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THEME: Agricultural Literacy

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February, 1991

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Number 8

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Articles and photographs should be submitted to the Editor, Regional Editors, or Special Editors. Items to be considered for publication should be submitted at least 90 days prior to the date of issue intended for the article or photograph. All submissions will be acknowledged by the Editor. No items are returned unless accompanied by a written request. Articles should be typed, double-spaced, and include information about the author(s). Two copies of articles should be submitted. A recent photograph should accompany an article unless one is on file with the Editor.

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Leadership for the Profession?

Agricultural education is in an interesting and yeasty time with tremendous opportunity for growth and expansion. Expansion in terms of services provided and people served. The expanded mission visualized and captured by the writers of the Strategic Plan For Agricultural Education offers the opportunity of a lifetime for leading the profession to a new higher level of service. For the first time in years, agricultural education is in a significant offensive position rather than a crippling, defensive one of attempting to defend the status quo. Personally, this is a refreshing position with many challenges and even more opportunities. However, actions speak louder than words, even those written in the Strategic Plan.

Unless the agricultural education family quickly embraces the concepts of the Strategic Plan and moves forward aggressively to make those concepts reality, the opportunity to direct change in a positive manner will be lost. Truly, our destiny is in our hands and not in the hands of those who don't understand or appreciate the contributions of agricultural education to the basic needs and prosperity of society.

The agricultural education family cannot afford to lose the enthusiasm and momentum generated by Summit I and the Strategic Plan. It is essential that the process of writing Tactical Plans be completed and actions taken to begin the implementation process. It's obvious from the content of the articles in this issue of *The Agricultural Education Magazine* that many in the family don't understand the "About" agriculture vision. It is far more dynamic, comprehensive and robust than the articles would lead one to believe.

Others in the agricultural education family lament and question the value of the time and effort put into developing the Strategic Plan. These individuals are the greatest enemies to the achievement of our destiny and fulfillment of our potential. As is so often the case, they come from within our own ranks! What is the motive of these who would derail and bash the future of agricultural education? Unfortunately, many of these individuals sincerely want to promote agricultural education, but simply do not know how to deal with change and become paralyzed when faced with change. Under such conditions it becomes far easier to become defensive and to attack those who propose new programs and ways of dealing with emerging circumstances. It is essential that agricultural education rise above such individuals and develop leaders who are capable of dealing with change and can see opportunities in change.

Agricultural education is in need of individuals capable of managing change and exerting leadership in changing times. There are most certainly unique competencies necessary for such a role. The first phase of Summit I was devoted to improving the effectiveness of the participants by providing training in the skills necessary for managing change and exerting leadership in changing times. There is no question that the success of Summit I was the direct result of the program on "Increasing Human Effectiveness" pro-



BY PHILLIP R. ZURBRICK, EDITOR

(Dr. Zurbrick is Professor, Department of Agricultural Education, The University of Arizona.)

vided by Bob Moawad, Chief Executive Officer, Edge Learning Institute. In no time, the participants were convinced that it was better to be "green and growing than to be ripe and rotting."

Further, dealing with change required some "right brain" thinking of a creative nature and a new attitude that embraced change as an opportunity to be seized rather than a threat to be avoided. Basing proposed program changes on basic "bed rock" values relieved the concern of those who feared that change would destroy the "tried and true" aspects of agricultural education. That is not to say the process did not have its "highs" and "lows" with some individuals pounding the pulpit and speaking in excited voices.

The agricultural education movement must invest in the development of future leaders so that they can develop the skills required to manage change and exert leadership. The investment is essential if the potential of the Strategic Plan is to be realized. It is unrealistic and foolish to expect that *The National Council* can carry the movement and realize the potential of the Strategic Plan. Further, there must be change after the current Strategic Plan has served its purpose. Such a document should be dynamic and must be made so by active, forward looking individuals capable of providing leadership in changing times.

It is exciting to contemplate the future of agricultural education if all those in leadership positions at the national and state levels had the opportunity to participate in a "human effectiveness workshop." The opportunities to keep the programs on the cutting edge would be a reality and the struggle of dealing with change would be significantly reduced. Change would be embraced as an opportunity and program adjustments made quicker and easier. An example of this kind of action was demonstrated when AATEA (American Association of Teacher Educators in Agriculture) changed the name of their organization, in a near unanimous vote, to the American Association for Agricultural Education (AAAE). In addition to encompassing an expanded clientele and supporting the expanded mission of the Strategic Plan, the name is also significant in the sense that it implies a mission for the organization. No longer is the

(Continued on page 23)

Agricultural Literacy — The Undefinable Goal of Agricultural Education

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.

This lack of definition became clear as I was in contact with potential authors for this magazine issue. Those I contacted said, "What is it? Tell me more about it." The authors who contacted me each had a clear idea about what they wanted to share with the profession about agricultural literacy, but as you can see by the variety of articles the concept was not interpreted the same way.

Some look at agricultural literacy as enrichment programs for junior high level students. Others see literacy efforts aimed at short term activities like Food For America. Still others see the literacy effort as information infusion in all general education curriculums and programs. But no consensus is reached on who we target, with what information and who is responsible.

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 of Supervisors of Agricultural Education draft plan placed emphasis on curriculum K-12 and the coordination of groups. Their plan also suggested supporting literacy efforts through newsletters or magazines.

The American Association of Teacher Educators in Agriculture plan proposed researching the topic and identifying what constitutes an understanding about agriculture. The plan also proposed that agricultural literacy become a part of teacher accreditation standards like the other basic subjects.



BY JACQUELYN P. DEEDS, THEME EDITOR
(Dr. Deeds is Assistant Professor, Department of Agricultural and Extension Education, Mississippi State University.)

The National Young Farmers Education Association placed emphasis on education about agriculture to adults through mass media, speakers and other events. Their draft plan identified a role for the Young Farmers in working with agricultural literacy programs. The Postsecondary Student Organization draft plan had an action step that included integration of activities among agricultural organizations to promote education about agriculture.

The National Vocational Agriculture Teachers Association suggested legislative efforts aimed at education about agriculture. The NVATA plan included coordination with agribusiness, commodity groups and farm organizations to promote agriculture.

The National FFA Organization draft plan had a number of action steps aimed at agricultural literacy. Food for America program expansion K-12, using the AgEd Network and increased use of national officers and award winners as spokespeople were part of the plan. Increasing the weight of agricultural literacy activities in FFA awards was an approach included. The FFA plan also addressed consumers, a group not specifically identified by other groups.

The things that all the draft plans had in common were some words I found exciting and somewhat new to our multifaceted profession. Words like linkages, networks, and articulation were found in all the plans. Cooperation with other agricultural agencies and segments of the agricultural industry was a common thread. A number of the plans included discussion of teacher preparation to teach both in and about agriculture. But in all this not a common definition of agricultural literacy was to be found.

Dictionary Definition

Like any good student stumped by an assignment I tried to do my homework. First I went to the dictionary to find a definition for literacy. According to the dictionary, literacy is the state of being literate. That definition didn't help a lot. So I looked up literate which had four definitions that varied from reading and writing, to versed in literature and

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Agricultural Mechanization

Time To Teach Teams

Often times we spend a great deal of time looking for something when it has been right there in front of us the whole time. Several weeks ago I was reading an article which was describing the management strategies for the new Saturn Motor Division of General Motors. The article included an interview with the company president, Richard LeFauve. Mr. LeFauve was asked about the "team approach" of building automobiles and his reply was, "The team approach came out of a group of 99 manufacturing people that toured all over the world visiting 'successful' companies. They tried to figure out what made them successful. What they found was they were generally very people-oriented organizations. They found that team-oriented structures were more successful than hierarchical structures." He continued by stating, "The big difference at Saturn is that the teams are aimed at being self-directed and don't have supervisors telling them what to do and how to do it."

There are times when you are working on something that you realize does not really need a major overall, but merely a bit of fine tuning. Besides being quite a relief, it is also very gratifying in that we have saved time, maybe some money, and a lot of valuable effort. For many years we have taught various projects and learning processes using team strategies. Many of you are using small groups of students to build projects, perform maintenance on large pieces of equipment, and other such learning activities. Recently there has been a renewed emphasis upon students learning as teams or as the concept has evolved, cooperative learning. Team teaching appears to be an important teaching and learning strategy for the future. We, as Agricultural Mechanization educators, will need to place more emphasis upon this type of learning activity in order to better prepare entry level employees and technicians for the future work environment.

The past two semesters I have tried to incorporate strategies for team learning in the laboratory. The process was very effective but not in the usual sense. As with any new teaching strategy I had some very pleasant surprises as well as several disappointments. One of the situations I encountered was that it was much more difficult than I thought it was going to be to keep a "distance" from the activities of the students. There were several times I knew of a shorter, more efficient method, but it was much more beneficial that the students figure it out for themselves. As I saw that the learning process was indeed working and the students realized that I was going to force them to "think through the process" their decision making process became much more accurate and efficient.

Another key point was that the process took a much longer period of time than I had expected. It seemed as though it was an excellent use of the available time, but during the laboratory sessions I was always looking for ways



BY JOE G. HARPER, SPECIAL EDITOR
(Dr. Harper is Associate Professor, Department of Agricultural Education, Clemson University.)

to save time. The reason was that in the beginning I was much more concerned with the product than the process. As I allowed the students to work as a team the eventual process was producing a better product. Later I realized that with teams the process should come first and a good team effort will produce a good product.

As I work with the groups I realized that the students were not very comfortable with the initial process. This is a very strong point for using a "pure" team approach. Our students have not had many opportunities to work as true teams. We often appoint someone to oversee the team or we take on that task ourselves. In which case we tend to direct the process rather than allowing the team to make decisions. Of course in certain situations, such as safety and design defects, it is our role as instructors to intervene, but I found myself holding back an obvious decision until the group made that decision. It became quite a challenge for me as the instructor to provide feedback to students of several alternatives for a situation, like how to design a brace, without providing a bias opinion of how "we used to do it."

The type of learning which occurred appeared to be different and therefore I was not as comfortable with the evaluation processes. The obvious strategy is to involve the team with the evaluation process. This process required some instructional time, but it was time well spent. The end result was that the students were able to learn at a higher cognitive level when they were expected to evaluate.

A very important component which came in to play with the team approach was the skills and abilities that each team brought with them to the team. The students were very quick to identify the level of skill, the actual level of expertise, and probably most important the attitudes of the other team members. In retrospect this was the most valuable aspect of the instructional process. A good worker was considered to be one who actively participated in the complete process on a regular basis, not necessarily the one who was the best welder. The team placed a very high value upon those team members who attended every laboratory session

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Agricultural Literacy Programs: Current Status

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).



BY DAVID E. HALL

(Dr. Hall is Assistant Professor, Department of Agricultural and Extension Education, Pennsylvania State University.)

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 agricultural 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:

- 1) Instruction "About Agriculture" defined as consumer education about agriculture
- 2) Instruction "In Agriculture" defined as career education in agriculture
- 3) FFA involvement by junior high students

"About Agriculture"

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 found in Table 1. Of the 18 states reporting no current program, four (22%) indicated that they plan on implementing a program by the 1991-92 school year. Figure 1 illustrates current and planned programs.

Grade Levels Where Programs are Currently Conducted

State	K	1	2	3	4	5	6	7	8
Alabama	X	X	X	X	--	--	--	X	X
Alaska	--	--	--	--	--	--	--	--	--
Arizona	X	X	X	X	X	X	X	--	--
Arkansas	X	X	X	X	X	X	X	X	X
California	--	--	--	--	--	--	--	--	--
Colorado	--	--	--	--	--	--	--	--	--
Connecticut	--	--	X	X	X	X	X	X	X
Delaware	--	--	--	--	--	--	--	--	--
Florida	--	--	--	--	--	--	X	--	--
Georgia	X	X	X	X	X	X	X	X	X
Hawaii	--	--	--	--	--	--	--	--	X
Idaho	--	--	--	--	X	--	--	X	X
Illinois *	--	--	--	--	--	--	--	--	--
Indiana	--	--	--	--	X	--	--	--	--
Iowa *	--	--	--	--	--	--	--	--	--
Kansas	X	X	X	X	X	X	X	X	X
Kentucky	--	--	--	X	X	--	--	--	--
Louisiana	--	--	--	--	--	--	--	--	--
Maine	--	--	--	--	--	--	--	--	--
Maryland	--	--	--	--	--	--	--	--	--
Massachusetts *	--	--	--	--	--	--	--	--	--
Michigan	--	--	--	--	--	--	--	--	--
Minnesota	--	--	--	--	--	--	--	--	--
Mississippi	X	X	X	X	X	X	X	X	X
Missouri	X	X	X	X	--	--	--	--	--
Montana	X	X	X	X	X	X	X	X	X
Nebraska	--	--	--	--	--	--	--	X	X
Nevada	--	--	--	--	--	--	--	X	X
New Hampshire	--	--	--	X	--	--	--	--	--
New Jersey	--	--	--	--	--	--	--	--	X
New Mexico	--	X	X	X	X	X	X	X	X
New York	--	--	X	X	X	X	X	--	--
North Carolina	--	--	--	--	--	--	--	--	--
North Dakota	--	--	--	--	X	X	--	X	X
Ohio	--	X	X	X	X	X	X	--	--
Oklahoma	--	X	X	X	X	X	X	X	X
Oregon	--	--	--	--	--	--	--	--	--
Pennsylvania *	--	--	--	X	X	X	X	X	X
Rhode Island	--	--	--	--	--	--	--	X	X
South Carolina	--	--	--	--	--	X	--	--	--
South Dakota	--	--	--	X	X	--	--	X	X
Tennessee	--	--	--	--	--	--	--	--	--
Texas	--	--	--	--	--	--	--	--	--
Utah	--	--	--	X	X	X	X	X	X
Vermont	--	--	--	--	--	--	--	--	--
Virginia	--	--	--	--	--	--	--	--	--
Washington	--	--	--	--	--	X	--	X	X
West Virginia	--	--	--	--	--	--	--	--	--
Wisconsin	--	--	--	--	--	--	--	X	X
Wyoming	X	X	X	X	X	X	X	X	X
TOTALS	9	12	14	19	20	17	15	20	22

* Plan in place to implement a program by 1991-92 school year.

Table 1. State Status of Organized "About Agriculture" Programs in Kindergarten through Eighth Grade.

"In Agriculture"

Twenty-six states (52%) reported having organized programs "in agriculture" being conducted in the seventh and/or eighth grades. A complete listing of each state's status can be found in Table 2. Of the 24 states indicating no current program, four (17%) are planning to implement programs by the 1991-92 school year. Figure 2 shows current and planned programs of instruction "In Agriculture" for 7th and 8th graders.

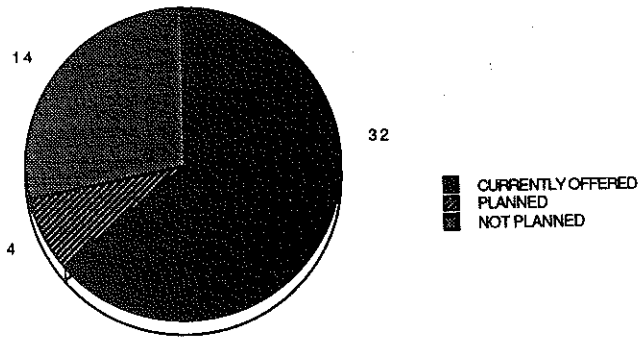


Figure 1. States Offering Organized "About Agriculture" Programs in Kindergarten through Eighth Grade.

Grade Levels Where Current Programs are Conducted

State	7	8	FFA
Alabama	X	X	X
Alaska	--	--	--
Arizona **	--	X	--
Arkansas **	--	X	--
California	--	--	--
Colorado	--	--	--
Connecticut	--	--	--
Delaware	--	--	--
Florida	X	X	X
Georgia	X	X	X
Hawaii	--	--	X
Idaho	X	X	--
Illinois *	--	--	X
Indiana	X	X	--
Iowa *	--	--	--
Kansas	X	X	--
Kentucky	X	X	X
Louisiana	X	X	X
Maine **	--	--	--
Maryland	X	X	X
Massachusetts	--	--	--
Michigan **	X	X	--
Minnesota	--	--	--
Mississippi	X	X	X
Missouri	--	--	--
Montana	--	--	--
Nebraska	X	X	X
Nevada	X	X	--
New Hampshire *	--	--	--
New Jersey **	--	--	--
New Mexico	X	X	X
New York	--	--	X
North Carolina	X	X	X
North Dakota	X	X	X
Ohio	--	--	--
Oklahoma	--	X	X
Oregon	X	X	X
Pennsylvania *	--	--	X
Rhode Island **	--	--	--
South Dakota	X	X	X
Tennessee	--	--	--
Texas	--	--	X
Utah	--	--	--
Vermont	--	--	--
Virginia	X	X	X
Washington	--	--	X
West Virginia	--	X	--
Wisconsin	X	X	X
Wyoming	X	X	--
TOTALS	21	26	23

* Plan in place to implement a program "in agriculture" by 1991-92 school year.
 ** Plan in place to implement FFA in 7th and/or 8th grades by 1991-92 school year.

Table 2. State Status of Organized "In Agriculture" and FFA Programs in Seventh and Eighth Grades.

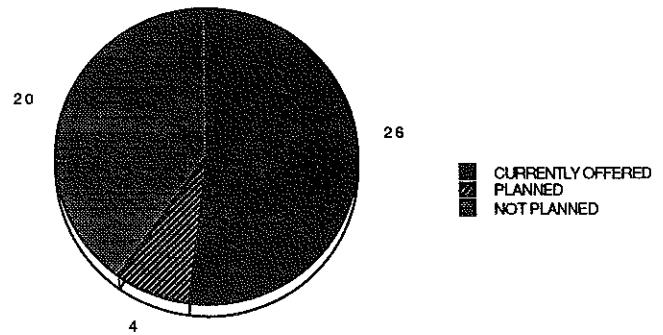


Figure 2. States Offering Organized "In Agriculture" Programs in Seventh and/or Eighth Grades.

FFA

Twenty-three (46%) of the states offer FFA participation for their 7th and/or 8th grade students (Table 2). Six (22%) of the states not currently offering FFA for junior high students are planning to implement programs by the 1991-92 school year (Figure 3).

In view of the National FFA Constitution (National FFA Organization, 1990), the researcher questions how states without organized programs "In Agriculture" for 7th and/or 8th graders can legally offer FFA participation for these students (Table 2).

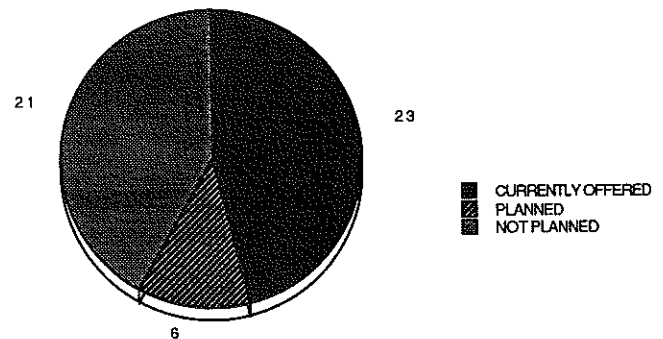


Figure 3. States Offering Organized FFA Programs for Seventh and/or Eighth Grades.

The researcher did not attempt to assess the quality of programs being offered in the various states. The study was merely a survey of the status 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.

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Computer Technology Resources

Tips For Updating Software

Eventually it's going to happen. Your old word processing program crashes. You see an advertisement in a magazine for a new and improved spreadsheet. Another teacher makes fun of the database you have been using since 1981. Your students ask to go to the computer room instead of using the computer in your classroom. It occurs to you that it is time to update the computer software for the agriculture program's computer. You make the decision to buy some new computer programs. That is when your problems can multiply. Invariably questions will arise which demand answers.

- What software should I buy?
- What new features are important?
- Will the new software run on my computer system?
- Where should I buy the software?

Many teachers have bought a computer program only to find that it will not work on their machine or that it will not do what they thought it would. Many of these programs go back in the box and onto the shelf. Some software packages go back to the retailer. The purpose of this article is to provide a few tips for keeping your software library up-to-date in a timely, efficient manner.

Tip #1: Get needed information before making a purchase.

There are several places to learn about new or revised computer programs. One of the best places is popular computer magazines. Most all computer magazines review new software packages as they are developed or updated. These articles can provide important information about the features including the hardware requirements of the new packages. You will also get an "expert opinion" of the new packages.

Another source of information is other people who are presently using a particular computer program. Ask them to show you how the program works and to lend you the manuals so that you can read about the program for yourself. Your local computer store may provide you with information on the software they carry. Finally, look for a telephone number. You can phone many software companies to ask for information and product bulletins.

Tip #2: Compare features and requirements.

Take notes as you review the materials from various companies. List the features of each product, the hardware requirements, and the operating system needed. Decide which features you want in your new program. Let's look at one example: If you replace your word processing program do you want to buy a new one that includes a spelling checker? If you decide that the spelling checker feature is important, then you would need to determine if your computer will run the new program.



By W. WADE MILLER, SPECIAL EDITOR
(Dr. Miller is Associate Professor, Department of Agricultural Education and Studies, Iowa State University.)

You will find that many computer programs list minimum requirements and optional requirements, such as a hard drive or increased RAM. Often, you will find that optional requirements listed are needed for the program to function at its best. For instance, the dictionary for a spelling checker may be too large for a 5¼" disk but fits well on a 3½" disk or hard drive. You will also need to determine if you have the correct version of the disk operating system and the ROM chip for the program you are considering.

Tip #3: Buy as few software packages as possible.

It is difficult for you and your students to learn how to operate several different software packages. It is almost impossible to remember all the commands for several different software packages, unless you use them on a frequent basis. For this reason, it may be advisable to buy "integrated" packages or multiple feature packages when you can. Instead of buying separate packages for spreadsheet applications, word processing, database management, and graphics you may be able to find a software package that combines all these features into one product. You will find that the commands for all of the features are similar. Integration may be available for a single function program, such as word processing, where you may find a package that includes a spelling checker, thesaurus, and a mail-merge program.

Tip #4: Buy from responsive companies.

There may be several entities here for you to consider. If you buy the software directly from the publisher then you will want a toll-free service number so that you can phone someone with your problems. You are also going to want to find out if you can return the software package if it does not perform to your expectations. If you buy the software from a computer store, you need to know if they will help you when you have questions. If you buy software from a mail order distributor, you will need to ask about their policies regarding support and return of unsatisfactory products. The lowest price is not always the best deal when service is involved.

(Continued on page 10)

Agricultural Literacy in Agriculture's Heartland

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.

How to Determine Literacy?

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 the following concepts:

Agriculture is . . .

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

Any score below 50 percent was labeled a "Low" level of literacy.

Literacy Scores

The data from the Oklahoma Study resulted in an overall mean correct score of 32.62 percent. After further review-



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ing 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.

An example of a question that appeared on the eighth-eleventh grade tests was: "Which of the following products does not contain wheat?" The multiple choice answers included: macaroni, hamburger buns, pizza crust, tortilla chips and the option to choose "I don't know". Less than one percent of the students, in both grades, chose "tortilla chips" as the correct response. The study also indicated, by the average scores of all grades combined, that the students knew the least about the concept that "Agriculture is historically significant to the development of our nation."

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). At the fifth grade level, male students scored slightly higher than the female students. However, at the eighth and eleventh grade levels, females scored higher than the male students. These scores revealed that the female students were as equally knowledgeable in their understanding of agriculture as their male counterparts. The question, then, 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"?

In the comparison between on-farm and off-farm residents, the students who lived or had lived on a farm or ranch scored much higher than the off-farm residents. Although the on-farm residents' scores were higher, we must

keep in mind that their scores were still below the 50 percent category.

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. One might conceive that those students participating in agricultural education courses, FFA and/or 4-H programs, would have higher scores than 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.

State Departments of Vocational and Technical Education and school administrators nationwide should recognize that current agricultural education programs which have changed little over the past decade, prepare students for a rather limited and shrinking component of the job market while failing to alert them to other career opportunities in agriculture.

Implication for Agricultural Education

More flexibility in curriculum and program design and graduation requirements as well as the FFA program of activities is a desired goal. Camp's (1986) analysis was typical of statements heard repeatedly by the Committee on Agricultural Education in Secondary Schools (1988):

In spite of the rhetoric of the profession that we are not training primarily for farming occupations and that agriculture education has changed dramatically, the typical agricultural program remains much as it was when the Vocational Education Act of 1963 was passed. Production agriculture, taught by a single teacher, in a general high school, remains the norm (p. 31).

Until new curriculums in agriculture are mandated, agriculture emphasis in the classroom may continue to be plagued by the "Cows, sows, and plows" syndrome.

Local communities must also accept the responsibility for change. With the long-standing traditional notion that winning "Grand Champion" at the livestock show is the highest accomplishment a student can receive in agricultural education (FFA), many other phases of agriculture will be completely ignored.

The "low" test scores in this study, and previous research studies, have revealed a "low" level of a basic knowledge of agriculture among our youth. Those who are concerned about the future of the agricultural industry, must stop and evaluate programs and personal philosophies about agriculture. 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.

Programs, such as Ag in the Classroom, ensure a viable delivery system to address agricultural literacy. This program provides, a positive approach to incorporating agriculture into the daily classroom instruction schedule. Resources from Ag in the Classroom programs are not only beneficial to improving agricultural literacy, but can benefit teachers, who are always looking for new and innovative ways to motivate their students to learn.

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Computer Technology Resources Tips For Updating Software

(Continued from page 8)

Tip #5: Fill out and mail the product registration card.

You will find that most reputable companies do not just publish a product and never change it. They will continue to revise, refine, and improve popular products. As each revision is completed, they will send update information to registered customers. Most companies will allow you to update your computer software for a greatly reduced fee. They cannot contact you if you have not mailed the registration card to them. And they will not contact you if you are us-

ing an unregistered, illegal copy of their product. Take the necessary time to fill out and return the registration card; you will be glad you did.

Keeping the computer and its software library up-to-date is a bit like maintaining an energy efficient house. With a house, you are never finished updating and adding features. You can install a new pulse furnace, or add some insulation in the attic, or even buy highly efficient appliances. Your computer can also benefit from hardware updating and new software to help it perform at its best and to extend its useful life. These tips are offered to help keep your computer up-to-date as new software products find their way to the market.

Needed: Agricultural Literacy

"I'm tired of hearing all 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 or no knowledge of the practices of agriculture or of 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 educational 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 well 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



BY JACQUELINE F. TISDALE

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decisions about agriculture related topics such as food safety, genetic engineering and pesticide versus nonpesticide 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.

Increased 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.

Agricultural Literacy — The Undefinable Goal of Agricultural Education

(Continued from page 4)

creative writing. For our purposes, the definition having knowledge and competency seemed most appropriate. That would leave us with agricultural literacy is having knowledge and competency in agriculture.

However, is that enough of a definition to guide the profession in the planning and pursuit of our national goals? We must still answer several questions before we have a definition that can give direction. Who should have or receive this knowledge and competence? Where should this knowledge and competence be gained? What should this knowledge and competence include? When and how should this knowledge and competence be delivered? These are serious questions that have not yet come to closure in the profession.

Where do we go from here

Until we have a definition of agricultural literacy that we in the profession can agree on and set as our goal, it is not likely to be accomplished. I am not suggesting that there is only one way to approach the goal. All the tactical plans developed in St. Louis and in the states include laudable goals and workable action steps. However, we must focus on a common goal.

All I know for sure about agricultural literacy is that literacy is in the dictionary somewhere between listen and literature. Perhaps the way we can come to consensus is to listen to the constituent groups and read everything we can find, beginning with this issue of *The Agricultural Education Magazine*.

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Sustainable Agriculture — What Does It Mean?

The same word may have widely different meanings depending on how and by whom it is used. Witness the word "jumper" whose definitions range from a "wire" to "a person" to a "piece of clothing". Sometimes the definitions have only minor dissimilarities, but it is not unusual for one term to have several meanings and to have different meanings for different people. One term currently causing much confusion is "sustainable agriculture." Organic farmers, conventional farmers, economists, agriculture industrialists, and scientists all have their own definitions for sustainable agriculture. These definitions vary anywhere from quite similar to extremely different. How then can we clarify the term's meaning.

Sustainable Agriculture Defined

Sustainable agriculture can be defined by clarifying the meaning of "conventional." To be conventional means conforming what is acceptable. This definition does not hold conventional to be synonymous with excessive chemical and fertilizer use or with the overworking of the soil just because these practices are prevalent. Rather conventional means the acceptable use of inputs, internal or external, to maintain a competitive edge in the market system. To be acceptable, sustainable farming systems need to be resource-conscious, environmentally compatible and commercially competitive. Many conventional farmers by using common sense practice what is considered to be acceptable sustainable agriculture.

One example of sustainable agriculture is the seeding of steep hillsides to grasslands rather than planting to row crops. Thus, the conventional farmer has found an acceptable way to conserve a great resource, the soil, and to seed crop that complements the environment well. To be truly sustainable a farming system must endure and be profitable. A farm can only remain profitable if society is able and willing to pay for the production of the goods. Ideally farmers can reduce the costs of their input and increase the returns from their output. One method conventional farmers have found for doing this is crop rotation. Research indicates that the rotation of row crops such as corn and soybeans helps reduce the amounts of needed external outputs such as herbicides, insecticides and fertilizers. This not only reduces farmers' cost but is also an example of sustainable agriculture. Many farmers have already made contributions to the sustainable agriculture movement by using commonly accepted methods.

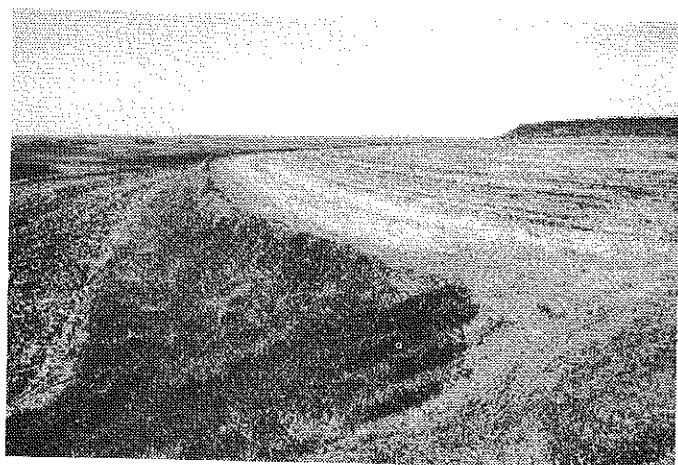
Many agriculturalists believe that for agriculture to be sustainable, the use of all external inputs must be eliminated. This belief is not entirely true. New technologies and scientific findings are being employed by conventional farmers. By employing the new computer and mechanical technologies available, conventional farmers are becoming



BY NAOMI COOPER AND JULIA GAMON

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better managers of their external inputs. They are turning their conventional methods into sustainable methods. Farmers are developing a basis for the long-term productivity of their land. Society needs to realize that conventional methods can be accepted as a part of the sustainability movement if the correct management techniques are used (Ikerd, 1990).



Conventional farming is made sustainable through the use of grassed back-slope terraces. (Courtesy of USDA Soil Conservation Service, Des Moines, IA).

Farming as a System

A second way to clarify the meaning of sustainable agriculture is to emphasize the premise that farming is a system. Each farming operation is a system made up of many subsystems. Including those of livestock, crops, buildings, machinery and bookkeeping. But livestock can be broken down into hogs, sheep and cattle; crops can be broken down into soybeans, corn and forages. Each of these separate entities requires its own technologies and methods for proper

management, and all these individual management methods should work in harmony to form the farming system as a whole. Forage crops, which help prevent erosion, are grown to feed livestock throughout the winter. Livestock manure is returned to the soil, which helps reduce the amount of external inputs, or fertilizer that the farmer must apply to the soil. Because the farm operation is a system, it is diverse and does not become a breeding ground for weaknesses and injuries that may result from extended monoculture.



No-till beans in corn residue are an example of conservation tillage as an alternative management method which helps sustain the soil. (Courtesy of USDA Soil Conservation Service, Des Moines, IA).

Because farming is a system, it requires many management methods to be continuously productive. Sustainable agriculture is an excellent complement for farming operations because it is often defined as an entire system of methods used to achieve productivity. It employs a knowledge of soil, crop production, botany, pathology, chemistry, ecology, entomology, engineering and economics. A knowledge of these subjects is needed to ensure that each subsystem within the farm system is managed in the best way. Current and prospective agriculture students should be introduced to the application of these subjects in relation to the total farm operation. Great strides should be made in improving the understanding of how the combined use technologies can enhance the long-term sustainability of agriculture (Rodale, 1990 & Wagner, 1990).

Practice Determines Definition

A third way to clarify the meaning of sustainable agriculture is to admit that the definition of sustainable agriculture is dependent upon the situation. Because the methods

involved in sustainable agriculture are so varied, all may not be applicable to all farming systems. People's definitions of the term develop from what they practice. When people from different farming operations or agriculturally related fields pool their information and try to pinpoint an exact definition of sustainable agriculture, they may be unable to agree.

The National Research Council in its 1989 report *Alternative Agriculture* provides several case studies of farming systems which range from tomato processing in California to crop-livestock farming in Iowa, to livestock farming in Colorado. Included are small gardeners, lawn keepers, greenhouse managers and large farming systems. Each farming system presented is obviously unique and it may require different management techniques. Both large and small farms require varied management techniques to be considered sustainable and may need to develop their own systems of operation.

The definitions of sustainable agriculture that these organizations or individuals develop are all acceptable. Farmers are devoting much effort to becoming more resource-conscious, environmentally compatible and commercially competitive. For some their efforts mean the successful elimination of all external inputs. For example, home gardeners can afford to eliminate all external/chemical inputs because they do not market their crops. Commercial fruit and vegetable growers have to remain competitive; cannot allow pests to damage their crops. They need to scout their fields and to use chemical controls in a timely and prudent fashion. Although the methods used by home operations differ from those used by commercial operations, both may be practicing sustainable agriculture.

Summary

This article has attempted to clarify the meaning of sustainable agriculture. First, it has clarified sustainable agriculture's relation to conventional farming practices such as seeding hillsides to grass and rotating crops. Operators use new computer and mechanical technologies to manage for long-term profitability through reduced commercial inputs. The second clarification concerns sustainable agriculture as a farming system with diverse subsystems complementing each other. A knowledge of subjects such as soil chemistry, entomology and economics, which may undergird the various components, is needed to properly manage the total system.

The third clarification is that the definition of sustainable agriculture changes with the situation and that an operation that is resource-conscious, environmentally compatible and commercially competitive is practicing sustainable agriculture. Unlike the word "jumper," which has diverse meanings, "sustainable agriculture" has a common core of meanings. The definition of sustainable agriculture rests in what an operator can do to conserve resources, work in harmony with the environment and yet enjoy long-term profitability.

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Food For America

Food For America is the National FFA Organization's answer to agricultural illiteracy among elementary students.

The program, which is 15 years old, was one of the first national efforts to teach young students about the business of food and fiber. More than 30 percent of FFA chapters participate in Food For America, making it the FFA's most popular program.

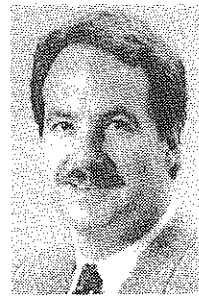
The program was recently revised, and distributed free to every FFA chapter in the country. This version is easier to use and reaches a broader group of students. The program, which was once targeted at grades 3-5, has been expanded to encompass grades 1-6.

In November, a preview of the new Food For America program was presented to third graders at New Stanley Elementary School in Kansas City, Kansas. Students learned about agriculture and food through demonstrations about different types of crops, such as sunflowers, wheat and corn. They also learned about insects and which kinds are beneficial or harmful to agricultural crops — including an up-close-and-personal view of 3-inch-long African cockroaches. Then the students all got a taste of agriculture when apples were given to them at the end of the session.



New Stanley elementary students learn about agricultural crops during a Food For America presentation given by the Williamsburg, Kan., FFA Chapter.

The Williamsburg, Kansas, FFA chapter gave the presentation, and the members were enthusiastic about the new materials. "This is an opportunity to show students where their food and clothing comes from, give them hands-on examples and help them explore what rural America is like," explained Lee Weis, Williamsburg FFA chapter advisor. "I think it's just a great cultural experience."



BY BILL STAGG

(Mr. Stagg is Director of Information, National FFA Organization.)

Food For America was last revised in 1984-85, and many agricultural issues have surfaced since then — mainly food safety and environmental issues. The new materials address these topics, in addition to all the steps of food production — from the field to the processor to the distributor to the grocery shelf.

The format of the materials has also been revised. Previously, the program consisted of a classroom kit, which was given to each elementary class that hosted a Food For America presentation, a presenter's guide, which gave instructions on how best to prepare for a presentation; a film about food, entitled, "The Case of the Sneaky Snack;" and various certificates for elementary students and schools. Most materials were supplied as spirit masters.

The newer program takes advantage of the latest in photocopy technology, since virtually every school has replaced its ditto machines with copiers. Each FFA chapter advisor was sent a packet of three-hole punched materials which may be stored in a ring binder. The materials consist of a teachers' guide, which gives elementary teachers instructions on how to incorporate the Food For America lessons into their classroom; a presenter's guide, which provides FFA chapters with tips on how to effectively present the program; and two packets of instructional materials, one for grades 1-3, and one for grades 4-6. Also included are promotional brochures, certificates and evaluation forms, all of which are designed to be photocopied. The flexibility in photocopying should result in a much heavier usage of the materials.

The most convenient benefit to this program, though, is that the FFA chapter can tailor the program to each school. For example, if, after meeting with the elementary teacher at the hosting school, the chapter learns that they are most interested in the processing, trade and marketing of food, those lessons can be pulled from the ring binder and copied. This enables FFA to better meet the needs of the hosting elementary schools. It's also much cheaper, as formerly each classroom kit costs \$7.50, and had to be supplied for each presentation.

(Continued on page 20)

Helping Implement Groundwater Protection Policy

Groundwater is a hidden, essential natural resource. Concerns about its quality and potential contamination have made groundwater protection a local, state, national, and global issue. Recognizing the importance of groundwater to the life and health of people, its use in agriculture and industry, and the threats of contamination, the 1987 Iowa Legislature produced what many have called the strongest groundwater protection policy in the United States. The legislation includes a strong educational component.

Iowa's groundwater protection policy focuses on "protection through prevention," advocating that it is feasible, more effective, and less expensive to prevent groundwater contamination than to try to clean it up after it has occurred. Because agriculture plays an important role in the protection of groundwater quality, the Department of Agricultural Education and Studies at Iowa State University recently developed instructional materials that focused on understanding the relationship between groundwater quality and agricultural systems.

The materials were based on 32 educational concepts emerging from groundwater issues in Iowa. The concepts were grouped into eight major categories:

- * hydrogeology background
- * agricultural use of nitrogen fertilizer
- * agricultural use of pesticides
- * underground tanks and pipelines
- * hazardous substances handling/storage
- * direct paths of contamination
- * land applied solid/liquid wastes
- * urban use of fertilizers/pesticides

Framework and Support for the Instructional Materials

Several developments provided a framework for the instructional materials. A national challenge to strengthen the teaching of soil and water conservation and natural resources management was issued through the August 29, 1988, signing of a memorandum of understanding between the United States Department of Education and the United States Department of Agriculture. To meet this challenge in Iowa, several steps were taken. First a partnership was formed between the Agricultural Education and Studies Department at Iowa State University and the Soil Conservation Service. A technical committee set up under the Carl Perkins Act identified the natural resources (including water) content that should be taught in secondary school agriculture programs (Williams and Weber, 1990). In addition, a natural resources education recognition program was established for Iowa agriculture teachers and students.



By DAVID L. WILLIAMS AND ELDON WEBER

(Dr. Williams is Professor and Head, Department of Agricultural Education and Studies, Iowa State University.)

(Mr. Weber is Liaison Iowa State University, U.S. Soil Conservation Service.)

Funding to develop the materials was provided by the Iowa Department of Natural Resources through oil over-charge funds from the U.S. Department of Energy. The Soil Conservation Service assisted by providing the salary of the project coordinator and, Monsanto Agricultural Company provided videotapes and funds for references and groundwater flow models.

From Issues to Content

The Iowa Department of Natural Resources (1987) identified several curricular areas where groundwater education should be infused, including secondary school agriculture programs. To focus the agriculture curriculum on the problem, personnel in the Iowa Department of Natural Resources analyzed the Iowa groundwater issues and outlined areas needing major emphasis. The content included:

- * groundwater movement
- * groundwater contaminants
- * source of nitrate contaminants
- * source of pesticide contaminants
- * best farm management practices
- * energy conservation
- * contents of underground tanks and pipelines
- * reducing leaks from underground tanks
- * economic impact of leaks in tanks
- * problems in handling and storage of hazardous substances
- * best management practices for handling and storage of hazardous substances
- * conserving energy by reducing use of hazardous substances
- * direct paths of contamination of groundwater

- * contamination prevention and effects on wildlife
- * state and federal rules related to groundwater contamination
- * reducing groundwater contamination of animal wastes
- * conservation of energy through proper use of manure
- * effects of urban use of fertilizers and pesticides on groundwater and people
- * best management practices in use of urban chemicals
- * alternatives to urban chemical use
- * conserving energy by reducing use of urban fertilizers and pesticides

From Content to Instructional Materials

The next step in the project was the translation of content to instructional materials. An advisory committee representing education, agriculture, and government agencies was formed. After the committee grouped the content into eight units, the project staff developed lesson plans that featured objectives, interest approach, list of materials needed, and teaching procedures. Included were information sheets on technologies, student activities, visual masters, references, a glossary, and two videos.

The three opening units, Recognizing Groundwater Concerns, Describing the Water Connection, and Locating Direct Connections, introduce students to groundwater issues related to agriculture, identify types and sources of contamination, and emphasize the importance of maintaining the quality of our groundwater. In addition to supporting agriculture and industry, groundwater provides drinking water for 30 percent of the urban population and 97 percent of the rural population in the United States.

The instructional materials explore views of environmentalists and agriculturalists, attempting to provide a balance on issues that will allow students to make informed decisions. They address potential groundwater contamination problems resulting from agricultural activities and identifies the best management practices to prevent contamination. The teaching plans focus on managing nitrogen fertilizers, agricultural pesticides, underground tanks and pipelines, natural fertilizers, and urban fertilizers and pesticides.

From Instructional Materials to Teacher

Teachers teaching teachers was used in disseminating the instructional materials. During June, 1989, 16 innovative Iowa agriculture teachers were asked to develop model groundwater education programs and were invited to a 3-day workshop on groundwater education. The workshop acquainted these teachers with background information, included a detailed review of the curriculum, and involved them in peer teaching using the lesson plans developed. These key teachers then assisted in providing a 1-day in-service workshop for other teachers during July 1989. The in-service was designed to motivate teachers to use the instructional materials, to provide an overview of groundwater issues related to agriculture, to acquaint teachers with the concepts and content in the materials, and to outline ways to infuse groundwater education into their instructional program.

The in-servicing was very effective as illustrated by the following comments recorded on teachers' evaluation forms: (1) well-researched materials; (2) excellent materials, very

well written, exciting possibilities, terrific setting, facilities and meals; (3) new fresh activities, user friendly, and quality interest approaches; (4) complete package of materials, information, activities, and references; and (5) very relevant, promoting problem solving and higher order thinking skills.

The feedback from teachers strongly suggests that they plan to use the materials either to initiate a new unit in their curriculum or to infuse sustainable agriculture dimensions into existing units on crop production and livestock production.

The instructional materials were designed for Iowa secondary school agriculture programs; however, the materials are appropriate for use in other states, in other vocational classes, and with youth and adults in nonformal settings.

One of the unique features in the materials is the demonstration of a groundwater flow model made of plexiglass filled with layers of sand. This 30 x 15 x 2 inch model is designed to represent a slice of the earth's surface with features such as wells, leaking underground tank, leaching field, sink hole in bedrock, leaking lagoon, artesian well, shallow and deep aquifers, and a stream. Food coloring is used to demonstrate how groundwater moves, how groundwater becomes contaminated and the connection between surface water and groundwater. Most people can visualize the surface water contamination process but few understand groundwater pollution principles. The flow model helps students visualize groundwater contamination. It attracts attention and interaction as the students track the colorful red and green dye that simulates pollution plumes.

Each of the 16 teachers who attended the 3-day groundwater workshop and who are conducting model groundwater education programs were given a flow model and were taught how to demonstrate it. Since the workshop, many other Iowa teachers have purchased a flow model for their schools.

From Teacher and Student to Community

Through the Soil Conservation Service and Iowa State University partnership, teachers and students are networking with federal, state, and local agency people in developing community action programs to help carry out federal and state policy. The Iowa Groundwater Protection Act is landmark legislation with a special emphasis on research and education. Agriculture teachers and students are helping with the educational thrust of the legislation. The groundwater flow model is the center of attraction when students provide demonstrations at county and state fairs and community activities.

The Result

The instructional materials, entitled "Groundwater Protection Through Prevention," are available in 230 Iowa secondary and area schools with agriculture teachers trained in their use. The materials will assist agriculture teachers in providing systematic groundwater instruction, and at the same time demonstrate the capacity of vocational education to address contemporary issues and assist in implementing public policy. Teachers and students are becoming very visible in their communities as they take leadership for a new educational program receiving state and national attention.

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International Agriculture

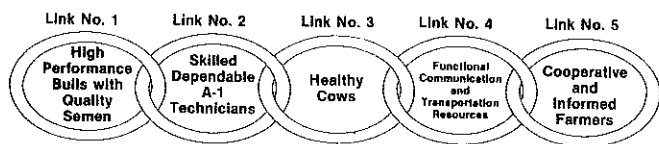
Improving Artificial Insemination Programs in Nigeria

Dairy cattle in Nigeria serve a dual purpose: milk and meat. These products are expensive and in short supply. Therefore, vast opportunities are available for marketing these products to Nigeria's approximately 100 million people.

The use of artificial insemination (AI) on dairy cattle in Nigeria could improve genetic capacity, thus enhancing milk production. The genetic capacity for milk production by indigenous dairy cattle can be improved by selecting and using semen from bulls with the desired characteristics for high milk production. Improved nutrition, disease control, and other management practices also influence milk production. As illustrated in Figure 1, a viable AI program includes:

1. High performance bulls with quality semen.
2. Skilled, dependable AI technicians.
3. Healthy cows.
4. Functional communication and transportation resources.
5. Cooperative and informed farmers.

Figure 1.



The linked essential elements of a viable artificial insemination program.

If any of these essential elements are lacking, the entire AI program fails.

According to Van Raay (1975), Nigeria has approximately 2.5 million farmers who raise cattle. These farmers primarily consist of the settled and nomadic Fulani who raise 90 percent of the dairy cattle in Nigeria. The estimated number of nomadic Fulani farmers in Nigeria is somewhere between 25,000 and 500,000 (Livestock Review Mission, 1981; Riesman, 1979).

Dairy cattle represent the main source of livelihood for the Fulani farmers. The average herd size is between 40 to 50 head. The Fulani are incessant wanderers in search of grass and water for their cattle. They are bound by tradition, unwilling to sell their cattle, difficult to administer, and are a problematic group of people who, some feel, need to be settled or semi-settled.

Relatively little work has been done to demonstrate the feasibility of artificial insemination in dairy cattle to the Fulani livestock farmers. Their nomadic grazing tradition, lack of communication, unsteady supply of electricity, transportation, and cooperation, and general lack of information about modern technology present social problems for a successful AI program for their dairy cattle.



By CHRISTIAN OJOMO

(Mr. Ojomo is Graduate Student, Department of Agricultural Education, Ohio State University.)



The nomadic Fulani create special challenges for agricultural educators in Nigeria. (Photo by Christian Ojomo).

Artificial insemination sub-centers have been established in areas throughout the country. The Federal Government AI program provides free insemination of all cows owned and managed by the Fulani livestock farmers. An adequate number of extension workers and artificial insemination technicians are available to transfer the knowledge and perform the AI procedures. There is interest by the Fulani in knowing about artificial insemination as a viable alternative to natural breeding. However, the AI program does not function well.

A study was conducted to determine if the essential elements of a viable artificial insemination system were functioning for the Fulani farmers. The study attempted to determine the:

1. Accessibility of quality semen for AI purposes.
2. Availability of skilled AI technicians.
3. Current health status of the Fulani dairy cattle.
4. Availability of communication and transportation resources for implementing an AI program.
5. Level of knowledge of the Fulani livestock farmers in relation to artificial insemination procedures.

The study revealed that quality semen is not available. The semen used for breeding the Fulani cows was purchased by the Nigerian government outside of the country. There are no breed registry associations, private herd records, or dairy semen production organizations in Nigeria. The processing of White Fulani semen is done in Nigeria by the National Animal Production Research Institute (NAPRI) by qualified people who have been trained to collect, process, store, and ship frozen semen. However, due to technical difficulties, the NAPRI laboratory is not always in operation.

AI technicians are usually trained by veterinarians. Records are not kept to indicate whether or not the AI technicians are performing their AI work properly. While collecting data for this study, the researcher, who is a trained and certified inseminator, observed AI technicians performing their work in a less than desirable manner. AI technicians may need additional training and supervision to upgrade their insemination skills.

There was little indication of serious health problems among White Fulani dairy cows. However, during the dry season, feed supplies are limited. The White Fulani dairy cows are frequently moved in search of feed. Findings revealed that cows on native pasture during the climatic dry and wet seasons are not in good nutritional health for breeding purposes.

There are no adequate communication and transportation resources to serve the AI program for the Fulani farmers. Artificial insemination technicians and veterinarians do not have their own vehicles to transport themselves to and from the AI sub-centers. They also lack telephone services in their homes to communicate with the farmers. All communication is by personal contact. Survey results revealed that functional communication and transportation resources are inadequate in all areas and totally absent in some areas.

The Fulani livestock farmers have little knowledge of artificial insemination. The Fulani livestock farmers who are nomadic have not had an opportunity to learn and understand artificial insemination procedures. Only 120 (less than 1% of the population) Fulani farmers indicated they have had AI performed on their cattle by the AI technicians. They know little or nothing about AI performance-tested bulls, cattle diseases, AI breeding procedures, or the role of nutrition in milk production.

Nigeria faces substantial obstacles in its efforts to become self-sufficient in the production of meat and milk products to bring improved welfare to its people. The AI agents are

inadequately trained and supervised, the AI program lacks effective coordinating administration, and there is no performance testing. An integrated approach must be used to solve these problems through information obtained from research and disseminated by extension agents to the settled farmers and the Fulani livestock farmers.

Selected White Fulani bulls should be performance tested in order to verify their genetic abilities to bring about improvements in the local breed of cattle. Factors such as heat tolerance, resistance to internal and external parasites, walking ability, water economy, and ability to withstand periodic shortages of feed are factors which are recommended for study by dairy researchers.

Additional technical AI training should be given to the AI technicians to upgrade their insemination skills and knowledge. Proper methods of thawing semen, straw insemination, and cattle identification should be identified. Breeding records should be kept so that AI technicians' skills and other factors may be properly evaluated.

Feed reserves should be established or developed for use during seasonal feed shortages. These feed reserves will also help increase milk production because they will provide adequate nutrition for production and reproduction. Evaluation of feed materials and pasture supplementation to produce a balanced ration for increased milk production and reproduction are also recommended.

There should be a long-term national livestock development policy and major national commitments for increasing meat and dairy production. Synchronization techniques and procedures should be practiced on cows to reduce communication and transportation problems.

A feasibility study on how the nomadic Fulani livestock producers could be educated about AI is recommended. The Fulani farmers should learn and understand the links between the essential elements of a viable artificial insemination program for Kaduna State, Nigeria. Farmers' cooperatives and cow testing programs should be established to support farmers' goals and AI program needs. There is a strong need for extension personnel to introduce and develop effective educational programs that will accelerate the feasibility of AI by the Fulani livestock farmers.

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About the Cover

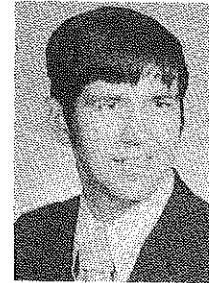
The diversity of materials and thoughts on agricultural literacy is illustrated with the Cover Photo.
(Photo courtesy of Melissa Gayle Crowder, Agricommunications student, Mississippi State University).

Being the Odd One in a Profession

Being in the minority can be a very uncomfortable and unsettling position. Women who comprise over 50% of our population are still the minority in the many professions. Agriculture occupations and the agricultural education profession is such an area. We find if we look at early documentation that women have played an important role in agriculture in raising and harvesting the crops as well as care of the livestock for many years. Today, many modern women are entering agriculture by managing and operating family/corporate owned farms as well as working in or operating agribusinesses.

In the State of New Hampshire we have over 1,500 women employed in farming, forestry and fishing industries. That's almost 20% of the work force based on information from the New Hampshire Department of Employment Security in 1986. Still a significant minority and a figure to improve upon.

In the agricultural education classroom we find a profession that has been dominated by males for years. As Ellen Doese pointed out in her article entitled "Opportunities and Challenges Facing Female in Agricultural Education" which appeared in the April 1987 issue of the *Agricultural Education Magazine*. Women teachers often hear, "So you're a vocational instructor, huh! I thought your husband would be the agriculture instructor." (p. 5) It is not easy entering a profession that has been dominated by males for so many years. In the twelve states of the Eastern Region females currently fill fourteen percent of our teaching positions. (1988 Agriculture Teachers Directory). We have come a long way since 1969 when the FFA officially admitted women into its membership for the first time, but we still have a long way to go.



By MARY HEWITT AND DAVID L. HOWELL

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(Dr. Howell is Associate Professor, Department of Vocational-Technical and Adult Education, University of New Hampshire.)

Note: The numbers and percent represent the number and percentage of the total teachers, teaching each subject area.

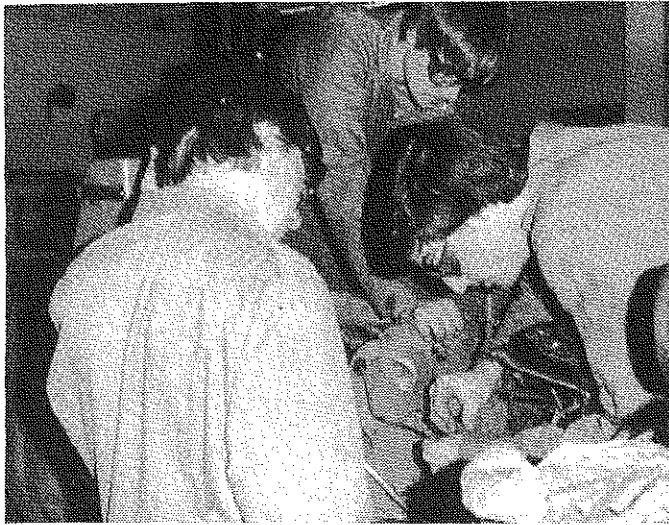
In a survey of the 151 female agricultural education instructors in New England we had 116 (77%) respond, almost 70% of the respondents were in multi-teacher departments so most are able to specialize in a subject area. Table 1 identifies the subjects they are teaching. It shows that forestry is the area with smallest involvement by female teachers and all areas of horticulture closely followed by production agriculture as having the highest representation. We also see many teachers are involved in teaching more than one subject area of agriculture.

As a part of the study the teachers were asked what they considered as nontraditional subjects for women and if they would be willing to teach in that area to remain in the profession. Agricultural mechanics was identified as the most nontraditional subject for women from the twelve Eastern Region States and the majority indicated they would be willing to teach such a course to stay in the profession. It was also shown that women in single teacher departments were more willing to make such a move than those in multi-teacher departments. After teaching at least three years women feel more accepted by administrators, peers, businesses, students, parents and the community in teaching nontraditional subjects. Ellen Doese points out in her article the students test you because you are a female in a traditional male area and the administration and community wait for you to establish a favorable relationship. You must prove yourself.

Table 1

Subjects Currently Taught by Female Vocational Agriculture Teachers in the Eastern Region

Subject	Number	Percent
a. Horticulture:		
Ornamental	46	49%
Floriculture	52	56%
Nursery/Landscape	44	47%
b. Forestry	16	17%
c. Agribusiness	30	30%
d. Animal Science:		
Production Agriculture	43	46%
Small Animal	28	30%
e. Agricultural Mechanics	43	46%
f. Other	29	31%



Putting tractor electrical system back together after having replaced defective clutch pilot bearing. (Photo by Mary Hewitt)

Entering teaching, the first few years are difficult but unfortunately being female makes those first years even more difficult, especially in a single teacher program or in teaching nontraditional subjects. Support groups could help in our profession as they do for many others. If you have a new teacher in your area or are a new teacher, be sure to maintain close contact with others in the profession. We can all help and knowing the view of our female peers as a minority gives us all the greater reason for giving a helping hand. Being the odd one is never a comfortable position, let's support them.

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Food for America

(Continued from page 14)

A listing follows of the program materials that are included in each grade level:

Grades 1-3	Grades 4-6
Production Agriculture	Production Agriculture
Processing	Processing
Distribution	Distribution
Trade and Marketing	Trade and Marketing
Nutrition	Nutrition
Food Safety	Food Safety
Environment	Environment
Careers	Careers
History and Social Development	Agricultural Policy

Each lesson lists the academic skills the students use, whether it be math, geography, science or language arts. Teachers can integrate the materials into their regular classes, and teach agriculture through their traditional subjects.

Another benefit to the program's new format is that it allows for updating. Supplementary lessons will be sent out in several mailings over the next two years as new lesson topics in agriculture are developed.

The Food For America program has been sponsored by Mobay Corporation as a special project of the National FFA Foundation since its inception in 1975. The new materials have been produced by Spectrum Communications, Inc., in Kansas City, MO.

Helping Implement Groundwater Protection Policy

(Continued from page 16)

Resources

For a copy of Groundwater Protection Through Prevention write to IAVIM, 208 Davidson Hall, Iowa State University, Ames, IA 50011. The groundwater flow model is available from the Student Chapter of the Soil and Water

Conservation Society, 2216 Agronomy Hall, Iowa State University, Ames, IA 50011 for a cost of \$375, which includes handling and shipping.

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Knowledge Base and Content of Agricultural Education

Since their inception, agricultural education programs have been a part of the comprehensive high school system throughout the nation. Supposedly these programs offer to students a definite body of knowledge that is unique. Some would say the agricultural education program takes existing bodies of knowledge and presents them in unique ways. For many years, agricultural education focused on preparation of future farmers. Over twenty-five years ago, there was a call to broaden the scope of career/occupational preparation in programs in agricultural education. Some programs changed and broadened the subject matter offerings. Many programs did not change (*Understanding Agriculture*, 1988).

Production agriculture — farming — still dominates most programs, although it no longer represents a major proportion of the jobs in the total agricultural industry. Traditional programs are not meeting the broader needs for agricultural education generated by changes in the food and fiber industries and society as a whole (*Understanding Agriculture*, 1988, p. 3). With a more recent call for broadening the curriculum in agricultural education and in the face of a total school curriculum revolution, it appears agricultural educators are ready to debate the issue of curriculum content. What should be "in" the agricultural education curriculum? What is the definition of the body of knowledge unique to agricultural education? What content validates agricultural education as a legitimate discipline in the curriculum of the nation's secondary school system?

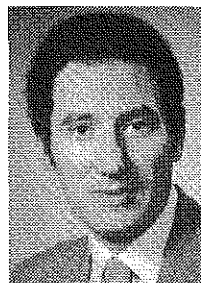
Focus of Agricultural Education

Agricultural education encompasses the applied study of the basic sciences (biology, chemistry, physics) and business management principles. One of the major purposes of agricultural education is to apply to agricultural situations the knowledge and skills learned in several different disciplines. Agricultural education is driven by the needs of individuals, groups and the marketplace and focuses on developing satisfying and socially responsible knowledge, skills and values. Such a focus recognizes the value of and relies heavily on experience as the context in which these knowledges, skills and values are learned (*Reinventing Agricultural Education*, 1990). Agricultural education is unique in that it bridges the gap between and among the basic sciences, communications and computational skills and human relations studies.

Components of the Curriculum

Agricultural education has three critical components around which the curriculum is focused: Technical Agriculture, Experiential Learning, and Personal/Human Development.

If students are to understand modern agriculture, they should have a deep understanding of the "principles of



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agriculture." They in turn should be given the opportunity to put these principles into practice by studying and understanding the "functions of agriculture." Finally, students of agriculture should be given opportunities to fit these "principles" and "functions" into various segments of the agricultural industry through the study of and involvement in real-life situations related to the particular part of the industry being investigated. Figure #1 indicates examples of the principles of agriculture, the functions of agriculture and the technically specific fields of the agricultural industry which could provide the technical focus of the agricultural education program.

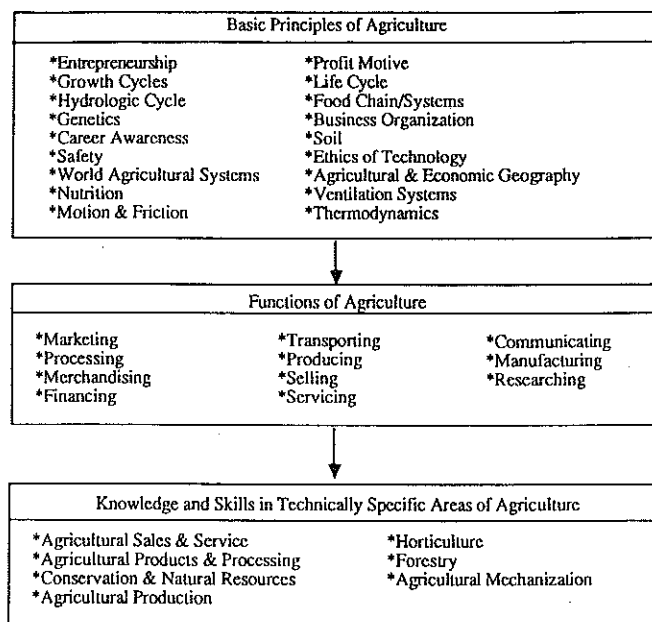


Figure 1. The Technical Agriculture Component

The ultimate purpose of teaching the various forms of knowledge and skills in agriculture is to prepare students to be able to use newly acquired knowledge and skills in meaningful ways. One of the best ways to ensure student understanding is to arrange to make use of knowledge and skills at the time learning is to occur (Marzano, et al., 1990). While experiential learning in general may not be unique to the study of agriculture, the multi-faceted approach to experiential learning in agriculture and its emphasis in the curriculum certainly makes it unusual. In-school and out-of-school experiences which focus on the utilization of knowledge and skills related to the instructional-learning process represents a key component of the agricultural education program. The supervision and evaluation of experiential learning and the eventual recognition of students for excellence in experience make this aspect of agricultural education critical to the mission of the program and a cornerstone to the curriculum.

Agricultural education prides itself on development of human potential. The heart and soul of the program is the student. The intra-curricular nature of the personal/human development and the experiential segments of the program make agricultural education unique.

The personal/human development component focuses on those activities that develop self-esteem, cooperation, citizenship and leadership knowledge and skills. The personal/human development component of agricultural education helps students to sharpen the essential life-long learning skills of comparing, classifying, inducing, deducing, analyzing, abstracting and synthesizing. The fact that all of these activities take place in an intra-curricular program in an agricultural context makes agricultural education one of the most unique educational experiences the school has available.

If we believe that educational programs should concentrate on three major domains of learning — cognitive,

psychomotor, affective — then we must recognize and seek to emphasize that agricultural education addresses these domains with its three major components — technical agriculture (cognitive), experiential learning (psychomotor), personal/human development (affective). All of these components make up the essence of the curriculum and define the discipline of agricultural education.

Summary

Agricultural education goes far beyond knowledge and skills development in that students are able to develop an understanding of the 1) significance of agriculture in a global society; and 2) interdependency and relationship between the agricultural industry and other businesses interwoven with the entire economic and social structure of the community, state, nation and world (*Reinventing Agricultural Education*, 1990). As Curtis (1989) stated, the student is the focus of the program; practical application of science determines the curriculum content; entrepreneurship, decision-making, and problem solving are the goals of agricultural education; leadership and life-skills development are integral parts of the curriculum; and the educational program is community based and experientially focused.

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Sustainable Agriculture — What Does It Mean?

(Continued from page 13)

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Time To Teach Teams

(Continued from page 5)

and were enthusiastic about the project. Those who tended to "always have a better way" were quickly put to work and more times than not, the better way was not as expected.

Furthermore, as I worked with the students as teams I recognized that the team learning approach was a variation of the problem solving approach. Many of the strategies I used to teach students how to solve problems were transferable to the team approach. The teams were quick to use problem solving techniques once they applied the basic principles of the problem solving method.

A final point for consideration is that our present societal structure does provide equal status for team learning as it does for individual learning. Our awards and competitions place a much greater emphasis upon the individual. Even what we call team competitions are really a series of individual competitions with a summative team result. There-

fore, as educators we really need to carefully evaluate our instructional competitions and rewards to include a variety of true team activities. This would be a very valuable investment and contribution to the future of agricultural mechanization education programs.

Team learning is a teaching strategy for some but not all learning situations. When we are teaching some instructional areas like basic electrical wiring, the individual approaches of skill development are probably the best. However, as our students progress we need to incorporate more team learning strategies. In agricultural mechanics education programs we have an excellent opportunity to develop strong programs of team or cooperative learning. It appears that the future workforce will be expected to work in a more cooperative environment. For us to revise our existing programs does not require a major overall, but rather some tuning. Each of us should attempt to incorporate and develop some of these new strategies and, if we work as a team, therefore provide innovative instructional programs for our students.

Leadership for the Profession?

(Continued from page 3)

group an association of individuals (teacher educators), rather an association for promotion of a program (agricultural education). Now, it is time for the teachers association to demonstrate a similar sense of enlightenment.

It appears there are several ways in which human effectiveness workshops might be provided. Hopefully, *The National Council* can work on providing such opportunities. What better way of assuring a national presence for agricultural education? There are a number of individuals in the profession who have the background and experience to help with future workshops, fine tuning them to the specific needs of agricultural education. Similar workshops held on a regional basis would seem to be an excellent idea. It appears the best investment agricultural education can make towards its future is to invest in effective member/leaders capable of providing leadership for the profession.

SHARE YOUR VISION

"Agricultural Education 2025"

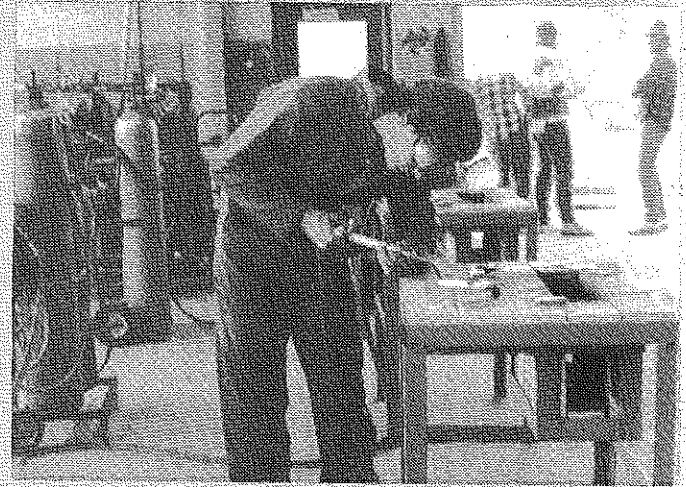
Theme for June, 1991 issue
A Futuristic Look at Agricultural Education

Theme Editor:
Dr. Lou Riesenberg
University of Idaho
Deadline: March 1, 1991

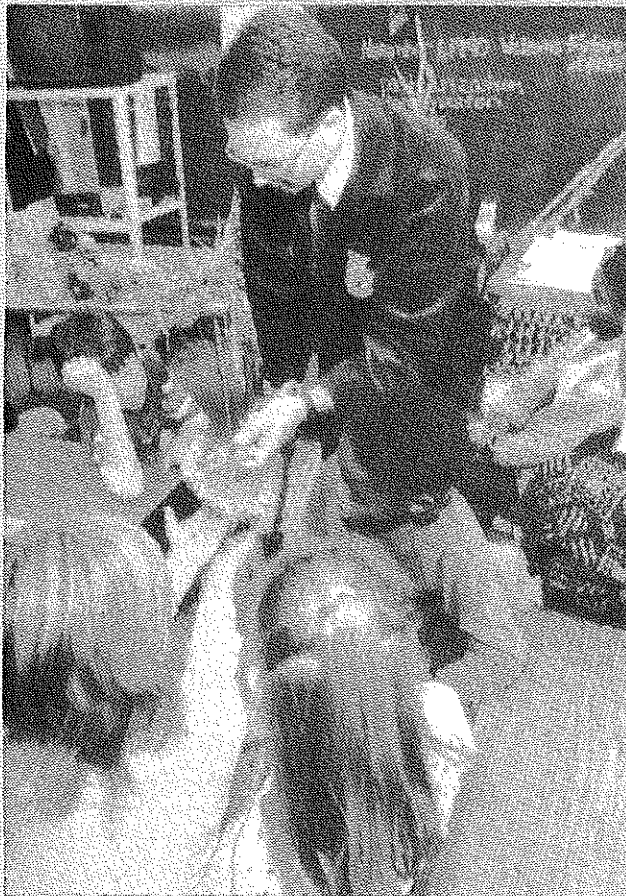
Stories in Pictures



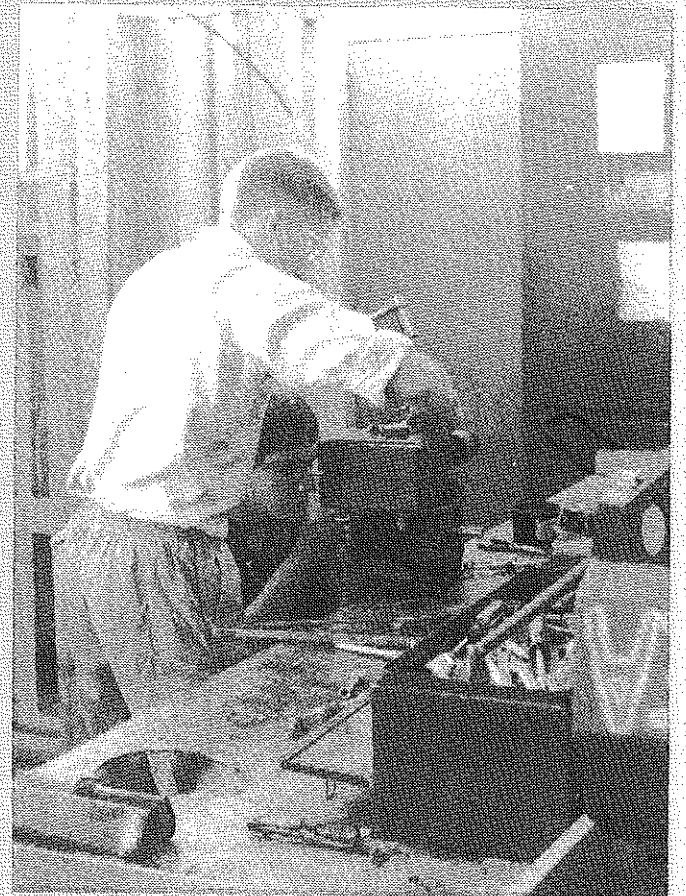
Good insects and bad insects were the topic of this lesson. (Photo courtesy of Bill Stagg).



State Agricultural Mechanics Contest Winner, 1990 performing a fusion weld. (Photo courtesy of Mary Hewitt).



An FFA member teaches elementary students about sunflowers and how they are processed into seeds and oil. (Photo courtesy of Bill Stagg).



State Small Engine Contest Winners 1988 involved in trouble shooting and engine. (Photo courtesy of Mary Hewitt).