

**AN ASSESSMENT OF AGRICULTURAL
LITERACY AMONG STUDENTS IN
LUTHER, OKLAHOMA**

By

GEORGANNE WILLIAMS

Bachelor of Science in Agriculture

Oklahoma State University

Stillwater, Oklahoma

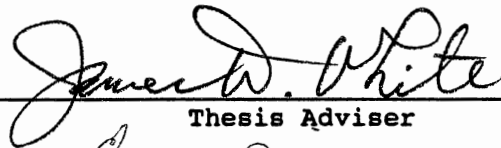
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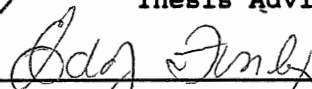
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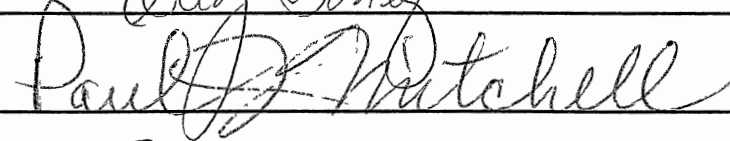
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Thesis Adviser







Dean of the Graduate College

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CHAPTER I

INTRODUCTION

The present generation's increasing commitment to conserve limited resources and to protect the environment for future generations was tied to fundamental values and principles that normally transcend the usual limits of both social and behavioral disciplines within agriculture.

Lockeretz (8) stated that unfortunately, education, research and administration of agriculture are substantially isolated from instruction in other academic subjects. As a result of omitting agriculture in general education programs leads many to take the importance of the industry for granted.

Agricultural literacy has been defined as the goal of education about agriculture. An agriculturally literate person has a basic understanding of the food and fiber system, its history and current economic, social and environmental significance to all of society. This definition encompasses knowledge of food and fiber production, processing, and domestic and international marketing. Agricultural literacy also includes enough knowledge of nutrition to make informed personal choices about diet and health.

The Committee on Agriculture Education in Secondary Schools (5) stated that achieving the goal of an agriculturally literate populace would tend to insure that citizens would be well enough informed to make decisions concerning policy that benefit not only

agriculture, but the whole society.

Statement of the Problem

Since agriculture touches each of us, it is important for tomorrow's leaders and policy makers to understand production practices, international trade, and a market oriented agriculture. "What happens in agriculture affects the whole world and what happens in the world affects agriculture". The production decisions made locally affect markets and profitability in the long term. The quality of life in Luther, Oklahoma is closely related to the agriculture economy. If markets are not available or low cash prices exist it impacts the collection of ad valorem taxes which affects local education programs to the wages of steel workers which manufacture steel for tractors, combines, etc. If this capital intensive agriculture impacts society in such a manner, then it's important to find out how much people know about an industry that affects their lives so dramatically.

Purpose of the Study

The purpose of this study was to assess the level of agricultural literacy among elementary, junior high and high school students, during the 1990 fall semester, in the Luther Independent School District in rural Oklahoma County.

Objectives of the Study

In order to accomplish the purpose of the study, the following

objectives were established:

1. To determine the level of agricultural literacy in the fifth grade, eighth grade and eleventh grade of the Luther Independent School District.

2. To determine the level of agricultural literacy among students by grade level in the following six concepts:

Agriculture is...

- a. the business that provides food, clothing and shelter.
- b. interdependent with the well-being of society in Oklahoma, the United States and the world.
- c. a vital system shaped by research and development.
- d. influenced by government.
- e. interdependent with the environment and uses of natural resources.
- f. historically significant to the development of our nation.

3. To determine if significant differences existed between gender, by grade level, and attainment of the concepts of agricultural literacy.

4. To determine if significant differences existed between students who had or had not lived on a farm/ranch, by grade level, and the attainment of the concepts of agricultural literacy.

5. To determine if significant differences existed between students who had or had not participated in 4-H or enrolled in agricultural education, by grade level, and the attainment of the concepts of agricultural literacy.

Scope of the Study

This study involved all fifth, eighth and eleventh grade students in the Luther Independent School District.

Assumptions

The following were assumed to be true and not tested in conducting this study. It was assumed that:

1. All students participating in this study were able to read and understand the questions.
2. Students answered only those questions they felt they knew the answers to, and thus guessing which could result in a measurement error was minimized.
3. The reading level of questions was appropriate for the reading level of students.

Definition of Terms

The following terms are defined as used in this study:

Agriculture: the production of agricultural commodities, including food, fiber, wood products, horticultural crops, and other plant and animal products. The term also includes the financing, processing, marketing, and distribution of agricultural products; farm production supply and service industries; health nutrition, and food consumption; the use and conservation of land and water resources; development and maintenance of recreational resources; and related economic, sociological, political, environmental, and cultural characteristics of the food and fiber system.

Agricultural Education: (Vocational Agriculture) a 3-4 year articulated program of instruction to prepare students with competencies needed for employment in agricultural occupations utilizing a delivery system which includes the Supervised Agriculture Experience (SAE) and the Future Farmers of America (FFA) student organization.

Agricultural Literacy Education: education about the food and fiber system including its history and current economic, social and environmental significance.

CHAPTER II

REVIEW OF LITERATURE

A review of related literature was conducted to become better acquainted with the numerous aspects of a relatively new program of incorporating agriculture into the general studies of grades K-12. To insure an adequate review of related literature, particular attention was paid to the specific aspects of: (1) Agriculture in the Luther Community, (2) the importance of agriculture to Oklahoma's economy, (3) agricultural literacy, (4) an assessment of education in agriculture, (5) mainstreaming the curriculum to include agriculture in grades K-12, and a (6) summary.

The information obtained was minimal, due to recent emphasis concerning the need to examine agricultural literacy in students across the United States. This information was presented in five sections and a summary to facilitate clarity, organization and understanding.

The Luther Community

Luther, Oklahoma is a community of 1800 persons located approximately thirty miles northeast of Oklahoma City. Although Luther could be considered a suburb of Oklahoma City, it is basically a rural community.

Agriculture in the Luther Community is diversified. While beef cattle is the major livestock species produced, swine and sheep also

contribute to the livestock driven economy, while wheat, alfalfa and pecans are the major crops produced in the area. The feed mill and livestock feed dealership in Luther brings producers from surrounding communities which contributes greatly to the area's agribusiness economy. According to Roy and Simons (13), agribusiness generated \$925,000.00 in income, during 1989, of which \$27,750.00 in sales tax went to the Luther Community.

The Luther Independent School District offers Agricultural Education in its curriculum with an emphasis on Production Agriculture. The community supports agricultural youth activities through the FFA and 4-H youth programs.

Importance of Agriculture to Oklahoma's Economy

Agriculture plays a major role in Oklahoma's economy. With 31,541,977 acres in farmland out of a total of 43,939,270 acres of land (71.8%) in the state, Oklahoma could easily be labeled as an "agricultural" state.

Cash receipts from farm marketings totaled \$3.4 billion in 1988 according to the Oklahoma Agricultural Statistics Service (10). Receipts from crop sales were \$1.1 billion, or thirty-three percent of total farm marketings. Livestock and related products accounted for \$2.3 billion in receipts.

Oklahoma's number one agricultural commodity was the production of cattle and calves, and ranks fourth nationally. Winter wheat is Oklahoma's number one cash crop, and ranks second in the nation.

Other major crops grown in Oklahoma include: pecans, peanuts, cotton, milo, grain sorghum and all types of hay.

Poultry and eggs, milk production and swine also contribute greatly to Oklahoma's agricultural economy.

Agricultural Literacy

Agricultural literacy has been defined as the goal of education about agriculture. An agriculturally literate person has a basic understanding of the food and fiber system, its history and current economic, social and environmental significance to all of society.

According to Moore (9):

Students should come to appreciate that the species providing our food and fiber are part of a vast web of life that functions as an integrated whole. Every species of plant and animal depends not only on its physical environment but on the biological component of the environment as well. All living creatures are part of the same cycles of matter and energy. Thus, education will be incomplete unless students learn what is essential for the lives of our crops, animals, and plants (pp. 5-6).

According to Russell, McCracken and Miller (14), the role that agriculture plays in the United States is poorly understood by youth and the general public. In spite of the sustained programs of education in agriculture in public schools, universities, the Cooperative Extension Service and other agencies, most people still seem to perceive "agriculture" as synonymous with "farming".

The problem of agricultural illiteracy is widespread. Previous studies in other states had shown that current levels of agricultural literacy are low due to the relative absence of information about agriculture in public education programs. Horn

and Koch (6) conducted a study of the agricultural knowledge of 2,000 elementary, junior and senior high students in Kansas, which is a major agricultural state, fewer than 30 percent of the students gave correct answers to relatively basic questions. Only 27.3 percent of the elementary school students knew that veal was the meat of young calves; 25 percent of middle and junior high students knew that the sprouting of seeds was called germination; and 10 percent of senior high students knew that beef cattle production was the primary industry in Kansas in terms of gross sales. In many cases, the majority of students chose to answer, "I don't know".

Based on the findings of Horn and Koch's (6) Kansas study and a similar study done by Perey (11) in Arizona, the consistently low levels of agricultural literacy among students lends credibility to the work being done to promote a new delivery system to address agricultural literacy. The agriculture programs currently in place in high schools across the country may well be meeting the needs of society for a trained work force but are currently not equipped to meet the agricultural literacy needs of a society which is agriculturally illiterate.

An Assessment of Education in Agriculture

According to Aldrich (1), in the 1980's, many forces have challenged American agriculture and education. These forces included demographics; urbanization; rapid gains in worldwide agricultural production capacity; domestic and trade policies; lifestyle changes; global competition in basic and high technology

industries; biotechnological techniques; specialization within the professions; and public expectations about the role of schools, the food supply and public institutions. A growing number of educators, farmers and those in agribusinesses and public institutions recognized the need to adjust policies. Our educational system must meet these challenges.

According to Reed (12), the early 1980's also brought about a nationwide education reform movement. One concept of this movement was that every school program (including agricultural education) should have contributed to and reinforced students' basic academic educational literacy. This led to the discovery that current basic academic education was leaving graduates agriculturally illiterate and that this caused them to be at a disadvantage as consumers and responsible citizens.

As concluded by the Committee on Agricultural Education in Secondary Schools (5) agriculture is too important a topic to be taught only to the relatively small percentage of students considering careers in agriculture and pursuing agricultural education studies.

According to Russell, McCracken and Miller (14), currently fewer than 5 percent of American high school students are enrolled in agricultural education, and a very small percentage at junior high and elementary levels are touched by agricultural education programs such as Ag in the Classroom and 4-H Club programs.

The Committee on Agricultural Education in Secondary Schools (5) had acknowledged that agricultural education is education in

agriculture and has had a long history in American education. Most programs have consisted of three parts: classroom and laboratory instruction, supervised agricultural experiences (SAEs), and membership in the National FFA (Future Farmers of America) Organization. A broader definition of agricultural education is needed because technological and structural changes in agricultural industries had enlarged the scope and number of careers. In the committee's view, agricultural education should give students the skills needed to enter and advance in careers such as farm production; agribusiness management and marketing; agricultural research and engineering; food science, processing, and retailing; banking; education; landscape architecture; urban planning; and other fields.

Change within agriculture is an ongoing process that would affect agricultural businesses and institutions. They must adapt to continue serving agriculture. The institution of agricultural education is no exception.

In content, the agricultural education curriculum had failed to keep up with modern agriculture. More flexibility in curriculum and program design and the requirements and activities of the FFA was essential. Camp's (4) analysis was quoted in Understanding Agriculture: New Directions For Education and was typical of statements heard repeatedly by the Committee on Agricultural Education in Secondary Schools (5):

In spite of the rhetoric of the profession that we are not training primarily for farming occupations and that agriculture education has changed dramatically, the typical agricultural program remains much as it was

when the Vocational Education Act of 1963 was passed. Production agriculture, taught by a single teacher, in a general high school, remains the norm (p. 31).

The Committee on Agricultural Education in Secondary Schools (5) recognized that current agricultural education programs, that have changed little over the past decade, prepare students for a rather limited and generally shrinking component of the job market. These programs were also geared to a shrinking segment of the student population. They probably gave some students an unrealistic view of agricultural job prospects, while failing to alert them to other career opportunities in agriculture.

New efforts were needed to reform secondary school agriculture programs to better prepare students for agricultural-sector growth industries. An essential step toward achieving this goal was to fully accept the broadened definition of agriculture education recommended by the committee. In some cases, this would require change in or abandonment of vocational guidelines. Under agricultural education, this definition would include greater diversity of career paths, such as scientific research, technology development, medical and social services, finance, law, business, management, and marketing.

Mainstreaming The Curriculum To Include

Agriculture In Grades K - 12

According to Bowen (3) in 1983, the Reagan Administration was successful in making Americans aware of the mediocrity that had invaded our educational system.

A Nation At Risk and subsequent reports stated a definite need for education quality had to rise. Increased graduation requirements and a host of reforms were instituted. In most states, agricultural education was severely affected. The results were obvious on several fronts. One program "labeled" as Ag in the Classroom was initiated in 1981. The USDA established this program with the cooperation of the state departments of agriculture and some State Farm Bureau organizations.

At the first national Ag in the Classroom Conference, Secretary of Agriculture John Block (2) stated . . .

When I became Secretary of Agriculture, one of the things I realized early on was the need to educate the nation's young people on the value of agriculture . . . We are not interested in making farmers out of everyone or getting everyone back to the farm. We simply want a nation of people who understand the importance of agriculture - - who appreciate the impact that its food, fiber and forestry have on their lives... More and more, agriculture policy decisions run the risk of being shaped by people who - - although they are concerned about agriculture and food issues - - do not have the information or background to fully understand them . . . (p. 3).

Ag in the Classroom programs have already demonstrated the potential benefits from properly structured program initiatives. It was the most extensive effort ever taken to help elementary school students become more knowledgeable about the food and fiber system. The process used by teachers included incorporating agricultural instructional materials and subject matter into classroom activities. The USDA acted as an information clearinghouse and resource to encourage states and school districts to adopt the program. Districts in the program provided in-service training

opportunities and special instructional material to teachers, who then pursued a variety of options for incorporating new subject matter into the curriculum.

Forty-seven states have developed materials as part of the Ag in the Classroom program. In most cases, the materials spanned several school grades. In 38 states, a combined total of 21,000 teachers had been prepared in the use of Ag in the Classroom materials. A USDA (15) estimate indicated that these teachers had already reached more than 1.2 million students.

Summary

Agriculture played a major role in the Luther Community. Cattle, swine and sheep were produced in the area. Wheat, alfalfa and pecans were the major crops grown in the area. Agribusinesses were of economic significance to the community.

Oklahoma could easily be labeled as an "agricultural" state. Cash receipts for farm marketings totaled \$3.4 billion in 1988 according to the Oklahoma Agricultural Statistics Service (10).

Education about agriculture must meet the challenges of a changing society. All students should have been made aware of the importance of agriculture in their daily lives. Related studies had shown that the majority of students had a low level of agricultural literacy.

Agricultural Education programs should have become more flexible in their curriculum, program design and the requirements and activities of the FFA.

Mainstreaming the curriculum to include agriculture in grades K-12 included programs such as Ag in the Classroom. This program had been the most extensive effort ever taken to help elementary students become more knowledgeable about the food and fiber system.

In 38 states, a combined total of 21,000 teachers had been prepared in the use of Ag in the Classroom materials. A USDA (15) estimate indicated that these teachers had already reached more than 1.2 million students.

CHAPTER III

PROCEDURES

The purpose of this chapter was to describe the methods and procedures utilized in conducting this study.

The intent of this study was to assess the level of agricultural literacy among elementary, junior high and high school students, during the 1990 fall semester, in the Luther Independent School District in rural Oklahoma County. In order to accomplish the purpose and objectives of this study, it was necessary to determine a population and develop an instrument for data collection. The data treated in this study was collected by multiple-choice answer tests given to the students in September of 1990.

Institutional Review Board (IRB)

Federal regulations and Oklahoma State University policy require review and approval of all research studies that involve human subjects before investigators can begin their research. The Oklahoma State University Research Services and IRB conduct this review to protect the rights and welfare of human subjects involved in biomedical and behavioral research. In compliance with the aforementioned policy, this study received the proper surveillance and was granted permission to continue. Furthermore, this research was assigned the following research project number: AG-91-002.

The Population

The population for this study were students enrolled in the fifth, eighth and eleventh grades in the Luther Independent School District. In keeping with previous agricultural literacy studies conducted, the accessible population were students designated as fifth graders, eighth graders and eleventh graders in Luther Schools.

Specifically, the population of this study was all fifth grade, eighth grade and eleventh grade students at the Luther Schools attending school on the day the instruments were administered. One Hundred twenty-seven students participated.

Permission to administer the assessment instrument was sought and granted from the principals of the respective schools and teachers of the respective classes.

Development of the Instrument

The instruments used to assess the agricultural literacy of students in the sample were a modified version of the instruments which were used by the Kansas Foundation for Agriculture in the Classroom. The items on the assessment instruments were generated by selected faculty in the college of Agriculture and Education and the researchers, Horn and Koch (6) at Kansas State University. The modifications were limited to the removal of selected questions that were specific to Kansas and replacement of those questions with similar ones specific to Oklahoma Agriculture. However, certain questions from the Kansas Study were deleted, and new questions were

developed to better assess the students' knowledge of agriculture. Three instruments were used, one for elementary school students, one for junior high students and one for high school students, in an effort to compensate for the complexity of the questions and the reading differential between grades. All three instruments measured the same six concepts using different questions. The instruments were designed in such a manner that questions 1 through 6 referred to Concept a; questions 7 through 12, Concept b; questions 13 through 18, Concept c; questions 19 through 24, Concept d; questions 25 through 30, Concept e; and questions 31 through 36, Concept f (See Appendixes C, D and E).

Form I (Appendix C) was administered in the fifth grade and consisted of thirty-six multiple-choice answer questions based on the six agricultural concepts being tested. There was also a twelve question personal data sheet (Appendix B).

Form II (Appendix D) was administered in the eighth grade and consisted of thirty-six multiple-choice answer questions based on the six agricultural concept areas being tested. There was also a twelve question personal data sheet (Appendix B).

Form III (Appendix E) was administered in the eleventh grade and consisted of thirty-six multiple-choice answer questions based on the six agricultural concept areas being tested. There was also a twelve question personal data sheet (Appendix B).

The assessment instruments were tested for face validity by the researcher's Graduate Committee. Furthermore, before the test was modified for Oklahoma, it had undergone extensive pilot testing and

modification in Kansas.

Conduct of the Study

Classroom teachers who agreed to cooperate were given numbered copies of the assessment instruments (Appendixes C, D and E) and a set of instructions for giving the test (Appendix A). Tests were numbered to compare assessment scores with the variables in the study. The teachers were asked to read written instructions to all pupils so that all responses were solicited in a consistent fashion. The responses to the multiple-choice answer questions and personal information portions of the instrument were made on the instrument itself. The participating teachers gave students the time to complete the assessment instrument. Upon completion of the instruments, the participating teachers called the researcher to pick up all tests, and all instructions.

Analysis of the Data

Since this was a descriptive study assessing agricultural literacy, the data were described by utilizing frequency distributions, means, percentages and ranges in scores.

Key (7) stated:

The primary use of descriptive statistics was to described information or data through the use of numbers. The characteristics of groups of numbers representing information or data were called descriptive statistics. Descriptive statistics were used to describe groups of numerical data such as test scores, number of hours of instruction, or the number of students enrolled in a particular course.

In addition, the two-tailed t-test from an IBM statistical package was employed to make comparisons between groups and determine levels of significance. F values calculated at the .05 probability level determined significance.

The average number of correct responses for all questions at each grade level was reported as a percentage. Each student's score was calculated by dividing the total number of correct responses possible by the number of correct responses. The mean correct score, for each grade level, was obtained by totaling all of the individual scores and dividing by the total number of student respondents in that grade. The mean correct score, for all grades combined, was derived by totaling each grade level's mean correct score and dividing by the number of the grade levels tested.

An interval scale with percentage levels ranging from 50 percent correct responses to 100 percent correct served to determine levels of agricultural literacy. The "level" categories of literacy were arbitrarily chosen, but were consistent with previous agricultural literacy assessment studies. The literacy levels were labeled in categories and assigned the following percentage values: "Low" level of literacy = 50 percent correct responses or below; "Minimal" level of literacy = 51 to 70 percent; "Moderate" level of literacy = 71 to 90 percent; and a "High" level of literacy = 91 percent and above. In addition, real limits were established to more accurately define and describe the responses secured by the instruments. The limits set for the levels of agricultural literacy were: 50.49 percent and below for "Low"; 50.50 - 70.49 percent

correct for "Minimal"; 70.50 - 90.49 percent correct for "Moderate";
and 90.50 - 100 percent correct for a " High" level.

CHAPTER IV

PRESENTATION AND ANALYSIS OF THE DATA

Introduction

The major intent of this study was to assess the level of agricultural literacy among elementary, junior high and high school students, during the 1990 fall semester, in the Luther Independent School District in rural Oklahoma County.

The accessible population was all fifth, eighth and eleventh grade students in the Luther Schools attending school the day the instruments were administered. One-Hundred twenty-seven students participated. Of the 127 tests administered, 123 (96.85%) usable instruments were utilized. Three of the instruments were deleted from the study due to complete pages being "accidentally" not answered. One of the respondents had answered "I don't know" on every question and the researcher felt that the student was not answering honestly and sincerely. Therefore, this instrument was also deleted.

To better understand this study, the primary goal in this chapter was to examine the data collected and report the findings in a logical order according to the format and sequence of the study objectives and the instruments.

Table I revealed that 123 students were assessed in the Luther Public School District. Forty-five (36.58%) were at the fifth grade

level; forty-four (35.77%) at the eighth grade level and thirty-four (27.64%) at the eleventh grade level.

TABLE I
A SUMMARY OF MEAN CORRECT SCORES BY GRADE LEVEL

Grade Level	Mean Correct Score	Score Ranges
5th (n=45)	27.78	8.33-61.11
8th (n=44)	32.83	8.33-61.11
11th (n=34)	37.25	2.78-86.11
All Grades (n=123)	32.62	2.78-86.11

The mean correct score at the fifth grade level was 27.78 percent with a range of 8.33 percent to 61.11 percent. The mean correct score at the eighth grade level was 32.83 percent and scores ranged from 8.33 percent to 61.11 percent. The mean correct score at the eleventh grade level was 37.25 percent and scores ranged from 2.78 percent to 86.11 percent. The overall mean correct score for all grades was 32.62 percent and scores ranged from 2.78 to 86.11 percent.

Table II showed the level of agricultural literacy among students by grade level which was indicated by mean correct scores for the following concepts:

Agriculture is...

- a. the business that provides food, clothing and shelter.
- b. interdependent with the well-being of society in Oklahoma, the United States and the world.
- c. a vital system shaped by research and development.
- d. influenced by government.
- e. interdependent with the environment and uses of natural resources.
- f. historically significant to the development of our nation.

The findings concerning Concept a indicated mean correct scores of 54.07 percent for the fifth grade (n=45), 26.52 percent for the eighth grade (n=44), 43.14 percent for the eleventh grade (n=34) and 41.24 percent for all grades combined (n=123). Concept b revealed mean correct scores of 37.04 percent for the fifth grade, 32.20 percent for the eighth grade, 41.18 percent for the eleventh grade and 36.81 percent for all grades combined. It was shown with regard to Concept c mean correct scores of 19.63 percent for the fifth grade, 45.08 percent for the eighth grade, 47.06 percent for the eleventh grade and 37.26 percent for all grades combined. Concept d showed mean correct scores of 19.63 percent for the fifth grade, 30.30 percent for the eighth grade, 34.31 percent for the eleventh grade and 28.08 percent for all grades combined. Mean correct scores concerning Concept e showed 23.33 percent correct for the

TABLE II

A SUMMARY OF MEAN CORRECT SCORES CONCERNING
AGRICULTURAL LITERACY BY AGRICULTURAL
CONCEPT AND GRADE LEVEL

Agricultural Concept	Mean Correct Scores			
	5th Grade (n=45)	8th Grade (n=44)	11th Grade (n=34)	All Grades (n=123)
A. Agriculture is the business that provides food, clothing and shelter.	54.07	26.52	43.14	41.24
B. Agriculture is interdependent with the well-being of society in Oklahoma, the United States, and the world.	37.04	32.20	41.18	36.81
C. Agriculture is a dynamic system shaped by research and development.	19.63	45.08	47.06	37.26
D. Agriculture is influenced by government.	19.63	30.30	34.31	28.08
E. Agriculture is interdependent with the environment and uses of natural resources.	23.33	35.61	30.39	29.78
F. Agriculture is historically significant	12.96	27.27	27.45	22.56

fifth grade, 35.61 percent for the eighth grade, 30.39 percent for the eleventh grade and 29.78 percent correct for all grades combined. It was shown through Concept f that the mean correct scores of the fifth grade were 12.96 percent, 27.27 percent for the eighth grade, 27.45 percent for the eleventh grade and a mean score of 22.56 percent correct overall.

The data in Table III showed that males in the fifth grade had a slightly higher mean correct score (28.00%) compared to the females in the same grade. However, females in the eighth grade showed a higher mean correct score (33.43%) compared to the males. While data from the eleventh graders also indicated a higher mean correct score for the females (39.44%) as compared to the males (35.53%).

TABLE III

A SUMMARY OF MEAN CORRECT SCORES, FROM THE
THREE RESPECTIVE GRADES, CONCERNING
AGRICULTURAL LITERACY BY GENDER

Gender	5th Grade	8th Grade	11th Grade
Male	28.00	31.77	35.53
Female	27.50	33.43	39.44

In all three grades, students who resided on farms or ranches showed a higher mean correct score compared to those students who had never lived on a farm or ranch as was indicated in Table IV. On-farm residents' mean scores were 28.44 percent (5th graders) to 42.88 percent (11th graders). Lower mean correct scores of off-farm residents were 26.94 percent to 32.25 percent.

At the eighth grade level, a t-test indicated a significant difference was found between students who resided on farms compared to non-farm residents at the .05 level of probability.

TABLE IV
A SUMMARY OF MEAN CORRECT SCORES CONCERNING
AGRICULTURAL LITERACY OF ON-FARM OR
OFF-FARM RESIDENCE BY GRADE

Grade	On Farm Mean Correct	Off Farm Mean Correct
5th	28.44	26.94
8th	38.47	28.13
11th	42.88	32.25

On the personal data sheet at the end of each instrument, students were to indicate whether or not they were a participant in any agricultural youth organizations (4-H or FFA). Table V revealed higher mean correct scores for participants in the fifth (30.55%) and eighth grade (45.37%) compared to non-participants (27.58% and 31.91% respectively). However, non-participants scored slightly higher (37.37%) above the participants (37.04%) at the eleventh grade level.

TABLE V

A SUMMARY OF MEAN CORRECT SCORES OF STUDENT
RESPONDENTS BY WHETHER OR NOT THEY WERE
PARTICIPANTS IN 4-H OR FFA
YOUTH ORGANIZATIONS

Category	5th Grade (n=45)	8th Grade (n=44)	11th Grade (n=34)
Participant in 4-H and/or FFA Youth Organizations	30.55	45.37	37.04
Non-Participant	27.58	31.91	37.37

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

Agricultural literacy has been defined as the goal of education about agriculture. An agriculturally literate person has a basic understanding of the food and fiber system, its history and current economic, social and environmental significance to all of society.

Since agriculture touches each of us, it is important for tomorrow's leaders and policy makers to understand production practices, international trade and a market oriented agriculture. The production decisions made locally affect markets and profitability in the long term. The quality of life in Luther, Oklahoma is closely related to the agriculture economy.

Test scores in this study and previous research reports by Horn and Koch (6) and Perey (11) revealed that the youth population, as a whole, lack a basic knowledge of agriculture which may impact future decisions concerning policy that could benefit not only agriculture, but the whole society.

The purpose of this chapter was to present a concise summary, and major findings of the study. In addition, as a result of the analysis of data and a thorough inspection of the findings, conclusions and recommendations were made.

Purpose of the Study

The major purpose of this study was to assess the level of agricultural literacy among elementary, junior high and high school students, during the 1990 fall semester, in the Luther Independent School District in rural Oklahoma County.

Objectives of the Study

In order to accomplish the purpose of the study, the following objectives were established:

1. To determine the overall level of agricultural literacy in rural Oklahoma County and specifically, in the Luther Independent School District at the elementary, junior high and high school levels.

2. To determine the level of agricultural literacy among students by grade level and overall in the following six concepts:

Agriculture is...

- a. the business that provides food, clothing and shelter.
- b. interdependent with the well-being of society in Oklahoma, the United States and the world.
- c. a vital system shaped by research and development.
- d. influenced by government.
- e. interdependent with the environment and uses of natural resources.
- f. historically significant to the development of our nation.

3. To determine if significant differences existed between gender, by grade level, and attainment of the concepts of

agricultural literacy.

4. To determine if significant differences existed between students who had or had not lived on a farm/ranch, by grade level, and the attainment of the concepts of agricultural literacy.

5. To determine if significant differences existed between students who had or had not participated in 4-H or enrolled in agricultural education, by grade level, and the attainment of the concepts of agricultural literacy.

Population

The population of this study was all fifth, eighth and eleventh grade students in the Luther Independent School District attending school the day the instruments were administered. One Hundred twenty-seven students participated in the study, however, four unusable instruments were deleted.

Rationale and Design of the Study

Low test scores in previous research reports and a low level of a basic knowledge of agriculture, in all phases of the population, had been of great interest to those who were concerned about the future of the agriculture industry.

Since agriculture touches each of us in our daily lives, it is important for tomorrow's leaders and policy makers to obtain a knowledge of agriculture to benefit the society as a whole. Only through the education of our nation's youth, can the industry of agriculture progress.

The instruments used to assess the level of agricultural literacy among students in the Luther Independent School District were modified versions of the instruments which were developed by Horn and Koch (6) at Kansas State University. However, certain questions from the Kansas Study were deleted, and new questions were developed to better assess the students' knowledge of agriculture.

Permission to administer the instruments was obtained by principals and teachers of the fifth, eighth and eleventh grade students.

Classroom teachers who agreed to cooperate were given numbered copies of the assessment instruments (Appendixes C, D and E) and a set of instructions for giving the test (Appendix A). Tests were numbered to compare assessment scores with the variables in the study. The teachers were asked to read written instructions to all pupils so that all responses were solicited in a consistent fashion. The responses to the multiple-choice answer questions and personal information portions of the instrument were made on the instrument itself. The participating teachers gave students the time to complete the assessment instrument. Upon completion of the instruments, the participating teachers called the researcher to pick up all tests, and all instructions.

Descriptive statistics were used to analyze the data collected. In addition, the two-tailed t-test was employed to make comparisons between groups and determine levels of significance. The "Level" categories of literacy were arbitrarily chosen, but were consistent with previous agricultural literacy assessment studies.

Major Findings of the Study

In order to clarify the major findings of this study, the following subheadings were established:

1. Levels of Agricultural Knowledge
2. An Assessment of Agricultural Literacy by Concept
3. An Assessment of Agricultural Literacy by Gender
4. An Assessment of Agricultural Literacy by Students' Residence
5. An Assessment of Agricultural Literacy by Students' Participation in Agricultural Youth Organizations

Levels of Agricultural Knowledge

In reviewing the findings of this study, the overall mean correct score (32.62%) was well into the "Low" level category of agricultural literacy. The eighth grade's mean correct score (32.83) was very close to the overall mean correct score. There was also a very broad range of scores from 2.78 percent to 86.11 percent.

An Assessment of Agricultural Literacy by Concept

The level of agricultural literacy broken down into the six agricultural concepts revealed that students have more knowledge of the concept that "Agriculture is the business that provides food, clothing and shelter" (44.24%), but they have little or no knowledge of the historical significance of agriculture to the development of

our nation, as indicated by an overall mean correct score of 22.56 percent.

An Assessment of Agricultural Literacy by Gender

Although the differences of the mean correct scores between males and females were not significant, it was interesting to note that females scored higher than the males in the eighth and eleventh grades.

An Assessment of Agricultural Literacy by Students' Residence

In all three grades, students who had resided on farms showed a higher mean correct score than those students who had never lived on a farm. On-farm residents' mean correct scores were from 28.44 percent (fifth grade) to 42.88 percent (eleventh grade). Off-farm residents' average scores were from 26.94 percent (fifth grade) to 32.25 percent (eleventh grade). At the eighth grade level, a t-test indicated a statistically significant difference at the .05 level of probability.

An Assessment of Agricultural Literacy by Participation in Agricultural Youth Organizations

Mean correct scores revealed in Table V indicated that participants in agricultural youth organizations (4-H and/or FFA) at

the fifth and eighth grade levels were higher (30.55% and 45.37% respectively) than those non-participants (27.58% and 31.91% respectively). However, non-participants at the eleventh grade level scored slightly higher (37.37%) than the participants (37.04%).

Summary Table

Table VI reveals a summary of mean correct scores for all grade levels and indicates comparison scores between males and females, on-farm and off-farm residents, participants and non-participants in agricultural youth organizations and an overall average score for levels of agricultural literacy.

Conclusions

Based on the major findings and interpretation of the data reported by the One-hundred twenty-three student respondents, the following conclusions were drawn:

1. Based on the finding that the mean correct score for all grades combined was 32.62 percent, indicating a "Low" level of agricultural literacy, it was therefore concluded that the fifth, eighth and eleventh grade students in the Luther Independent School District lacked a basic understanding of agriculture.

2. However, it was concluded that according to the agricultural concepts measured in this study, students had a better understanding of "Agriculture as the business which provides food, clothing and shelter".

TABLE VI

**A SUMMARY OF MEAN CORRECT SCORES BY GRADE,
GENDER, RESIDENCE AND PARTICIPATION IN
AGRICULTURAL YOUTH ORGANIZATIONS**

5th Grade	N	Mean Number Correct	Mean Correct Score	Range
Male	25	10.08	28.00	8.33 - 61.11
Female	20	9.90	27.50	13.89 - 58.33
On Farm	25	10.24	28.44	16.67 - 58.33
Off Farm	20	9.70	26.94	8.33 - 61.11
Ag Organi- zation Part- icipant	3	11.00	30.55	25.00 - 38.89
Non-Partic- ipant	42	9.93	27.58	8.33 - 61.11
Overall	45	10.00	27.78	8.33 - 61.11
<u>8th Grade</u>				
Male	16	11.44	31.77	8.33 - 61.11
Female	28	12.04	33.43	8.33 - 58.33
On Farm	20	13.85	38.47	8.33 - 61.11
Off Farm	24	10.13	28.13	8.33 - 55.56
Ag Organi- zation Part- icipant	3	16.33	45.37	36.11 - 55.56
Non-Partic- ipant	41	11.49	31.91	8.33 - 61.11
Overall	44	11.82	32.83	8.33 - 61.11
<u>11th Grade</u>				
Male	19	12.79	35.53	2.78 - 72.22
Female	15	14.20	39.44	2.78 - 86.11
On Farm	16	15.44	42.88	2.78 - 72.22
Off Farm	18	11.61	32.25	8.33 - 86.11
Ag Organi- zation Part- icipant	12	13.33	37.04	22.22 - 69.44
Non-Partic- ipant	22	13.45	37.37	2.78 - 86.11
Overall	34	13.41	37.25	2.78 - 86.11
<u>All Grades Combined</u>				
Overall	123	11.74	32.62	2.78 - 86.11

3. With regard to gender, it was evident that the female students were as knowledgeable about agriculture as their male counterparts.

4. It was apparent that students who had lived on a farm/ranch had a better understanding of basic agricultural concepts.

5. With regard to participation in agricultural youth organizations(4-H and/or FFA), it was concluded that the participants lacked a basic understanding of agriculture.

Recommendations

Based on the findings and conclusions of this study, the researcher presents the following recommendations;

1. Programs such as Ag in the Classroom should be incorporated into the Luther Independent School District's curriculum.

2. A philosophic point dictates that since most students had female elementary teachers as role models, it is reasonable to assume that females directing agricultural activities would encourage potential female aspirants to consider agriculture as a career option.

3. Curriculum writers, teachers, supervisors and extension specialists should emphasize the need for assisting all students to develop a better understanding and knowledge base concerning food and agricultural policy, the environment and the significance of the historical development of agriculture in this country.

4. Efforts of agricultural youth organizations should be directed toward achieving a higher level of understanding

among their members concerning all phases of agriculture.

Recommendations for Additional Research

The following recommendations are made in regard to additional research. The recommendations are judgements based on having conducted the study and on the examination of the findings of the study.

1. A comprehensive state-wide study involving fifth, eighth and eleventh grade students should be conducted.

2. A study should be conducted to assess the level of knowledge/understanding among college freshmen enrolled in colleges of agriculture.

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APPENDIXES

APPENDIX A

INSTRUCTIONS FOR THE INSTRUMENTS

This survey is being conducted under the guidelines established by Oklahoma State University. By cooperating, you will help the survey administrators find answers to important questions; however, your participation is strictly voluntary. You should omit any questions which you feel invade your privacy or which are otherwise offensive to you. Confidentiality is guaranteed; your name will not be associated with your answers in any public or private report of the results.

Please circle the number of the answer you feel is correct. Please do not guess; if you do not know the answer, circle the number that corresponds to "I don't know".

APPENDIX B

PERSONAL DATA SHEET - ALL INSTRUMENTS

- A. In what year were you born? _____
- B. What grade are you in this year? _____
- C. Where do you live? (Check the one that best describes your current residence)
- _____ 1.lot (one acre or less outside city limits)
 - _____ 2.acreage (1 to 10 acres)
 - _____ 3.farm (more than 10 acres)
 - _____ 4.large city (50,000 or more)
 - _____ 5.medium city (25,000 to 49,999)
 - _____ 6.small city (10,000 to 24,999)
 - _____ 7.large town (2,501 to 9,999)
 - _____ 8.small town (2,500 or less)
- D. Have you ever lived on a farm? _____yes _____no _____
- E. What is your father's occupation? _____
- F. What is your mother's occupation? _____
- G. What grades do you usually receive in school? (Check the most accurate one)
- | | | |
|-------------|-------------|-------------|
| _____ 4.A's | _____ 2.C's | _____ 1.D's |
| _____ 3.B's | | _____ 0.F's |
- H. What is the highest educational level you hope to achieve? (Check one)
- _____ 1.complete high school
 - _____ 2.complete vocational or trade school
 - _____ 3.complete junior/community college
 - _____ 4.complete four-year college
 - _____ 5.complete graduate school (masters/doctorate)
 - _____ 6.complete professional school (medicine, law)
- I. What is your sex? _____male _____female
- J. Are you involved in 4-H or Agricultural Education?
_____yes _____no
- K. Do you plan to enroll in Agricultural Education or become a member of 4-H? _____yes _____no
- L. Where would you like to live as an adult? (Check one)
- _____ 1.lot (1 acre or less outside city limits)
 - _____ 2.acreage (1 to 10 acres)
 - _____ 3.farm (more than 10 acres)
 - _____ 4.large city (50,000 or more)
 - _____ 5.medium city (25,000 to 49,999)
 - _____ 6.small city (10,000 to 24,999)
 - _____ 7.large town (2,501 to 9,999)
 - _____ 8.small town (2,500 or less)

APPENDIX C

FORM I - FIFTH GRADE INSTRUMENT

AGRICULTURE KNOWLEDGE ASSESSMENT INSTRUMENT
FORM I

Underline denotes correct answer.

1. Bread would most likely be made from which of the following?
 1. corn
 2. soybeans
 3. wheat
 4. flax
 5. I don't know

2. Veal is the meat of young -
 1. sheep
 2. chickens
 3. dairy calves
 4. goats
 5. I don't know

3. Which section of the supermarket would you find yogurt, cream cheese and eggnog?
 1. produce
 2. dairy
 3. frozen foods
 4. bakery
 5. I don't know

4. In Oklahoma, wheat is usually planted at what time of year?
 1. spring
 2. summer
 3. fall
 4. winter
 5. I don't know

5. The processing of wheat into flour is called -
 1. grinding
 2. blending
 3. baking
 4. milling
 5. I don't know

6. Pork sausage is made from the meat of -
 1. hogs
 2. cattle
 3. chicken
 4. goats
 5. I don't know

7. Meat is a primary source of -
 1. carbohydrates
 2. protein
 3. calcium
 4. vitamin C
 5. I don't know

8. Milk is an important source of -
 1. carbohydrates
 2. iron
 3. calcium
 4. vitamin C
 5. I don't know

9. Oklahoma ranks in the top ten in which of the following crops?
 1. corn
 2. soybeans
 3. wheat
 4. barley
 5. I don't know

10. Which one of the following food products is not normally imported to the United States?
 1. rice
 2. corn
 3. vanilla
 4. bananas
 5. I don't know

11. Which country imports the most products from the United States?
 1. Mexico
 2. the Netherlands
 3. Iran
 4. Japan
 5. I don't know

12. Most agricultural crops are transported from Oklahoma to other states by -
 1. airplanes
 2. trains
 3. boats
 4. semi-trucks
 5. I don't know

13. Over the past 50 years, the number of farms in the United States has -
 1. increased
 2. stayed about the same
 3. decreased
 4. no government statistics are kept on this
 5. I don't know

14. What adds nutrients to the soil to increase crop yields?
 1. herbicides
 2. fertilizers
 3. terraces
 4. pesticides
 5. I don't know

15. What process kills bacteria in fluids such as milk with heat?
 1. homogenization
 2. gelatinization
 3. pasteurization
 4. germination
 5. I don't know

16. Modern research on wheat has developed varieties that -
 1. are taller in height
 2. do not need to be harvested by combines
 3. produce more bushels per acre
 4. add nitrogen to the soil
 5. I don't know

17. Modern greenhouses have the ability to do all of the following except -
 1. allow plants to be grown throughout the year
 2. produce plants that are free of insects
 3. provide a perfect environment for plants
 4. protect plants in bad weather
 5. I don't know

18. Today's farmers can produce more bushels per acre because of -
 1. improved seed quality
 2. warmer temperatures worldwide
 3. government price supports
 4. more rainfall
 5. I don't know

19. United States Department of Agriculture Food Stamps cannot be used for -
 1. toilet paper
 2. ice cream
 3. milk
 4. bread
 5. I don't know

20. The U.S. Department of Agriculture is responsible for the inspection of sanitation and wholesomeness of -
 1. farm equipment
 2. red meat and poultry
 3. pesticides
 4. vegetable gardens
 5. I don't know

21. Farm foreclosures occur because -
 1. farmers are unable to repay loans
 2. the government wants to decrease the number of farms
 3. there is less demand for farm products
 4. machines have replaced the need for farm workers
 5. I don't know

22. In order to buy more land, a farmer needs to get permission from which of the following?
 1. County Extension Agent
 2. County Commissioner
 3. U.S. Department of Agriculture
 4. none of the above
 5. I don't know

23. The agricultural youth program sponsored by the County Extension Service is -
 1. FFA
 2. Boy Scouts
 3. 4-H
 4. Rodeo Clubs of America
 5. I don't know

24. Why must food processors, by law, list ingredients on the labels of food products?
 1. to inform the buyer on how to cook the product
 2. so the buyer may compare prices of similar products
 3. so the buyers will know how to make the product themselves
 4. to inform the buyer of the exact ingredients in each product
 5. I don't know

25. Most water used for irrigation in Oklahoma comes from -
 1. ponds and lakes
 2. water wells
 3. city water districts
 4. rural water districts
 5. I don't know

26. Which one of the following is not a product of trees?
 1. lemonade
 2. pineapple juice
 3. maple syrup
 4. orange juice
 5. I don't know

27. Insecticides are used by farmers to control -
 1. erosion
 2. fossils
 3. flooding
 4. insects
 5. I don't know

28. Which of the following natural resources would least likely influence agricultural crops?
1. sunshine
 2. air
 3. natural gas
 4. soil
 5. I don't know
29. Erosion of the soil is -
1. soil which crumbles easily
 2. controlled by using lots of fertilizer
 3. the wearing away of the land surface
 4. controlled by allowing cattle to overgraze the land
 5. I don't know
30. Which of the following statements is not true about using pesticides?
1. Pesticides can increase crop yields.
 2. Pesticides can be harmful to plants and animals.
 3. Pesticides are not harmful to humans.
 4. Pesticides can run into rivers and kill fish.
 5. I don't know
31. Which cattle trail went from Mexico to Abilene, Kansas?
1. Chisholm
 2. Independence
 3. Yukon
 4. Westward
 5. I don't know
32. The first rural communities were usually started near -
1. springs and streams for drinking water
 2. transportation such as rivers and railroads
 3. mountain bluffs for protection
 4. the centers of countries
 5. I don't know
33. Compared to farms 100 years ago, a farm today would likely -
1. grow a wider variety of crops
 2. depend on more family labor
 3. be smaller in size
 4. have an owner who does not live on it
 5. I don't know
34. Who invented the cotton gin?
1. John Deere
 2. Eli Whitney
 3. Cyrus McCormick
 4. George Washington Carver
 5. I don't know

35. Which U.S. president was best known for using advanced farming practices?
1. James Madison
 2. George Washington
 3. John Wayne
 4. John Block
 5. I don't know
36. Which U.S. president was a peanut farmer from Georgia?
1. John F. Kennedy
 2. Ronald Reagan
 3. Jimmy Carter
 4. John Adams
 5. I don't know

APPENDIX D

FORM II - EIGHTH GRADE INSTRUMENT

AGRICULTURE KNOWLEDGE ASSESSMENT INSTRUMENT
FORM II

Underline denotes correct answer.

1. In Oklahoma, wheat is usually planted at what time of year?
 1. spring
 2. summer
 3. fall
 3. winter
 5. I don't know

2. The processing of wheat into flour is called -
 1. grinding
 2. blending
 3. baking
 4. milling
 5. I don't know

3. Wheat is a major ingredient in each of the following except -
 1. macaroni
 2. hamburger buns
 3. pizza crust
 4. tortilla chips
 5. I don't know

4. Which set of ingredients would most likely be found in margarine?
 1. skim milk, cultured cream and salt
 2. soybean oil, water, salt and whey
 3. soybean oil, onion, water and egg yolk
 4. bleached flour, water, vegetable oil and salt
 5. I don't know

5. Which sequence of steps is correct for the processing and marketing of bread?
 1. wheat transported to mill, wheat harvested, dough mixed and baked, wheat milled into flour, loaves packaged, loaves trucked to grocery store
 2. wheat harvested, wheat transported to mill, dough mixed and baked, wheat milled into flour, loaves packaged, loaves trucked to grocery store
 3. wheat harvested, wheat transported to mill, dough mixed and baked, loaves trucked to grocery store, loaves packaged, wheat milled into flour
 4. wheat harvested, wheat transported to mill, wheat milled into flour, dough mixed and baked, loaves packaged, loaves trucked to grocery store
 5. I don't know

6. Veal is the meat of young -
 1. sheep
 2. chickens
 3. dairy cattle
 4. goats
 5. I don't know

7. Oklahoma ranks in the top ten states in which of the following?
 1. corn
 2. soybeans
 3. wheat
 4. barley
 5. I don't know

8. Which one of the following products is not normally imported to the United States?
 1. rice
 2. corn
 3. vanilla
 4. bananas
 5. I don't know

9. Which country imports the most agricultural products from the United States?
 1. Mexico
 2. the Netherlands
 3. Iran
 4. Japan
 5. I don't know

10. The "real seal" on packages from the grocery store means that product -
 1. was grown organically
 2. contains genuine dairy products rather than artificial ones
 3. was grown in Oklahoma
 4. has been inspected by a government agency
 5. I don't know

11. A job as a farm machinery dealer is an example of a job in -
 1. farming
 2. production
 3. agribusiness
 4. government
 5. I don't know

12. Sugar, rice and whole wheat cereals are primary sources of -
 1. iron
 2. calcium
 3. protein
 4. carbohydrates
 5. I don't know

13. Over the past 50 years, the number of farms in the United States has -
 1. increased
 2. stayed about the same
 3. decreased
 4. no government statistics are kept on this
 5. I don't know

14. What adds nutrients to the soil to increase crop yields?
 1. herbicides
 2. fertilizers
 3. terraces
 4. pesticides
 5. I don't know

15. What process kills bacteria in fluids such as milk with heat?
 1. homogenization
 2. gelatinization
 3. pasteurization
 4. germination
 5. I don't know

16. A substance or mixture used for destroying or repelling insects, rodents, weeds and brush is known as -
 1. nematodes
 2. fertilizer
 3. pesticides
 4. plant regulators
 5. I don't know

17. Modern research on wheat has developed varieties that -
 1. produce fewer bushels per acre
 2. are taller in height
 3. add nitrogen to the soil
 4. are resistant to certain diseases
 5. I don't know

18. Modern greenhouses have the ability to do all of the following except -
 1. allow plants to be grown throughout the year
 2. produce plants that are free of insects
 3. provide a perfect environment for plants
 4. protect plants in bad weather
 5. I don't know

19. Products such as red meat and poultry are inspected by the -
 1. Food and Drug Administration
 2. United States Department of Agriculture
 3. State Board of Health
 4. Environmental Protection Agency
 5. I don't know

20. Under U.S. laws, processed foods must list ingredients on the label according to -
 1. alphabetical order
 2. descending order of proportion
 3. the most nutritious ingredients listed first
 4. the four food groups
 5. I don't know

21. The program where the federal, state and county governments together fund specialists in each county to help the people with agriculture, home economics, 4-H youth and other projects is which one of the following?
 1. Agricultural Experiment Stations
 2. Social and Rehabilitation Services
 3. Farm Bureau
 4. Cooperative Extension Service
 5. I don't know

22. Which of these congressional Acts helped develop farming in the Midwest by giving a settler up to 160 acres of land in return for his residing on it for five years?
 1. Land Grant
 2. Morrill
 3. Capper-Volstead
 4. Homestead
 5. I don't know

23. Farm foreclosures occur because -
 1. farmers are unable to repay loans
 2. the government wants to decrease the number of farms
 3. there is less demand for food products
 4. machines have replaced the need for farm workers
 5. I don't know

24. In order to buy more land, a farmer needs to get permission from which of the following?
 1. County Extension Agent
 2. County Commissioner
 3. U.S. Department of Agriculture
 4. none of the above
 5. I don't know

25. Erosion of the soil is -
 1. soil which crumbles easily
 2. controlled by using lots of fertilizer
 3. controlled by allowing cattle to overgraze the land
 4. the wearing away of the land surface
 5. I don't know

26. Which of the following statements is not true about using pesticides?
1. Pesticides can increase crop yields.
 2. Pesticides can be harmful to plants and animals.
 3. Pesticides are not harmful to humans.
 4. Pesticides can run into ponds and kill fish.
 5. I don't know
27. Most water used for irrigation in Oklahoma comes from -
1. ponds and lakes
 2. water wells
 3. city water systems
 4. rural water districts
 5. I don't know
28. Which of the following is a practice to control erosion?
1. allowing cattle to overgraze the land
 2. practicing minimum tillage (plowing)
 3. using large amounts of fertilizer
 4. clearing the land of trees and shrubs
 5. I don't know
29. Which of the following intercepts surface run-off water before it picks up enough speed to erode soil to a great extent?
1. waterways
 2. irrigation ditches
 3. terraces
 4. lagoons
 5. I don't know
30. Which layer of soil contains the most organic matter?
1. topsoil
 2. residual soil
 3. parent material
 4. subsoil
 5. I don't know
31. Which cattle trail went from Mexico to Abilene, Kansas?
1. Chisholm
 2. Independence
 3. Yukon
 4. Westward
 5. I don't know
32. The first rural communities were usually started near -
1. springs and streams for drinking water
 2. transportation such as rivers and railroads
 3. mountain bluffs for protection
 4. the center of countries
 5. I don't know

33. What was the function of Eli Whitney's cotton gin?
1. removes the oil from the seed of cotton
 2. processes the cotton into cloth
 3. separates the fibers of the raw cotton from the seed
 4. grinds the cottonseed, which is used in cattle feed and other products
 5. I don't know
34. The number of persons needed to work on U.S. farms has decreased over the past 30 years because -
1. not as many farm products are needed
 2. we import more food products
 3. machines are more efficient
 4. farm labor is too hard for most people
 5. I don't know
35. An agricultural invention of 1831 that greatly improved the ease and speed of harvesting grain was Cyrus McCormick's -
1. plow
 2. tractor
 3. reaper
 4. disk
 5. I don't know
36. In his research at Tuskegee Institute in Alabama, George Washington Carver made cheese, milk, coffee, flour, ink, soap, wood stains, linoleum and insulating boards from which of the following plants?
1. soybeans
 2. peanuts
 3. aloe vera
 4. corn
 5. I don't know

APPENDIX E

FORM III - ELEVENTH GRADE INSTRUMENT

AGRICULTURE KNOWLEDGE ASSESSMENT INSTRUMENT
FORM III

Underline denotes correct answer.

1. Wheat is a major ingredient in each of the following except -
 1. macaroni
 2. hamburger buns
 3. pizza crust
 4. tortilla chips
 5. I don't know

2. Which set of ingredients would most likely be found in margarine ?
 1. skim milk, cultured cream and salt
 2. soybean oil, water, salt and whey
 3. soybean oil, onion, water and egg yolk
 4. bleached flour, water, vegetable oil and salt
 5. I don't know

3. The produce section of the supermarket contains products such as -
 1. yogurt, cheese and eggnog
 2. fresh fruits and vegetables
 3. canned fruits and vegetables
 4. laundry soap, paper towels and toilet paper
 5. I don't know

4. Which sequence of steps is correct for the processing and marketing of bread ?
 1. wheat transported to mill, wheat harvested, dough mixed and baked, wheat milled into flour, loaves packaged, loaves trucked to grocery store
 2. wheat harvested, wheat transported to mill, dough mixed and baked, wheat milled into flour, loaves packaged, loaves trucked to grocery store
 3. wheat harvested, wheat transported to mill, dough mixed and baked, loaves trucked to grocery store, loaves packaged, wheat milled into flour
 4. wheat harvested, wheat transported to mill, wheat milled into flour, dough mixed and baked, loaves packaged, loaves trucked to grocery store
 5. I don't know

5. Veal is the meat of young -
 1. sheep
 2. chickens
 3. dairy calves
 4. goats
 5. I don't know

6. Milling is a process which -
 1. wheat is made into flour
 2. can only be done by machine
 3. is only used on peanuts
 4. is never done in third world countries
 5. I don't know

7. The "real seal" on packages from the grocery store means that product -
 1. was grown organically
 2. contains genuine dairy products rather than artificial ones
 3. was grown in Oklahoma
 4. has been inspected by a government agency
 5. I don't know

8. A job as a farm machinery dealer is an example of a job in -
 1. farming
 2. production
 3. agribusiness
 4. government
 5. I don't know

9. The number one industry in Oklahoma in terms of money received is -
 1. pecans
 2. beef cattle production
 3. swine production
 4. meat processing
 5. I don't know

10. Sugar, rice and whole wheat cereals are primary sources of -
 1. iron
 2. calcium
 3. protein
 4. carbohydrates
 5. I don't know

11. Which crops would be transported overseas by barges?
 1. cereal grains
 2. perishable fruits
 3. fresh vegetables
 4. all of the above
 5. I don't know

12. Which of the following statements is false about farmer cooperatives ?
1. Coops supply farmers with seed, fertilizer and other products.
 2. Coops market farmers' products.
 3. Coops intend to make a "profit" for their members.
 4. The number of coops has been increasing in recent years.
 5. I don't know
13. A substance or mixture used for destroying or repelling insects, rodents, weeds and brush is known as -
1. nematodes
 2. fertilizer
 3. pesticides
 4. plant regulator
 5. I don't know
14. Crop yields have increased over the past 50 years due to
1. warmer temperatures worldwide
 2. more rainfall
 3. improved varieties and pest control
 4. government price supports
 5. I don't know
15. Pasteurization is a process which -
1. kills bacteria in milk by heating
 2. separates fat particles in milk
 3. condensed or evaporated milk is produced
 4. adjusts the butterfat content of milk to meet required standards
 5. I don't know
16. Modern research on wheat has developed varieties that -
1. produce fewer bushels per acre
 2. are taller in height
 3. add nitrogen to the soil
 4. are resistant to certain diseases
 5. I don't know
17. The statement not true about fertilizers is -
1. Fertilizers add nutrients to the soil.
 2. Fertilizers are all man-made products.
 3. Fertilizers can increase crop yields.
 4. Fertilizers can be organic or inorganic material of natural or synthetic origin.
 5. I don't know

18. Modern greenhouses have the ability to do all of the following except -
 1. allow plants to be grown throughout the year
 2. produce plants that are free of insects
 3. provide a perfect environment for plants
 4. protect plants in bad weather
 5. I don't know

19. Products such as red meat and poultry are inspected by the -
 1. Food and Drug Administration
 2. United States Department of Agriculture
 3. State Board of Health
 4. Environmental Protection Agency
 5. I don't know

20. Under U.S. laws, processed foods must list ingredients on the label according to -
 1. alphabetical order
 2. descending order of proportion
 3. the most nutritious ingredients listed first
 4. the four food groups
 5. I don't know

21. The program where federal, state and county governments together fund specialists in each county to help the people with agriculture, home economics, 4-H youth and other projects is which one of the following?
 1. Agricultural Experiment Stations
 2. Social and Rehabilitation Services
 3. Farm Bureau
 4. Cooperative Extension Service
 5. I don't know

22. Which of these Congressional Acts helped develop farming in the Midwest by giving a settler up to 160 acres of land in return for his residing on it for five years?
 1. Land Grant
 2. Morrill
 3. Capper-Volstead
 4. Homestead
 5. I don't know

23. Farm foreclosures occur because -
 1. farmers are unable to repay loans
 2. the government wants to decrease the number of farms
 3. there is less demand for food products
 4. machines have replaced the need for farm workers
 5. I don't know

24. In order to buy more land, a farmer needs to get permission from which of the following?
1. County Extension Agent
 2. County Commissioner
 3. U.S. Department of Agriculture
 4. none of the above
 5. I don't know
25. Most water used for irrigation in Oklahoma comes from -
1. ponds and lakes
 2. underground reservoirs
 3. city water systems
 4. rural water districts
 5. I don't know
26. The major concern of the harvesting of large amounts of forests, worldwide is -
1. soil erosion
 2. the warming of the Earth's surface
 3. the depletion of oxygen in the Earth's atmosphere
 4. the depletion of fossil fuels
 5. I don't know
27. Which of the following is a practice to control erosion?
1. allowing cattle to overgraze the land
 2. practicing minimum tillage (plowing)
 3. using large amounts of fertilizer
 4. clearing the land of trees and shrubs
 5. I don't know
28. A major factor that determines which crops are suitable for planting in specific areas of the United States is-
1. irrigation
 2. type of farm equipment available
 3. government farm programs
 4. temperature (number of frost-free days)
 5. I don't know
29. Which of the following intercepts surface run-off water before it picks up enough speed to erode soil to a great extent?
1. waterways
 2. irrigation ditches
 3. terraces
 4. lagoons
 5. I don't know
30. Which layer of soil contain the most organic matter?
1. topsoil
 2. residual soil
 3. parent material
 4. subsoil
 5. I don't know

31. The first rural communities were usually started near -
1. springs and streams for drinking water
 2. transportation such as rivers and railroads
 3. mountain bluffs for protection
 4. the center of countries
 5. I don't know
32. Why did Texas cattlemen use the Chisholm Trail during 1868-1875?
1. there was plenty of water for cattle along the way
 2. there were towns all along the trail
 3. in order to get the cattle to the railroads for the Eastern markets
 4. to avoid indian attacks
 5. I don't know
33. What was the function of Eli Whitney's cotton gin?
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APPENDIX F

PERMISSION TO UTILIZE QUESTIONNAIRE



**Center for Extended Services
and Studies**

College of Education
126 Bluemont Hall
Manhattan, Kansas 66506
913-532-5886

July 25, 1990

Georganne Williams
Route #1, Box 446
Luther, Oklahoma 73054

Dear Georganne:

Becky Koch has given her permission for the inclusion of any of the instrument questions used in the study of assessing students' knowledge of agriculture conducted in 1986. We understand that appropriate credit will be given for the references.

Your study sounds interesting. We would be interested in obtaining the results when your study is completed. Let me know if I can be of further assistance.

Sincerely,

A handwritten signature in cursive script that reads 'Barbara Havlicek'.

Barbara Havlicek
Director

BH:cs

VITA

Georganne Williams

Candidate for the Degree of

Master of Science

**Thesis: AN ASSESSMENT OF AGRICULTURAL LITERACY AMONG STUDENTS IN
LUTHER, OKLAHOMA**

Major Field: Agricultural Education

Biographical:

**Personal Data: Born in Oklahoma City, Oklahoma, April 21,
1958, the daughter of George J. and Jo Anne Williams.**

**Education: Graduated from Luther High School, Luther,
Oklahoma, in May 1976; received Bachelor of Science Degree
in Agricultural Education from Oklahoma State University
at Stillwater, Oklahoma in July, 1980; completed
requirements for the Master of Science degree at Oklahoma
State University in December, 1990.**

**Professional Experience: Nursery Manager, Sneed Landscaping,
Oklahoma City, 1980-1984; Landscape Crew Supervisor,
Cooper Brothers Construction, Oklahoma City, 1984-1985;
Landscape Crew Supervisor and Customer Relations, Oklahoma
Lawn Care, Edmond, Oklahoma, 1985-1987; Substitute
Teacher, Guthrie High School, Guthrie, Oklahoma, 1988 to
present.**