Summaries of Research and Development in Agricultural Literacy

A Publication of: WCC-106 Western Region Coordinating Committee for Agricultural Literacy

July 1999

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Committee Members

* Dr. Marlow served as the committee's administrator from its beginning until April 1999 when Dr. Cox took over that role.

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Undergraduates in the Department of Agricultural Education at the University of Arizona for their work in helping to compile the contents of this publication.

Bell-Ritz, J., & Lockaby, J. (1996). An assessment of agricultural literacy level of civic leaders. Proceedings of the Fifteenth Annual Western Region Agricultural Education Research Meeting, 15. Moscow, ID.

This research report was designed to establish agricultural literacy levels of civic leaders within a community in a predominant agricultural area. Again, the case was well presented that agricultural literacy was an important issue since this group is considered to be the opinion leaders within a community and in our society.

Within the design, provision was made for comparing relationships between general knowledge, awareness, and local agricultural awareness scores and demographic variables. Demographic variables were selected to control for the usual personal characteristics as well as agricultural background, agricultural courses taken, 4-H/FFA membership, education level, and involvement in raising crops. These variables were important to compare for relationships especially since several suggest potential implications for agricultural education.

An important contribution from the results of this study is that an agricultural literacy level for this particular group was established. The mean scores obtained provided a benchmark against which a similar population studied in the future can be compared. With regard to general knowledge, it was interesting to note that age was the only factor significantly related and negative as well. It was surprising to note that no significant relationship occurred for high school agricultural courses, 4-H/FFA membership, or involvement in raising animals or crops when compared with general knowledge, agricultural awareness, or local agricultural area knowledge. This finding raised questions such as what variables are linked to agricultural literacy or is the construct for measuring agricultural literacy valid? These and other questions deserve further debate and research.

This study provides a valuable contribution in that it establishes a benchmark for agricultural literacy level held by general public civic leaders. It is the first step of many that are needed to answer critical questions. The agricultural education profession desperately need to find answers to these questions before attempting to develop programmatic decisions about agricultural literacy.

Birkenholz, R. J. (1990, July). Expanding our mission: Pre-secondary agriculture. The Agricultural Education Magazine, 63 (1), 12-13.

Educational programs in agriculture have historically focused on career preparation for secondary students. The Smith-Hughes Act (U.S. Congress, 1917) provided funding to support Agricultural Education programs in public secondary schools in the United States. For nearly 50 years, such programs concentrated on preparing students for careers in production agriculture. The Vocational Education Act of 1963 (U.S. Congress, 1963),expanded the mission of Agricultural Education programs to include areas other than production. This change was prompted by changes in society and agriculture. Since then even more significant changes have occurred removing the average citizen even further from the farm.

Expanded Mission

Manny of the issues and problems facing agriculture today are important to more than those persons who are employed by the industry. Food safety, soil conservation, wildlife conservation, and animal welfare are examples of issues which directly affect agriculture but are of serious concern to a broader range of citizens. The question remains, “How can we provide information to the general public which enables then to make informed decisions regarding issues affecting agriculture?” One possible solution is to infuse instruction about agriculture into the public school curriculum. Efforts such as “Agriculture in the Classroom” and “Food for America” have been initiated with varying degrees of success. Ironically, students in schools which lack secondary agricultural programs would likely benefit most from information about agriculture, food, and food production.

The Curriculum

Another alternative solution would involve a structured curriculum at the seventh or eighth grade level. The curriculum may be designed to accommodate a module within an existing course or to encompass an entire quarter, semester, or year-long course. This approach appears to be counterproductive tot he ‘back to basics’ movement which is prevalent in public education today. However, it could be argued that instruction related to an understanding of the critical importance of agriculture, food, and food production is just as ‘basic’ as reading writing and arithmetic.

The Teacher

In addition to the issue of curriculum, the issue of staffing such a course is a major concern. Many schools have utilized secondary agriculture teachers to provide instruction about agriculture at the junior high or middle school level. This situation may tend to reduce the effectiveness of the secondary agricultural education program by limiting the time available for individualized instruction, SAE supervision, and FFA activities. Teachers of agriculture at the pre-secondary level may also be required to take additional course work to become fully certified.

The Goal

Agricultural instruction at the pre-secondary levels should be distinctly different from the instruction provided at the secondary level. Whereas te goal of traditional secondary Agricultural Education programs has been for career preparation, pre-secondary Agricultural Education should be designed to enhance student understanding of the role of agriculture in our lives.

Birkenholz, R. J. (1993). Pilot Study of Agricultural Literacy. Columbia, MO: University of Missouri, Department of Agricultural Education.

This study was conducted to assess the knowledge and perceptions of U.S. citizens regarding agriculture, food, and natural resources. Four groups of respondents provided data representing primarily white Indiana High School students, primarily black Michigan High School students, Rural Missouri Adults, and Urban Missouri Adults. The following statements summarize the major findings of this study:

1. Adults were more knowledgeable and had more positive perceptions of agriculture than high school students.
2. Respondents were most knowledgeable about Natural Resources and least knowledgeable about the Agricultural Policy and Plants in Agriculture.
3. Respondents were most positive about the Natural Resources and least positive about the Agricultural Policy.
4. White respondents were more knowledgeable about Agricultural Literacy than black respondents.
5. There was no difference among the ethnic groups' perceptions of agriculture.
6. Respondents living on farms were more knowledgeable about agriculture than their rural non-farm neighbors, who were more knowledgeable than people in urban areas.
7. Respondents living on farms had more positive perceptions of agriculture than those living in rural or urban areas.
8. Respondents from larger farms were more knowledgeable and positive about agriculture than respondents from smaller farms or not from a farm.
9. Respondents with higher levels of education were more knowledgeable about agriculture than those with less education.
10. Respondents who were more knowledgeable about agriculture also had more positive perceptions of agriculture.
11. Respondents from smaller cities and towns were more knowledgeable about agriculture than those from larger cities.
12. The Urban Missouri Adult group was the most knowledgeable about agriculture and the Michigan High School group was the least knowledgeable about agriculture.
13. Each respondent group had relatively positive perceptions of agriculture.
14. There was no difference in the agricultural knowledge levels of adults from rural Missouri than those from urban Missouri.

The following are the primary recommendations resulting from this study:

1. Elementary and secondary school should integrate instruction about agriculture throughout the curriculum.
2. Agricultural literacy instructional efforts should target inner city minority students.
3. Agricultural literacy programs for adults should be conducted in urban areas utilizing television media.
4. The USDA should develop a National Center for Agricultural Literacy to coordinate agricultural literacy efforts at the national level.
5. Current and future teachers should be provided with the assistance necessary to integrate instruction about agriculture, food & natural resources into their curricula.
6. Undergraduate degree programs in institutions of higher education in the U.S. should include instruction about the significance of agriculture, food, and natural resources as a component of general education degree requirements for all students.
7. A National Conference on Agricultural Literacy should be planned and conducted to increase the awareness of the agricultural literacy issue.

Brown, W. B., & Stewart, B. R. (1992). Agriculture instruction in middle school. Proceedings of the 19th Annual National Agricultural Education Research Meeting, 19. St. Louis, MO.

The purpose of this study was to assess if middle school students' agricultural knowledge and attitudes differed after being exposed to an agricultural curriculum. The general research question was: Did middle school students' agricultural knowledge and attitude pre test scores differ from the student's agricultural knowledge and attitude post test scores after being exposed to varying lengths of agricultural instruction?
More specific questions addressed by the study were:

1. Did the middle school students' agricultural knowledge pre-test scores differ from post test scores?
2. Did the middle school students' agricultural attitude pre-test scores differ form post-test scores?
3. Did middle school students' agricultural knowledge pre-test scores differ from the post-test scores in relation tot he various lengths of agricultural instruction?
4. Did the middle school students' agricultural attitude pre-test scores differ from the post-test scores in relation to the various lengths of agricultural instruction?

This study was conducted as a single group pre-test, post-test quasi-experimental design. The population for this study consisted of all students in Missouri middle schools which were taught the Exploring Agriculture in America curriculum. Each school received all of the testing materials along with instructions. These tests were administered before the first day of instruction and then following the completion of the 6, 9, or 18 weeks of agricultural instruction.
The following conclusions were drawn concerning the effectiveness of instruction about agriculture in the middle school. (a) There is a change in the agricultural knowledge and agricultural attitude of the students after they receive instruction about agriculture. (b) The length of time middle school students receive agricultural instruction between 6 and 18 weeks does not affect the change in agricultural knowledge or attitude. The finding that there was not a strong ($r = .126$) significant relationship between that agricultural knowledge and the agricultural attitude of the middle school students indicated that although the students may have a good knowledge of agriculture, they may not necessarily have a positive attitude towards the subject. Conversely, they may have a favorable attitude towards agriculture but may not posses a good understanding or knowledge of the subject. The results of this study indicate that there can be an improvement in the agricultural attitude of middle school students through instruction about agriculture. This age group of students represents an important educational stage for developing an increased understanding and appreciation about agriculture. Those persons interested in increasing the agricultural literacy of the general population should continue promoting the teaching about agriculture.

Byrum, W. D., & Elliot, J. F. (1994). Homeowner's attitudes about the uses of lawn chemicals. Proceedings of the 21st Annual National Agricultural Education Research Meeting, 21. Dallas, TX.

Purpose and Objectives

The purpose of this study was to measure the attitudes of homeowners to determine how they feel and what they think about lawn chemicals. Specific objectives of the study were to:

1. Determine homeowners attitudes about lawn care.
2. Determine relationships between homeowners' attitudes on lawn chemicals and demographic data.
3. Determine relationships between homeowners' attitudes about proposed restrictions on lawn chemicals and demographic data.
4. Determine which media sources or other sources of information homeowners obtain their lawn chemical information.

The following research hypotheses were used in this study:

1. There are no differences in homeowner attitudes on lawn chemicals when compared with demographic data.
2. There are no differences in homeowner attitudes about proposed restrictions on lawn chemicals when compared with demographic data.

Results and Conclusions

Objective 1

1. Homeowners were undecided (3.04 average on 27 questions) concerning their attitudes toward lawn chemicals.
2. Homeowners disagreed with the statement that, "lawn chemical manufacturers do not sell lawn chemicals which would harm the environment." However, homeowners agreed with the statement that, "a healthy lawn provides a safe area for people in public parks," and , "the benefits of a healthy lawn justify the use of lawn chemicals."
3. Homeowners were undecided (3.28 average on 8 questions) concerning their attitudes about proposed restrictions on lawn chemicals.
4. When homeowners were asked about their attitudes towards proposed restrictions on lawn chemicals they agreed with the statement that, "professional applicators who do lawn chemical spraying should be licensed" and professional applicators should post signs after lawn chemical application until the chemical is dry or 24 hours after the application." However, they disagreed with the statement that "homeowners who do lawn chemical spraying should be licensed".

Objectives 2 and 3

1. No significant differences or important relationships were found for either objective.

Objective 4

1. Eighty-three homeowners indicated that their primary source of information was the newspaper. Eighty-one homeowners indicated that television was their second major source.
2. Eighty-nine respondents indicated that they receive a majority of their information from a lawn and garden store and 42 respondents listed friends as another major source of information.

Cardwell, V. B. (1994, November). Report from Conference on The Role of Scientific Societies in K-16 Food, Fiber, and Environmental Science Education. Abstract of Meeting held September 1994, Greenbelt, MD.

An *ad hoc* committee of fifteen K-16 educators from ten states, and twenty scientists representing twenty professional societies met in Greenbelt, Maryland, to explore the role of scientific societies in food, fiber and environmental science education for grade levels K-16. This meeting was based on the belief that people must be scientifically and agriculturally literate in order to make wise and informed economic and political decisions about the use of renewable resources. The initial objective of this meeting was to explore the desirability and feasibility of a coordinated effort to prepare materials and programs for science education. The initial funding for this activity was provided by the W.K. Kellogg Foundation, The United States Department of Agriculture- ARS and CSRS and each of the participation societies. The group heard reports from representatives of government agencies with significant science education programs and from scientific societies with successful science education initiatives .The group also heard from J. Patrick Jordan, Administrator of the Cooperative State Research Service, and from Dr. Jose Amador, Assistant Secretary Designate for USDA Science Education Programs. Members of the *ad hoc* committee unanimously support the vision that by the year 2005 all professional scientific societies involved in food, agriculture and renewable natural resources will be active and effective participants in the full spectrum of pre-school to post baccalaureate education. The committee recommends the name: Coalition for Food, Agriculture, and Renewable Resources (C-FAR) as an inclusive rubric for ti's members' activities. The *ad hoc* committee recognizes that the main stakeholders involved in creating and supporting an informed citizenry about FAR are: academic and governmental agency administrators, educators, scientists, professional and scientific societies, and policymakers.

Several areas were evaluated: needs identified by K-16 teachers and scientists to enhance science education, needs identified by K-16 teachers to enhance their science and technology capacity, the role of scientific societies, and the role of individual scientists.

The following were the recommendations of the participants of the conference:

1. Establish a Coalition of Scientific Societies with expertise in the Food, Agriculture, Renewable Resources and the Environment (C-FAR) with the proposed mission of the coalition to serve as a forum for collaboration and participation of C-FAR science communities with the education community to support national education goals, to enhance pre-K to post graduate science and technology education to improve the technological, agricultural, and environmental literacy of the U.S. population and the increase awareness about C-FAR related professions.
2. Establish a steering committee to plan next steps for C-FAR
3. All scientific societies to review the NAS-Science Education Standards and to submit a summary of behalf of C-FAR
4. Pursue granting sources to help C-FAR societies meet U.S. science education goals for all Americans. Using our expertise in subject matter areas to conduct teacher workshops, develop teaching kits, expand curriculums, develop master teachers, etc.
5. Establish an electronically accessible list of scientists, their areas of expertise, and nature of activities willing to assist educators.

6. Study the structure and educational services of the American Chemical Society for applicability as a model for C-FAR.

Connors, J., & Elliot, J. (1993). The influence of agriscience and natural resources curriculum on students' science achievement scores. Proceedings of the 47th Annual Central Region Research Conference in Agriculture Education, 47. St. Louis, MO.

Purpose:
Ariscience and natural resources (ANR) programs utilize activity-oriented instructional methods to instruct students in science. However, many parents, educators and administrators do not feel that agriscience and natural resource classes are viable alternatives to more traditional science classes for college-bound students. Is agriscience and natural resources a legitimate science course? Do students who enroll in agrisciece and natural resources classes perform as well on science tests as students who take more traditional science classes? These are a couple of questions that his research study attempted to answer.

Objectives:
1. Determine if there was any difference between students who had agriscience and natural resources courses and those who did not on standardized science achievement tests.
2. Determine the influence of students' demographic characteristics on their science achievement scores.

Procedure:
This study was a pre-experimental study that used a static-group comparison design. The independent variable was the number of science credits that students had completed in science classes including agriscience and natural resources. The dependant variable was achievement of high school students. The population was 156 senior high school students from four Michigan high schools where the schools had completed the restructuring process to offer an Ariscience and Natural Resources program.

Conclusions:
This research found that high school seniors who had agriscience and natural resources classes performed as well as seniors who did not have agriscience and natural resources classes on the science achievement test. The multiple regression, while controlling for extraneous variables such as age, gender, socioeconomic status, and science credits completed by students found no significant differences between students who had ANR classes and those that did not have ANR classes. The regression also determined that high school seniors' overall grade point averages and number of science credits they completed had a direct relationship to their scores on the science achievement test. Forty-three percent of the variance was explained.

Recommendations:
As a result of the findings of this study several recommendations can be made. Local school boards should study the possibility of offering science credit for certain agriscience and natural resources classes that are shown to teach a significant amount of science objectives. State supervisors of agricultural education should also lobby for community colleges and four-year universities to recognize agriscience and natural resources as a science credit when a student applies for admission. Additional studies should be undertaken that include a larger number of students.

Crunkilton, J. R. Agriculture in Elementary School: A Challenge, Blacksburg, VA: Virginia Polytechnic Institute and State University.

If we accept the premise that agricultural education should be taught in the elementary school as it was argued in the January 1973 issue of the Ag Ed Magazine, then careful thought must be given to the manner in which the agricultural topics should be included within the curriculum. Realizing that no single approach may prove to be a panacea for all local educational programs, several concepts have been explored for consideration for the offering of agricultural instruction at the elementary level.

One possibility is a full-time agricultural teacher hired specifically for the elementary grades. This particular approach would permit an agriculture teacher to plan and to implement an innovative and comprehensive education program of agriculture in the elementary grades. This particular teacher could rotate from grade to grade throughout the year, teaching topics relating to agriculture. A full-time teacher could also conduct field trips for individual classes, supplement classroom instruction in the form of team teaching and assist guidance personnel and those responsible for career education instruction by providing up-to-date information.

A major thrust could be launched by the extensive development of materials, lesson guides, and teaching aids which elementary teachers could use in their instructional programs. This approach would permit the elementary teachers to plan and to carry out most of the instructional activities and the local agriculture teachers could serve as consultants to assist and to guide the elementary teachers when appropriate.
Curriculum guides - to assist elementary teachers in planning agricultural instructional topics would provide valuable direction.
Lesson materials - should be based upon the proposed units of instruction identified in the curriculum guides. These lesson materials must be explicit and concise in order that teachers who are unfamiliar with agriculture Could review the materials, and prepare themselves for teaching these agricultural topics.
Teaching Aids - The development of teaching aids relating to the agricultural topics to be taught at the elementary level could help tremendously toward an effective teaching-learning situation in the elementary grades.
Textbook - Another approach would be the development of a textbook for use by the elementary teachers and the students. In 1913, a textbook (Sixty Lessons in Agriculture) was written for 6th, 7th, and 8th graders to help acquaint students with agriculture.
Mini-projects or experiments - The use of these projects could serve as an approach by which students could learn about agriculture, ecology, and careers.
School farm, laboratories, greenhouse and the agricultural classroom - These facilities could be used very well for supplementing classroom instruction. Hosting field trips to these areas would help students visualize the topics under discussion.
Resource People - Involving guest speakers in the classroom setting would help to vary teaching techniques and again the teacher could very effectively cover the occupations in the community.

As career education becomes a greater part of the elementary programs and becomes an established part of all local educational systems, agricultural educators have no choice but to give leadership to the development of the type of agricultural education program which will lead to a meaningful learning experience for all students. Otherwise, no agricultural awareness will exist or at the very best only a futile' attempt will be made by

those who do not have The necessary expertise. Deeds, J. P. (1991). Agricultural literacy-The undefinable goal of agricultural education. Agricultural Education Magazine, 63 (8).

One of my favorite books on goal setting is *If You Don't Know Where You Are Going You'll Probably End Up Some Place Else*, by David Campbell (1974). As I worked on editing this issue on "agricultural literacy", I was struck by the idea that this may very well be our problem in agricultural education. We do not have a clear definition of agricultural literacy, so, we don't know where we are going.

Education about agriculture
Agricultural literacy is mandated in *The Strategic Plan for Agricultural Education* released in 1990. Goal 1 is "To update instruction in and expand programs about agriculture." The discussion of the goal mentions meaningful programs to educate the public and a basic program for all students in the nation. But we are still wondering what agricultural literacy means.

There was a lot of disagreement on what agricultural literacy really meant and who was responsible for it. Some thought is should be part of general education curriculum and others thought it should be aimed at adults through mass media and speakers. No one could agree on who should be targeted with what information.

How the profession looks at literacy
I turned to the draft tactical plans that were developed during Summit II in St. Louis to see if a clear concept of education about agriculture appeared in the objectives and action steps proposed by the various groups represented. What I found was interesting but by no means were the plans all moving toward the goal in the same way.

Several of the state tactical plan drafts talked about developing units for infusion into general education. Several also emphasized in-service for teachers at all levels. The National Association for Supervisors in Agricultural Education, The American Association of Teacher Educators in Agriculture, The National Young Farmers Education Association, The National Vocational Agriculture Teachers Association, and the National FFA Organization all had a different idea about what agricultural literacy was, and what they should do about it. The exciting fact was that words like linkages, networks, and articulation were found in all of the plans. They all agreed that they should work together, but work together on what?

Dictionary Definition
The most appropriate definition was having knowledge and competency. So agricultural literacy would mean having knowledge and competency in agriculture. The definition of these words isn't enough to direct the work of these organizations. There are still several question that must be answered. Who should get this knowledge? Where should they learn it? What should they learn? When and how should it be taught?

Where do we go from here
Until this profession arrives at a definition of agricultural literacy, we are not likely to be able to set goals and accomplish them. Every organization has laudable goals and good action steps. However, we must focus on a common goal.

Dyer, J. E., Lacey, R., & Osborne, E. W. (1995). Attitudes of University of Illinois College of Agriculture freshmen toward agriculture. Proceedings of the 22nd Annual Agricultural Education Research Meeting, 22. Denver, CO.

The Primary Purpose of this study was to determine the attitudes and intentions of College of Agriculture freshman students at the University of Illinois toward high school and university agriculture programs and the field of agriculture. The following questions were used to guide the study:

1. What were the attitudes of College of Agriculture freshman toward the field of agriculture?
2. What were the attitudes of College of Agriculture students toward their major area of study?
3. What was the influences of high school agriculture program experiences of the attitudes of students who are now pursuing agricultural majors?

The study used a descriptive survey design. The sample, target, and accessible populations were all 1994-95 University of Illinois College of Agricultural freshmen (N=495). Since all freshmen students must enroll in an introductory agriculture course, the class rosters served as the population frame. The entire population in attendance was surveyed. Instruments were administered by Teaching Assistants during the final week of Fall 1994 semester. A total of 324 (65.5%) usable instruments were collected. A two-part questionnaire specific to the questions addressed by the study was developed by the researchers and reviewed for content and face validity by a panel of experts from the University of Illinois College of Agriculture staff. Part I of the instrument contained demographic information, closed-ended, and partially closed-ended items. Part II identified attitudes of students toward the field of agriculture.

Conclusions:

1. A high percentage of College of Agriculture freshmen do not plan to complete their undergraduate degree in the College. Furthermore, for those students without high school agriculture course work, this percentage is even higher (nearly 50%).
2. The number of students enrolling in the College of Agriculture at the University of Illinois who have completed high school agriculture courses, who have farm backgrounds, or who have experience in agriculture represent a clear minority of those freshmen enrolling in the College.
3. Students who have completed high school agriculture courses, and those who were FFA and/or 4-H members, are much more likely to complete a degree in the College of Agriculture than are freshmen who have not had those experiences.
4. College of Agriculture freshmen view agriculture as being both scientific and technical, and view high school agriculture courses as being good preparation for college.
5. College of Agriculture freshmen who completed high school agriculture programs have more positive attitudes toward university agriculture programs, high school agriculture programs, and agriculture as a career than to do freshmen with no high school agriculture courses.

Dyer, J. E., & Osborne, E. W. (1995). A factor analysis of attitudes of Illinois guidance counselors toward agriculture programs. Proceedings of the 22nd Annual National Agricultural Education Research Meeting, 22. Denver CO.

The primary purpose of this study was to determine the attitudes of Illinois guidance counselors toward agriculture and science education programs. A secondary purpose was to investigate the relationships of guidance counselor attitudes and selected demographic variables. Specifically, the study addressed the following research questions:

1. What were the attitudes of Illinois guidance counselors toward agricultural and science education programs?
2. What was the influence of applied science in agriculture courses on guidance counselors' attitudes toward agricultural education?
3. What was the relationship between counselors' attitudes about agriculture and the demographic characteristics: gender, age, school size, experience as a counselor, familiarity with course offerings, and background in agriculture?

The study utilized a descriptive survey design. The target and accessible populations consisted of all Illinois high school guidance counselors. Using Krejcie and Morgan's (1970) formula for determining sample size, 316 counselors were randomly sampled. 50 agriculture teachers and 50 principals were selected from participating schools to triangulate the counselors' responses as outlined by Borg and Gall (1989).A five-point Likert-type scale was used for the 50 items which comprised Parts I, II, and III of the instrument, the 16 questions in Part IV were asked in the same manner to assess counselors' attitudes toward agriculture and science program quality. The 11 demographical questions in Part V were close-ended and partially close-ended items. Triangulating instruments contained all but the demographical data. Questionnaire packets were mailed to all participants with two-week and four-week follow-up mailings. Nonresponse error was controlled by contacting 20% of the nonrespondants and comparing their responses and comparing with those already received.

Results obtained from questionnaires mailed to agriculture teachers and principles confirmed that the responses obtained from guidance counselors were indeed their true attitudes and perceptions. Responses obtained from agriculture teachers disagreed with those of counselors in only one area of perceptions: Agriculture Program Quality.
The conclusions of the study were as follows:

1. Illinois guidance counselors' attitudes have become more positive toward agricultural education programs over the past decade.
2. Guidance counselors in Illinois believe agriculture to be a scientific field of study.
3. Counselor attitudes toward agriculture programs are positively influenced by the presence of applied science courses in the agricultural education curriculum.
4. Guidance counselors perceive agriculture programs to be superior in work value to science programs.
5. Female guidance counselors perceive agricultural education programs to be of more value to students than to male counselors.
6. The demographic characteristics of age, paid work experience, high school or college agricultural course work, counselor experience, school size, and teaching experience do not significantly influence counselor attitudes and perceptions toward agriculture program emphasis or the scientific nature of agriculture.
7. Guidance counselors perceive science programs to be of higher quality than agricultural education programs.

Elliot, J. (1999). Food and agricultural awareness of Arizona public school teachers. Proceedings of the Seventeenth Annual Western Region Agricultural Education Research Meeting, 17. Corpus Christi, TX.

The purpose of this study was to determine if attending an agricultural literacy conference improves the agricultural knowledge base and opinion levels of educators. The research questions developed to address the above stated purposes were:

1. Is there a difference between the agricultural knowledge base of educators who attended an agricultural literacy conference and educators who planned to attend the conference but were no shows?
2. Is there a difference between levels of agreement (opinions) toward agricultural issues by educators who attended an agricultural literacy conference and educators who planned to attend the conference but were no shows?
3. What relationships existed among the respondents' knowledge base, opinions and demographics?

Results Research Question 1

1. Grouped knowledge base analysis revealed that more than 15% of the accepting sample responded incorrectly to knowledge inquiries, and that almost 7% were sure of their incorrect responses. Sixty-nine percent of the respondents were sure and correct (see Table 2).
2. A comparative group knowledge base analysis showed that the educators who attended the “Teaching in the World Around Us” conference were statistically higher in correct responses than the no show educators.

Results Research Question 2

3. The grouped analysis for opinion assessment produced a mean of 3.04 on 4-point scale, placing the mean between strongly agree (4) and agree (3). A majority (84.5%) of the respondents felt favorable toward the opinion statements.
4. The educators who attended the “Teaching in the World Around Us” conference were statistically more favorable in their opinions on agriculture than the no show educators.

Results Research Question 3

5. Individuals who raised plants responded to inquiries in the knowledge base portion of the study significantly higher than those with no such experience.
6. There were no significant differences on knowledge and opinion scores between those individuals with previous agricultural education experience and those individuals who reported no previous experience.
7. There were no significant differences on knowledge and opinion scores with the following variables: gender, home location, relatives or friends in farming or agricultural business, FFA and/or 4-H membership and experience raising animals.

Elliot, J. (1999). A prototype three-dimensional model for assessing international agricultural and environmental literacy. Proceedings of the 15th Annual AIAEE Conference, 15. Port of Spain, Trinidad and Tobago.

Knowledge and understanding of agriculture and the environment have been of major concern, especially since the release of "Understanding Agriculture: New Directions for Education." (National Research Council, 1988) The purpose of this project is to implement Phase 2 in continuation of "Identifying and Understanding Consumers' Agricultural and Environmental Issues" by developing a literacy model to assess depth of knowledge and understanding of international issues and to distinguish effective formal and nonformal modes of education. The employment of a three-dimensional model for representing multi-attribute criterion was established by Dr. Charles E. Osgood, linguistic psychologist, in 1957. The purpose of his model was to provide a way by which semantic differentiation of concepts could be physically illustrated, i.e., realistically plotted and represented within a three-dimensional grid system called the semantic space. It is the basic concept of Osgood's three-dimensional model which serves as the archetype for the proposed literacy model. The axes of the proposed model correspond to Osgood's axes.

Levels of Learning

The proposed model employs an hierarchical order of learning levels based upon the version posed by L. H. Newcomb and Marilyn Trefz in 1987. Taking Dr. Benjamin Bloom's Hierarchy of Learning, Newcomb and Trefz assigned nontechnical terminology to the learning levels and collapsed Bloom's Comprehension, Application and Analysis classifications under one order: Processing. The new levels are 1. Evaluating; 2. Creating; 3.Processing; and 4. Remembering.

International Agricultural and Environmental Themes

Since 1988 the state of California has funded and supported public school agricultural literacy programming. This resulted in the establishment of Framework for Agriculture, a literacy strategy for grades K-12, which includes the following five themes:[1] 1. Food and Fiber Systems: Understanding Agriculture; 2. Historical, Cultural, and Geographic Significance; 3. Science: Agricultural-Environmental Interdependence; 4. Business and Economics; and 5. Food, Nutrition, and Health. These themes provide the broad topics under which all international agricultural and environmental issues are to be categorized in the proposed model.

Formal and Nonformal Educational Sources

Beginning in 1976 the W. K. Kellogg Foundation and other agencies encouraged incorporation of education on agriculture, food, and natural resources in the public and higher education curriculum. Recent research has found that student populations **and** other populations of consumers can acquire information through influential nonformal education sources. Such sources include: publications (books, newspapers, magazines, trade journals), audiovisual materials, communications media (radio, television), government agencies (Cooperative Extension, chambers of commerce, etc.), workshops, presentations, resource centers, visitor centers, museums, zoos, gardens, parks, special events, fairs, outreach programs, clubs (FFA, 4-H, hobby, outdoor recreation, etc.). The

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list could easily be extended.

Elliot, J., & Frick, M. J. (1995). Food and agriculture awareness of land grant university education faculty. Proceedings of the 22nd Annual National Agricultural Education Research Meeting, 22. Denver, CO.

The purpose of this study was to determine the agricultural knowledge base and opinion levels of Land Grant University Education faculty. The research questions developed to address the above stated purpose were:

1. What was the agricultural knowledge base of Land Grant University Education faculty?
2. What level of agreement (opinions) toward agricultural issues was held by Land Grant University faculty?
3. What relationships existed among the respondents' knowledge base, opinions and demographics?
4. What are the critical issues related to agriculture?
5. Who is responsible for educating the populace about agriculture?

The research employed a descriptive survey design, using a mail survey technique, and may be described as a descriptive and relational study. An 80-statement instrument was modified from an existing instrument. The target population for this study was College of Education faculty at land grant institutions. Due to time constraints and resource availability it was determined to limit the population to education faculties at only two land grant universities. At one land grant institution (The University of Arizona), agricultural education faculty held appointments within the College of Agriculture, whereas at the other land grant institution (Montana State University), agricultural education faculty held appointments within the College of Education.

Educational Importance of the Study and Recommendations:

1. Education faculty knowledge and opinion levels indicated a good basic knowledge and opinion about agriculture, agricultural issues and who delivers agricultural education.
2. Education faculty did desire agricultural information in order to make accurate assessments about the issues. Effective educational programs need to be developed for that purpose, especially because they viewed themselves as more important that traditional agricultural education programs for educating the populace.
3. Further research is needed to assess the value of participation in 4-H, FFA and other agriculturally related experiences as it relates to overall agricultural literacy.
4. Current formal agricultural education programs, both vocational and non-vocational efforts, should be reevaluated to incorporate content and delivery methods that will increase awareness about agriculture.
5. The results of this study indicate that perhaps the current method of assessing agricultural literacy may need to be reevaluated. In fact, these results lend support to a future study that would establish an agricultural literacy model.

Elliot, J., & Olson, J. (1995) Identifying and understanding Arizona consumers' agricultural and environmental issues. Proceedings from the 14th Annual Western Region Agricultural Education Research Meeting, 14. Phoenix, AZ.

The original mission of the land grant universities, to serve the general public, may be unknown to the general public. This mission could be better fulfilled if an accurate understanding of consumer views on issues was known.

It is important to understand that this project, "Identifying and Understanding Arizona Consumers' Agricultural and Environmental Issues," is a four phase effort to improve the public's understanding of agricultural and environmental issues. The four phases include:

1. Phase 1, reported here, is devoted to identifying agricultural and environmental issues and comparing them with current AES research priorities (NCR-90) and other lists of priorities.
2. Determining and testing an agricultural literacy model will comprise the second phase.
3. The third phase will focus on assessing the levels of knowledge and understanding attitudes that Arizona people have on the agricultural and environmental issues.
4. The final phase will evaluate the effectiveness of educational and other strategies or models designed to improve agricultural and environmental literacy.

Purpose and Objectives

The primary purpose of the study was to identify concerns of Arizona people as they relate to the environment, food production and consumption, the use of Arizona land (forests, state parks, etc.), pollution, and international food trade. The specific objectives are:

1. To identify agricultural and environmental issues that are of concern to the people of Arizona.
2. To ascertain differences and similarities between agricultural and environmental issues identified by consumers and similar issues identified from research.

Results and Conclusions

1. A comparison of the top twenty agricultural and environmental issues between the three-stage (research-identified issues) and four-stage (consumer-identified issues) Delphi participants is shown in the paper.
2. The three-stage Delphi issues more closely resembled issues identified by Cooperative Extension Service (CES), the USDA, commodity groups and the Arizona Department of Agriculture (ADA) due to the initial identification of issues coming from the literature.
3. The four-stage Delphi issues are consumer-identified issues and they differed from issues identified by CES, commodity groups, ADA and the three-stage results (only 11 out of 20 were similar). The four-stage issues tended to be more environmentally focussed.
4. Commodity groups focused on economic issues directly related to production, whereas consumers focused on environmental concerns and education.

Flood, R. A., & Elliot, J. (1994). Agricultural awareness in Arizona. Proceedings of the 21st Annual National Agricultural Education Research Meeting, 21. Dallas, TX.

PURPOSE AND RESEARCH QUESTIONS

The purpose of this study was twofold. First, to collect and assess data related to current knowledge base levels about agriculture possessed by urban community college students in Arizona. Second, to solicit and report current opinions about agriculture held by the same sample of individuals. The research questions developed to address the above stated purposes were as follows:

1. What was the agricultural knowledge base held by urban community college students in the State of Arizona?
2. What level of agreement (opinions) toward agricultural issues was held by urban community college students in the State of Arizona?
3. What relationships, if any, existed among the respondents' knowledge base, opinions and demographics?

RESULTS AND CONCLUSIONS

The following results were determined through the study and should be viewed as generalizable only to the 230 respondents:

Research Question 1

1. Grouped knowledge base analysis revealed that over 30% of the accepting sample responded incorrectly to knowledge inquiries, and that almost 13% were sure of their incorrect response. Less than a third(30.3%) of the respondents were sure and correct.
2. A comparative group knowledge base analysis showed that a majority (55%) of the respondents were not sure of their responses to inquiries about basic agricultural concepts.
3. The function of the Cooperative Extension Service was not understood by the respondents- over 70% were not sure of their responses.

Research Question 2

1. The grouped analysis for opinion assessment produced a mean of 2.56 on a 4-point scale, placing the mean between agree (3) and disagree (2). A majority (54) of the respondents felt favorable toward the opinion statements.
2. Over 80% of the respondents agreed that they need facts about agriculture in order to make informed decisions.
3. **Research Question 3**Caucasians comprised 64.8% of the respondents. They scored significantly higher than non-whites on both the knowledge and opinion sections of the instrument.
4. Individuals who raised plants responded to inquiries in the knowledge base portion of the study significantly higher than those with no such experience.
5. There were no significant differences on knowledge and opinion scores between those individuals with previous agricultural education experience and those individuals who reported no previous experience.
6. There were no significant differences on knowledge and opinion scores with the following variables: gender, home location, relatives or friends in farming or agricultural business, FFA membership, 4-H membership and experience raising animals.

Frick, M .J., Birkenholz, R. J., & Machtmes, K. (1995). Rural and urban adult knowledge and perceptions of agriculture. Journal of Agricultural Education, 36 (2), 44-53.

The Purpose of this piolet study was to assess the agricultural literacy level of rural and urban adults in a mid-western state. Since this study was a pilot project these two subgroups of the United States population were assessed to provide baseline data reflecting the knowledge and perceptions of United States residents regarding agriculture and the food industry. Three objectives were specified for this study as follows:

1. To assess the level of agricultural knowledge among rural and urban adults in a mid-western state
2. To assess the level of agricultural perceptions among rural and urban adults in a mid-western state
3. To Describe the demographic variables of both subgroups that may influence their knowledge or perceptions of agriculture.

A data collecting instrument organized in three sections was developed for this study. The three sections were: a knowledge section, a perceptions sections and a demographics section. In total there were 884 individuals who provided responses which were used for data analysis. The rural adult group consisted of 456 respondents. The urban adult group consisted of 428 respondents.

Conclusions:

1. Both groups of adult respondents were most knowledgeable about the animals concept and least knowledgeable about the Plants in Agriculture concept.
2. Respondents were most positive about the Natural Resources concept and were the least positive about the Agricultural Policy concept. However, Rural adults were also very positive about the animals concept.
3. Respondents living on farms were more knowledgeable about agriculture than their rural non-farm neighbors, who were more knowledgeable than their urban neighbors.
4. Respondents with higher levels of education were more knowledgeable about agriculture than those with less education.
5. Both respondent groups were somewhat knowledgeable about agriculture.
6. Both respondent groups had relatively positive perceptions of agriculture.

Recommendations:

This study provides evidence of the need to further educate the general public regarding the industry which produces and markets the food needed to sustain human life.

Relatively low knowledge concepts means were produced in the areas of Plants in Agriculture, Agricultural Policy, and Agricultural Processing. These areas appear to be target areas for future educational efforts.

Additional emphasis should be directed toward instructional programs in elementary and secondary schools. Educational programs should be provided in larger population centers to meet the needs of those residents.

Frick, M. J., Birkenholz, R. J., & Machtmes, K. (1995). 4-H member knowledge and perception of agriculture. Proceedings of the 21st Annual National Agricultural Education Research Meeting, 21. Dallas, TX.

Purpose and Objectives

The purpose of this study was to assess the level of knowledge about and perceptions towards agriculture in the United States of 4-H club members in a midwestern state. Three objectives were specified for this study as follows: 1) To assess the level of agricultural knowledge among 4-H members; 2) to assess the level of agricultural perceptions among 4-H members; 3) to describe the demographic variables of 4-H members that may influence their agricultural literacy.

Results

Of the 550 respondents, 361 (65.6%) were female and 189 (34.4%) were male. The group primarily consisted of white respondents whereas minorities made up about ten percent of the respondents. Fifty percent of the respondents noted that they were from a farm and 68% indicated that they lived nearest a community with a population under 10,000. Only 14% of the respondents indicated that they were also FFA members. Ninety-four percent of the respondents had been involved in raising animals or pets and 89% indicated that they had been involved in raising plants, gardens or crops. Television was the most common medium used for a news source and only 2% indicated that they had completed 11th or 12th grade.

The first objective was to assess the level of agricultural knowledge among 4-H members. The 4-H members produced a mean knowledge of agriculture score of 23.07 with a standard deviation of 4.96. The second objective was designed to assess the level of agricultural perceptions among 4-H members. The overall mean perception of agriculture score was 80.20 with a standard deviation of 12.88.

Conclusion and Recommendations

The overall mean level of knowledge of agriculture concept areas held by 4-H members is high but varies widely. Although the 4-h members' overall level of knowledge of agriculture is high, responses to particular items by the entire group did not parallel the overall knowledge score. 4-H members were most knowledgeable about the Natural Resources and Marketing of Agricultural Products concept areas, whereas the lowest group knowledge score was the Plant concept area. The overall level of perceptions score is high, although responses to particular items by the entire group did not parellel the overall perception score. The 4-H member group produced lower perception scores for the Natural Resources and Animal Science concept areas, whereas the highest score was in the Policy concept area.

This study provided evidence of the need to further educate a major youth organization regarding the industry which produces and markets the food needed to sustain human life. A study should be conducted to determine 4-H members' interest in the subject areas and topics used in the instrument. Inservice Programs should be developed to assist 4-H youth personnel in their efforts to increase agricultural literacy level of 4-H members. Educators who initiate agricultural literacy programs for 4-H youth should recognize the upsurge in membership of urban 4-H clubs and develop agricultural literacy programs to meet the needs of both rural and urban clientele.

Frick, M. J., Birkenholz, R. J., Gardner, H., & Machtmes, K. (1995). Rural and urban inner-city high school student knowledge and perception of agriculture. Proceedings of the 21st Annual National Agricultural Education Research Meeting, 21. Dallas, TX.

To address the problem of a society which has become increasingly illiterate with each passing generation, there was a need to assess the knowledge and perceptions of United States citizens regarding agriculture, food, and food production. Identifying shortfalls and misconceptions about agriculture is prerequisite to charting an appropriate course of action.

Purpose and Objectives

The purpose of this pilot study was to assess the agricultural literacy level of rural and urban inner-city high school students in the Midwest. Three objectives were specified for this study as follows: a) to assess the level of agricultural knowledge among rural and urban inner-city high school students in the Midwest; b) to assess the level of agricultural perceptions among rural and urban inner-city high school students in the Midwest; c) to describe the variables of both subgroups that may influence their knowledge or perceptions of agriculture.

Results

There were 1121 individuals who provided responses which were used for data analysis. The Rural High School Student group consisted of 668 adult respondents from predominantly rural Indian areas. The Urban Inner-city High School Student group consisted of 453 student respondents from a predominantly urban area of Michigan.

The mean knowledge of agriculture score as 22.77 for the Rural High School Students group compared to mean of 16.95 for the Urban Inner-city High School Students group. It was obvious that the Rural High School Students group produced the highest group mean knowledge score for all seven of the concept areas. The mean perception of agriculture score ranged 83.90 for the Rural High School Students group to 85.79 for the Urban Inner-city High School Students group. Lower perception scores reflected more positive perceptions of agriculture.

Conclusions and Recommendations

Overall, 35 percent of the items in the knowledge section were answered incorrect or don't know by the Rural High School Student respondents. 52.1 percent of the items in the knowledge section were answered incorrect or don't know by the Urban Inner-city High School Student respondents. Overall, respondents had the most positive perception about the Natural Resources concept and were the least positive about the Agricultural Policy concept.

Respondents from smaller cities and towns were found to be more knowledgeable than their counterparts from larger population centers. Therefore, educational programs should be provided in larger population centers to meet the educational needs of those residents regarding agriculture, food, and natural resources. Recognizing the relationship between agricultural knowledge and perceptions, it is hypothesized that programs directed toward the 30 plus percent of the knowledge responses which were incorrect or don't know would result in an even more positive perception of agriculture.

Frick, M. J., Kahler, A. A., & Miller, W. W. (1990). The subject areas and concepts of agricultural literacy. Proceedings of the 1990 National Agricultural Education Research Meeting. Cincinnati, OH.

The fundamental purpose of this study was to develop a document that could provide educators with the concepts about agriculture that every citizens should know. The specific objectives of this study were to identify those subject areas falling within the framework of agricultural literacy, and to identify those agricultural concepts that every citizen should know. Subject areas refers to educational disciplines that are either related to or are part of agriculture. Concepts describes a general idea or notion about agriculture.

Two questionnaires were developed and employed. Questionnaire #1 asked panelists to identify agricultural subject areas. The design of questionnaire #2 was based on the 11 subject areas identified through questionnaire #1. The subject areas identified were returned to panelists for their reaction and for consensus development. The subject areas identified are the following:

1. Agriculture's important relationship with the environment
2. Processing of agricultural products
3. Public agricultural policies
4. Agriculture's important relationship with natural resources
5. Production of animal products
6. Societal significance of agriculture
7. Production of plant products
8. Economic impact of agriculture
9. Marketing of agricultural products
10. Distribution of agricultural products
11. Global significance of agriculture

The following recommendations were derived from the conclusions:

1. The concepts lists should be refined by subject matter specialists and educators interested in incorporating aspects of agriculture into their current curriculum.
2. Subject matter specialists should identify where the concepts can be integrated into the existing curriculum.
3. Instructional materials developed should represent the breadth and scope of the agricultural discipline found in the concepts submitted
4. A document should be developed that illustrates various teaching strategies that can be used to infuse agricultural literacy concepts in a systematic and comprehensive manner throughout K-12 curriculum.
5. The 11 broad agricultural subject areas and their concepts should be useful to secondary agricultural education programs attempting curriculum reform.

Frick, M. J., & Spotanski, D. (1990). Coming to grips with agricultural literacy. The Agricultural Education Magazine, 62 (8).

Before we begin to understand the concept of agricultural literacy, we should begin by investigating the concept of literacy itself. Literacy usually refers to some minimum level of reading and writing skills. In the past, individuals were judged to be literate if they could read and write their own names, whereas those signing their names with an "X" were judged to be illiterate. More recently, the ability to read packages, traffic signs, and a bus schedule has been included in the modem definition of basic literacy.

Functional agricultural literacy does not imply a perfect level of understanding about agriculture, but rather a minimum level. Hom & Vining's 1986 finding that fewer than 30 percent of a sample of Kansas students could give correct answers to basic agriculture questions indicates the magnitude and seriousness of the task before us. Deciding what to teach about agricultural literacy can be a substantial task. Regardless of the subject, implementation of agricultural literacy initiatives demand the emphasis of three major causes: 1) an understanding of the applied processes or methods of agriculture, 2) the basic vocabulary of agricultural terms, and 3) the impact of agriculture on society. No matter what agricultural subject is taught, these three themes must be incorporated to ensure the development of agricultural literacy. Today, the agricultural system and its processes extend beyond production to include the preparation of food and clothing. These processes are better understood than ever before, and, through agricultural research, they have been quantified and controlled. The science of agriculture is positioned in the center of a broader system with the ability to integrate human society with its physical environment. Vocational agriculture is also positioned in the center of the school system and has the ability to integrate students with their physical environment. Teachers can build agricultural literacy by continually identifying and applying the scientific principles involved. Eventually, they learn to evaluate agriculture in terms of a system that affects them personally. With food safety and water quality becoming national concerns, sustainable agriculture has the potential to be introduced in an agricultural literacy program.

The second approach to improving agricultural literacy is that of developing an understanding of basic agricultural terms. Building a student's agricultural vocabulary is an ongoing process that deserves the attention of all agricultural educators. Initially, an assessment of students' familiarity with agricultural terms can be conducted as part of a Food for American Project. Knowing a student's grasp of agricultural terminology can help plan activities aimed at raising a school's agricultural literacy level. The third dimension of agricultural literacy concerns an understanding of the impact of agriculture on society and on the daily life of individuals as consumers and citizens. In fact, agriculture has been a resource base that sustained our society while making a significant contribution to our national economy. Ninety percent of America's population has been non-farm for over 30 years (Douglass, 1985). Ironically, this is due precisely to advancements in agriculture. In the broader view, agriculture impacts the world, but the message of its impact must begin at the local level, where teachers and students can identify the effects of agriculture on a familiar environment. As agricultural educators, we will serve best not as experts, but as facilitators able to apply our techniques to a variety of tasks. Approaching agricultural literacy with an eye to the three major themes outlined in this paper may help facilitate the process of introducing an entire generation to the basic knowledge of our field.

Frick, M.J., & Wilson, D. (1996). Native American high school student knowledge and perception of agriculture. Proceedings of the 23rd Annual National Agricultural Education Research Meeting, 23. Cincinnati, OH.

To address the problem of a society which has become increasingly illiterate (in an agricultural sense) with each passing generation, there was a need to assess the knowledge and perception of United States citizens regarding agriculture, food, and food production. Tribal colleges have recently received land grant status from the United States Department of Agriculture. These new land grant colleges are uniquely situated to address the agricultural needs of the Native American population. Identifying shortfalls and misconceptions about agriculture is prerequisite to charting an appropriate course of action.

Purpose and Objectives

the purpose of this pilot study was to assess the agricultural literacy level of Native Americans in the west. Since this study was a pilot group, this subgroup of the U.S. population was assessed to provide baseline data reflecting the knowledge and perceptions of Native American high school students regarding agriculture and the food industry.

Three objectives were specified for this study as follows:

1. To assess the level of agricultural literacy among Native American high school students.
2. To assess the level of agricultural perceptions among Native American high school students.
3. To describe the demographic variables of Native American high school students that may influence their agricultural literacy.

Demographic Characteristics

The largest tribe was represented by the Sioux with 43% of the respondents. Other tribes represented were Chippewa, Mohican, Navajo, Apache, Cheyenne, Cherokee, and Blackfeet. Only 6% indicated that they were FFA members and 11.5% were 4-H members. Only 14.6% of the respondents had taken an agricultural education course in high school.

Conclusion and Recommendations

The overall level of knowledge of agriculture concepts held by Native American high school students in the study is moderate to high, varying widely. Students were most knowledgeable about natural resources and animals than in the area of plants. The overall perception of agriculture among Native American students was positive but varied widely. This study provides evidence of the need to further educate a population who primarily live near reservations that are devoted, in most cases, to agricultural areas. Inservice programs should be developed to assist educational personnel in their efforts to increase the agricultural literacy levels. With the USDA recently giving tribal colleges land grant status, more agricultural literacy efforts directed toward Native American populations could be centered out of the tribal colleges facilities. Therefore, it is recommended that the USDA investigate the possibility of implementing a national initiative directed toward enhancing the agricultural knowledge of all Native Americans through tribal colleges.

Garton, B. L., Birkenholz, R. J., & Thompson, G. W. (1996). An assessment of an introductory unit of an applied environmental science curriculum. Proceedings of the 23rd Annual National Agricultural Education Research Meeting, 23. Cincinnati, OH.

The National Council for Agricultural Education sponsored a project to develop instructional materials to assist agriculture and science teachers in teaching about the environment. The objective of the Introduction of Environmental Science unit, was to introduce students to the concepts of environmental science, encourage students to be conscious and concerned about the environment in which they live, to recognize the need to conserve the environment and its resources, and to begin to understand the interrelationships between agriculture and the environment. However, after developing the introductory unit, the question arose as to the influence the instructional materials would have on students' attitudes and knowledge of the environment. In addition, how would teachers perceive the content and usability of the instructional materials? Consequently, a field test of the introductory unit was needed to address these questions.

Results/Findings

Student attitudes towards the environment and knowledge of environmental science concepts were assessed prior to and after being taught the content contained in the instructional materials. The student attitudes prior to being taught the instructional materials indicated a relatively positive attitude toward the environment. An analysis of the students' attitudes after receiving the instruction indicated a relatively positive attitude also. There was a statistically significant difference between pretest and posttest scores regarding student attitudes toward the environment and learning about environmental science concepts. There was a gain of nearly four points in achievement, which was found to be significant.

Conclusions

Students who participated in the field test developed more positive attitudes towards the environment and developed a greater knowledge of environmental science concepts. However, little practical difference was found between pretest and posttest attitude scores.

Teachers reported that they experienced time management problems associated with teaching the instructional unit. With regards to the content of the instructional materials, the teachers reported the materials in the unit were needed, up-to-date, technically accurate, and useful. Overall, teachers who participated in the field test were satisfied with the content of the instructional materials.

The environment and its protection has become a major issue facing today's society. Environmental education is needed to enable school age children, the future citizens of our country, to make wise decisions concerning environmental problems and conflicts. It is recommended that the Environmental Education Instructional Materials be made available to agriculture and science teachers through the national Council for Agricultural Educations's professional growth series.

Hall, D. E. (1991, February). Agriculture literacy program: Current status. The Agricultural Education Magazine,63 (8), 6-7.

Having knowledge about agriculture was a rarity. Possessing competencies in agriculture was almost nonexistent. These general statements about United States students were received by most agricultural educators with very little surprise. The National Research Council's Committee on Agricultural Education in Secondary Schools had released their findings after three years of extensive study of agricultural education in America. The agricultural literacy level was extremely low; lower than most had imagined. The committee recommended that "all students should receive at least some systematic instruction about agriculture beginning in kindergarten or first grade" (National Research Council, 1988). Five years after the study, what is the status of organized programs "about agriculture"? Do states currently offer junior high students an opportunity to develop competencies "in agriculture"? Are these junior high students provided opportunities to participate in the FFA? If programs are not currently in place, have plans been made for implementation in the near future? These questions are all pertinent when considering the current status of agriculture literacy.

Early in the summer of 1990, questionnaires were sent to agricultural education leaders in each state to collect data about kindergarten through 8th grade agricultural education programs. These leaders consisted of state supervisors, state FFA executive secretaries or their counter parts. Surveys were received from all 50 states. The research was concerned with the following three aspects: instruction "About Agriculture" defined as consumer education about agriculture, instruction "In Agriculture" defined as career education in agriculture, and FFA involvement by junior high students. State leaders were asked if an organized program was being taught "about agriculture" to any of the grades kindergarten through 8th grade. Thirty-two states (64%) reported programs being conducted in at least one grade level. A complete account of the "about agriculture status for each grade level by states can be bound in Table 1. Of the 18 states reporting no current program, four (22%) indicated that the plan on implementing a program by the 1991-92 school year. Twenty-six (52%) reported having organized programs "in agriculture" being conducted in the seventh and/or eighth grades. A complete list of each states status can be found in Table 2. Of the 24 states indicating no current programs, four (17%) are planning to implement programs by the 1991-92 school year. Twenty-three (46%) of the states offer FFA participation for their 7th and/or 8th grade students. Six (22%) of the states not currently offering FF for junior high students are planning to implement programs by the 1991-92 school year.

In view of the National FFA Constitution (National FFA Organization, 1990), the researcher questions how states without organized programs "In Agriculture"for 7th and 8th graders can legally offer FFA participation for these students. The researchers did not attempt to assess the quality of programs being offered in the various states. The study was merely a survey of the states of agricultural education programs in grades kindergarten through eighth grade. There undoubtedly is a wide range in the quality and types of programs being offered. Further research is recommended in this area.

It is clear that we as a profession have a considerable amount of work to do before all students will be receiving at least some systematic instruction about agriculture beginning in kindergarten or first grade as recommended by the 1988 National Research Council Study.

Harbstreit, S., Martin, R., Riley, J., Persons, E., Shinn, G., Seibel, R., Bishop, D., & Weeks, H. (1993-94). Adult Education In and About Agriculture An AAAE Position Statement.

Since the Morrill Act of 1862, land-grant colleges have contributed to the development and enhancement of the "common person". Educational, research, and extension programs have been conducted to develop and extend information needed to solve agricultural problems. In 1914, the Smith Lever Act enabled the cooperative extension service to diffuse and disseminate useful and practical new knowledge to farmers and others. In 1917, the Smith-Hughes Act provided support for agricultural education programs to train present and prospective farmers. Training has been available mainly to producers, suppliers, and marketing institutions. However, there is an increasing need to provide agricultural information to persons beyond the traditional clientele groups.

Agriculture in the United States is often characterized as being narrowly focused on the production of food and fiber. Producers at the core of the industry have decreased in number with advances in technology. With this trend there appears to be less emphasis on adult education in some agricultural education programs across the USA. There is concern in some states that student teachers may not be involved in adult education activities to any great extent and that teacher educators do not emphasize adult education to the extent they expect it to be conducted.

There have been other trends and changes in the agriculture industry that may have an impact on adult education in agriculture. Consider the fact that the agricultural supply sector has also experienced dramatic changes. Corporate mergers have created multinational conglomerates from what was once an array of more specialized companies focusing on relatively narrow markets, this trend will likely continue. The agricultural marketing sector, which is involved with the processing and distribution of agricultural products, has also undergone considerable changes in recent years. Public knowledge and attitudes about agriculture and agricultural products have changed. Consumer buying habits have altered the types of agricultural products in demand today. Technological changes have had significant impact on all parts of the agriculture industry. And finally, communication technologies have influenced and will continue to influence the information delivery system.

The importance and necessity of lifelong learning as it relates to agriculture cannot be denied. The knowledge explosion in the agricultural industry mandates that all adults must continue to learn about agriculture and put useful information into practice. Educational programs are changing. The actual and potential target audience for agricultural adult education has expanded. Education for farmers is a critical area of need, but others who work in agriculture also have needs related to agricultural education that should be addressed. The USA has more adults between the ages of 25-60 than ever before and they are more highly educated. Agricultural educators should study the appropriate delivery systems, trends, learning styles, and policies that help fill the educational needs of this new clientele group.

The American Association for Agricultural Education supports adult education programs in and about agriculture and encourages expansion of programs to prepare adult educators to conduct such programs. A redefinition of adult education in agriculture and the identification of new clientele groups demands that AAAE seek new approaches, new

models and strategies to serve the growing need for adult education in agriculture.

Harris, Clark, & Birkenholz, R. J. (1996). Agricultural literacy of Missouri secondary school educators. Journal of Agricultural Education, 37 (2).

The purpose of this study was to assess secondary educators' knowledge of and attitude toward agriculture. The population of this study consisted of teachers and administrators in 245 secondary schools in Missouri that offered an Agricultural Education program as part of their curriculum.

The sample consisted of 200 randomly selected schools and a cohort group of educators representing: administration, agriculture teachers, language arts teachers, mathematics teachers, science teachers, and social sciences teachers. Data collection instruments included 35 items to assess respondents' knowledge of agriculture and 35 items to assess their attitude toward agriculture. Usable responses were collected from 616 educators representing 146 schools.

Data analysis revealed that agriculture teachers were the most knowledgeable and had the most positive attitudes towards agriculture. Administrators and Social Sciences teachers had the next highest scores on both the knowledge and attitude portions of the instrument. Science teachers came next. Language arts and mathematics teachers were the least knowledgeable and had the least positive attitude toward agriculture. However, each of the educator groups surveyed were judged to be knowledgeable of and had a positive attitude toward the industry of agriculture.

Based on the findings of this study, it was recommended that pre-service and in-service programs be conducted to promote strategies to integrate agricultural concepts and illustrations into other courses in the secondary school curriculum.

Hawkes, J. E. (1993) A National Census of State Supervisors Reporting Strategic Planning and Agricultural Literacy Initiatives in State Agricultural Education Programs. Doctoral dissertation, Cornell University, Ithaca, NY.

The National Research Council (NRC) report, Understanding Agriculture. New Directions for Education, recommended many changes to the agricultural education profession, based on an extensive review of agricultural education in public schools.

This national census of state supervisors investigates the status of planning for future change in the agricultural education profession since the NRC report in 1988. This study examines the extent of change and types of planning processes being used to facilitate change in agricultural education. The study also explores agricultural literacy initiatives and the degree of concurrence of respondents to the NRC report recommendation relating to agricultural literacy.

Data were collected from state supervisors or the equivalent in all states, using a telephone survey instrument. Statistical analysis of the data included frequency, percentage, means, Chi-square test and Pearson product moment correlation coefficients.

Extensive change occurred in agricultural education since the NRC report and future changes are anticipated. Strategic planning processes were used in 45 percent of the states using planning processes. Elements of strategic planning were used regardless of the planning process employed. No significant relationships were found between the type of planning processes and state agricultural education statistics.

The NRC report and the National Strategic Plan for Agricultural Education influenced states to change. There were many factors affecting planning. Frequently mentioned negative factors included: department of education administration, funding issues, and federal legislation. Frequently mentioned positive factors included: support of agriculture teachers, support of agriculture business and industry, and national initiatives including the NRC report and the National Strategic Plan for Agricultural Education. Factors having the most influence (negative or positive) on planning were: national initiatives, changes in the agriculture industry, decreases in student enrollment, and state education department administration.

Overall, respondents agreed with the NRC recommendation pertaining to agricultural literacy. The agricultural education profession participates in programs to promote agricultural literacy. Formal linkages to promote agricultural literacy existed between agricultural education and elementary, secondary, and post-secondary education.

Howell, K., & White, J. (1996). Agricultural literacy of radio station news reporters in Oklahoma. Proceedings of the 1996 National Agricultural Education Research Meeting, 23. Cincinnati, OH.

The purpose of this study was to determine the agricultural knowledge levels of broadcast news representatives of radio stations in Oklahoma. The following specific objectives were formulated to accomplish this purpose:

1. Determine the demographic characteristics of radio news reporters in Oklahoma.
2. Identify and determine relative levels of agricultural literacy among broadcast news reporters of radio stations in Oklahoma.
3. Determine if a relationship exists in the levels of agricultural literacy between those who have had some form of agricultural education and those who have not.
4. Determine if radio broadcast news reporters feel qualified to report agricultural news and activities.
5. Determine if radio reporters feel a need to report on agricultural news and events.

The population of this study included broadcast news representatives responsible for on-air news at 129 AM/FM radio stations in Oklahoma listed in the Oklahoma Press Guide. 69 radio station news representatives returned usable surveys for a 53.5% response rate. One reporter or other person responsible for the news was targeted to receive a survey at each station. Surveys were designed in two parts. Part one was demographic information. Part two was 30 multiple choice questions.

Conclusions (listed by objective):

1. The typical radio station reporter respondent int his study was a young adult male who grew up in a small town and was reported primarily non-agricultural news.
2. Based on the major findings, it seemed that the representatives/respondents were knowledgeable concerning the basics of agriculture. However, it was apparent that there was little understanding of the technical and policy issues of the industry.
3. Oklahoma radio station reporters were primarily educated in liberal arts with little or no agricultural education. No apparent relationship existed between those respondents with an agricultural background and those without.
4. The typical radio station respondent felt qualified to report agriculture news and events even though they had little or no agricultural background or education.
5. The typical Oklahoma radio station reporter has had the responsibility at some time for agricultural news stories and/or events and felt a need to report agriculture news stories and events to the public.

Recommendations:

1. Radio broadcast reporters should recognize the importance of maintaining a high level of integrity concerning their knowledge of agriculture.
2. A greater effort should be made to seek educational opportunities about the scientific and technical aspects of the industry.
3. Liberal arts programs should include a general agriculture class as a requirement in liberal arts curricula if citizens are to become better informed concerning agricutlure.
4. An increased effort should be made by more radio stations to air agricultural news stories and events. An effort should be made to provide accurate and meaningful information concerning the industry to the public.
5. Radio station program directors should assign staff reporters to cover agriculturally related stories and events.

Igo, C. & Frick, M. (1999). A case study assessment of standard and benchmarks for implementing food and fiber systems literacy. Proceedings of the 18th Annual Western Region Agricultural Education Research Meeting, 18. Corpus Christi, TX.

The purpose of this study was to assess food and fiber knowledge of selected students in kindergarten through eighth grade before and after receiving instruction based upon the Food and Fiber Systems Literacy (FFSL) Framework standards and benchmarks. For the three case studies of this research, the specific objectives included:

1. Assess students' knowledge of Food and Fiber Systems before and after receiving instruction based upon the FFSL Framework.
2. Determine differences by grade grouping (K-1, 2-3, 4-5, 6-8) in student knowledge about agriculture before and after instruction based upon the FFSL Framework.
3. Determine grade grouping differences in student knowledge about agriculture before and after instruction based upon the five thematic areas of the FFSL Framework.
4. Determine if a relationship existed between the differences in student knowledge about agriculture before and after instruction based upon the FFSL framework and the number of teacher reported instructional connections to the framework.

The conclusions were not to be generalized beyond the case studies within this research. Examination and analysis of the major findings for each objective led to the following conclusions:

1. Students at each site had some prior knowledge of Food and Fiber Systems.
2. In each case study, it was possible to increase student knowledge about agriculture by infusing instruction based upon the FSL Framework standards and benchmarks.
3. It was possible to infuse education about agriculture into core academic learning using the FFSL framework's five thematic areas as the guide for instruction.
4. A positive relationship existed between the number of connections teachers made to the FFSL Framework and increases in student knowledge.

Based upon the conclusions and major findings of the research the following recommendations were made:

1. As a means of assessing changes in student knowledge about Food and Fiber Systems, agricultural literacy instructional materials should be linked to the FFSL standards and benchmarks.
2. There is a need for inservice training of teachers at all grade levels to assist them in making relevant connections between core and academic instruction and FFSL.
3. Further investigation is needed to understand how FFSL standards and benchmarks effectively can be infused into departmentalized instruction found in middle, junior and senior high schools

Kuempel, D., & Spivey, W. F. (1990). What a bean can do for you. The Agricultural Education Magazine. 63 (1).

Can you remember back to first grade when the teacher asked everyone to bring a bean to class? Remember going home to mom, searching the pantry for just the right bean; then on the next morning, conjuring up stories of Jack's magic bean on the way to school? In our class, Mrs. Walker carefully helped us place our magic beans in wet paper towels. Each day we checked our beans; childish bets were placed on whose bean would sprout first; and, in a few days, my very own "magic" bean came to life. This simple agricultural experiment, based on applied learning, left a lifelong impression on me. With increased urbanization, the advent of the technological age, and the decline of the American farm, agricultural education has likewise declined. The National Research Council agrees: "Agriculture is too important a topic to be taught only to the relatively small percentage of students considering careers in agriculture and pursuing vocational agriculture studies." The council further states that an "agriculturally literate person's understanding of the food and fiber system includes its history and current economic, social, and environmental significance to all Americans." Enrollment in agriculture programs peaked in the late 1970's and is now declining about one to three percent annually. While the direct agriculture educational involvement of students has declined, the concepts behind agricultural education are as viable today as they ever were and should be expanded not condensed. These concepts include the "hands-on" application approach to learning. This article will deal with the concept of utilizing a vocational horticulture lab as the basis for an integrated curriculum in agricultural education, science, and math in the pre-secondary setting.

Let us first take a look at the current status of pre-secondary agricultural education. In short, it is almost nonexistent, and when it does exist, it is generally a watered down version of the freshman level high school ag course. Virginia is in the final stages of curriculum modification of an existing agriscience education for the middle school, and a noteworthy study was conducted in the Valley Center Middle School in Arizona. Other programs exist on a sporadic basis. I propose that middle schools provide exploratory courses in agricultural education utilizing horticultural science. Instruction is to be enhanced by the use of a greenhouse lab. The major emphasis of the agrisciente program is to provide middle school students with an introduction to agriculture as it relates to horticulture, and to relate horticulture to academic classes such as science, math and technology. Beginning courses may introduce the students to the concepts of plant growth and the component parts of the greenhouse. Other courses may emphasize horticulture in the areas of gardening and commercial ornamental plant production. Environmental concerns may be taken into account with the use of projects to beautify the campus, including the use of interior and exterior landscaping. Technology is introduced with the use of computerized records and plant production using methods such as hydroponics and drip irrigation. Science teachers can articulate with the ag teacher to have a myriad of projects demonstrating Mendelian genetics, growth stages and use of scientific method. Life and health science classes can coordinate with the ag classes to demonstrate food production, nutrition and the importance of plants in our environment. The lab allows the student to apply the traditional lecture and book lessons with projects generated in the lab. By introducing agriculture classes into the middle school and integrating the agriculture teacher into the academic classes, the role of the agriculture teacher is expanded. By use of an integrated program, all students are exposed to agricultural education in a positive and progressive light.

Law, D. A. (1990, March). Implementing agricultural literacy programs. The Agricultural Education Magazine, 62 (9), 5-6, 22.

Agriculture in America is a broad-based growing industry which employs people in virtually every community in the nation. It has played a vital role in the history of the nation and the food and fiber system continues to play a vital role in the nation's economy. Vital to the continued success of this industry, and the nation as a whole, is a well informed literate society with regard to knowledge about agriculture. As special interest groups revolving around issues such as animal rights, pesticide usage, soil and water conservation, and other environmental concerns gain more media and public attention, it becomes even more important that the general public have some background and understanding of not only what agriculture is all about, but of how it affects each person's life on a daily basis.

The Illinois Plan for Agricultural Education was developed to assist administrators and agricultural education instructors as they design new forward looking agricultural education programs which address the challenge of providing opportunities for all students, kindergarten through the twelfth grade, to be exposed to knowledge and concepts about agriculture. The plan helps those responsible for program planning to conceptualize both the role and function of agricultural education in a modem technological society. An agriculturally literate society is one goal of the plan.

Implementation at the Elementary School Phase
The Illinois Plan calls for the agricultural education instructor in school districts with an agricultural program to serve as the resource person who assists elementary school teachers in identifying where and how to incorporate agriculture into their existing courses. Agriculture in the classroom is a joint initiative of USDA and USDE with primary leadership responsibility resting in each state. The goals are to (a) provide for a systematic infusion of agricultural concepts into the basic subject areas of the curriculum, and (b) to provide in-service training to teachers of the basic subject areas in order to provide necessary background information for incorporation of agricultural knowledge into their respective subject areas. Pilot projects were conducted on a variety of age appropriate topics. Elementary students explored areas of agriculture that directly related to current classroom curriculum. Curriculum development is being undertaken by outstanding teacher in the areas of math and science. They are developing kits that address a number of agricultural topics appropriate for grades 4-6.

Implementation at the Middle School/Jr. High Phase
The Illinois Plan provides for the incorporation of agricultural literacy at the middle school level similar to the elementary school phase. There is also a curriculum project working on developing science laboratory exercises to incorporate agricultural concepts.

Implementation at the Secondary Phase
The Illinois Plan provides for agricultural literacy through both vocational education and separate courses to try to reach a broader audience. Core Curriculum Course Sheets have been developed to serve as a framework to build an instructional program in the agricultural literacy area. Consumer education is also targeted by encouraging agriculture teachers to build linkages with those responsible to build agricultural literacy.
These initiatives have been developed and implemented to broaden the number of students exposed to agriculture and help them see the impact it has on their lives.

Lombardi, L., & Malone, B. J. (1990) Agricultural literacy in Montana schools "education about agriculture". The Agricultural Education Magazine, 62 (9).

Agricultural literacy in Montana is delivered primarily by a grassroots voluntary organization known as Agriculture in Montana Schools (AMS). AMS was organized in 1985 to provide a better understanding to students and teachers of the contribution of agriculture to their lives and to the state and national economies. Financial support for AMS is derived from membership dues, donations, grants and a voluntary tax check-off program on the Montana state income tax forms. Members of AMS are representatives of most major agricultural organizations, commodity groups and educators. AMS is endorsed by the State Office of Public Instruction, State Department of Agriculture and the College of Agriculture in Montana State University. Staff from each of these agencies participate in AMS meetings and provide a facility for meetings. AMS network allows for communication with AMS grassroots volunteers strategically placed around the state. Montana has been divided into 15 districts, with a district director responsible for his/her area. Each district director has a group of volunteers in each county, and a contact for each school. AMS relies on these dedicated volunteers to keep our teachers informed about new materials in our AMS Treasure Chest and the contest rules for their students, as well as keeping our Treasure Chests stocked. In order to inform our members, grantors, and grassroots volunteers, a newsletter, "Newsbits," is sent out twice a year. AMS trains and informs its volunteers with a workshop in July of each year. At this time, AMS distributes new Treasure Chest inventories and informs our workers and district directors of new programs and materials.

Agriculture in Montana Schools has a large green wooden box (AMS Treasure Chest constructed by local agriculture education programs) in every school in our state with 20 or more students. It is filled with free, hands-on agricultural materials for the teachers to use. Also, in each school are three teacher's manuals; brown grades K-3, red grades 4-6, yellow grades 7-8. These manuals and materials are for the teacher to use in integrating agriculture into each of the curriculum he/she teaches. This is not an additional course to be added to the curriculum. In order to reach its goal, Agriculture in Montana Schools has a number of programs and contests it offers throughout the year. In January, the AG Day mailing is sent to every school in the state. It contains the contest rules for the year, as well as work sheets and ideas for the teacher to use. AMS has two statewide contests for our Montana students. The first is for K-6 grade students. Our second contest is for 7-10 grade students. AMS has two continuing education instructors who present a 10-hour, one-credit workshop anywhere in the state where 10 or more teachers are interested. In this workshop, teachers learn how to use all of the AMS material in their classrooms. In June, AMS sponsors a free, two-credit* summer workshop for 35 teachers from around the state. In this workshop, teachers not only learn to incorporate AMS materials into their existing curriculum, but they have the opportunity on a university campus to see firsthand the high tech agricultural careers available to our Montana students. All of these activities and contests are developed to make our Montana students and teachers aware of how agriculture effects all aspects of their lives. Our children in Montana need to understand how cotton and cranberries are grown, as well as beef, grain, sugar beets, and honey! Our teachers need to have access to free, exciting, fun to use agriculture materials. In Montana, AMS has become the respected voice and accepted channel to put factual, reliable, educational materials from all areas of agriculture in the hands of our educators. Montana educators are learning they can rely on AMS to provide them with an unbiased composite of agriscience materials they need to make their students "agriculturally

literate."

McBlair, R., & Shelhamer, V. C. (1996). The relationship of agricultural literacy of superintendents, principals, and counselors in four western states to adherence to state guidelines. Proceedings of the 15th Annual Western Region Agricultural Education Research Meeting, 15. Moscow, ID.

It was with a high degree of interest that this research report was reviewed. First, there was much curiosity in the level of agricultural literacy held by superintendents, principals, and counselors. Second, the relationships of literacy level to adherence to state guidelines and student enrollment raised high interest as well. The title of this report suggested an obvious goal that the researcher may have had in conducting this study. It suggests that the results, if favorable may be used to promote agricultural literacy improvement among the groups mentioned in addition to the stated objectives. The theoretical framework presented makes a strong case for the importance of an agricultural literate society. It was well stated that agricultural literacy is of key importance for present and future policyrnakers. Although it can be debated whether the agricultural literacy problem rates the same significance level as nuclear war, it has to rate fairly significant as a problem if one of the goals of the planet is to sustain life over a long period of time.

The results of this study are most interesting, especially since there were both positive and negative correlation's between literacy level and perceptions of adherence to state guidelines. As one reviews the strength of the negative associations and the relatively weak positive associations obtained, it suggests either that increased agricultural literacy held by our school policy makers places them in a better position to be more critical of agricultural education programs or that increased agricultural literacy does not necessarily coincide with understanding of and support for key agricultural education program guidelines.

The following conclusions can only be applied to the population surveyed, and not to the general population. First, a majority of administrators did not attain the necessary background to make informed decisions about agricultural education and FFA and now do not have the proper perception to make choices about whether students should experience agricultural education. This is supported by a mean literacy test score of 69.4 percent, which indicates they have minimal agricultural literacy. Next, there are some moderately to very high positive and negative correlations between administrators' literacy test score means and adherence to state guidelines. The question most frequently and most highly, negatively correlated to administrators' literacy test score means was the question of FFA being an intra-curricular activity. Lastly, there is substantial to very high correlation between administrators' literacy test score means and enrollment in agricultural education.

Probably one of the most significant findings was the strong positive association between counselors' literacy scores and agricultural education enrollment. This result suggests that efforts to increase agricultural literacy of counselors could potentially have a positive impact on agricultural education programs.

One is left in a quandary however, with the negative relationships obtained between literacy scores and adherence to state guidelines. The positive value of this study is that it suggests unanswered questions that require additional research as well as the documented importance of agricultural literacy for school counselors.

Moore, E. A. (1987). The potential for Agriculture in the Classroom as an integral part of agricultural education. Staff Study. East Lansing, MI: Michigan State University.

The purpose of the study was to identify agricultural education teachers who were interested in providing some of the leadership for local "Agriculture in the Classroom" initiatives. The respondents were asked to respond to the following questions: (1) At what level in your school district would you initiate an effort to increase the utilization of agriculture and natural resource concepts and materials to enhance the learning of students? Why this level? (2) What obstacles do you foresee in developing such an effort? and (3) Do you think such an effort would benefit your vocational agriculture program? If so, why? If not, why?

Nearly 40% of the agricultural education teachers responded to the survey as a result of two mailings. Over 95% of the respondents indicated that local Agriculture in the Classroom efforts would benefit their programs for various reasons. Fifty-four percent of the teachers indicated that they would initiate Agriculture in the Classroom efforts at the elementary school level. Twenty-six percent felt the middle-school level would be their target grades while 20% were interested in initiating Agriculture in the Classroom activities at the high school level.

Several conclusions and implications were presented as a result of the study. First of all, there is potential for making Agriculture in the Classroom an integral part of agricultural education in Michigan. However, if such an effort is to be successful, an enormous amount of creative thinking and planning must occur at the local level. Providing release time for agricultural education teachers and other key school personnel must be given a high priority during the early planning stages. Additionally, financial support will have to be secured to implement quality local efforts. In school districts where vocational agriculture student enrollments have significantly decreased, the agricultural education program should be redirected to serve the larger school population. In light of the challenges facing agricultural education and the Governor's Task Force on the Revitalization of Agriculture Through Research and Education, It was also concluded that the timing seemed to be right for redirecting agricultural education in some school districts.

Osborne, E. W., & Dyer, J. E. (1996). Attitudes of Illinois agriscience students and their parents toward agriculture and agricultural education programs. Proceedings of the 23rd Annual National Agricultural Education Research Meeting, 23. Cincinnati, OH.

Purpose and Objectives

The purpose of this study was to describe the attitudes of Illinois secondary agriscience students and their parents towards the agricultural industry and educational programs in agriculture. The following research questions were addressed:

1. What were the attitudes of students enrolled in the Biological Science Applications (BSAA) and their parents towards agriculture as a career field and agricultural technologies?
2. What were the attitudes of Illinois BSAA students and their parents toward secondary agriculture programs?
3. What was the influence of selected demographic variables on the attitudes and perceptions of BSAA students and their parents?

Results

Approximately two-thirds of the participating students were male, and about two-thirds of the responding parents were female. Of the 24.9% of the students who planned to continue working/studying in agriculture, 7.3% indicated that they planned to take a job in agriculture after high school graduation, 5.9% planned to study agriculture at a community college, and 11.7% planned to pursue a four-year degree in agriculture. Another 24.5% were uncertain as to their plans after high school. Students ranked the following as most influential in their career plans: 1st- high school agriculture teacher, 2nd- parents/guardians, 3rd- other teachers, 4th- brother/sister, and 5th- high school counselor.

While 30.1% of the parents had taken a high school agriculture course, only 13.35 had completed a college agriculture course and 4.8% majored in agriculture in college. About half the parents reported having paid work experience in agriculture. As the data indicates, a large majority of both groups felt that they were familiar with the agricultural industry and rated the quality of the SAA courses as good to excellent.

Conclusions

Students enrolled in the BSAA courses and their parents hold positive attitudes toward agricultural technologies and agriculture as a career field. Both groups believe agriculture is a scientific field with numerous career opportunities. However, parents are uncertain as to whether they encourage their son/daughter to pursue a career in agriculture. BSAA students and their parents agree that the quality of the current agriculture program is high, even somewhat higher than the science program, although they believe both programs are of high quality. In addition, students who perceive the BSAA course to be of higher quality have more positive attitudes toward agriculture as a career field and agricultural technologies. The people who exert the most influence on BSAA students' career plans include the agriculture teachers, parents, other teachers, siblings, and guidance counselors. Educators and agricultural industry representatives should continually direct information programs toward these groups in an attempt to strengthen their attitudes toward agriculture. This may enhance efforts to recruit students into the agricultural industry and postsecondary educational programs in agriculture.

Pals, D. A. (1998). Evaluation of the Agriculture in the Classroom curriculum guide as perceived by Idaho teachers. Proceedings of the Seventeenth Western Region Research Meeting, 17. Salt Lake City, UT.

The purpose of this study was to determine the success of the Idaho Agriculture in the Classroom program. Specific objectives were to identify selected personal and professional characteristics of teachers using AITC materials in their classrooms, to determine the extent to which teachers teach about agriculture using materials received at an AITC Level I training workshop or other sources, to identify the type and degree of assistance that teachers would be interested in to teach agriculture-related concepts in their classrooms, to determine if there is a difference in the level of use of the AITC curriculum materials between teachers in schools where an AITC teacher trainer is on staff and schools which do not have an AITC teacher trainer on staff.

This was a descriptive one-shot case study using a survey data collection procedure. The data were collected using a six-part questionnaire. The parts reported in this paper were: Part I contained open-ended questions pertaining to personal and professional characteristics. Part III asked to what extent the teachers had used the units of the Idaho AITC curriculum guide. Part IV asked for a response to the content, organization, and structure of the AITC curriculum guide. Part V asked how teachers used the AITC Curriculum guide or other AITC materials. Part VI asked how teachers could be assisted in integrating agriculture into their curriculum. The population of this study was the nearly 1,800 Idaho teachers who had successfully completed the AITC Level I workshop between the summer of 1988 through the fall of 1996. Sixteen AITC teacher trainers administered the questionnaires and returned them to the researcher by mail. Fourteen teacher trainers completed the process. The 14 AITC teacher trainers returned a total of 149 questionnaires, of which 140 were complete and used in the data analysis.

Slightly over 50 percent of the teachers in the study had taught between 1 and 5 years. Nearly 75 percent, of the teachers were teaching in grades pre-K through 5th grade. Over 65 percent of the units taught by the 128 teachers were in the 27 units in the science core curriculum section of the AITC guide. The 128 teachers reported a mean of nearly 11 units taught. Over 79 percent of the teachers were interested in taking workshops for science credit. They were not interested in taking one-to-two-day, one-week, two-week, non-credit workshops. They did indicate an interest in taking one, two or three credit graduate courses. The teachers were interested in receiving a list of sources of materials in agriculture and consulting with local agriculture teachers for assistance in teaching agriculture. For all five of the core curriculum sections in the AITC guide, there were not statistically significant differences in the number of units taught between teachers in an AITC teacher trainer school compared to teachers in a neighboring school.

The Idaho AITC leadership should emphasize the science in agriculture when revising or developing new AITC curriculum. Further research should be conducted to determine why teachers aren't teaching agriculture in the remaining four core curriculum areas as readily as in the science core area. The Idaho AITC leadership should continue to offer credit workshops as the primary delivery method of agriculture-related materials to teachers. Further research should be conducted to determine the best method for delivering agricultural literacy. A model should be developed to assist interested teachers in networking with the local agriculture teacher.

Parmley, J. D., & Harbstreit, S. R. (1992). Agricultural Education below the high school level from 1785-1920. Manhattan, KS: Department of Secondary Education, Kansas State University.

This research effort was initiated as a part of the authors on-going interest to review and synthesize historical data related to the Agricultural Education profession with special focus on education about agriculture or agricultural literacy.

The investigators sought to identify efforts of early agricultural societies and early school which were designed to address agriculture and/or nature.

The researchers conducted computerized literature searches of education and agriculture data bases, contacted the Agricultural and Rural History Section of the Economic Research Service of the U.S. Department of Agriculture, as well as agricultural societies which existed during the period of study and continue to exist.

The findings indicated that early agricultural societies, such as the Philadelphia Society (now known as the Philadelphia Society for Promoting Agriculture), the New York Agricultural Society, and similar societies in Connecticut, Maine, Maryland, Massachusetts, and Virginia played prominent roles in the establishment of public schools and the teaching of agriculture/nature.

While the earliest schools tended to follow a "classical approach" to curriculum development, later in the period covered by the study, teachers began to view agriculture and nature as valuable examples to enhance the teaching of various subjects. However, reports indicate that teachers stopped short of teaching practices that would enhance agricultural production.

Perritt, D., & Morton, D. (1990). Pre-secondary agriculture: Preparing for the future. The Agricultural Education Magazine, 63 (1).

The bed of my next door neighbor's pickup truck should be enshrined in the Smithsonian as a representative slice of Mid-America. There is seldom a day that passes that a hodgepodge of baseball bats, soccer balls, and basketball equipment cannot be found mixed in with the tools of his trade. He even has a duffel bag full of those little orange pylons that kids run through, dribble around and jump over to improve their agility. Every team member on the Sidekicks even has his own personalized water bottle. It is very evident that all this effort has its rewards. The trophies, t-shirt, and pictures that our little neighbors, Jenna and Aaron bring by the house are without question a very significant part of their young lives. The attitudes developed and the bonds formed from such experiences will, for most of us, last a lifetime.

One of the growing responsibilities that agricultural educators face in the 1990's is to develop, in the public sector, a similar kind of positive association with agriculture. This fact is true not only for students enrolled in our secondary classroom but for all those young impressionable minds in our elementary and middle school classrooms. If we take a lesson from the "little dribblers" we will discover the philosophy: the younger you start them the better they will become. Unfortunately, in most cases, our youngsters in urban and suburban areas receive very little exposure to the real world of agriculture. Agriculture in the Classroom has made significant strides in a number of states, but there are many opportunities and stones yet unturned.

The Agricultural Science teachers at Nacogdoches High School have implemented a plan to increase agricultural awareness in the public schools. The FFA's Food for America program is being utilized as a vehicle to inject agriculture into the social studies and science classrooms at the elementary level. Last fall, 120 fourth graders ere presented a five-day curriculum during their regular class periods. This instruction was, of course, directly keyed to the state adopted list of essential elements for the fourth grade. The difference was that ag students used agricultural examples to assist the teacher in the classroom. Three months following the instructional unit, a review quiz was completed by the fourth grade students. Eighty-nine percent of the students passed. Some investigation reveled that only a few hundred FFA chapters nationwide utilize this program and even fewer actually complete the program.

Secondly, the agricultural science instructors at Nacogdoches are making a concerted effort to develop agricultural awareness in eighth grade students. Educational reform during the mid 1980's pushed many of the traditional ag science students into college preparatory tracks. This exodus of top students required a rethinking of the agricultural science curriculum as well as the methods used to lure students into a quality program. The teachers and administration at NHS persuaded a number of volunteers to develop a videotape aimed at educating eighth grade students and their parents on the merits of the agricultural science program. The comments of a number of parents indicated that they had no conception of the real content contained in the secondary agricultural science program and the FFA. Copies of this tape are now in the hands of over 600 FFA chapters. The lesson to be learned from interaction with elementary and middle school students is that the interest generated and the crop harvested is directly proportional to the cultivation methods used. The opportunities are present for us to make a difference in the way young people perceive agriculture.

Pope, John. (1990). Agricultural literacy: A basic American need. The Agricultural Education Magazine, 62 (9).

The American food and fiber system - one of the greatest success stories known to man. The ability to produce food and materials for human usage is one in which the average American has taken for granted. This attitude has proliferated through the years and when combined with a move from rural communities to more urbanized areas the real success story of American agriculture is lost.

In 1984 the National Council for Vocational and Technical Education in Agriculture in cooperation with the United States Department of Agriculture and the United States Department of Education commissioned a national study on agricultural education in secondary schools. In their report the study committee focused on instruction in and about agriculture. The report defined instruction in agriculture as agricultural education in high schools training and preparing students for agricultural careers. Instruction about agriculture was defined as the concept of agricultural literacy or the understanding of the food and fiber system which includes its history and current economic, social and environmental influences on people. The report published two principal findings as related to agricultural literacy: 1) Most Americans know very little about agriculture, its social and economic significance in the United States and particularly its link to human health and environmental quality. 2) Few systematic education efforts are made to teach or otherwise develop agricultural literacy in students of any age. The report went on to list the following recommendations:

1. All students should receive some systematic instruction about agriculture beginning in kindergarten continuing through 12th grade.
2. State Education leaders, school administrators and school boards should develop and implement a plan to foster instruction about the food and fiber system.
3. Teachers should be encouraged to modify lesson plans to incorporate materials about scientific, economic, and public health aspects of agriculture.
4. Representatives of agribusiness and community leaders should meet with school officials to bring more agriculture into the curriculum.
5. Senior government officials and political leaders in the U.S. Departments of Education and Agriculture must direct efforts to upgrade agricultural literacy.
6. Curriculum development projects funded by the National Science Foundation and U.S. Department of Education should include the development of instructional modules and materials leading to agricultural literacy.
7. National agricultural community and vocational education organizations should develop new links with organizations with a goal of facilitating progress in the teaching of agricultural literacy.

In 1988 Project Food, Land and People was implemented as an effort to provide classrooms to students and teachers to help them better understand the importance and interdependence of food, land and people. Specifically, Project Food, Land and People was to address six basic areas of agriculture for literacy purposes:

1. Basic food production
2. The historical development of agriculture through the years.
3. Agriculture and the environment; industry and natural resource interdependence.
4. Economics
5. Views and perceptions of the interdependence of food, land and people.
6. Decision-making or shaping policy now and for the future.

Specifically, the real need for an agriculturally literate society is knowledge of the impact

the industry, as a whole, has upon our daily lives.

Reed, W. D. (1990, March). Delivering agricultural literacy. The Agricultural Education Magazine, 62 (8), 4.

Implementation plans can be any of many formats. One plan for the implementation of agricultural literacy education programs could be as follows:

Phase I - Determining what agricultural literacy is, its purposes, the need (or lack of need) for it.

Phase 11 - After determining that there exists a need for agricultural literacy, learning how to bring it about.

Phase III - Establishing and conducting programs of agricultural literacy education.

Phase IV - Program evaluation and revision as appropriate.

Phase V - Ongoing program operation with periodic evaluation and adjustment.

The February 1990 theme of THE AGRICULTURAL EDUCATION MAGAZINE was Agricultural Literacy at the Secondary Level. In that issue we were treated to several perspectives of the definition of Agricultural Literacy; its purposes; the need for it; etc. Probably we could view the February 1990 issue as being the culmination of Phase I in the nation-wide implementation of Agricultural Literacy, an extended study which began sometime before the National Study on Agricultural Education in Secondary Schools. It progressed through the release of the report of National Study by the Board on Agriculture of the National Research Council and then for another year or so. We now understand what agricultural literacy is, agree to the need for it, and for the most part, have determined to be a part of the campaign to develop it within the population with which we deal.

The theme of this issue of THE AGRICULTURAL EDUCATION MAGAZINE is "Delivering Agricultural Literacy. " It seeks to launch Phase 11 in the nation-wide implementation of agricultural literacy education programs - discovering how to do it. To that end, we have asked several persons with experience in planning and conducting agricultural literacy education programs at state and local levels to share their experiences with us. We'll read about state education agency plans in three states, a local district approach, an outstanding state program of industry sponsored Agriculture-InThe-Classroom, and other perspectives. Readers are reminded that the May 1989 issue of THE AGRICULTURAL EDUCATION MAGAZINE also had an excellent article which dealt with ideas for delivering agricultural literacy. It was titled Agricultural Education Model and authored by Drs. Cox, McCormick and Miller of the University of Arizona.

If we can accept the Implementation Plan Model outlined at the beginning of this article and can agree that this issue of THE AGRICULTURAL EDUCATION MAGAZINE is the launching of Phase 11 - Learning How to Bring About Agricultural Literacy, then plainly we have some work ahead of us to accomplish the goal. Those who are serious about being part of the solution to agricultural illiteracy are urged to expedite their plans. Perhaps future issues of THE AGRICULTURAL EDUCATION MAGAZINE can be devoted to themes addressing Phases 111, IV, and V of the Implementation Plan.

Perhaps the National Council on Agricultural Education can be persuaded to make full implementation of agricultural literacy education one of its top action priorities.

Russell, E. B., McCraken, J. D., & Miller, W. W. (1990). Position statement on agricultural literacy. The Agricultural Education Magazine, 62 (9).

The role that agriculture plays in the history of the United States, in the quality of life for the nation's citizens, and in the economic well-being of the nation and its states is poorly understood by youth and the general public. The problem of agricultural illiteracy is widespread, having serious ramifications in the arenas of public policy development, development of personnel to serve the broad agricultural industry, and in the education of our people from kindergarten through adult levels. Fewer than 5 % of American high school students are enrolled in vocational agriculture studies, 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. Current levels of agricultural literacy are low due to the relative absence of information about agriculture in public educational programs. Agricultural literacy should include historical understanding, social significance, economic contributions, scientific understanding, and awareness and understanding of agricultural careers.

The following guiding principles are suggested for the development and implementation of agricultural literacy programs. Every citizen of the United States should possess a basic understanding of agriculture. Schools and other agencies of government have a responsibility to educate the citizenry concerning agriculture and its role in American society. Students should be able to apply scientific principles to agricultural applications. Agricultural literacy programs are too broad and pervasive in concept to be implemented through traditional structures of vocational agriculture and state divisions of vocational education. Agricultural literacy programs should be incorporated, insofar as possible, into existing efforts of USDA such as Ag in the Classroom and Cooperative Extension Service programs for youth and adults, state departments of education, and universities. The basic purpose of agricultural literacy programs should be to achieve an awareness and understanding of the significance of agriculture to the lives of all people. To achieve this purpose, the following objectives are suggested:

1. To develop understanding of ethical and environmental issues related to agriculture.
2. To develop the ability to grow and care for plants and animals.
3. To develop understanding of the relationship between agriculture and diet.
4. To develop an appreciation for agriculture's relationship to national and international economic and trade systems.
5. To develop an understanding of issues relating to agricultural policy
6. To develop an awareness of the broad diversity of agricultural careers.

Agricultural literacy programs should be targeted at all youth - particularly school age youth at all grade levels - and adults. Agricultural literacy programs should focus heavily around the content areas suggested in the National Academy of Sciences report, Understanding Agriculture: New Directions for Education (1988). The primary responsibility for agricultural literacy should be placed with the U.S. Department of Agriculture, building on and expanding beyond the Ag in the Classroom program. In order for USDA to provide the necessary leadership, USDA will need to work closely with the U.S. Department of Education and state departments of agriculture and education. Agricultural literacy programs, due to their broad scope, should necessarily be administered within and beyond state departments of education and the U.S. Department of Education. Major USDA programs such as the Cooperative Extension Service, Ag in the Classroom, and the Soil Conservation Service should play key roles.

Ryan, D., & Lockaby, J. (1996). An assessment of agricultural literacy level of city and government leaders. Proceedings of the 15th Annual Western Region Agricultural Educational Research Meeting, 15. Moscow, ID.

In this research report, the authors present the case for the importance of our policy makers to possess a knowledge of agriculture. The basis for this concern is well documented in the theoretical construct. In the purpose and objective, it was recognized that in addition to general knowledge and awareness, it was also important to measure awareness of agriculture in the immediate area as well.

An additional part of the design was to determine if there were relationships among demographic variables and literacy score. Agricultural background, agricultural education, participation in 4-H on FFA, education level, gender and ethnicity were the key variables compared in this particular study. Although the relationship was low, there was a positive relationship between having taken high school agriculture courses and respondents' general knowledge scores. It was noted that a significant relationship between 4-H/FFA members and general knowledge scores did not occur. It seems reasonable to debate whether 4-H members and FFA members are sufficiently homogeneous to combine together for this comparison. When making comparisons on agricultural awareness, neither having taken agriculture courses nor membership in 4-H or FFA were significantly related to respondents' scores. Only the variables age and involvement in raising animals or crops were significantly related.

What was of most interest, considering the agriculture area in which the sample was taken was that no significant relationships were obtained between any of the variables and knowledge of agriculture in the immediate area. Even the variables, completed high school agriculture courses, had been members of 4-H or FFA, or were involved in raising animals or crops were not significantly related to specific agricultural area knowledge scores. Again, this result should stimulate considerable debate.

Agriculture embraces not only those involved in production agriculture, but also all others within the industry and everyone else who partakes of agricultural products. Even philosophers like Socrates, Pestalozzi and Comenius believed that people should learn about plants, animals, and the ways humans use them.

For a body of people to be knowledgeable of agricultural practices they must be agriculturally literate, or educated about agriculture. In order for city and government leaders to make relevant decisions concerning the agriculture industry, they too must be literate in and about agriculture. Agricultural literacy will enable them to guide their constituents into the future with agriculture, rather than the past. Agriculturally literate people would have some knowledge of food and fiber production, processing, marketing and the practical knowledge needed to care for their outdoor environments, which include lawns, gardens, recreational areas, and parks.

Overall, this study has value in that it contributes considerably more knowledge about levels of agriculture literacy and factors that are linked to literacy. However, the primary questions remain to be answered. What benchmark or standard of agricultural literacy should be achieved by the various groups within our society? What is the link between level of agricultural literacy held by our policymakers and quality of their decisions that affect agriculture?

Swortzel, K. A. (1996). Systematic educational efforts teaching about agriculture and the effects on fourth-grade students knowledge of animal agriculture in Ohio. Proceedings of the 23rd Annual National Agricultural Education Research Meeting, 23, 2-5. Cincinnati, OH.

Elementary school students lack knowledge about the importance of agriculture, primarily its social and economic significance and its links to human health and environmental quality. If students are to become literate about the significance and importance of American agriculture, efforts must be made to provide systematic instruction. The Committee on Agricultural Education in Secondary Schools recommended that all students should receive some systematic instruction about agriculture beginning in kindergarten or first grade. What should be the focus of elementary school programs that provide agricultural instruction? In Ohio, efforts have been made to provide instruction to fourth-grade students about the importance of Ohio agriculture.

Purpose and Objectives

The purpose of the study was to assess fourth grade students' knowledge about animal agriculture in Ohio before and after receiving instruction about agriculture by integrating the content of AgVenture Magazine into the core curriculum. Specific objectives of the study were to:

1. Describe fourth grade students on selected demographic characteristics
2. Describe agricultural experiences of fourth grade students who lived on farms
3. Assess fourth grade students' knowledge about animal agriculture on a pretest
4. Assess fourth grade students' knowledge about animal agriculture on a posttes
5. Determine differences between fourth grade students' pretest and posttest scores

Conclusions and Recommendations

Fourth grade students in Ohio have knowledge of the importance of animal agriculture in Ohio. Receiving instruction about agriculture through the integration of the content of AgVenture Magazine into the core curriculum does increase fourth grade students' knowledge about the importance of animal agriculture in Ohio. Significant differences did not exist between the type of school fourth grade students attended and their pretest knowledge scores on the importance of animal agriculture in Ohio. The same is true of the type of community where the students lived.

The results from this study offer hope that worthwhile efforts exist in providing instruction about agriculture, making school-aged students more aware about the importance of agriculture. Other states are encouraged to develop similar efforts to promote instruction about agriculture, if they do not already exist, and evaluate their efforts to see if their efforts make a difference. When designing studies to evaluate the effectiveness of systematic instruction about agriculture, efforts should be taken to include control groups not providing systematic instruction to alleviate threats to validity that may affect the results of the study.

Talbert, B. A. (1996). Attitudes toward agriculture of urban students enrolled in high school agricultural education by gender and ethnicity. Proceedings of the 1996 National Agricultural Education Research Meeting. Cincinnati, OH.

Purposes and Objectives

The purposes of this study was to assess the perceptions towards agriculture of students in an urban agricultural magnet school. The specific objectives of the study were to;

1. Describe selected demographic and situational characteristics of first year agricultural science and business students.
2. Compare these students using the above characteristics on reasons for enrolling, perceived barriers to enrolling, and personal opinions toward agriculture.

The population of this study consisted of all first and second semester agricultural science and business students in an urban magnet school in a Midwestern state during the Spring Semester, 1995. There were 26 first semester students and 28 second semester students. Because the population was so small, a census study was conducted. The students were surveyed using a five-part questionnaire previously used in studies identifying factors influencing minority and nonminority students to enroll in agriculture courses.

Results

Students were classified as minority if they considered themselves to be Black, Native American, Asian-American, or Hispanic and classified as nonminority if they considered themselves to be White. There were 29 minority students and 25 nonminority students. Almost all the students were from urban areas or cities with more than a 50,000 population. One-fourth of the students planned to enter an agricultural career upon high school or college graduation. One-half of the minority students were unsure of their immediate agricultural plans and approximately one-third were unsure of their lifetime agricultural career plans. For nonminority students, 60% were unsure for both immediate and lifetime agricultural career plans. There were no statistically significant relationships between gender, minority, free lunch status, nor 4-H enrollment on the scales.

Conclusion

Despite their non-agricultural backgrounds, one-fourth of the students indicated that they saw themselves in an agricultural career after graduation while almost one-third saw themselves in an agricultural career sometime within their lifetime. In addition, students who saw themselves in an agricultural career were more likely to have a higher opinion of their ability to enter an agricultural occupation. These students were also more likely to view agricultural occupations as diverse.

One conclusion is that negative peer influence can occur when students view other students as not wanting to be involved. Peer pressure can be both a strong positive or negative force. Maybe agriculture teachers can encourage positive peer interactions with students not interested in an agricultural career rather than letting negative influences push those students farther away.

Terry, R., Herring, D .R., & Larke, A. Assistance Needed for Elementary School Teachers in Texas to Implement Programs of Agricultural Literacy. Unpublished Document. College Station, TX: Texas A&M University.

Formal agricultural education has existed in this country since it was first taught to Georgia colonists in 1733 (National Research Council, 1988). From these humble beginnings, the process by which Americans have been taught about the art and science of using renewable resources has expanded and changed many times. During the first 150 years of the development of the United States, the primary means by which people learned about agriculture was from their parents. Fathers taught their sons the practices and knowledge needed to support the family through the production of food and fiber. At this same time, agriculture became a part of the curriculum in many private schools in states such as Maine, New York, and Georgia (Moore, 1987).

The federal government became involved in agricultural education with the passage of the Morrill Act of 1862. This legislation enabled the establishment of an agricultural college in every state. Perhaps the most significant federal legislation involving agricultural education in American public schools was the Smith-Hughes Vocational Education Act of 1917. It established the system of vocational education in agriculture which is common in secondary schools in every state. Under the provisions of this act, agricultural education was given the task of preparing young people to become farmers or farm workers. The most drastic alterations to the vocational agriculture program established under the Smith-Hughes Act came with the passage of the Vocational Education Act of 1963. This legislation broadened the mission of the program to include training for "off-farm" agricultural occupations. While the focus of the program remained vocational in nature, the program prepared students for a wider range of agricultural careers (Moore & Bourne, 1986).

Agricultural education in public schools has undergone many changes during the 73 years since passage of the Smith-Hughes Act, but one thing has remained the same: the primary delivery system for agricultural education is the program of vocational agriculture. Yet, in 1987, only 4.5% of all secondary students were enrolled in programs of vocational agriculture (National Research Council, 1988). Thus, a relatively small number of students in this country receive formal education about our nation's largest industry--agriculture.

In 1985, the National Research Council of the National Academy of Sciences commissioned a study to evaluate and suggest improvements of the system by which Americans learn about agriculture. The Committee on Agricultural Education in Secondary Schools was formed for the purpose of conducting the study.

The committee's findings led it to two primary concerns. First, they suggested that major revisions were needed within vocational agriculture. They found the focus of the programs to be outdated, the clientele to be primarily white males, and a great disparity in the quality of programs (National Research Council, 1988). The second concern of the Committee was that agricultural education must become more than vocational agriculture. One of the major recommendations of the study was that "agricultural literacy" be taught to all students at all grade levels from kindergarten through twelfth grade (National Research Council, 1988). Due, in part, to the work of the Committee, leaders in agricultural education developed a national mission for agricultural education

to include education "in" and "about" agriculture (National Summit, 1988).

Thomson, J. S. (1996). Suburbanites' perceptions about agriculture: The challenge for agricultural education. Proceedings of the 1996 National Agricultural Education Research Meeting. Cincinnati, OH.

Evolving from the current globalized food system to one that incorporates more locally responsive food preferences presents both a challenge and an opportunity for those in agriculture education. Agricultural educators have the potential to contribute significantly to these discussions and to the outcome of the debate regarding a sustainable food system within a region. But first consumers must become both more interested in and knowledgeable about a region's agricultural capacity, thereby strengthening the link among producers and consumers.

Purpose and Objectives

The purpose of this study was to understand how consumers in Southeastern Pennsylvania view themselves in the context of their food system and the importance they place on sustaining regional agriculture. Specific objectives were:

1. To determine consumer produce buying preferences
2. To determine consumer preferences for locally grown produce
3. To determine consumer preference in knowing how produce is grown
4. To document consumer perceptions toward agriculture in the region

Conclusion and Recommendations

This study suggests that many consumers:

1. Are not knowledgeable about the relationship between food and the land; for example, the difference between valuing land for the open space it provides vs. the goods it produces.
2. Lack language to discuss the complex issues associated with a sustainable food system.
3. Express a diversity of perspectives regarding issues related to farming and the food system.
4. Do not hold strongly held opinions about locally grown produce and how such produce is grown
5. Believe their buying practices influence farming in the region and what is available to purchase.

As the public has less firsthand knowledge and experience with an issue, the more likely they are to look to generalized mass media for information about the issue. Media, especially generalized mass media, within a region concerned about the continuing viability of a sustainable food system need to facilitate the dialogue across all sectors of the community. Educators can help, especially those knowledgeable about sustainable food systems. Furthermore, agricultural educators can support K-12 education on sustainable food systems, working to see that such education becomes an integral component of the core curriculum. To maintain a sustainable food system within a region, the public must see beyond the value of open space to the "value-added" for themselves as well as for the grower through an economically viable food system. Public policy alternatives need to be evaluated for their impact on the viability of agriculture in a region.

Thuemmel, W. L. (1989). It's Your World: Learning Activities for Grades 4-6. Amherst, MA: Massachusetts Agriculture in the Classroom, Inc., Funded Project., University of Massachusetts.

The purpose of the project was to develop a set of specific lessons or learning activities in science and nutrition and social studies for Massachusetts elementary teachers, grades 4-6, to further agricultural literacy among their students.

The project was conducted as a result of joint planning by the project director and Massachusetts Agriculture in the Classroom (MAC), Inc. This effort was a sequel to development of the Massachusetts Agriculture in the Classroom Teacher Resource Book by Barbara Garner Koech in 1985. Dr. Koech's pioneering efforts were well appreciated by educators in Massachusetts and acclaimed by Agriculture in the Classroom leaders at the national level. However, after four years and limited teacher training resources, it was decided to update and revamp the Teacher Resource Book by restructuring the learning activities into a more concise and active learning format. It's Your World is the completely revised new edition and contains 39 learning activities.

The project director was assisted by two former elementary teachers who served as project specialists in developing the various learning activities. The lessons focus on agriculture and agricultural products from all geographic regions of Massachusetts and reflect a nationwide trend to include agriculture and agricultural issues in Classroom instruction in a meaningful and integrative way.

The learning activities were designed to minimize the amount of teacher time required to prepare individual lessons. They are active in nature, flexible, and address major concepts in science and nutrition and social studies while creating an awareness of the food and fiber system. All materials were field tested by selected elementary teachers and agricultural industry representatives. The learning activities were printed *and assembled in three-ring binders. Elementary teachers are introduced to the teaching materials through workshops sponsored by MAC, Inc.

Tisdale, J. F. (1991). Needed: Agricultural literacy. The Agricultural Education Magazine, 63 (8), 11.

"I'm tired of hearing that agriculture/farm crisis stuff, it doesn't have anything to do with me; my family lives in town, and I buy all our food from the grocery store." While it seems ridiculous, the statement is similar to sentiment frequently expressed around the country.

Most American families no longer live "on the farm." Farm residents are outnumbered in the general U.S. population by more than 40 to 1. Less than two percent of the population is involved in production agriculture. Almost forgotten is the once common practice for even non-farm households to have a few chickens, a vegetable garden and maybe a cow. The result is a public with little knowledge of the practices of agriculture or the importance of agriculture to the lives of individuals.

In other words, the average John Q. Public is ag-illiterate.

With ever-increasing demands on the education system to produce graduates who are computer-literate, second language-literate and also highly skilled in a specific area, does ag literacy really matter? If America plans to continue feeding her own and millions in other countries, yes, it matters.

For citizens to be minimally educated about agricultural practices is important for the individual and for the industry. An individual must be will informed to make responsible choices whether it be in matters of food and fiber or politics. As fewer people are directly involved in production agriculture, public support of the industry becomes even more important.

Fear of the unknown often leads to needless public alarm. Agriculturally literate people can make personal informed decisions about agriculture related topics such as food safety, genetic engineering and pesticide versus non-pesticide issues. The often highly sensational media coverage of alar-type scares is seen in context by people with a basic knowledge of agriculture. Those without this basic understanding react without reason, frightened for themselves and their families. The resulting damage to the industry is not easily repaired.

Increasing technology and efficiency in farming practices allow Americans to spend less than 15 percent of their disposable income for food that is readily available the year round. This ranks among the lowest in the world. Ag educated consumers realize and appreciate the bargain prices offered by U.S. agriculture for their abundant safe food supply.

Whether education about agriculture is in formal classroom settings, in public forums, by multimedia or a combination of these, it must be done. The what is more important than the where. For the benefit of all and for agriculture in particular, we must become an agriculturally literate people.

Traxler, S. (1990). Why, “Ag in the Classroom?” The Agricultural Education Magazine, 62 (8).

When my mother taught school in the early 1900's, she rode horseback ten miles round trip through fields and farmyards to teach students in every grade, first through eighth. The school year was determined by planting, cultivating and harvesting schedules. At that time, most of our population was involved in farming. The textbooks this young school teacher used to instruct her students were filled with information about agriculture and students were never asked the question, "Where does milk come from?" They all knew, many from first-hand experience milking cows or completing other farm chores before skipping off to school. How times have changed. Just this summer, a class of elementary students visiting a dairy farm watched as the cows were being milked to get an up-close lesson on where milk comes from. One young lad leaned over to another and said, "That may be the way they get their milk, but we still get ours from the carton."
This boy was hard to convince because he, like most youngsters of his generation, had no close ties to the farm. For him, milk originates at the grocery store.

How did we, as a nation, arrive at this stage of agricultural illiteracy? In the 1920's, 30's and 40's, as the farm population shrank and agricultural emphasis decreased in schools, books and educational materials, educators focused on agriculture as an occupational specialty, rather than as an integral part of almost every student's life. Agricultural education was mainly offered to those few students who wanted to make farming their career. During this period, a small nucleus of educators and others persistently pushed for more agriculture in education. They kept interest in agriculture and the environment alive when interest by the public as a whole was declining.

During the 60's and 70's, as experienced agriculture, conservation, and forestry organizations realized the need for quality materials, many excellent films, filmstrips, literature, and classroom aids were financed and produced by businesses, foundations, nonprofit groups and associations, as well as state and federal agencies. However, there was no coordination, hence there was little exchange of ideas among the groups.
But considering the importance of agriculture to our national well being, and realizing the population was increasingly further removed from the farm, the U.S. Department of Agriculture (USDA) invited representatives of the agriculture, government, and education sectors to a meeting in Washington, D.C. to discuss the lack of agricultural literacy and to determine a course of action to correct the deficiency. This meeting marked the start of Ag in the Classroom at the national level.

A national task force was selected from this group to guide the program. The task force wisely decided that the program maintain its grass roots approach since education decisions are made at the state and local levels. They also decided that the USDA would serve as coordinator and be the communications link among the states. As a result, AITC has the endorsement of all former Secretaries of Agriculture, the National Association of State Departments of Agriculture, the National Conference of State Legislatures, most of the governors of the states, and the major agricultural organizations and commodity groups. Each state approaches Ag in the Classroom from the basis of its own needs and resources and is responsible for organization, funding, public outreach, materials development and teacher training. There is now an AITC effort in every state.

Vestal, T.A., & Briers, G.E. (1999). Knowledge, attitudes, and perceptions of journalists for newspapers in metropolitan markets in the United States regarding food biotechnology. Proceedings of the 18th Annual Western Region Agricultural Education Research Meeting, 18. Corpus Christi, TX

The purposes of this study were to determine the knowledge of and attitudes/ perceptions of journalists toward food biotechnology. The research objectives were to: 1) investigate and determine the knowledge, attitudes and perceptions held by metropolitan journalists regarding food biotechnology; and 2) investigate the relationship among knowledge, attitudes/perceptions regarding food biotechnology, and selected personal situational characteristics of journalists.

Results for Research Objective One:
Nine items measured journalists' knowledge about food biotechnology. Scores revealed a lack of knowledge about food biotechnology with a sample mean of 30% correct answers. Conversely, almost 75% of the respondents assessed their level of scientific knowledge as "average", "somewhat high", or "high".

The instrument contained 40 items designed to assess journalists' attitudes or perceptions regarding food biotechnology. The first scale involved journalists' acceptance of genetic modification of organisms (GMO's). Another scale measured their beliefs regarding effects of biotechnology on world hunger, healthful foods, family farms, and fish and wildlife. Journalists were then asked their opinions of the importance of biotechnology research leading to seven possible outcomes. Journalists were also asked questions about specific journalistic styles and obstacles to acceptance of biotechnology.

Results for Research Objective Two:
Correlations indicated that as journalists' awareness of biotechnology's effects on food, health, and the environment increased, assessed knowledge also increased. None of the personal characteristics of journalists were related to knowledge. Data supported that editors were less accepting of genetically modified organisms (GMO's) then were writers. Journalists' acceptance of GMO's was related to whether or not they had contributed to an article on biotechnology, to their perceived level of scientific knowledge, and to their perception of the rate of acceptance of food biotechnology as a farm practices.

Williams, G., & White, J., D. (1991). Agricultural literacy in America's heartland. Agricultural Education Magazine, 63 (8).

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 enable an individual to make informed personal choices about one's diet and health. The definition developed by the Committee on Agricultural Education in Secondary Schools (1988), ascribes to the goal that an agriculturally literate populace would tend to ensure that citizens would make intelligent decisions concerning policies that benefit not only agriculture: but all of society. A basic knowledge of agriculture is especially important where it is the major industry in a state and the lack of agricultural knowledge and experience impedes economic development. Oklahoma is such a state, where the necessity of agricultural literacy for tomorrow's leaders and policy makers impacts the economy of the entire state, and to some extent the national scene.

Individuals who have followed the issue of agricultural literacy may recall references to a somewhat current study conducted in Kansas by Horn and Koch (1986) that assessed the knowledge of agriculture among 2000 students across the state. A similar study has just been completed in a rural school district, in urban Oklahoma county. As with the Kansas study, all fifth, eighth and eleventh grade students were assessed. Students in each grade level were given a multiple-choice answer test, designed and based on several concepts in agriculture. Any score below 50 percent was labeled a "Low" level of literacy. The data from the Oklahoma Study resulted in an overall mean correct score of 32.62 percent. After further reviewing the Kansas study and studies conducted in Arizona, the low scores that were revealed in the Oklahoma study were not surprising, but it was disturbing to see such scores come from a state where agriculture is the second largest industry in terms of income generated. Comparisons, from the data, were made between males and females, on-farm and off-farm residents, and participants and non-participants in agricultural Youth organizations (4-H and/or FFA). These scores revealed that the female students were as equally knowledgeable in their understanding of agriculture as their male counterparts. The question could be asked: "Is the agriculture industry losing a knowledgeable sector of the population, due to a lack of female role models coordinating and directing agricultural programs in public schools, which could influence young people to pursue agriculture as a viable career"?The last objective in the Oklahoma study was to compare those students who were participants in agricultural youth organizations (4-H and/or FFA) with non-participants. At the fifth and eighth grade levels the participants had higher scores; but at the eleventh grade level, the non-participants actually demonstrated a higher average correct score than the participants. This finding may indicate that the high school agriculture curriculum has not kept up with modern agriculture, or instruction is lacking concerning the basics in agriculture. More flexibility in curriculum and program design and graduation requirements as well as the FFA program of activities is a desired goal. Until new curriculums in agriculture are mandated, agriculture emphasis in the classroom may continue to be plagued by the "Cows, sows, and plows" syndrome. We must realize that only through including agriculture in the day to day curriculum can our nation's youth, be expected to understand American agriculture in the 21st Century.

Zurbrick, P. R. (1990). Agricultural literacy - Why! The Agricultural Education Magazine, 62 (8).

Certainly, the teachers, teacher associations and others who are simply changing their names from vocational agriculture teachers to agricultural science teachers are not contributing to the development of an expanded mission for agricultural education. Such simple-minded approaches will prevent the development of the vision of an occupational preparation program and an agricultural literacy program in agriculture. It is essential that the profession carefully make the distinction between the two programs and develop a philosophy, delivery system and goals for each. The need for the "about agriculture" program is outlined in the National Research Council's report. It might serve the profession well if everyone would reread the section outlining the need for agricultural literacy. Horn and Vining's 1986 study in Kansas that showed less than 30% of a sample of students in that state would answer basic agricultural questions was used to illustrate the need for an educational program "about agriculture." Similar studies have been conducted in other states and need to be administered nationwide.

The Kansas study included questions relating to six agricultural concepts. These included: 1) agriculture is a business that provides food, clothing and shelter; 2) agriculture is interdependent of society; 3) agriculture is a vital, dynamic system shaped by research and development; 4) agriculture is influenced by government; 5) agriculture is interdependent with environment and uses natural resources; 6) agriculture is historically significant. These six concepts might logically become the bases for an agricultural literacy program. Others have suggested that the "about agriculture" might also include: 1) training in systems management; and 2) leadership and life skills.

Perey (1989), in a study on agricultural literacy recently completed in Arizona, found that students in a rural school district were very deficient in terms of agricultural literacy. His results seem to support and parallel the results in Kansas when using a written examination modified from the one used in Kansas. Perhaps the most significant finding reported by Perey was that in his fifth grade student sample those who had enrolled in vocational agriculture were, on the
average, no more agriculturally literate than those who had not enrolled. This suggests that the vocational agriculture curriculum is not suited for developing agricultural literacy as envisioned by the six concepts listed above. The implication of this finding is that the profession must prepare a new and different curriculum using a different delivery system if we hope to develop an agriculturally literate public. Teaching the same old thing and calling it an agricultural literacy program will not work and will surely doom the concept of an expanded mission for agricultural education.

The Behavior Research Center of Phoenix (1989) conducted a telephone survey of 427 heads of households in an attempt to quantify the attitudes of urban residents toward production agriculture in Arizona. The results of that effort indicate that good will toward the industry is still widely evident and reassuring. However, there are unmistakable signs of malaise toward corporate farming, water usage, the role of agriculture in wildlife management and growing concern regarding the impact of agricultural pesticides and hormones on human beings. Further, the percentage of respondents who responded with "Don't know," 'Not sure," or were "Unaware" is increasing, indicating a deterioration in the agricultural literacy rate of urban heads of households. There is no question that both agriculture and agricultural education need an agricultural literacy program at the secon-

dary school level.

Zurbrick, P. R. (1990, March). Delivering secondary school level agricultural literacy. The Agricultural Education Magazine, 62 (8), 3.

Both the February and March, 1990 issues of The Agricultural Education Magazine have been devoted to agricultural literacy themes. The February issue was intended to develop the philosophical base for dealing with agricultural literacy and this, the March issue, with how to deliver agricultural literacy. An analysis of the articles in the two issues is, perhaps, revealing of where we are on this subject. The February issue included only five theme articles on "Why Agricultural Literacy." This is the fewest theme articles ever printed in a single issue. Further, two of the five theme articles were written by authors outside the profession. This suggests that the members of the agricultural education profession have not given a great deal of thought or attention to agricultural literacy. Continuing the analysis of articles, it seems that the "Ag in the Classroom" program is growing and filling a need for providing instruction about agriculture in many states. Some in the profession seem to suggest that the "ag in the classroom" and other similar programs using volunteers and providing agricultural instructional activities for other academic teachers is sufficient to develop an agriculturally literate populace. Such a shortsighted, pass-the-buck attitude will surely result in failure!

Based upon an analysis of the two issues of "The Magazine," it is apparent that two states, Illinois and California, are aggressively moving towards the establishment of a multi-purpose agricultural education program that encompasses more than vocational agriculture at the secondary school level. Both state programs might be described as multi-faceted with programs spanning the spectrum from K to 12. The plans include programs such as “Ag in the classroom” and other more traditional programs. The Illinois plan includes a secondary school level phase that specifically identifies “separate courses for students interested in the impact of agriculture in their lives” (Law p.5).

The profession must decide if agricultural literacy can be achieved /promoted at the secondary school level with one or more courses encompassing the listed topics. Some individuals would argue for a smorgasbord approach whereby a variety of courses of a semester or two in duration are provided. The courses might range from those of a highly science oriented nature, i.e. "biotechnology," to those of a general nature, i.e. "agriculture in our lives." Environmental and economic based courses might also be included in the agricultural literacy offerings as well as courses dealing with leadership and agricultural problem-solving. An agricultural systems course based upon a holistic approach to problem-solving is needed for students to deal with messy, complex, real world food and agriculture problems. Such problems can never be solved with the traditional scientific, reductionist approach to problem-solving!

It is clear that existing preparatory programs in agriculture at the secondary school level are not appropriate nor effective in developing agricultural literacy. I am disturbed to read where someone suggests that the agricultural education profession cannot provide agricultural literacy particularly at the secondary school level. I believe that the profession has the ability to plan an articulated agricultural literacy program and given additional resources to deliver it in a superior manner. We need to begin this process now and not wait for additional funds or official edicts from some Washington bureaucrat. As Warren Reed says in his article, the most difficult step is making the decision to expand the mission of agricultural education from a single overriding purpose to one of a multi-purpose program.

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