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**COMPETENCIES IN AGRICULTURE NEEDED BY MALES EMPLOYED  
IN RETAIL FERTILIZER DISTRIBUTION**

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Des Moines, Iowa



3-367

*This is an abstract of a thesis submitted to Iowa State University of Science and Technology by Frederick Alvin Van Loh in partial fulfillment of the requirements for the degree of Master of Science in August of 1964.*

*The study is one of a series conducted by the Department of Education of Iowa State University of Science and Technology with the assistance of graduate students in agricultural education in cooperation with the Iowa Agriculture and Home Economics Experiment Station and the Vocational Agriculture Section, Division of Vocational Education, State Department of Public Instruction.*

*This abstract was prepared by Frederick A. Van Loh with the assistance of Alan A. Kahler and Roy D. Hickman, research assistants for the Iowa Agriculture and Home Economics Experiment Station Project 1253, under the direction of Professor C. E. Bundy.*

# COMPETENCIES IN AGRICULTURE NEEDED BY MALES EMPLOYED IN RETAIL FERTILIZER DISTRIBUTION

by

Frederick Alvin Van Loh

## Purpose of the Study

The main purposes of this study were to determine (1) the important agricultural competencies needed by males employed in retail fertilizer distribution and (2) to determine the degree of competence needed and possessed by managers and employees in each agricultural competency. Other purposes were to seek the factors which influence the degree competence is needed and possessed and to determine the nonagricultural competencies needed.

The ultimate purpose of this study was that of securing information which will assist counsellors and administrators of agricultural education in planning future programs.

## Method of Procedure

Twelve selected retail fertilizer distributors in Iowa served as a panel of specialists in developing a list of agricultural and nonagricultural competencies needed by males employed in retail fertilizer businesses. The list of agricultural competencies as prepared by the panel of specialists was put into questionnaire form and mailed to 120 Iowa licensed fertilizer dealers. A list of the 1962-1963 Class II Fertilizer Licenses was obtained from the Secretary of the Iowa Department of Agriculture. Manufacturers and firms not offering any type of application or spreading service were not included in this investigation. Each employer was asked to select one employee to participate in the study.

## Findings

Of the 29 agricultural competencies listed by the panel of specialists, 14 were understandings and 15 were abilities. Thirteen of the competencies pertained to various phases of farming and 16 to dealership management and service. Managers and sales employees indicated a higher degree of competence needed than possessed in all of the competencies listed. This was true of service employees with one exception. Service employees indicated they possessed as much competence as needed in the ability to determine individual customer's financial situation and management level. Performance of this ability is more in line with the duties of managers and sales employees.

Observations of the mean scores of managers for the degree competence was needed revealed that 26 of the 29 competencies listed had mean scores of 3.0 or higher. These scores are shown in Table 1. Fifteen of the 29 had mean scores of 3.4 or higher.

Sales employees had mean score ratings of 3.0 or higher for competence needed in 17 of the 29 competencies as is shown in Table 1. Service employees had mean score ratings of 3.0 or higher in 14 of the competencies listed. Managers, sales employees and service employees had mean score ratings of 2.5 or higher for competence needed in every competency listed.

Ranges in mean scores for competence needed as evaluated by managers, sales employees, and service employees were as follows: scores by managers for understandings ranged from 2.7 to 3.5 and for the abilities from 2.9 to 3.6; scores by sales employees from 2.5 to 3.5 for the understandings and 2.8 to 3.5 for the abilities; service employee scores for understandings ranged from 2.5 to 3.3 and for abilities from 2.6 to 3.2.

Differences of .5 or more between degree competence was needed and possessed was observed for managers and all employees in their evaluations for the understandings of farm credit procedures, physical and chemical properties of soil in relation to plant growth and yield potential, cropping plans for specific soil types, seed quality and plant population in relation to fertilizer response, weed and insect problems and their control, economics of crop production for local farming area, and micronutrients and their effect on crops. The same observation was made for the abilities to recognize plant food deficiency in growing crops, estimate potential demand of various plant food nutrients in service area and develop a fertilizer promotion and marketing program. Sales employees had differences of 1.0 or more for two of the above understandings and two of the above mentioned abilities. Managers and sales employees indicated more competence needed in the decision making areas of the business as compared to service employees who indicated a higher rating needed for understandings and abilities involving operation of equipment and plant operation.

A difference of .4 or less in mean scores for degree competence was needed and possessed was found in evaluations of managers, sales employees and service employees in the understandings of fertilizer plant operation, timeliness of operations in relation to crop yields, and in the abilities to take an accurate soil sample, interpret a soil test report, identify various fertilizer materials and evaluate fertilizer formulas, make recommendations to customers regarding proper use of fertilizers and assist customer in keeping a fertilizer history of his farm, operate and maintain fertilizer handling equipment, and apply fertilizer to the soil properly and accurately and accurately estimate acreage.

Ranges in mean scores for competence possessed as evaluated by managers, sales and service employees were as follows: scores by managers for understandings ranged from 1.9 to 3.3 and abilities from 2.5 to 3.2; scores by sales employees from 1.5 to 2.6 for understandings and 2.2 to 3.1 for the abilities; service employee scores for understandings ranged from 1.4 to 3.1 and for abilities 1.7 to 3.1.

The 10 most needed competencies by the combined group of managers, sales and service employees were used as variables and tests of correlation made. Variables selected included the competency needed and possessed in each of the following: (1) amounts of fertilizer required for various levels of crop production, (2) seed quality and plant population relative to fertilizer response, (3) weed and insect problems and their control, (4) interpreting a soil test report, (5) identifying fertilizer materials and evaluating formulas, (6) making proper recommendations regarding fertilizer use and help individual customer keep

Table 1. Manager, sales and service employee evaluations of degree agricultural competencies were needed and possessed

Competencies	Mean scores									
	Managers		Sales				Service			
	Na	Pb	Employer		Employee		Employer		Employee	
		N	P	N	P	N	P	N	P	
Understanding of:										
		N=94		N=44		N=44		N=43		N=43
Fertilizer plant operation	3.5	3.3	2.4	2.2	2.8	2.6	3.2	3.2	3.3	3.1
Farm credit procedures	3.5	3.0	2.8	2.0	2.8	2.3	2.2	2.0	2.7	2.2
Governmental agricultural programs and their effect on fertilizer use	3.0	2.6	2.6	1.8	2.5	2.0	2.1	2.0	2.7	2.0
Characteristics of different fertilizer materials before and after they are blended	3.4	3.1	2.8	2.5	2.9	2.5	2.8	2.8	3.2	2.8
Physical and chemical properties of soil in relation to plant growth and yield potential	3.1	2.5	2.8	2.0	2.9	2.0	2.6	2.1	3.0	2.1
Cropping plans for specific soil types	3.0	2.4	2.7	2.3	2.8	2.3	2.4	2.1	2.7	2.1
Timeliness of operations in relation to crop yields	3.2	2.8	2.8	2.4	2.7	2.5	2.6	2.3	2.9	2.7
Effects of weather on plant food utilization	3.2	2.9	2.8	2.5	2.9	2.4	2.4	2.3	2.9	2.3
Fertility needs for various levels of crop production	3.4	3.0	3.3	2.4	3.4	2.6	2.8	2.5	3.3	2.8
Seed quality and plant population in relation to fertilizer response	3.4	2.9	3.2	2.8	3.4	2.6	2.6	2.3	3.1	2.6
Soil pH and how to maintain it at its most productive level	3.3	2.8	3.2	2.4	3.3	2.5	2.6	2.2	2.6	2.3
Weed and insect problems and their control	3.4	2.8	3.3	2.5	3.5	2.5	2.7	2.1	3.0	2.3
Economics of crop production for local farming area	3.2	2.7	2.8	2.3	2.9	2.3	2.5	2.1	2.6	2.1
Micronutrients and their effect on crops	2.7	1.9	2.5	1.6	2.5	1.5	1.9	1.2	2.5	1.4

a4--very much competence needed, 3--much competence needed, 2--some competence needed, 1--little competence needed, 0--no competence needed.

b4--possessed very much competence, 3--possessed much competence, 2--possessed some competence, 1--possessed little competence, 0--possessed no competency.

Table 1 continued.

Competencies	Mean scores									
	Managers		Sales				Service			
	N	P	Employer		Employee		Employer		Employee	
	N=94		N	P	N	P	N	P	N	P
Ability to:										
Take an accurate soil sample	3.2	3.1	3.6	3.5	3.3	3.0	3.1	3.0	2.9	2.7
Interpret a soil test report	3.6	3.2	3.3	2.9	3.4	3.1	3.1	2.6	3.0	2.6
Identify various fertilizer materials and evaluate fertilizer formulas	3.5	3.2	3.0	2.6	3.3	2.8	3.0	2.6	3.2	2.8
Make recommendations to customers regarding proper use of fertilizers and assist customer in keeping a fertilizer history on his farm	3.5	3.2	3.3	2.7	3.4	3.0	2.8	2.3	3.0	2.5
Recognize plant food deficiency in growing crops	3.4	2.7	3.2	2.4	3.5	2.4	2.7	2.0	3.0	2.4
Help tenant sell his landlord on a sound fertilizer program	3.1	2.7	3.0	2.4	3.0	2.4	2.6	2.1	2.9	2.4
Operate and maintain fertilizer handling equipment	3.0	2.9	2.4	2.3	2.9	2.6	3.4	3.3	3.3	3.1
Determine proper tillage conditions for application of fertilizers	3.1	2.7	2.8	2.2	3.0	2.4	2.9	2.7	2.8	2.6
Apply fertilizer to the soil properly and accurately, and accurately estimate acreage	2.9	2.6	2.5	2.3	3.2	2.7	3.0	2.9	3.0	2.9
Make recommendations regarding amounts of fertilizer in absence of a soil test report	3.5	3.1	3.1	2.2	3.3	2.8	2.9	2.4	3.0	2.3
Estimate potential demand of various plant food nutrients in service area	3.3	2.8	2.6	2.1	3.0	2.5	2.2	1.9	2.6	2.1
Advise customer in choice of purchase of fertilizer applying equipment	2.9	2.5	2.8	2.2	2.8	2.3	2.4	2.3	2.8	2.3
Determine individual customer's financial situation and determine his management level	3.5	2.9	2.9	2.0	3.3	2.5	2.4	1.9	2.5	2.5
Develop a fertilizer promotion and marketing program	3.5	2.8	2.3	1.6	3.2	2.2	2.3	1.7	2.6	1.7
Recognize good new fertilizer practices and recommend their use	3.5	3.1	3.3	2.8	3.4	2.8	2.8	2.3	3.1	2.7

a fertilization history on his farm, (7) recognize good, new fertilizer practices and recommending their use, (8) recognizing plant food deficiency in growing crops, (9) making recommendation in absence of a soil test report, and (10) determining an individual's financial situation and management level.

Control variables used were years of experience in retailing fertilizer, years of farm background, years of vocational agriculture training, years of educational attainment, and age. When the correlation matrix was run for managers there were no apparent correlations between the degree of competency needed or possessed when the control variables of vocational agriculture and educational attainment were used. With one exception, farm background was negatively correlated with degree competence was needed for all competency variables while being positively correlated with degree competence was possessed. Correlations were small. The trend was positive for possessed and negative for needed.

Two significant negative correlations were observed when age was compared with competence needed. Competencies involved had reference to the abilities to make proper recommendations regarding fertilizer use and assist the customer in keeping a fertilization history of his farm, and identifying fertilizer materials and evaluate formulas. Years of experience in retailing fertilizer resulted in a significant negative correlation for the competence possessed in understanding amounts of fertilizer required for various levels of crop production and for the ability to determine an individual's financial situation and management level.

The same correlation matrix as used for managers was used for all employees participating in the study. Vocational agriculture was more highly correlated to competencies needed and possessed than the other control variables used. High correlations were found between vocational agriculture and competence needed and possessed in the understandings of fertilizer required for various levels of crop production, seed quality and plant population in relation to fertilizer response, and possessed competence in the understanding of weed and insect control. High correlations were also found for competence possessed in the abilities to identify fertilizer materials and evaluate formulas, to recognize good, new fertilizer practices and recommend their use, the competence needed and possessed to recognize plant food deficiency in growing crops, and to make recommendation in absence of a soil test report.

Educational attainment was considerably greater for managers as compared to employees. All of the managers who completed four years of vocational agriculture completed one or more years of college; however, less than one-half of the employees had obtained the same level of educational training. On a percentage basis, twice as many employees completed four years of vocational agriculture as compared to managers. Fifty percent of the managers completed one or more years of college as compared to 23 percent of the employees.

Fifty-seven percent of the managers and 70 percent of all employees were under 42 years of age. Seventeen percent of the managers were 42 to 47, 10.7 percent were 48 to 53, 10.7 percent were 54 to 59, and 3.2 percent were over 59 years of age. Of the 30 percent of the employees over 41, 10.3 percent were 42 to 47, 8 percent were 48 to 53, and 12.6 percent were over 59 years of age.

Presented in Table 2 are the nonagricultural competencies needed by employees in retail fertilizer distribution.

Table 2. Nonagricultural competencies needed by males employed in retail fertilizer distribution

Competencies	Occupational Area		
	Managers	Sales	Service
Understanding of:			
Business principles	X	X	-
Finance and credit procedures	X	X	-
Financial statement	X	-	-
Legal aspects of retailing	X	-	-
Tax regulations including withholding tax and social security	X	-	-
Government reports	X	-	-
Business mathematics	X	X	-
Company-customer relationships	X	X	X
Company buying and profit motives	X	X	-
Advertising methods and procedures	X	X	-
Management control	X	-	-
Insurance including types and regulations	X	-	-
Products handled by company and competitors	X	X	X
Ability to:			
Establish and formulate company policies	X	X	X
Coordinate activities and phases of the business so that major policies are achieved	X	-	-
Delegate authority and motivate	X	-	-
Make timely decisions	X	X	-
Use time efficiently	X	X	X
Select and train employees	X	-	-
Organize a public relations program	X	-	-
Keep up-to-date and adjust to change	X	X	X
Analyze records and reach conclusions	X	-	-
Display company product attractively	-	X	-
Communicate with customers	X	X	X
Sell quality rather than price	X	X	-
Maintain good employer-employee relationships	X	-	-
Compute fertilizer blending formulas	X	X	X
Follow instructions	-	X	X
Be aggressive and accept responsibility	X	X	-
Be persuasive and yet not oversell	-	X	-
Assist in selecting the most advantageous product for the customer	X	X	-
Create favorable image of employer and business represented	-	X	X
Analyze a market	X	X	-
Originate sound ideas	X	-	-
Evaluate customer's reliability	X	X	-
Strive for constant self-improvement	X	X	X



## Implications

Educational programs need to be re-evaluated to determine what changes or additions can be made to provide practical experience along with formal instruction in agriculture in order to meet the needs that exist today as a result of the rapid technological changes taking place. A cooperative effort should be made to develop programs which include in-service training as well as meet the needs of future employees.

Administrators of educational programs and individuals involved in developing curricula should cooperatively plan programs commensurate with the needs of present and future employees engaged in retail fertilizer distribution.

The present high school vocational agriculture programs can and should provide many of the basic skills as outlined in this study. These programs can be updated and since they are already in operation are in a good position to contribute much to the challenge of adequately training present and prospective employees of retail fertilizer businesses.

The need for in-service training is evident when several thousand employees of the retail fertilizer industry do not possess the needed competency in the competencies included in this survey. It is possible that these competencies may be developed in area vocational-technical schools or in area or regional workshops organized by the retail fertilizer industry, the Iowa State University or by cooperating vocational agriculture departments.

