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**COMPETENCIES IN AGRICULTURE NEEDED BY MALES EMPLOYED
IN COUNTRY ELEVATOR GRAIN MARKETING**

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This is an abstract of a thesis submitted to Iowa State University of Science and Technology by Elwood Jackson Mabon 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 Elwood J. Mabon 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 COUNTRY ELEVATOR GRAIN MARKETING

By

Elwood Jackson Mabon

Purpose of the Study

The major purposes of this study were to determine: (1) the important agricultural competencies needed by males employed in country elevator grain marketing; and (2) the employment opportunities in this field in Iowa.

The secondary purposes were to determine from managers and employees: (1) the degree each competency was needed and possessed; (2) factors that influenced the degree personnel possessed each agricultural competency; (3) the important nonagricultural competencies needed; and (4) the degree each nonagricultural competency was needed by males employed in country elevator grain marketing.

Method of Procedure

To develop a list of important agricultural and nonagricultural competencies, a 16 member panel of outstanding elevator managers was chosen. The list of agricultural competencies was incorporated into questionnaires and mailed to 155 Iowa elevator managers and to 155 selected employees. These men evaluated each competency as it was needed in their jobs for them to perform efficiently, and evaluated the degree that each competency was possessed. Managers also evaluated either the assistant manager or elevator man position and the employee, relative to the degree the employee needed and possessed each competency.

The list of 57 nonagricultural competencies developed by the 16 member panel was incorporated by the investigator into a questionnaire and returned to the members of the panel. They evaluated each competency as to degree it was needed by managers, assistant managers, elevator men, and male clerical workers.

Data for the employment phase of the study was obtained from a random sample consisting of 272 of the 1088 Iowa country grain elevators.

Findings

In general, the higher the level of job classification, the greater was the degree of importance of the agricultural competencies, according to the managers evaluations for all three elevator positions, and also according to the self evaluations by all personnel in the study.

The 10 competencies that managers evaluated highest for the degree they were needed by themselves in order to conduct an efficient and successful grain business included the understanding of: moisture migration and its effects on grain; moisture and grade limits for short and long storage; grain marketing procedures; and the ability to: identify various types of grain; sample, weigh, and grade grain; operate grain moisture testers; anticipate merchandise needs and to control business inventory; figure and receive grain bids; analyze a farmer's credit potential for credit purposes; and to recognize opportunities in grain futures markets and use hedging principles as shown in Table 1. The range in mean scores for these 10 competencies was 3.4 to 3.7.

The 10 competencies that employees (assistant managers and elevator men) evaluated highest for the degree they were needed by themselves included three of those in the high 10 for managers and are also shown in Table 1. They were: the understanding of moisture and grade limits for short and long storage; and the ability to sample, weigh, and grade grain; and to operate grain moisture testers. The other seven were: the understanding of the uses, effects and safe uses of fumigants; Federal Drug Administration regulations regarding grain sanitation; and the ability to read grain temperature tests and interpret the readings; aerate and condition grain; identify insect pests and fungi controls; blend grain; and make recommendations to farmers regarding proper use of crop fertilizers and chemicals. The range in mean scores for these 10 competencies was 2.8 to 3.1.

The overall mean scores for the 19 abilities for both degree competence was needed and possessed were greater than those for the 18 understandings, according to the self evaluations by personnel in each of the three job classifications. This was also the case according to the managers' evaluations of employees.

In all but one of the mean scores for the individual competencies, the managers indicated the employees did not possess as much competence as was needed. However, when the elevator men evaluated their own competence, they indicated, in more than one-fourth of the competencies, that they possessed more competence than they needed. In approximately one-fourth of the competencies, the assistant managers indicated that they possessed a higher degree of competence than was needed.

A total of 73 percent of the personnel in the study had had farm experience. Assistant managers had the most farm experience (82%). Of all personnel having had farm experience, 40 percent had had over 10 years. The overall mean scores for managers for both the degree needed and possessed were quite similar among the groups with and without farm experience.

Assistant managers with farm experience possessed more but indicated they needed slightly less competency than did the group with no farm experience. Elevator men with farm experience indicated that they needed and possessed more competency than did the elevator men without farm experience.

The overall mean scores for both the understandings and abilities were, with one exception, highest for degree possessed by personnel in all three job classifications having had vocational agriculture in high school. For degree needed, the number of high overall mean scores were evenly divided between the vocational agriculture group and the nonvocational agriculture group. Only the personnel with 2, 3, or 4 years of vocational agriculture training were compared to those without such training in the matter of competency evaluations.

Table 1. Manager, assistant manager and elevator man evaluations of degree agricultural competencies were needed and possessed

Competencies	Mean scores									
	Managers		Assistant Manager				Elevator Man			
	N ^a	P ^b	Employer		Employee		Employer		Employee	
		N	P	N	P	N	P	N	P	
Understanding of:	N=132		N=76		N=76		N=56		N=56	
Moisture migration and its effects on grain	3.4	2.9	3.0	2.3	2.6	2.5	3.1	2.2	2.9	2.5
Moisture and grade limits for short and long storage	3.6	3.1	3.1	2.5	2.8	2.6	3.2	2.4	2.8	2.7
When and how to dry or condition grain	3.3	2.8	3.1	2.3	2.8	2.5	3.0	2.5	2.8	2.6
Sanitation habits for preparing to store or handle grain	3.2	2.9	2.8	2.6	2.4	2.6	3.0	2.4	2.7	2.8
The uses, effects, and safe use of fumigants	3.3	2.5	3.0	2.2	2.9	2.4	3.0	2.3	2.9	2.5
Federal Drug Administration regulations regarding grain sanitation	3.3	2.4	3.0	1.9	3.0	1.9	2.7	1.6	2.9	2.0
Grain marketing procedures	3.6	2.8	3.1	2.0	3.0	2.4	2.3	1.5	2.6	1.8
National and world economic picture as it affects country grain elevator grain business	2.9	2.1	2.3	1.5	2.5	1.8	1.6	.9	2.2	1.4
General farm operations and farming problems	3.1	2.8	3.0	2.5	2.8	2.8	2.4	2.3	2.6	2.5
Government grain programs for farmers	3.0	2.6	2.7	2.0	2.5	2.2	2.1	1.6	2.5	2.1
Various government paper forms used by grain business personnel	2.9	2.7	2.7	2.3	2.8	2.3	2.8	2.6	2.6	1.4
The services offered by the state agriculture college	2.8	2.2	2.5	1.6	2.5	1.9	2.0	1.3	2.3	1.4
Various types of grain handling equipment, both permanent and portable	3.3	2.7	2.8	1.7	2.5	2.6	1.6	1.0	2.7	2.7
Storage of grain in wood, concrete, metal flat, or upright bins	3.3	2.9	3.0	2.2	2.6	2.5	2.8	2.3	2.7	2.8
Livestock and poultry nutrition knowledge for use in working with farmers growing or feeding grain	3.2	2.4	3.1	2.3	2.9	2.5	2.5	1.8	2.6	2.4
Efficient grain and livestock production practices for the area	3.2	2.5	3.0	2.3	2.7	2.3	2.4	1.8	2.4	2.1

^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 competence.

Table 1 continued.

Competencies	Mean scores									
	Managers		Assistant Manager				Elevator Man			
	N	P	Employer		Employee		Employer		Employee	
N			P	N	P	N	P	N	P	
Understanding of:	N=132		N=76		N=76		N=56		N=56	
Soil testing and soil test recommendations	2.9	2.1	2.8	1.7	2.7	2.0	1.8	1.3	2.4	1.4
Machines and equipment used in the area for harvesting grain	2.2	2.0	2.1	2.2	1.9	2.5	2.0	2.1	2.0	2.4
Ability to:										
Identify various types of grain	3.6	3.4	3.3	3.1	2.8	3.4	3.5	3.0	2.7	3.2
Sample, weigh, and grade grain	3.7	3.4	3.6	3.1	3.2	3.3	3.3	2.8	2.9	3.0
Operate grain moisture testers	3.6	3.5	3.5	3.3	3.1	3.4	3.3	3.1	3.0	3.2
Read grain temperature tests and interpret the readings	3.5	3.4	3.5	3.1	2.9	3.2	3.3	3.0	2.9	3.1
Aerate and condition grain	3.4	3.0	3.3	2.5	2.9	2.8	3.3	2.7	2.9	3.0
Identify grain insect pests and fungi, and use pest and fungi controls	3.2	2.3	3.0	2.0	3.0	2.2	3.0	2.0	3.0	2.3
Carry out an effective program of rodent and bird control	2.9	2.6	2.9	2.3	2.6	2.3	2.8	2.3	2.6	2.4
Operate grain handling machines and equipment	2.9	2.7	3.1	2.8	2.7	3.0	3.4	3.0	2.9	3.1
Keep grain handling machines and equipment in repair	2.8	2.7	3.0	2.6	2.7	2.7	3.3	2.9	2.8	2.9
Blend grain	3.4	3.1	3.4	2.7	3.1	3.1	3.6	2.8	3.0	2.9
Anticipate merchandise needs and to control business inventory	3.6	3.0	3.1	2.4	3.0	2.6	2.5	1.9	2.6	2.1
Figure and receive grain bids	3.7	3.4	3.4	2.5	3.1	2.7	2.4	1.8	2.6	1.6
Analyze grain market trends	3.3	2.2	2.7	1.4	2.8	1.9	1.8	1.0	2.5	1.3
Evaluate fertilizer formulas	3.2	2.5	3.0	2.2	3.0	2.2	2.2	1.4	2.4	1.3
Make recommendations to farmers regarding proper use of crop fertilizers and chemicals	3.4	2.5	3.2	2.1	3.2	2.3	2.3	1.5	2.7	1.5
Estimate the grain and livestock production potential of a farmer's farming operation	2.9	2.2	2.7	1.8	2.5	2.0	1.8	1.3	2.3	1.4
Estimate the grain production potential in the area served by your elevator	3.0	2.4	2.5	1.8	2.5	2.2	1.8	1.3	2.5	1.6
Recognize opportunities in grain futures markets and how to use hedging principles	3.5	1.9	2.9	1.0	2.9	1.6	1.8	.9	2.4	1.0
Analyze a farmer's credit potential and to know whether to extend credit	3.7	2.7	3.2	2.0	3.1	2.3	2.1	1.4	2.6	1.8

Of the 264 persons in the study, 86 (33%) had had 1 to 4 years of vocational agriculture. Forty-three (33%) of the managers, 28 (37%) of the assistant managers, and 15 (27%) of the elevator men had had 1 to 4 years of this training. Managers' attendance at college was 10 percent greater for those who had vocational agriculture than for those without. All but 2 of the 43 employees with vocational agriculture training had been graduated from high school; however, 34 (39%) of the 89 without vocational agriculture training were not high school graduates.

Of the 132 managers 49 (37%) had had 1 or more years of college training, 69 (52%) had completed high school, and 14 (11%) had less than 12 years of schooling. Thirty of the managers with college training had completed 4 or more years.

Twenty-two percent of the assistant managers and nine percent of the elevator men had attended one or more years of college. Fifty-seven percent of the assistant managers and 54 percent of the elevator men were high school graduates. Twenty-one percent of the assistant managers and 37 percent of the elevator men had less than 12 years of formal education.

As with the agricultural competencies, the nonagricultural competencies were selected on the basis of being important to at least one, and not necessarily more than one, of the job classifications and are presented in Table 2. The overall mean scores were highest for managers, followed by those for assistant managers, clerical workers, and elevator men. This was true for both the understandings and the abilities.

The highest rated nonagricultural understandings were; for managers and assistant managers, credit and credit policies; for elevator men, various receiving and binning techniques; and for clerical workers, double entry bookkeeping and good accounting procedures. In abilities, the highest rated were: for managers, to use financing efficiently; for assistant managers, to gain customer's confidence; for elevator men, to cooper and load and unload rail cars and all sizes and types of trucks; and for clerical workers, to use skills in basic mathematics and work accurately with figures.

Data indicated that in 1963, 5942 males were employed full-time in Iowa country retail grain elevators. It was estimated that in 1967 a total of 7253 males would be employed full-time in 922 elevators as shown in Table 3. The increase in numbers was based on the predictions of the 215 elevator managers. The 10 percent reduction of elevators was estimated by the investigator. This assumption was made after contacting numerous persons in Iowa elevators and conferring with some trade association personnel. Some retail elevators have been converted to grain storage, some have been merged with other elevators. It appears that this trend will continue.

Nearly 40 percent of the male elevator personnel in the 215 elevators in 1963 were in the three job classifications of manager, assistant manager, and elevator man. On the basis of these data, 2300 were employed full-time in the three job classifications in Iowa elevators in 1963. Since few persons work exclusively with grain, it was considered impractical to predict an anticipated grain labor force. On the basis of 922 elevators, and the labor force prediction data from the 215 managers, 2345 men will be employed full-time in these three job classifications in 1967.

Table 2. Nonagricultural competencies needed by managers and male employees in country elevator grain marketing

Competencies	Manager		Ass't Manager		Grain Elevator Man		Clerical	
	Mean ^a		Mean		Mean		Mean	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank
Understanding of:								
Credit and credit policies	3.86	1	3.57	1	1.93	5	3.36	2
Audit procedures	3.79	2.5	3.00	12	.50	17	3.29	3
Banking procedures	3.79	2.5	3.07	11	.64	12.5	2.57	6
Commerce Commission's role in merchandising grain	3.71	5.5	3.14	7.5	2.14	3.5	1.57	16
Federal wage and hour laws	3.71	5.5	2.93	13.5	.57	14	2.50	7.5
Legal aspects of retailing and wholesaling grain	3.71	5.5	2.93	13.5	1.29	9	1.79	14.5
Rates and regulations for shipping grain	3.71	5.5	3.14	7.5	2.14	3.5	1.93	12.5
Account collection procedures	3.64	9.5	3.21	5	1.00	10	2.50	7.5
Business taxation	3.64	9.5	2.64	16.5	.43	18	2.43	9
Double entry bookkeeping and good accounting procedures	3.64	9.5	3.21	4	.64	12.5	3.71	1
Shipping procedures and forms used	3.64	9.5	3.36	2	2.36	2	3.14	4
Insurance facts applicable to grain business and personnel	3.62	12	3.08	10	1.31	8	2.23	11
Business law	3.57	13.5	2.71	15	.57	14	1.79	14.5
Freight structures--both truck and rail	3.57	13.5	3.14	7.5	1.50	7	1.93	12.5
Basic English skills	3.43	15.5	3.14	7.5	1.64	6	3.00	5
Proper parliamentary procedure	3.43	15.5	2.64	16.5	.57	14	1.00	17
Various receiving and binning techniques	3.36	17	3.21	4	3.64	1	.86	18
Postal regulations applicable to the grain business	2.99	18	2.50	18	.86	11	2.36	10
Ability to:								
Use financing efficiently	4.00	1	2.93	34.5	.23	38	1.00	37
Be an effective leader of employees	3.93	6	3.36	27	1.71	21	1.43	34
Delegate responsibility fairly and authoritatively	3.93	6	3.54	13.5	1.71	21	1.21	35
Do general overall planning within the realm of the assigned job (position)	3.93	6	3.50	19	2.64	10	2.71	14
Evaluate the financial statement and to take corrective action when necessary	3.93	6	2.93	34.5	.21	39	2.14	21
Gain customer's confidence	3.93	6	3.79	1	3.29	5	2.21	18.5
Intelligently plan for new facilities	3.93	6	2.71	39	1.14	28	.93	38.5
Maintain good employer-employee relations	3.93	6	3.57	11.5	1.86	17.5	1.57	32.5

^a4--Very much competence needed, 3--Much competence needed, 2--Some competence needed, 1--Little competence needed, 0--No competence needed.

Table 2 continued.

Competencies	Manager		Ass't Manager		Grain Elevator Man		Clerical	
	Mean		Mean		Mean		Mean	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank
Ability to:								
Recognize the merit and potential of new products	3.93	6	3.50	19	1.36	26.5	1.07	36
Sell oneself and ideas	3.93	6	3.36	27	1.71	21	1.71	29.5
Be a good listener and apply what you learn	3.86	11.5	3.64	6	2.93	7	2.79	13
Give needed advice to customers without "knowing it all"	3.86	11.5	3.64	6	2.29	13	2.07	24.5
Explore the community for new or additional services	3.79	13	2.93	34.5	1.07	29	.93	38.5
Project a pleasing personality in telephone conversation	3.73	14	3.64	6	1.91	16	3.09	11
Efficiently use facilities	3.71	17.5	3.43	24.5	3.29	5	2.21	18.5
Give needed advice to co-workers without "knowing it all"	3.71	17.5	3.50	19	1.99	15	2.36	17
Meet the public pleasingly	3.71	17.5	3.71	2	2.79	8	2.43	16
Practice ethical behavior toward business competitors	3.71	17.5	3.50	19	1.85	19	1.69	31
Practice moral and ethical business law	3.71	17.5	3.50	19	1.86	17.5	2.64	15
Work cooperatively under stress or confused conditions when necessary	3.71	17.5	3.57	11.5	3.36	3	2.93	12
Express oneself clearly, concisely, and effectively with individuals and groups	3.64	21	3.36	27	1.64	23	2.07	24.5
Maintain a high level of safety in working surroundings	3.57	23	3.50	19	3.57	22	2.14	21
Use skills in basic mathematics and to work accurately with figures	3.54	24	3.62	10	2.31	12	3.92	1
Write warehouse receipts	3.50	25	3.50	19	.71	33.5	3.50	6.5
Adequately advertise the elevator's grain handling equipment and services	3.43	28	3.00	31	1.62	24	.69	40
Display merchandise effectively	3.43	28	3.64	6	1.57	25	1.57	32.5
Know individual characteristics of customers	3.43	28	3.43	24.5	2.46	11	1.92	26
Make provisional insurance reports	3.43	28	3.50	19	.79	31.5	3.50	6.5
Skillfully handle business cash and receipts	3.43	28	3.64	6	.93	30	3.50	6.5
Figure extensions of grain with discounts	3.36	31	3.54	13.5	1.36	26.5	3.33	10
Make out insurance reports	3.29	32.5	3.50	19	.43	36	3.43	9
Use double entry bookkeeping method and good accounting procedure	3.29	32.5	3.14	29	.50	35	3.86	2

Table 2 continued.

Competencies	Manager		Ass't Manager		Grain Elevator Man		Clerical	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
	Score		Score		Score		Score	
Ability to:								
Make out government reports (tax, social security, withholding, etc.)	3.21	34.5	2.93	34.5	.14	40	3.50	6.5
Operate weighing scales	3.21	34.5	3.64	6	2.71	9	1.79	28
Carry out good "house and grounds keeping programs"	3.14	36	3.64	6	3.29	5	1.83	27
Develop and maintain a filing system	3.07	37	3.00	31	.79	31.5	3.57	4
Keep perpetual inventory	2.79	38	3.00	31	2.07	14	2.14	21
Efficiently operate office machines and equipment	2.50	39	2.86	38	.71	33.5	3.79	3
Cooper and load and unload rail cars and all sizes and types of trucks	2.21	40	2.57	40	3.86	1	.29	41
Take shorthand	.14	41	.21	41	.00	41	1.71	29.5
Compose good business letters	3.62	22	2.92	37	.31	37	2.08	23

Table 3. Present and future manpower needs in country elevators by job classification (males only)

Job classification	(1) ^a Emp. in 1958	(2) ^a Increase 1958-63	(3) ^a Emp. in 1963	(4) ^a Anticipated increase 1963-67	(5) ^a Anticipated employment 1967	(6) ^b Total est. emp. 1963	(7) ^b Total anticipated emp. 1967
Manager	209	6	215	--	215	1024	922 ^c
Assistant manager	124	18	142	18	160	676	763
Head of feed department	39	10	49	19	68	233	321
Head of fertilizer department	15	12	27	20	47	129	224
Elevator man	112	14	126	13	139	600	660
Mill man	102	25	127	40	167	605	792
Fertilizer salesman	4	10	14	20	34	67	162
Feed salesman	34	6	40	29	69	190	328
Clerical	37	9	46	33	79	219	376
Service man (utility worker)	95	26	121	35	156	576	743
Other grain, feed or fertilizer employees	221	30	251	33	284	1195	1350
Nongrain, feed or fertilizer employees	<u>78</u>	<u>12</u>	<u>90</u>	<u>39</u>	<u>129</u>	<u>428</u>	<u>612</u>
TOTAL	1070	178	1248	299	1547	5942	7253

^aData in columns (1) through (5) were obtained from 215 elevator managers.

^bData in columns (6) and (7) were projected from data in columns (3) and (5).

^cThe 922 managers were estimated by the investigator based on assumption of a 10 percent reduction in elevators by 1967.

State-wide, on the basis of the 215 respondents' estimates for additional employees for 1967, 132 new employees will be needed per year, in the following job classifications: managers, none; assistant managers, 22; elevator men, 15; clerical workers, 39; service men, 17; and other grain, feed and fertilizer employees, 39. Thus 528 additional new full-time male employees will be needed during the four-year period in these six job classifications. An estimated 1252 replacements will be needed within the four-year period 1964-1967 in these six job classifications. These classifications are those most likely to include employees having grain employment responsibilities.

Implications

The findings in this study have implications for future programs in vocational education. Farm experience and high school vocational agriculture may provide the foundation for the development of interest in grain handling and a base for further development of needed agricultural competencies. Some understandings and abilities in grain handling and marketing may be developed in high school vocational agriculture. Training experience needs to be provided in a local grain elevator. For most students, the junior and/or senior years of high school vocational agriculture would be the most appropriate time for the employment training. The broadening of the objectives of vocational agriculture by the Vocational Education Act of 1963 authorized this type of program. The development of area vocational schools could be another source of aid for many students to receive initial or advanced schooling with concurrent employment experience.

The competencies needed in country elevator grain marketing should be incorporated in training programs at the most appropriate educational levels. Cooperative vocational education programs (high school and adult) could be developed to provide a complete training program for both prospective and present personnel. High school vocational agriculture, in conjunction with employment training, can provide a firm background in many competencies. For more specialized training and retraining, community school adult programs, area post high school vocational programs with short or full-term courses, and colleges with short courses, workshops, and four-year degree courses can offer adequate opportunities.

Since so many of the competencies are needed by farmers, the farming practices taught in vocational agriculture have high carry-over value to students who enter the grain business. From the results of this and other competency studies, instructors may determine the clusters of understandings and practices of a common denominator that will best train the students to meet their plans and objectives in agriculture.

Persons advising young people and adults need to be informed of the opportunities available in the grain handling and marketing field and the competencies necessary for success. The lists of important competencies, the degree they were needed and possessed, and the employment data as found in this study should be useful to educators and for on-the-job training in elevators.

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