326
44	840.	Prepare or assist an accountant in the preparation of farm income tax returns.	3	15	12	7	27	31	3.51	323
45	818.	Keep farm accounts and using these records, determine the position of the business by farm enterprise.	6	11	8	11	33	26	3.62	322

TABLE 3 --Continued

Rank Order No.	Comp. No.	Farm & Ranch Foreman Competencies Rated by F&RF and Others N=95	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
46	817.	Plan and estimate farm budgets to determine expenses.	6	7	14	16	22	30	3.61	321
47	829.	Figure crop and livestock budgets estimating costs and potential income.	4	8	9	20	35	19	3.53	321
48	846.	Figure the relative amount and the seasonal distribution of the labor required in each farm enterprise.	4	7	5	28	38	13	3.49	318
49	830.	Know the capital requirements per enterprise.	5	11	5	21	32	21	3.52	317
50	825.	Figure the costs and the returns from using chemicals, herbicides and insecticides.	4	9	6	26	34	16	3.46	315
51	821.	Figure the depreciation schedule of farm equipment and buildings.	4	14	10	21	21	25	3.36	306
52	848.	Obtain the performance of physical labor over extended periods when necessary.	7	8	4	32	28	16	3.45	304
53	837.	Negotiate land purchases and transactions such as leasing land.	5	18	10	6	35	21	3.34	301

TABLE 3 --Continued

Rank Order No.	Comp. No.	Farm & Ranch Foreman Competencies Rated by F&RF and Others N=95	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
54	814.	Recognize the services offered by farm business organizations.	3	5	16	30	32	9	3.26	300
55	816.	Appraise farm and ranch properties to determine their total value.	7	9	9	30	21	19	3.36	296
56	833.	Determine the per acre crop expense.	3	14	7	30	27	14	3.22	296
57	838.	Prepare a net worth statement of the operation.	5	16	10	16	28	20	3.29	296
58	852.	Summarize and analyze labor records to improve efficiency of labor use.	6	10	9	26	32	12	3.30	294
59	831.	Understand the economic principle of diminishing returns.	10	12	6	19	29	19	3.44	292
60	803.	Estimate the potential value of family labor to the farming operation.	4	13	13	24	28	13	3.16	288
61	827.	Identify all sources of income (family, crops, off-farm) to assess assets.	7	17	11	16	20	24	3.26	287
62	839.	Plan the farm insurance programs.	3	17	13	18	30	14	3.12	287

TABLE 3--Continued

Rank Order No.	Comp. No.	Farm & Ranch Foreman Competencies Rated by F&RF and Others N=95	Frequency 0 1 2 3 4 5	Mean Rating	Wtd. Score
63	836.	Figure the rate of return per dollar invested in each enterprise.	4 15 11 22 33 10	3.13	285
64	807.	Know about educational programs of extension services and vocational education programs that would benefit the farm enterprise.	4 5 18 37 24 7	3.11	283
65	835.	Analyze the farm accounts on the basis of individual production enterprises.	4 12 19 21 26 13	3.10	282
66	849.	Keep records of labor use and accomplishments.	4 12 18 22 27 12	3.10	282
67	832.	Figure the management return.	4 15 9 28 31 8	3.09	281
68	834.	Figure the power and machinery cost per acre.	4 16 16 28 18 13	2.96	269
69	822.	Determine the cash value of insurance policies in assessing assets.	7 15 18 26 18 11	2.91	256
70	870.	Determine the extent an employer should become involved in personal problems of employees.	8 16 18 24 19 10	2.87	250

TABLE 3--Continued

Rank Order No.	Comp. No.	Farm & Ranch Foreman Competencies Rated by F&RF and Others N=95	Frequency 0 1 2 3 4 5	Mean Rating	Wtd. Score
71	828.	Estimate the percent of income used for family living.	5 21 15 27 18 9	2.77	249
72	869.	Provide for relaxation after regular working hours.	12 17 19 17 20 10	2.84	236

Data in Table 4 indicates the rank order of competencies for persons entering the job title General Farm Worker - Livestock. This job title was rated by the largest number of persons (140).

Forty-seven competencies were rated. The competency having the highest weighted score (615) was delivery of newborn animals, followed by assisting in lambing, calving or farrowing and being able to detect livestock ready to lamb, calve or farrow. Although keeping fences and buildings and equipment in a state of good repair was important, competencies rating high tended to be associated with maintenance of the health and well-being of various livestock species. Competencies associated with identification, feeding, watering and preventative measures were ranked in the middle grouping of competencies.

Competencies ranking in the bottom one-third tended to be those associated with management responsibilities as arranging for livestock shipment, determining marketing weights and developing mechanical feeding systems. Competencies associated with the preparation of animals for fairs and shows received the lowest weighted scores.

TABLE 4

AGGREGATE RANK ORDER OF COMPETENCIES FOR
GENERAL FARM WORKER - LIVESTOCK AS RATED BY
GENERAL FARM WORKER - LIVESTOCK AND OTHERS

Rank Order No.	Comp. No.	General Farm Worker-Livestock Competencies Rated by GFW-Livestock and Others N=140	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
1	884.	Assist in the delivery of new born livestock.	1	1	2	14	42	80	4.42	615
2	883.	Assist livestock in lambing, calving or farrowing.	1	1	3	12	52	71	4.36	606
3	882.	Detect livestock ready to lamb, calve or farrow.	1	2	4	8	59	66	4.32	600
4	918.	Administer simple medication to animals by mouth or by use of a syringe or hypodermic needle.	1	2	2	24	57	54	4.14	576
5	923.	Keep fences, buildings and equipment in a good state of repair.	2		5	17	66	50	4.17	575
6	902.	Read brands and animal identification systems.	2	3	10	23	51	51	3.99	551
7	916.	Determine the general condition of livestock.	3		6	22	57	42	3.99	546

TABLE 4--Continued

Rank Order No.	Comp. No.	General Farm Worker-Livestock Competencies Rated by GFW-Livestock and Others N=140	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
8	925.	Identify symptoms in animals suffering injury, common diseases or other problems.	4	4	8	18	62	44	3.99	542
9	890.	Mark livestock for identification.	2	5	10	27	46	50	3.91	540
10	919.	Apply medication to cuts and bruises.	4	3	7	31	53	42	3.91	532
11	908.	Determine the amount of water needed for livestock.	2	9	14	26	45	44	3.73	515
12	924.	Set up hospital quarters for weak, injured or ill livestock.	2	4	15	34	50	35	3.70	511
13	907.	Fill feed troughs with grain and roughage.	2	7	15	32	46	38	3.67	507
14	913.	Read and understand the meaning of the ingredients listed on a feed tag.	4	10	7	34	48	37	3.70	503
15	881.	Clean livestock pens and housing.	1	8	24	27	44	36	3.55	493
16	915.	Identify symptoms in animals suffering from deficiencies of essential nutritive elements in feeding rations.	6	9	12	30	47	36	3.66	491

TABLE 4--Continued

Rank Order No.	Comp. No.	General Farm Worker-Livestock Competencies Rated by GFW-Livestock and Others N=140	Frequency 0 1 2 3 4 5	Mean Rating	Wtd. Score
17	920.	Spray livestock with insecticide repellents.	2 11 11 45 43 28	3.48	480
18	901.	Determine when pastures should be rotated.	7 12 15 23 47 36	3.60	479
19	889.	Move herd or flock about areas assigned for grazing.	6 7 18 28 58 23	3.54	474
20	903.	Dispose of dead livestock in accordance with present health standards.	3 10 20 36 40 31	3.45	473
21	885.	Alter animals by castration.	2 10 24 40 33 31	3.37	465
22	900.	Determine when animals should be bred.	6 15 20 20 48 31	3.45	462
23	917.	Administer medicine through feeds.	5 10 19 40 43 23	3.37	455
24	880.	Manage livestock in stalls, pens or houses for confinement.	2 9 31 39 29 30	3.29	454
25	905.	Determine feed needs in terms of nutrients for growth, production and reproduction.	5 12 25 32 35 31	3.36	453

TABLE 4 --Continued

Rank Order No.	Comp. No.	General Farm Worker-Livestock Competencies Rated by GFW-Livestock and Others N=140	Frequency 0 1 2 3 4 5	Mean Rating	Wtd. Score
26	886.	Construct appropriate quarters for lambing, calving, farrowing.	3 8 25 48 35 21	3.26	447
27	906.	Mix feed additives to insure proper nutrition.	6 14 22 33 35 30	3.34	447
28	911.	Modify feeding practices to increase livestock value.	5 17 20 34 44 20	3.22	435
29	926.	Keep records on livestock to assist a veterinarian in injury, sicknesses and/or other problems.	9 20 18 33 33 27	3.22	422
30	910.	Balance rations for different types of livestock of various ages.	5 18 26 34 39 18	3.10	418
31	914.	Determine the form (pelleted, rolled, ground, etc.) in which feed should be fed to livestock.	8 25 16 29 37 25	3.16	417
32	898.	Determine when livestock are ready for market.	9 23 20 24 42 22	3.15	413
33	888.	Control herd or flock on range or pasture by tending them with trained dogs, horses, or herders.	9 25 16 37 34 19	3.05	399

TABLE 4--Continued

Rank Order No.	Comp. No.	General Farm Worker-Livestock Competencies Rated by GFW-Livestock and Others N=140	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
34	904.	Prepare trucks, railroad cars for livestock shipment.	6	18	29	36	38	13	2.99	391
35	897.	Determine the most economical weights to market livestock.	8	28	21	30	36	17	2.95	389
36	912.	Compute weight losses and gains of livestock.	9	21	27	34	33	16	2.97	389
37	899.	Set up appropriate creep feeders.	6	28	31	34	30	11	2.74	367
38	921.	Dip livestock.	14	32	26	30	23	15	2.71	341
39	922.	Adjust thermostats to insure proper temperature and humidity for livestock confined in housing.	19	45	15	21	27	13	2.57	311
40	909.	Plan and develop mechanical feeding systems.	13	37	33	35	18	4	2.36	300
41	891.	Pregnancy test livestock.	14	48	30	18	20	10	2.32	292
42	893.	Block animals by docking or clipping.	20	58	26	22	8	6	1.98	238
43	895.	Fit animals by grooming or clipping.	19	70	21	17	8	5	1.82	220

TABLE 4 --Continued

Rank Order No.	Comp. No.	General Farm Worker-Livestock Competencies Rated by GFW-Livestock and Others N=140	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
44	887.	Remove needle teeth of pigs.	41	54	12	12	14	7	2.07	205
45	894.	Wash animals.	20	72	27	13	4	4	1.67	198
46	892.	Clamp metal rings into nostrils of animals for ease of handling.	24	71	25	11	5	4	1.67	194
47	896.	Cut up animals into retail cuts.	23	75	22	10	7	3	1.64	192

Data in Table 5 shows the rank order, mean rating and weighted scores of competencies required for the job title General Farm Worker - Sheep. Guarding flock against predators received the highest weighted score - 50. This was followed by the competency assisting in lambing, docking and shearing animals. Other competencies ranked in order of their weighted score values were: tending flock, moving sheep, recognition of poisonous plants, supplemental feeding, using trained dogs in working with sheep and being able to cook and maintain a camp.

The rank order of competencies, 11 through 21, were associated with shearing, handling of sheep for shearing and the caring of the wool during and following the shearing operation. These competencies were perhaps of less importance on each farm or ranch since specialized shearing crews shear nearly all the sheep shorn in Montana at the present time.

TABLE 5

AGGREGATE RANK ORDER OF COMPETENCIES FOR GENERAL FARM WORKER - SHEEP AS RATED BY GENERAL FARM WORKERS - SHEEP AND OTHERS

Rank Order No.	Comp. No.	General Farm Worker-Sheep Competencies Rated by GFW-Sheep and Others N=13	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
1	939.	Guard flock against predatory animals.	1	1		1	4	6	4.17	50
2	941.	Assist in lambing, docking and shearing animals.	1	1			6	5	4.17	50
3	935.	Tend flock of sheep grazing on range or pasture.	1	1		1	5	5	4.08	49
4	937.	Prevent animals from wandering or becoming lost.	1	1	1	2	4	4	3.75	45
5	936.	Move sheep to and about area assigned for grazing.	1	1	1	3	3	4	3.67	44
6	940.	Recognize poisonous plants.	1	1		3	6	2	3.67	44
7	942.	Feed animals supplementary rations.	1	1	1	4	4	2	3.42	41
8	938.	Use trained dogs to round up strays and assist in moving flock to other locations.	1	1	3	2	4	2	3.25	39

TABLE 5--Continued

Rank Order No.	Comp. No.	General Farm Worker-Sheep Competencies Rated by GFW-Sheep and Others N=13	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
9	943.	Cook and maintain a camp.	1	2	3	3	2	2	2.92	35
10	944.	Be licensed when required, for the type of equipment operated.	2	4		3	3	1	2.73	30
11	951.	Administer treatment to nicked and cut sheep.	4	2	1	1	5		3.00	27
12	954.	Separate heavy tags, dung locks and badly stained wool from clean portion of the fleece.	4	2	2	3	2		2.56	23
13	952.	Determine the amount of moisture in fleece to schedule shearing.	4	2	4	1	2		2.33	21
14	946.	Secure animal in position for shearing.	4	2	5	1	1		2.11	19
15	947.	Shear wool from sheep using power driven clippers or hand shears.	5	3	2	2		1	2.25	18
16	950.	Shear without nicking or cutting skin of sheep.	5	3	2	1	2		2.25	18
17	953.	Fold and tie each wool fleece into a bundle.	5	3	3		1	1	2.25	18

TABLE 5 --Continued

Rank Order No.	Comp. No.	General Farm Worker-Sheep Competencies Rated by GFW-Sheep and Others N=13	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
18	955.	Sack wool.	5	3	2	2		1	2.25	18
19	949.	Clip wool close to the hide to remove fleece in one piece.	5	3	3	1	1		2.00	16
20	945.	Set up power clipper unit and other equipment used in shearing sheep.	5	2	5	1			1.88	15
21	948.	Maintain and sharpen clippers and shears.	5	3	4		1		1.88	15

The data in Table 6 show the rank order of the fifteen competencies making up the job title Milker on the basis of weighted score values.

Because sanitation is the first order in the dairy business, cleanliness of the cow and equipment used in milking received the highest weighted score - 67. Competencies listed whose weighted scores were between 66 and 59 were associated with the actual mechanics of milking; however competency number 976 was related with the administration of proper treatment for infected animals, and had a weighted score value of 61.

Competencies having a weighted score value of 49 and 48, respectfully, were providing maintenance to milking machines and securing cows in stanchions. The three lowest rated competencies were associated with conducting strip cup test, guiding cows into stations and emptying milk receptacles.

TABLE 6

AGGREGATE RANK ORDER OF COMPETENCIES FOR
MILKER AS RATED BY MILKERS AND OTHERS

Rank Order No.	Comp. No.	Milker Competencies Rated by Milkers and Others N=14	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
1	971.	Clean teats and udder of cow with disinfectant.					3	11	4.79	67
2	981.	Clean and sterilize milking equipment.					3	11	4.79	67
3	978.	Remove milking machine cups when milking is completed.					4	10	4.71	66
4	970.	Carry out a good sanitation program.					5	9	4.64	65
5	984.	Care for and handle milk properly.		1			2	11	4.57	64
6	977.	Attach milking machine cups to teats of the cow.		1	1			12	4.50	63
7	979.	Tend and operate milking machine.		1			4	9	4.43	62
8	976.	Administer the proper treatment for infected animals.		1		1	3	9	4.36	61
9	975.	Identify mucus, curds or blood in milk sample.				3	4	7	4.29	60

TABLE 6--Continued

Rank Order No.	Comp. No.	Milker Competencies Rated by Milkers and Others N=14	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
10	982.	Clean and sterilize milking parlor.				2	7	5	4.21	59
11	983.	Provide maintenance to milking machine as recommended by manufacturer's operator's manual.		3	1		6	4	3.50	49
12	973.	Secure cow in stanchions.		3		3	4	4	3.43	48
13	974.	Strip cow's teat to collect sample of milk in strainer cup.		4	1	5	2	2	2.79	39
14	972.	Guide cow into milking station.		6	1	4	2	1	2.36	33
15	980.	Empty milk receptacle.	2	5	1	3		3	2.58	31

Data in Table 7 show the rank order on the basis of weighted score of competencies for the General Farm Worker - Crop Production job title.

The competencies rating first and second with a weighted score of 379 and 376 stressed safety of machinery operation and safe use of farm chemicals. Being able to operate power units, clean fertilizer equipment and seed crops with grain drill were given weighted scores of 369, 358 and 355 respectfully.

Competencies dealing with adjusting and operating farm equipment on and off roads, determining when crops are ready to harvest and safely store and being able to identify and control crop hazards as diseases, weeds and insects were given weighted score values ranging between 343 and 315. Receiving the lowest weighted score values of 300 or less were competencies associated with removing crop residue, interpret directions for application of agri-chemicals, determine moisture content of grain, know where and how to obtain crop production information, select sprays and dusts for crops and determine when soil moisture conditions warrant irrigation.

TABLE 7

AGGREGATE RANK ORDER OF COMPETENCIES FOR
GENERAL FARM WORKER - CROP PRODUCTION AS RATED BY
GENERAL FARM WORKERS - CROP PRODUCTION AND OTHERS

Rank Order No.	Comp. No.	General Farm Worker-Crop Production Competencies Rated by GFW-Crop Production and Others N=88	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
1	996.	Know and comply with safety rules relating to the operation of each major piece of farm machinery.				13	35	40	4.31	379
2	1004.	Observe recommended safety precautions in handling agricultural chemicals.		1	2	11	32	42	4.27	376
3	997.	Operate farm equipment and power units for planting, cultivating, and harvesting.			1	13	42	32	4.19	369
4	1005.	Properly clean fertilizer equipment upon completion of operation.	1	1	1	15	40	30	4.11	358
5	1008.	Seed crops using grain drill.		2	5	10	42	29	4.03	355
6	1009.	Adjust grain drill for seeding the recommended quantity of grain to desirable depth.	2	3	4	15	33	31	3.99	343
7	1000.	Properly clean planting equipment upon completion of operation.		2	2	18	48	18	3.89	342

TABLE 7--Continued

Rank Order No.	Comp. No.	General Farm Worker-Crop Production Competencies Rated by GFW-Crop Production and Others N=88	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
8	1016.	Determine when crops are ready to harvest.	2	3	7	13	37	26	3.88	334
9	1007.	Prepare seed bed using appropriate farm implements.	1	2	7	14	48	16	3.79	330
10	998.	Operate farm equipment and power units on and off roads and through all kinds of traffic, and under all weather conditions with the ability to attach chains and sanding equipment.	1	6	3	21	32	25	3.77	328
11	1014.	Recognize and identify actual and potential crop hazards such as disease, weeds and insects.	2	3	5	19	37	22	3.81	328
12	1017.	Know the proper storage procedures for grain.	3	4	6	17	36	22	3.78	321
13	1006.	Conduct secondary tillage operation prior to seed bed preparation.	2	3	3	25	40	15	3.71	319
14	1012.	Operate and adjust farm sprayer and duster for the control of weeds and insects.		7	6	24	31	20	3.58	315

TABLE 7 --Continued

Rank Order No.	Comp. No.	General Farm Worker--Crop Production Competencies Rated by GFW-Crop Production and Others N=88	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
15	995.	Be licensed when required, for the type of equipment operated.	5	8	7	12	26	30	3.76	312
16	1002.	Execute the initial tillage operation using appropriate equipment for local conditions.	1	2	7	30	35	13	3.57	311
17	1003.	Adjust fertilizer spreader for application of the recommended type and quantity of fertilizer.	4	4	7	20	38	15	3.63	305
18	1010.	Know stages and growth development of crop maturation.		6	10	26	29	17	3.47	305
19	1001.	Follow management directions for removal of crop residue.	6	3	7	20	37	15	3.66	300
20	1011.	Interpret the directions for the proper application of agri-chemicals.	2	9	9	20	27	21	3.49	300
21	1018.	Determine moisture content of grain.	3	14	12	11	30	18	3.31	281
22	1015.	Know where and how to obtain advanced information about improved crop production techniques.	4	10	10	24	26	14	3.29	276

TABLE 7 --Continued

Rank Order No.	Comp. No.	General Farm Worker—Crop Production Competencies Rated by GFW-Crop Production and Others N=88	Frequency 0 1 2 3 4 5	Mean Rating	Wtd. Score
23	999.	Select sprays and dusts for the appropriate cropping practice.	5 19 12 21 16 15	2.95	245
24	1013.	Determine when soil moisture conditions warrant irrigation.	13 16 6 14 25 14	3.20	240

Data in Table 8 reveal the rank order of competencies making up the job title General Farm Worker - Hay.

The competency with the highest weighted score - 425, was making necessary field repairs. Competencies given comparable weighted scores of 407 were associated with having workers familiar with operator's manuals and determining desirable moisture level of hay for processing.

Competencies whose weighted scores ranged from 382 to 356 were associated with stacking bales, determining stage of maturity of hay and the level of moisture in hay after cutting.

Competencies whose weighted score ranged from 299 to 237 were those dealing with proper liscensure, bucking bales, measuring hay, packing ensilage, and the ability to protect hay from spoilage.

TABLE 8

AGGREGATE RANK ORDER OF COMPETENCIES FOR GENERAL FARM WORKER - HAY AS RATED BY GENERAL FARM WORKERS - HAY AND OTHERS

Rank Order No.	Comp. No.	General Farm Worker-Hay Competencies Rated by GFW-Hay and Others N=101	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
1	1027.	Maintain equipment making the necessary field repairs.			1	11	55	34	4.21	425
2	1026.	Be familiar with the operator's manual for the equipment operated.	1	1	2	17	49	31	4.07	407
3	1030.	Determine the desirable moisture level of hay for baling, cropping, stacking or ensilage.		2	3	16	49	31	4.03	407
4	1031.	Stack bales or loose hay by hand or using farm machinery.	3	1	3	26	43	25	3.90	382
5	1028.	Determine the stage of maturity of the hay for cutting.	4	7	8	21	34	27	3.68	357
6	1029.	Determine the level of moisture in the hay after cutting.	4	5	10	20	39	23	3.67	356
7	1025.	Be licensed, when required, for the type of equipment operated.	10	19	7	15	29	21	3.29	299

TABLE 8 --Continued

Rank Order No.	Comp. No.	General Farm Worker-Hay Competencies Rated by GFW-Hay and Others N-101	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
8	1033.	Buck bales onto a wagon or a truck using a hand hook.	8	17	15	30	16	15	2.97	276
9	1035.	Measure quantity of hay and/or silage in piles, bunkers or trucks.	6	17	23	26	18	11	2.82	268
10	1032.	Pack ensilage for storage using appropriate equipment.	12	27	10	19	18	15	2.82	251
11	1034.	Cover stack or hay pile to protect from spoilage.	9	29	17	21	14	11	2.58	237

The data in Table 9 reveal how competencies for the job title Agricultural Mechanic were rated by persons employed as agricultural mechanics and others.

Thirty-eight persons rated the competencies making up this job title. The competency having the highest weighted score - 184 was loading trucks properly. Competencies rating second, third and fourth with weighted scores of 176, 171 and 170 were associated with changing oil filters, keeping lubricants and fuel clean and lubricating and servicing machinery. Competencies with a weighted score of between 168 and 151, in general, were associated with the proper and safe operation and preventative maintenance under field and shop conditions of the power sources commonly used on farms and ranches.

Competencies with weighted scores of between 150 and 106 tended also to be those competencies associated with the light tune-up and maintenance of the cooling, lubrication, ignition, carburetion and hydraulic systems of the farm power and machinery units.

Competencies with a weighted score value of between 106 and 79 were associated with using micrometers and performing technical level mechanical skills as refacing valves and seats, engine diagnosis, repairing hydraulic motors, replacing injector nozzles, and testing hydraulic units. The above jobs are those the researcher understands are commonly taken to specialized shops for repair.

TABLE 9

AGGREGATE RANK ORDER OF COMPETENCIES FOR AGRICULTURAL MECHANIC AS RATED BY AGRICULTURAL MECHANICS AND OTHERS

Rank Order No.	Comp. No.	Agricultural Mechanic Competencies Rated by Agricultural Mechanics and Others N=38	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
1	1383.	Load trucks properly.	3			7	17	11	4.11	184
2	1301.	Change oil filters.	1	2	1	1	16	17	4.22	176
3	1201.	Recognize the need for keeping lubricants and fuels clean.			1	2	12	23	4.50	171
4	1189.	Lubricate and service machinery.				3	14	21	4.47	170
5	1257.	Replace diesel fuel filters.	2	1	2	4	14	15	4.11	168
6	1197.	Drain and refill engine oil.				6	14	18	4.32	164
7	1175.	Repair equipment under field conditions.			1	4	16	17	4.29	163
8	1181.	Operate power machinery.				7	15	16	4.24	161
9	1385.	Operate trucks safely.	1			2	20	15	4.35	161
10	1387.	Keep tires properly inflated.	1			4	22	11	4.19	155
11	1178.	Make preliminary machinery checks.	1	1		8	11	17	4.16	154

TABLE 9 —Continued

Rank Order No.	Comp. No.	Agricultural Mechanic Competencies Rated by Agricultural Mechanics and Others N=38	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
12	1382.	Lubricate and service trucks.	1	1		4	19	13	4.16	154
13	1199.	Identify operational problems in power units and equipment.			1	8	18	11	4.03	153
14	1384.	Maintain all truck safety equipment.	1			5	22	10	4.14	153
15	1177.	Recondition worn equipment.			1	7	21	9	4.00	152
16	1230.	Clean an air cooled engine to prevent overheating.	1		2	7	14	14	4.08	151
17	1376.	Follow a lubrication chart.	1	2		4	18	13	4.08	151
18	1377.	Consult operators manual for lubrication instructions.	1	2		5	16	14	4.08	151
19	1378.	Systematically check and repair field machinery.	1	1		8	14	14	4.08	151
20	1379.	Inspect machinery for needed repair.	1		1	8	15	13	4.08	151
21	1192.	Check air pressure in tires.			3	8	15	12	3.95	150
22	1205.	Keep tractor tires properly inflated.			3	6	19	10	3.95	150

TABLE 9--Continued

Rank Order No.	Comp. No.	Agricultural Mechanic Competencies Rated by Agricultural Mechanics and Others N=38	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
23	1248.	Service a dry element air cleaner.	3		2	4	11	18	4.29	150
24	1390.	Winterize a truck.	1	1	1	6	16	13	4.05	150
25	1180.	Read and follow technical service manuals.		2	1	7	16	12	3.92	149
26	1224.	Replace radiator hose.	1		1	10	13	13	4.03	149
27	1200.	Identify component problems in power units and equipment upon disassembly.		1	3	7	15	12	3.89	148
28	1297.	Select appropriate oils and lubricants.	1	1	2	5	17	12	4.00	148
29	1182.	Clean machinery prior to disassembly or clean component parts.			4	9	13	12	3.87	147
30	1222.	Remove, adjust and/or replace fanbelts.	1		2	10	12	13	3.97	147
31	1196.	Replace oil seals.			4	8	16	10	3.84	146
32	1183.	Start an engine after storage.			2	13	13	10	3.82	145
33	1213.	Gap sparkplugs.		1	4	5	19	9	3.82	145

TABLE 9 --Continued

Rank Order No.	Comp. No.	Agricultural Mechanic Competencies Rated by Agricultural Mechanics and Others N=38	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
34	1216.	Replace distributor points and condenser.		1	3	8	16	10	3.82	145
35	1246.	Service an oil bath air cleaner.	2		1	5	12	18	4.31	145
36	1256.	Check gas lines, fittings and repair leaks.	1	1	1	8	17	10	3.92	145
37	1328.	Maintain oil level in hydraulic system.	2	1	3	3	16	13	4.03	145
38	1188.	Maintain clean shop surroundings.		1	1	11	17	8	3.79	144
39	1202.	Disassemble, pack and replace wheel bearings.		2	1	9	17	9	3.79	144
40	1223.	Identify faulty fanbelts.	1	1	2	8	15	11	3.89	144
41	1251.	Replace fuel pump.	2	1	1	6	17	11	4.00	144
42	1260.	Bleed a diesel fuel system.	2	1	3	6	11	15	4.00	144
43	1375.	Select appropriate machinery lubricants.	1	1	2	7	18	9	3.86	143
44	1386.	Pack wheel bearings.	1	1	2	9	14	11	3.86	143

TABLE 9--Continued

Rank Order No.	Comp. No.	Agricultural Mechanic Competencies Rated by Agricultural Mechanics and Others N-38	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
45	1207.	Charge or recharge a wet cell battery.		1	3	10	15	9	3.74	142
46	1193.	Recognize the cause of tire wear.		1	2	13	13	9	3.71	141
47	1211.	Trouble shoot and identify ignition problems.		2	4	6	17	9	3.71	141
48	1306.	Adjust V-belts for tension.	2	2	2	4	17	11	3.92	141
49	1190.	Order parts.		1	2	14	12	9	3.68	140
50	1191.	Check tires for defects.		1	3	11	15	8	3.68	140
51	1229.	Replace engine thermostat.	1		3	12	12	10	3.78	140
52	1344.	Check for external oil leaks.	2	2	3	4	15	12	3.89	140
53	1397.	Adjust belt tension.	2	1	1	7	19	8	3.89	140
54	1198.	Replace brake assemblies.		2	3	10	14	9	3.66	139
55	1231.	Replace water pump.	1	1	5	6	15	10	3.76	139
56	1254.	Adjust engine idle.	2	1	3	4	20	8	3.86	139
57	1310.	Correctly line up a chain and sprocket.	2	2	3	2	20	9	3.86	139

TABLE 9 --Continued

Rank Order No.	Comp. No.	Agricultural Mechanic Competencies Rated by Agricultural Mechanics and Others N=38	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
58	1331.	Clean hydraulic system breather cap or air vent.	2	3	2	1	21	9	3.86	139
59	1334.	Drain, clean, flush, and refill hydraulic system.	2	2	2	5	17	10	3.86	139
60	1369.	Adjust and maintain mowers and swathers.	1	2	1	9	17	8	3.76	139
61	1253.	Adjust carburetor idle air/fuel mixture.	2	2	3	3	19	9	3.83	138
62	1186.	Clean disassembled components for inspection.	1	2	3	8	15	9	3.70	137
63	1203.	Repair buildings and equipment.	1		5	8	17	7	3.70	137
64	1250.	Replace fuel filters.	2		1	9	12	14	4.08	137
65	1312.	Maintain and adjust safety clutches.	2	3	1	4	20	8	3.81	137
66	1335.	Stop leaks in hydraulic system.	2	3	2	3	19	9	3.81	137
67	1394.	Properly lubricate electric motors.	2	1	1	8	20	6	3.81	137
68	1212.	Remove, clean and evaluate sparkplugs.	2	1	3	7	17	8	3.78	136

TABLE 9--Continued

Rank Order No.	Comp. No.	Agricultural Mechanic Competencies Rated by Agricultural Mechanics and Others N=38	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
69	1219.	Set ignition timing using a timing light.	1	3	2	9	13	10	3.68	136
70	1313.	Adjust clutch free travel.	2	3	1	5	19	8	3.78	136
71	1366.	Adjust and maintain planting equipment.	1	2	1	11	16	7	3.68	136
72	1373.	Adjust and maintain disc tillage equipment.	1	1	2	11	17	6	3.68	136
73	1208.	Clean and maintain a wet cell battery.		4	2	9	15	8	3.55	135
74	1215.	Replace an ignition distributor.		2	4	9	17	6	3.55	135
75	1303.	Adjust or replace clutch assembly.	2	3	2	8	11	12	3.75	135
76	1347.	Adjust wheel brakes.	2	2	2	8	15	9	3.75	135
77	1206.	Determine correct electrolyte level of a battery.		3	5	8	13	9	3.53	134
78	1220.	Replace primary and secondary ignition cables.		3	3	11	13	8	3.53	134
79	1247.	Replace exhaust system.	2	1	3	11	11	10	3.72	134

TABLE 9 --Continued

Rank Order No.	Comp. No.	Agricultural Mechanic Competencies Rated by Agricultural Mechanics and Others N=38	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
80	1309.	Adjust high speed chains.	2	3	3	4	17	9	3.72	134
81	1314.	Adjust and repair slip clutches.	2	4		5	20	7	3.72	134
82	1392.	Bleed brake lines.	1	2	4	10	11	10	3.62	134
83	1179.	Maintain shop power equipment.		3	2	14	11	8	3.50	133
84	1285.	Replace piston rings.	2	8	3	3	10	12	3.42	133
85	1332.	Replace hydraulic fittings.	2	4	1	6	17	8	3.67	132
86	1333.	Replace hydraulic "0" rings.	2	4	1	8	13	10	3.67	132
87	1337.	Make hydraulic hose connections.	2	3	3	5	18	7	3.64	131
88	1364.	Demonstrate a basic proficiency in arc welding.	2	2	3	11	10	10	3.64	131
89	1367.	Adjust and maintain cultivating equipment.	2	1	2	11	17	5	3.64	131
90	1292.	Install and torque connecting rod caps.	3	8	2	4	9	12	3.43	130
91	1300.	Service and repair oil coolers.	2	7	5	9	9	6	3.06	130

TABLE 9 --Continued

Rank Order No.	Comp. No.	Agricultural Mechanic Competencies Rated by Agricultural Mechanics and Others N=38	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
92	1308.	Repair roller chains.	2	2	4	7	16	7	3.61	130
93	1346.	Check rear wheel brakes.	2	2	4	7	16	7	3.61	130
94	1393.	Properly mount electric motors.	2	1	1	14	15	5	3.61	130
95	1396.	Align electric motor.	3	1	2	9	17	6	3.71	130
96	1214.	Test and replace ignition coil.		2	6	12	11	7	3.39	129
97	1252.	Test a fuel pump.	2	2	5	7	14	8	3.58	129
98	1343.	Bleed hydraulic system.	2	4	1	7	18	6	3.58	129
99	1348.	Drain and flush transmission.	2	2	5	6	16	7	3.58	129
100	1370.	Adjust and maintain balers.	1	4	2	9	16	6	3.49	129
101	1236.	Replace generator bushings.	2	3	5	8	9	11	3.56	128
102	1240.	Remove and replace starter motors.	3	2	4	7	13	9	3.66	128
103	1350.	Service power steering.	2	3	4	7	14	8	3.56	128
104	1352.	Adjust brake for travel.	2	3	3	10	12	8	3.53	127

TABLE 9 —Continued

Rank Order No.	Comp. No.	Agricultural Mechanic Competencies Rated by Agricultural Mechanics and Others N=38	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
105	1372.	Adjust and maintain combines.	2	2	1	14	14	5	3.53	127
106	1228.	Clean and flush a radiator.	2	1	3	13	15	4	3.50	126
107	1255.	Install carburetor kits.	2	3	4	5	16	8	3.61	126
108	1274.	Replace pan and gasket assembly.	2	5	3	5	15	8	3.50	126
109	1298.	Service and replace oil pumps.	1	6	5	5	10	11	3.41	126
110	1345.	Check wear in axle bearings.	2	2	6	8	12	8	3.50	126
111	1209.	Test battery with a hydrometer.		5	7	5	14	7	3.29	125
112	1217.	Set breaker point dwell using a dwell meter.		6	6	6	11	9	3.29	125
113	1235.	Replace generator brushes.	2	4	5	7	10	10	3.47	125
114	1249.	Drill and tap broken exhaust and manifold studs.	2	2	5	11	10	8	3.47	125
115	1360.	Service and adjust power take-offs.	2	5	2	7	15	7	3.47	125
116	1368.	Adjust and maintain plows.	1	3	4	10	16	4	3.38	125

TABLE 9 --Continued

Rank Order No.	Comp. No.	Agricultural Mechanic Competencies Rated by Agricultural Mechanics and Others N=38	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
117	1380.	Maintain a high pressure chemical sprayer.	2	2	1	16	12	5	3.47	125
118	1398.	Clean electric motor.	2	2	3	13	12	6	3.47	125
119	1226.	Test cooling system for leaks.	2	3	5	9	11	8	3.44	124
120	1276.	Test engine compression.	2	7	2	4	14	9	3.44	124
121	1277.	Adjust valve clearance.	2	8	3	1	13	11	3.44	124
122	1327.	Maintain hydraulic cylinders.	2	5	3	7	13	8	3.44	124
123	1353.	Replace brake shoes.	3	3	5	4	16	7	3.54	124
124	1354.	Determine cause of backlash, clearance or "play" in gear train.	2	5	4	4	16	7	3.44	124
125	1365.	Demonstrate a basic proficiency in oxyacetylene cutting.	3	3	3	11	8	10	3.54	124
126	1271.	Torque cylinder heads.	2	9		5	11	11	3.42	123
127	1299.	Check and adjust engine oil pressure.	1	7	5	4	11	10	3.32	123
128	1302.	Trouble shoot clutch problems.	2	4	4	6	17	5	3.42	123

TABLE 9 --Continued

Rank Order No.	Comp. No.	Agricultural Mechanic Competencies Rated by Agricultural Mechanics and Others N=38	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
129	1305.	Select correct types and sizes of V-belts.	2	5	2	7	17	5	3.42	123
130	1339.	Clean and replace hydraulic lines.	4	4	3	4	14	9	3.62	123
131	1351.	Adjust power steering linkage.	2	3	6	6	15	6	3.42	123
132	1210.	Test battery with a voltage meter.		3	10	7	12	6	3.21	122
133	1263.	Disassemble and inspect a cylinder head.	2	6	5	4	11	10	3.39	122
134	1288.	Install and torque main bearings and caps.	3	8	2	4	7	14	3.49	122
135	1321.	Clean hydraulic relief valves.	2	6	3	4	17	6	3.39	122
136	1388.	Rotate tires according to manufactures instructions.	2		6	14	12	4	3.39	122
137	1291.	Install rod bearings.	3	8	2	3	10	12	3.46	121
138	1296.	Install timing chains or gears.	2	9	2	3	11	11	3.36	121
139	1340.	Clean hydraulic systems orafices.	2	5	3	10	10	8	3.36	121

TABLE 9—Continued

Rank Order No.	Comp. No.	Agricultural Mechanic Competencies Rated by Agricultural Mechanics and Others N=38	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
140	1363.	Demonstrate a basic proficiency in acetylene welding.	2	4	3	12	10	7	3.36	121
141	1185.	Measure shaft RPM with a tachometer.		5	7	9	11	6	3.16	120
142	1234.	Replace and adjust voltage regulator.	2	5	5	6	13	7	3.33	120
143	1278.	Remove piston assembly.	2	8	3	3	13	9	3.33	120
144	1281.	Remove carbon from ring grooves.	2	10	2	2	10	12	3.33	120
145	1289.	Install rear-main oil seals.	3	8	2	3	11	11	3.43	120
146	1290.	Torque main bearings.	3	8	2	3	11	11	3.43	120
147	1317.	Identify governor malfunctions.	2	7	2	6	14	7	3.33	120
148	1349.	Adjust power take off clutch.	2	5	5	6	13	7	3.33	120
149	1391.	Reline brakes.	1	4	8	6	13	6	3.24	120
150	1395.	Clean motor commutator.	2	3	4	11	14	4	3.33	120
151	1187.	Clean and inspect new parts for shipping damage in preparation for installation.	1	3	3	11	13	7	3.49	119

TABLE 9 --Continued

Rank Order No.	Comp. No.	Agricultural Mechanic Competencies Rated by Agricultural Mechanics and Others N=38	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
152	1218.	Adjust vacuum advance.	1	3	6	13	10	5	3.22	119
153	1233.	Trouble shoot and identify problems in a charging circuit.	3	5	4	8	8	10	3.40	119
154	1244.	Replace solenoid.	3	4	2	10	14	5	3.40	119
155	1275.	Ream cylinder ridge.	2	10	1	5	8	12	3.31	119
156	1284.	Clean oil passages.	2	8	3	4	12	9	3.31	119
157	1315.	Service an engine governor and linkage.	2	7	2	6	15	6	3.31	119
158	1362.	Trouble shoot power take-offs.	2	4	6	5	17	4	3.31	119
159	1227.	Determine proper radiator cap.	2	3	7	9	11	6	3.28	118
160	1283.	Check piston ring end gap.	2	9	3	2	13	9	3.28	118
161	1307.	Repair hook link chains.	3	3	6	7	13	6	3.37	118
162	1318.	Service and repair external hydraulic pumps.	2	8	1	7	13	7	3.28	118
163	1381.	Calibrate a chemical sprayer.	2	4	5	10	11	6	3.28	118

TABLE 9 —Continued

Rank Order No.	Comp. No.	Agricultural Mechanic Competencies Rated by Agricultural Mechanics and Others N=38	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
164	1242.	Replace starter brushes.	3	5	3	9	11	7	3.34	117
165	1245.	Replace bendix gear.	3	4	5	6	15	5	3.34	117
166	1293.	Install piston assembly.	2	9	2	3	12	10	3.33	117
167	1311.	Prepare chains for storage.	3	3	3	11	15	3	3.34	117
168	1241.	Trouble shoot starter motor.	3	6	4	5	13	7	3.31	116
169	1287.	Install a crankshaft.	2	9	3	5	9	10	3.22	116
170	1295.	Replace camshaft bearings.	2	9	2	6	10	9	3.22	116
171	1204	Remove and mount tractor tires.		4	7	14	10	3	3.03	115
172	1243.	Replace starter bearings and bushings.	3	5	4	8	12	6	3.29	115
173	1273.	Remove, inspect and replace intake manifold.	2	7	3	7	14	5	3.19	115
174	1268.	Replace rocker arms.	2	9	2	7	10	8	3.17	114
175	1323.	Analyze malfunction of hydraulic valves.	2	7	2	10	12	5	3.17	114
176	1329.	Service hydraulic motors.	2	7	4	7	12	6	3.17	114

TABLE 9 --Continued

Rank Order No.	Comp. No.	Agricultural Mechanic Competencies Rated by Agricultural Mechanics and Others N=38	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
177	1399.	Reverse electric motor.	3	3	5	12	10	5	3.26	114
178	1225.	Repair radiator leaks.	2	5	4	12	11	4	3.14	113
179	1264.	Determine the valve stem guide clearance.	3	7	3	7	11	7	3.23	113
180	1279.	Hone cylinder.	2	12	1	3	10	10	3.14	113
181	1282.	Measure ring land clearance.	2	1	3	1	12	9	3.14	113
182	1286.	Use micrometer and Plastigage to check crankshaft main and rod journal clearance.	3	10	2	5	6	12	3.23	113
183	1322.	Service and repair hydraulic valves.	3	7	2	5	18	3	3.23	113
184	1355.	Adjust or replace differentials.	2	8	2	10	9	7	3.14	113
185	1356.	Trouble shoot differentials.	2	8	2	8	13	5	3.14	113
186	1361.	Repair power take-offs.	2	7	3	8	14	4	3.14	113
187	1374.	Adjust and maintain loose hay stacking system.	2	7	2	11	11	5	3.14	113

TABLE 9 --Continued

Rank Order No.	Comp. No.	Agricultural Mechanic Competencies Rated by Agricultural Mechanics and Others N=38	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
188	1389.	Repair truck tires.	1	6	7	9	9	6	3.05	113
189	1294.	Measure camshaft for wear.	2	11	2	5	8	10	3.11	112
190	1371.	Adjust and maintain field choppers.	1	8	4	9	11	5	3.03	112
191	1326.	Repair hydraulic cylinders.	2	8	3	10	8	7	3.08	111
192	1400.	Change electric motors from 120 to 240 volts.	3	4	5	11	11	4	3.17	111
193	1176.	Construct machinery and equipment.	1	4	7	15	8	3	2.97	110
194	1269.	Check condition of lifter and push rod.	3	8	4	4	13	6	3.14	110
195	1357.	Service and adjust final drives.	2	9	1	10	11	5	3.06	110
196	1304.	Determine sizes and speeds of pulleys.	2	6	8	6	11	5	3.03	109
197	1320.	Analyze malfunctions of hydraulic pumps.	2	8	5	6	12	5	3.03	109
198	1232.	Test charging circuit using a voltmeter or ammeter.	3	8	5	4	12	6	3.09	108
199	1280.	Measure cylinder taper and roundness.	2	13	2	3	8	10	3.00	108

TABLE 9 --Continued

Rank Order No.	Comp. No.	Agricultural Mechanic Competencies Rated by Agricultural Mechanics and Others N=38	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
200	1184.	Use a micrometer.	1	10	5	7	10	5	2.86	106
201	1359.	Trouble shoot final drives.	3	8	5	16	10	6	3.03	106
202	1270.	Reface valves and valve-seats.	2	12	3	6	6	9	2.92	105
203	1324.	Determine hydraulic cylinder displacement.	2	8	7	7	8	6	2.92	105
204	1267.	Grind valves.	2	12	2	7	8	7	2.89	104
205	1316.	Repair an engine governor.	2	11	3	6	11	5	2.89	104
206	1358.	Repair final drives.	2	11	2	9	8	6	2.89	104
207	1195.	Diagnose an engine with an analyzer.	1	9	6	10	8	4	2.78	103
208	1221.	Determine resistance using ohmmeter.	2	7	7	10	9	3	2.83	102
209	1265.	Replace valve guides.	3	12	1	7	8	7	2.91	102
210	1330.	Repair hydraulic motors.	3	9	5	7	8	6	2.91	102
211	1258.	Remove, clean, and replace injector nozzle.	2	8	7	8	10	3	2.81	101
212	1336.	Operate a hydraulic tester.	2	10	5	7	10	4	2.81	101

TABLE 9 --Continued

Rank Order No.	Comp. No.	Agricultural Mechanic Competencies Rated by Agricultural Mechanics and Others N=38	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
213	1319.	Service and repair internal hydraulic pumps.	3	10	5	6	9	5	2.83	99
214	1325.	Determine hydraulic cylinder lift force.	2	9	7	9	6	5	2.75	99
215	1266.	Test valve springs.	3	12	1	11	4	7	2.80	98
216	1272.	Measure cylinder head and block warpage.	3	14		6	10	5	2.77	97
217	1338.	Service and adjust hydraulic assist transmissions.	3	10	6	6	10	3	2.71	95
218	1261.	Service and maintain turbochargers.	3	11	5	7	8	4	2.69	94
219	1237.	Check armature and fields.	4	8	9	5	9	3	2.71	92
220	1341.	Repair hydraulic assist transmissions.	3	10	7	10	5	3	2.54	89
221	1342.	Trouble shoot hydraulic assist transmissions.	3	10	8	9	5	3	2.51	88
222	1194.	Operate an exhaust analyzer.	2	13	6	9	6	2	2.39	86
223	1259.	Analyze the operation of the diesel injector nozzle.	4	11	6	7	8	2	2.53	86

TABLE 9 —Continued

Rank Order No.	Comp. No.	Agricultural Mechanic Competencies Rated by Agricultural Mechanics and Others N=38	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
224	1239.	Turn down commutator.	4	11	4	14	1	4	2.50	85
225	1238.	Undercut mica on generator armature.	4	10	7	11	3	3	2.47	84
226	1262.	Repair turbochargers.	4	12	8	7	5	2	2.32	79

The data in Table 10 reveal the rank order of competencies on the basis of weighted scores for the job title General Farm Worker - Unspecified (Construction and Maintenance). The competency having the highest weighted score value - 118 was, strike an arc and run a bead. Ranking second and third with a weighted score of 117 and 114 respectively were safety in arc welding and electrical wiring. Determining the kind of metal to weld also received a weighted score value of 114.

Competencies with a weighted score value of between 112 and 83 were competencies in the areas of electricity, welding, shop maintenance and management, shop safety, wood working, selecting appropriate materials, soldering, water systems, concrete, plumbing and minor tune-up of power units.

Competencies whose weighted scores ranged from between 82 and 50 were those dealing with simple skills as being able to plane and smooth wood, repair tubing, rivet metal, ream pipe, work with or repair rope, work with sheet metal and skills associated with blacksmithing.

Competencies with weighted scores between 49 and 40 were those associated with leather work, blacksmithing and metal lathe.

TABLE 10

AGGREGATE RANK ORDER OF COMPETENCIES FOR
GENERAL FARM WORKER - UNSPECIFIED (CONSTRUCTION & MAINTENANCE) AS RATED BY
GENERAL FARM WORKERS - UNSPECIFIED AND OTHERS

Rank Order No.	Comp. No.	General Farm Worker-Unspecified Competencies Rated by GFW-Unspecified and Others N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
1	1120.	Strike an arc and run a bead.	2			5	12	11	4.21	118
2	1118.	Demonstrate safety measures in arc welding.	2		1	2	16	9	4.18	117
3	1113.	Use safety measures in electrical wiring.	3		3	2	8	14	4.22	114
4	1119.	Determine the kind of metal to be welded.	2			6	14	8	4.07	114
5	1114.	Properly connect a welder and the electrodes.	2			7	14	7	4.00	112
6	1168.	Use fire fighting equipment to control fires.	2	1	1	2	17	7	4.00	112
7	1121.	Make butt welds in a flat position.	2			11	7	10	3.96	111
8	1169.	Maintain a clean, orderly shop area.	2			7	15	6	3.96	111
9	1131.	Use safety precautions in oxyacetylene welding.	3		3	2	12	10	4.07	110

TABLE 10--Continued

Rank Order No.	Comp. No.	General Farm Worker-Unspecified Competencies Rated by GFW-Unspecified and Others N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
10	1167.	Properly place fire fighting equipment.	2	1	2	4	14	7	3.86	108
11	1116.	Select electrodes for farm welding.	2	1	1	8	11	7	3.79	106
12	1047.	Saw wood with hand and power saws.	2	1	2	7	11	7	3.75	105
13	1170.	Maintain a clean, orderly area immediately surrounding shop.	2		1	11	10	6	3.75	105
14	1046.	Measure and mark wood.	2	2	1	6	13	6	3.71	104
15	1138.	Cut using oxyacetylene flame.	3	1	1	8	8	9	3.85	104
16	1104.	Replace fuses.	4		2	5	12	7	3.92	102
17	1122.	Make fillet welds in the flat and horizontal positions.	3		1	11	8	7	3.78	102
18	1132.	Set up and operate oxyacetylene equipment.	3		2	8	11	6	3.78	102
19	1051.	Select appropriate fasteners (nails, hinges, etc.).	2	2	2	9	7	8	3.61	101
20	1106.	Protect electric motors against overload.	4		1	8	11	6	3.85	100

TABLE 10--Continued

Rank Order No.	Comp. No.	General Farm Worker-Unspecified Competencies Rated by GFW-Unspecified and Others N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
21	1133.	Determine the kind of metal to be welded.	3		2	11	7	7	3.70	100
22	1166.	Organize shop equipment to enable easy location of tools.	2		4	8	12	4	3.57	100
23	1145.	Drill holes in metal.	3		1	13	7	6	3.67	99
24	1069.	Protect concrete while curing.	3	1	2	11	5	8	3.63	98
25	1073.	Clean the surfaces that are to be soldered.	3		6	5	9	7	3.63	98
26	1103.	Select correct fuse size.	4		2	7	12	5	3.77	98
27	1107.	Clean and lubricate electric motors.	4		4	7	7	8	3.73	97
28	1123.	Weld in vertical, horizontal and overhead positions.	3		1	13	9	4	3.59	97
29	1135.	Braze weld.	3		2	13	6	6	3.59	97
30	1050.	Bore and drill holes in wood.	2	1	5	9	7	6	3.43	96
31	1067.	Build and prepare forms.	3		3	10	10	4	3.56	96

TABLE 10--Continued

Rank Order No.	Comp. No.	General Farm Worker-Unspecified Competencies Rated by GFW-Unspecified and Others N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
32	1096.	Take care of automatic water system.	3	2	2	9	7	7	3.56	96
33	1126.	Build up worn parts; hard surfacing.	2		2	15	8	3	3.43	96
34	1130.	Select equipment for oxyacetylene welding and cutting.	3		4	11	5	7	3.56	96
35	1140.	Lay out and mark metal.	3	2		12	7	6	3.56	96
36	1144.	Select drilling equipment.	3		2	12	9	4	3.56	96
37	1065.	Properly mix materials into concrete.	3		4	9	10	4	3.52	95
38	1066.	Reinforce concrete.	3	1	2	11	8	5	3.52	95
39	1100.	Attach wires to terminals.	4		1	10	12	3	3.65	95
40	1143.	Use hand and power hack saws.	3	1	3	9	9	5	3.52	95
41	1064.	Determine the proportions of materials for mixing concrete.	3		4	11	7	5	3.48	94
42	1117.	Select arc welding accessories.	2	1	3	14	5	5	3.36	94
43	1092.	Cut a gasket.	4		4	9	7	6	3.58	93

TABLE 10--Continued

Rank Order No.	Comp. No.	General Farm Worker-Unspecified Competencies Rated by GFW-Unspecified and Others N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
44	1098.	Splice electric wires.	4		2	11	9	4	3.58	93
45	1102.	Repair electric cords.	4		2	11	9	4	3.58	93
46	1115.	Select an arc welder for the farm.	2	3	2	11	7	5	3.32	93
47	1094.	Repair leaky valves and faucets.	4		4	9	8	5	3.54	92
48	1105.	Wire simple circuits.	4		3	11	7	5	3.54	92
49	1074.	Clean, tin and use soldering irons.	3	2	5	6	9	5	3.37	91
50	1139.	Distinguish between different kinds of iron and steel.	3	1	3	12	7	4	3.37	91
51	1142.	File metal.	3		5	11	7	4	3.37	91
52	1068.	Place concrete.	3		6	11	5	5	3.33	90
53	1124.	Arc weld cast iron.	3		5	13	4	5	3.33	90
54	1146.	Bend cold metal.	3	1	5	10	6	5	3.33	90
55	1075.	Solder different metals.	3		6	11	6	4	3.30	89

TABLE 10--Continued

Rank Order No.	Comp. No.	General Farm Worker-Unspecified Competencies Rated by GFW-Unspecified and Others N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
56	1164.	Order and inventory supplies and parts for use in general and equipment maintenance.	3		5	13	5	4	3.30	89
57	1093.	Remove section of defective pipe.	4	1	2	13	6	4	3.38	88
58	1125.	Arc weld high-carbon steel.	3		3	17	4	3	3.26	88
59	1070.	Remove concrete forms.	3	2	5	8	9	3	3.22	87
60	1076.	Solder small holes.	3	1	5	11	7	3	3.22	87
61	1078.	Solder seams or joints.	3	1	6	10	6	4	3.22	87
62	1090.	Assemble pipe and pipe fittings.	4	2	2	12	5	5	3.35	87
63	1095.	Repair pumps.	3	4	3	9	5	6	3.22	87
64	1099.	Select wire sizes.	4	1	4	10	7	4	3.35	87
65	1111.	Make extensions of an existing wiring system.	4	1	4	11	5	5	3.35	87
66	1045.	Select kinds and grades of lumber for a job.	3	2	6	8	7	4	3.19	86

TABLE 10 --Continued

Rank Order No.	Comp. No.	General Farm Worker-Unspecified Competencies Rated by GFW-Unspecified and Others N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
67	1108.	Figure electric motor pulley size and speeds.	5		6	8	5	6	3.44	86
68	1134.	Fusion weld.	3	1	5	13	4	4	3.19	86
69	1086.	Select pipe and pipe fittings for a job.	4	3	2	10	7	4	3.27	85
70	1087.	Measure and cut pipe.	4	2	4	9	7	4	3.27	85
71	1097.	Know electrical terminology such as: volts, amps, watts, ohms.	5	1	4	9	6	5	3.40	85
72	1165.	Take a shop inventory.	3	3	2	14	4	4	3.15	85
73	1110.	Charge a storage battery.	5	3	1	11	4	6	3.36	84
74	1128.	Control expansion and contraction.	3	1	4	16	3	3	3.11	84
75	1127.	Cut cast iron and steel with electric arc.	3		8	13	2	4	3.07	83
76	1141.	Cut cold metal with cold chisel.	3	2	5	13	3	4	3.07	83
77	1048.	Plane and smooth wood.	2	4	7	9	3	5	2.93	82

TABLE 10--Continued

Rank Order No.	Comp. No.	General Farm Worker-Unspecified Competencies Rated by GFW-Unspecified and Others N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
78	1077.	Solder patch large holes.	3	2	6	11	5	3	3.04	82
79	1112.	Install an electric fence.	4	4	3	10	3	6	3.15	82
80	1052.	Shape curved and irregular surfaces.	2	6	4	10	3	5	2.89	81
81	1080.	Solder with welding equipment.	3	1	11	6	5	4	3.00	81
82	1089.	Thread pipe.	4	3	3	12	4	4	3.12	81
83	1063.	Select materials for concrete.	3	3	6	11	3	4	2.96	80
84	1079.	Repair tubing.	3	2	8	9	5	3	2.96	80
85	1148.	Thread metal.	4	1	9	7	5	4	3.08	80
86	1055.	Lay out and erect a small building.	2	5	7	8	4	4	2.82	79
87	1129.	Use the carbon arc torch.	2		13	10	2	3	2.82	79
88	1136.	Hard surface with the oxyacetylene torch.	3	3	5	14	2	3	2.89	78
89	1091.	Use copper tubing.	4	3	6	10	3	4	2.96	77
90	1147.	Rivet metal.	3	4	8	8	2	5	2.85	77

TABLE 10-Continued

Rank Order No.	Comp. No.	General Farm Worker-Unspecified Competencies Rated by GFW-Unspecified and Others N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
91	1049.	Cut wood with chisels.	2	3	11	9	1	4	2.71	76
92	1053.	Cut common rafters.	2	5	10	5	4	4	2.71	76
93	1072.	Operate a gasoline blow torch.	4	4	7	7	3	5	2.92	76
94	1088.	Ream pipe.	4	4	5	10	3	4	2.92	76
95	1054.	Build stairs and steps.	2	6	8	7	3	4	2.68	75
96	1058.	Make hitches.	5	1	7	11	3	3	3.00	75
97	1082.	Cut sheet metal.	3	2	14	4	2	5	2.78	75
98	1056.	Read blueprints.	3	5	6	9	5	2	2.74	74
99	1057.	Finish the ends of a rope.	5	1	7	12	2	3	2.96	74
100	1062.	Clean, oil and preserve leather.	4	5	3	11	5	2	2.85	74
101	1081.	Lay out sheet metal work project.	3	4	11	6	3	3	2.63	71
102	1085.	Select pipe tools for the shop.	4	5	3	14	2	2	2.73	71
103	1071.	Set bolts in concrete that has already hardened.	5	4	6	8	5	2	2.80	70

TABLE 10 -Continued

Rank Order No.	Comp. No.	General Farm Worker-Unspecified Competencies Rated by GFW-Unspecified and Others N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
104	1083.	Form sheet metal joints.	3	5	11	5	2	4	2.59	70
105	1060.	Make rope halters.	5	4	6	10	2	3	2.76	69
106	1059.	Splice rope.	5	2	10	9	1	3	2.72	68
107	1160.	Bend and straighten iron.	4	6	7	7	3	3	2.62	68
108	1084.	Rivet sheet metal.	3	6	8	10		3	2.48	67
109	1137.	Silver braze.	3	7	8	9	1	2	2.37	64
110	1109.	Connect dry cells.	6	4	9	8	1	2	2.50	60
111	1101.	Use electrician's Underwriters Code Book.	6	7	4	10	2	1	2.42	58
112	1156.	Select blacksmithing equipment for the farm shop.	4	10	8	4	1	3	2.19	57
113	1163.	Temper metal to desired hardness.	5	10	7	4	2	2	2.16	54
114	1158.	Heat iron in a forge.	4	12	6	5	1	2	2.04	53
115	1161.	Draw and upset iron.	4	12	7	5	1	1	1.92	50

TABLE 10 -Continued

Rank Order No.	Comp. No.	General Farm Worker-Unspecified Competencies Rated by GFW-Unspecified and Others N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
116	1162.	Work tool steel.	4	13	6	5		2	1.92	50
117	1157.	Build and maintain a forge fire.	5	13	5	4	1	2	1.96	49
118	1159.	Cut iron using hardy.	4	13	7	5		1	1.81	47
119	1153.	Operate a metalworking lathe to turn wood.	5	13	6	5		1	1.80	45
120	1152.	Operate a metalworking lathe to cut threads.	5	13	7	4		1	1.76	44
121	1155.	Make accurate measurements using micrometers.	6	13	6	3		2	1.83	44
122	1061.	Splice leather using a waxed thread.	6	11	7	6			1.79	43
123	1150.	Grind cutter bits for the metal lathe.	6	13	6	3	1	1	1.79	43
124	1154.	Operate a metalworking lathe to do chucking work.	5	14	7	3		1	1.68	42
125	1149.	Operate a metalworking lathe.	6	13	6	5			1.67	40
126	1151.	Operate a metalworking lathe to turn tapers.	6	14	6	3		1	1.67	40

Data in Table 11 indicate the rank order by weighted score of competencies required for the job title Artificial Inseminator.

Seventeen persons rated the fifteen competencies making up this job title.

The top six rated competencies with weighted scores ranging from 82 to 69 were associated with the knowledge and skill involved in maintaining semen, methods of insemination, detection of estrous cycle, handling livestock, maintaining logs and restraining animals.

The ten remaining competencies with weighted scores ranging from 65 to 52 were associated with the general areas of sanitation, physiology of the reproductive system, selecting sires, designing insemination pens and pregnancy testing.

TABLE II

AGGREGATE RANK ORDER OF COMPETENCIES FOR ARTIFICIAL INSEMINATOR AS RATED BY ARTIFICIAL INSEMINATORS AND OTHERS

Rank Order No.	Comp. No.	Artificial Inseminator Competencies Rated by Artificial Inseminators and Others N=17	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
1	1416.	Maintain semen under desirable conditions.					3	14	4.82	82
2	1412.	Demonstrate skill involved in using approved artificial insemination methods such as: -clean cows genital area with soap, water and antiseptic -draw semen into breeding pipet -inject prepared bull semen into cows for breeding -insert and depress syringe to inject semen				2	2	13	4.65	79
3	1413.	Visually detect the various stages of the estrous cycle.					6	11	4.65	79
4	1422.	Handle livestock in a quiet, easy manner.					9	8	4.47	76
5	1418.	Maintain log of semen specimens used and cows bred.			1	1	5	10	4.41	75

TABLE 11 -Continued

Rank Order No.	Comp. No.	Artificial Inseminator Competencies Rated by Artificial Inseminators and Others N=17	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
6	1415.	Hold, confine and restrain the animal in the appropriate position for insemination.			1	3	7	6	4.06	69
7	1423.	Clean and disinfect all equipment after inseminating livestock.		1	2	3	4	7	3.82	65
8	1411.	Know the functions of male and female reproductive organs.			1	6	7	3	3.71	63
9	1414.	Design appropriate catch pens and holding equipment for artificial insemination.			5	2	4	6	3.65	62
10	1417.	Select semen from bulls according to sire characteristics published by breeder services.			4	4	3	6	3.65	62
11	1419.	Log day cow is to calf.		2	1	3	7	4	3.59	61
12	1420.	Prevent various venereal diseases through an immunization program.	1		3	4	3	6	3.75	60
13	1410.	Name the parts of the reproductive organs.			2	9	3	3	3.41	58

TABLE 11 -Continued

Rank Order No.	Comp. No.	Artificial Inseminator Competencies Rated by Artificial Inseminators and Others N=17	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
14	1421.	Pregnancy test livestock.		3	2	5	4	3	3.12	53
15	1424.	Clean and disinfect footwear before traveling from one farm to another.	1	2	5	1	3	5	3.25	52

The data in Table 12 indicate the rank order of competencies for the Ranch Cook job title. The seven competencies were ranked by four persons. The competency ranking highest was following orders of employer. Competencies ranked in descending order on the basis of weighted score were: mixing ingredients and baking bread and pastries, estimating consumption and ordering foodstuffs, cooking and planning meals, supervising helpers and traveling with chuck wagon to prepare food.

TABLE 12

AGGREGATE RANK ORDER OF COMPETENCIES FOR
RANCH COOK AS RATED BY
RANCH COOKS AND OTHERS

Rank Order No.	Comp. No.	Ranch Cook Competencies Rated by Ranch Cooks and Others N=4	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
1	1437.	Follow orders of employer.					2	2	4.50	18
2	1438.	Mix ingredients and bake breads and pastries.				2	2		3.50	14
3	1439.	Estimate consumption and order foodstuffs.		1		1	1	1	3.25	13
4	1435.	Prepare, season and cook by appropriate methods, all food consumed by employees or residents of a ranch.	1			1	1	1	4.00	12
5	1436.	Plan menus.	1			1	1	1	4.00	12
6	1440.	Supervise one or more helpers.	1	1		1	1		2.67	8
7	1441.	Travel with chuck wagon to prepare food on the range.		2	2				1.50	6

The data in Table 13 give the rank order of competencies for the job title Cowboy. Seventy-one persons ranked the 13 competencies making up this job title.

The competency with the highest weighted score - 325 was feed cattle during cold weather. Other competencies whose weighted score ranged between 304 and 283 were associated with feeding, handling and management of cattle. Competencies whose weighted score ranged between 278 and 154 were concerned with isolating stressed animals, collecting strays, castrating animals and breaking wild horses.

TABLE 13

AGGREGATE RANK ORDER OF COMPETENCIES FOR COWBOY
AS RATED BY COWBOYS AND OTHERS

Rank Order No.	Comp. No.	Cowboy Competencies Rated by Cowboys and Others N=71	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
1	1456.	Feed cattle during cold weather.				4	22	45	4.58	325
2	1453.	Inspect fences to determine necessary repairs.			1	9	30	31	4.28	304
3	1445.	Tend beef cattle on stock ranch.		1		8	34	28	4.24	301
4	1447.	Recognize stress demonstrated by behavior of animals.			1	11	32	27	4.20	298
5	1452.	Brand animals.		2	5	9	25	30	4.07	289
6	1446.	Move herd from one area to another.			1	18	28	24	4.06	288
7	1454.	Assist in vaccinating, spraying and dipping.			2	16	31	22	4.03	286
8	1450.	Ride horses to drive cattle in desired direction.	1		6	13	21	30	4.07	285
9	1455.	Ride over range to inspect cattle.	1		2	12	37	19	4.04	283
10	1448.	Isolate stressed animals.	1		5	14	29	22	3.97	278

TABLE 13--Continued

Rank Order No.	Comp. No.	Cowboy Competencies Rated by Cowboys and Others N=71	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
11	1449.	Ride horses to round up stray cattle.	2	1	5	14	23	26	3.99	275
12	1451.	Castrate animals.		3	7	11	26	24	3.86	274
13	1457.	Break wild horses and train them for saddle.	4	22	19	16	7	3	2.25	151

Data in Table 14 provide the ranking of 113 competencies for the job title Feedlot Manager. Feedlot Manager competencies were rated by nine respondents. Those competencies having weighted scores between 42 and 36 were in the broad areas of accurate inventories, willingness to work, human relations, planning work schedules, performing major jobs efficiently, planning feeding rations economically, management of lot financing, cattle supply, health, handling and marketing of cattle.

Those competencies whose weighted scores were between 35 and 27 were in the broad general areas of labor management, preparing financial statements, computing alternate feeding rations, constructing various areas of the feed lot, maintaining animal health, consumating general feed lot business and operating feedlot equipment.

Competencies whose weighted scores were between 26 and 15 were not easily clustered into general areas. Specifically mentioned were competencies dealing with the operation of office machines, preparation of balance sheets, construction of walls around feedlot, labor records, employer involvement in employee's personal problems, dipping livestock, hedging livestock purchases, handling liquid feed and adjusting thermostats for confined livestock.

TABLE 14

AGGREGATE RANK ORDER OF COMPETENCIES FOR
FEEDLOT MANAGER AS RATED BY
FEEDLOT MANAGERS AND OTHERS

Rank Order No.	Comp. No.	Feedlot Manager Competencies Rated by Feedlot Managers and Others N=9	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
1	1465.	Keep accurate log or records of livestock inventory.				1	1	7	4.67	42
2	1513.	Demonstrate a willingness to work.					3	6	4.67	42
3	1515.	Demonstrate the ability to get along with others.					3	6	4.67	42
4	1487.	Plan the overall farm work schedule.				1	2	6	4.56	41
5	1491.	Train workers to perform their jobs efficiently.					4	5	4.56	41
6	1494.	Assign appropriate priorities to the feedlot work to be done.				1	2	6	4.56	41
7	1505.	Make definite arrangements and agreements with hired workers about working conditions (hours, wages, days off, meals).				1	2	6	4.56	41
8	1514.	Demonstrate the ability to work independently.					4	5	4.56	41

TABLE 14--Continued

Rank Order No.	Comp. No.	Feedlot Manager Competencies Rated by Feedlot Managers and Others N=9	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
9	1540.	Use feed additives wisely.					4	5	4.56	41
10	1466.	Do business in compliance with state and federal laws regulating operation of feedlots.				1	3	5	4.44	40
11	1472.	Determine when livestock are ready for market.					5	4	4.44	40
12	1490.	Observe safety precautions in general to avoid potential loss of man-hours of labor.				1	3	5	4.44	40
13	1495.	Assign jobs to workers according to their abilities and interests.				1	3	5	4.44	40
14	1516.	Use the telephone to conduct business transactions.				1	3	5	4.44	40
15	1536.	Determine feed supply needed well in advance of feedlot demands.					5	4	4.44	40
16	1548.	Identify symptoms in animals suffering from disease.					5	4	4.44	40
17	1566.	Manage feedlot manure handling problems.				1	3	5	4.44	40

TABLE 14--Continued

Rank Order No.	Comp. No.	Feedlot Manager Competencies Rated by Feedlot Managers and Others N=9	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
18	1577.	Arrange transportation for shipping livestock.					5	4	4.44	40
19	1468.	Keep abreast of market trends using several available information sources.				1	4	4	4.33	39
20	1479.	Recognize the conditions and circumstances requiring immediate attention and labor.					6	3	4.33	39
21	1480.	Recognize when labor problems exist and take corrective measures.				1	4	4	4.33	39
22	1496.	Evaluate workers ability to perform various jobs.				2	2	5	4.33	39
23	1497.	Give instructions to workers quickly and clearly.				2	2	5	4.33	39
24	1517.	Establish employees wages, hours and working conditions.				1	4	4	4.33	39
25	1538.	Mix rations properly to assure proper nutrition.				1	4	4	4.33	39
26	1539.	Compute livestock gains and losses and current costs per pound of gain or loss.					6	3	4.33	39

TABLE 14--Continued

Rank Order No.	Comp. No.	Feedlot Manager Competencies Rated by Feedlot Managers and Others N=9	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
27	1571.	Receive livestock into feedlot arriving in truck and by rail noting any problems for future claims.					6	3	4.33	39
28	1474.	Keep current with feedlot technology by reading and attending professional meetings.				2	3	4	4.22	38
29	1484.	Anticipate and prepare for peak work loads in the farm work schedule.					7	2	4.22	38
30	1485.	Plan the daily work schedule.				1	5	3	4.22	38
31	1493.	Recognize and emphasize the important aspects of a job.				2	3	4	4.22	38
32	1499.	Judge the qualifications of prospective workers.					7	2	4.22	38
33	1512.	Compute credit costs.				1	5	3	4.22	38
34	1520.	Evaluate physical layout for increased worker production.				2	3	4	4.22	38
35	1527.	Identify injured, deficient or diseased livestock.			1		4	4	4.22	38

TABLE 14—Continued

Rank Order No.	Comp. No.	Feedlot Manager Competencies Rated by Feedlot Managers and Others N=9	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
36	1467.	Plan and arrange financing for the feedlot.				3	2	4	4.11	37
37	1469.	Buy livestock at the best time and price.			1	1	3	4	4.11	37
38	1471.	Determine the feeding and marketing point at which livestock should be marketed.				2	4	3	4.11	37
39	1488.	Figure the relative amount and the seasonal distribution of the labor required in each farm enterprise.				2	4	3	4.11	37
40	1503.	Lead but not needlessly dominate workers.				2	4	3	4.11	37
41	1519.	Read and follow technical service manuals.				2	4	3	4.11	37
42	1522.	Appraise employee performance for possible discharge or disciplinary action.		1		1	2	5	4.11	37
43	1535.	Provide an adequate supply of uncontaminated water to livestock.			1	1	3	4	4.11	37

TABLE 14--Continued

Rank Order No.	Comp. No.	Feedlot Manager Competencies Rated by Feedlot Managers and Others N=9	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
44	1551.	Follow directions of a veterinarian in treating livestock.			1	1	3	4	4.11	37
45	1572.	Weigh newly arrived livestock into feedlot.			1		5	3	4.11	37
46	1573.	Make newly arrived livestock comfortably.			1		5	3	4.11	37
47	1574.	Sort livestock into pens on basis of size, sex and condition.			1		5	3	4.11	37
48	1576.	Dispose of dead animals in accordance with health standards.			1	1	3	4	4.11	37
49	1476.	Set up and use inventory records.			1	2	2	4	4.00	36
50	1502.	Exercise patience and tolerance with workers resulting in minimum labor turnover.				3	3	3	4.00	36
51	1504.	Allow workers to use their own judgement when necessary to complete a job.			1	1	4	3	4.00	36
52	1533.	Interpret worth of various feed ingredients.		1			5	3	4.00	36

TABLE 14--Continued

Rank Order No.	Comp. No.	Feedlot Manager Competencies Rated by Feedlot Managers and Others N=9	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
53	1549.	Determine the length of the feeding period.			1	1	4	3	4.00	36
54	1550.	Provide fattening rations.			1	1	4	3	4.00	36
55	1575.	Mark animals by branding or tagging.			1	1	4	3	4.00	36
56	1481.	Determine the net return for each lot of cattle fed.				2	6	1	3.89	35
57	1482.	Prepare an income (profit-loss) statement for the feedlot for each current year.			1		7	1	3.89	35
58	1501.	Execute the employer responsiblities for Social Security, withholding taxes, insurance (including liability) and comply with regulatory laws related to hired workers.			1	3	1	4	3.89	35
59	1518.	Determine employee benefits.				4	2	3	3.89	35
60	1529.	Determine feed needs for growth, production and reproduction.		1		1	4	3	3.89	35

TABLE 14--Continued

Rank Order No.	Comp. No.	Feedlot Manager Competencies Rated by Feedlot Managers and Others N=9	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
61	1530.	Determine least cost rations for maximum growth, production and reproduction.		1		1	4	3	3.89	35
62	1531.	Determine needed feed additives to supplement rations.		1		1	4	3	3.89	35
63	1537.	Order feedlot feed supply to take advantage of market changes.		1		1	4	3	3.89	35
64	1542.	Administer simple medication to animals by mouth by use of a syringe or hypodermic needle.			2	1	2	4	3.89	35
65	1555.	Plan a feedlot for maximum efficiency.				3	4	2	3.89	35
66	1556.	Construct a feedlot corral system.				3	4	2	3.89	35
67	1557.	Construct a feedlot scale system.				4	2	3	3.89	35
68	1558.	Construct a feedlot water system.				4	2	3	3.89	35
69	1560.	Construct a feedlot feed processing, handling and storage systems.				3	4	2	3.89	35

TABLE 14--Continued

Rank Order No.	Comp. No.	Feedlot Manager Competencies Rated by Feedlot Managers and Others N=9	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
70	1570.	Supervise workers engaged in maintenance of farm machinery and equipment.				3	4	2	3.89	35
71	1486.	Observe and act upon the changes in labor requirements per unit as the size or volume of each farm enterprise increases or decreases.			1	3	2	3	3.78	34
72	1526.	Administer necessary shots, medicine, dips or sprays.		1		2	3	3	3.78	34
73	1532.	Balance rations for different types of livestock of various ages, breeds and sex.		1		1	5	2	3.78	34
74	1553.	Precondition animals for feedlot.			1	1	6	1	3.78	34
75	1565.	Maintain mechanical and automatic feedlot equipment.				4	3	2	3.78	34
76	1567.	Keep fences, buildings and equipment in a good state of repair.			1	1	6	1	3.78	34
77	1483.	Estimate the amount of work to expect of workers in a working day.	1			1	5	2	4.12	33

TABLE 14—Continued

Rank Order No.	Comp. No.	Feedlot Manager Competencies Rated by Feedlot Managers and Others N=9	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
78	1498.	Use labor productively during slack periods of the regular work schedule.		1		1	6	1	3.67	33
79	1509.	Write clear, concise letters to businesses.		1		3	2	3	3.67	33
80	1511.	Prepare sales receipts.		1		2	4	2	3.67	33
81	1528.	Pen sick, weak or injured animals separately.			1	3	3	2	3.67	33
82	1534.	Determine form in which feed should be fed (pelleted, rolled, ground).		1		2	4	2	3.67	33
83	1541.	Administer medicine through feed.			1	2	5	1	3.67	33
84	1544.	Spray livestock with insecticide repellents.			2	1	4	2	3.67	33
85	1564.	Operate mechanical and automatic feedlot equipment.			1	4	1	3	3.67	33
86	1473.	Bill animals for marketing.	1		1	1	3	3	4.00	32
87	1521.	Recommend employees for promotion and/or transfer.		1		3	3	2	3.56	32

TABLE 14--Continued

Rank Order No.	Comp. No.	Feedlot Manager Competencies Rated by Feedlot Managers and Others N=9	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
88	1543.	Apply medication to cuts and bruises.			3	1	2	3	3.56	32
89	1547.	Set up hospital quarters for weak, injured or ill livestock.		1		2	5	1	3.56	32
90	1559.	Construct a feedlot electrical system.				4	3	2	3.78	32
91	1569.	Keep separate inventory and expense records for major pieces of feedlot equipment.				6	1	2	3.56	32
92	1475.	Set up and use feedlot budget.	1			3	3	2	3.88	31
93	1477.	Set up and use cash flow sheets.		1		4	2	2	3.44	31
94	1507.	Assist workers and their families in finding housing.			2	3	2	2	3.44	31
95	1500.	Hire and fire farm labor.		2		3	1	3	3.33	30
96	1510.	Prepare purchase orders.		1	1	3	2	2	3.33	30
97	1562.	Construct feedlot pen surfaces.		1		4	4		3.22	29
98	1568.	Prepare trucks for shipping animals.		2	1	1	3	2	3.22	29

TABLE 14--Continued

Rank Order No.	Comp. No.	Feedlot Manager Competencies Rated by Feedlot Managers and Others N=9	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
99	1478.	Set up and use labor records.		1	3	2	1	2	3.00	27
100	1508.	Prepare clear, concise written reports.	1	1	1	1	4	1	3.37	27
101	1523.	Enter details of transactions as they occur in chronological order in account and cash journals.	1	1		4	1	2	3.37	27
102	1492.	Summarize and analyze labor records to improve efficiency of labor use.	1	1		4	2	1	3.25	26
103	1524.	Operate office machines.		1	3	2	2	1	2.89	26
104	1525.	Prepare month-end balance sheet.		1	2	4	1	1	2.89	26
105	1563.	Construct walls around feedlot.		2		5	1	1	2.89	26
106	1489.	Keep records of labor use and accomplishments.	1	1	1	3	3		3.00	24
107	1506.	Determine the extent an employer should become involved in personal problems of employees.		1	4	2	1	1	2.67	24
108	1545.	Dip livestock.		3	1	3	1	1	2.56	23

TABLE 14--Continued

Rank Order No.	Comp. No.	Feedlot Manager Competencies Rated by Feedlot Managers and Others N=9	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
109	1470.	Hedge livestock purchases and sales using the futures market.		2	4	2	1		2.22	20
110	1552.	Handle liquid feed additives.	1	2	2	2	2		2.50	20
111	1554.	Limit feed intake of animals through the use of feed additives.		3	4		2		2.11	19
112	1561.	Construct livestock housing.		4	1	4			2.00	18
113	1546.	Adjust thermostats to insure proper temperature and humidity for livestock confined in housing.	2	3	2	1		1	2.14	15

The 15 competencies making up the Herdsman job title were rated by 15 different persons and are displayed in Table 15. The competency receiving the highest weighted score - 60 was evaluating potential genetic combinations in planning breeding programs.

Those competencies having a weighted score value between 55 and 46 were in the general areas of evaluating progeny records, preparing of appropriate rations, scheduling fitting and showing, initiating breeding systems, registering animals, corresponding, arranging for livestock transportation, housing, inspections, certificates and releases.

Competencies with weighted scores ranging between 44 and 35 were concerned with knowledge and skills in the areas of exporting, importing and transporting livestock, entering animals into fairs and shows, and planning fair or show schedules.

TABLE 15

AGGREGATE RANK ORDER OF COMPETENCIES FOR
HERDSMAN AS RATED BY
HERDSMEN AND OTHERS

Rank Order No.	Comp. No.	Herdsman Competencies Rated by Herdsmen and Others N=15	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
1	1699.	Evaluate potential genetic combinations from livestock records in planning breeding programs.			2		9	4	4.00	60
2	1698.	Evaluate the performance records, daily gain, adjusted weight, I.P.R. of dams and sires.		1	1	4	5	4	3.67	55
3	1701.	Evaluate progeny from various breeding systems.		2		3	6	4	3.67	55
4	1704.	Prepare rations for growth, maintenance and fattening for various species, sexes and types of livestock.		2	1	3	4	5	3.60	54
5	1705.	Schedule fitting and feeding programs in advance of shows, fairs and sales so livestock are in condition.		3		3	4	5	3.53	53
6	1700.	Initiate various livestock breeding systems.		2	1	2	8	2	3.47	52

TABLE 15--Continued

Rank Order No.	Comp. No.	Herdsman Competencies Rated by Herdsmen and Others N=15	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
7	1695.	Fill out registration papers.	1	2	2	1	6	3	3.43	48
8	1696.	Correspond with breed associations.		3	1	2	8	1	3.20	48
9	1707.	Make necessary arrangements for intrastate livestock transportation.		1	3	4	7		3.13	47
10	1703.	Make arrangements at livestock shows for livestock housing, inspections, certificates and releases.		2	2	4	7		3.07	46
11	1709.	Make necessary arrangements for exporting livestock.		3	3	2	6	1	2.93	44
12	1706.	Make necessary arrangements for interstate livestock transportation.		2	5	2	6		2.80	42
13	1708.	Make necessary arrangements for importing livestock.		3	4	2	5	1	2.80	42
14	1697.	Enter animals in shows, fairs in appropriate age and sex classes.		4	3	5	3		2.47	37
15	1702.	Plan show or fair travel schedule.		3	6	5		1	2.33	35

Forty-five persons rated the 17 competencies making up the Irrigator job title.

Data in Table 16 indicate that channeling water was the competency receiving the highest weighted score - 181, followed by removing ditch obstructions and using various type dams. Weighted scores from 167 to 113 were associated with competencies in the general areas of diverting water through gates, ditches, trenches, dykes, rows, siphons, sprinklers and having knowledge and skills with electrical pumps and leveling instruments.

Receiving the lowest rank order with a weighted score of 112 was the competency assembling pipes and sprinklers.

Interviewers commented that they received some criticism from irrigators about the competencies for the irrigator job title. Specifically they commented about the various types of special irrigation systems and suggested a more detailed break out of the competencies relating to each system.

TABLE 16

AGGREGATE RANK ORDER OF COMPETENCIES FOR
IRRIGATOR AS RATED BY
IRRIGATORS AND OTHERS

Rank Order No.	Comp. No.	Irrigator Competencies Rated by Irrigators and Others N=45	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
1	1715.	Channel water to flow evenly over fields.	2		1	5	21	16	4.21	181
2	1718.	Remove obstructions from ditches and rows.	3			5	21	16	4.26	179
3	1729.	Use canvas, plastic, etc., dams to direct water flow from ditch to field.	3		3	4	19	16	4.14	174
4	1719.	Remove plugs and gates from port-holes in pipes or wooden tunnels.	3	2	2	7	15	16	3.98	167
5	1720.	Build up edges of ditches with rows of dirt.	2		1	15	15	12	3.88	167
6	1716.	Cut trenches in high areas of fields to direct water flow.	2	1	3	12	18	9	3.72	160
7	1717.	Close off bordered dyke inlet gates when dyke section is flooded.	3	3	1	9	19	10	3.76	158
8	1721.	Plug portholes as rows are flooded.	4	4		6	19	12	3.85	158

TABLE 16--Continued

Rank Order No.	Comp. No.	Irrigator Competencies Rated by Irrigators and Others N=45	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
9	1725.	Start electrical motor to drive water pump.	6	10	1	6	11	11	3.31	129
10	1722.	Siphon water from ditch into furrows.	6	10	2	7	11	9	3.18	124
11	1727.	Move pipes and sprinklers.	4	12	5	4	11	9	3.00	123
12	1733.	Use leveling instruments, hand level, plaintable, transit for running ditches.	5	9	8	4	9	10	3.07	123
13	1726.	Regulate water flow from main line to lateral sprinkler lines.	5	11	4	5	12	8	3.05	122
14	1734.	Consult with government agencies for assistance in designing an irrigation system.	5	9	7	7	13	4	2.90	116
15	1723.	Use tubes or hoses to siphon water into rows or fields.	7	8	7	6	10	7	3.03	115
16	1724.	Remove siphon when water in furrows reaches desired levels.	8	10	4	3	14	6	3.05	113
17	1728.	Assemble pipes and sprinklers.	6	12	5	5	10	7	2.87	112

TABLE 16—Continued

Rank Order No.	Comp. No.	Irrigator Competencies Rated by Irrigators and Others N=45	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
18	1731.	Measure and compute water flow.	4	9	10	10	9	3	2.68	110
19	1732.	Divide water into desired quantities using various measuring devices.	5	9	11	8	8	4	2.67	107
20	1730.	Use instruments to identify stress conditions of crops.	5	12	11	5	10	2	2.47	99

The eleven Maid competencies were reacted to by 2 producers. There were so few data received it would appear logical to forego a discussion of this job title.

TABLE 17

AGGREGATE RANK ORDER OF COMPETENCIES FOR MAID AS RATED BY MAIDS AND OTHERS

Rank Order No.	Comp. No.	Maid Competencies Rated by Maids and Others N=2	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
1	1747.	Wash dishes and clean silverware.					1	1	4.50	9
2	1745.	Assist in meal planning and purchasing of foodstuffs.					2		4.00	8
3	1750.	Change linens.				1		1	4.00	8
4	1752.	Wash linens and other garments by hand or machine.				1		1	4.00	8
5	1753.	Mend and iron clothing, linens, and other household articles using hand iron or electric ironer.		1				1	3.00	8
6	1754.	Answer doorbell and telephone.			1			1	3.50	7
7	1746.	Prepare and cook food according to employers instructions.			1		1		3.00	6
8	1749.	Clean furnishings, floors, and windows using vacuum cleaner, mops, brooms, cloths and cleaning solutions.			1		1		3.00	6

TABLE 17—Continued

Rank Order No.	Comp. No.	Maid Competencies Rated by Maids and Others N=2	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
9	1751.	Make beds.		1				1	3.00	6
10	1755.	Feed pets.		1				1	3.00	6
11	1748.	Oversee activities of children.	1				1		4.00	4

The data in Table 18 show the rank order of Machinery Operator competencies on the basis of weighted scores. Their mean scores are also shown for comparative purposes. One hundred thirty-two persons ranked the machinery operator competencies.

The competency having the highest weighted score - 562 was service machinery according to operator's manual. Those competencies with weighted scores between 562 and 528 were safe operation, adjust machinery, use operator's manual, and operate machinery under varying field conditions.

Competencies having a weighted score between 513 and 443 were attach accessory equipment, prepare machines for storage and keep machinery maintenance and repair records. Rated last with a weighted score of 319 was the competency keeping a daily equipment log.

TABLE 18

AGGREGATE RANK ORDER OF COMPETENCIES FOR
MACHINERY OPERATOR AS RATED BY
MACHINERY OPERATORS AND OTHERS

Rank Order No.	Comp. No.	Machinery Operator Competencies Rated by Machinery Operators and Others N=132	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
1	1761.	Service machinery and equipment according to operator's manual.	1			12	69	50	4.29	562
2	1766.	Operate machinery using safety standards relating to the operation of each particular major piece of farm machinery.	1	2	5	14	67	43	4.10	537
3	1764.	Adjust farm implements under field conditions for maximum efficiency.	1	5	1	13	70	42	4.09	533
4	1760.	Be familiar with operator's manual accompanying each power or machine unit.	3		1	19	72	37	4.12	532
5	1762.	Operate farm machinery and power units under a variety of field conditions.		1	5	21	71	34	4.00	528
6	1763.	Attach accessory equipment to basic farm power unit.	1	1	5	33	57	35	3.92	513

TABLE 18--Continued

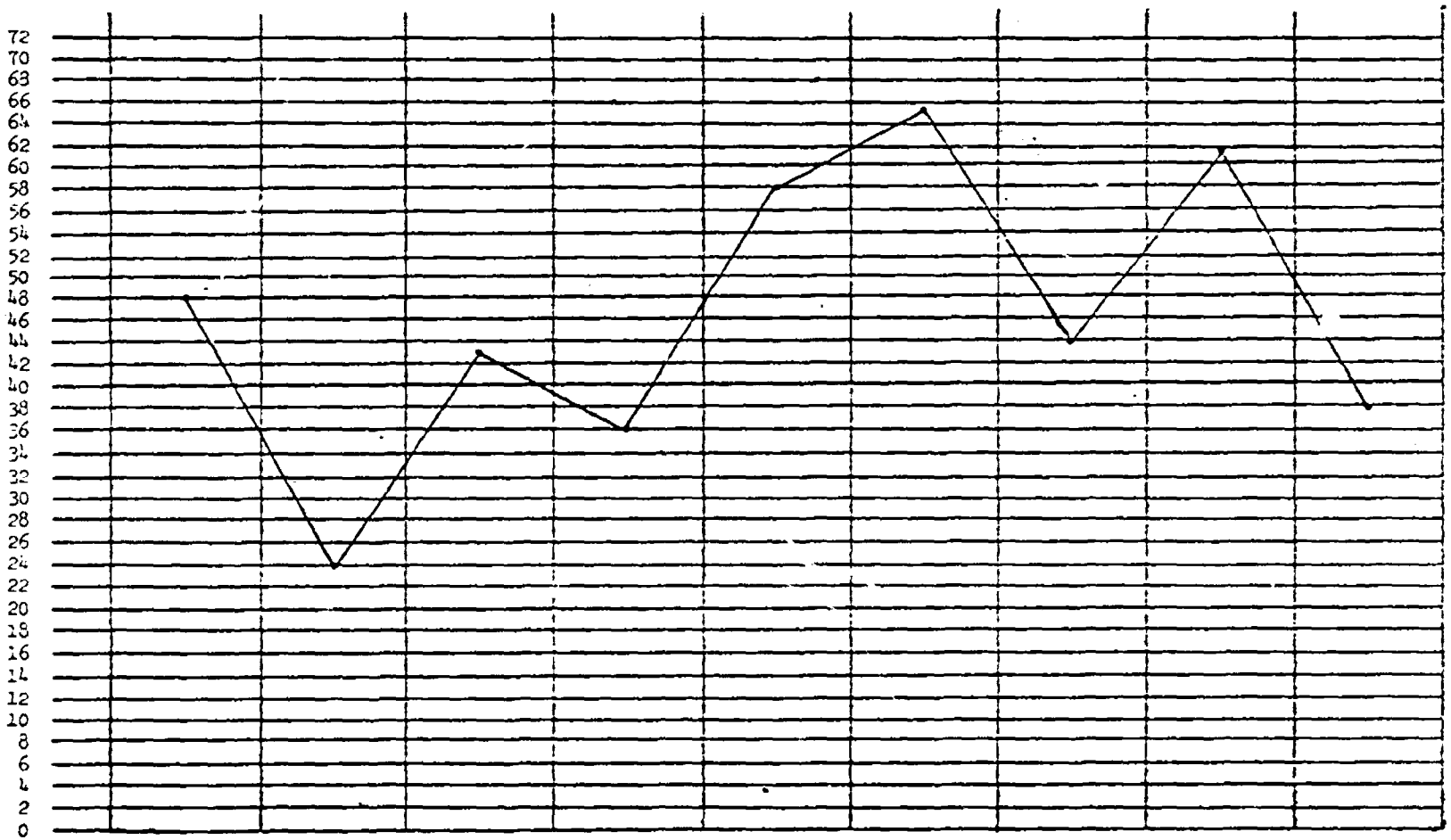
Rank Order No.	Comp. No.	Machinery Operator Competencies Rated by Machinery Operators and Others N=132	Frequency 0 1 2 3 4 5	Mean Rating	Wtd. Score
7	1767.	Prepare machines and equipment for storage.	1 4 8 32 62 25	3.73	489
8	1765.	Keep records of maintenance and repair on machinery and equipment.	1 12 17 34 45 23	3.38	443
9	1768.	Keep daily log of number of hours each piece of equipment is used.	6 35 21 46 16 8	2.53	319

To ascertain what equipment machinery operators operated, they were asked to respond to a prepared list of farm and ranch machinery which they were commonly expected to be able to operate. Seventy-two persons responded to this list. Figure 1 indicates the various types of machinery respondents operated.

Equipment operated in descending order of importance were light trucks, wheel power units, heavy trucks, balers, combine, other machines (grain drill, dozer, etc.), crawler power unit and bale stacker.

FIGURE 1

A PROFILE DISPLAYING MACHINERY OPERATED BY 72 AGRICULTURAL PRODUCTION EMPLOYEES



Ninety-seven persons rated the 17 Truck Driver competencies. The data in Table 19 show the rank order of competencies on the basis of their weighted scores.

The highest weighted score - 438 was given to the competency drive responsibly and defensively. Competencies with weighted scores between 432 and 389 were licensing, safe operation, driving, protecting loads, familiarity with operator's manual, emergency repairs, loading and unloading, lubricating and operating effectively on and off roads.

Making minor repairs, driving in adverse weather, regulations, driving trucks under 3-tons, operating trucks at proper speeds and distances while combining, preparing records and making collections were competencies in descending rank order having weighted scores ranging from 385 to 318 respectively. The competency having the lowest weighted score - 260, was being able to drive a truck under 3-tons to transport personnel.

TABLE 19

AGGREGATE RANK ORDER OF COMPETENCIES FOR
TRUCK DRIVER AS RATED BY
TRUCK DRIVERS AND OTHERS

Rank Order No.	Comp. No.	Truck Driver Competencies Rated by Truck Drivers and Others N=97	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
1	1779.	Drive responsibly and defensively at all times.	1		1		39	56	4.56	438
2	1775.	Be licensed when required, for the type of equipment operated.	1		2	7	28	59	4.50	432
3	1777.	Know and comply with safety rules and regulations.				8	38	51	4.44	431
4	1780.	Drive a vehicle with varying forward speeds.			1	12	42	42	4.29	416
5	1786.	Properly protect and secure load.			2	13	53	29	4.12	400
6	1776.	Be familiar with the operator's manual of the equipment operated.			2	11	61	23	4.08	396
7	1790.	Perform emergency roadside repairs (changing tires, installing bulbs, fuses and spark plugs).			4	18	42	33	4.07	395
8	1791.	Load and unload trucks by hand or mechanical devices (hoists, pumps, lifts or winches).	1	1	2	17	45	31	4.07	391

TABLE 19--Continued

Rank Order No.	Comp. No.	Truck Driver Competencies Rated by Truck Drivers and Others N=97	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
9	1789.	Lubricate truck.	1	1	3	20	37	35	4.06	390
10	1778.	Operate equipment on and off roads through all kinds of traffic and terrain, in all weather conditions for the purpose of hauling passengers and cargo.	1	3	3	11	48	31	4.05	389
11	1788.	Make minor mechanical repairs.			4	23	42	28	3.97	385
12	1784.	Equip and handle trucks in adverse weather conditions (sanding equipment and chains).	2	4	7	21	42	21	3.73	354
13	1785.	Be familiar with state and federal regulations regarding the transportation of agricultural commodities across county and state lines (crop and livestock inspections, weight restrictions and load limits).	2	8	13	9	42	23	3.62	354
14	1781.	Drive a truck under 3 tons to transport materials in liquid or package form.	3	5	13	25	29	22	3.53	342

TABLE 19--Continued

Rank Order No.	Comp. No.	Truck Driver Competencies Rated by Truck Drivers and Others N=97	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
15	1783.	Operate a truck at the proper speed and distance in the harvesting operation so the combine can maintain constant operations and does not need to stop to unload.	5	9	8	18	33	24	3.60	331
16	1787.	Prepare records and make collections commonly associated with picking up and delivering a load.	2	6	17	27	28	17	3.35	318
17	1782.	Drive a truck under 3 tons to transport personnel to and from specific destinations.	6	18	11	32	16	14	2.97	260

Job overlaps were determined during the interview. Each person interviewed rated the competencies in his particular job title and was asked to identify which other job titles the duties he performed would fall under. As can be noted in Table 20 the competencies performed by an individual worker varied by agricultural production worker. By listing the job titles of the person giving the ratings down the vertical axis and the job title areas in which this person worked along the horizontal axis, the researcher was able to reveal the number of times a certain job title General Farm Worker - Combination reported that his duties fell into that job title area. Thus, the person rating himself indicated the other areas in which he worked.

From a review of this array, one is able to determine that the General Farm Worker - Combination for example, was the most consistently found ranch worker and that his duties fell into 16 different job title or competency areas. The second most consistently found ranch employee was the Farm and Ranch Foreman - Combination, whose duties fell into 11 job title or competency areas.

From this array, educational planners might find value in observing commonalities in competency areas and design appropriate curriculums after reviewing the values attributed to the various competency statements.

Job title profiles of the 4 most consistently found agricultural production personnel explaining the job overlaps are presented in Appendices H, I, J, K, pp. 175, 177, 179, 181. Those profiles presented are as follows: Farm and Ranch Foreman - Combination, Farm and Ranch Foreman - Livestock, General Farm Worker - Combination and General Farm Worker - Livestock.

TABLE 20

AN ARRAY OF JOB OVERLAPS IN AGRICULTURAL PRODUCTION OCCUPATIONS

Respondent	Job Titles Being Rated																							
	GFW COMB	GFW LVSTK	GFW SHEEP	GFW BEEF	GFW DAIRY	GFW HAY	MACH. OPR	AG. MECH	IRRIG	F&RF GENL	F&RF LVSTK	F&RF CROPS	F&RF UNSPEC	F&RF COMB	HRD SMN	MILKER	COWBY	TRK DRVR	COOK	MAID	GFW CROP PROD	GFW UNSPEC	ARTIF INSEM	FEEDLOT MGR
GFW COMBINATION 102	47	6	5	2		37	47	12	14						3	1	26	35			47	12	4	1
GFW LIVESTOCK 103		36	4			19	25	6	10						2	1	15	17			2	5	1	
GFW SHEEP 104			3			1											1	1						
GFW BEEF 105				4		4	4		4								4	2				2	1	
GFW DAIRY 107					3	1	3									3		1			1			
GFW HAY 110						3	1		1															
MACHINE OPERATOR 113																								
AG. MECHANIC 114						1		7	1								1	1				1		
IRRIGATOR 115																								
F&RF GENERAL 116																								
F&RF LIVESTOCK 117		6				5	3		1	6	15				2		4	3				1	2	
F&RF CROPS 118							1	1				2						1			1			
F&RF UNSPECIFIED 119																								
F&RF COMBINATION 120	5	6				9	12	4	6					23	3	2	6	6			6	1	2	2
HERDSMAN 121															2									
MILKER 122																3								
COWBOY 124																								
TRUCK DRIVER 125																								
COOK 126																			1	1				
MAID 127																								
GFW CROP PROD. 140							5	1										3			6	6		
GFW UNSPECIFIED 141																								
ARTIFICIAL INSEM. 142																								
FEEDLOT MANAGER 143							2											2						3
OWNER/EMPLOYER 144	16	9	1			21	25	7	8		10	2		37	3	4	14	25	3	1	25	2	6	3

CONCLUSIONS

1. This research model proved to be feasible since it yielded data necessary to satisfy the purpose of the study.
2. Competencies essential for entry level employees in the various job titles in agricultural production can be secured by obtaining an importance rating on validated competencies. Job titles in agricultural production are not mutually exlusive. In most instances job overlaps exist.
3. The relative importance of ratings assigned to competencies essential for entry level agricultural production workers by persons performing the job titles and others closely associated with the same job title were not statistically different; thus the data from the two groups were considered in the aggregate.
4. The identification of competencies essential for agricultural production entry level workers provides valuable information for evaluating programs and for counseling students.
5. This study discloses a ranking of competencies required for entry level employment in agricultural production. This up-to-date information provides program planners with the necessary material for developing appropriate and meaningful curriculums in agricultural education.

RECOMMENDATIONS FOR PROGRAM IMPLEMENTATION AND FOR FURTHER RESEARCH

The following recommendations have been made as an outgrowth of the conclusions of this study and the conclusions from the Agricultural Production Manpower Report (1972). Since implications arise from program recommendations they will be incorporated with the recommendations.

1. Using the basic data in this study, develop curriculums which are appropriate for educating persons for each job title identified. In the curriculum development phase, competencies should be divided into separate tasks performed by workers who accomplish a particular competency. As tasks are identified they should be submitted to the field for validation.
2. Curriculum materials should be prepared and made available to schools considering agricultural education programs for field testing.
3. Determine through an analysis of the curriculum the probable length of the educational program necessary for training persons for each job title. Determining the probable length of an educational program would facilitate program planning efforts since length is often the prime determinant in cost considerations. Program length may very from short intensive courses to courses two to three years in length.

4. Analyze the agricultural production competencies for commodities existing between job titles thereby possibly reducing the number of programs required for educating entry-level workers for agricultural production.

5. Plan and develop an educational program aimed at agricultural producer groups and school administrative personnel at the several levels in order to make them aware of the findings of the study.

6. Work cooperatively with interested school administrative personnel at all levels to initiate educational programs to meet employment needs of agricultural producers. Through the aid of the Agricultural Supervisor of the Office of the Superintendent of Public Instruction assist local schools in expanding already existing agricultural education programs toward meeting newly identified needs rather than initiate programs in institutions having no previous experience with vocational agriculture education programs.

7. Organize statewide advisory committees for each agricultural education program to be established for the purposes of offering advise and assistance on (1) locating programs, (2) facilities, (3) equipment, (4) type of instructors, (5) experience programs of students, (6) student recruitment, (7) placement of students and (8) program evaluation.

8. Articulate through the Office of the State Superintendent of Public Instruction, the several levels of agriculture programs being conducted throughout the state, specifically career education

programs in agriculture at grade and junior high schools, high school and post-high school agricultural education programs, agricultural programs at community colleges and/or four year universities and colleges and programs of adult agricultural education.

9. Distribute lists of competencies, available as a result of this study, and curriculum materials which might be developed for the various job titles to teachers of vocational agricultural education at the several educational levels throughout Montana. These data will provide a valuable basis for teachers making local curriculum adaptations.

10. Salaries paid to seasonal and full-time agricultural employees as pointed out in the 1972 study may become a major concern of students contemplating entering the types of agricultural education programs identified through this study.. An awareness of this potential problem relating to salaries should be communicated to potential employers. A recognition of this problem by employers may bring about corrective measures over a period of time.

RECOMMENDATIONS RELATED TO THE RESEARCH MODEL

Recommendations relative to the documentation of the research model:

1. Delimit the scope of future studies more in keeping with resources available.
2. Research indepth the alternative statistical tests which might be used for the type of data received from the rating system and for the population under consideration.
3. Provide on any future competency instrument a place for employees to indicate the frequency with which they perform a particular competency.
4. Put forth a more tenacious effort in validating the instrument thereby reducing the time necessary for the interview.

V

BIBLIOGRAPHY

Books

1. Adams, J. Stacey. Interviewing - A Manual for Survey Interviewers. Chapel Hill: The University of North Carolina Press, 1958.

2. Richardson, Stephen A., Dohrenwend, Barbara Snell, and Klien, David. Interviewing - Its Forms and Functions. New York: Basic Books, Inc., 1965.

3. Thompson, O. E. and Beckett, J. W. Education in Agriculture in California. Davis: University of California Press, 1971.

4. Turabian, Kate L. A Manual for Writers of Term Papers, Theses, and Dissertations. Chicago: The University of Chicago Press, 1965.

5. U. S. Department of Labor. Dictionary of Occupational Titles. Washington, D. C.: U. S. Government Printing Office, 1965.

Reports

6. Amberson, Max L. Agricultural Production Manpower Report. Office of the Superintendent of Public Instruction (ERIC ED 069-873). Helena, 1972.

7. Bishop, C. E., Tolley, G. S. Education For a Changing World of Work. Office of Education Report (ERIC ED 019-501). Washington, D. C., 1963.

8. Campbell, Proctor. Some Training and Services Needed in Agriculture. Agricultural Research Service (ERIC ED 020-313). Washington, D. C., 1964.

9. Hansen, Herbert Eugene. Competencies in Welding Needed for Agricultural Machinery Maintenance. Iowa State University (ERIC ED 042-922). Ames, 1970.

10. Heady, Earl O., Arcus, Peter. Manpower Requirements and Demand in Agriculture by Regions and Nationally With Estimation of Vocational Training and Educational Needs and Productivity. Iowa State University (ERIC ED 016-797). Ames, 1966.

11. Hensel, James W. A Planning Study to Determine the Feasibility of a Research Project Concerning Employment Opportunities and Training Needs in Farming. The Ohio State University (ERIC ED 025-616). Ames, 1968.

12. Long, Gilbert A. Clusters of Tasks Performed by Washington State Farm Operators Engaged in Seven Types of Agricultural Production. Washington State University (ERIC ED 021-067). Pullman, 1968.

13. Morrow, Charles Kendall. Competencies Needed by Seed Production and Distribution Company Employees. Iowa State University (ERIC ED 044-499). Ames, 1970.

14. Lockwood, Larry Lee. "Competencies Needed by Males Engaged in Dairy Farming." Unpublished Master's Dissertation, Iowa State University of Science and Technology. Ames, 1964.

APPENDIX A

CHANGES IN FULL-TIME AGRICULTURAL EMPLOYEES FOR 1971 AND PREDICTED TO 1974

TABLE 24

CHANGES IN FULL-TIME AGRICULTURAL EMPLOYEES
1971-1974 AS INDICATED BY MONTANA AGRICULTURAL PRODUCERS

Job Titles	1971	1974	Number Change (+)(-)	Percent* Change
General Farm Worker	12	13	+ 1	+ 8.3
Comb. Livestock and Crop	246	260	+ 14	+ 5.7
Livestock (General)	213	251	+ 38	+ 17.8
Sheep	4	4	0	0.0
Beef	14	14	0	0.0
Poultry	1	0	- 1	-100.0
Dairy	4	4	0	0.0
Hogs	3	4	+ 1	+ 33.3
Field Crops (General)	3	3	0	0.0
Hay	5	4	- 1	- 20.0
Grain	16	14	- 2	- 12.5
Sugar Beets	0	0	0	0.0
Vegetables	0	0	0	0.0
Fruit Trees	0	0	0	0.0
Potatoes	2	2	0	0.0
Farm Machinery Operator	20	26	+ 6	+ 30.0
Agricultural Mechanic	14	14	0	0.0
Irrigation	9	11	+ 2	+ 22.2
Farm and Ranch Foreman	15	13	- 2	- 13.3
Livestock	59	58	- 1	- 1.7
Crops	20	23	+ 3	+ 15.0
Unspecified	14	14	0	0.0
Combination Livestock & Crop	42	46	+ 4	+ 9.5
Artificial Inseminator	0	0	0	0.0
Herdsman	29	25	- 4	- 13.8
Milker	9	8	- 1	- 11.1
Sheep Herder	11	8	- 3	- 27.3
Apiarist	0	0	0	0.0
Cowboy	21	23	+ 2	+ 9.5
Truck Driver	6	5	- 1	- 16.7
Farm and Ranch Cook	5	5	0	0.0
General Household Assistant	14	14	0	0.0
Forestry	0	0	0	0.0
Horticulture	0	0	0	0.0
Total	811	866	+ 55	

* Rounded to nearest tenth

APPENDIX B

RATING SHEET

MONTANA AGRICULTURAL MANPOWER PROJECT PHASE II

Answer Sheet for Competency Ratings

Date ______________________________

Interviewer ______________________________

Job Title of Employee
Giving Ratings ______________________________

Job Title(s) Being Rated ______________________________

Firm or Ranch ______________________________

Total No. of Employees ______________________________

ID No. ______________________________

INSTRUCTIONS

Enter the competency number on the line and circle the proper number rating the importance of the job task, not the ability to perform the task.

0-No response
1-No importance
2-Some importance
3-Average importance
4-Very important
5-Essential

Comp. No.	Ratings	Comp. No.	Ratings	Comp. No.	Ratings	Comp. No.	Ratings
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5

APPENDIX C

COMPETENCY STATEMENTS' INSTRUMENT FORMAT

Montana Agricultural Manpower Project
Department of Agricultural and Industrial Education
Montana State University, Bozeman, Montana

COMPETENCY RATING SHEET

Please rate each competency by telling the interviewer the number that you believe rates the importance of each judgement, knowledge or skill. Each competency should be rated on a scale of 1 to 5, with 1 being of no importance and 5 being essential. If there is no response, mark 0. Remember, you are being asked to indicate the judgements, knowledge, and skills a General Farm Worker - Livestock should have for entry-level employment, not on his ability to perform the tasks nor whether he does or does not perform each particular task.

GENERAL FARM WORKER
LIVESTOCK

Be Able To:

		NO RESPONSE	NO IMPORTANCE	SOME IMPORTANCE	AVERAGE IMPORTANCE	VERY IMPORTANT	ESSENTIAL
I. Livestock Production							
880.	Manage livestock in stalls, pens or houses for confinement.	0	1	2	3	4	5
881.	Clean livestock pens and housing.	0	1	2	3	4	5
882.	Detect livestock ready to lamb, calve or farrow.	0	1	2	3	4	5
883.	Assist livestock in lambing, calving or farrowing.	0	1	2	3	4	5
884.	Assist in the delivery of new born livestock.	0	1	2	3	4	5
885.	Alter animals by castration.	0	1	2	3	4	5

Be Able To:	NO RESPONSE	NO IMPORTANCE	SOME IMPORTANCE	AVERAGE IMPORTANCE	VERY IMPORTANT	ESSENTIAL
886. Construct appropriate quarters for lambing, calving, farrowing.	0	1	2	3	4	5
887. Remove needle teeth of pigs.	0	1	2	3	4	5
888. Control herd or flock on range or pasture by tending them with trained dogs, horses, or herders.	0	1	2	3	4	5
889. Move herd or flock about areas assigned for grazing.	0	1	2	3	4	5
890. Mark livestock for identification.	0	1	2	3	4	5
891. Pregnancy test livestock.	0	1	2	3	4	5
892. Clamp metal rings into nostrils of animals for ease of handling.	0	1	2	3	4	5
893. Block animals by docking or clipping.	0	1	2	3	4	5
894. Wash animals.	0	1	2	3	4	5
895. Fit animals by grooming or clipping.	0	1	2	3	4	5
896. Cut up animals into retail cuts.	0	1	2	3	4	5
897. Determine the most economical weights to market livestock.	0	1	2	3	4	5
898. Determine when livestock are ready for market.	0	1	2	3	4	5
899. Set up appropriate creep feeders.	0	1	2	3	4	5
900. Determine when animals should be bred.	0	1	2	3	4	5
901. Determine when pastures should be rotated.	0	1	2	3	4	5
902. Read brands and animal identification systems.	0	1	2	3	4	5
903. Dispose of dead livestock in accordance with present health standards.	0	1	2	3	4	5

Be Able To:	NO RESPONSE	NO IMPORTANCE	SOME IMPORTANCE	AVERAGE IMPORTANCE	VERY IMPORTANT	ESSENTIAL
904. Prepare trucks, railroad cars for livestock shipment.	0	1	2	3	4	5
II. Livestock Nutrition						
Be Able To:						
905. Determine feed needs in terms of nutrients for growth, production and reproduction.	0	1	2	3	4	5
906. Mix feed additives to insure proper nutrition.	0	1	2	3	4	5
907. Fill feed troughs with grain and roughage.	0	1	2	3	4	5
908. Determine the amount of water needed for livestock.	0	1	2	3	4	5
909. Plan and develop mechanical feeding systems.	0	1	2	3	4	5
910. Balance rations for different types of livestock of various ages.	0	1	2	3	4	5
911. Modify feeding practices to increase livestock value.	0	1	2	3	4	5
912. Compute weight losses and gains of livestock.	0	1	2	3	4	5
913. Read and understand the meaning of the ingredients listed on a feed tag.	0	1	2	3	4	5
914. Determine the form (pelleted, rolled, ground, etc.) in which feed should be fed to livestock.	0	1	2	3	4	5
915. Identify symptoms in animals suffering from deficiencies of essential nutritive elements in feeding rations.	0	1	2	3	4	5

III. Animal Care Be Able To:	NO RESPONSE	NO IMPORTANCE	SOME IMPORTANCE	AVERAGE IMPORTANCE	VERY IMPORTANT	ESSENTIAL
916. Determine the general condition of livestock.	0	1	2	3	4	5
917. Administer medicine through feeds.	0	1	2	3	4	5
918. Administer simple medication to animals by mouth or by use of a syringe or hypodermic needle.	0	1	2	3	4	5
919. Apply medication to cuts and bruises.	0	1	2	3	4	5
920. Spray livestock with insecticide repellents.	0	1	2	3	4	5
921. Dip livestock.	0	1	2	3	4	5
922. Adjust thermostats to insure proper temperature and humidity for livestock confined in housing.	0	1	2	3	4	5
923. Keep fences, buildings and equipment in a good state of repair.	0	1	2	3	4	5
924. Set up hospital quarters for weak, injured or ill livestock.	0	1	2	3	4	5
925. Identify symptoms in animals suffering injury, common diseases or other problems.	0	1	2	3	4	5
926. Keep records on livestock to assist a veterinarian in injury, sicknesses and/or other problems.	0	1	2	3	4	5

_____ See competencies for Truck Driver, if applicable.
_____ See competencies for General Farm Worker - Crop Production, if applicable.
_____ See competencies for General Farm Worker - Hay, if applicable.
_____ See competencies for Irrigator, if applicable.
_____ See competencies for Machinery Operator, if applicable.
_____ See other competencies, if applicable.

APPENDIX D

INTERVIEWERS' MANUAL

AGRICULTURAL MANPOWER PROJECT

MANUAL FOR INTERVIEWERS

January, 1973

Department of Agricultural and Industrial Education

Montana State University

Bozeman, Montana

Agricultural and Industrial Education
Montana State University
Bozeman, Montana

MANUAL FOR INTERVIEWERS

TABLE OF CONTENTS

MANUAL FOR INTERVIEWERS

This manual was prepared as a guide for interviewers who will be engaged in field contacts with employers and workers, in a study of job competencies in agriculture and agriculturally related areas in Montana. This study is being conducted by the Department of Agricultural and Industrial Education of Montana State University funded jointly by the Office of the Superintendent of Public Instruction and the Montana Experiment Station.

Preparation of this manual is necessary for several reasons. Primarily, certain types of information are deemed important and necessary if the basic objectives of the study are to be realized. An interview instrument has been prepared to insure that all pertinent statements will be covered during each interview. The sequence of the statements in the instrument should be clearly understood by each interviewer. Since several interviewers will participate in the study, some standardization of procedures is necessary to insure comparability of the results.

The interviewer is all important to the success of the study. Your role is a dual one -- you must motivate the respondent to answer each question or statement completely and at the same time be able to measure the adequacy of his responses in terms of the interview objective. The survey has been carefully designed but we must rely on interviewers to get the actual information.

A key concept of interviewing is communication. The interviewer must be able to communicate without distorting the statement designed by the researcher. Learning to interview properly requires extreme sensitivity to the respondent and diligent practice of interviewing techniques. It is important to establish an atmosphere which will maximize the ability of the respondent to communicate.

Success of each interview depends on the ability of the interviewer to create a friendly, permissive atmosphere of mutual trust and confidence when the respondent is first contacted. The first impression made on the respondent is very important for it sets the stage in a manner which will be either beneficial or detrimental to the purpose of the survey. There is not just one way to do this but rather the interviewer must adapt the situation to the differences in people.

In general, the respondent should be made to feel important and that the person being interviewed is doing an important job. He should not feel that answers are wrong or right, good or bad, acceptable or unacceptable. Neither should he be made to feel that being Republican or Democrat, driving a Chevy or a Cadillac, going to church or not, are not equally acceptable. It is imperative that the interviewer be "neutral" in his manner and should not make judgemental comments or indicate attitudes by facial expressions.

It is well to remember that some respondents encountered are so defensive in their personality structure that no amount of effort on the part of the interviewer will lead them to believe anything they say is "all right". As a result, their answers to questions or statements rather than being honest or "true" may be modified to suit a false perception they have of the interviewer brought about by peculiar personality needs.

There is no way of assuring that a desirable atmosphere can be created, therefore, certain principles should be followed which are likely to bring about rapport. As in the case of most principles, they should be used intelligently and adapted to the situation and its needs - the nature of the survey, the characteristics of the respondent, the place of the interview, and so forth.

General Procedure Suggestions

A. Introducing the Survey and Establishing Rapport

1. The interviewer should introduce himself and state the purpose of his call. HELLO. I AM _____. I AM INTERVIEWING PEOPLE WHO WORK IN AGRICULTURE AND AGRICULTURALLY RELATED POSITIONS IN ORDER TO FIND OUT WHAT SKILLS AND KNOWLEDGE ARE NEEDED TO PERFORM THEIR JOBS. THESE JOB TASKS WILL THEN BE STUDIED TO DETERMINE THEIR IMPORTANCE AND WILL SERVE AS A BASIS FOR FUTURE AGRICULTURAL EDUCATION PROGRAMS.

   In addition, the respondent needs to know who is conducting the survey and that the information given will be held confidential.

   THIS STUDY IS BEING DONE BY THE AGRICULTURAL EDUCATION DEPARTMENT OF MONTANA STATE UNIVERSITY IN BOZEMAN SUPPORTED BY THE OFFICE OF THE SUPERINTENDENT OF PUBLIC INSTRUCTION, THE MONTANA EXPERIMENT STATION AND THE AGRICULTURAL COMMITTEE OF THE MONTANA CHAMBER OF COMMERCE. THE INFORMATION YOU PROVIDE WILL BE CONSIDERED CONFIDENTIAL.

   It is sometimes beneficial to tell the respondent how he was chosen to participate in the survey.

   YOUR BUSINESS OR FARM WAS USED IN OBTAINING JOB TITLES FROM YOUR RESPONSE TO OUR STUDY WHICH WAS CONDUCTED LAST YEAR. WE ARE NOW SURVEYING THOSE WHO RESPONDED TO OUR FIRST QUESTIONNAIRE TO OBTAIN THE JOB TASK INFORMATION THAT YOU CAN PROVIDE FOR US. YOUR OWN ANSWERS TO OUR STATEMENTS ARE VERY IMPORTANT TO THE SUCCESS OF OUR STUDY. THE RESULTS OF OUR INTERVIEW WILL HELP DEVELOP PROGRAMS IN MONTANA'S SCHOOLS THAT WILL BETTER FIT OUR YOUNG PEOPLE, AND OLDER PERSONS WHO NEED RE-TRAINING, FOR THE JOB MARKET IN MONTANA.

2. The interviewer must make the respondent feel the interview situation is "permissive" (neutral acceptance). He should show no signs of

approval or disapproval. You have no opinions, feelings or beliefs about the interview answers or the respondent himself. Your job is to help the respondent verbalize his feelings and then record his answers. There are a variety of neutral signs, "uh-huh", "I've got that", "I see" or a simple nod. The interviewer should remain business-like at all times.

3. The interviewer's appearance must be "neutral" and this is important, for appearance is the source of the first impression.
   a. Clothing should be "average" and of the type that is usually seen in the locality where the interview is taking place. It should not be too fashionable or too plain.
   b. Speech should be carefully controlled - not unusual or overly simplified language - "just plain English". Control of intonations and facial and verbal expressions should be exercised.
4. It is best to attempt to obtain an interview at the time of the first call. If this is not possible, you should try to make definite arrangements to obtain the interview at a later time.
   a. "Too busy" is often used as a brush off. If this is the reply, try to arouse the respondent's interest by stating the purpose and the importance of the study. Ask for a definite appointment and be punctual.
   b. If someone answers the call for the respondent who is sick or out of town, give the general introduction to inform him of the purpose of the call. Try to interest the person answering the call so that he can pass the information on to the respondent.
5. The interviewer's approach must be flexible.
   a. The introduction and general content of the interview will have

to be simplified for an illiterate person.

b. If the person is engaged in a task that interests you, express an interest in what he is doing but this must be done sincerely.

B. Choosing the Setting for the Interview

1. It is best to have a quiet, comfortable place.

2. It is a better situation if the respondent can be interviewed alone. The presence of others may alter his responses and bias the interview.

C. Using the Instrument

1. The statements must be asked precisely as they appear on the competency sheets. Rewording must be avoided. This is important to insure balanced responses. Every applicable statement must be asked. (Details of using the forms for the study will be outlined after this general discussion of interviewing techniques).

2. When a statement is not understood, it must be repeated using the same words and not paraphrased. It should be read again, but more slowly. Every statement should be rated. If the respondent is not able to give it a rating, the interviewer should circle "0" denoting "no response". Do not force answers. If any statement is consistently giving the respondents trouble, this information should be turned in to the supervisor.

3. Statements which respondents hesitate or refuse to answer initially must be handled tactfully in order not to destroy rapport.

4. Instruction on the competency sheets for the interviewer must be carefully followed.

5. The instrument must be used informally and with ease. This can only be accomplished by practice. It is best to try to keep an informal

manner and sometimes the understanding of the statements can be enhanced by giving the respondent a copy of the form.

6. Maintaining rapport through the interview is most important. This can be done by taking time to strengthen and re-establish rapport after a "sensitive" question. Assure him of no "right" or "wrong" answers and that his opinions are important.

D. Closing the Interview

1. After the questioning phase of the interview is over, briefly review the instrument in the presence of the respondent to be sure all information has been obtained and recorded. At this time resolve omissions and inconsistencies, if any.
2. Thank the respondent for his participation in the survey and leave him with a feeling that the interview has been a pleasant and interesting experience.

E. Recording Responses

1. Responses must be recorded at the time they are made.
2. The competency ratings must be complete. Do not leave blanks. Remember, every statement should be rated. If the respondent is not able to give it a rating, the interviewer should circle "0" denoting "no response".
3. Significant events during the course of the interview should be recorded -- i.e., major interruptions, emotional reactions, etc.
4. Recorded responses should be made in writing and must be legible.
5. Before the instrument is returned to the supervisor, it must be checked for completeness.

Since our study is concerned with competencies which are the skills, knowledge and attitudes needed to perform certain tasks, perhaps you will be interested in looking over the competencies compiled for interviewers.

For your own information, perhaps you might like to rate the importance of these competencies on a scale similar to the one you will be using when out in the field.

COMPETENCIES FOR INTERVIEWERS

Circle One - - - - - -

Has the ability to:	NO RESPONSE	NO IMPORTANCE	SOME IMPORTANCE	AVERAGE IMPORTANCE	VERY IMPORTANT	ESSENTIAL
1. Remember details and names.	0	1	2	3	4	5
2. Write clearly.	0	1	2	3	4	5
3. Record data conscientiously.	0	1	2	3	4	5
4. Relate to all social classes and function in an unstructured situation.	0	1	2	3	4	5
5. Approach total strangers and participate in a wide variety of small talk.	0	1	2	3	4	5
6. Make the informant feel at ease.	0	1	2	3	4	5
7. Structure one's role in a realistic non-threatening way.	0	1	2	3	4	5
8. Keep the ultimate objectives of the research project in mind while interviewing.	0	1	2	3	4	5
9. Pick up quickly the technology common to the organization or community in which one is working.	0	1	2	3	4	5
10. Keep from probing into problems he or the respondent can't handle.	0	1	2	3	4	5
11. Be warm enough so that people will want to talk, but not so hot or pressing that he becomes a threat.	0	1	2	3	4	5

Certain characteristics can better be classified as personal qualities:

	NO RESPONSE	NO IMPORTANCE	SOME IMPORTANCE	AVERAGE IMPORTANCE	VERY IMPORTANT	ESSENTIAL
12. Humility, modesty, integrity, respect, sympathy, curiosity about people and the subject.	0	1	2	3	4	5
13. Insight, patience, fortitude, wonder, sincerity, sincere appreciation of people.	0	1	2	3	4	5
14. Ability to make a good first impression. Neither too much the "native" nor too much the "outsider." The ability to look "different" from the native in a way one is expected to look.	0	1	2	3	4	5
15. Open friendliness rather than withdrawn curiosity.	0	1	2	3	4	5
16. Ability not to be resentful at unfavorable field situations.	0	1	2	3	4	5
17. A person whose thinking tends to run off in a great many directions and who seeks out widespread implications, rather than a person who has a clearly, highly organized mind.	0	1	2	3	4	5
18. Should be able to respect others customs, habits, and mannerisms and values.	0	1	2	3	4	5

APPENDIX E

CONTACT CARD

YOUR NAME _____

NAME OF FIRM OR RANCH INTERVIEWED _____

DATE INTERVIEWED _____

NUMBER OF EMPLOYEES INTERVIEWED _____

TIME SPENT DOING INTERVIEW _____

JOB TITLES RATED _____

_____

_____

_____

_____

_____

APPENDIX F

LETTER TO RESPONDENTS

FROM THE DEAN OF AGRICULTURE

Montana State University
College of Agriculture

Agricultural Experiment Station
Bozeman, Montana 59715 Tel. 406-587-3121

Directors Office

We once again request your participation in the Agricultural Manpower Project which is being conducted cooperatively by the Montana Experiment Station and the Office of the Superintendent of Public Instruction.

We again find it necessary to contact you to identify the knowledge, skills and attitudes needed by those employed in your business or farm. We would greatly appreciate your cooperation in rating prepared job tasks.

In a few weeks an interviewer will be contacting you to review the job skills necessary for employment in your enterprise. We hope that the inconvenience and time involved in your cooperation in this effort will be tempered by the fact that the information you provide will be used to help plan Agricultural Education programs in Montana. Hopefully, these programs will provide you in the near future with trained manpower for jobs in agriculture and related fields.

May we express to you our appreciation for your cooperation and the information that you will be providing for us which will benefit our research.

Very truly yours,

J. A. Asleson
Director

JAA:cbm

APPENDIX F

CODING RATIONALE

CODE SHEET FOR AGRICULTURAL PRODUCTION PHASE II

CARD 01

Columns 1 through 6	I.D. Number		
Columns (5 and 6)	Type of operation and acreage		
Columns 7 and 8	Card # 01		
Columns 9 through 11	Job title giving ratings		
Columns 12 through 14	Job title being rated		
Columns 15 and 16	Number of employees		
Columns 17 and 18	Interviewers I.D. Number		
Columns 19 through 80	Competencies 800-861	F&RF General	62 comp./card

CARD 02

Columns 1 through 6	I.D. Number		
Columns 7 and 8	Card # 02		
Columns 9 through 11	Job title giving ratings		
Columns 12 through 14	Job title being rated		
Columns 15 through 24	Competencies 862-871	F&RF General	10 comp./card

CARD 03

Columns 1 through 6	I.D. Number		
Columns 7 and 8	Card # 03		
Columns 9 through 11	Job title giving ratings		
Columns 12 through 14	Job title being rated		
Columns 15 through 61	Competencies 880-926	GFW Livestock	47 comp./card

CARD 04

Columns 1 through 6	I.D. Number		
Columns 7 and 8	Card # 04		
Columns 9 through 11	Job title giving ratings		
Columns 12 through 14	Job title being rated		
Columns 15 through 35	Competencies 935-955	GFW Sheep	21 comp./card

CARD 05

Columns 1 through 6	I.D. Number		
Columns 7 and 8	Card # 05		
Columns 9 through 11	Job title giving ratings		
Columns 12 through 14	Job title being rated		
Columns 15 through 29	Competencies 970-984	Milker	15 comp./card

CARD 06

Columns 1 through 6	I.D. Number		
Columns 7 and 8	Card # 06		
Columns 9 through 11	Job title giving ratings		
Columns 12 through 14	Job title being rated		
Columns 15 through 38	Competencies 995-1018	GFW Crop. Prod.	24 comp./card

CARD 07

Columns 1 through 6	I.D. Number		
Columns 7 and 8	Card # 07		
Columns 9 through 11	Job title giving ratings		
Columns 12 through 14	Job title being rated		
Columns 15 through 25	Competencies 1025-1035	GFW Hay	11 comp./card

CARD 08

Columns 1 through 6	I.D. Number		
Columns 7 and 8	Card # 08		
Columns 9 through 11	Job title giving ratings		
Columns 12 through 14	Job title being rated		
Columns 15 through 80	Competencies 1045-1110	GFW Unspec.	66 comp./card

CARD 09

Columns 1 through 6	I.D. Number		
Columns 7 and 8	Card # 09		
Columns 9 through 11	Job title giving ratings		
Columns 12 through 14	Job title being rated		
Columns 15 through 74	Competencies 1111-1170	GFW Unspec.	60 comp./card

CARD 10

Columns 1 through 6	I.D. Number		
Columns 7 and 8	Card # 10		
Columns 9 through 11	Job title giving ratings		
Columns 12 through 14	Job title being rated		
Columns 15 through 80	Competencies 1175-1240	Ag. Mech.	66 comp./card

CARD 11

Columns 1 through 6	I.D. Number		
Columns 7 and 8	Card # 11		
Columns 9 through 11	Job title giving ratings		
Columns 12 through 14	Job title being rated.		
Columns 15 through 80	Competencies 1241-1306	Ag. Mech.	66 comp./card

CARD 12

Columns 1 through 6	I.D. Number		
Columns 7 and 8	Card # 12		
Columns 9 through 11	Job title giving ratings		
Columns 12 through 14	Job title being rated		
Columns 15 through 80	Competencies 1307-1372	Ag. Mech.	66 comp./card

CARD 13

Columns 1 through 6	I.D. Number		
Columns 7 and 8	Card # 13		
Columns 9 through 11	Job title giving ratings		
Columns 12 through 14	Job title being rated		
Columns 15 through 42	Competencies 1373-1400	Ag Mech.	28 comp./card

CARD 14

Columns 1 through 6	I.D. Number		
Columns 7 and 8	Card # 14		
Columns 9 through 11	Job title giving ratings		
Columns 12 through 14	Job title being rated		
Columns 15 through 29	Competencies 1410-1424	Artificial Ins.	15 comp./card

CARD 15

Columns 1 through 6	I.D. Number		
Columns 7 and 8	Card # 15		
Columns 9 through 11	Job title giving ratings		
Columns 12 through 14	Job title being rated		
Columns 15 through 21	Competencies 1435-1441	Cook	7 comp./card

CARD 16

Columns 1 through 6	I.D. Number		
Columns 7 and 8	Card # 16		
Columns 9 through 11	Job title giving ratings		
Columns 12 through 14	Job title being rated		
Columns 15 through 27	Competencies 1445-1457	Cowboy	13 comp./card

CARD 17

Columns 1 through 6	I.D. Number		
Columns 7 and 8	Card # 17		
Columns 9 through 11	Job title giving ratings		
Columns 12 through 14	Job title being rated		
Columns 15 through 80	Competencies 1465-1530	Feedlot Mgr.	66 comp./card

CARD 18

Columns 1 through 6	I.D. Number		
Columns 7 and 8	Card # 18		
Columns 9 through 11	Job title giving ratings		
Columns 12 through 14	Job title being rated		
Columns 15 through 61	Competencies 1531-1577	Feedlot Mgr.	47 comp./card

CARD 19

Columns 1 through 6	I.D. Number		
Columns 7 and 8	Card # 19		
Columns 9 through 11	Job title giving ratings		
Columns 12 through 14	Job title being rated		
Columns 15 through 29	Competencies 1695-1709	Herdsman	15 comp./card

CARD 20

Columns 1 through 6	I.D. Number		
Columns 7 and 8	Card # 20		
Columns 9 through 11	Job title giving ratings		
Columns 12 through 14	Job title being rated		
Columns 15 through 34	Competencies 1715-1734	Irrigator	20 comp./card

CARD 21

Columns 1 through 6	I.D. Number		
Columns 7 and 8	Card # 21		
Columns 9 through 11	Job title giving ratings		
Columns 12 through 14	Job title being rated		
Columns 15 through 25	Competencies 1745-1755	Maid	11 comp./car

CARD 22

Columns 1 through 6	I.D. Number		
Columns 7 and 8	Card # 22		
Columns 9 through 11	Job title giving ratings		
Columns 12 through 14	Job title being rated		
Columns 15 through 23	Competencies 1760-1768	Mach. Opr.	9 comp./car
Columns 24 through 32	Machinery Operated 0000-0009		

CARD 23

Columns 1 through 6	I.D. Number		
Columns 7 and 8	Card # 23		
Columns 9 through 11	Job title giving ratings		
Columns 12 through 14	Job title being rated		
Columns 15 through 31	Competencies 1775-1791	Truck Driver	17 comp./ca

APPENDIX H

FIGURE 2

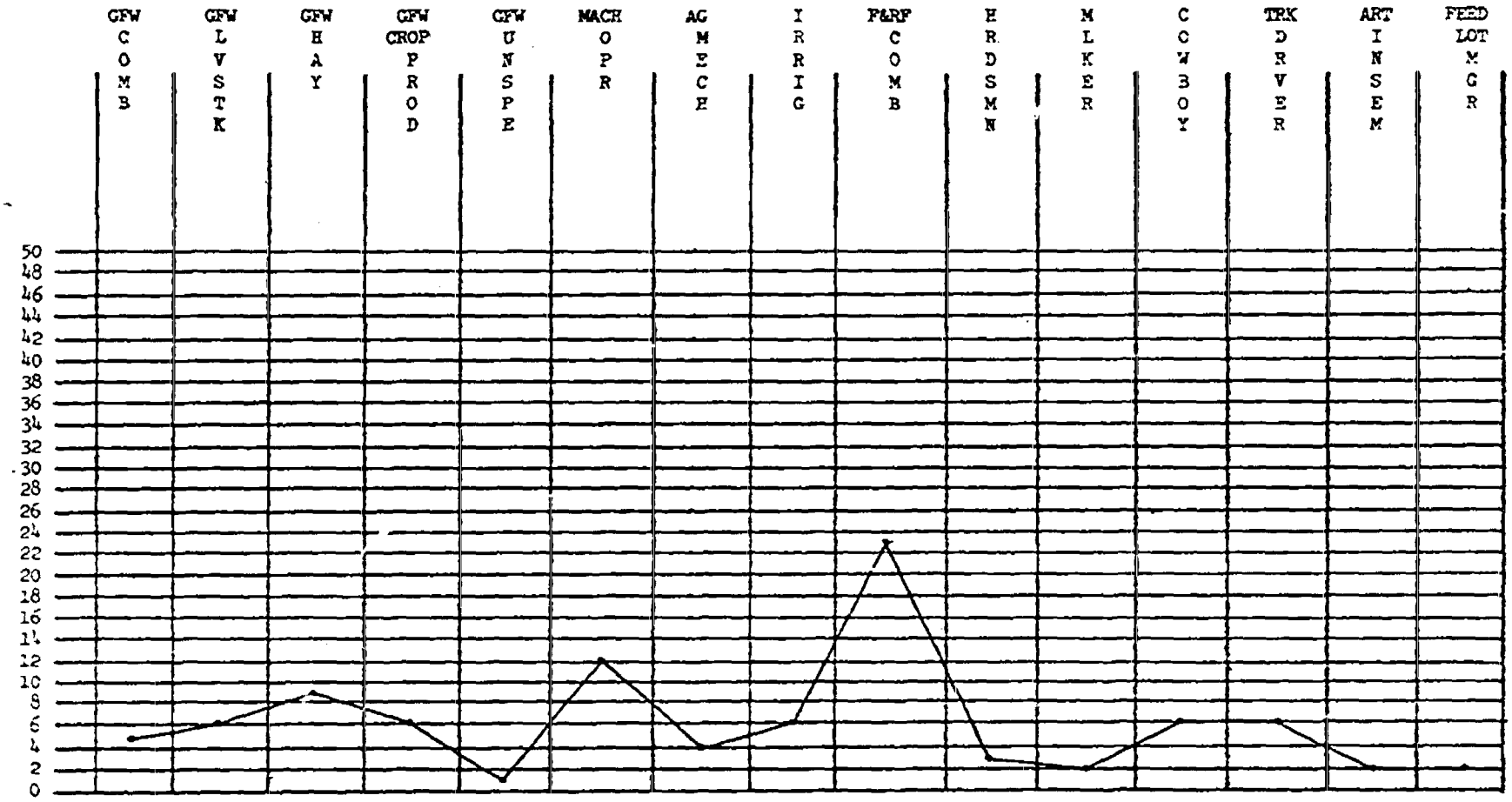
A PROFILE OF JOB DUTIES FOR 23

FARM AND RANCH FOREMEN - COMBINATION

FIGURE 2

A PROFILE OF JOB DUTIES FOR 23

FARM AND RANCH FOREMEN - COMBINATION



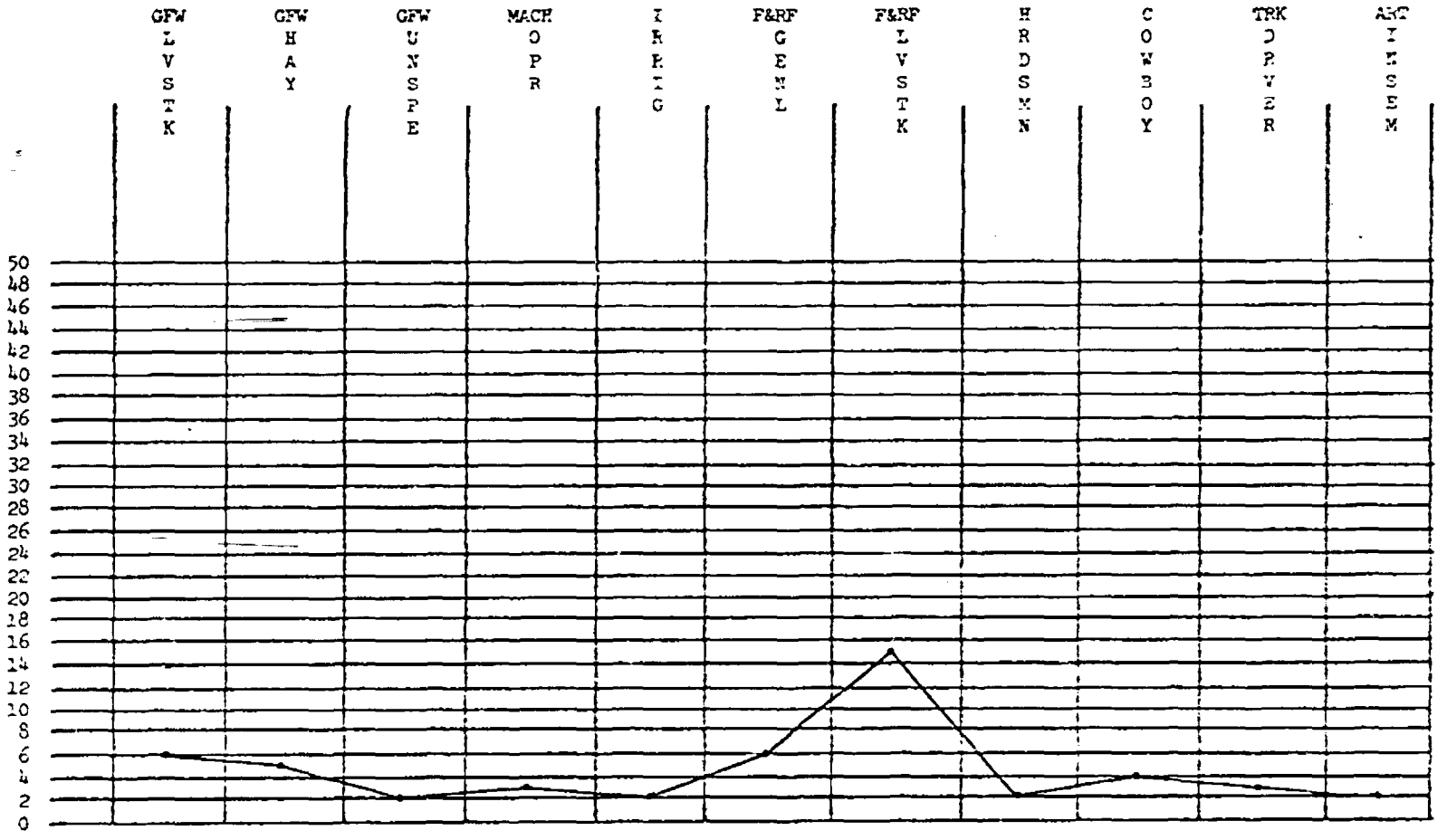
APPENDIX I

FIGURE 3

A PROFILE OF JOB DUTIES FOR 15 FARM AND RANCH FOREMEN - LIVESTOCK

FIGURE 3

A PROFILE OF JOB DUTIES FOR 15
FARM AND RANCH FOREMEN - LIVESTOCK



APPENDIX J

FIGURE 4

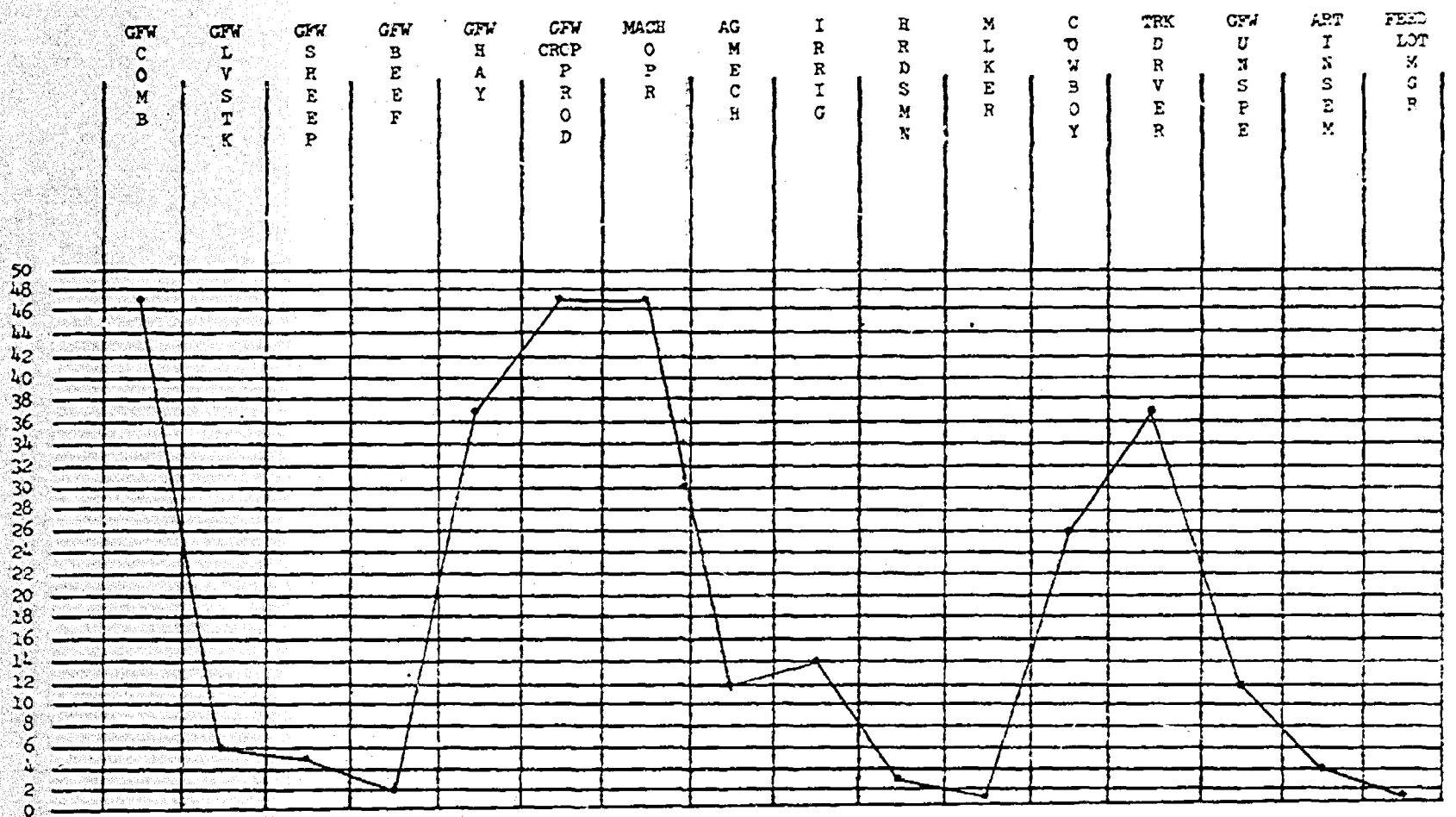
A PROFILE OF JOB DUTIES FOR 47

GENERAL FARM WORKERS - COMBINATION

FIGURE 4

A PROFILE OF JOB DUTIES FOR 47

GENERAL FARM WORKERS - COMBINATION



APPENDIX K

FIGURE 5

A PROFILE OF JOB DUTIES FOR 36

GENERAL FARM WORKERS - LIVESTOCK

FIGURE 5

A PROFILE OF JOB DUTIES FOR 36

GENERAL FARM WORKERS - LIVESTOCK