

standardized testing that they have achieved whatever outcomes are appropriate for our institutions.

Having said that, I am going to be brazen enough to offer suggested criteria of quality education. If someone were to say to me, "Chancellor, what are your desired outcomes for an undergraduate at North Carolina State University?" this would be my response.

First is communication skills. I expect those who graduate from this institution should be able to receive and interpret and express ideas effectively, utilizing language or symbolic systems.

Second is critical thinking, to reason logically and apply problem solving techniques appropriately.

Third is self-directed learning. If there is anything that you can be certain about for the future, it is that students will need the ability to direct themselves in further learning because they won't be able to turn around before they will find the game has changed.

Fourth is functional understanding in the humanities and fine arts. My hope would be that they would understand the relationship between the human condition and the creative activities and products that are the expression of the human spirit. I recall a course at Rutgers University in art history. The marvelous thing about that course was that I learned that the evolution of the human condition could be traced in the creative works of people through the ages. In terms of social and behavioral sciences, I would hope that our graduates understand the development of the individual and the dynamics of social institutions within which individuals function.

Fifth is an absolute must — a knowledge of science and technology. If someone does not understand physical and biological environments and the laws that govern them, there is no way that they are going to keep pace with modern society.

Sixth is historical perspectives. I would hope a student could interrelate a series of events over time and draw from them some of the implications for today.

Finally, cultural understanding. Appreciating and understanding the impact of diverse cultures on the global village definitely is another must in our society. Our graduates must be able to examine the ethical implications of questions they will face in life and formulate a reasoned and value-oriented position concerning other cultures. If there is any capability that our society and particularly our public servants need, it is a broader cultural perspective.

Obviously to be educated implies worthwhile purpose — to perform worthwhile activities. To that end the basic requirements of a knowledge base and skills and tools are essential.

In closing, I draw your attention to the most significant changes in agricultural education over the last four years. I would say first is putting agricultural education within the context of the broader considerations of the environment and natural resources. I

think that has been a marvelous step forward. The world we live in demands that. I compliment agricultural educators for that step. I think second I would list the effort to put agriculture within a context of a national and international energy agenda.

Looking to the future, what needs to be done? Clearly one task is to reexamine the relative roles of land, labor and capital in the context of modern-day agricultural production. In that reexamination I think a great deal more consideration must be paid to financial management, cash flow, and equity protection. In addition we must reexamine market elasticities in both domestic and international markets. Some of the old ideas about market elasticities may no longer apply. Certainly in this state where 35 percent of our production is going into world markets, it would be a disservice to let a student graduate without a real understanding of where the international market place fits into agriculture production.

## The Agricultural Image

Kyle Jane Coulter

I am pleased to be with you today to discuss the image of agriculture and related implications for the U.S. food and agricultural sciences higher education system. While the topic is too complex to fully explore in a few minutes, I'd like to share with you some major issues that appear to be surfacing at the national level and, hopefully, suggest some alternatives for resolving these issues. We, who are trying to attract the best young minds in the Nation, are acutely aware of how important it is that these young men and women recognize the multiplicity of exciting scientific and professional career opportunities in agriculture.

Mounting evidence suggests that we must do a better job of helping today's students become aware of these opportunities. Between 1977 and 1983, baccalaureate enrollments in agriculture at our land-grant universities declined approximately 30 percent. During this same time period, graduate enrollments diminished by a factor of 5 percent. Furthermore, enrollment projections through the mid-1990's suggest a continuation of these trends. To some extent, a portion of projected declining enrollments may be attributed to demographic realities. However, the fact remains that between 1977 and 1982, total U.S. college enrollments were continuing to increase while agriculture enrollments were declining. Total U.S. college enrollments did not reflect a decrease until 1983. Hence, demographic changes, such as a diminishing pool of college age youth, cannot be used solely to rationalize declining enrollments in agricultural fields of study. Rather, we must recognize that the unidimensional public image of agriculture as production, combined with increasing competition

Remarks by Kyle Jane Coulter, Director of Higher Education Programs, U.S. Department of Agriculture, at the 31st Annual Conference of the National Association of Colleges and Teachers of Agriculture, June 17, 1985, Raleigh, N.C.

from other disciplines is contributing to the reluctance of students to pursue university degrees in the broad array of academic disciplines comprising the food and agricultural sciences.

### Vital Expertise

Agricultural expertise is vital to the security and well-being of this country. The United States' world posture as the lead Nation in agriculture requires an adequate scientific and professional human capital base. Therefore, the U.S. Department of Agriculture is concerned about these enrollment trends. One of our missions, as described in the Food and Agriculture Act of 1977 and as amended by the 1981 Agriculture and Food Act, is to help ensure that our nation has the requisite food and agricultural expertise. Because the image of agriculture affects our ability to accomplish this mission, I would like to share with you some ideas about the image we have, the image we need, and strategies for enhancing our public image.

When I think of image, I think about reputation and a scene from Shakespeare's *Othello* in which a character complains that he has lost his reputation unjustly. Iago responds that, "Reputation is an idle and most false imposition, oft got without merit and lost without deserving." In a sense, our college and university programs in the food and agricultural sciences are currently experiencing this very kind of irony. I certainly am not suggesting that these institutions did not earn the excellent reputation they have enjoyed over the past century as evidenced by sizeable enrollments of students seeking preparation for careers in agriculture. Ironically, however, today when our universities are coping with a serious image problem in recruiting academically outstanding students, we are, at the same time, witnessing in many respects the finest hour of achievement in the agricultural sciences. It seems that, like the character in *Othello*, the reputation of our higher education programs may have suffered without "deserving."

Fortunately, the realities of today's world are much different from those of the tragic world of *Othello*. Shakespeare's character did not have access to modern public relations, and we all know the wonders that can be wrought in changing an image or a reputation with the help of Madison Avenue. Remember when New York was once regarded by many as dirty, crime-ridden, and financially troubled? Along came the "I Love New York" campaign which helped transform its image to one of scenic beauty, interesting people, and cultural excitement. And, of course, the face and voice of Lee Iacocca have become familiar to all of us. Chrysler has been revitalized in large part because of an extraordinary mass media campaign to transform its image to one of quality, dependability, comfort, and economy. It now challenges even Mercedes and BMW, confidently announcing that "It's over, over there."

### Our "Farm Problem" Image

The portrayal of agriculture via the mass media, however, is not currently enhancing our image. The "farm problem" is all we hear about these days when agriculture is the subject. *The Washington Post*

recently ran a series of front-page articles on farming titled "Growing Broke." Many television specials have also focused on farm problems. Most are similar to the CBS *Sunday Morning* show which recently featured a midwestern farmer, his many awards displayed behind him, explaining that he "just can't make it any more" and, when asked what he would advise his son, said he would not recommend a career in farming. Regrettably, the public tends to equate farming with the totality of agriculture.

Even the nonjournalistic media are caught up in the nostalgia of a time past in agriculture. On the radio, we hear country singer Charley Pride singing about a man whose dreams are slipping through his fingers like the dirt of the land he loves and lamenting that if we can put a man up on the moon, why can't we keep one down on the farm.

Movies this last year were practically dominated by stories about families struggling valiantly to earn a living on the farm. Of course, these movies were not meant to inform the public about the science and technology of and careers in agriculture. Rather, they dramatized the struggles of the human spirit. But books, movies, plays, and songs never convey a single message and, unfortunately, a high school senior emerging from having seen "Country" or "Places in the Heart" would not be likely to hurry home to complete an application to enroll in a college or university degree program in agriculture.

Certainly, the difficulties of the family farm are an important part of today's agricultural scene. But they are temporal and represent only part of the picture. Nevertheless, the media's exploitation of news about farmers in financial trouble contributes to a negative image which, by default, we are allowing to be extended to the whole of agriculture and particularly to the food and agricultural sciences higher education system. Through the years, as our standard of living has consistently advanced, we have been remiss in not publicizing agriculture's unique contributions to this miraculous achievement. We in higher education have been further remiss in failing to convey to the public the message that our graduates have made profound contributions to this effort.

Today is still an exciting time to be involved in agriculture — an industry that employs about one-fifth of all U.S. workers in one capacity or another. The pursuit of future scientific and technological developments in agriculture offers exciting challenges to the very best young minds in the Nation. But, we must transmit this message to the world-at-large. We must strive to promote an image that better conveys the multiplicity of opportunities available to food and agricultural sciences graduates. An image of employment diversity, challenge, and reward must become our goal. And we must pursue this image with vigor and vitality. I would now like to explore some ways we might go about establishing this image.

Our public relations efforts must emphasize that scientific opportunities in agriculture are manifold. We must tell the story of how agriculture plays an integral role in advancing the frontiers of science and technology related to areas such as: genetic

engineering to improve livestock and crops; tissue culture to expedite plant variety development and propagation; livestock embryo splitting and transplanting; creation of new vaccines through bioengineering; improved pest control through the use of insect pheromones, allelopathic, and other biorational procedures; rapid and supersensitive analytical methodology to monitor and protect water quality; computer models to predict, monitor, and control soil erosion and reduce production costs; remote sensing via weather satellites; and use of novel enzymatic and aseptic technologies to develop more convenient, economical foods with nutrient composition responsive to current research into diet and health relationships.

While biological and physical sciences are and should be portrayed as central to agriculture, many other facets are likewise important. Marketing and merchandising opportunities flourish throughout today's complex food and fiber chain. Agricultural engineering permeates the production, processing, storage, and transportation of food, as well as the conservation of natural resources and the maintenance of environmental quality. And modern agriculture is inseparable from the world of insurance, credit, stocks and commodities, real estate, tax law, and monetary policy. In essence, agricultural professionals are prominent citizens in the world of business and high finance.

No other U.S. industry can compete with agriculture in terms of diversity of career opportunities, both at home and abroad. No other industry offers a broader nor more complex array of challenges associated with solving crucial domestic and world problems. Consequently, agricultural careers afford opportunities to interact with intellectually stimulating scientists and professionals, different cultures worldwide, dynamic organizations, and international leaders and political infrastructures — whether one specializes in biological or physical science, in business or finance, or in social science areas of agriculture.

Let me summarize thus far. We need to actively promote an image that encompasses four fundamental themes, as follows:

- Our educational programs prepare students for a **myriad of career opportunities** that far transcend agricultural production. These career opportunities pervade the biological, physical, and social sciences.
- **Substantial employment opportunities** exist for graduates in the food and agricultural sciences. In fact, there are significant shortages of scientific and professional expertise in several areas of specialization, such as biotechnology, agricultural engineering, food and agricultural marketing, food science, and human nutrition.
- Our **graduates are successfully employed** across the full spectrum of the labor force. They are to be found in positions such as corporate chief executive officers, bank

presidents, university presidents, scientists, public relations specialists, commodity brokers, and economists. They are employed by the Fortune 500 Companies, State and Federal governments, and universities, as well as mid-size business firms. Sizeable numbers own their businesses. Others are in high demand as consultants.

Building such a persuasive case for agricultural higher education is beyond the capability of a single entity. Rather, we must act in concert to change public opinion. Government, industry, and academia working together can accentuate the positive, eliminate the negative, latch on to the affirmative, and enhance the image of agriculture. In order to do this effectively, however, we need to:

- **develop a comprehensive national strategy**, involving substantial use of marketing and public relations expertise and mass media delivery modes, that will stimulate the interest of —
  - academically outstanding young people
  - high school science teachers
  - counselors
  - parents
  - individuals responsible for development of education policy and resource allocation
- **enlist significant others to help tell our story**, for example —
  - leaders of American industry
  - successful graduates and/or their parents
  - nationally renowned scientists and educators
  - political statesmen
  - personalities from the world of sports and entertainment

One of the most striking reasons for the success of American agriculture has been the long established partnership of government, industry, and academia. I am confident that working together via this partnership, we can meet the current challenge.

It is heartening to see industry's demonstrated commitment to broadening the image of agriculture. The recent television special, "Agriculture's Next Generation: A Conflict of Interest," provides a case in point. This show, hosted by Eddie Albert and sponsored by Monsanto, DuPont, Yamaha, and Ford, was principally aimed at revitalizing the image of high school vocational agriculture programs. It exemplifies industry's interest in furthering agricultural education in our country and that resources are available when we make a concerted effort to work cooperatively with industry in solving problems of mutual concern.

This kind of commitment is needed also from the higher education system. I recognize that a campaign of the magnitude of Chrysler's in rebuilding its image may be impractical. Nevertheless, a reasonable commitment of resources is essential, and faculty and student involvement is critical. And you are in the best position to mobilize these valuable resources. For

example, there are few relationships deeper and more enduring than the student teacher relationship. Unfortunately, professors and students too often lose contact with one another. In a more general sense, universities too often lose touch with their graduates and thus forego a valuable resource for strengthening programs and for recruiting students. We critically need a better system of tracking former graduates if we are to involve them in enhancing the stature of agriculture. Additionally, I would like to encourage you to examine promotional materials for your institution. Do they project the parochial image of agriculture? You as individuals and NACTA as an organization must ensure that promotional materials reflect the totality and the importance of your educational programs.

While I cannot over emphasize the importance of your role in changing the image of agriculture, I recognize also that we in government have an important role to play. Before closing, I would like to share with you some of the initiatives we in USDA are undertaking.

Through our manpower analysis studies, we are documenting the Nation's supply of and demand for graduates of higher education in the food and agricultural sciences. We are deeply involved in developing the Food and Agricultural Education Information System (FAEIS) which will provide the first computerized, comprehensive, coherent set of national statistics for use in developing policies and programs aimed at strengthening food and agricultural sciences higher education. We are supporting several national projects focusing on faculty development, curricula development, and student recruitment. And in 1984, we established the first graduate fellowships grants program targeted toward recruiting outstanding master's and doctoral students into expertise shortage areas in the food and agricultural sciences.

The Secretary of Agriculture has even taken a personal interest in the situation. Through a 1984 private sector challenge forum, involving leaders of industry and academia, the Secretary elevated to the White House level the crucial need for maintaining our nation's food and agricultural scientific and professional expertise. That forum is still producing major dividends. Key industry participants in the forum, working cooperatively with USDA, have recently made a commitment to initiate a coordinated mass media campaign targeted specifically toward attracting our Nation's outstanding young people into the food and agricultural sciences. This campaign will consist of nationwide television and radio announcements and will also provide a "hotline service" for interested viewers/listeners.

But there is much more to be done and we cannot afford to waste time and energy lamenting our "reputation lost without deserving." Rather, we must direct our capabilities, imagination, and ingenuity toward presenting an impressive advocacy of the value of higher education in the food and agricultural sciences. Government, academia, and industry must unite to accentuate the positive, eliminate the negative, latch on to the affirmative, and revitalize the image of food and agricultural sciences higher education.

# The Environment For Effective Learning

George Bostick

*"Education is not about making a living, it's about making a life."*

(Doris Betts, 1985)

Providing educational environments is an expensive undertaking. Annually, about \$10 billion is spent for constructing educational facilities, and this figure has remained almost static for the past four years.

However, while the total may have remained static, there have been significant changes in the way that money has been spent. For example:

1. School districts are spending more money adding to, and rehabilitating, existing facilities than on new building construction.
2. Overall, about 50 percent of all construction dollars in school districts and colleges is spent on refurbishing and adding to existing buildings.
3. Continuing a trend that began in 1983, colleges are now spending more on construction than are school districts. In particular, spending on new buildings for four-year colleges alone is now greater than spending on new buildings for school districts.

It is clear, therefore, that besides providing additional classroom space, a significant percentage of construction dollars is spent on renovating and refurbishing the learning environment.

Some people may look upon the learning environment as nothing more than bricks and mortar containing teachers and students engaged in the educational process. However, the educational facility plays a much more substantial role in the development of its main ingredients — teachers and students.

Normally, three considerations are used in evaluating the accomplishment of a school's educational mission: educational philosophy, educational program, and educational facility. Decisions about the educational facility depend upon philosophy and program, and ideally all three should be compatible. Anything less than this would mean a failure of the educational mission and therefore a decline in the quality of the educational experience for students and teachers.

Until recently, considerations about the classroom environment were limited to establishing minimum standards for heating, lighting, acoustics, and ventilation. The assumption seems to have been that as long as these basic requirements were met learning depended solely on pedagogical, psychological, and

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Remarks by George Bostick, Director of the Educational Media Center, Department of Agricultural Communications, NCSU, at the 31st Annual Conference of the National Association of Colleges and Teachers of Agriculture, NCSU, Raleigh, June 18, 1985.