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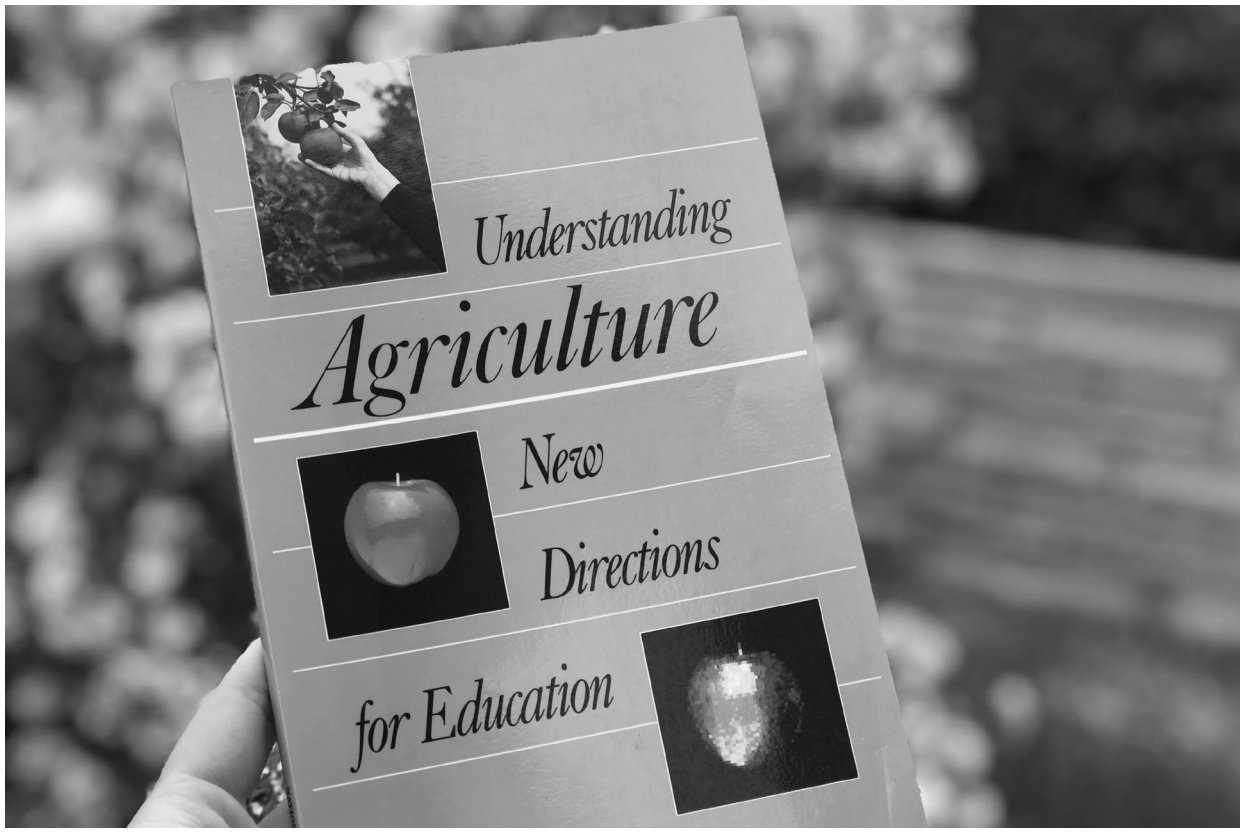


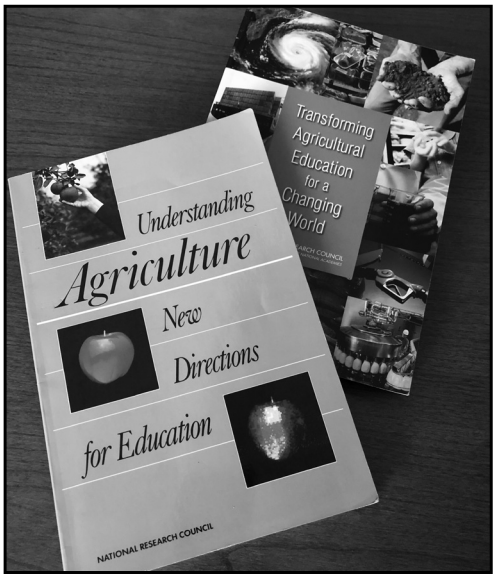
Blowing the Dust off of The Green Book: Reexamining "Understanding Agriculture: New Directions for Education"

What Does the Future of Agricultural Education Look Like?

by Gaea Hock

I remember first learning about *Understanding Agriculture: New Directions for Education* (aka "The Green Book") while I was in graduate school at Texas Tech University. The section that resonated with me the most was the call to educate people *in* and *about* agriculture. That question came up on my comprehensive exams and I hope I answered it in an intelligent manner. (I passed the exam so I must have done a decent job.)

In addition to *Understanding Agriculture: New Directions for Education*, another important document from the National Research Council was published in 2009 titled, *Transforming Agricultural Education for a Changing World*. This publication focused on improving undergraduate education in agriculture. Similar to "The Green Book," this publication was the result of a large committee of dedicated professionals tasked with considering, "what an undergraduate education in agriculture should comprise to prepare a flexible and well-prepared workforce" (National Research Council, 2009, p. xii). This publication is critical to those of us at the university level, but the secondary agriculture teachers serve a crucial role in preparing students for their undergraduate career.



Both of these documents helped to educate me on how I can prepare my students to tackle the challenges facing the agricultural industry. *Understanding Agriculture* is just over 30 years old and *Transforming Agricultural Education* is 10 years old. I wonder what new challenges have arisen since the time of these two publication dates.

It is important that we spend time thinking about the future while also reflecting on the past. Too often, we get bogged down in the minutia of everyday tasks and lose sight of the real purpose we serve in our communities. There are components of the agricultural education program that require large chunks of our time and focus, but are those the most important pieces? Have you engaged your advisory council in a meaningful manner in order to move your program forward? Have you conducted a needs assessment to determine new opportunities to serve your students and the school community? Making time to reflect on your agricultural education program is time well spent in an effort of continual improvement.

This issue includes articles from some of the giants in the agricultural education profession. They remember the events that led to the publication of "The Green Book" and the changes that resulted from the recommendations it contained. They reflect on what the book helped to modify, improve, and alter while also considering the areas that still need to be improved.

As you read the articles, I hope you will reflect on how you are working to meet the goals outlined in "The Green Book." I also encourage you to think about what changes or additions you would recommend to update it to advance our current agricultural education system.

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Check Out That Old FFA Jacket: Why the Name of the FFA Changed

by R. G. (Tre) Easterly III

One day after work, I ventured to a used book store for a bit of retail therapy. There is a cavernous used bookstore in the middle of downtown Las Cruces, NM. The bookstore has everything from one dollar Steven King paperbacks to leather-bound first editions of the classics. It was on my obligatory sweep through the "agriculture" section that I found a slim paperback that I had seen many times on my PhD advisor's bookshelf. The book was titled *Understanding Agriculture: New Directions for Education*, but I have always known it as *The Green Book* because of its familiar green cover. As I eagerly shelled out $4 for the book, I remarked about how great the condition was for a book just over thirty-years old.

The Green Book was commissioned by the National Research Council to provide a vision for agricultural education in the United States. In 1988, when the report was published, agricultural education was facing an identity crisis that manifested itself in sagging enrollment and questionable relevance. The report was to be a call to action to make agricultural education relevant for the 21st century. The rest of the afternoon, as I reread the pages, I thought about the recommendations made by the council. The most obvious change that came about from *The Green Book* was the change of name of the FFA from the Future Farmers of America to The National FFA Organization (which did not change the name in the federal charter). Other manifestations of *The Green Book* are a change from vocational agriculture, to agricultural education (the word "education" is not really needed, but provides nice symmetry on the emblem), and Supervised Agricultural Experience in lieu of Supervised Occupational Experience. Aside from being able to spot the occasional pre-1988 jacket at national convention, what meaningful changes came as a result of *The Green Book*? Now that we are in the throes of the 21st century, did the recommendations hold true or did they miss the mark? Is agricultural education relevant or are we still clinging to the old ways? And do we need yet another 'new direction' for agricultural education?

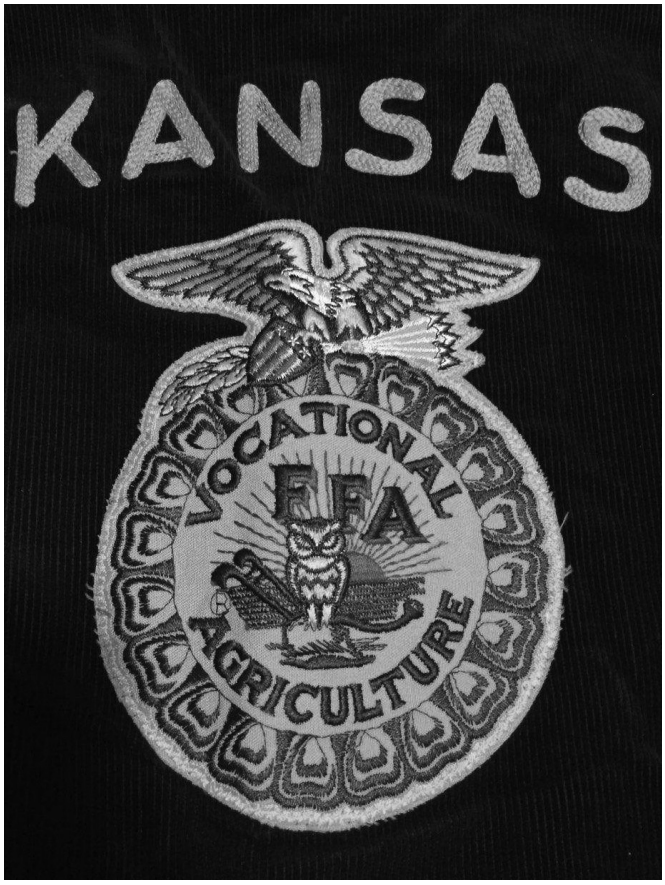


Photo courtesy of Leslie Krehbiel.

It has been over thirty years since *The Green Book* was published. This issue of The Agricultural Education Magazine is a reflection of the last thirty years and an examination of the changes that still need to happen in agricultural education. I have called on leaders in various areas of agricultural education to offer their thoughts on the major findings from *The Greenbook*. I encourage all agricultural education professionals, especially those directly involved with middle and high school instruction, to reflect on the findings of the National Research Council and work to find ways to make agricultural education relevant for all students.

R. G. (Tre) Easterly III is an Assistant Professor of Agricultural Education at New Mexico State University.

Where There is no Vision, the People Perish

by Gary Moore

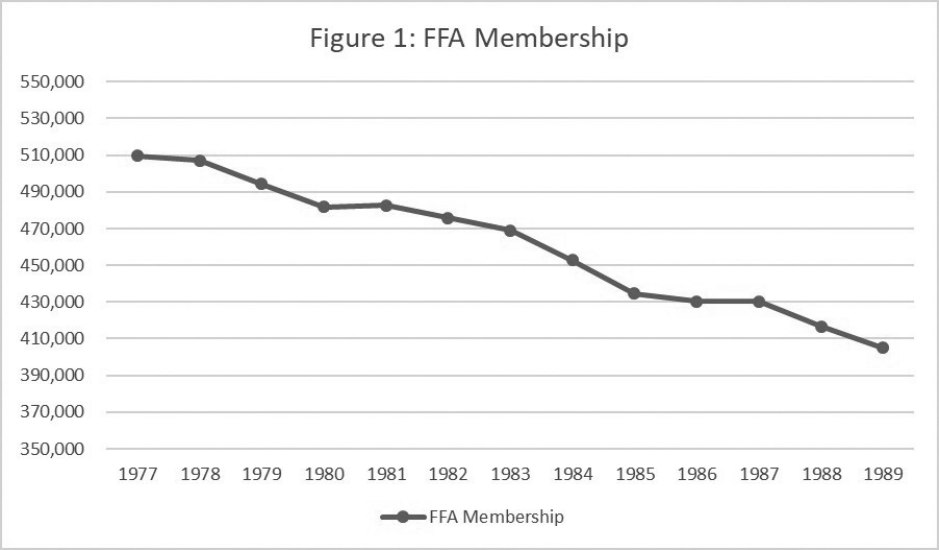
In March of 2019 a big news item was that only one Blockbuster video store remained in the world (in Bend, Oregon). At one time, there were 9,000 Blockbuster video stores. Radio Shack, Sears, Toys R'Us, J.C. Penney, Gymboree, Charlotte Russe, and Payless Shoes have closed some or all of their stores in the last couple of years. Is it possible that Agricultural Education programs will be next to close their doors? That was a question that was prevalent during the 1980s.

In the mid-1980s there were grave concerns about the future of agriculture. During the 1980s, farmers in the United States faced an economic crisis that was more severe than any since the Great Depression. Inflation was running rampant. Land prices reached new highs and then plummeted. Delinquency on property taxes increased 400 percent. Banks in the agricultural heartland were failing at a rate higher than at any time since the Great Depression.

Many farmers faced financial ruin. The number of farmers declaring bankruptcy soared and it was common to hear of farmers committing suicide. In 1985 there were three farmer suicides in one week in Iowa. Overall, the were more than 900 farmer suicides during the 1980s. Why would anyone want to be involved in agriculture with daily headlines like these?

The farming crisis had a ripple effect and impacted agribusiness and other areas of agriculture, including Vocational Agriculture programs (yes, that was the name in the early 1980s). Why would anyone want to study agriculture? Was it time to close the doors on Vo-Ag?

Enrollments in Vocational Agriculture (and the FFA) declined during the 1980s. Not only was there a perception that agriculture was a failing industry, but it was also believed by many that agriculture, Vocational Agriculture, and FFA was out-of-date, not scientific, and just wasn't cool (in the lingo of the day). Why would anyone want to wear dorky blue corduroy jackets around? Between 1977 and 1989 FFA membership had declined by more than 100,000 members



The faming crisis of the 1980s coupled with the release of *A Nation at Risk* in 1983 created a "Perfect Storm" for Vocational Agriculture. In the early 1980s there was concern about the quality of education in America. In response to this concern, the U. S. Secretary of Education, Terrel Bell, created a "National Commission on Excellence in Education." The release of the Commission's report in April of 1983 alarmed the public and led to dramatic changes in education for both K-12 schools and institutions of higher education.

One of the opening lines in the *Nation at Risk* report stated, "the educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a Nation and a people" (National Commission on Excellence in Education, 1983, p. 1). That line caught people's attention as did the declaration that followed "If an unfriendly foreign power had attempted to impose on America the mediocre educational performance that exists today, we might well have viewed it as an act of war".

Among the 38 recommendations found in *A Nation at Risk* several had a negative impact on Vocational Agriculture. The first was that high school graduation requirements should be raised. Students should be required to complete at least four years of English, three years of mathemat-

ics, three years of science, three years of social studies, and half a year of computer science and two years of a Foreign Language for college bound students. Because of this recommendation, 47 states increased the number and distribution of courses required for high school graduation, often exceeding the Nation at Risk minimums (Pipho, 1985). Since students had to take more required courses to graduate, there was a decline in Vocational Agriculture program enrollments.

Universities were encouraged to increase their admission standards and requirements – and they did. Thus, students who wanted to go to college, were guided into the more scientific and rigorous courses that would prepare them for college. Enrollments continued to slide in Vocational Agriculture.

It was also recommended that education be made more rigorous with higher standards. As a result, many states instituted additional graduation requirements including various standardized graduation tests. Vocational Agriculture was not considered to be very rigorous, thus "serious" students tended to avoid these classes.

In an article in the *Vocational Education Journal* in 1985 Price wrote that *A Nation at Risk* recommendations was having a negative impact on vocational education in California. The title of Feldman's 1984 AVA presentation pretty much sums up his opinion "In the Name of Excellence: The Ambush of Vocational Education." An article in *The Urban Review* titled "Throwing the Baby Out with the Bathwater: Changing Requirements for a Successful Business Education Program" lamented how the new graduation requirements were having detrimental effects in Business Education. Numerous other articles could be cited but the bottom line was that *A Nation at Risk* had an adverse effect on vocational education programs.

In addition to everything discussed so far, another issue was the word "Vocational." The public's perception of "vocational education" programs were negative and outdated. The perception was that vocational education was for students of lesser ability. The opening paragraph of the monograph *Vocational Education's Image for the 21st Century* (Catri, 1998, p. 1) states:

These are hard times for secondary vocational education. Leaders of the new school reform movement do not give it high priority. They assume that it is separate from general education, has little educational value, and should be replaced by a predominantly academic curriculum. At best vocational courses are expected to provide students who are not college bound with minimal training for low-status jobs at entry level (Silberman 1986). Ask a vocational educator to name the most serious issues facing the field today, and most will rank "our image problem" high on the list ("What Do People Think of Us?"1997, p. 14) The "image problem" has been pervasive over the past 10 years."

Many states were experimenting with renaming their vocational agriculture programs in the 1980s. In one state Agribusiness Education was the new name. In others it was Agriscience Education. There were other iterations of the name. However, more often than not, the name was changed but the curriculum and program remained basically the same.

It was obvious given the farm crisis, the declining membership in the FFA, the implementation of *A Nation at Risk* recommendations, and the public's perception of vocational education that something needed to change in the Vocational Agriculture world. Accordingly, a major study on agricultural education was conducted by the non-partisan, unbiased National Research Council. At the request of the U. S. Secretaries of Education and Agriculture, The National Research Council established the Committee on Agricultural Education in Secondary Schools to conduct an intensive study of Agricultural Education. The Committee started its work in 1985 with three major objectives

1. Look at the goals for instruction in agriculture.
2. Determine the subject matter and skills that should be taught in agriculture.
3. Identify policy changes needed at the local, state and national levels to facilitate new and revised agricultural education programs.

It was obvious given the farm crisis, the declining membership in the FFA, the implementation of *A Nation at Risk* recommendations, and the public's perception of vocational education that something needed to change in the Vocational Agriculture world.

The Committee met seven times, held five hearings across the country, organized two conferences, attended a national FFA convention, and visited nine schools. The final report of their work, commonly referred to as the Green Book or the Apple Book because of the cover, was released in 1988 and was titled *Understanding Agriculture New Directions for Education*.

Concluding Remarks

Scarborough writes of the leader who failed (1965, p. 128), "He misunderstood the past, he miscalculated the present and ignored the future." In a conversation with a member of the Committee on Agricultural Education in Secondary Schools shortly after *Understanding Agriculture, New Directions for Education* was released, he stated it was common at the committee hearings to hear an agriculture teacher state "If it ain't broke, don't fix it." This sentiment was expressed more than once. It was obvious that some agriculture teachers were oblivious to the changing world and didn't see the need for a change. Perhaps they should have heeded the words of Scarbrough and also the words of Solomon who wrote in Proverbs 29.18 "Where There Is No Vision, The People Perish". *Understanding Agriculture, New Directions for Education* was the vision the agricultural education profession needed in the 1980s.

Understanding Agriculture, New Directions for Education was the vision the agricultural education profession needed in the 1980s.

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The Green Book's History and Legacy

by J. Robert Warmbrod

In June 1984 the newly organized National Council for Vocational and Technical Education in Agriculture petitioned the U .S. Secretary of Agriculture and the U.S. Secretary of Education to establish a national panel to critically examine vocational and technical education in agriculture in the nation's public secondary schools. Also requested were recommendations for educational outcomes to be achieved by agricultural instruction, persons who should be taught knowledge and skills in agriculture, and the subject matter that should be taught

On December 18, 1984, John R. Block, U.S. Secretary of Agriculture, Terrel H. Bell, U.S. Secretary of Education and Frank Press, President of the National Academy of Science signed a cooperative agreement for a study of agricultural education in secondary schools. The specific charge for the national study was to:

> . . . critically examine vocational and technical education related to agriculture in the nation's public school. Recommendations will be developed regarding the goals for instruction in agriculture, the subject matter and skills that should be stressed in curricular for different groups of students, and policy changes needed at the local, state and national levels to facilitate the implementation of new and revised agricultural education programs in secondary schools.

In May 1985 the Chairman of the Board of Agriculture of the National Research Council appointed a 17-member **Committee on Agricultural Education in Secondary Schools** to be chaired by Dr. Daniel G. Aldrich, Jr. the retired Chancellor of the University of California-Irvine. Members of the Committee were a university of California biology professor, a Stanford University journalism professor, a state director of vocational education, a former state commissioner of education, Chief Executive Officer of the Kellogg Foundation, the Dean of the College of Agriculture at the University of Georgia, a high school teacher of vocational agriculture, a national FFA officer, a professor of agricultural education, a school superintendent, a policy analyst well-known for a widely disseminated article *Vocational Agriculture: A Model for Education Reform*, the principal of the Chicago High School for Agricultural Sciences, a farmer, and three representative from agricultural production and agribusiness.

The Committee's first meeting was in June 1985. The committee met periodically in Washington D.C., during an AVA Convention in Atlanta, and during a National FFA Convention in Kansas City to hear testimony of persons invited to write papers for the Committee. Members of the Committee met at several locations in Arkansas, California, Pennsylvania, and Chicago to visit schools and confer with teachers and school administrators.

Report of the Committee

The Board on Agriculture of the National Research Council issued the report of the Committee on Agricultural Education in Secondary Schools in 1988: *Understanding Agriculture: New Directions for Education* or *The Green Book*. The Committee presented two major overarching recommendations.

- Public school agricultural instruction should become more than vocational agriculture, calling for the establishing of agricultural literacy instruction, which the Committee labeled "education about agriculture."
- Major reforms are needed in secondary school vocational agriculture, which the Committee labeled "education in agriculture."
- The Committee offered specific recommendations pertaining to the major recommendations.

Reform in Vocational Agriculture

- Expand and upgrade the scientific and technical content of vocational agriculture courses.
- Subject matter of instruction in vocational agriculture must be broadened beyond production agriculture.
- The quality of vocational agriculture programs must be enhanced.
- The "vocational " label should be avoided to attract students with diverse interests, including the college bound and those aspiring

to professional and scientific careers in agriculture.

– Programs must be upgraded to prepare students for career opportunities in agricultural sciences, agribusiness, marketing, management, and food production and processing.

– Programs must be upgraded to prepare students for the study of agriculture in post-secondary schools and colleges.

– Enrollment of females and minorities in vocational agriculture programs should be increased.

– Supervised experience programs should be broadened to reflect the range of opportunities in today's agricultural industry.

– FFA should change its name and revise its symbols, rituals, contests and awards, and requirements for membership to reflect a contemporary image of agriculture and a broadened and improved agricultural education program.

Establish Agricultural Literacy Instruction

– Beginning in kindergarten and continuing through twelfth grade, all students should receive some systematic instruction about agriculture (agricultural literacy).

– Much of the instruction about agriculture could be incorporated into existing courses (science and social science) rather than taught in separate courses in agriculture.

– To accomplish the goal of agricultural literacy, teachers of agriculture and other subjects should be provided more and better instructional resources and support.

Change Strategy

– Representatives of agribusiness and community leaders should meet with school officials to implement cooperative efforts to bring more instruction about agriculture into the curriculum

– In addition to specialists in agricultural education, legislators, school superintendents and board members, principals, and science teachers should provide leadership in the initiation of agricultural literacy efforts and the reformulation of vocational agriculture.

– States should establish commissions, preferably appointed by the governor and chief state school officer, to identify needs and strategies for implementing agricultural literacy programs and reforming vocational agriculture programs.

The Green Book's Legacy

Agricultural education must become more than vocational agriculture. Has agricultural instruction in the public school become more than vocational agriculture? Has agricultural literacy instruction been established?

Major revisions are needed in vocational agriculture. What major revisions have been made in purpose, curriculum, students taught, supervision and administration, and teacher education?

Answers to these questions define and describe the legacy of *The Green Book* for the development and improvement of agricultural instruction in the public schools.

J. Robert Warmbrod is a Distinguished University Professor Emeritus in the Department of Agricultural Communication, Education, and Leadership at the Ohio State University. Dr. Warmbrod was Editor of the Agricultural Education Magazine from January 1968 to December 1970.

STEM and Agricultural Education: Manure, Lowell Catlett and Three Circles

by Marshall Swafford

Thirty years ago, *Understanding Agriculture: New Directions for Education*, also known as *The Green Book* was published in an attempt to illustrate how the Committee on Agricultural Education in Secondary Schools viewed contemporary (1980s style) agricultural education and its vision of what agricultural education should become in the future (now). Throughout the book, several observations and numerous recommendations were made to serve as a foundation to modernize agricultural education. While the term STEM did not exist at the time of the book's publication, topics included under its umbrella were identified as vital to the future of agricultural education. After re-reading the book and taking into consideration the theme of this edition of the *Agricultural Education Magazine*, I realized that we (agricultural education) have come a long way since *The Green Book*.

While the term STEM did not exist at the time of the book's publication, topics included under its umbrella were identified as vital to the future of agricultural education.

Manure

"The opposite of progress is ignorance." – Unknown

Our lives are completely dependent on agriculture, from the clothes we wear, to the food we eat, to the roof over our heads; we simply cannot survive without it. Having, at least, a rudimentary understanding of agriculture provides us with a minimum level of knowledge to help us make decisions which impact our lives and those of our loved ones. Since most American adults can identify products like food, clothes, and lumber, I would like to believe that everyone is a semi-agriculturally literate citizen however, I am continually befuddled that there are people outside of the agricultural industry who do not understand its impact on their lives and their future. What is even more disturbing is that even in the 21st century, people continue to ask, "I'm not a farmer, why do I need to know anything about agriculture?" These individuals also tend to be the ones who do not realize that agricultural education is a thriving component of today's schools and is found in over half of the school systems in the United States. When I inform those not in the know that agriculture has been a part of education since colonial times and that by 1915, 21 states required instruction on agriculture in rural schools with half of those states requiring it in urban schools, I usually get looks of complete bewilderment. By the time I explain that a majority of our founding fathers were agriculturists and that President Jimmy Carter was an FFA member (after I explain what the FFA is), I am asked to leave the conversation. While it is not completely shocking (though disappointing) that there are still adults who are woefully under-educated about agriculture, it may be more disturbing that there is a disconnect between agriculture and STEM among those we perceive as *educated*.

Manure, at least "artificial manure" (Marcus, 1985), of all things, started a scientific revolution in American agriculture in the late 19th century. Farmers who wanted accurate analyses of the fertilizer (artificial manure) they purchased clamored for scientific research that resulted in the passage of the Hatch Act of 1887. The Hatch Act provided funds for scientific research that still drives the creation of new knowledge and innovation today. Over the succeeding 30 years, as a result of the Hatch Act, with support from the USDA, agricultural education in this country was very science-based. In fact, Chambers's Encyclopedia (1889) defined agricultural education as, "…a comprehensive term, including instruction in chemistry, geology, botany, zoology, mechanics – embracing, in short the science as well as the practice of agriculture" (p.61). The USDA was also instrumental in providing courses of study to be used in teaching agriculture (Wheeler, 1948) and instructional materials for teachers (Ekstrom, 1969; Lane, 1942).

The disconnect between agriculture and STEM can be traced to passage of the Smith-Hughes Act. With its passage in 1917, agricultural education shifted from a

The disconnect between agriculture and STEM can be traced to passage of the Smith-Hughes Act.

foundation grounded in academics to one of employment preparation. As stated in the Smith-Hughes Act, the purpose of agricultural education, "…shall be to fit for useful employment; that such education shall be of less than college grade and be designed to meet the needs of persons fourteen years of age who have entered upon or who are preparing to enter upon the work of the farm or of the farm home" (Smith-Hughes Act). The shift in agricultural education philosophy from science-based and academic-oriented to vocational preparation eventually resulted in the concerns which served as the foundation for *The Green Book*. As noted by the National Research Council (1988), the study on agricultural education in secondary schools was initiated because of concerns about, among other things, instructional content and quality of agricultural education programs. Since 70 years of formal agricultural education was grounded in vocational preparation, a modicum of forgiveness is warranted for those who struggle to connect agriculture and STEM.

Lowell Catlett

"It's always darkest before the dawn." – Dean Swafford

Prior to the publication of *Understanding Agriculture: New Directions for Education*, agriculture in the United States experienced declining profitability and international competiveness which led to issues in agricultural education including, decreased enrollment and the aforementioned concerns regarding instructional content and program quality. Since the publication of *The Green Book*, agricultural education has experienced a renaissance, which continues today. Many of the changes to agricultural education are easily viewed by those involved – the Future Farmers of America became the National FFA Organization, Vocational Education was changed to Agricultural Education on the back of FFA Jackets, and Supervised Occupational Experiences (SOEs) became Supervised Agricultural Experience (SAEs). However, the relationship between agriculture and content normally considered *academic*, including those falling under the STEM umbrella, are becoming more defined, highlighted, and often, celebrated.

Lowell Catlett, agricultural futurist, recently noted that today is the best time ever to be in agriculture. I would build upon that notion by emphasizing the relationship between agriculture and STEM. A quick (.54 seconds) Google search of STEM in agriculture yields about 193,000,000 results. As would be expected, several of the results are associated with agriculture companies, education programs, and government agencies. However, a significant portion of the results are associated with non-agriculture websites or organizations. Outside organizations are taking note of the renewed emphasis on academics in agricultural education. In 2015, U.S. News and World Report indicated that STEM skills are a necessity in over 25% of new agriculture jobs. *ECN Magazine* (Electronic Component News), a trade magazine for electronic equipment designers and engineers, has highlighted the importance of integrated STEM and agriculture careers and the need for qualified workers. The importance of the interconnected nature of agriculture and STEM has even entered the non-agriculture federal research agency arena, as well. Organizations like the National Science Foundation (NSF) and the National Institutes of Health (NIH) have recognized that excluding agriculture researchers from their funding opportunities has created a knowledge void regarding the strategies needed to maintain and enhance human and environmental well-being. However, even though non-agriculturists have taken note with and are singing the praises of the relationship between agriculture and STEM, we cannot just sit back and enjoy the ride. While it is difficult to avoid tripping over the term STEM on television or on the internet, it is still vital for those of us in the profession to promote and teach agriculture and STEM using an integrated approach to better prepare our students for their futures.

However, the relationship between agriculture and content normally considered *academic*, including those falling under the STEM umbrella, are becoming more defined, highlighted, and often, celebrated.

Three Circles

"Agricultural Education, quite possibly the world's most perfect education." – Marshall Swafford

Agricultural education teachers, do not ever let anyone make you believe that you cannot teach or support STEM education in your classrooms. Do not ever let anyone question you or your program's value to your students. By its very nature, the model of agricultural education creates a synergy of opportunities to teach and support STEM like no other educational program in existence today. When taught from well-rounded curriculum grounded in the *Agriculture, Food and Natural Resources (AFNR) Career Cluster Content Standards* agricultural education students can be explicitly taught concepts in every STEM area (Swafford, 2018). Career Development Events are not just contests either. In addition to their exposure to the STEM concepts embedded in each event, student participants are engaged in activities which promote and aid in the development of workforce skills required by STEM employers including, effective communication, problem-solving and critical thinking, and information technology applications (Swafford, 2018). And let's not forget SAEs. Depending on the specifics of the SAE, students engaged in meaningful programs are exposed to areas included in the *Next Generation Science Standards* including, Earth & Space Science; Engineering, Technology, & Applications of Science; Life Science; and Physical Science (Swafford, 2018). At a minimum, the model in which agricultural education programs are grounded provides a framework for a comprehensive STEM education embedded in agriculture. No other educational program available is designed to provide contextualized STEM education which includes meaningful and authentic learning experiences for its students, like agricultural education. So yes, you can teach and support STEM in your classroom.

We should always continue to strive to improve our teaching and our programs. However, agricultural education is now on the path which, I believe, the authors of *The Green Book* envisioned.

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Agriculture IS the Integrated Science: Consider the Context

by Andrew C. Thoron and Edward W. Osborne

Strikingly, the first paragraph from *Understanding Agriculture: New Directions for Education* is still as relevant today as it was in 1988.

"In the 1980s, many forces have challenged American agriculture and education. These forces include demographics; urbanization; rapid gain in worldwide agricultural production capacity; domestic farm and trade policies; lifestyle changes; global competition in basic and high-technology industries; the explosion in knowledge caused by increasingly sophisticated computers, digital equipment, and biotechnological techniques; specialization within the professions; and public expectations about the role of schools, the food supply, and public institutions," (NRC, 1988 p. v).

One might read this first paragraph and think that we really have not fixed or changed anything from when this was originally written over thirty years ago. However, the historical context when the 1988 NRC report, commonly known as *The Green Book,* was released is very important. This report followed the 1983 National Commission on Excellence in Education's report titled *A Nation at Risk*, which prompted an increase in math and science high school graduation and college admission requirements. This, in turn, impacted vocational education in America. As a result, school-based agricultural education in the public schools began redefining its focus from a production and technical skill development curriculum to a more science-based curriculum.

Agricultural Education's Response

Understanding Agriculture: New Directions for Education became the tipping point for school-based agricultural education (SBAE) during this transition and ongoing challenge to remain relevant in the larger school community. One response was the release of new curricula and textbooks that focused on *agriscience*, such as *Biological Science Applications in Agriculture* (Osborne, 1989), which used experiments as a way to connect science concepts and principles to agricultural practices. In the ensuing years, science became prevalent in our SBAE curricula, and many states had one or more agriculture courses that qualified for science credit. During this time, textbooks began to resemble biology textbooks with agriculture concepts embedded. As a profession, we responded to the call for more science and math instruction in high schools by incorporating science into our curricula, often replacing instructional time on agricultural topics.

In the early 2000s the concept of Science, Technology, Engineering, and Math (STEM) was widely promoted by Texas Governor George W. Bush (as he was running for president) as an avenue for increased education funding in these areas (Robelen, 2000). As an agricultural education community, we reminded everyone that we were already emphasizing STEM, and many even pushed for the revised acronym STEAM, which added agriculture. As a profession, we often doubled down on the science in our programs, and perhaps this has served us well. Simply remaining a largely skills and job-prep program may have made SBAE less relevant today, given the needs of our larger school community. As The Green Book pointed out, there was certainly room to

examine and think further about the needs of our students – we had to consider the changing context.

Declining Technical Agriculture Knowledge and Skills

Meanwhile, the students we teach today are remarkably different than the students enrolled in high school agriculture courses in 1988. Students enrolled in agriculture courses at that time who were not involved in production agriculture probably had a stronger awareness of basic agriculture concepts and practices, when compared to today's students. Perhaps SBAE has gone too far into teaching science and has forgotten the call to *teach the science of agriculture*. The introduction of the CASE curriculum was a commendable attempt to provide national thinking/curriculum to help connect science and agriculture concepts. When deciding our approach to integrating science concepts and principles into our agriculture courses, we must not lose sight of the fact that more and more high school students have little to no knowledge and experience in agriculture.

The Green Book pointed out a need to think about teaching *in* and *about* agriculture. In this book, the National Research Council proposed that teaching *about* agriculture includes agricultural literacy and the economic significance of the industry on the well-being of the United States. Meanwhile, teaching *in* agriculture should involve instruction focused on specific principles and practices in the broad agriculture and natural resources sector. As we have fewer students with experience in production agriculture enrolled in agriculture classrooms across the United States, we should first think about providing an agricultural literacy course at the middle school level or early high school level to give these students a better foundation for learning in their high school agriculture courses.

Many states have experienced major shortfalls in funding for schools and career and technical education programs. Agriculture teachers strive to provide the foundation for developing the next generation of agricultural scientists, yet many of our teachers struggle to teach effectively with seriously outdated and inadequate materials, facilities, and equipment. Our profession also holds true to ideals of the past, including curricula approaches and recognition programs that no longer align with student and industry needs. We find ourselves at another critical moment, not unlike that addressed by The Green Book in 1988. The great majority of today's students, including those who enroll in high school agriculture courses, has limited knowledge about agriculture. The push to incorporate more math and science in our high school curricula has, in many cases, led to greater inclusion of science and math in our curricula but without an explicit connection to agricultural practices.

These trends have led to a cadre of teachers who struggle to develop a working knowledge of science and agriculture and an understanding of how science informs and explains agricultural practices. All of these factors have led to a growing number of students in high school agriculture courses who fall short of developing the foundational knowledge and technical skills needed to support the future of this critical industry.

Anchoring Your Teaching in Agriculture Supported by Science

Despite the policy constraints

placed on teachers today, agriculture teachers, in particular, continue to have a great deal of autonomy in how they approach their teaching. A number of steps can help address the trends discussed above. First, think about how your curriculum can address teaching *in* and *about* agriculture. Explore new ways to develop agricultural literacy in your students and get them excited about the many careers in this broad industry. Secondly, if you wish you knew more about agricultural production principles and practices, consider the following ideas:

proactively participate in state and national workshops and other professional development experiences that strengthen your technical knowledge and skills;

complete one or more immersion experiences with growers and producers for several weeks each year to learn/update your skills and deepen your knowledge of current production practices; and

update your instruction to reflect modern agricultural principles and practices and their underlying science connections.

Third, if you wish you knew more about the science concepts and principles that provide the foundation for agricultural practices so you can better connect agriculture and science in your courses, the following strategies may be helpful:

seek teacher professional development experiences that explicitly focus on the content and methods for integrating science and agriculture;

complete one or more immersion experiences each year in agriculture and natural resources businesses that have

science and technology at the forefront of their operations; and

focus your curriculum first on important practices in agriculture and natural resources, and let those topics dictate the science concepts and principles that you teach.

Teaching Agriscience

The emphasis on science and math in middle schools and high schools over the last three decades is unlikely to fade – and for good reason. U.S. students continue to lag behind their international peers in academic achievement in these two subjects. Equally alarming, though, is the graduation of high school students who have little to no knowledge of the scope, science, technology, and practices in the broad agriculture industry – and the science connections that support these innovations.

Science as a subject in schools involves both *content* and *process*. Concepts and principles, such as photosynthesis, form the *content* of science, and science process skills, such as collecting data and identifying conclusions, constitute the *process* of science. Science process skills are generic to any scientific investigation, whether the focus is on a general science question or an investigation on an agricultural topic. However, the science content that we should teach in our agriculture courses should be limited to the concepts

and principles that explain the agricultural practices that are important in our local communities and the industry as a whole. This integrated approach provides the opportunity for students to gain direct experience with agricultural practices, pursue scientific investigations, and connect science and agriculture in the way they are connected in fields and laboratories. Using experiments in teaching agriscience optimizes student engagement in science, agriculture, and inquiry. Agriscience instruction must focus on agricultural practices first, followed by an examination of their connections to science concepts and principles. The science concepts and principles studied in agriculture should be those that explain why an agricultural practice is performed as it is and why the practice has the effects that it does.

Summary

As in 1988, we're at a pivotal time in school-based agricultural education. Even with the local foods movement, the distance between consumers and the mainstay agriculture industry has continued to expand. Students in schools have become more removed from our complex food system than ever before. The academic reforms and school accountability agendas in the last three decades have forced agricultural education to become more science based, but this has often not translated into a curriculum focused first on agricultural practices and supported by integrated science concepts and principles. In addition, the demands on agriscience teachers today in providing a complete agricultural education program have made curriculum revisions and their own professional updating more challenging. What's the ideal scenario? We suggest one in which the curriculum is centered first on agriculture practices and explicitly connects (teaches) relevant science concepts and principles, program completers have technical agriculture knowledge and skills, university teacher education programs further develop the technical agriculture knowledge and skills of teacher candidates, industry and community resources are engaged to support the technical advancement of agriculture teachers, and school classrooms and labs are designed and equipped to support high quality agriscience instruction.

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Photos in this article are courtesy of Texico High School, Texico, NM.

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Curriculum for Agriculture Teachers by Agriculture Teachers: The Processing of Development Curricular Resources in Utah

by William Deimler

Call to Action

In 1988 the Vocational Agriculture and Future Farmers of America community received a "call to action" through a report titled "Understanding Agriculture – New Directions for Education". The report was commissioned by the Governing Board of the National Research Council (NRC), whose members were recruited from the councils of the National Academy of Sciences, the National Academy of Engineering and the Institute of Medicine. From the NRC, a Committee on Agricultural Education in Secondary Schools was created to lead the discussion on three topics identified as concerns for vocational agriculture and the FFA: declining enrollments, instructional content, and quality in agricultural education programs. The members of the committee came from universities, high schools, state departments of education, agricultural commodity groups and farm credit organizations. The members associated with education had primary responsibility in the local communities, universities and state departments of education as secondary education classroom teachers and FFA advisors, university professors with responsibility for preparing classroom teachers for vocational agriculture programs, and state level leadership for vocational agriculture and the FFA.

To set the stage for this discussion, the agricultural sector was in a financial crisis which had started in the late 1970's and continued through the mid 1980's. Several of the reasons identified for this financial crisis were, U.S. export policies and poor borrowing and lending practices. As usual, the adults in charge of creating the mess, began looking for someone to blame for the mess, and then made recommendations to fix the mess.

The first recommendation of this call to action was; "The success of reform in vocational agriculture programs relies on innovative programmatic leadership at the state and national levels. Major leadership challenges include developing the curriculum, revising the focus and content of FFA programs and activities, evaluating programs, educating teachers, assuring adequate resources, and creating a more flexible and adaptive legislative and budgetary framework." I have been asked to address the development of curriculum resources.

Program Direction

You cannot, however, talk about curriculum development without first addressing the focus and direction of the agricultural education program. In 1995 Dr. Gary Straquadine and I wrote a White Paper that addressed a growing concern among the agricultural education teachers in Utah. There were two major concerns; 1) teachers were prepping five to six different courses a day and 2) students were taking these courses out of sequence or courses that were not related to each other. Agriculture teachers generally prep more courses than other teachers. An English or Science teacher, because there may be more than one English or Science teacher in the school, might prep only one or two different courses. When you are the only agriculture teacher in the school you prep all the courses offered, which might include one animal science course, one plant and soil science course, one Biology course, one greenhouse course, one natural resource science course, and one agricultural mechanics or welding course. The second concern was created when students signed up for courses from a cafeteria list of all the agricultural education courses available in the state. After the students make their selection the counselor/principal schedule the courses that met the minimum student number requirements. Courses that had too few students enrolled were combined with other courses. So, you might have a student who signed up for a Greenhouse course scheduled into an Equine Science course. These two issues needed to be fixed before we could address the curriculum development issue. And so, before it was the "flavor of the month," we started the discussion about Pathways; aligning our courses in a logical sequence of three to four years

You cannot, howerver, talk about curriculum development without first addressing the focus and direction of the agricultural education program.

and then helping counselors and principals understand the importance of taking these courses in sequence. Today Pathways are a big deal in Utah's Career and Technical Education world and across the nation. Not every person is on board and even though the concept of "Pathways" is very widely accepted it doesn't always mean that students will take courses in a logical sequence or that they will complete a Pathway. In Utah for the past 5-10 years students who graduate from high school as completers of a CTE Pathway are often recognized with cords or medals or a certificate during the graduation ceremony. This recognition at graduation speaks volumes about the importance of Pathways.

Standards and Curriculum Development

The process starts with the development of the content standards. Content standards are statements that describe specific knowledge and skills that a student should know for a specific course. Like many states, we have always had content standards in Utah. Because we are a small state with limited resources, we had to find creative ways to develop our own instructional materials. From the beginning, university agricultural education faculty, high school agriculture teachers and industry representatives have been a part of the process of developing content standards. We use this same process today. Currently we review and revise our content standards by Pathway on a four-year rotating schedule. Year-one we review all composite courses and the Natural Resource Science courses, year-two we review all agricultural mechanics and welding courses, year-three we review animal science, equine science and veterinary assistant courses and year-four we review all the plant and soil science and horticulture courses. End-of-course Skill Certificate tests are also very important for Perkins funding. Of course, a result of reviewing and revising the content standards is that you must also review and revise the associated Skill Certificate test.

From the beginning, we have used Utah State University's agricultural education faculty and teacher committees to develop, write and implement curriculum or instructional materials. The committees meet and discuss, assignments are made, and materials are written including content material, student activities, PowerPoint presentations, worksheets, student labs, and a student evaluation for each unit. These materials are all channeled through one teacher or retired teacher who is a very good writer. The final writer proofs the materials and formats them so that they look the same across the entire course. The materials look more professional if the same writing style and the same format are used throughout. This is helpful as you move from one unit of instruction to another because components are always found in the same place in each unit. In this process, we have to caution teachers not to use copyrighted materials and photos.

When the instructional materials are completed, we provide time at summer conference for the teachers who developed the materials to in-service the materials in teacher-led workshops. Because of our rotation schedule, we have new materials every summer. These materials are not for sale to other states because the funding does not allow for these resources to be monetized. Additionally, the resources were created to be used in Utah and thus, are not designed to be used in other states. They are, however, kept on a password protected site available to every agricultural education teacher in Utah. I hope that agriculture leaders can learn from our teacher-driven process of creating high-quality curricular materials appropriate for their own state.

William (Buddy) Deimler is the Agricultural Education Specialist in Utah.

Fulfilling the Vision for SAE: A 30-Year Process

by Michael Retallick

The early 1980's was a tumultuous time for education, and specifically agricultural education. President Regan's *A Nation at Risk* report (United States National Commission on Excellence in Education, 1983) raised concerns about educational preparation of American students. Declining profitability and international competition were affecting the agriculture economy and there was a laundry list of competing forces that were impacting the enrollment in secondary agricultural programs. These production agriculture and agricultural education challenges caused the U.S. Secretaries of Agriculture and Education to charge the National Research Council to study and make recommendations. As a result, in 1985, a committee on agricultural education in secondary schools was established to assess and make recommendations to maintain and improve agricultural productivity and competitiveness.

The committee's final report, which was titled *Understanding Agriculture: New Directions for Education* (National Research Council, 1988), was nicknamed the "Green Book." The report was an honest, but not very glowing, assessment of agricultural education. Declining enrollments, instructional content, lack of consistency among programs, and program quality were concerns. They concluded there was a need to adjust policy and perception of both agriculture and agricultural education to meet these challenges. The report became a bellwether to reframe agricultural education nationally.

The committee suggested a transition from a focus on pure production-based vocational training to include agricultural literacy. They expanded the definition of agricultural education to include both vocational and literacy describing it as both education *in* and *about* agriculture. The *Green Book* provided the vision for expanding agricultural education – including SAE (Supervised Agricultural Experience).

The committee called for major revisions in the relevance and scope of SOE (Supervised Occupational Experience), as it was called at the time. The program needed to be more effective in the preparation of students for current and future career opportunities beyond traditional production agriculture. The committee recommended a goal that ALL students participate in worthwhile SOEs focused "on learning, with appreciation for earning" (National Research Council, 1988, p. 5).

> *The Green Book* provided the vision for expanding agricultural education — including SAE (Supervised Agricultural Experience).

The *Green Book* articulated a vision of SOE that included an involved teacher, planned experiences, adequate resources, and student placement. Although segments of our profession still debate the legitimacy of using such facilities, the committee allowed for supervised experiences acquired through "land laboratories, agricultural mechanic laboratories, greenhouses, nurseries, and other facilities provided by the school" (National Research Council, 1988, p. 5). Extensive contact between student and teacher in a diverse portfolio of SOE opportunities was a quality factor to minimize uneven quality instruction within and across programs. The committee also acknowledged that 4-year SOE programs was the goal but noted that not all students needed SOE throughout their 4 years. Finally, while the *Green Book* didn't call for a change from SOE to SAE, it precipitated the discussion and the change.

Prior to and following the *Green Book*, researchers continued to study SAE. While supervised experience had an economic impact and educational value, there were issues. Among those issues were declining supervised experience participation because of changes in student demographics, school schedules, cuts to teachers' summer contracts, diminishing appreciation by school administrators, and additional expectations and pressures for agriculture teachers' time. These works continued the discussion regarding the implementation of

SAE which lead to educational materials for both local agricultural programs as well as agricultural teacher education. Among them was a SAE Handbook by Barrick, et al. (1992), National FFA's CD-ROM SAE Handbook (2006) SAE unit plans for agricultural teacher education (Barrick et al., 2015), and the Philosophy and Guiding Principles for the execution of the Supervised Agricultural Experience Component of the Total School Based Agricultural Education Program (National Council on Agricultural Education, 2015). These works had significant influence on the evolution of SAE and most recently culminated in the development of *SAE for All* (National Council on Agricultural Education, 2017).

SAE is defined as a **student-led, instructor supervised, work-based learning experience** that results in **measurable outcomes** within a predefined, agreed upon set of **Agriculture, Food and Natural Resources (AFNR) Technical Standards and Career Ready Practices** aligned to student **career plan** of study. *SAE for All* (Figure 1) begins with building awareness at the middle school level and continues through advanced levels for high school seniors. There are five foundational elements that are applicable to all students. Once students establish career-based goals and a focus via the foundational elements, there are opportunities for further enrichment and individualization through five types of immersion SAEs.

The foundational elements are essential skills and activities for all students and can be further developed no matter where they are at within the program (e.g., first semester freshman or last semester senior). It allows for easy entry and exit, can be applicable for students who enter the program for a single semester or for program completers, can be taught within a class or self-taught via the student handbook that was developed, which allows for *SAE for All* to be required for all students and graded as a part of every course.

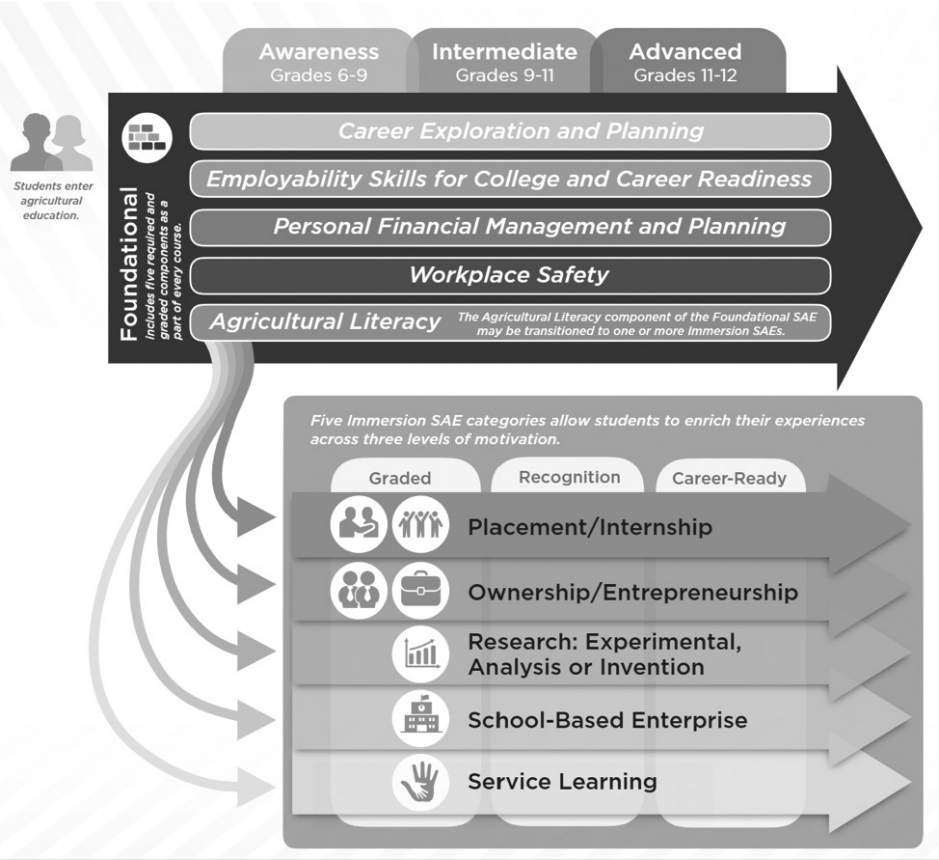

Figure 1. SAE for All

The foundational elements of *SAE for All* situate agricultural education as a premier career and technical education program and addresses educational and societal issues that parents and lawmakers expect school districts to address. *SAE for All* includes purposeful career planning and exploration which is a requirement for most states and Perkin V's programs of study. It provides an authentic mechanism for students to plan, develop, and record employability skills for college and career readiness. Personal financial management and planning is incorporated and addresses the national need for finance education. *SAE for All* also addresses workplace safety and the related labor laws, which is not only a concern regularly voiced by the U.S. Departments of Agriculture and Labor, but also employers. Finally, there is an element of agricultural literacy at the foundational level to address the need for a literate employee pool and society who has a basic understanding of the depth and breadth of the agricultural industry and the national food supply.

The immersion SAEs, for the most part, are similar to previous traditional types of SAE including placement/internships and ownership/entrepreneurship. However, it has been expanded to research (i.e., experimental, analysis, and

invention), school-based enterprise, and service learning. The Immersion SAE categories allow students to enrich their experiences across three levels of motivation – graded, recognitions and awards, and career-readiness. The immersion SAEs fit a broader range of student interests and provide a venue for all students to explore careers and interest while developing transferable skills to college and the workplace.

SAE for All has been adopted by the National Council for Agricultural Education and the related organizations. Funding and support have been secured for the training and in-service of state Team AgEd members in a train-the-trainer-fashion. Ag Experience Tracker (AET) and other state-approved recordkeeping systems are making changes to align with *SAE for All*. And, most importantly for many agriculture teachers, National FFA has committed to aligning the recognition and award systems to the elements of *SAE for All*.

In summary, it's been more than 30 years since the *Green Book* was published. It initiated an ongoing agricultural education discussion which has led to continual advancements in all areas including SAE. As I reflect on the most recent advancements with SAE, I believe we are closer than ever to achieving the vision of the committee who penned the *Green Book.* The pendulum has swung. The primary focus of SAE is on student learning and meeting the needs of ALL students who have interest in our agricultural programs. It will take ongoing and significant effort to continue to advance SAE. *SAE for All* addresses the practical challenges teachers face daily as well as the primary educational mandates and societal issues around career planning, financial education, and workplace safety. All of this is in an effort to better prepare a more agriculturally informed generation of employees and consumers through our education *in* and *about* agriculture.

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The Green Book: Chapter 2 – Agricultural Literacy

by Debra Spielmaker

What have we achieved and what still needs to be done?

Understanding Agriculture: New Directions for Education (1988) or *The Green Book*, has three chapters. These relatively short chapters discuss findings, conclusions, and recommendations concerning agricultural education's future. The first chapter begins with an acknowledgement that social changes have taken place in the 20th Century and that these changes require a new direction for agricultural education "to become more than vocational agriculture" (p. 1). The introduction continues by saying that *within* vocational agriculture programs changes are needed. The authors recognize that the future of American agriculture requires an informed citizenry in addition to trained agricultural workers. They cite the small number of students enrolling in vocational agriculture programs and a shrinking farming population, as signs leading to a future of ill-informed policymakers; potentially jeopardizing advancements in the agricultural industry. Chapter 2, the focus of this article, is dedicated to agricultural literacy and discusses the need for a more informed society. The authors infer that expanded agricultural literacy will result in increased interest and enrollments in revised inclusive agricultural education programs.

The second chapter opens with this statement, "Agriculture—broadly defined—is too important a topic to be taught only to the relatively small percentage of students considering careers in agriculture and pursuing vocational agriculture studies" (National Research Council, 1988, p. 8). Within this chapter the National Research Council (NRC) committee highlighted several studies identifying a "disturbing trend" (p. 9) regarding the understanding of agriculture by American children. The committee (approved by the NRC) was concerned that a lack of *agricultural literacy* would undermine the agricultural industry—an industry that all require for their basic needs of food, clothing and shelter. The committee noted the difference between education *about* agriculture (agricultural literacy) and education *in* agriculture (at the time vocational agriculture or today, secondary school-based agricultural education). The committee envisioned "that an agriculturally literate person's understanding of the food and fiber system would include its history and its current economic, social, and environmental significance to all Americans" (p. 8).

"Agriculture—broadly defined —is too important a topic to be taught only to the relatively small percentage of students considering careers in agriculture and pursuing vocational agriculture studies."

The committee posited that "most Americans know little about agriculture," (p. 9) and that research in this area was "fragmented, frequently outdated, usually only farm oriented, and often negative or condescending in tone" (p. 9). The group recommended that all K-12 students receive some instruction about agriculture using curriculum integration as an approach, noting that it would be easier to incorporate agriculture into existing curriculum than to make additional demands on instructional time with separate agricultural lessons. They also recommended that education leaders support the implementation of agricultural concepts into the core academic areas of science, history, economics, and health.

To fund agricultural literacy programming, the committee suggested that curriculum integration efforts be supported by the National Science Foundation (NSF) and the U.S. Department of Education. They highlighted the need for government, local community, and agricultural business leaders to work together with school systems to support agricultural literacy curriculum integration efforts and that teachers be supported with training. Finally, they encouraged the agricultural community and "vocational education organizations" (p. 11) to collaborate with other national education organizations to garner their support for curricular integration to increase agricultural literacy. The remaining sections of Chapter 2 focused on how these recommendations could be implemented and on model programs that were underway to address agricultural literacy.

Looking back, most of the needs identified by the NRC committee have been addressed or at least partially addressed. So what has been accomplished in the past 30 years regarding agricultural literacy? The simple answer is a lot! In terms of research, Google Scholar returns 1,560 articles that have been published since 1988 using the term "agricultural literacy." This does not include other terms that researchers sometimes use that are closely related to agricultural literacy such as; food literacy, agrifood literacy, natural resource literacy, STEM literacy, and food justice (Keeton, et al., 2016). There have also been several influential reports/articles published highlighting agricultural literacy program accomplishments and establishing benchmarks for agricultural literacy (examples can be found on https://www.agliteracy.org/research/influential.cfm). All provide recommendations for continued diligence in the area of educating the public about agriculture.

The American Association for Agricultural Education National Research Agendas (including the current one) have all included a priority for conducting research on public and policymaker understandings of agriculture and natural resources (Enns, Martin, & Spielmaker, 2016). To further research efforts, four multistate research committees have been approved by Land-Grant University Agricultural Experiment Stations since the early 1990s. More recently the National Center for Agricultural Literacy (NCAL) at Utah State University was established (2017). The recommendation by the NRC committee for more research and a national foundation or center (NCAL) supported by USDA and private funds has been accomplished.

Programs to increase agricultural literacy among educators have also emerged and have been expanding. The G*reen Book* cited "Ag in the Classroom*" (AITC, officially organized in 1981), and "Life Lab Science," focusing on gardening (established in 1979), as programs that had been successful in developing integrated curriculum materials. Both programs are very active today. The National Agriculture in the Classroom Organization (NAITCO) reported there were 49 state contacts with 45 states having active education programs in 2018 (State Programs, 2018). The NAITCO annual report also stated that nearly 150,000 teachers participated in at least one professional development training. These teachers, with the support of 44,446 volunteers representing a variety of commodity groups and state Farm Bureaus, reached 7.3 million students with AITC resources in 2017. Forty-three state AITC programs conducted in-service teacher trainings and 16 states conducted pre-service teacher trainings in 2017 (State Programs, 2018). The American Farm Bureau Federation has also created resources and programming that are used nationwide by its membership. The Life Lab program trained 4,000 educators in 2018 (Life Lab, 2019) and these educators are expected to work with 400,000 students on gardening projects. Several other local/state gardening programs have emerged, and 4-H and FFA programs have developed resources for K-12 students to use in formal and nonformal settings. The "Project, Food, Land & People" program began in 1989 and has also formed coalitions and partnered with state AITC programs to deliver K-12 curriculum resources. This program has reached nearly 50,000 educators (Food, Land & People, n.d.). While participation in these programs suggests that a

great deal has been accomplished, these numbers just scratch the surface of the estimated 3.2 million teachers (National Center for Education Statistics, 2018) who could help to increase agricultural literacy. Therefore, the NRC vision/mission is *partially* accomplished.

The National Agricultural Literacy Curriculum Matrix, supported by USDA and NAITCO, and maintained/developed by the National Center for Agricultural Literacy, is an online searchable database for teachers looking to integrate agriculture into their instruction. The "Matrix" provides K-12 educators with more than 400 free lesson plans and 800 supportive companion resources. These instructional materials are reviewed for accuracy and evaluated for sound pedagogical approaches that integrate agricultural concepts. In addition, the lesson plans must align with national education standards and the National Agricultural Literacy Outcomes. The Matrix had nearly 110,000 site visitors in 2017. Based on the availability of these high quality resources, the NRC recommendation for integrated curricular resources has been adequately addressed.

While NRC recommended support funds should come from NSF and the U.S. Department of Education, the USDA-National Institute of Food and Agriculture (NIFA) agency has provided the bulk of the support for programming over the last 30 years. Since 1998, USDA-NIFA has provided funds annually to maintain the National Agriculture in the Classroom website (http://agclassroom.org) and train educators at regional meetings and at an annual national conference. More recently, USDA-NIFA has supported the National Agricultural Literacy Curriculum Matrix and research at the National Center. More private and public support could extend the resources and training opportunities for teachers.

Many of the agricultural literacy programs operationalize their programmatic goals using the Logic Model for Agricultural Literacy (Spielmaker, Pastor, & Stewardson, 2014). This logic model was developed by stakeholders from Cooperative Extension, National Agriculture in the Classroom, 4-H, the U.S. Department of Education - Agriculture Education & FFA, the American Farm Bureau, and USDA-NIFA representatives. The logic model was built on previous research and provides programs with measures for impact. The model complements the ideals of *The Green Book* and checks off another recommendation by the NRC committee to engage agricultural educators and industry experts in the agricultural literacy effort.

Much has been accomplished in areas of research, instructional resource development, program development, and teacher train-

Educators will need ongoing training and instructional resources that also incorporate critical thinking, problem solving, and decision making if they are to continue to increase agricultural literacy and grow and informed citizenry into the future.

ing. However, while programs and networks have been established, a larger audience needs to be reached. Compounding this effort is the need to address the growing number of misconceptions *about* agriculture. The Internet and social networks have provided an opportunity for agricultural literacy education globally, but also resulted in challenges related to dubious claims regarding agricultural production, food processing, nutrition, and sustainability in the environment. Educators will need ongoing training and instructional resources that *also* incorporate critical thinking, problem solving, and decision making if they are to continue to increase agricultural literacy and grow an informed citizenry into the future.

** Many "Ag in the Classroom" programs changed their names to "Agriculture in the Classroom" in the early 2000s, as the abbreviation "Ag" caused confusion among teachers and their students.*

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Photos in this article are courtesy of Centennial FFA, Las Cruces, NM.

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In and About – Can We Tell the Difference?

by R. Kirby Barrick

A major portion of the National Research Council (NRC) report *Understanding Agriculture* focused on the concept of education "about" and "in" agriculture. As described in various sections of the publication, a call was made to move education in agriculture beyond traditional and historic vocational agriculture (now agricultural education) and place more emphasis on agricultural literacy, while also making major improvements in vocational agriculture programs. The overall recommendation was that "beginning in kindergarten and continuing through twelfth grade, all students should receive some systematic instruction about agriculture" (p. 10).

Many have interpreted the mandate to expand agriculture instruction to include enrolling students who want to learn *about* agriculture alongside those who desire to pursue a career pathway *in* agriculture, separate from agricultural literacy programs for students of less than high school age. That interpretation is valid, since agricultural education instructors are already available in secondary schools and could, or should, be able to provide programs for students who simply want and need to know more about the broad field of food, agriculture, and natural resources. An obvious benefit in some scenarios is increased enrollment in agricultural education programs, perhaps saving the "in" agriculture programs from elimination due to declining numbers as identified by the NRC report (page 26).

What have been the results of including students from both groups, the "in" and "about" students, in the same agricultural education classes? We probably do not know, and this is a potential research investigation that is probably warranted. So we can only offer observations and conjectures and perhaps sketch out a line of inquiry to aid in moving the NRC recommendations farther ahead.

Classroom and Laboratory Instruction. Agricultural education is a part of state- and federally-funded career and technical education (CTE), with a purpose of preparing students to obtain and advance in a chosen occupational area or career path. Therefore, classroom and laboratory instruction should address the technical job requirements in an agriculture career pathway. Typically, that instruction begins with basic understandings, and that content may well qualify as instruction in agricultural literacy. Beyond the basics, however, teachers who work with classes that include "in" and "about" students face a dilemma: How much is too much for agricultural literacy, and how much is not enough for career preparation. Several results may occur. The "about" students may become more interested in the subject matter than simply filling an elective requirement or science credit and become *vocationally* interested in agriculture. But for the "in" students the instruction they receive may not be adequate to achieve initial success in a job and career in agriculture.

Leadership and Personal Development and the FFA. Traditional students, those who enroll in the agricultural education program with an intent to enter the agriculture workforce, have an array of opportunities to embellish their technical skills with employability skills through participating in leadership development activities incentivized by the FFA. Many are engaged for four years (or more, in some states), enabling them to amass an impressive record of accomplishment. In contrast, the "about" students may be enrolled in the agricultural education program for only a year or even less; middle school programs may be only a semester or nine-week program. How does agricultural education serve both groups appropriately? Should the "about" students be expected to join the FFA, pay dues, and participate alongside and compete against the "in" students?

Supervised Agricultural Experience (SAE) Program. The applied learning portion of agricultural education evolved from the home project method to a supervised occupational experience program and then to a supervised agricultural experience program (SAEP). The concept of SAEP is not as prevalent in other parts of career and technical education and is a mainstay of truly vocational or career preparation. Regardless of the strength and breadth of classroom and laboratory instruction, teachers cannot adequately address every job in agriculture that students may aspire to, and the school-based instructional setting is artificial. Students need to gain experience in a real work situation, whether as an owner/operator or as a valued employee. Questions mentioned in previous

sections of this article also arise here: how do opportunities and expectations differ for students studying "in" agriculture and those studying "about" agriculture?

It is somewhat illogical to expect agricultural literacy students to be involved in an applied work experience program (SAE). Further, those students may be enrolled for only a year or less, making it extremely difficult to envision a *program* of supervised agricultural experiences.

Where to From Here. As noted throughout this issue of the magazine, progress has been made in addressing the various findings, conclusions and recommendations of the National Research Council report. This article has mainly addressed agricultural education instructional programs at the secondary school level. Much more can be written regarding agricultural literacy outside of school-based agricultural education programs. Based on the observations included above, here are some additional thoughts to ponder as the profession continues to help all citizens have a working knowledge of the food and fiber industry *and* prepare students for a career in agriculture.

For classroom instruction at the high school level, the ideal is to have separate courses for the two groups of students. That probably would be a curricular nightmare for teachers and administrators and potentially require more teachers. The decades-old national shortage of agriculture teachers contributes to the lack of feasibility of this idea. Alternatively, study "about" agriculture could be offered only at less than ninth- or tenth-grade with instruction "in" agriculture offered only during three or four years of high school. While overall enrollments in agricultural education programs may increase, the career and technical education programs in agriculture may experience a decrease in enrollment.

Leadership and personal development skills are of value to all students, regardless of their vocational and career interests. The FFA provides opportunity and incentive for students to develop those skills and be rewarded for their efforts. But the actual opportunity for "in" and "about" students varies considerably. Consider that instruction about agriculture would be confined to middle school programs. It seems appropriate that specific events provided by FFA should be designed to address that age group and agriculture interest. Simply moving the existing programs from 9th-12th grades down to 6th-8th grades may not be in the best interest of the students.

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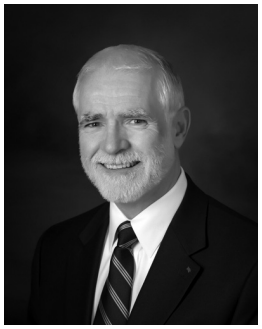
In recent years, various agricultural educators have proposed new and alternative opportunities in SAE. Here again, SAEs beyond ownership and internship/placement may be best suited for students studying "about" agriculture; the "in" students need the real-world work experience associated with their career intentions. Instructors can focus more on helping prepare those students for their first job without having the pressure to ensure that the "about" students meet some sort of requirement that may not be appropriate. A vital question revolves around the extent to which "about" students should have an SAE program of any type, while the "in" students conduct career-focused ownership and placement programs.

The agricultural education profession has addressed the NRC report in several meaningful ways. As the profession continues to welcome into local programs students who are interested to some degree in learning about the agriculture sector of the U.S. economy as well as those with a career interest in agriculture, it is important to ponder whether we are serving both groups well. Can we tell the difference between agricultural literacy programs and CTE agriculture programs in terms of the level of instruction, student involvement in FFA, and the conduct of SAE programs?



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