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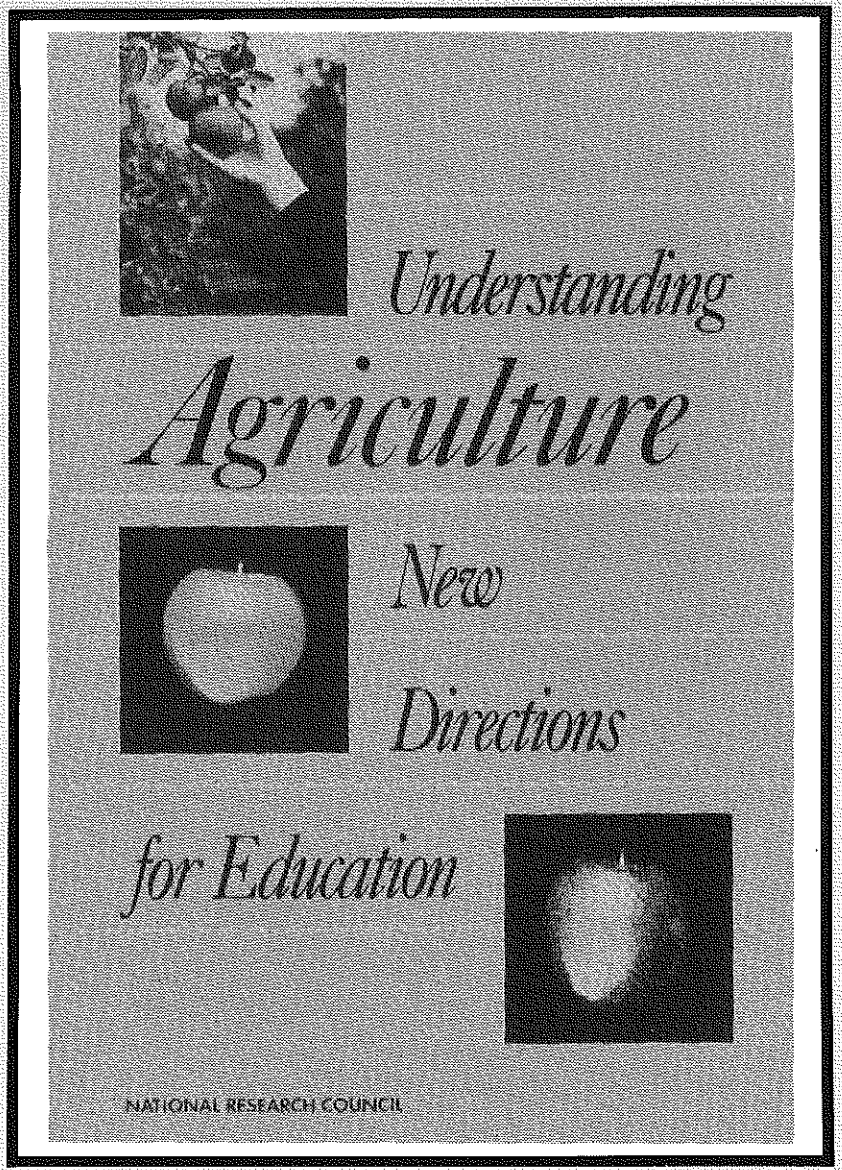

THEME: Why Agricultural Literacy

THE
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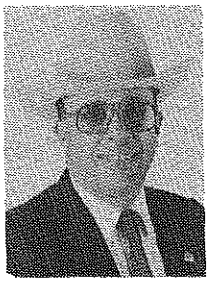
Agricultural Literacy — Why!



By Phillip R. Zurbrick, Editor

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

This month's theme looks at the rationale and/or philosophy supporting the "about agriculture" portion of the agricultural education spectrum. As noted in the report of the National Research Council, *Understanding Agriculture: New Directions for Education*, agricultural education must become more than vocational agriculture at the secondary school level. The intent for this month's theme was to explore the philosophical base for a non-vocational program in agricultural education. Next month's theme articles will attempt to describe ways in which agricultural literacy is currently being delivered. The fact that only four articles were prepared for this issue may be symptomatic of the dearth of writing and or thinking on this subject within the profession.

Certainly, the teachers, teacher associations and others who are simply changing their names from vocational agriculture teachers to agricultural science teachers are not contributing to the development of an expanded mission for agricultural education. Such simple-minded approaches will prevent the development of the vision of an occupational preparation program **and** an agricultural literacy program in agriculture. It is essential that the profession carefully make the distinction between the two programs and develop a philosophy, delivery system and goals for each.

The need for the "about agriculture" program is outlined in the National Research Council's report. It might serve the profession well if everyone would reread the section outlining the need for agricultural literacy. Horn and Vining's 1986 study in Kansas that showed less than 30% of a sample of students in that state would answer basic agricultural questions was used to illustrate the need for an educational program "about agriculture." Similar studies have been conducted in other states and need to be administered nationwide.

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

Perey (1989), in a study on agricultural literacy recently completed in Arizona, found that students in a rural school district were very deficient in terms of agricultural literacy. His results seem to support and parallel the results in Kansas when using a written examination modified from the one used in Kansas. Perhaps the most significant finding reported by Perey was that in his 11th grade student sample those who had enrolled in vocational agriculture were, on the average, no more agriculturally literate than those who had not enrolled. This suggests that the vocational agriculture curriculum is not suited for developing agricultural literacy as envisioned by the six concepts listed above. The implication of this finding is that the profession must prepare a new and different curriculum using a different delivery system if we hope to develop an agriculturally literate public. Teaching the same old thing and calling it an agricultural literacy program will not work and will surely doom the concept of an expanded mission for agricultural education.

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

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About The Cover

The National Research Council Report issued September 13, 1988, has focused attention on the need for educational programs "about agriculture." This month's theme is directed at the rationale for such programs.

THEME

Agricultural Literacy: Challenge of the Nineties

By James G. Leising, Theme Editor

(Dr. Leising is Supervisor of Teacher Education, Department of Applied Behavioral Sciences, University of California, Davis.)

Since December, 1988, when the National Research Council published their report, Understanding Agriculture: New Directions for Education, the profession has been discussing how the focus of agricultural education must be broadened to encompass a larger audience than traditionally served by vocational agriculture. Some see the teaching of general agriculture (agriculture literacy) as diluting the traditional career/vocational program. Others see the need for agricultural literacy as a challenge and opportunity to integrate agricultural knowledge across the curriculum in an effort to create a truly agricultural literate population and motivate more students to pursue agricultural careers.

This issue of the magazine addresses the rationale for agricultural literacy from industry, education and government perspectives and offers definitions of agricultural literacy and subject matter content. One of the major issues that must be addressed concurrently with determining "What to teach," is how the identity of the career/vocational program can be maintained and strengthened. One model that is being studied in California involves the identification of two programs, general agriculture and career/vocational. It is envisioned that the programs will share a common core of agricultural knowledge and aquaculture career exploration in grades seven through ninth. In grade ten, students would have the option to begin a sequence of courses in career/vocational preparation in agriculture or a sequence of courses that are oriented around major agricultural and environmental issues (see figure 1).

I believe that new program models of agricultural education must be studied, field tested and discussed by all members of the profession if we are to develop successful programs that will serve a larger segment of the population. The window of opportunity may disappear as quickly as it developed if we do not act quickly and decisively. Just as the agricultural industry is changing from an era of production only and specialization only to an area of systems integration, so agricultural education too needs to enter an era of integration and interdependence in the educational enterprise.

AGRICULTURAL EDUCATION CURRICULUM MODEL

Figure 1

Program

Career/Vocational Agriculture	Common core agricultural, environmental and career awareness "Integrated into academic core."	Common core agriculture, environmental and career exploration. "Integrated into academic core" or taught in separate courses.	Agricultural career preparation course sequence that includes supervised experience and leadership development (FFA).
General Agriculture			Specialized sequences of courses that address agricultural and environ mental issues or integrate into academic core.
	K 1 2 3 4 5 6	7 8 9	10 11 12 Post Secondary

Grade Level

Computer Technology Resources

Educational Technology in the Secondary Agriculture Program

Editor's Note:
The guest authors for this month's column are Bob Steward and Robert Birkenholz. They recently completed a study that examined the present and projected use of instructional technology in high school agriculture programs in the United States. This study was commissioned by the National FFA Board of Directors. Many of you participated in the study. We are taking this means to report a summary of results to the profession.

By W. Wade Miller, Special Editor
(Dr. Miller is Associate Professor, Department of Agricultural Education, Iowa State University.)

Instructional technology has become increasingly available for use by high school agriculture teachers. Technological developments have contributed significantly to the acquisition and use of microcomputers in educational settings. VCRs, camcorders, satellite receivers, and computer modems have also become available for use in high school agricultural educational programs.

Many leaders in education have suggested that educational technology and its application in the classroom is of crucial importance to educators and those with an interest in education. McCarney (1987) advocated shifting education from a labor-intensive emphasis to a capital-intensive emphasis and indicated that this could best be accomplished through the classroom use of technology such as computers and video cassette recorders. Others have suggested that educational technology should be used to support and empower the learner.

However, keeping up with technological change was cited as one of the most difficult challenges facing vocational education. Rosenfeld (1986) suggested that keeping up with technology is like chasing a moving target and noted problems in readjusting programs and obtaining needed equipment.

> Supporters of vocational agriculture have agreed upon the need for expanded programs and better resources in the high schools and on the importance of science, technology, and problem-solving in the curriculum (p. 10).

And in 1984, legislation was enacted that:

> for the first time, explicitly addressed and responded to the impacts of technological change. Technology was no longer treated as an unseen force acting on labor market demand, but as a force with known dimensions that should be factored into vocational education instructional policies (p. 13).

Emphasis has been placed on the need to prepare students who are literate in a technological sense. Barbour (1984) reported that there was increased emphasis on the integration of computers in the curriculum, especially in the ninth through the twelfth grades. He further noted that several states have mandated that students develop computer literacy skills as part of the secondary school curriculum. In 1982, the development of computer literacy was the primary objective of microcomputer use in secondary classrooms. However, a recent report has identified enrichment as the principal use of microcomputers in educational settings, followed by computer literacy and remediation (Office of Educational Research and Improvement, 1986).

Edward R. Murrow (cited in Cline and Anderson, 1984) writing about the potential for using television for educational purposes, noted that, "This instrument can teach, it can illuminate; yes, it can even inspire. But it can do so only to the extent that humans are determined to use it to those ends. Otherwise, it is merely lights and wires in a box" (p. 39).

Although this statement was made in reference to the development of television media, the message might also have been written in recent years regarding the introduction of microcomputers and related equipment. Educational planners must focus on how newly-developed technologies will be used in classrooms of the future.

As a result of a proposal funded by the National FFA Board of Directors, a national study of the use of educational technology in programs of agriculture was conducted during the spring of 1988. Table 1 reveals the percent of agriculture programs and schools which reported having the selected items of equipment available for instructional purposes. As can be noted, except for overhead projectors, the greatest number of programs and schools had microcomputers available. VCR players were more often available in the school rather than the agriculture department setting.

Additional information collected indicated that Apple microcomputer equipment was most often (54%) available

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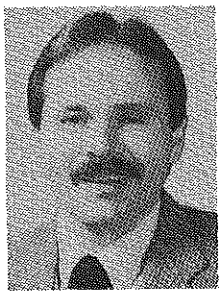
Coming To Grips With Agricultural Literacy



By Marty Frick and David Spotanski

(Mr. Frick is a Graduate Student, Department of Agricultural Education, Iowa State University. Mr. Spotanski is a Graduate Student, Department of Agricultural Education, Iowa State University.)

To many agricultural educators, agricultural literacy is a relatively new term whose mere utterance brings to mind a wide variety of questions: How are we to develop the overview necessary to be comfortable with agricultural literacy, considering the broad scope of agriculture? Why teach agriculture to all students? How can we become effective at teaching about agriculture to all students? Clearly, agricultural literacy means many things to many people, but approaching it with an understanding of what it means in agricultural education can assist us as we prepare to tackle the profession's expanded mission. Some of the thoughts presented in this article have been adapted from a paper entitled, *Scientific Literacy* by Jon Miller and presented at the 1989 Annual Meeting of the American Association for the Advancement of Science.

The Concept of Literacy

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

The evolution of these definitions helps characterize the basic concept. The level of skill (knowledge) needed to be literate changes over time; it is a relative measure without absolute standards.

Moreover, determining the threshold level for literacy is not an exact science. Instead, it is a judgment by experts as to the minimum level of knowledge required by someone to function in a certain role and setting. The literature indicates that there are several tests or measures of functional literacy which testify to the diversity of skills deemed necessary for individuals to function in society. A comparison of several functional literacy tests has found that all are testing a common domain of skills; thus there is some agreement on the kinds of skills and knowledge required in order to be classified as functionally literate.

Functional agricultural literacy does not imply a perfect level of understanding about agriculture, but rather a minimum level. Horn & Vining's 1986 finding that fewer than 30 percent of a sample of Kansas students could give correct answers to basic agriculture questions indicates the magnitude and seriousness of the task before us.

A Three Dimensional Approach to Agricultural Literacy

Deciding what to teach about agricultural literacy can be a substantial task. Although each educational setting will influence what can and should be taught, general subdivisions within the topic could prove useful. Regardless of the subject, implementation of agricultural literacy initiatives demand the emphasis of three major causes: 1) an understanding of the applied processes or methods of agriculture, 2) the basic vocabulary of agricultural terms, and 3) the impact of agriculture on society. No matter what agricultural subject is taught, these three themes must be incorporated to ensure the development of agricultural literacy.

Understanding The Processes and Methods Used by Agriculture

Countless generations of farmers had an understanding of the interactions of livestock, soil, crops, water supply, climate, and supply and demand. The strongest argument that agriculture should be treated as a separate science has come with the rise of cybernetics, or system theory — the theory of how the diverse elements of systems interact over time to produce change. Today, the agricultural system and its processes extend beyond production to include the preparation of food and clothing. These processes are better understood than ever before, and, through agricultural research, they have been quantified and controlled. The science of agriculture is positioned in the center of a broader system with the ability to integrate human society with its physical environment.

Vocational agriculture is also positioned in the center of the school system and has the ability to integrate students with their physical environment. Teachers can build agricultural literacy by continually identifying and applying the scientific principles involved. As students come to understand those principles, they begin to develop an understanding and appreciation of how agriculture affects their environment. They also begin to speculate about what problems might cause agriculture to be less productive. Eventually, they learn to evaluate agriculture in terms of a system that affects them personally.

Although complex systems exist with agriculture, illustrating the interactions of "mini-systems" may best fulfill

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THEME

Reinforcing The Common Bond Between Urban and Agricultural Interests

By Len Richardson
(Mr. Richardson is Editor of **California Farmer and Agrichemical Age** *magazine.)*

I was on the San Francisco Bay Bridge when the Big E (Earthquake) struck and our slightly damaged building in San Francisco wasn't reopened for a week — the period when I had planned to write this article.

Like San Francisco, agriculture has experienced economic and public perception quakes — from the economic crisis of 1981 to the Temik watermelon scare, Alar, and a report from the National Academy of Sciences that confirms agriculture's greatest fear that indeed agriculture must change.

It is also clear that agricultural decisions now reverberate like aftershocks around the globe. Alar-free apples were being advertised in London and Hong Kong shortly after the "60 Minutes" broadcast. And what reverberates through agriculture is certain to shake up that other big E (Education).

In fact, a year before the National Academy of Sciences (NAS) released its "Alternative Agriculture" report, it filed another blockbuster: "Understanding Agriculture: New Directions for Education." This report called the status of agricultural literacy "disturbing," and said most Americans know very little about agriculture, its social and economic significance in the United States, and, in particular, its links to human health and environmental quality. In addition, few systematic educational efforts are being made to teach or otherwise develop agricultural literacy in students of any age.

But just as interesting, in the same report, the 17-member panel of educators and agricultural experts criticized vocational agriculture programs in high schools and called on the Future Farmers of America (FFA) to broaden its accessibility by changing its name and "revising its symbols, rituals, contests, awards, and requirements for membership." As you know, many of these recommended changes have already been made or are being acted upon.

The report also struck at the very infrastructure of teacher education. "Unfortunately, the federal and state systems of vocational agriculture require that instruction in agriculture in secondary schools be designed primarily, if not exclusively, to teach agriculture as a career. These systems tend to preserve the status quo," observed Daniel Aldrich, chancellor emeritus at UC-Irvine who headed the committee.

In other words, the Academy's agricultural education report, like so many others that have followed, is saying that agriculture has been living in its own sturdy, but isolated, special interest "production only" farmhouse. And just as I discovered when abandoning my car on the Bay Bridge, we all have a common ground — even when it shakes. Agriculture has been shaken by the economic farm crisis which started in 1981 and is now reeling from the aftershocks of a food safety crisis.

In short, the era of production only and agricultural specialization is giving way to the era of systems integration. It is a change so big that it will affect all of agriculture's major supporting institutions and programs, including agricultural education.

As such a change shakes its way across agriculture, many agricultural leaders, including agricultural education leaders, feel a genuine sense of frustration over the fact that agriculture is still productive and as a whole has been acting responsibly on such issues as food safety. Beyond this, agricultural leaders have made a point of telling our writers of the invalidity of the food safety concerns, especially in light of other issues with long-term consequences. For example, they despair at the urban encroachment into farm land in California and elsewhere.

"In a few hundred years this land is going to be gone," says Larry Taber, president of the California League of Food Processors. "Our great-grandchildren are going to say, 'What the hell did they do?' "

There are signs, other than scientific reports, to confirm that the era of production, independence, and specialization is giving way to interdependence and systems integration. For one thing, our domestic agricultural economy and government farm programs are no longer independent of the full economy — fiscal, monetary, foreign exchange, trade — and our foreign policy now affects agriculture as much as farm policy.

For another, the old iron triangle (USDA, general farm organizations, and agricultural congressional subcommittees) no longer direct agricultural policy. In recent years, this triangle has been replaced by farm commodity and other special interests who seek trade-offs, not for the common good but for individual goals. But since special interests do not represent a comprehensive agricultural or environmental direction, the agenda is being set by issue-oriented consumer and conservation interests — conservation in the 1985 Farm Bill, and environmental interests in the 1990 Farm Bill.

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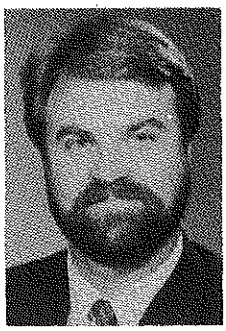
FEATURE COLUMN

The Software Sampler

Software Development — What Is Needed



By Jeffery A. Wood

(Dr. Wood is an Associate Professor and Coordinator of Agricultural Education, Department of Agriculture, Illinois State University.)

How are computers and computer software used in agricultural education? How prevalent is this technology in our instruction? Are microcomputers and related software utilized for instruction? Drill and practice? Tutorials? What is the typical profile of those who use computer technology in the agricultural classroom? These questions must be answered in order for new research and development to take place in instructional technology and software development.

Many studies have been concluded over the last several years which have dealt with computer competencies needed by users and several surveys have been made concerning what type of hardware is used most extensively. Sutphin and Berkey (1985) conducted a study in New York State in 1985 in which they compared computer use among vocational agriculture teachers and Cooperative Extension agents.

They concluded that New York teachers used computers less often that their cohorts in Cooperative Extension. More important, however, was the identification of priority needs for software development in the areas of problem solving, tutorials and simulations. What advances have been realized since the findings of the Sutphin and Berkey research? Have we an adequate supply of quality software to be used in the agriculture classroom for problem solving or simulation exercises or tutorials?

Miller and Kotrlik (1986) published the findings of their research which dealt with microcomputer use in vocational agriculture programs across the entire United States. Their findings reinforced the fact that microcomputers are an important educational tool in the modern vocational agricultural classroom. They reported that thirty-nine percent of the study respondents had computers in their classrooms which indicates significant numbers of vocational agriculture teachers utilize the rapidly emerging education technology. Miller and Kotrlik reported that teachers are comfortable with the amount of "program management software" which is available for classroom use and feel likewise about the availability of agricultural software.

Teachers who responded in the Miller and Kotrlik study indicated that word processing was the most common use of microcomputer software by students (10.29 hours per month per student), and that teachers used communications software (10.07 hours per month) followed closely by word processing (10.05 hours per month) software. The Miller study revealed that in the area of computer-aided instruction, students use simulation software the least (6.73 hours per month per student) followed by tutorials (9.23 hours) and problem solving (9.27 hours). Teachers reported that they use simulation software the least amount of time, then tutorial and problem solving software respectively.

Recent research indicates that teachers use microcomputer technology most often for administration and planning purposes (Stewart and Birkenholz, 1989). Does there exist a need for quality software for use in instruction?

The results of these studies suggest a need for quality computer software within agriculture. Should efforts be made at developing quality simulation, tutorial and problem solving software for use in vocational agriculture classrooms? Would teachers and students utilize high quality software for use in agriculture?

Developing Quality Software

Who should take the responsibility for developing quality software for agriculture students? The most likely group to be tapped for development purposes is the practicing teacher. No other single group knows better what is needed for use in the agricultural classrooms. This, however, may be too burdensome a task even for the most capable of software writers among practicing teachers. Other sources which could develop software are commercial software houses and educators at colleges and universities. The promise of software development through commercial houses may also be too optimistic since the market for agriculture specific software may not warrant the investment. On the other hand, software development from our colleges and universities should be expected by the profession.

It is logical for educators in colleges and universities to have a major role in developing quality software to be utilized in agriculture classrooms. Development centered at colleges and universities would likely include components of field testing and subsequent revision of any software. Our systems of higher education are structured to provide that service along with software development. It is imperative

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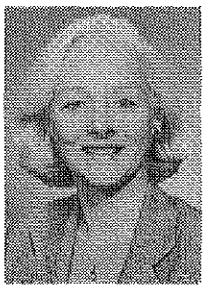
Why, "Ag In The Classroom"



By Shirley Traxler

(Dr. Traxler is Director, National Ag In the Classroom, United States Department of Agriculture, Washington, D.C.)

When my mother taught school in the early 1900's, she rode horseback ten miles round trip through fields and farmyards to teach students in every grade, first through eighth. The school year was determined by planting, cultivating and harvesting schedules. At that time, most of our population was involved in farming. The textbooks this young school teacher used to instruct her students were filled with information about agriculture and students were never asked the question, "Where does milk come from?" They all knew, many from first-hand experience milking cows or completing other farm chores before skipping off to school.

How times have changed. Just this summer, a class of elementary students visiting a dairy farm watched as the cows were being milked to get an up-close lesson on where milk comes from. One young lad leaned over to another and said, "That may be the way they get their milk, but we still get ours from the carton."

This boy was hard to convince because he, like most youngsters of his generation, had no close ties to the farm. For him, milk originates at the grocery store.

How did we, as a nation, arrive at this stage of agricultural illiteracy?

In the 1920's, 30's and 40's, as the farm population shrank and agricultural emphasis decreased in schools, books and educational materials, educators focused on agriculture as an occupational specialty, rather than as an integral part of almost every student's life. Agricultural education was mainly offered to those few students who wanted to make farming their career.

During this period, a small nucleus of educators and others persistently pushed for more agriculture in education. They recognized the interlocking role of farming and food and fiber production with environmental quality, including wildlife habitat, clean water, and the preservation and improvement of forests. They kept interest in agriculture and the environment alive when interest by the public as a whole was declining.

During the 60's and 70's, as experienced agriculture, conservation, and forestry organizations realized the need for quality materials, many excellent films, filmstrips, literature, and classroom aids were financed and produced by businesses, foundations, nonprofit groups and associations, as well as state and federal agencies. However, there was no coordination, hence there was little exchange of ideas among the groups.

But considering the importance of agriculture to our national well being, and realizing the population was increasingly further removed from the farm, the U.S. Department of Agriculture (USDA) invited representatives of the agriculture, government, and education sectors to a meeting in Washington, D.C. to discuss the lack of agricultural literacy and to determine a course of action to correct the deficiency. This meeting marked the start of Ag in the Classroom at the national level.

A national task force was selected from this group to guide the program. The task force wisely decided that the program maintain its grass roots approach since education decisions are made at the state and local levels. They also decided that the USDA would serve as coordinator and be the communications link among the states. It was the Department's responsibility to solicit and encourage the support of national groups. As a result, AITC has the endorsement of all former Secretaries of Agriculture, the National Association of State Departments of Agriculture, the National Conference of State Legislatures, most of the governors of the states, and the major agricultural organizations and commodity groups.

An Action Plan was developed to help states initiate their programs. USDA conducted five regional meetings where concerned individuals could discuss the issue and develop strategies for establishing Ag in the Classroom programs.

Each state approaches Ag in the Classroom from the basis of its own needs and resources and is responsible for organization, funding, public outreach, materials development and teacher training. The most successful state programs are a result of cooperation among agriculture, education, volunteers and government.

Many states began Ag in the Classroom efforts by developing materials for fourth grade since that is when most students are introduced to the study of their state's history and geography, subjects that agriculture information complements very well.

Teaching materials come in many forms — loose-leaf binders bulging with student activities; video tapes; film strips; posters; treasure chests filled with seeds, miniature farm machinery, and samples of agricultural commodities; games; computer programs; and agricultural readers reminiscent of the Weekly Reader we all looked forward to reading as elementary students.

These are combined with field trips to farms, agricultural research laboratories and agri-businesses; activities which enliven state fair visits such as treasure hunts among the agricultural exhibits; adopt-a-classroom programs where farm families write to students about exciting farm events such

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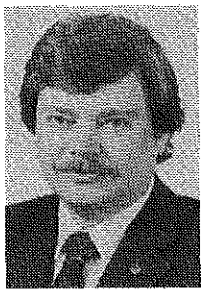
A State Plan For Agricultural Education



By Dale A. Law and Jerry D. Pepple

(Dr. Law is Assistant Professor, Agricultural Education, University of Illinois, Urbana-Champaign. Dr. Pepple is Visiting Assistant Professor, Agricultural Education, University of Illinois, Urbana-Champaign.)

The transformation of American society from primarily rural to primarily urban has resulted in the average citizen knowing very little or nothing about agriculture even though agriculture continues to play a vital role in the nation's economy. An agriculturally illiterate citizenry gives rise to two major concerns for agricultural educators. The first concern is that an agriculturally literate citizenry is vital to the development of well thought out policies covering critical issues affecting the food and fiber system. America cannot afford the consequences of individuals with little or no agricultural knowledge making policy decisions affecting our food and fiber supply. The second concern is with the need for a well-educated, agriculturally literate supply of high school and college graduates who are prepared to enter the labor force in the food and fiber system.

Agricultural literacy may be defined as the development of the individual in the principles and concepts underlying modern agricultural technology. As defined here, it applies to producing, processing, distributing, marketing, and consuming the products of the food and fiber system. It also includes an awareness of the impact agriculture has on the environment, on society, and on everyday living of the individual.

Agricultural educators have long recognized that agriculture is a broad-based growing industry which employs individuals in virtually every community in the nation. The challenge for agricultural educators today is to somehow help the average citizen recognize that everyone's well-being, from the producer on the farm to the commodity traders in Chicago to the consumer, is in some way affected by the vast food and fiber system, and therefore in need of an understanding of some basic agricultural literacy concepts. The USDA Economic Research Service estimates that 22 percent of the total labor force is employed in the food and fiber system (National Research Council, 1988). These individuals are involved in communications, education, science, government, production, processing and distribution, marketing and sales, as well as other agribusiness occupations which serve the farmer or the total agricultural industry.

The National Research Council's Committee on Agricultural Education in Secondary Schools (1988) stated that the focus of agricultural education must be broadened to encompass a much larger audience than traditionally served by vocational agriculture. Their report states that "beginning in kindergarten and continuing through twelfth grade, all students should receive some systematic instruction about agriculture." The point is further made that the majority of American children currently enter school knowing little about agriculture and leave after high school graduation only slightly better informed.

State Planning

In 1987, the Illinois State Board of Education/Department of Adult, Vocational and Technical Education (ISBE/DAVTE) began funding a project to develop a comprehensive plan for agricultural education from kindergarten through the adult level, and to develop a new agricultural core curriculum at the high school level. In order to meet these objectives two committees were organized to develop a conceptual framework for agricultural education and to develop a plan for implementing change. One committee was the **design team** and consisted of agricultural teacher educators, state department consultants and representatives of several interested organizations. The second committee was the **advisory committee** and consisted of nine high school agricultural education teachers from throughout Illinois.

One of the first challenges facing the design team was to conceptualize what agricultural education should be in Illinois. It was determined that the ultimate goal of agricultural education in Illinois (Fig. 1) is to prepare persons to meet the needs of the vast "food and fiber system" of Illinois. Adequately meeting these needs would require **education in agriculture** and **education about agriculture.**

The primary purpose of education in agriculture is to prepare effective workers and entrepreneurs for entry into the food and fiber system and includes two primary areas of concentration; occupational education and professional education. Education in agriculture has been the traditional emphasis of agricultural education programs.

The primary purpose of **education about agriculture** is to prepare effective citizens and consumers for entry into the food and fiber system and also includes two primary areas of concentration: agricultural literacy and personal development. Some personal development has traditionally been emphasized in agricultural education programs. Agricultural literacy has not received much emphasis in the past due in part to the requirement that vocational programs be occupationally oriented.

The second challenge facing the design team was to develop the objectives for each phase to be included in a

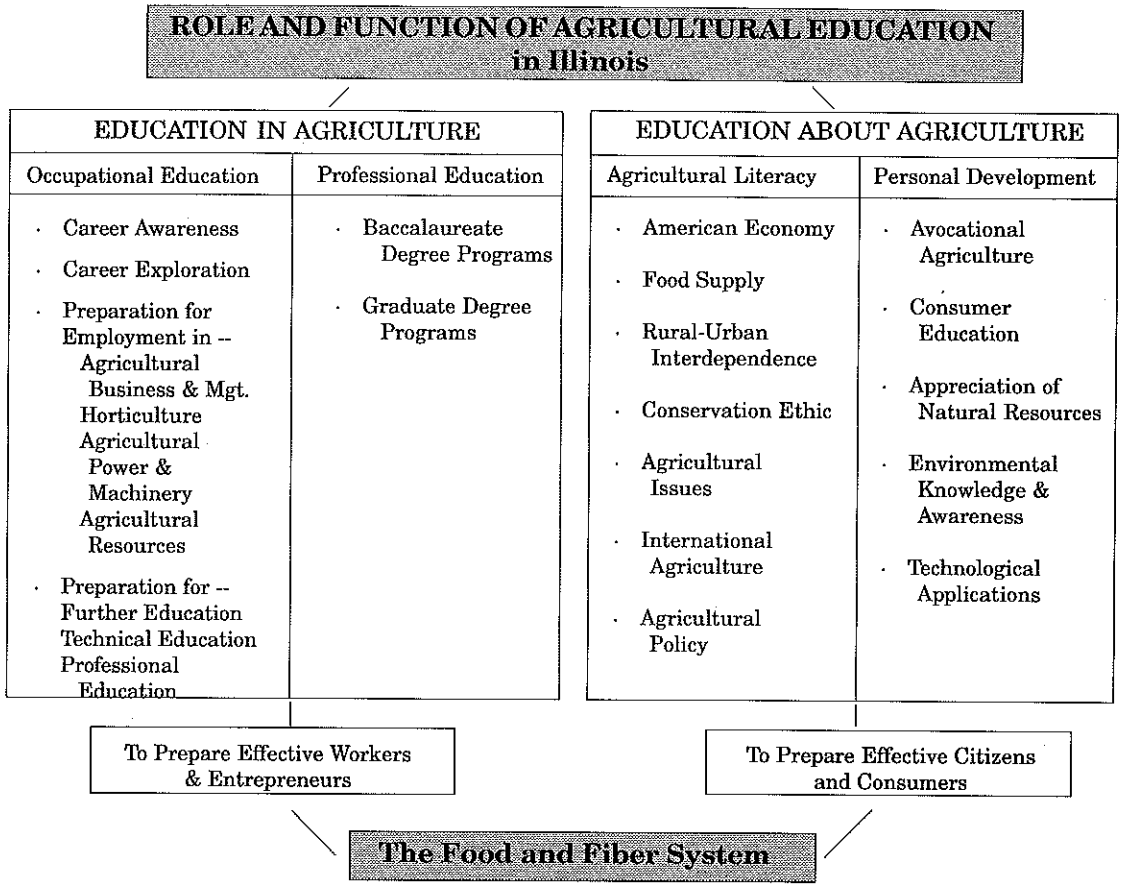


Figure 1

comprehensive, articulated program plan of agricultural education extending from kindergarten through adult. Several factors influenced the contents of what would eventually be called the **Illinois Plan for Agricultural Education** (1989). Among these were the educational reform legislation passed by the legislature which defined the primary purpose of schooling; the state goals for learning and the sample learning objectives adopted by the State Board of Education; and the State Board's new policy on Education for Employment.

Several assumptions were identified which underscore the development of the new plan. These were: 1) major changes have occurred in agricultural technology; 2) a broadened curriculum is needed to reach a wider potential audience; 3) greater emphasis should be placed on applied science; 4) employability skills should be taught; 5) occupational opportunities must be considered; 6) agricultural education should contribute to the primary purpose of schooling; 7) advisory personnel should be used; and 8) local program needs should be addressed.

The Illinois Plan was developed to reflect five phases, each a logical step in an overall lifelong program of agricultural education. The five phases are elementary, middle school/junior high, secondary, postsecondary, and continuing agricultural education. The first three will be discussed in the remainder of this article.

Elementary Programs

Although distinct programs of agricultural education or courses in agriculture do not currently exist at the elementary phase, it is important that certain agricultural education objectives be addressed. Three objectives were identified for incorporating agricultural concepts and knowledge into existing subject matter taught at this phase. They are agricultural literacy, career awareness, and contribution to the state goals for learning.

Agricultural Literacy Objective: The agricultural literacy objective can be met by providing for the systematic infusion of agricultural concepts and knowledge into the basic subject areas (e.g., science, mathematics, social science, language arts) of the curriculum. Making available instructional materials which incorporate agricultural concepts and knowledge into the basic subject areas and providing inservice training to elementary teachers on how and why to incorporate agriculture into their existing curriculum will help achieve this objective.

Agricultural Career Awareness Objective: While it is important for students to be "agriculturally literate," it is equally important for them to have an understanding of the scope and diversity of career opportunities in agriculture. If the food and fiber system is to continue to be successful, the educational system must provide a means for future leaders in agriculture to develop career goals and explore

(Continued on Page 12)

A State Plan For Agricultural Education

(Continued from page 11)

agricultural alternatives. Activities at this phase are designed so that a student gradually develops an appreciation of his or her own interests and how they interface with agricultural careers.

Contribution to the State Goals for Learning Objective: The State Board of Education has identified state goals for learning and sample learning objectives for grades 3 and 6. Agricultural concepts and knowledge are directly related to many of these and can enhance student learning by providing for real life examples and experimentation.

Middle School/Jr. High Programs

The middle school/junior high agricultural education phase builds on the components of the elementary phase. Four objectives were identified for this phase. They are agricultural literacy, technological literacy, career exploration, and contribution to the state goals for learning.

Agricultural Literacy Objective: Activities to accomplish this objective build on those introduced at the elementary phase. Since experiential learning is encouraged, opportunities to gain hands-on experiences in laboratories, shops, and greenhouses should be emphasized. Students should have the opportunity to solve real life problems, create new products, experiment with materials and role play a variety of situtations.

Technological Literacy Objective: Further emphasis is placed on agricultural technology and the impact these technological changes have had on the nation. Students are encouraged to recognize the impact that changing technology has on the work place, the home, agriculture and society as a whole.

Career Exploration Objective: At this phase, the study of agricultural careers becomes more area-specific and concentrated. The food and fiber industry is broken down into specific occupations, and each is explored to determine its function and nature, existing and future opportunities, and the training and education required.

Contribution to the State Goals for Learning Objective: The State Board also developed state goals for learning and sample learning objectives for grade 8. Again, agricultural concepts and knowledge are directly related to many of these and can enhance student interest and learning.

Secondary Programs

Secondary agricultural education programs must be both academically rigorous and technically sound in order to meet the demands of both institutions of higher learning and agricultural business and industry. Five objectives were identified for this phase. They were agricultural literacy, orientation to agricultural education, preparation for employment in agriculture occupations, preparation for further education in agriculture, and contribution to the state goals for learning.

Agricultural Literacy Objective: Agricultural literacy at the secondary phase may be offered both as a part of the vocational agricultural education program and as a separate course for students interested in the affects of agriculture in their lives. Separate agricultural literacy courses provide the opportunity to reach a much broader audience and to tailor courses to the specific needs and interests of those enrolled. Agricultural literacy courses could be developed around the themes of technology, economics, environment or agriculture in our lives. In addition, all secondary students in Illinois are required to "study courses which include instruction in the area of consumer education, including but not necessarily limited to . . . an understanding of the roles of consumers interacting with agriculture, business, labor unions and government . . ." which recognizes the opportunity to incorporate a substantial amount of agricultural knowledge into such courses.

Orientation Objective: Orientation courses give students a general background in occupation awareness, career choices, transition skills, employability skills, and vocational ethics. In addition the basic concepts and knowledge in animal science, plant and soil science, horticulture, agricultural resources and agribusiness management thought to be necessary for anyone desiring to enter the labor force of the food and fiber industry are stressed. Applied mathematics, communications and science skills are reinforced.

Preparation for Employment Objective: Preparatory courses include both basic knowledge in agricultural science and business and training in specific occupational skills and tasks. These courses stress interpersonal skills, problem solving, decision making, thinking and reasoning skills, communications and transition skills.

Preparation for Further Education Objective: Many graduates of secondary agricultural education programs choose to continue their education in agriculture, either at community colleges or four-year institutions. Community colleges and colleges of agriculture seek to recruit academically qualified students with strong agricultural backgrounds. The secondary agricultural education curriculum needs to attract students who have a wide variety of interests and to provide them with foundational knowledge in agriculture which enhances their college preparation. The curriculum needs to be science based and rigorous enough to meet these demands.

Contribution to the State Goals for Learning Objective: The academic skills required to prepare students for further education in agriculture can also serve to address the state goals for learning identified for grade 11.

Local Planning

Local planning is being encouraged through a series of two-day workshops, one in the fall followed by one in the spring. The fall workshop introduces teachers to a ten-step program renewal process (Fig. 2). The significance of each step, as well as specific strategies for accomplishing each step, as it relates to the state plan components of occupational education, agricultural literacy and agricultural science are discussed.

At the conclusion of the workshop, teachers are expected to work with their local advisory councils and other resource personnel to further develop and implement new courses and programs.

The spring workshop provides an opportunity for teachers to share the results of their program renewal efforts.

Figure 2

Ag Ed Program Development Planning Calendar

Step	Who is Responsible	Estimated Date
1. Assess needs of community		
2. Determine program mission (purpose)		
3. Identify focused needs of clientele		
4. Develop program objectives		
5. Assess resources available		
6. Identify courses to be offered		
7. Prepare course details		
8. Develop lesson plans		
9. Develop marketing plans		
10. Evaluate and revise		

Summary

The Illinois Plan for Agricultural Education was prepared to assist administrators and instructors as they design new forward looking agricultural education programs which will meet the future needs of society and the food and fiber system. The plan helps those responsible for program planning to conceptualize both the role and function of agricultural education in a modern technological society. A single curriculum pattern is not prescribed for all programs in all situations, but instead instructional objectives identified may be assembled in a variety of ways to help meet local and regional needs.

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Coming To Grips With Agricultural Literacy

(Continued from page 6)

this task. An example of this approach is a simple hands-on experiment illustrating how the lack of sunlight affects plant growth when plants have adequate nutrients and water. Another example is an activity illustrating how improper application of nitrogen fertilizer cannot only be economically inefficient, but also detrimental to groundwater quality.

A more advanced example illustrating how the interactions of science make agriculture a system is the concept of sustainable agriculture. Alternative production systems are being used by very few farmers, and even fewer citizens understand what sustainable agriculture means. With food safety and water quality becoming national concerns, sustainable agriculture has the potential to be introduced in an agricultural literacy program.

Many other examples, besides the ones cited above, can be used to illustrate agricultural processes and methods. No matter what the principles may be, such examples should help students realize the significance of the interrelationships present within agriculture.

Understanding Basic Agricultural Terms

The second approach to improving agricultural literacy is that of developing an understanding of basic agricultural terms. This argument is founded on the simple premise that if individuals cannot comprehend basic terms like tillage, choice cut, pesticides, fertilizer, growth hormones, cultivation, or soil erosion, they would hardly be able to follow public discussion of major agricultural issues or public policy decisions relevant to agriculture. Regarding the lack of interpretive information on agriculture, Little (1987) stated, "The reason the agricultural industry has no interpretive information to speak of is that the public does not know how to ask for it. We do not know the terms of agriculture, the language, the basic concepts" (p. 146).

Building a student's agricultural vocabulary is an ongoing process that deserves the attention of all agricultural educators. Initially, an assessment of students' familiarity with agricultural terms can be conducted as part of a Food for American Project. Knowing a student's grasp of agricultural terminology can help plan activities aimed at raising a school's agricultural literacy level.

Understanding The Impact of Agriculture

The third dimension of agricultural literacy concerns an understanding of the impact of agriculture on society and on the daily life of individuals as consumers and citizens. In fact, agriculture has been a resource base that sustained our society while making a significant contribution to our national economy. Ninety percent of America's population has been nonfarm for over 30 years (Douglass, 1985). Ironically, this is due precisely to advancements in agriculture.

In the broader view, agriculture impacts the world, but the message of its impact must begin at the local level, where teachers and students can identify the effects of agriculture on a familiar environment. Projects might include tracing agriculture's place in initially forming the community, determining the present impact of agriculture in terms of jobs and dollars generated, or in terms of the cost of food in different communities. A look at agriculture's mark on the environment and natural resources could also prove fruitful. Such activities could lead eventually to investigations of agriculture's effect on counties, states, or nations.

Conclusion

Because agricultural education's delivery system is already in place, the potential impact of agricultural literacy on youth is unlimited. As agricultural educators, we will serve best not as experts, but as facilitators able to apply our techniques to a variety of tasks. Approaching agricultural literacy with an eye to the three major themes outlined in this paper may help facilitate the process of introducing an entire generation to the basic knowledge of our field.

Agricultural literacy is important to the future of our nation and the discipline of agriculture. Our task is not to foresee the future, but to prepare ourselves and others for it.

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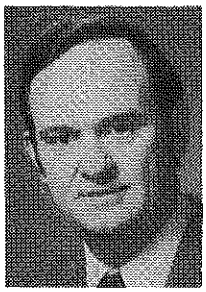
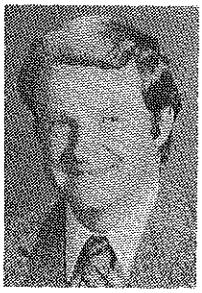
ARTICLE

Expanding Natural Resources Education





By David L. Williams and Eldon Weber

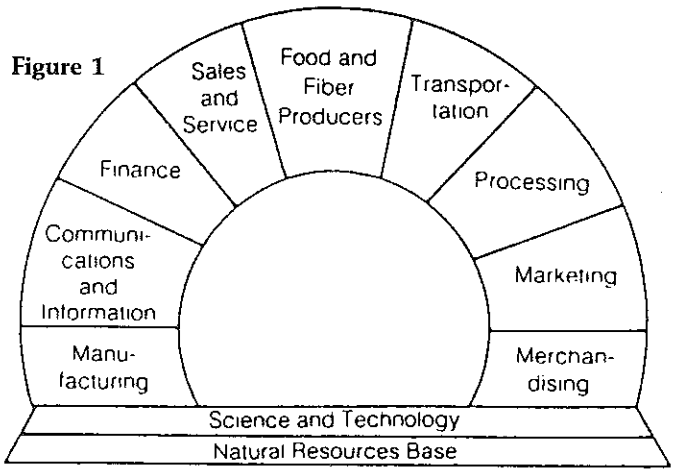
(Dr. Williams is Head, Department of Agricultural Education, Iowa State University. Mr. Weber is U.S. Soil Conservation Service - Iowa State University Liaison, Department of Agricultural Education, Iowa State University.)

Agricultural education programs in secondary schools have long advocated the teaching of natural resources. However, in many schools, natural resources instruction has not been a priority when compared with agricultural production, agribusiness, horticulture, and agricultural mechanics. Instruction in natural resources needs to be expanded and focused to help youth and adults understand the relationship between agricultural systems and conservation of natural resources. There is a great national and global concern about the adequacy of natural resources to sustain continual growth of agriculture. The time is right and the need is obvious for the development of a comprehensive natural resources curriculum for agricultural education in secondary and postsecondary schools.

Recognizing the importance of teaching soil and water conservation and natural resources management, a Memorandum of Understanding (MOU) between the United States Department of Education (USDE) and the United States Department of Agriculture (USDA) has been signed. The purpose of this MOU is to develop a cooperative effort between USDE and USDA to provide students (secondary, postsecondary, and adults) practical education in conservation while helping farmers develop and apply conservation plans.

The MOU encourages schools to become involved in helping to implement federal agricultural policy. About 40 percent of the Nation's farmers (about 800,000 farmers) have highly erodible land and, according to the 1985 Food Security Act, must develop conservation plans by December 31, 1989, if they want to remain eligible for most USDA programs. The plans developed must then be implemented by January 1, 1995. This partnership between education and agriculture encourages expansion of classroom/laboratory instruction, FFA activities, and supervised agricultural experience programs that focus on natural resources conservation and management.

Figure 1



Functions and support bases of the food and fiber system (Source: 1986 USDA Yearbook of Agriculture).

Figure 1 illustrates the importance of natural resources to the global enterprise of agriculture. Stansbury and Coulter (1986) believed that the U.S. food and agricultural system can be depicted as an arch. The keystone of the arch is producing food and fiber. The arch rests on two vital bases — natural resources and science and technology. The other functions of agriculture (manufacturing, communications, finance, sales and services, transportation, processing, marketing, and merchandising) also depend on the natural resources base for support.

The challenge to expand instruction in natural resources in agricultural education has been accepted by state leaders in Iowa. Statewide initiatives include: 1) forming a partnership between Agricultural Education and the Soil Conservation Service to accomplish at the state level what the USDE-USDA MOU advocated nationally, 2) utilizing a Carl Perkins Act technical committee to identify the natural resources content that should be taught in agricultural education programs, and 3) implementing a recognition program for teachers and students.

Iowa Ag Ed - SCS Partnership

This linkage evolved from a need identified by each partner. Agricultural education was in need of an expanded curriculum on conservation and management of natural resources. The Soil Conservation Service was in need of broadening its base through the education system to help educate the farmers on the need to develop and implement conservation plans for highly erodible land. This partnership produced curriculum materials and teacher in-service training on the conservation provisions of the 1985 Food Security Act, conservation planning skills, and the connection between soil erosion and soil productivity. Teachers received a natural resources activity handbook with hands-on student activities to enhance classroom/laboratory instruction, FFA activities, and supervised agricultural experience programs.

Natural Resources Technical Committee

In 1988, the Iowa Department of Education formed a technical committee on natural resources to identify the major topic areas in natural resources that should be taught in vocational and technical agriculture programs. The technical committee was made up of representatives from agricultural companies, the agricultural education community, and relevant government agencies. Topic areas identified by the committee are presented under the headings: 1) air, 2) fish and aquatics, 3) forest, 4) land use, 5) soil, 6) water, and 7) wildlife.

Topic Areas for Natural Resources Curriculum

Air
Air Quality
Air Monitoring
Odor Control
Noise Control
Weather Interpretation

Fish and Aquatics
Impact of Water Pollution
Management of Water Resources
Farm Pond Construction
Stream Alteration
Flood Control

Forest
Forest Benefits
Tree Identification
Forest Planting
Forest Management
Forest Products
Windbreaks
Christmas Tree Production
Forest Fires
Forest Pests

Land Use
Planning and Zoning
Land Measurement and Surveys
Mineral Resources
Solid Waste Disposal
Recreational Site Selection
Outdoor Recreation Demand
Recreational Safety
Recreational Enterprise Regulations

Soil
Erosion Problems
Erosion Control
Soil Management Advisory Services
Conservation Structures
Soil Erosion Costs
Tillage Systems
Soil Survey Reports

Water
Water Resources
Water Demands
Water Quality
Wastewater Treatment
Liquid Waste Effects
Point and Nonpoint Contamination
Surface/Groundwater Contamination

Wildlife
Wildlife Needs
Bird Species
Animal Species
Wildlife Management
Wildlife Preserves
Wildlife Conservation Laws
Wildlife Populations
Wildlife Crop Depravation

The next steps in curriculum development is to sequence these topics into courses and develop instructional plans.

Teacher and Student Recognition Program

SCS and the Agricultural Education Department at Iowa State University are cooperating in the implementation of an awards program to recognize the outstanding efforts and accomplishments of teachers and students in advancing soil and water conservation. This recognition program is based on SCS's Volunteer Program authorized by Congress to officially employ volunteers to assist with and enhance soil and water conservation efforts. Earth Team is the name given to this volunteer conservation program.

Agriculture teachers and students are invited to become a part of the professional Earth Team in Iowa. Teachers providing the best leadership will be recognized at the local, state, and national levels. Students who are at least 16 years of age qualify for Earth Team membership and recognition. Agreements can be made between the local SCS District Conservationist and students for supervised occupational experience programs. The time worked for SCS as a volunteer can be used on a student's resume as employment experience with a federal agency. Awards will be made locally and at the state FFA convention to recognize outstanding achievement. Awards are also being developed to recognize soil and water conservation achievements of local FFA chapters.

Conservation of natural resources is a priority of many people. This is evident in federal and state legislation that has been enacted in recent years. Agricultural education programs in secondary and postsecondary schools should expand and focus on natural resources instruction to emphasize the natural resources base that support the global enterprise of agriculture.

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Stansbury, D. and K.J. Coulter, Agriculture: a world of scientific and professional opportunities. RESEARCH FOR TOMORROW (1986 Yearbook of Agriculture), U.S. Department of Agriculture. Washington, D.C., pp. 302-303.

The Software Sampler — Software Development - What Is Needed

(Continued from page 8)

that we have quality software for use in our classroom. It is incumbent upon the teacher to make known the software and computer needs to those who can respond at colleges and universities.

Berkey, Arthur L., and Sutphin, H. Dean (1985). Computer practices used, and software needs by use category and program, among Agriculture Teachers, Post-secondary Teachers, and Extension Agents. Eastern Region Agricultural Education Research Conference, Easton, Maryland.

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Stewart, Bob R., and Birkenholz, Robert J. (1989). Educational Technology in the Secondary Agriculture Program, National FFA.

Computer Technology Resources — Educational Technology in the Secondary Agriculture Program

(Continued from page 4)

in agriculture programs. Teachers reported using overhead projectors, slide projectors, and VCR recorders most often for group instruction and microcomputers most often for administration and planning purposes. Video tapes were the most frequently used audio-visual materials.

The majority of teachers reported that a computerized data base should provide lesson plans, instant access to information, agricultural markets, and news reports. Instructors also strongly supported the development of a variety of support materials in future curriculum projects. In addition, teachers noted that the greatest barrier to the potential use of educational technology was a lack of funds.

Overall, it was recommended by 75 percent of the teachers that future curriculum materials include the following components: instructor's guide with lesson plans, evaluation materials (tests and quizzes), videotapes, student references, assignment sheets, transparency masters, directions for lab activities, computer software, and competency lists.

In addition, agricultural educators must continue to be active in in-service programs to keep up to date in using new technologies and also seek ways to fund the acquisition use of "state of the art" equipment.

Table 1

Inventory of Instructional Equipment in Agriculture Departments and Schools (N = 254)

Equipment	Agriculture departments %	Schools %
Microcomputer	72.8	85.0
Microcomputer modem	26.0	37.4
Microcomputer printer	66.1	82.3
Overhead computer projection unit	6.3	23.2
Amplified telephone	8.3	21.7
VCR player/recorder	35.4	81.9
VCR camera	19.7	81.9
Satellite receiver dish	2.8	15.4
Interactive video	3.9	20.5
Carousel slide projector	66.9	79.6
Overhead projector	80.3	79.6
Audio-cassette player	55.5	72.8
16mm film projector	47.2	80.3
Film strip projector	60.6	76.8
Opaque projector	17.7	74.4
Large screen TV	10.2	24.0

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Rosenfeld, S.A. (1986). Changes and choices: A review of technology's impact on vocational education in the high school. TECHNOLOGY, THE ECONOMY, AND VOCATIONAL EDUCATION. Washington, DC: Carnegie Forum in Education and the Economy.

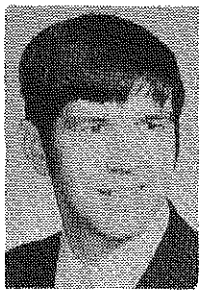
Future Themes/Theme Editors

Issue	Theme	Theme Editor	Due Date
June, 1990	A Health Profession in Unhealthy Times	Paul Vaughn Mississippi State University	March 1, 1990
July, 1990	Pre-Secondary Agricultural Education	Joe Townsend Texas A&M University	April 1, 1990
August, 1990	Expanding Audience Base	Blannie Bowen Pennsylvania State University	May 1, 1990
September, 1990	Focus on Teaching	Stacy Gartin West Virginia University	June 1, 1990
October, 1990	Urban Agriculture	Margaret Elliber Iowa Dept. of Education Des Moines, IA	July 1, 1990
November, 1990	Changing the FFA	Jeff Moss University of Illinois, Urbana	August 1, 1990
December, 1990	Developing Entrepreneurship	Layle Lawrence West Virginia University	September 1, 1990

FEATURE COLUMN

Book Review

Family Farm/Livestock Judging



By David L. Howell, Special Editor

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

In this month's mail I found one review concerning the changes in the family farm and the other concerns the judging and selection of livestock.

Many people have expressed the concern that the family farm was disappearing, but Charles Hamsa of Louisiana, in reviewing Friedberger's book, shows that the medium-sized farm is doing well. High school students as well as agricultural educators will find this interesting reading and an incentive to many aspiring farmers.

Many of our teachers enter the profession with little livestock judging experience. Kirl Swortzel, a student teacher in Virginia, has found a reference which he believes is excellent and perhaps it will also be useful to you. As teachers we can't know everything when we enter our profession, but with good references such as this we can continue learning on the job!

FARM FAMILIES & CHANGES IN TWENTIETH-CENTURY AMERICA, by Mark Friedberger. Lexington, Kentucky: The University Press of Kentucky, 1988, 282 pp., Price $28.00.

The first two chapters (Corn-Belt Farming and Central Valley Ranching) show how the geographical areas of Iowa and California's Central Valley had reacted to technological change with special emphasis on the evolution of the self-sustaining farm to more specialized forms. Farm families in both areas are examined in how they have historically reacted to such concerns as Land Tenure, Farm Inheritance and Credit. These areas of the work are more technical discussions of how the structure of agriculture had affected their development. Family and Community are sections where these structures are closely examined in order to make comparisons between both geographical sections under study so that the reader can see how family and community in the agricultural setting had developed and how they responded to, or were impacted by, the farm crisis of the eighties.

What emerges from these pages is the reemergence of what Friedberger calls the 'frugal farmer' mentality which the eighties crisis made respectable again.

It has been easy for some in the past to contend that the large-scale firms involved in farming would be the ones that would succeed. Friedberger shows that the medium-sized family farm with post eighties conservatism in using credit along with viable plans for diversification could remain viable in the years ahead. Moreover, large-scale firms, many of which had maximized production to meet the demands of the so-called food crisis of the early seventies, and which had borrowed heavily to buy more land and machinery, were often stuck with large unsold commodities when the food crisis "vanished" and gave way to the farm crisis of the eighties.

Friedberger makes good use of research to show why certain families and communities have remained strong even during the downturn of the eighties. As such, this well-written book would be an excellent source of both personal reading or instruction in all levels of higher education for both areas of agriculture and sociology.

Charles F. Hamsa
University of Southwestern Lousiana
Lafayette, Louisiana

LIVESTOCK JUDGING, SELECTION, AND EVALUATION by Roger E. Hunsley and W. Malcolm Beeson. Danville, Illinois: The Interstate Printers and Publishers, Inc. 1988, Third Edition, 437 pages, price $26.95.

The third edition of Livestock Judging, Selection, and Evaluation is an excellent reference for those individuals training livestock judging teams at the secondary or collegiate level or for those individuals who participate on these judging teams. This text is also useful to the person who must analyze performance data and pedigrees in selecting animals for replacement.

This text is divided into five parts, each dealing with a major specie. Parts 1, 2, and 4 deal with beef cattle, sheep, and swine, respectively. Basically the same format is used on each one of these species. Each one deals with scoring the respective animal, the first steps in evaluating the live animal, characteristics used in selecting and evaluating live animals, breeds of livestock, the internal structure of the animal, wholesale cuts, carcass evaluation techniques, and terminology for the respective breed. Sample oral reasons are provided for sheep and swine.

In each one of these parts, excellent comparison is made between the old-fashioned type animal evaluated fifteen years ago and the modern-type animal evaluated today. Details are very explicit as to what each type of animal looks like when making comparisons and evaluations.

Part 3 deals with dairy cattle. This part is divided into the following sections: dairy type, judging dairy cattle,

(Continued on page 19)

Reinforcing The Common Bond Between Urban and Agricultural Interests

(Continued from page 7)

Agriculture and its leaders are beginning to recognize that interdependence, not special interests, is the effective way to do political business. "It doesn't matter if we agree or disagree. Those views, those activists and decisionmakers are here," says California Department of Food and Agriculture Director, Henry Voss.

Finally, we are seeing integration down on the farm. In fact, that is the upshot of the NAS report "Alternative Agriculture." "The report calls for a biological evolutuion not a policy revolution," contends Charles Benbrook, executive director of the NAS Board on Agriculture.

Many farms in California are already ahead of the report. The Nunes Company, for example, is a private, family-owned farm that has been integrated into a marketing organization for several California and Arizona growers. According to David Nunes, the firm has an integrated systems approach to its growing and pesticide application programs. These include application control analysis, chemical analysis reports, harvest interval and worker re-entry monitoring, integrated pest management, and limited organic growing. And this is not small scale. To date, Nunes has data on 533 fields, representing over 10,000 acres of lettuce and cauliflower.

"It is our considered opinion that the public health will best be served by the bringing together of all groups interested in the issues of health, fresh produce, and pesticide use. That is to say — producers, retailers, government, physicians, health organizations, media, and consumer advocates," concludes Nunes.

As an educator, what does this new era mean to you? While I can only guess, here are some ideas from Francis W. Wolek's report, "Key to a New Agriculture." Wolek, the former deputy assistant secretary for productivity, technology, and innovation in the U.S. Department of Commerce and now at Villanova University, writes that agriculture's monoculture mindset is being replaced by the flexibility to integrate systems while assuring the stewardship of these systems. His work suggests the need for several innovations, including:

- Training in systems management. Such managers will need skills in managing public resource constraints — soil, groundwater, and even useful insects. In addition, communications skills will be vital because community acceptance is a major constraint in any agricultural system.

- Training in stewardship management. Individuals need to be trained to monitor market power, technology-induced emergencies, and production practices that jeopardize a community or company's reputation.

- Training in market integration. Agriculture needs managers who can solve fragmented market problems. How do we provide year-round melons, for example. Managers need to be trained to merge new technologies like biotech with similar innovations in harvesting, quality, taste and processing systems.

It also seems that many of you will be involved in urban education. We will probably see more schools like the Chicago High School for Agricultural Sciences. In addition, there will be more efforts, like the Food, Land, and People program, to educate elementary through high school students about the interdependence of food, land, and people. Educators will be called upon to provide supplementary educational materials to be integrated into curricula that teachers are already using in subject areas like mathematics, science, languages, and social studies.

But as you plan your programs, I would attach this warning: As agriculture goes through this shakeout and change it will need the leadership and life skills which have always been the hallmark of the vocational agriculture and FFA programs. This is because agriculture needs unity in the same way our highway columns need spiral reinforcing to withstand an earthquake. "Mentally, farmers have gotten down to believing we can have a united front to sell our story . . . a year ago all we were doing was bitching about it," observes Bill Pauli, first vice-president of the California Farm Bureau Federation.

But unity won't be an easy task. In California alone there are more than 700 farm organizations, each with their own agenda. Key life and leadership skills like self-discipline, motivation, judgment, and maturity will be required to create agricultural unity.

Edward Hammond, president of Fort Hays State University, notes that a national survey of high school graduates since the 1930s shows that life skills increased steadily from that decade until 1963, then showed a continual decline, with a one-year reversal in 1985. During this same time-frame in which key life skills declined, you will find a proportionate increase in crime, suicide, teen-pregnancy, dropouts, and chemical dependency.

Some argue that our kids are growing up in faster times. "But when one studies the 23 leading nations in economic output, we find that the United States is the only country since 1963 in which graduating seniors have less self-discipline, less motivation, less judgment, and less maturity," Hammond counters. He concludes that our educational system should encourage programs like FFA which develop leadership and life skills. Indeed, it is the spiral reinforcing agriculture needs right now.

"Agriculture needs to be more directly involved and more accepting of change. There's no need to circle the wagons. Just keep 'em going down the path," John Ross, executive vice-president of the California Cattlemen's Association told "California Farmer" writer Diane Keaton in an August 12, 1989 article discussing communication between agricultural leaders and the public. As agriculture moves and shakes, there is not much point in trying to prove we are right, only in proving that we care about our customers and the urban majority — a solid common ground.

Why, "Ag In The Classroom"

(Continued from page 9)

as calving and harvesting; and visits to classrooms by farmers and ranchers to talk to students about the realities of farm and ranch life and the economics of agriculture.

There is now an AITC effort in every state, Guam, and the Virgin Islands. And Ag in the Classroom has attracted international interest as well. Canada will host its third annual national AITC conference this year. The Ag in the Classroom video tape, "21st Century Explorers," was featured at an international science fair in Yugoslavia. Requests for information about Ag in the Classroom have come from Africa, Australia, Central America, Hungary, Japan and South America.

Ag in the Classroom was cited by the National Academy of Sciences in its report, "Agricultural Literacy: New Directions for Education," as a successful program for achieving agricultural literacy. Ag in the Classroom's success can be attributed to the cooperation of many groups whose goals and objectives are similar — to help students truly understand the importance of agriculture and its role in our economy and society. The national agricultural organizations and commodity groups have encouraged their members to become involved and have also developed some excellent instructional materials. They also provide important financial and staff support.

There are FFA students who, in their "Food for America" program, teach about agriculture and learn self-confidence and public speaking at the same time. Vocational agriculture teachers have been leaders in many state and local Ag in the Classroom programs by providing expert advice and counsel in materials development, teacher training and by serving as resource experts to classroom teachers. The men and women in our universities and colleges understand that if we are to maintain our productive and competitive agricultural industry, we must find a way to tell students about the challenging agriculture career opportunities that await them.

More and more educators, at every grade level, when given the opportunity, realize the importance of agriculture to them and to their students. They have found that infusing information about agriculture into the lessons they teach adds an exciting dimension to classroom activities.

The continuing trend of urban crawl and suburban creep is threatening our farm land and a very significant way of life that has contributed to our nation's prosperity and well being. As more of the population understands the contributions of agriculture — provider of all our basic necessities — hopefully, too, they will understand the interdependence of agriculture and the rural communities that provide the farmer with shops, schools, markets, medical facilities, and places of worship. Hopefully, they will understand the link that starts with the farm and joins the rural communities to the suburbs and cities and reaches beyond the oceans to people all over the world.

Book Review — Family Farm/Livestock Judging

(Continued from page 17)

breeds of dairy cattle, evaluation defects and disqualifications, and a sample set of reasons. The Dairy Unified Scorecard listed in this part is incorrect. Greater emphasis is placed today in general appearance and udder (now 35 pts.) with less emphasis in body capacity (now 10 pts.).

Part 5 deals with stock horses. This part is broken down into the following sections: stock horse type, the skeleton and its relationship to the appearance and usefulness of a stock horse, blemishes and unsoundness, common defects, determining the age of a horse, feet and legs, form, the Quarter Horse, the Palomino, the Appaloosa, terminology, and sample reasons.

Excellent pictures and photographs accompany each explanation of type and breed of livestock. Both modern and old-fashioned pictures are used in the explanations. This helps in making comparisons between the ideal animal and the animal evaluated fifteen years ago.

An updated list of every major breed association is included at the end of each part in case an instructor or student would wish to gather additional information about a breed.

Overall, LIVESTOCK JUDGING, SELECTION, AND EVALUATION is an excellent reference. It contains very practical and helpful information to assist one in making proper evaluations of livestock today.

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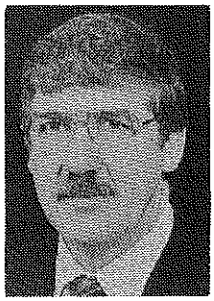
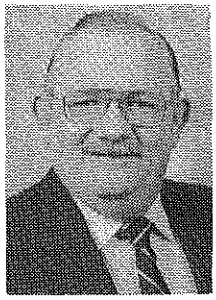
ARTICLE

Changing The Mission of Agricultural Education Through Curriculum Modification

Mission: a sending out or being sent out with authority to perform a special duty; the special task or purpose for which one is apparently destined in life; a calling.
—*Webster's New World Dictionary*





By Maynard J. Iverson and Boyd F. Robinson, Jr.
(Dr. Iverson is Head of Agricultural Education, The University of Georgia. Dr. Robinson is Program Specialist in Agriculture, Maryland State Department of Education.)

The basic mission of Agricultural Education has changed little since its formal inception in the early part of this century. Then, as now, the dual mission of serving agricultural industry while developing the individual has stood as a guiding beacon to the profession. There is strong evidence that this mission is still appropriate.

Certainly the continued growth of contributions from industry to the National FFA Foundation, as well as to state and local organizations, speaks well for agri-industry's support of the program. Research substantiates the strong student enthusiasm for the program. This was reflected in the Southern Region five year follow-up study of program completors who said that they would enroll again if they had it to do over (Iverson, 1980). With such evident support for the dual mission, agricultural educators may well ask, "Why the clamor for change?! Why change the old ways, the tried and true methods and policies in our programs?" Unless we can clearly answer these questions — to ourselves, to our colleagues and to our constituents — we are unlikely to meet the challenges of the times.

The reasons for change are numerous. First of all, the program must change because the world has changed. We are part of a global society. Our fundamental means of communication has been altered by technology. The most common tool in America is reportedly the keyboard (Daggett, 1989). The FAX machine has made serious inroads into the market for overnight mail services. Perhaps the major communication miracle of the 1990's, fiber optics, will enable us to transport 80 million words around the world in a few seconds (Daggett, 1989). The implications of these changes for education are just beginning to be understood.

We must change because agriculture has changed, dramatically and fundamentally. Agriculture has gone through severe crises during the past decade. However, a leaner and more efficient agricultural industry has emerged. Although farmers now comprise just three percent of the population, plentiful supplies — including surpluses of some commodities — exist. Agribusiness firms have diversified, merged or gone out of business. Even in the traditionally agricultural areas of the U.S., part-time farming is the wave of the future.

Unfortunately, the future leadership in agriculture is also being affected by this situation; the numbers of students choosing careers in agriculture is the lowest in 20 years. And, interesting changes are occurring in the sources of agriculture majors: the majority of students in the College of Agriculture at the University of Georgia now come from Atlanta! In Agricultural Education, a majority of prospective teachers in Georgia are urban, have never had high school agriculture/FFA, and are graduates in other majors who are adding certification while pursuing graduate degrees. It is a different marketplace and we are scrambling to understand it and respond to it.

We must change, because the situation in the schools and communities has changed. American society has undergone substantial change during recent years. A reduction in expected standard of living, movement away from the values of the past generation, availability of heretofore unknown conveniences and advances in communication devices have all affected the way people live and learn. The most common problems that teachers of the 1960's and 1970's faced were students with long hair, smoking, or excessive tardiness. Only occasionally did "serious" problems with alcohol, vandalism or dropping out for jobs, marriage or the like occur. Today, young and not-so-young teachers face many challenges on a day-to-day basis. Drugs are a threat, even in the smallest communities.

A decline in respect for the teacher, both by students and citizens is apparent in many communities. High rates of teenage pregnancy and other evidences of moral decline are on the rise. Rampant dropout problems of up to 50% in some communities have created tremendous problems with illiteracy. In a majority of homes both parents work, making after school contacts a real problem. Perhaps the most devastating of all is the apathy that was once true of only a small minority but that is now in epidemic proportions. It is enough to challenge the strongest teachers! And yet we

have some of the brightest and most talented people coming into teaching. These enthusiastic newcomers are the hope of our profession; and they are what makes teacher education and state supervision worthwhile!

We must change our programs because the profession demands change! Last fall, the National Academy of Sciences Committee on Agricultural Education in the Public Schools clearly and emphatically addressed the need for change. Their report also recommended the new directions in which we should move, including increased emphasis on science and technology (Committee on Agricultural Education, 1988). Many states are working to implement these recommendations, but if we are to retain the national scope and quality standards of our program, all states must respond to the National Academy report.

During the 1960's, changes were made in the Agricultural Education program to reflect off-farm occupations, the emergence of females in the world of work, and attention to the handicapped and disadvantaged. However, because education is almost always a **reflection** of society rather than a predictor or leader, the program has been unable to keep pace with recent dramatic changes in agricultural industry and with societal demands on the individual. Clearly, agricultural education is in a situation demanding changes to reflect these new realities.

How Change Can Be Accomplished

To many leaders in the profession, change need only be a course correction, not an about face. This modification in direction can best be done in the curriculum. Defined as "all the courses of study in a school or program," the curriculum is the lifeblood of the Agricultural Education program. Thus, changes that are made in the curriculum are long term and far reaching.

As most states are attempting to update their curriculum to reflect the "new agriculture," science and technology have become bywords. Changes in the funding system from federal and state to a more locally based system places the prerogative at the community level. This localized base requires rethinking of the means for effecting curriculum change.

Some proponents of change place great store on sciences and emerging technologies. Let's examine the basis for the optimism about this approach. Webster defines technology as "applied science." In Agricultural Education, we have always taught applied science. Animal science, plant science, soil and water management, horticulture, forestry, natural resources, agricultural mechanics and other units of instruction are filled with scientific applications. When teaching plant and animal breeding as a junior/senior unit, VoAg instructors reemphasize (re-teach) the scientific principles of mitosis, meiosis, genetics and phenotypic selection. The content is made interesting to students by the applications to their own livestock and crop projects or jobs.

The emerging areas of biotechnology (including genetic engineering), hydroponics, food science, agricultural engineering technology, environmental science, computer science, acquaculture, integrated pest management, and the like were addressed at the National Conference on Agriscience held in Orlando last October (National Council for Vocational and Technical Education in Agriculture, 1988).

Recent literature also reveals numerous examples of technology in Agricultural Education. In Maryland, teachers of agriculture have made excellent progress in addressing the new and emerging areas through curricular options, by changing the program image — the "MAST" or Maryland Agricultural Science and Technology program puts emphasis on the "new and emerging agriculture" — and through development of a new state model for education in agriculture.

The Maryland Model

Education in agriculture for Maryland was addressed by the 1987 report of the Commission on Education in Agriculture. The proposed Model consists of the following key components:

Pre-school. Agricultural awareness should reflect a realistic image of the fast-changing agricultural industry through the development of media and instructional materials and by using public television and pre-school programs as a delivery system.

K-8. Infusion of up-to-date agricultural concepts in the science and social studies curriculum should be sequenced, progressive and articulated between grade levels. The United States Department of Agriculture is encouraging each state to develop Agriculture in the Classroom programs to serve as a means of making all Americans aware of the agricultural industry. An Agriculture in the Classroom program should provide lesson plans, unit materials, newsletters, classroom applications and other information for infusion into the curriculum of the primary grades.

Middle Schools. A career inventory that identifies students with an interest in agriculture is suggested for all students. Reports of students having high agricultural interest levels can effectively identify potential students for secondary agricultural programs. Agricultural Arts programs that provide for an introduction to the diverse industry of agriculture and that stress agricultural science and biotechnology applications should be developed for local adoption.

Secondary Comprehensive High Schools. An integrated agricultural science and technology program is proposed that is based on quality standards; that transcends general, academic and vocational lines; and that replaces traditional vocational agriculture programs. The proposed Maryland Agricultural Science and Technology (MAST) program will retain the major elements of traditional vocational agriculture programs, including classroom/lab instruction, entrepreneurship, work experience, and leadership and citizenship development through the FFA student organization — all of which have contributed to its overwhelming success in the past. The proposed secondary program should engender new elements such as semester-based units of instruction and flexible program options that will provide for a bridge to meeting the needs of both a fast changing agricultural business and industry and a student clientele group that is markedly different in its attitudes and orientation concerning agriculture. The revised curriculum should be implemented through an efficient, computer-based communication system. An added feature is that all graduates should have access to adequate placement services. In Maryland, each local education agency (LEA) develops a curriculum specific to its community. Figures 1 and 2 provide examples of how the proposed secondary component might be implemented in a hypothetical LEA.

(Continued on Page 22)

Changing the Mission of Agricultural Education Through Curriculum Modification

(Continued from page 21)

Figure 1. Hypothetical Program with Four Options.

Course Name	Ag Prod	Elective	Ag Mech	Elective	Hort-culture	Elective	RNR	Elect
Agricultural Science	X		X		X		X	
General Ag Mechanics	X		X		X		X	
Plant Science	X		X		X		X	
Animal Science	X						X	
Ag Electrification		X	X					
Ag Mech Construction		X	X				X	
Forestry							X	
Wildlife Management							X	
Crop Science	X		X			X		
Livestock Science	X			X				
Beg Computers in Ag	X			X		X		X
Adv Computers in Ag		X		X		X		X
Beg Greenhouse Mgt					X			
Adv Greenhouse Mgt					X			
Ag Business Mgt	X					X		X
Ag Sales and Service		X		X		X		
Ag Power and Machinery		X	X					X
Small Engine Maintenance			X		X		X	
Turf and Landscaping					X		X	

Figures 2. Curriculum option matrix for a one teacher department in which the sequence of courses are taught over a four year period.

	First Semester	Second Semester
1st year	Agricultural Science Plant Science Animal Science Ag Electrification Beg Computers in Ag Beg Greenhouse Management	General Ag Mechanics Adv Computers in Ag Livestock Science Ag Power and Machinery Adv Greenhouse Management Wildlife Management
2nd year	Agricultural Science Plant Science Ag Sales and Service Small Engines Maintenance Beg Computers in Ag Beg Greenhouse Managment	General Ag Mechanics Crop Science Ag Business Managment Turf and Landscaping Ag Mech Construction Forestry
3rd year	Agricultural Science Plant Science Animal Science Ag Electrification Beg Computers in Ag Beg Greenhouse Management	General Ag Mechanics Adv Computers in Ag Livestock Science Ag Power and Machinery Adv Greenhouse Management Wildlife Management
4th year	Agricultural Science Plant Science Ag Sales and Service Small Engines Maintenance Beg Computers in Ag Beg Greenhouse Management	General Ag Mechanics Crop Science Ag Business Management Turf and Landscaping Ag Mech Construction Forestry

Note: This is an example of a program having four options that are taught over four years by a single instuctor. All courses are set up for single periods and are one semester in length. The program is based in a school having six periods of instruction per day.

High Schools for Agricultural Sciences. The need for agricultural instruction in highly urbanized areas is critical due to the unprecedented expansion of agricultural careers in the areas of nursery, greenhouse production, landscaping, agricultural research, biotechnological applications, aquaculture, agricultural supplies, sales and service, and hydroponic applications. In some major cities, notably Philadelphia and Chicago, high schools for agricultural sciences operating as magnet schools have served a population of students who traditionally have not been involved in the agricultural sector. Students with interests in the diverse field of agriculture can be reached through this concept who otherwise might not be served.

Postsecondary. Postsecondary (two-year) programs in agriculture supporting major areas of Maryland agriculture should be identified for development throughout the state. Programs should be based in the Maryland Community Colleges and in the Institute of Applied Agriculture at the University of Maryland. Each two-year institution should offer selected introductory courses complementary to both two-year and two-plus-two programs. Program duplication can be avoided by designating and funding all approved programs as statewide area programs providing level tuition for all participants. A strong articulation program (secondary to postsecondary to university) would further enhance the efficiency of the institutions in meeting the educational goals and objectives set by students of agriculture.

Teacher Education. State-of-the-art model agricultural teacher education facilities are needed along with adequate staff to meet the needs of the entire agricultural education effort throughout the state. Responsibilities should include: graduate and undergraduate education; preparation for teacher certification; professional in-service education; and curriculum/instructional material development.

Although still under review/revision, the Model promises to provide the vision for needed change in the Maryland program for education in and about agriculture. During the summer of 1989, the authors conducted a "Curriculum Options" workshop involving 20 experienced MAST teachers. Substantial progress was made toward defining and developing the secondary school curriculum as a major component of the modified mission in agricultural education for the state.

Putting Everything in Perspective

A noted evangelist told of his ministry to an orphanage, where he took bibles and gave counsel to the youngsters. One boy left the preacher with this haunting challenge, "You can keep your bible, if you don't love me!" So too, will all of our work to transform our programs, to infuse the new science and emerging technology, and to improve our skills in delivery of instruction, be for nothing, if we fail to care about our students. We must keep the welfare of the children uppermost in our minds as we work to improve the program. Vocational Agriculture can continue to serve both the industry of agriculture and the individual students who enroll; it can emphasize science and still relate to the human needs of our constituents; and it can utilize technology as we strive to do a good job of teaching. These are complementary, not competitive concepts.

Editor Note: Special appreciation is given the other members of the Commission's writing subcommittee, including Ronald Seibel of the University of Maryland, Regina Smick of VPI & SU and Steen Westerberg of Hereford (MD) High School.

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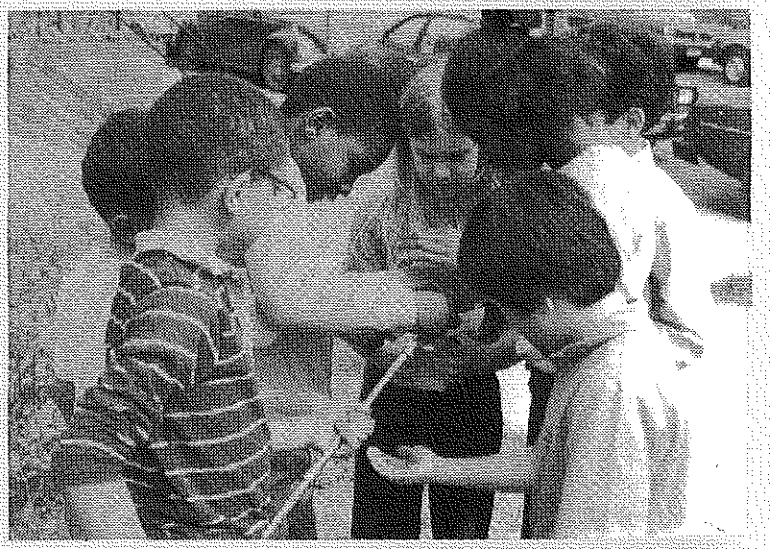
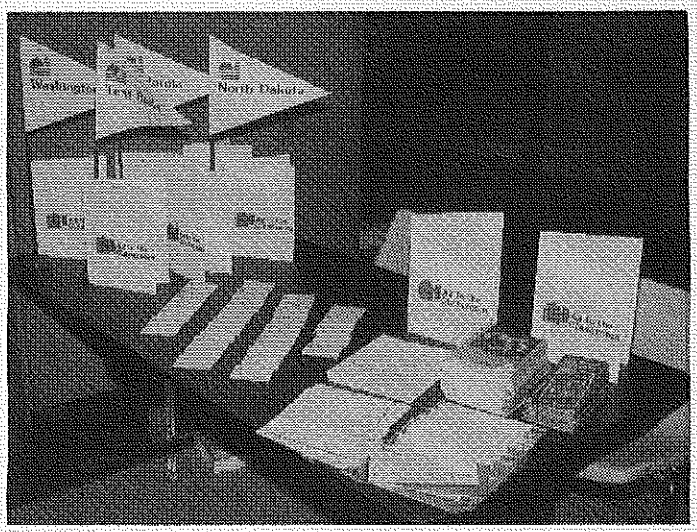
Stories in Pictures

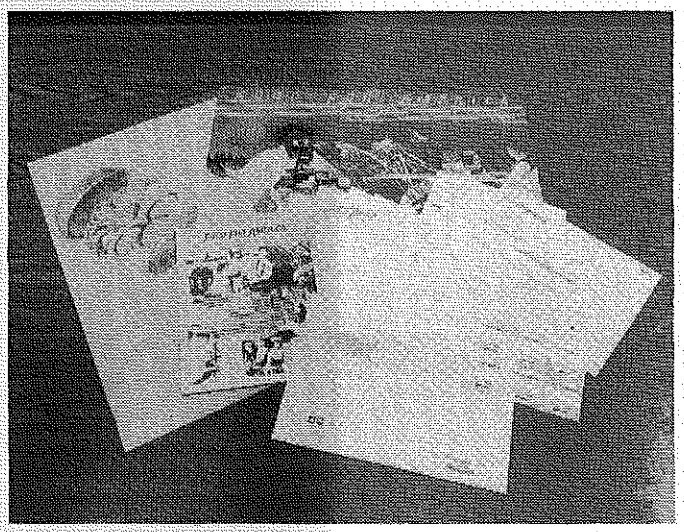


Students at Brent School, Washington, D.C. examine soil taken from their school garden to be tested (Photographer Ernie Moody. Photo courtesy USDA - Soil Conservation Service)

Agricultural Literacy Programs



In the classroom, materials are used to provide agricultural literacy.



"Food For America" is another agricultural literacy program available through the National FFA Organization.