PROCEEDINGS OF THE 1989
PROGRAM OF THE RESEARCH
CENTER ADMINISTRATORS SOCIETY

February 6 and 7, Nashville, TN

This Society is affiliated with the Southern Association of Agricultural Scientists and has membership from each of the southern states. The Executive Committee is composed of one representative from each state, the current officers and the immediate past chairman (is chairman of the Executive Committee).

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TEXAS AGRICULTURAL EXPERIMENT STATION
THE TEXAS A&M UNIVERSITY SYSTEM
El Paso, Texas

Texas A&M University Agricultural Research and Extension Center

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September 7, 1989

Membership
Research Center Administrators Society
Southern Association of Agricultural Scientists

Dear Members:

It is customary for the outgoing chairman to address the membership to outline "the state of the Society" from his perspective. I certainly agree with the numerous comments and compliments which have been made recently concerning the organization. We have made great progress and we are becoming a well-respected and functional organization.

Rather than continue to "pat us on the back," I would like to point out some areas where I think we need to continue to improve. On the one hand, I have been pleased over the past several years that our attendance, and consequent membership, has increased tremendously at our annual program sessions. However, we need to translate some of these new attendees into active, involved workers for the organization.

We must remember that many of our established leaders have retired or will retire soon. A small group of younger members, not subject to imminent retirement, have or are serving in the officer progression. It was gratifying to see the number of new state representatives at the recent Executive Committee meeting in Clemson. But, we must continue to encourage and recruit capable, eager people from our state branch stations into the active participation of the Society.

The Society has advanced recently through high quality programs, the establishment of by-laws and publication of a proceedings, among others. I challenge each officer who begins the long sequence beginning with secretary/treasurer and ending with chairman to try to add one innovative improvement to the Society during those 4 years. If we can add just one significant improvement each year, it will guarantee that we will continue to grow and provide the kind of service to our membership that the established professional societies have over long periods.

I want to thank you--the membership for granting me the opportunity to serve you. This is a good organization and I have benefitted personally from being a part of it.

Sincerely,

Howard L. Malstrom
1988-1989 Chairman

HLM/rmm

ACKNOWLEDGEMENTS

This year's Proceedings were much easier to prepare and complete. Much credit for that must go to Bill Loe, program chairman, who was able to obtain complete written texts of the talk from over half of the contributors. We also appreciate the efforts of those speakers who prepared the complete text. We know manuscript preparation is a time-consuming and difficult task.

For those talks for which there was not a written text, the committee thanks the following secretaries who transcribed the talks from audio tapes: Mrs. Kathy Bryant, Mrs. Tammy Smith, Mrs. Walter Rogers and Mrs. Debbie Brinkley.

We want to also give special thanks to Mrs. Rosa Maese, who typed several versions of edited manuscripts, did all of the final typing, duplicating and collating for the printer. To all of you who had a part in helping to complete this year's proceedings, we say thank you.

Editorial and Publications Committee
Howard Malstrom, chm
James Riley Hill
Gene Morrison
Carl Tart

TABLE OF CONTENTS

1989 Proceedings

OVERVIEW OF VIRGINIA AGRICULTURAL EXPERIMENT STATION

L. A. Swiger
Associate Director and Associate Dean
College of Agriculture and Life Sciences
Virginia Polytechnic Institute
Blacksburg, VA

I was asked to give you an overview of agriculture in Virginia and tell you something about how the Virginia Agricultural Experiment Station functions. I know this group is composed of branch station administrators so I would like to emphasize that element of our system, where appropriate. I know that our folks in Virginia--directors, superintendents, farm managers--are truly good managers. I respect the knowledge and ability of these people. Whenever I ask them to detail costs or what they need for their station to function, they can tell me. That's not as universally true of our department heads. The capability of our branch managers in the management of people and resources is excellent.

I had been involved with branch stations away from central campus for most of my early life. I can remember my Dad being involved in obtaining a new burley tobacco branch down on the Ohio River for Ohio State University long ago. I became aware of branch stations and their relationship to a college of agriculture and a land grant university early in life. My research in Iowa and Nebraska was on branches as well.

I'd like to make a point that is usually controversial depending on what state you're in and how you operate. We, in Virginia, don't really distinguish the three missions of the college of agriculture--research, extension and teaching. Likewise, the funds that come into the agriculture complex are not specifically earmarked. We don't expect a department head or the resident director of a branch station to worry about whether he is spending a research dollar or an extension dollar. We are really not concerned about how the leaders allocate funds as long as the three missions are getting fair treatment.

There is a difference in the missions of the organizations, but when the staff are working with the clientele, they can't say "I can't talk to you because that is a research question." That kind of foolishness doesn't serve us well with our industry at all. I give our leadership at V.P.I. much credit for trying to eliminate that provincial approach.

We are on our way toward combining research and extension as a single state agency receiving one source of funds. We had hoped to eliminate some administrative positions--but I doubt that will ever happen. The most difficult task is to be able to delineate the priorities. When you deal with a director of an experiment station, a director of cooperative extension, a dean of a college and a vice president for agriculture, you go to your state or federal legislature with several sets of priorities. In Richmond, Virginia, they look us in the eye and say, "What does agriculture really want? We want to help agriculture. We know it's doing good things, but we're very confused."

We have about 350 faculty positions in our College of Agriculture and Life Sciences and Experiment Station. There are 150 in research, 100 in extension and 100 in teaching. The support staff is 300 in research and about 50 each in extension and teaching. We have about 150 other fully funded on sponsored programs who are not counted as part of that permanent base.

The College of Agriculture budget is about $50 million. I often wonder if we are spending every bit of the $50 million as well as we can. The Ag Experiment Station budget is $36 million of which $12 million is from sponsored program money, about $3.5 federal and about $20.5 from the state. We spend about $160,000 per full time equivalent scientist position from hard money and about $80,000 from grants.

Our faculty receives such a small amount of "hard" money, it is almost insulting to give it to them. We brag because we're among the top land grant colleges in terms of grant funding, but there is a down side to that also. It certainly shows how effective the faculty can be and we brag on our faculty. However, the amount of grant money is limited and competition for it is intense. There is a real danger that grant funds are going to guide the direction of our programs. I think a lot of people worry about that, and they ought to be worried. It stresses the importance of good management.

There are some options available to manage this situation. We can try to direct funds towards those programs we think are most important. Unfortunately, the more traditional programs are being left behind these days. Some of them might be called maintenance programs, such as continuing to develop varieties or continuing to test fertility levels. That kind of maintenance has a value. If you stop doing those kinds of things, you lose something. We're not continuing to provide support for that sort of thing.

We have 15 departments on campus and 12 branch stations. We have about 45 faculty positions and 100 classified positions at the branch stations. Seven of those 12 stations do not have academic faculty and the principal investigators are either at Blacksburg or one of the other branch stations. We have a high proportion of our resources in our branch stations and additional money goes to them through the departments. Our branches are as dependent on outside grant funding as the campus departments and the degree of this support ranges from almost 0 to almost 100%.

We really don't have a lot of good farmland in Montgomery County Virginia where VPI is located. We recently obtained an 1800 acre farm in the Blacksburg area which has about 500 acres of good crop land. That farm will be nice if we get new resources to help develop it. Last year we had 20 some experiments on that farm. It is a boon to the plant science people because they've never had anything like it before. Most of their work from Blacksburg has been going to the branches or short term leases of private land in the area.

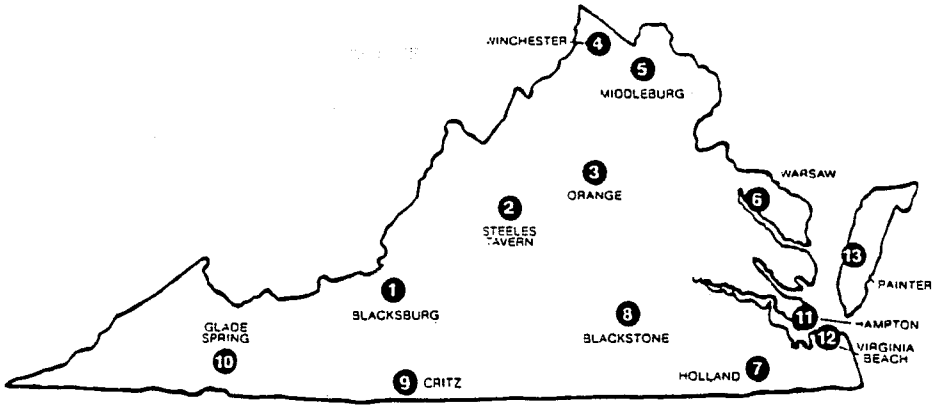

Fig. 1. The branch stations of the Virginia Agricultural Experiment Station.

Let's look at the branch stations in Virginia.

Tidewater station at Holland, VA was established in 1914. The main research is in peanut and swine production. It has also conducted research on soybeans, and in recent years on tillage and irrigation practices.

Southwest Virginia station at Glade Spring was established on leased land from 1929 to 1947. It was reopened in 1951 on another site and addressed production and curing of burley tobacco, production and management of corn and small grains. Livestock research is with beef cattle, and recently, sheep production.

The Winchester Fruit Laboratory, established in 1921, conducts research important to the apple industry. It was formed after five experimental orchards were created in the Shenandoah Valley about 1915. Insect control has been an important part of research in the area. This station receives good support from the Frederick County Fruit Growers and the Shenandoah Valley Apple Cider/Vinegar Corporation.

The Piedmont Station at Orange was established in 1940. There are 4,000 test plots on 43 acres and 34 varieties of grasses. Present research concerns fertilizer, including sewage sludge, soil-crop interaction, soybean research and alcohol and biomass production.

The Forage Station at Middleburg was established in 1949 on 420 acres donated by a resident of Upperville. Pasture and forage for cattle feed is emphasized. Results in improved nutrition and cost control have been significant.

The Eastern Virginia Research Station at Warsaw was established in 1950 to emphasize crop breeding, variety testing, fertilization, crop and soil management and chemical weed control. Recently, emphasis on soybean improvement has led to 5 new varieties which currently make up 80% of Virginia's acreage.

Shenandoah Valley Station at Steeles Tavern is a landmark of Virginia's significance to US agriculture. The McCormick family (descendants of Cyrus McCormick, inventor of the reaper) donated their 616 acre farm, Walnut Grove, in 1954 for agricultural research. Part of the farm was designated a national historical landmark in 1966. Research features insect control of pests in apples and grapes, breeding of beef cattle, new forage crops and a ram testing center.

Reynolds Homestead Center at Critz was established in 1970 as a gift from Mrs. Nancy Reynolds, daughter of R. J. Reynolds. Research concerns pine stands, watersheds, soils, forest genetics, pine bark beetle and quail and catfish production.

The Southern Piedmont Research Station at Blackstone was established in 1974 to augment tobacco research conducted at other stations. Research is also done on horticulture crops that can be rotated with tobacco and can utilize the same production equipment.

The Hampton Seafood Station was established in 1975 to help Virginia's important seafood processing industry remain competitive. Agricultural engineering and food science researchers have updated handling, equipment, work environment, quality control and marketing techniques.

The Virginia Truck and Ornamental Research Station (VTORS) joined the Ag Experiment Station in 1985 after being an independent state agency for 78 years. VTORS had conducted ornamentals, vegetable, fruit and grasses research at Virginia Beach and field crop, orchard, entomology and chemical testing at Eastern Shore in Painter. The merger of VTORS with AEX has increased funding sources and reduced duplication of resources.

I would like to make two important points in conclusion. The first is that we must realize the importance of the branch stations, and especially the type of research they were designed to conduct. It is impossible to address the crops and the problems inherent to the region in which they grow from a single, main station campus. Funding for the traditional work on stations is becoming much harder to obtain and this type of work is difficult to justify in an environment of biotechnology emphasis.

This says something about our ability to manage. We as leaders haven't generally taken a firm stand and tried to develop a strategy for advocating our research. We, in many cases, have reacted or not acted at all when we must be more aggressive.

The second point for branch station managers to consider is the fair and proper development of their faculty. We need to remember that the department head can perform a positive function on the academic end--graduate students, multidisciplinary research teams, and the availability and opportunity for grant funds. You as branch station administrators are the direct supervisor. You need to assure that your faculty know what is required, are supported as well as possible, are rewarded properly and that you provide an atmosphere that will prevent their isolation and allow the ultimate development of their academic career.

EMPLOYEE RELATIONS AND LEADERSHIP

Joe Lancaster
Tennessee Farmers Mutual
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Columbia, TN

INTRODUCTION

Joe High described my farm background in his introduction. I am almost reluctant to tell you how rural that early life really was. In the country where I grew up, it was customary to have something special at Thanksgiving and Christmas dinner. An elderly lady in the community always had a hen for Thanksgiving and a turkey for Christmas and she always bought it at the country store. The country store was the center of the community and usually furnished everything. They kept chickens in a hen box on the back porch of that little store. This little lady wanted to see a chicken but the store owner had only one. He knew if she knew this, she wouldn't buy it. So he set about to deceive her. He stirred that hen to make it appear that there were several in the box. He reached in and brought up the hen and said, "What do you think about this one?" She did exactly what he expected, she looked at it and then said, "Let me see another one." He dropped the old hen back in the box, stirred her again, trapped her from the other side, and brought her up and said, "Say, this is a nice one." She looked at him and squinted and then she said, "I'll take them both!"

I am somewhat awed to be in this room. I realize that most of you are PhD's and am also aware of the contributions you make to our nation's most important industry, agriculture. Not everybody knows that, but some do. We need to do a better job of letting the public know. From my perspective, nothing in this country, absolutely nothing, has achieved a better record of success than agricultural research. If you have the respect and are appreciated in the communities like Joe High is in Columbia, then I'm with a highly selective group of people this morning. I am fully aware that image and respect have to be earned and deserved, and am certain that you have all done this in your communities.

I was asked to talk on employee relations and leadership. I want to emphasize leadership, and hope you will remember just one phrase from my talk: "A leader is something you are, if leading is something you do".

Leaders can't take themselves too seriously. Our company has about 1/2 billion dollars in assets. I have been with the company for 37 years and have risen to a relatively good position. Yet, my 3-year-old grandson can put me in my place and make me realize my importance. Recently, my son and grandson, Boone, were riding with me in my pickup truck. Boone's strapped in that little jump seat in the king cab and this kid is talking a blue streak. I'm picking up on about half of it, and about half of it I don't understand, and his daddy is ignoring him just like I used to ignore his daddy. But, I am too mature for that now. I am not going to ignore that kid. So, I chime in every few seconds and say, "That's good, Boone. I'm glad, Son. Fine. Yeah, I like that." After

a time he got very quiet, and then suddenly he said, "I am talking to my daddy." Leaders must learn to laugh at themselves.

A leader is continually faced with great opportunities, brilliantly designed as insoluble problems. What does a leader do? Leaders plan, direct, delegate, develop the team approach, inspire, expect, set the example, and more. Sometimes we make it pretty complicated, and sometimes we get it pretty sophisticated, but it doesn't have to be that way. The company I work for is noted for its efficiency. It's also noted for its simplicity, and there is a designed relationship between the two.

Leaders plan with foresight, and have the ability to anticipate, to predict what's going to happen rather than wondering what happened, when it happened, and why it happened. Let me illustrate that.

It was customary for people in the community where I grew up to make their own entertainment most of the time. As a kid, I used to swim with others in Smith Fork Creek. There was a big rock on one side where we would take off our clothes and go to a gravel bar across the creek. There was just one little shallow neck where you could tiptoe across that creek. Otherwise, it was over your head and the stream was fairly swift. One of our group, Cooney Alred, couldn't swim a lick, but he enjoyed playing on the gravel bar.

One day we had all been over on the gravel bar and one by one the boys came back across the creek and began to get dressed. Cooney was left over on that gravel bar by himself. As he started back across to get to his clothes on the big rock, he missed that neck just a little--and he can't swim. He's struggling to keep his head above the water and, he hollered, "Boys, come help me!" Well, we were busy dressing and talking and ignored him. The swift waters began taking him downstream, and he, beginning to get in worse trouble, hollered the second time with more desperation, "Boys! Come help me!" And, we ignored him a second time. By now, he was having to shove off the bottom with his feet to get above the water and breathe. He knows now he's in trouble and he hollered a third time. "Boys! Come and help me! And if you're not going to come, tell me so I can make other arrangements!"

I think so many people in life plan like Cooney Alred. They use hindsight to cope with crises rather than anticipate and avoid them. Will Rogers once said he'd rather be a mile from hell going away from it than a thousand miles from hell going toward it. Direction is so important. Leaders know which direction they're going and with foresight and planning, they usually arrive at their destination on time with little problem.

Leaders delegate. Think about this and see if you don't agree. Personally, nothing motivates me more than the assignment of responsibility. Not title. Not recognition. Not even money. Nothing. Delegation of responsibility to an individual implies that he or she is worthy and capable. Worthy and capable. These are inspiring words. There are three steps involved in delegation. First, assign what is to be done, second, instruct how it is to be done and third, check to see if it was actually done. Too often the inspection is left off. We tell 'em what to do, and how to do it, but we don't go back to see if it was done. A leader knows how to delegate. I believe in

the old saying, "If you'll tell me how good a man is at delegating, I'll tell you how big a job he can handle."

Leaders create a team atmosphere. Is it important to everyone in your organization that the organization win? Or, does it seem unimportant whether the organization wins or loses? I went to college right after WWII and was housed in a dormitory with fifty-five veterans. There were five of us eighteen-year-olds who got an education that year. When we would go to play ball, we'd come back on a bus. I couldn't tell whether we had won or lost. I never had been used to that. I'm not putting those veterans down because they'd just won a war and deserved the right to do it their way. I'm not putting them down when I say I couldn't tell whether we'd won or lost. Dang it. That's not right folks. You're supposed to be able to tell whether you won or lost by the enthusiasm and attitude of the people.

Let me share a story with you about a circus in a small community. The circus parade was crossing a railroad track when an unscheduled inspection train came around a curve and ran into that circus parade. It hit an elephant, the tenth one in line. Have you ever watched elephants walk in a parade? Each one takes his snout and hooks it around the next one's tail. That last elephant was carried by the cow-catcher down the track. The president of the railroad wanted to settle for damages and get the train moving. They were out negotiating, but they weren't having any luck. The railroad said they'd pay for the dead elephant but the circus wanted $77,000 for that one. The railroad president said, "We just killed one didn't we? You can buy the best elephant in Africa for $10,000, and we just killed one." The circus rep said, "You killed one. That's right. But you jerked the tails out of nine others."

Politics has been called the art of including. So is leadership the art of including. Leadership finds a way to include all, to involve all, to penalize all, and to reward all. Maybe not in the same fashion, but in some fashion. To include all, involve all, penalize all and reward all is extremely important. I have watched Joe High have outings and parties on his station and somehow he always included everybody. That's leadership.

Leadership inspires people to believe in themselves, to apply themselves and to surprise themselves. Leadership causes people to rise above their potential. You might say, "Oh, that's impossible. There's no such thing as rising above your potential." Yes, you can. It happens all the time, in athletics, in the military, in business, and in personal and family crisis. People really do rise above their potential.

Let me tell you a true story that illustrates this fact. Ray Mears used to coach at the University of Tennessee, but he grew up in West Virginia. When he was a boy on the farm, a couple of neighbor boys had an old Farmall tractor. The oldest boy, about sixteen and the other about nine, were riding on the tractor. They were mowing some pastures on a hillside. The upper wheel of that tractor ran up on a rock, and flipped, throwing the younger boy off right down under the mower. The older boy cut the switch, pulled and lifted that bushhog, then grabbed the younger boy with the other hand and yanked him out. There wasn't a scratch on him, just a miracle.

Some two weeks later, some of the older boys in the community were out visiting on the farm, and they saw this old tractor parked next to the barn and they said, "Fred, is that the bushhog? Is that the tractor you were driving when you got on Sam?" He said, "Yeah." They said, "You can't lift that bushhog." They went over to that tractor, and Fred strained with every ounce of energy he had and he couldn't budge it. But, two weeks earlier he had lifted it with one hand, and pulled his brother from under it with the other.

You can rise above your potential, and leaders inspire people to do that. They realize that man's potential is unlimited. Leadership sets the stage for unbelievable accomplishment and achievements.

Leaders expect. They have a high level of expectation and let people know. Leaders understand that the power of expectation is truly transforming. Let me tell you another story. A teacher walked in her classroom at the beginning of school one September morning and looked at a brown folder containing a sheet of paper on which was listed the names of her students. She didn't know who these students were at this time. She looked at the sheet and noticed something different. Out from those names were a series of numbers, and those numbers read 128, 136, 142, 137, 135, etc. and she said to herself, "Oh, my. They are not supposed to give the IQ's of my students. Somebody has slipped up, but what a bright bunch." When the kids came in, she said, "Hey, I know something about you all I'm not supposed to know. I'm not gonna tell you what it is, but I'll tell you what I want us to do together. I want this to be the best class that I've ever had in my 20 years of teaching school. I know something about you. You're capable of being the best." Well, the story goes that it not only turned out to be her best class, but it turned out to be the best class they could ever remember in the history of that school.

Late in the year, in May, the assistant principal asked the teacher, "Mrs. Johnson, I'm missing something, and I think you might help me." He said, "Have you seen a brown folder with a list of your students names in it?" She smiled and said, "Yes, I have." She said, "I've got it." He said, "Did it have a series of numbers out from their names?" She said, "Yes, it did." He said, "Well, great!" He said, "You know, I had lost that, but those numbers represented their locker numbers and we need to get them checked in before school ends." As long as the teacher had thought those numbers represented something else, as long as the expectation was there, the students responded. Leaders understand the power of expectation. Expectation can and frequently does transform people.

Leaders set the example. You've heard old sayings, "A picture's worth a thousand words," and "I'd rather see a sermon than hear one any day." Let me tell you another story.

One time a man stopped on a little courthouse square in a small town and looked at his watch. Then he looked at the clock on the front of the jewelry store where he was standing, adjusted his watch and walked away. He did the same thing for several days, and the store operator had been watching him intently. Finally, one day he walked out and said, "My name is Phillips. I operate this store and I've noticed that you've been checking your watch by my clock. The other said, "My name is Benson and I work at one of the local plants. I have

an important job there. I am the fellow who blows the whistle in the morning that puts the people to work and blows the whistle in the afternoon that turns them loose." He said, "I've been checking my watch by your clock for months". And, Mr. Phillips said, "Now, isn't that a coincidence, Mr. Benson. Did you know that for years I've been setting my clock with your whistle?" Leaders know that they are constantly scrutinized, one man setting his clock and the next one's blowing his whistle. Somebody's watching them all the time.

Leaders know that life is much like the boomerang. What does the boomerang do when you throw it out? It comes back. Life is just that way. What we throw out is usually what we get back in direct proportion. If we'll just figure out what we want from life and write it down, be it respect, recognition, happiness, or even money. Then if we'll start helping others obtain what we want, do you know what happens? We wind up with it ourselves. It's the old boomerang principle, what we concentrate on, we become. If we try to help others achieve what we desire, we wind up with it ourselves, whether it be effort, honesty, loyalty, or whatever. We are justified in expecting what we give. Leaders set the example.

Let us now summarize what we have discussed. Leaders plan with foresight, set directions, develop the team approach, inspire impossible accomplishments, accentuate the power of expectation, and set the example. There is one more important factor I'll mention in summary. Leadership radiates. Let me explain again by way of example.

Once there was a semi-pro basketball team in Louisville, Kentucky whose coach was named Hickman. They were a consistent winning club and Hickman was a popular man in the community. Once, they were preparing for what Hickman considered a crucial game, and he wondered if his team was ready. His fears were well-founded, because with four minutes to play, his team was behind by a couple of baskets. This coach had struggled for fifty-six minutes trying to think of some way to pull it out, and suddenly a thought hit him.

He looked down the bench and saw a long, tall boy named Thompson. "Thompson, come here." Thompson immediately threw his warmup suit under the bench and he stood by Coach Hickman. Thompson hadn't played all year. Coach said, "Thompson, I want you to go in there." Imagine the anxiety and the tension that gripped this young man. Hadn't been needed until now, and all of a sudden in this critical situation they call on him. He's listening to the coach beginning to instruct him when the referees blow the whistle. The scoreboard horn goes off and Thompson gets so excited, he breaks away and he's in the game before Hickman can tell him anything. Thompson scored two baskets and the team scored two more, and went on to win.

The headlines in the sports page the next morning said, "Hickman's Strategy Pays Off. Colonels Win Again". Hickman got a call about the middle of the morning from the Quarterback Club asking him to have lunch with some members. In the middle of lunch, one member stood up and said, "Coach, you amaze us. How do you pull it out like you do?" Please tell us what you told Thompson when you sent him in that ball game last night." Hickman rose to his feet and said, "Gentlemen, I have a confession to make. I didn't tell him anything. I had

something in mind, and I believe it would've helped. Before I could tell Thompson what it was, he got excited and ran into the game. Before I could call a timeout, he had the game won.

It was not the strategy of Hickman that won that game. It was the attitude, the drive, the desire, the discipline of Thompson. He didn't win the game single-handedly, but he radiated. He radiated the enthusiasm and desire to the other team members when he hit that floor, and as a team, they could not have been beaten.

Leadership radiates to others. To be a success yourself is one thing, but to be the cause of others growing, developing, succeeding, and excelling, is far more important. The ultimate accomplishment of leadership is to be the reason why others reach their potential, to be the cause of others becoming leaders.

Thank you again for the contribution you make to agriculture and to our entire society.

LEGAL CHALLENGES TO AGRICULTURAL RESEARCH*

J.W. Looney
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University of Arkansas
Fayetteville, AR

I. INTRODUCTION

Agricultural research is credited with improving both U.S. agricultural production and agricultural productivity primarily through the development of new technologies. The beneficiaries of research efforts are not only the farmers who adopt the new technologies but consumers who benefit from lower costs and improved quality as well as increased choices. For example, the typical supermarket now has available between 11,000 and 39,000 food items compared to only 1,500 items less than 50 years ago.[1]

And, the dramatic changes in technology of the past may well pale by comparison with what is to come from "science power" in the future.[2] Along with other advances, significant increases in agricultural productivity are projected from the application of biotechnology. In the livestock and meat sector alone, genetic technologies, when combined with developments in animal health and nutrition and processing and marketing improvements, will likely result in major increases in production of milk and meat products.[3]

In the next 10 years or so meat production per cow and per sow is projected to increase by 25%; milk production per cow by 40%; production per sheep or goat by 35%; broiler production efficiency by 30%; and, catfish weight efficiency by 20%. By 2030 these increases may be as high as 60% per cow and sow; 70% per sheep and goat and 200% for catfish.[4]

The future of agricultural research, and particularly that related to biotechnology, raises important political, social, economic, ethical and legal questions not only for the agricultural sector but for society generally. The history of success of agricultural research since World War II, and the rapid changes brought about in recent years by the application of biotechnology to agriculture, make projections for future production increases appear somewhat frightening. Increased production of agricultural products, unless accompanied by increased demand, must be viewed in light of the trends already evident in U.S. agriculture -- what might be called food-system consolidation. Further economic consolidation, fewer farmers, fewer suppliers, fewer processors, may well continue, driven in part by the application of the new technologies. Consequences for the environment, such as pesticide and chemical effects, soil and water consumption, and safety concerns from biotechnology, raise similar concerns.[5]

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*Presented at the meeting of the Research Center Administrators Society, February 6, 1989, Nashville, Tennessee.

These potential changes in agriculture and the application of biotechnology raise suggestions that the regulation of the scientific pursuit of knowledge might become necessary or desirable. If scientific inquiry is to be regulated then certain other questions immediately arise. Who will regulate? What issues will be addressed in any such regulation? What criteria will be used to assess the safety and health concerns? Is there a constitutional argument that scientific pursuit of knowledge should not be regulated? These questions have not been fully addressed but they have been raised in recent years, as agricultural science researchers have found themselves embroiled in political and legal challenges to their research efforts. These challenges tend to fall within one of four broad categories:

a. challenges based on questions related to the social and economic effects of the research outcomes

b. challenges based on concern with the desirability of the research efforts

c. challenges based on environmental concerns

d. challenges based on concern for the use of animals in experimentation

II. SOCIAL AND ECONOMIC OUTCOMES

The first major questions posed about agricultural research outcomes were raised over 15 years ago with the publication of Hard Tomatoes, Hard Times under the direction of now Texas Commissioner of Agriculture, Jim Hightower. This study emphasized the contributions of agricultural research to the loss of field jobs by virtue of the invention of the mechanical tomato harvester followed by the development of hard skinned tomatoes which were less susceptible to damage from the use of the harvester.

The tomato harvester research is at the center of a major lawsuit filed against the University of California challenging its entire agricultural research effort, California Agrarian Action Project, Inc. v. University of California.[6]

The plaintiff, which was recently renamed the California Action Network (CAN), filed its original complaint for injunctive and declaratory relief on January 17, 1979. Ultimately, a second amended complaint, which serves as the operative pleading, was filed on September 4, 1979.

The plaintiffs are identified as the Action Project and 19 individually named agricultural workers who allege that each has been and/or is directly threatened economically by the commercial mechanization research projects conducted by the University. The Action Project contends that they represent the farm worker, small farmers, consumers and taxpayers.

The plaintiffs contend that the University has as a basic policy goal the development of machines and other technology to reduce the use of labor as a means of agricultural production. The plaintiffs allege this policy is implemented by the undertaking of the development of pre- and post-harvest

production practices, the use of genetically modified varieties of crops, experimentation with growth and maturation control chemicals for cultivation, and methods of handling, transporting and processing crops for machine harvest.

The plaintiffs allege that the priority of research projects is based upon the availability of private funds and the consideration of private profit for a select few at the expense of the majority of the people. The plaintiffs conducted a survey of 25 department chairpersons and randomly selected researchers to determine their opinions as to what factors affect research topic choices. The plaintiffs' survey revealed that the source of funding was the most influential factor in dictating what research would be undertaken. The plaintiffs also identified the subtle pressure placed on non-tenured faculty by senior faculty and administrators and the decisions made by the economically motivated advisory committees composed of representatives of agri-business interests, as other factors influential in the research priority decision making process. The plaintiffs allege that the University's decision to accept gifts, grants and contracts for commercial mechanization research are made with no analysis of, or regard for, the adverse effects of these mechanization projects on the farm workers, the small farmer, consumers, taxpayers or the quality of rural life.

The plaintiffs contend that the commercial mechanization projects are the principal cause of the elimination of the small family farm. The plaintiffs cite statistics that show that the number of small farms in California fell from 132,000 in 1950 to 67,000 in 1977. This decline has the effect of increasing the degree of concentration of the California agricultural industry and contributing to increases in the amount of capital invested.

The plaintiffs contend that the projects benefit only larger farmers because the economies of harvest mechanization dictates larger acreage and increasing amounts of capital to utilize the intergraded technology. The plaintiffs' tomato harvester is used as an example of the impact of the research projects on small farmers. In 1963 there were over 4,000 farms averaging 32 acres in the processing tomato industry. By 1973 the number had declined to only 597. This represents a 84% decrease in the number of farms; while the average size of the farms increased by 1,100%. These changes occurred during the period that the processing tomato industry became totally mechanized.

The plaintiffs allege that the projects have contributed to a lower quality of fruit and vegetables for the consumer caused by the technology of the commercial mechanization processes. This technology involves the engineering of the harvesting machine and process to accommodate genetically selected and bred crop varieties, coupled with the increased use of pesticides, herbicides, and growth hormones to produce crop varieties suitable to the mechanical aspect of harvest. This technology results in a mono-cultural system with less crop rotation and increased dependence on chemical fertilizer and chemical pesticides. This increased use of chemicals has increased the health hazards to the consumer of mechanized crops and to all persons dependent upon water supplies contaminated by such chemicals. In addition, this mono-cultural cultivation is highly vulnerable to disproportionate price escalation because all agricultural chemicals are derived from non-renewable fossil fuels.

The suit contends that the University is effectively using public funds to dispossess small farmers resulting in increased concentration of production thereby lessening competition. Between 1964-1975, the period during which the University developed the tomato harvester, the cost of a can of tomato rose by 111% while the cost of such non-mechanized crops as for example, strawberries, rose by only 41.9% and lettuce by 70.3%, while the cost of all processed fruits and vegetables increased by 74.2% and food as a whole by only 89.9%

The plaintiffs contend that the defendant commercial mechanization projects have contributed to the deterioration of the quality of rural life. The changes directly attributable to these projects, the plaintiffs contend, are the loss of jobs, the elimination of small family farms, altered housing patterns, population shifts, land and energy use shifts, the deterioration of soil and water, and the depletion of the non-farm economic base.

In the original complaint, the plaintiffs set out a number of "causes of action," that is, a legal basis for the suit. These ranged from contentions that the development of the commercial mechanization projects were a "gift of public funds" in violation of the California constitution to a charge that the Smith-Lever Act of 1914,[7] which established the Cooperative Extension Service, was violated because it did not authorize the Extension Service to engage in research activities. Of the original causes of action most were either dismissed at the plaintiffs' request or were disposed of by the court by granting motions for summary judgment. However, one cause remains viable. This cause alleges a violation of the Hatch Act of 1887[8] which is the mechanism for federal funding of agricultural experiment stations. The lower court's decision of November 18, 1987 on this point is now on appeal.[9]

According to the plaintiffs the intended beneficiaries of the Hatch Act are small family farmers, agricultural labor, consumers, and the rural population. The commercial mechanized projects have or will be detrimental to the interests of the Hatch Act's intended beneficiaries. In addition, the University's failure to establish procedures by which the research projects can be reviewed to determine whether they will or may injure the interests of the intended beneficiaries is a breach of its duty under the Hatch Act.

The lower court found that the Hatch Act funding amounted to only 3% of the total budget for the California Agricultural Experiment Station also, the University had no process designed to ensure consideration of the legislatively expressed interests, primarily the small family farmer. The court found that the legislative history of the Act, its subsequent amendments and the cognate terms and legislative history of the Morrill Act of 1862[10] and the Smith-Lever Act of 1914. The court found that the experiment station, when approving of and allocating Hatch funds, is required to "consider the extent to which the interests of all of the Congressionally intended beneficiaries will be favorably or unfavorably served by its agricultural research projects, and require that in that process, primary consideration shall be given to the interests of the small family farmer."[11]

The court found that the University was administering the funds in violation of the Hatch Act because it had no process designed to ensure consideration

of each legislatively expressed interest such as "promoting a sound and prosperous agriculture and rural life", the "improvement of rural life" and to "contribute to maximizing the welfare of the consumer." The court applied the same conclusions to state funding as well because these funds were to be expended in pursuit of or in compliance with the federal law.

The California litigation provides an example of the serious questions that are being raised about the outcomes of agricultural research. These have been recently amplified in Altered Harvest by Jack Doyle. He alludes to similar questions in the context of the close tie between scientists at a number of universities and companies that are involved in biotechnology.

But, it is not just those willing to litigate who are beginning to question research outcomes. A report from the congressional Office of Technology Assessment (OTA) suggests that new technologies could profoundly affect the future of farming, perhaps more than chemicals did in the past.[12] The developments in biotechnology have caused farmers themselves to question the wisdom of research that could have a detrimental effect on their own futures.[13]

III. DESIRABILITY OF THE RESEARCH

Existing law compels no ethics review before research is initiated. Some of the genetic engineering experimentation may result in major alterations in plant and animal life and may even result in new species being created.

If new species are created this may be irreversible and may result in genetic change that may have an effect on human health and safety to say nothing of the environment. It has been suggested that regulation is needed to control such experimentation when human genetics is involved. Cross species experimentation is an area of particular concern. Legal challenges to USDA animal productivity research have already been made with arguments reflecting an underlying concern for the nature of the research itself.

One of the best known of the groups to challenge the desirability of research is the Foundation on Economic Trends in Washington D.C. Andrew Kimbrell and Jeremy Rifkin, both associated with the Foundation, relate the advances in biotechnology to what they call one of the major productivity revolutions in America and agricultural history.[14]

> These technological developments in agriculture create complex and troubling issues involving environmental risk, social and economic dislocation in farm communities, and the ethical limits of our power to manipulate the genetic traits of the biotic community.[15]

They see the central problem as risk posed to human health and the general environment and they are particularly concerned about the release of genetically engineered organisms into the existing environment. Their concern is that new organisms could serve as the "trigger in a game of ecological roulette". They raise five questions which were posed by an EPA study group: 1) will it survive?; 2) will it multiply?; 3) will it transfer its inserted genetic traits to other species?; 4) will it be transported to other cites?; and 5) will it have a deleterious effect? They point to two specific situations where

government agencies have acted in what they consider to be an irresponsible manner related to a release of genetically engineered organisms. The first of these is the Frostban experiments in California. The second involves the release of genetically engineered vaccine by a licensed applicant (Biologics Corporation) upon approval by USDA's animal inspection service.

They also challenge the research because of socio-economic dislocation. The example they use is the research and development of Bovine Growth Hormone (BGH) which, according to reports, can increase milk production by at least 30% per dairy cow. This raises questions of a threat to the economic well being of dairy farmers and speculation that the number of dairy farms may have to be reduced considerably to restore market balance.

And, they object to some of the research on ethical grounds. For example, USDA sponsored research programs include genetic engineering experimentation and the possibility of introduction of human growth hormone into livestock. They raise the question of violation of "biological integrity" of the species by the alteration. They pose the questions in this way:

> What is wrong with the cow the size of an elephant, or a sheep the size of a horse, or "glowing" tobacco plants? Is there any meaning in the morphology of animals or plants, both internally and externally? Should we alter and mutilate, perhaps permanently, the forms and shapes of the biotic community so they better conform to our agricultural or industrial needs? Do plants and animals have any right to be treated as sufficient "ends" in themselves and not merely as "means" in a system of production? What are the ethical implications of the likely proposal to engineer plant or animal genetic materials into humans? Finally, who is to decide these issues: congress? scientists? corporations? theologians? the public? federal agency?[16]

In the first of its legal challenges to USDA animal productivity research[17] the Foundation on Economic Trends alleged that selected USDA research programs, which included genetic engineering would have a significant environmental, economic, and social impact, would affect the gene pool of animals, and pollute air and water. They allege a violation of the National Environmental Policy Act[18] for failure to prepare neither an environmental impact statement (EIS) nor environmental assessment (EA).

Central to the complaint was the alleged adverse environmental impact of experiments involving genetic engineering. Of the two experiments specifically singled out for attention one involved injection of fertilized ova with a growth hormone gene. A second experiment involved transfer of germ cells from a donor animal to a host embryo in order to isolate biomedical and physiological components responsible for growth in reproduction in poultry. These two experiments are part of nearly 700 USDA approved experiments in animal productivity, 136 involving reproduction and genetics. The animals used in transgenetic experiments are kept in confined facilities and all animals born from embryos injected with hormones from other species are housed in security containment facilities. USDA had indicated that if such animals were to leave the laboratory setting they might have to comply with environmental assessment

requirements. The plaintiff alleged that these programs should, at a minimum, require an environmental assessment or an environmental impact statement under the National Environmental Policy's Act.

The court concluded that the animal productivity experiments could not be said to have, at present, a significant impact on the environment, and that such experimentation was committed to agency discretion under the law. In fact, the court further said that the funding of animal productivity research cannot necessarily be considered "federal action" as required by the NEPA because of the fact that the animal productivity studies proceed independently of each other and that the program is not monolithic. Nor can it be considered to require a programmatic environmental assessment.

The court went on to say that the future applications of genetic engineering technology are "doubtful and remote" which would make it difficult, if not impossible, to draft a meaningful environmental impact statement. Since the case law in the past has not required highly speculative or indefinite impacts to be considered, it would be premature to require either environmental assessment or environmental impact abatement.

In the second of these challenges,[19] the plaintiffs took a slightly different approach. According to the court, the claim no longer was an objection to selective breeding technologies per se nor to specific research projects, such as growth hormone implantation or other recombinant DNA techniques. Rather, the objection was that USDA research on animal productivity was based on a focus of developing faster growing, more productive, and larger animals and that this should require an environmental impact statement in order to "evaluate the statutory goals, national priorities and policies that should have been considered in the development of the USDA Research Program." Under their argument, USDA's Animal Productivity Research Program, as a whole, requires a programmatic environmental impact statement.

USDA, on the other hand, argued that their research projects are too diverse and discreet to constitute major federal action or activities sufficiently systematic and connected to require a programmatic EIS. The court agreed with this argument. In any case, the court felt that the NEPA was not a suitable vehicle for the purpose of having USDA evaluate and diversify its research focus. The political process and not NEPA is the appropriate forum for policy discussions.

A second major focus on the desirability of the research itself has been directed toward the questions surrounding patent laws. Naturally, those who invest in research desire to protect that investment. The general patent law,[20] the Plant Variety Protection Act[21] and the Plant Patent Act[22] offer this protection. Since the 1980 U.S. Supreme Court decision in Diamond v. Chakrabarty[23] patent protection has been extended to biotechnological inventions. Immediately the question arose as to what extent this protection could be extended to higher life forms developed or altered through biotechnology. One of the first questions presented was the patentability, under the general law, of tissue, cells, seeds and whole plants developed by biotechnology. The patent examiner rejected a patent application but was overturned by the Patent Office Board of Appeals and Interferences.[24]

More recently, the patent office has faced the issue directly by determining patentability of a genetically altered oyster.[25] What is to follow? While patentability of specific organisms has gained considerable attention, the more basic question for agriculture has received less attention. That is, the granting of legal control over the substances of food production.[26]

Legal challenges to research have attempted to use existing environmental legislation to halt biotechnological experimentation. However, the concern is only partially based on possible environmental effects. The real issue is the ethical concern for the species and the moral questions involving man's right to tamper with nature. This raises issues beyond the short-term safety of the experimentation or economic exploitation through patentability of organisms. It focuses on the long term societal effects. The recombinant DNA research allows the prospect of controlling or changing genetic information inherited by an organism. This, of course, may be used for the good of society but also poses significant questions of the long term effects, particularly if human genetics is involved. In a provocative article by Mary Helen Sears, the question is put:

> Is it in the public interest for scientists to be able, on a superficially humane basis, to reprogram human beings genetically so that they become a "master race" or at least a race of echoes? Does mankind <u>want</u> scientists to acquire such powers, given the danger that once in existence, they may be used by the unscrupulous contrary to the best interests, desires, religious and moral convictions, or ethical beliefs of a significant segment of the human race?[27]

IV. FREE RELEASE/ENVIRONMENTAL EFFECTS

A major concern related to biotechnology has been the physical danger to man and to the environment from the release of new biotechnologically developed organisms into the environment. This concern is consistent in the challenges to USDA animal productivity research. These safety/risk questions have received attention and have resulted in the development of regulatory programs involving experimentation controls. These controls have, for the most part, grown out of the National Institute of Health (NIH) Guidelines which have, in turn, been adopted by specific federal agencies.

The NIH Guidelines have focused on methods employed in research (not the range of permissible goals) and safety. The guidelines apply only to recipients of NIH funding and are thus somewhat limited in scope. No congressional action has been taken although the debate has been extensive.

The original NIH guidelines were formulated in 1976 and were specifically designed for basic research in DNA technology.[28] They are binding only on institutions conducting or sponsoring DNA research if the institution receives NIH funding. NIH is not a regulatory agency and does not monitor compliance with the guidelines. Originally, direct release experiment were expressly prohibited but waivers (following review) were allowed in 1978. NIH must comply with NEPA in promulgating the guidelines and in approving experiments.

Court actions have focused on the NIH guidelines and have tied the restrictions on free release to NEPA. For example, Mack v. Califano,[29] was an attempt to enjoin experiments by NIH involving an altered organism. The issue was the sufficiency of the EIS issued by NIH. Foundation of Economic Trends v. Heckler[30] was a legal challenge focused on free release experiments, as such. The case was appealed to the Circuit Court of Appeals for the District of Columbia Circuit. The court affirmed the district court judge's decision that National Institute of Health had not given rigorous attention to environmental concerns as demanded by NEPA with regard to specific free release experiments under consideration.

The court had to determine the question of the appropriate level of environmental review required of the NIH before it could approve the deliberate release of genetically engineered recombinant DNA containing organisms into the open environment. The court believed that NIH had not yet displayed the attention to environmental concerns demanded by the law. A greater consideration to broad environmental issues intendant on deliberate release of organisms should have been given. NEPA contains what are called "action forcing" provisions requiring all agencies of the federal government to prepare detailed environmental analysis for major federal actions significantly affecting the quality of the human environment.

The court indicated that within the NEPA, congress had emphasized concern with the role of new technologies and their effect on the environment, and reviewed the approval of three deliberate release experiments at institution receiving NIH funding for recombinant DNA research. The court found that NIH had failed to consider the problem of dispersal in the free release experiments. This was a major environmental concern and NIH's environmental assessment failed to meet standards of environmental review necessary before an agency decides not to prepare an environmental impact statement. The court refused to uphold an injunction against NIH with regard to requirements that it undertake a programmatic EIS in connection with the impending request of approval of deliberate release experiments by others. The court said that if NIH gives adequate environmental consideration to each deliberate release experiment, (and, as the court indicated, that must be far more complete and rigorous than the consideration NIH had given in the past), then the procedure would be adequate. As a result of these challenges, the NIH guidelines have been revised as indicated above.

In detailed regulations related to funding of research, approval of new products such as animal biologies or new food products, and in its animal and plant health inspection programs, USDA has established processes for consideration of the safety and risks involved in biotechnologically developed or altered organisms or products.[31] The USDA decided to use existing regulatory programs to address these concerns. EPA and other federal agencies have adopted similar measures.[32]

V. ANIMAL RIGHTS/ANIMAL WELFARE

Concern for animal welfare and animal rights is focused on three aspects affecting agricultural research. First, there is the concern with the treatment

of livestock and poultry in commercial enterprise and, of course, the research efforts related to "factory farming." Second, there is the concern with the use of animals for experimental purposes especially in laboratory experiments involving surgical biomedical or other techniques. Third, there is the general concern with the use of animals for the benefit of humans - e.g., the question of moral and legal animal rights.

"Factory Farming". One allegation has been that consumers have a right to know the conditions under which meat products are grown. For example, in Animal Legal Defense Fund, Inc. v. Provimi Veal Corp.[33] the plaintiffs argued, unsuccessfully, that it was consumer fraud (an unfair and deceptive practice) not to inform consumers that "veal comes from cruelly mistreated calves." They argued that consumers are told that meat products are from "the pasture and barnyard," meat eating is associated with material success, and that the federal programs sanction "factory farming." Proposals for package labeling and inserts patterned after the Federal Meat Inspection Act requirement followed.

The "heaping of scorn" upon urban dwellers who criticize production methods for not understanding animal husbandry is addressed by Steven M. Wise as follows:

> However, the factory-farmers livelihood may be predicated on the ignorance they deride, for if enough city dwellers learn what is really happening on the farm, the industry could be shaken.[34]

Calls for regulation of "factory farming" have been more successful in Europe than in the U.S. Some European countries set detailed standards for confined animal operations and similar proposals have been made in congress.[35]

Laboratory Use - Animal Welfare. Generally, concerns for animal welfare reflect people's concern with the well being of animals - that they be treated humanely. Animal rights reflects a concern that animals be free from torture, abuse and, perhaps, death.

These concerns have led to federal legislation relating to laboratory use of animals (as well as state anti-cruelty statutes). The Animal Welfare Act (AWA)[36] administered by USDA (amended most recently in the 1985 farm bill) provides for licensing/registration, standards for handling laboratory animals and enforcement. The AWA requires licensing of animal dealers and exhibitors and registration of research facilities. The AWA requires standards related to housing, feeding, watering, sanitation, ventilation, shelter, etc. and adequate veterinary care. Separation by species is provided for if necessary for humane handling, care and treatment. The 1985 Amendments require consideration of alternatives to any procedures likely to cause pain or distress to an experimental animal.

One problem in challenges to animal experimentation under AWA is that USDA has defined "animal" to include dogs, cats, monkeys, guinea pigs, hamsters, rabbits or other warm blooded animals (excluding birds, rats and mice).[37] Under the Act farm animals such as livestock and poultry are excluded from the statutory definition of "animals."[38] The 1985 Amendments to the AWA have been criticized by animal protection groups as merely sanctioning "abuse and

destruction" of animals used in laboratory experiments.[39] However, the amendments require that veterinary care be provided with appropriate use of "anesthetic, analgesic, tranquilizing drugs, or euthanasia."[40] This will contribute to reduced suffering. The Act also calls for institutional committees to inspect and review practices relating to animal experiments. It requires attempts to prevent duplication of animal experimentation and encourages alternatives to the use of animals.

A clear question of USDA's enforcement interest was raised over the debate related to the hot iron face branding requirements under the Dairy Termination Program. The Humane Society sued the USDA claiming USDA could not require branding. The court required USDA to amend its regulations to allow choice of use of freeze branding, a less painful alternative.[41]

The only federal legislation, apart from the AWA relevant to animal welfare is: (1) "The 28-hour Law" (Livestock Transportation Act)[42] which limits the period of transport to 28 hours and requires rest, water and feeding and, (2) The Humane Slaughter Act (HSA)[43] which requires slaughterhouses to use humane methods to prevent needless suffering. It requires a rapid and effective rendering of the animal "insensible" by a single blow or gunshot or by "electrical or other means.

Moral Rights. The third area of concern of animal rights advocates is from those who believe that animals should have certain moral and legal rights and, therefore, should not be subject to experimentation (or even use) by man - especially not by genetic engineering. The argument for animal rights disputes ancient notions of man's "godlike, absolute dominion" over nonhuman animals and suggests regulation:

> The factory-farming and genetic engineering of farm animals, based as it is upon their unregulated institutionalized exploitation in a manner that inherently and unnecessarily infringes their basic needs and concerns, is unjust. Because it is unjust it should be abolished.[44]

VI. CONCLUSION

The challenges to research have significance far beyond mere agriculture. Two recent articles, by their titles, present the essential questions. Mary Helen Sears' article, referred to earlier, is entitled "The Concept of Societal Consent for Recombinant DNA Research and Engineering."[45] Here, the question is posed as to what society's interest is with regard to economic, psychological, social, and ethical considerations - and long range safety questions. The key question is whether societal consent is necessary for the conduct of certain research.

The second recent title is more dramatic: "The Prospect of Private Unauthorized Engineers and Ten Feet Tall Basketball Players: A Case of Legislative Oversight?"[46] This article raises the issue of private experimentation and its control.

A third important issue relates to control of the genetic material itself as raised by Jack Doyle in Altered Harvest. Multinational corporations in the seed, chemical and biotech business are also involved in sponsoring university research. Immediately the question is raised: Who controls the results? This is, in part, an underlying theme in the California Experiment Station litigation.

The legal challenges to agricultural research are only reflective of greater questions society must face with regard to the regulation of scientific inquiry. In the end, the economic, social and ethical questions will not be resolved by litigation but by the political process. Agricultural researchers must be sensitive to the concerns arising from the same public which supports their research efforts.[47]

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THE FUTURE ROLE OF RESEARCH AND EDUCATION CENTERS IN UNIVERSITY SYSTEMS

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Thank you for this opportunity to present some of my thoughts on the role of off-campus agricultural facilities in serving the people of our respective states. This is a timely topic as many of us struggle with tight budgets and increasing demands for our resources.

I realize that across the region we have a great many different organizational structures for handling off-campus facilities. We also have great diversity in the size and complexity of the individual units. Even so, I believe there are underlying principles that should guide us in the operation of these facilities. There are also common problems and concerns among those who work at these off-campus sites that are different from the concerns of faculty who work exclusively on-campus. I plan to address some of these concerns and we will have an opportunity to explore them further in the discussion period.

It would probably be worthwhile to review briefly the original purpose for the land grant universities and off-campus research sites before we address the future role of such facilities. The Morrill Act of 1862 established colleges of agriculture that were to educate the rural youth of the nation in matters that were practical and useful in improving the lot of farmers. This was a radical departure from the European style of higher education that was present at such American universities as Harvard and Yale.

It soon became apparent that much of the knowledge needed by agricultural students did not exist and that research was needed to find answers to farmers' problems. Some states established experiment farms and, in 1887, the Hatch Act was passed to finance experiment stations in every state. This combination of research and teaching equipped the professors for turning out more knowledgeable graduates. Still, information was not readily available to the farmers and, in 1914, the Smith-Lever Act established the Cooperative Extension Service to take information to farmers and farm families.

Political decisions determined the location of the land grant colleges. Many were located in a corner of a state distant from some farms and in climates and soil types that were unlike much of the agricultural land of the state. Branch stations were established to conduct work that was pertinent to the different geographic areas of a state. These stations often became focal points of farmers' educational programs and a source of pride for local farmers and politicians. Some became quite independent and, to a considerable degree, competitors with the main campus.

As we look at the land grant universities today, we see different types of institutions from those visualized by the Morrill Act. In the words of George R. McDowell in a 1988 issue of "Choices", the land grant colleges are becoming

as bad as Harvard and Yale. He says that the land grant system has been captured by professors who have little sympathy with land grant traditions. McDowell says these professors are using the resources of the university to enhance their own reputations and to conduct disciplinary research that is an end in itself. McDowell further says that if we continue in our current direction, the land grant colleges will serve and produce society's new elites, but they will NO LONGER SERVE THOSE WHO CANNOT QUALIFY to sit in their classrooms.

McDowell's statements may seem extreme, but there is some substance to the criticism, at least at those institutions I have served. Let me amplify a bit. We reward professors for publishing in prestigious journals and for obtaining grants from organizations that emphasize basic sciences. We recruit faculty that are at the cutting edge of science. We have given faculty an increasing role in university governance and, in the process, weakened the administrators' ability to set the agenda. At most, if not all, land grant universities, agriculture has become a smaller and smaller part of the total university. Under the pressures of these several forces, many agricultural teaching and research faculty on the main campus have lost sight of the need to find solutions to the real problems of ordinary citizens. Extension faculty are often frustrated by the lack of attention that their problems receive from the research faculty. Research faculty at off-campus locations are torn between the apparent need to become "basic scientists" and the need to solve practical problems of area farmers.

Let's explore the nature of our mission as we look to the decade of the 1990s and beyond. In a few words, our mission is "to develop and transfer knowledge to permit economically competitive decisions by producers and processors". The knowledge that we generate and transmit is of several kinds. First is fundamental or basic knowledge. This is knowledge about biological, physical, or economic principles that in itself is of little value. Secondly, we have subject matter knowledge that supports a commodity or discipline. The third kind of knowledge is problem-solving knowledge that uses basic and subject matter knowledge to find solutions. It is interdisciplinary in nature and it is often called applied research. The fourth kind of knowledge is that put into use by farmers and other clients.

One of the questions I've been asked to address is--what should be the off-campus stations' involvement in these different kinds of knowledge generation and dissemination? Of particular concern is your involvement in basic research.

As we implied earlier, there is a certain elitism associated with basic research. Even on the campus, there is tension between faculty members who are involved in basic research in glamour areas like biotechnology and immunology and those who work in more traditional areas. Administrators contribute to this tension by using glamourous research in budget requests and in public relations. It is a fact of life that "gee-whiz" ideas sell better to the press and to most funding agencies that do our traditional areas. Even so, we recognize that it is the application of many kinds of technology and the solution of often mundane problems that keep us in business. I believe most administrators recognize the need to reward good science by productive wokers at whatever level that scientist works. We don't do a perfect job of recognizing high quality productivity, but

I believe most administrators are conscientious in their efforts to evaluate personnel fairly and in relation to the job they are hired for.

The costly and sophisticated equipment that is required for some types of basic research dictates a location that can serve several scientists and an organization that can support a large program. Our smaller off-campus stations will probably not be involved in that kind of research. There is no physical or financial reason that larger units should not be involved in basic research. Just as USDA's ARS and large companies conduct basic research apart from university campuses, branch stations can conduct basic research at isolated sites.

While basic research can be conducted at off-campus sites, the question is: Should they? Let's focus on the reason for the existence of branch experiment stations. Each off-campus site should exist to meet some well-defined need. The site should have been chosen because soil, climate, or topography is different from that at other experiment station locations, and because there are numerous clientele in the area who require information. A given state should have as few locations as possible to meet its needs. Operating multiple sites is costly. It is poor policy to establish a station because someone gives us land or because a politician wants a station in his district. In short, I believe off-campus research sites should emphasize applied research on problems that are of the greatest importance to a geographic area with characteristics unlike those near the main campus or at other branch stations.

Once a station is established, it should be fully used. I believe extension personnel should be attached to branch stations, and that joint extension-research positions should be used when they aid the mission of the station and the extension program. An off-campus research and education center should involve as many disciplines as necessary to further its mission. Some team members may be located on-campus while others are stationed permanently at this station. Normally, a branch station should not be operated as a satellite of a department. This does not promote the interdisciplinary work that is needed and it makes the station susceptible to neglect in lean budget years.

A branch station should represent the university in a positive way. Local citizens may know the university only through their closest station. The facilities should be well maintained and personnel should be able to answer most questions from the local public about the university. The station should be open to field days, educational sessions in meeting rooms, and to tours of experimental plots--within reason. Graduate students should be involved in branch station research when appropriate. Undergraduate interns can be used with benefit to the student and the station. These kinds of interactions help station personnel feel more a part of the university. Station personnel should participate in campus events such as seminars, departmental staff meetings, department heads' meetings, search and screen committee meetings, etc. Obviously, time and budget will dictate less involvement in these activities than campus faculty, but some participation in campus affairs is highly desirable. This on-campus involvement is beneficial to campus personnel as well as to branch station scientists. Presentation of station research and local problems to campus faculty can help keep them in touch with the real world and can open up possibilities for cooperative work.

A branch station should have its own budget for maintenance and for supporting station researchers and extension personnel. Departments should contribute to research projects, but financing should be on a win-win basis between that station and a department. Neither should feel that it could do the job better and cheaper alone.

I will conclude by saying that there is probably no one best way to operate our off-campus agricultural facilities. It is probably good that we have diversity across our region. I hope some of my suggestions will be helpful. I will remain for the discussion session when you will have the opportunity to challenge my statements if you wish.

ROLE OF RESEARCH CENTERS IN UNIVERSITY SYSTEMS

Ronald R. Johnson
Associate Director
Oklahoma Agricultural Experiment Station
Stillwater, OK

The role of research centers in university systems is a critical and timely subject for this section's deliberation. It is my opinion that, as the nature of agricultural research changes, the role of the branch research station also must change. The nature and extent of this change will, of course, vary from station to station, depending to a great extent on how your branch network is structured. I come from a state which has vested full-time research faculty at only one of its branch centers. In contrast, many of you come from states where the existence of full-time faculty at the branch stations or centers is well established. My thoughts will relate to the more general situation, and hopefully will be applicable throughout the southern region.

CHANGING NATURE OF AGRICULTURE

First, we need to consider the changing nature of agricultural research. For decades, we in the sciences supporting agriculture have debated the issue of applied versus basic research and to no particular avail. In my opinion, this debate is now moot. There has been an emergence of three major factors that are having and will have immense impacts on the management and conduct of agricultural research in the next several decades.

NEW TECHNOLOGIES The first of these changes is the emergence of new technologies. Rapid developments in both biological and physical sciences were fashioned by creative application of biochemistry, biology, genetics and other sciences to solving problems in agriculture. Whether you choose to refer to this "new technology" as biotechnology, molecular biology or some other popular nomenclature, it has stirred a tremendous revolution in the thinking and direction of agricultural research in both the public and private sectors. The fundamental purpose continues to be solving real world problems.

What is the most logical target for the practical utilization of this scientific revolution? Certainly agricultural and medical fields stand to reap the greatest benefits. Such benefits do not come without immense attendant costs, however. The cost of equipping our laboratories and acquiring faculty to participate in this cutting edge science is immense, and to some degree is already creating a system of "haves" and "have-nots". I maintain that to avoid this disparity we must make hard choices as to what areas of focus any given Experiment Station system can afford to embrace with the resources available. At many land-grant institutions that decision process is just now being solidified after making the mistake of attempting to invest in too many high-tech areas at one time.

Another major emerging technology that demands similar types of decision-making has emerged from the electronic and information revolution. While this technology is mainly an extension of our process of developing decision aids, the availability of high-speed computing has taken a quantum

step forward. The emerging knowledge-based systems will have a major impact on research at both the central university locations and the branch stations.

Again, however, systems managers face hard decisions in this time of level or shrinking base budgets. Effective development in this area requires sophisticated computational equipment which continues to evolve more rapidly than even the experts could predict. Equally important, it also requires an understanding of the logic, theory and method associated with knowledge-based systems by a large proportion of our faculty. While many faculty may not have been trained in that type of science, they are now going back through the professional development required to enable them to apply knowledge-based systems.

MISSION ORIENTATION The second major factor is the increasing focus on the mission orientation of agricultural research, or, to put it more simply, to problem-solving. We now define a problem not as one small subset of questions that might traditionally have been asked by a researcher in designing his program, but rather as a response or solution to a broad problem that exists in the field of agricultural production.

Agricultural research has developed or adopted the tools to engage it in the study of entire production systems. Because of the array of factors which impact on any given agricultural production system, solutions to problems associated with that system generally demand involvement of scientists from several disciplines. The agricultural community has discussed multi and interdisciplinary research for some time, but, for a variety of reasons, has not been as successful as it should be. This situation is due in part to the rather antiquated structure of academic institutions, in which departments and departmental lines are still considered sacred cows. The reward system has been built on evaluation of individual accomplishment. Problem-solving in agriculture will progressively require more interdisciplinary teams that can function effectively. This change will provide sharp challenges to research managers who must develop an administrative philosophy that will allow not only funding for the interdisciplinary approach to research, but also a reward system for cooperative efforts.

SOURCES OF FUNDING The third factor changing the nature of agricultural research relates to the sources of funding. More and more, funding sources are directed toward the mission orientation of agricultural research, and problems which require interdisciplinary research efforts. An established example is integrated pest management. Many newly funded thrusts at the national level, however, will require similar systems of research management to access these funds for any given state or region. Two new examples are low-input sustained agriculture and water quality. The regional competitive grant program has been accepted as the model for the funding of these programs, and is likely to be utilized for other research initiatives as funding is generated nationally.

ROLE OF BRANCH STATIONS

Let me now turn to the role of the branch research centers in the future of Agricultural Experiment Station programs. As I have indicated, Experiment Station directors will be forced to concentrate much of their resources on

fundamental research at the central university location where a critical mass of personnel and facilities can be created. Most universities can not afford to duplicate many of the resources necessary for "new technology" research. Furthermore, it is vital that much of the research be conducted at a location that can also be utilized for educating the next generation of scientists. It therefore seems obvious that the systems will have to rely more heavily on the branch stations for what we have traditionally called applied research.

Let me assure you that I am aware of the nature of the research programs at these stations during the last several decades. Even a cursory review, however, will reveal that in many cases the research activity conducted at branch stations was of the nature of validation research. In some cases it was actually more for demonstration purposes than for development of new knowledge. There was nothing wrong with this approach, indeed it is a necessary component of any effective agricultural research and education program. I am fairly certain that some of that type of research will continue to be conducted at branch stations. However, I believe there will be a progressive shift of applied research away from the central university location to the branch stations. This may well require the additional vesting of faculty and support personnel, as well as related resources, to those locations. That process will vary greatly among states depending on availability of resources. The trend has been underway for some time in some of your states. I expect it to continue and accelerate.

There are logical reasons for this trend. First, consider the requirements for problem-solving research. Most of these problems will have to be approached in an interdisciplinary manner to accomplish the objectives. Assuming the appropriate scientists are available at a branch station or research center, what better place is there for mounting interdisciplinary research efforts? Without the attendant problems associated with departmental loyalty, participation in teaching activities, and other university activities, the branch station research faculty are ideally positioned for this type of problem-solving approach. The scientists can be in daily communication with each other during the planning, conduct, and interpretation phases of research. They are much better situated for sharing physical resources. Finally, because of their proximity to the agricultural producers themselves, they are likely in a better position to design their research to be most useful to that industry.

Some additional issues need to be considered if this trend is desirable and is to continue. The first is funding. I anticipate that more of our appropriated and grant dollars will be moving to branch station scientists. This will certainly be true for such things as IPM, PIAP, and LISA programs. It will probably also be true for the grants received from chemical companies, although these grants are decreasing steadily. The critical factor, therefore, is a change in the funding philosophy on the part of station directors. In order to allow this change to occur, they must see to it that the physical resources and support personnel necessary for productive programs are available. This will require a shift in funding philosophy in a state such as mine. Some of you have already made that shift.

A philosophical change in the reward system for scientists at branch stations must also occur. Branch station scientists must not be considered second-class citizens. We must recruit for those positions with the same vigor

as we do for positions on campus. The rewards for their efforts must be just as generous, but they should perhaps be evaluated by a different set of standards. Lastly, it is my firm conviction that a high proportion of these individuals should carry a part-time extension appointment, although I am aware this position is not entirely popular in all sections of the southern region.

I have tried to outline my perceptions of future changes in the role of the station systems in our agricultural research spectrum. I see it as a role of increasing importance. While will continue to be vastly different in the various states of our region, the management of these vital units will require an even greater appreciation of regional and national initiatives, sources of funding, and the personnel requirements to solve the problems in agriculture.

ROLE OF RESEARCH CENTERS IN UNIVERSITY SYSTEMS

C. D. Ranney, Head
Delta Branch Station and Assistant Director,
Mississippi Agricultural and Forestry Experiment Station
Stoneville, MS

In their wisdom, the founders of the Land Grant Colleges in the South placed most of their campus and main experiment stations at locations and in environments that still challenge researchers to develop profitable agricultural enterprises. As Experiment Station research activity matured, outlying sites were developed to meet special needs and to enhance the total state research program. As these off-campus research centers developed and succeeded in their programs, there was a tendency to become more specialized and self-centered. At times, when off shoots became the focus of a major commodity group or the supporting population, the whole system was challenged.

A major responsibility of research management is to assure that the Experiment Station system meets its total obligation through effective use of all the parts. Outlying units often conduct basic as well as adaptive and production oriented research. Where this situation exists, there is a special requirement for both outlying and university managements to assure that a coordinated research, teaching and service organization exists and avoids unnecessary duplication of effort.

The Delta Branch Experiment Station is the only state research facility in the 14 county, Yazoo-Mississippi Delta. Much of the total crop production in the state comes from this area (Table 1). There must be an effective organization of research resources and availability of the necessary discipline expertise to accomplish the desired program. Not all disciplines need not be permanently on site, but commitment must be made to be sure that necessary expertise can be mobilized at critical times at the research location. Management must assure that there is a continuing focus of expertise on appropriate crops and activity to assure continuing research progress.

The size and total staffing at the Delta Branch Station is unusual both in size and diversity of discipline expertise (Table 2). With this array of scientific support, it may be surprising that research effort is focused on only three crops--cotton, rice and soybeans--and catfish production. Research on the other important crops produced in the Delta is primarily addressed by researchers at the main station and other outlying stations.

For over two decades the Mississippi Agricultural and Forestry Experiment Station used a technique of "Problem Identification Program Development" (PIPD) to focus on research needs and disseminate research information. The PIPD program brought together producer groups, extension specialists, county agents, and researchers to concentrate on major production problems and needs. Initially, the PIPD program was successful in effecting changes in research effort relevancy to real world problems, development of effective research plans and management action to realign resources to implement plans. In time, there was less input from users and increased influence of participating scientists

on the direction of the programs. Focus again had shifted to the pieces, commodity-special programs and scientist interest. A revision of the total research program was needed to return emphasis to a system-wide research program based on priority needs. A Research Planning and Management (RPM) Program was established in 1988. It was based on major commodity-special program areas of state-wide need and concern. Again, producers and research users were drawn into the process, especially in defining priorities and a system-wide RPM program was defined. Key elements of the RPM are:

(1) There is a 5-year priority defined program for each commodity-special program element. These are updated each year as progress is made;

(2) There are annual research plans developed by scientists in each of the program elements that are reviewed by research management for relevancy to documented needs and priorities;

(3) There is an annual report of progress made that relates to the RPM stated goals and priorities; and

(4) Research users, extension personnel are involved in an annual review of proposed research activity.

Managers can appropriately assign resources with the assurance that: (1) the various elements are addressing priority research needs and (2) that total resources are considered and allocated to meet priority programs.

The RPM program has been implemented, accepted, and is functioning. A key element for this acceptance is that annually a "next year's plan" and an updated 5-year plan is generated for management review and resource allocation decisions.

At the Delta Station level, the RPM program continues the focus on three crops: cotton, rice, and soybeans, and catfish research. Figure I indicates the interrelated discipline nature of the three crop production programs in that either cotton, rice or soybean research fits into this figure. The focus of the program is improving the germplasm-productivity-quality of the crop. This focus is within the environment-ecosystem of the Yazoo-Mississippi Delta and usually has a "serendipity impact" in that the varieties and technology developed works well in many other crop-ecosystems. The other key element to effective development of new technology is due to the crop systems research activity. This unit integrates-implements the outputs of discipline components of the crop research program into usable and demonstrated usable technology.

Success of research center programs are significantly aided by a well defined system-wide program, and the effective organization of scientists focused on appropriate priority programs. However, much of the Station's success still depends on the center managers effective and innovative use of all the resources available at the research center.

ROLE OF RESEARCH CENTERS IN UNIVERSITY SYSTEMS
TEXAS

James Stansel and Howard Malstrom
Texas A&M University Agricultural Research
and Extension Centers
Beaumont and El Paso, TX

We want to emphasize the structural and statistical alignment of our system and describe the role of the scientist in that context. The chancellor is head of the Texas A&M University System which is the umbrella under which the rest of the colleges and agencies are a part. The Deputy Chancellor for Agriculture presides over the College of Agriculture, the Agricultural Experiment Station and the Agricultural Extension Service. The College of Agiculture has a dean and each of the other two agencies has a director who is responsible for the direct activities of that agency. In some cases the Deputy Chancellor may also hold titles as Dean and/or Director.

There are 15 research and extension centers in Texas and 9 smaller satellite stations which are administered by centers. The centers have as few as 5 and as many as 20 research scientists. There are extension scientists housed in all centers and USDA scientists in some. There are very few joint appointments at centers; scientists are either 100% research or extension. All Resident Directors are classified as 100% administration and are classified as Resident Directors of Research, indicating total responsibility to the Experiment Station.

Texas is a large state extending almost 1000 miles from extreme ends. El Paso at the extreme western portion is closer to San Diego than to Houston. Likewise, Texarkana is closer to Chicago than to El Paso. The headquarters for all agencies is the Texas A&M University campus at College Station (Fig. 1). With this tremendous size, centers with regional missions are a necessity.

There is also a large difference in terrain, climate and of course agricultural commodities across the state. The rainfall regions from east to west Texas are given in (Fig. 2). East Texas is very similar to most southeastern states with about 56 inches of rainfall. To the west, the rainfall gradually decreases to a low of 8 inches near El Paso. All of the agriculture in the western one third of the state and the lower Rio Grande valley is irrigated, either supplemental or total. Many of the crops in central and east Texas are not irrigated by necessity.

There is a considerable change in temperature, primarily from north to south (Fig. 3). Solar radiation also varies considerably across the state, increasing from east to west (Fig. 4). The temperature and solar radiation factors have an influence on the type of crop grown, and to some degree on the growth habit of the same crop in different regions.

Texas is an important agricultural state, with the on farm income exceeding $10 billion annually. Texas ranks first nationally in cotton and cattle/calf production. The High Plains of northwest Texas, with 2 1/2 million acres, is

the most intense cotton producing area in the world. Texas ranks third behind California and Florida in horticulture crop value. The Lower Rio Grande valley is an important vegetable and citrus production area.

The interaction between scientists of the departments in the College of Agriculture, and the Centers is important. Our research centers are autonomous in the sense that we conduct our own research and do not function as service units to main campus scientists. Research work done at Centers in cooperation with department scientists is done at the direction of the center scientist. Whereas center scientists do not have joint appointments, or tenure, department scientists are generally joint research and teaching. The heavy teaching assignments for campus-based scientists often leads to sharing of graduate students who do much of their research at the centers under the direction of center scientists.

A breakdown of the Texas Agricultural Experiment Station scientists is given in Table 1. There are more scientist years represented in the 16 departments on campus than the 15 centers and 9 substations. Almost 90% of campus-based scientists have joint appointments; almost no center scientists do.

The structure of the research and extension center system in Texas is not unlike that of some other southern states. Agriculture is an important industry in Texas, accounting for almost $40 billion in annual economic impact. While the total TAES budget is large, if one looks at the ratio of dollars spent on research versus the level of farm and ranch receipts, Texas ranks 33 of 35 major agricultural states. It ranks last in the 13 Southern agricultural states. Scientists in the Texas Agricultural Experiment Station are highly competitive nationally in the acquisition of grant and contract funding as these sources of funds make up on increasing portion of our total budget.

Table 1. Statistical breakdown of personnel in the Texas Agricultural Experiment Station.

Statistic	Numbers	Percentage
Total employees	1726	100
Total scientists	324	19
Total scientists on campus	181	56
Total campus scientists on soft funds	36	11
Total campus scientists joint teaching/research appointments	288	89
Total scientists at centers	143	44
Total center scientists on soft funds	3	1
Total center scientists joint research/extension appointments	3	1

FIGURE 1. RESEARCH AND EXTENSION CENTERS

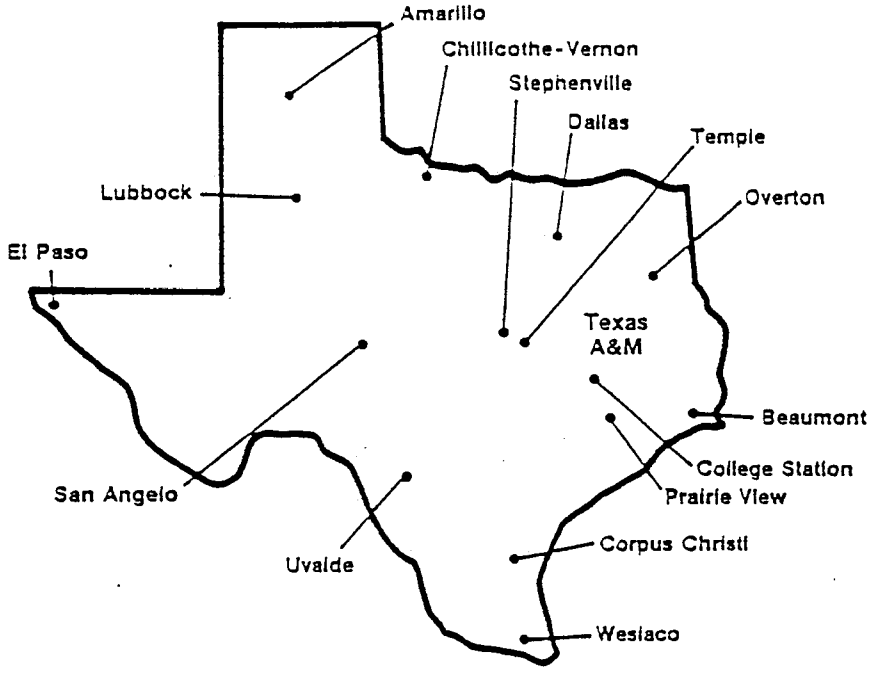


FIGURE 2. MEAN ANNUAL RAINFALL (INCHES)

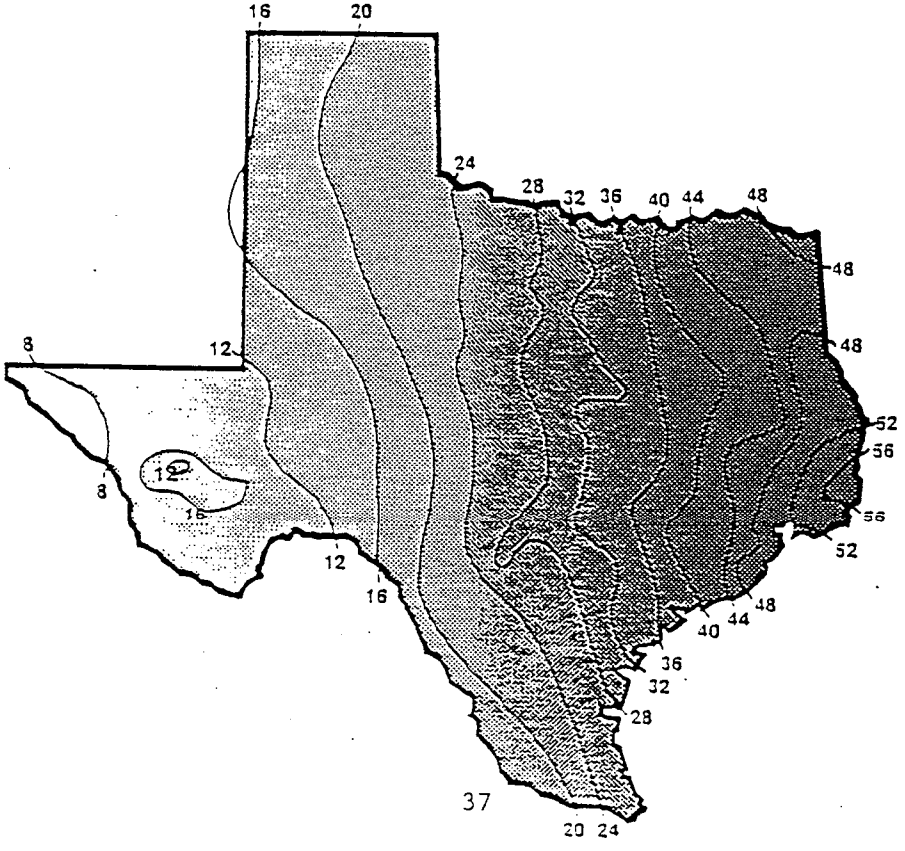


FIGURE 3. MEAN TEMPERATURE (DEGREES F)

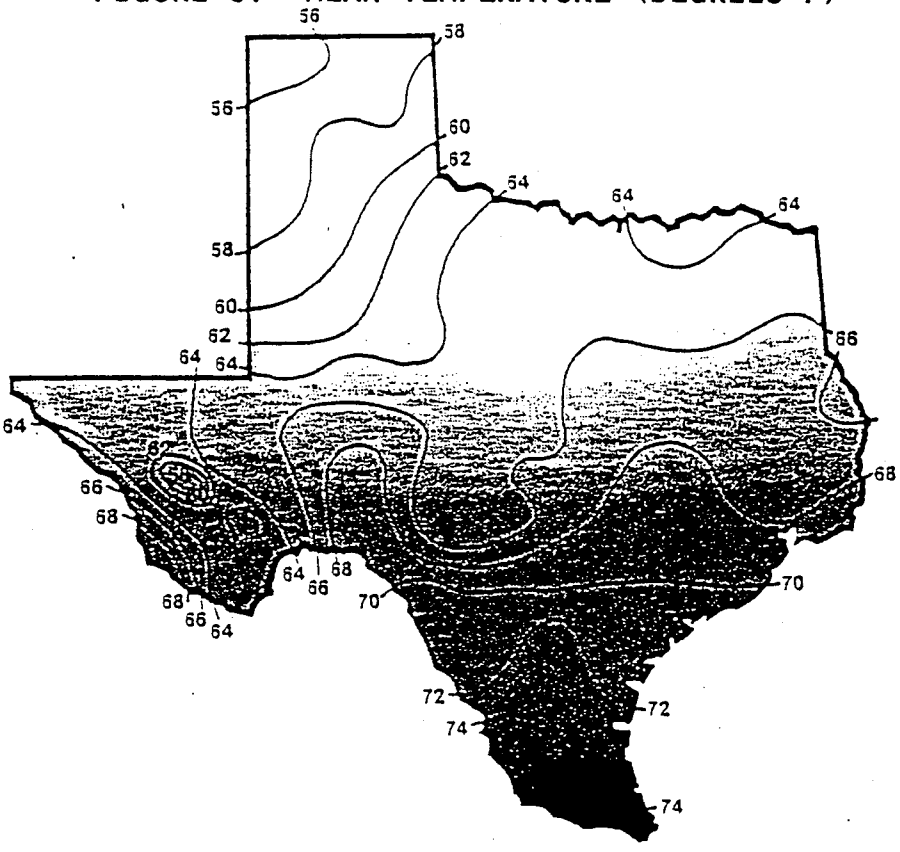
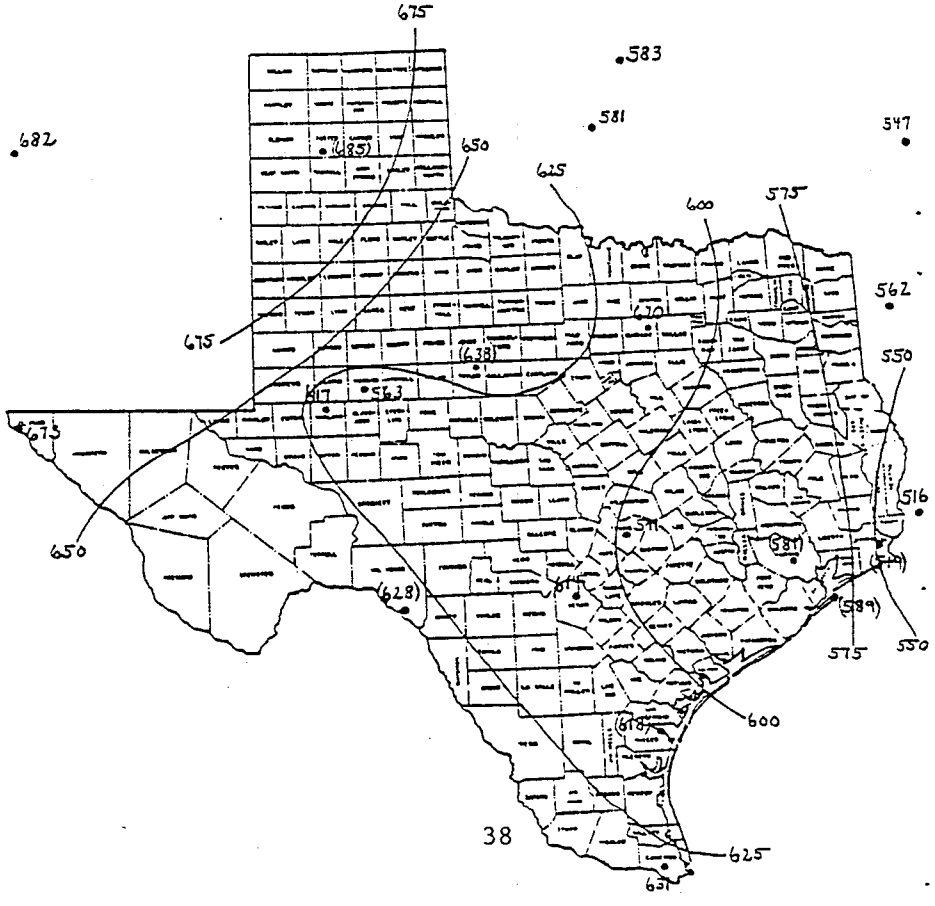


FIGURE 4. MEAN SOLAR RADIATION, JULY (LANGLEYS)



ROLE OF RESEARCH CENTERS IN UNIVERSITY SYSTEM -- NATIONAL COTTON COUNCIL VIEW

Craig Brown
Producer Representative
National Cotton Council of America
Memphis, TN

Good morning, ladies and gentlemen, and thank you for the opportunity to appear before you today. It is my pleasure to present some views on the role of research centers in the university systems from the perspective of the National Cotton Council.

From my many years of association with the Agricultural Center of LSU and more recently by broader exposure to Cotton Belt research leaders, I have a great deal of respect for the role of the research center in today's modern agriculture. As we examine the role of research centers, I think it is appropriate to take a backwards look of 50 years to the beginning of the NCC. In so doing, we will acquire a feel for why the Council has long been a staunch supporter for agricultural research.

Albert Russell, in his book "The First 40 Years," said that in 1937 the U.S. had the largest cotton harvest in history --nearly 19 million bales. The carryover was over 11.5 million bales. To cloud the future further, test-tube fibers in the form of rayon had entered the competitive arena. Though rayon production capacity was only about a million bales, its discovery was ominous. No longer would cotton and wool have a virtual monopoly in the fiber marketplace. This was the first example of an agricultural commodity facing replacement by a man-made substitute.

It was this setting that a fragmented cotton industry --producers, ginners, warehousemen, merchants, and mills independently recognized that cotton had a competitiveness problem. Recognizing that a united front was needed to address the complex issue of supply, demand, pricing, orderly marketing and research, a concept of a council of cotton interests had its genesis. Through keen organizational minds, the concept turned into reality and the NCC was born.

In its first annual meeting in Dallas 50 years ago in January, Council delegates called for research on cotton and cottonseed to increase consumption and improve varieties. The Council was also to work with the Southern Regional Research Laboratory in New Orleans, especially in regard to utilization research. Ever since those initial resolutions in Dallas, research support has been a major policy issue with the Council. That policy has been enacted through efforts to get federal appropriations for Hatch funding for states and through a Cotton Producers Institute which later was to become Cotton Incorporated.

Support of the research and promotion program of Cotton Incorporated still continues to be a major policy issue with the Council. We understand that CI had some growing pains in the early days. Relations with some research institutions were damaged but that was years ago and now we have, through CI, a lean and productive ag research staff. Funding for the research program has

significantly increased dollars for research in every Cotton Belt state. As you know, we are supporting the concept of the program being enhanced through two additional provisions -- a no-refund provision and a mandatory assessment of imported apparel. But we can't lose sight of the mainstay of cotton research in the U.S., that is, publicly supported research. The U.S. currently has over $50 million/year from state and federal sources for cotton research. The state's portion grows in comparison with federal each year.

Throughout its history, the Council has been a supporter of a balanced program of basic and applied research. The rationale is that neither basic nor applied research alone is sufficient. We are strong supporters of basic research because fundamental discoveries are essential to cotton's long-term health. But applied research -- research to extend basic findings, adapt them for the field and demonstrate to the farmer that they are useful -- is of equal importance.

The research centers are unique because within the land-grant system there is a structure for conducting basic research with a purpose -- to solve real-world problems. Additionally, because administrators have their fingers on the pulse of agriculture, they know what the priorities are. At this point, let me add the admonition for you to stay tuned to your primary constituents, the farmers. It's important that they know you and know what's going on. Likewise, you must know them and what their problems are. No matter how you accomplish it; liaison and input from the producer community is the greatest asset to a research center. Problems and goals are more readily identified as well as needed support for funding at the state and federal level can be counted on when producers are in your corner. A while back, we observed a research laboratory in a different part of the Belt that lost touch with the producers. They began to do "blue sky" research to the extent producers lost interest. Fortunately, administrators recognized what was happening and turned the program around.

It is in this role that research centers play so well. What better place is there for developing basic technology but also integrating knowledge gathered in the laboratory into productive, and profitable, systems for on-farm adaptation.

You, the center directors, are the experts and you know best how to direct your own station's activities. However, from a broader perspective, I would like to approach this subject with our own idea of a mission statement.

At the outset, I think the mission of the centers should be an extrapolation of the mission of the national agricultural research and development system. That is, it is to provide technology to assure that adequate and affordable food and clothing are available to the consumer and to be done so profitably by the farmers and ranchers. Others may add to this mission statement and refine it. But whatever changes I think any mission statement should have the operating words -- adequate, affordable and profitable. In developing goals to achieve that mission I identify several areas of emphasis:

First, Centers are the first points of assimilating basic findings and applying them into field systems. Systems research, the buzz term of the 70's, is as appropriate now as ever. It's your primary role to test those many pieces

of the puzzle to determine which pieces are candidates for being included in a workable cultural system.

Also Centers are locations where agronomic systems are designed--where they can be fine-tuned for adoption to local and area needs. Because of geographical and climatological differences, centers are best able to sort out the best fit of varieties, herbicides, fertilizers, irrigation, insect control, plant growth regulators, harvesting, and so on. There are literally millions of combinations of choices that a farmer must make. You are in the best seat to assist him in making those choices.

Another major task of the centers is their role in technology transfer. The cooperative extension service is the official educational arm but research centers are essential partners. A close working relationship is essential for the most efficient use of limited funding and accomplishing the mission of ag research. Centers must continue to provide the forum for teaching and demonstration with their partners in extension.

In summary, I want to underscore from the cotton industry's viewpoint that what you are doing for agriculture is the basis for its long-term survival. With the competition at home and abroad for markets, those who can deliver a high quality product for a reasonable profit will be the survivors.

MODEL OF SAFETY PROGRAM FOR RESEARCH CENTERS

David Baker
Extension Safety & Occupational
Health Specialist
University of Missouri
Columbia, Missouri

I wish I could tell you that the University of Missouri model is the ideal safety program, and tell you exactly what you as center leaders need to do to implement it. Unfortunately, it is far more complicated than that. Even in Missouri we do not have either the time or resources to assure that all the necessary things will be done. I go to the various branch stations around the state, walk out on the farms, talk to employees but I can only try to give advice; I have no administrative responsibility there.

I have spent the last year and a half working with one of the large chemical companies based in St. Louis. I was helping them put together a safety program because they are now in a farming situation. They have a large livestock research facility and have no experience or expertise in agricultural safety. Much of what I will tell you today will be based on that experience, and also on my technical training and experience in the University of Missouri System for 15 years.

The major problem with a university system is that it is a large commercial farming operation within which are multiple small farming operations. For example, the University of Missouri agronomy research facility conducts work on 590 acres with about 150 people involved. All of these people have different goals, needs and priorities. I think probably most of you experience similar situations. We have obsolete, outdated equipment because we don't have the dollars to replace it. We've got equipment that people have never been trained to operate. Often times this equipment is being used in a way it wasn't designed to be used.

We face many of the same problems the farmer might-remote locations, transport between facilities, long hours, untrained help, long distance to emergency help and locations. Often we must transport hazardous materials great distances. The requirements that go with that-proper marking, manifest-we are not complying with. We have to address issues related to housing of our employees in buildings designed for research. The research is often creating additional hazards.

The problem you all face is cost. Safety people and safety regulations tell you to put safety shoes on all your employees. At $50 per pair, where are you going to get the money? Where is the institution going to get the money? Another problem is logistics. How are we going to get the experts and the equipment to the remote locations.

There are some advantages of a university-based model. It can certainly be made to focus on programs and our needs and exposures. For example, a large dairy called me in to help them design their facility so that it would have all

the proper safety features built in. I looked through their plans, paying primary attention to the milking parlor, loafing sheds, pregnancy buildings, etc. when I noticed that all of these facilities had fire control sprinkler systems built in. This was fantastic, but I asked them, "Can you afford it?" They responded, "Can we afford not to? We invest thousands of dollars in these facilities, millions in the research, and we can't afford to lose them."

If you look at it that way it makes sense. We have to invest so as to reduce long-term costs. Our primary concerned is with the cost of Workman's Compensation insurance, but equally important is the cost of health-related disabilities. What is our long-term liability exposure to health risks like-pesticides, cancer, hearing loss, etc. Someday the courts may find that we have a major liability exposure.

Another big issue in all of this is our credibility. When we build our programs we either opt for preventative safety or we don't. If we don't and something happens we have lost our credibility. A good safety program is good cost effective public relations.

If I tell some of our employees to do it a certain way and they look elsewhere in the state and see this not being done. They say "Why do we have to do it. They don't do it at . . ." They often refuse to comply based on our examples. If, on the other hand, we can point to other locations where they have done what we advocate and it works, then we have positive PR and a positive investment in developing a strong safety attitude.

The basic goal of any hazard prevention program is to eliminate any controllable hazards. Then we are preventing accidents and reducing costs. We usually limit our overview of what safety is costing us to the direct cost of the accident. These are damage or destruction of equipment or facilities and of course medical costs for personal injury. These costs are very high--in the billions of dollars annually.

We often fail to truly consider what is called the intangible or indirect costs. These costs typically average 4 times the direct costs. This justifies the development and implementation of an accident prevention program. Industry has been used as the model safety program for years and I believe that its components can be applied to agriculture. They can be applied more easily to academic than they can to the typical farm situation. This is because of our mandate to provide safety for our employees. What is the mandate? It is simply a policy statement which clearly states its objectives. It must specifically delineate responsibility and authority. It must provide adequate physical and economic resources to get it done and cannot be delegated to a committee. Safety committees may be involved later but they don't replace the mandate. Employee training, supervision, program enforcement, identification and evaluation of hazards and monitoring are all part of the mandate.

One of the most important elements of the program is the assignment of responsibility. A top administrator such as a dean or director, or even the president or vice president, should be responsible. Someone that high in administration must take it seriously and be sure that it is done--especially

if they are also accountable. The effectiveness in the safety area should be part of the total evaluation of performance. If so, it will be taken seriously.

We have had an active and effective safety committee at the University of Missouri for the past 15 years. One of the things they have consistently recommended to the dean is that someone in the dean's office be identified with line authority to be responsible for the college of agriculture safety program. It hasn't been done because of a) limited resources and b) the fact that you add another administrator in the line. But if its going to be effective it has to happen this way.

There is also a need for specialized expertise and it ought to be written into the person's job description. It is normally written into the guidelines as a policy statement. The unit head is responsible, not me, even though I am the one charged to monitor the system.

Employees need to feel a sense of responsibility. You need to involve them. You need to make them feel that their role in the safety program is important. That is the bottom line--everyone has to feel a sense of responsibility.

We have begun with several of the departments to establish safety committees. The department committee must provide the leadership with the unit to assure that the needs are met for safety and health concerns of the employees. Some of the department committees are interacting with other similar committees within the College to develop uniform and comprehensive agendas. The College Committee must be the central focus of all these activities. Somebody with expertise in the safety area has to be in charge to coordinate and to keep things going.

We have a central committee which has representatives from most departments. Interests of those who work in the laboratory and those who work on the farm are represented. We presently do not have a student representative but believe we need one and have so recommended to the dean.

We have some problems with the committee. Some committee members are reluctant to report infractions of peers. They look on it as a police state-like situation or one where they are tattling. The only actual instructions we got from the dean was to hold an annual inspection and turn in an annual report. Normally that report will have from 15 to 20 recommendations which will range from implementing a training program for TA's to implementing a policy on safety shoes. The tour of duty on the committee is 2 years.

Our committee presently is preparing a safety manual. Signs need to be posted and standardize the use of an emblem. We patterned much of our procedural information after the manual prepared by Rutgers University. We abide by that saying that if "It ain't worth stealin, it ain't work havin," We are not too proud to use someone else's if it is good.

We must sell this concept to people in authority--deans, directors and presidents. We must have their commitment because they control budgets. Without the proper support, these programs will not succeed. We are considering a plan

to present to our dean to use a percentage of outside dollar--grants and contracts--for safety programs.

Policy statements are another matter. The one at Missouri is typical administrative gibberish. We describe and talk in bold terms, but do we implement the vaguely described policies? We don't spell out how we are going to accomplish our so-called goals. We need to be positive in our approach also.

We also must address the issue of voluntary vs. mandatory. As a general rule, voluntary won't do it. In our system, a former associate dean stated that we would comply, regardless of the difficulty. Many of our people didn't like it but he took a positive approach. He said we are going to put this in place and do it right and it was largely done.

How many of you give your employees annual training in tractor operation? All continuing employees should be given an annual updating and new employees as soon as they begin. This is all covered in the 1928 OSHA Standards. Other requirements are covered under Title 3.

We have some unique situations on a college campus. We have an Agronomy Research farm where about 70 people do research. This farm has many different types of pesticides which would not be used on a commercial farm. To address the issue a specialized storage facility has been built, including a wash-down pad, specialized personnel protective equipment storage, mixing area, laboratory, etc. We need to take special heed of Material Safety Data Sheets. We often have large amounts of experimental and old pesticide materials that cannot be sprayed on crops. Non-labeled compounds are a major problem. Where possible we need to get the manufacturer to take back all unused experimental chemical. The bottom line, is we need to develop a uniform storage, handling and disposal policy with the College.

Other problems, we have are campus requirement may not fit our situation. Our campus committee has required that all respirators purchased must be fit tested by a campus hygienist. However, at stations 300 miles from campus, there is no rush to come to campus for fitting. We need to have something worked out locally.

We are also looking at disaster plans, primarily natural disasters. Emergency plans are being formulated but they will not be implemented soon. We are going to address the notification of the fire department and anticipating where the water runoff will go.

All of you branch station directors or superintendents need to conduct an annual walk-through. You should involve your workers also. It lets them see the potential hazards of the problem and involves them. Employees ought to be taught to inspect equipment before they take it to the field. A pilot conducts a preflight check on his airplane before he flies because he knows that if equipment malfunction can cost him his life.

Fire extinguishers need to be used in the proper way. I truly believe that all CO_2 and pressurized water extinguishers should be replaced with either ordinary dry or multi-purpose dry chemical extinguishers. This is for two

reasons, 1) they don't need annual testing and 2) a standardized extinguisher system requires one type of training. We don't have to worry about specialized maintenance like keeping water extinguishers from splitting due to freezing. Other types can be worthless if they aren't tested at least annually and recharged.

Accident investigation is another aspect in which the supervisor needs to become more involved. Most of you stop with the Workman's Comp forms. You should go beyond that and look for what actually happened and what caused the accident.

The people doing purchasing need to be aware of standards. When we order pesticides we need to have a purchase agreement stating that unused portions of nonlabelled compounds can be returned. We are trying to get the legal department help us write those agreements.

Look at death rates for American workers on and off the job. We make a major investment in workers and we must realize that we don't hire safe people. Either that or the nature of their jobs is so dangerous that agriculture ranks first in accident frequency. One of those reasons is the stubborn nature of farmers. My Dad is a good example. Whenever I would talk to him about a safer ways to do things (based on all of my college training, of course), he would answer--"I've done it this way for X years and I'm going to continue. I never had an accident." This is something we need to change. Farmers and farmer-types are great risk takers. They take chances without seriously considering the consequences.

Not all state agricultural systems have an extension safety specialist. I think there are four of them in states which are part of the Southern Region SAAS. From my perspective you have to understand that, although I enjoy doing this work, I have a 92% Extension and 8% teaching appointment and I am still evaluated based on my publications, and the quantity and quality of my teaching. Obviously, we must give serious emphasis to those things for which our promotion and pay are based.

The kind of help you as station administrators can get depends on how your institution has set things up. Even if they have safety specialists to help, they are limited because of the vast size of many of the ag complexes. Libraries have lots of information if you have time to find it. The Industrial Safety Prevention Manuals can be of considerable help also. Many of the states have their own publications on this topic. Your safety specialists will have copies of most of these and know where you can get the information.

Our primary responsibility is to protect our people--researchers, students, workers, general public. Protection of property, although important, is secondary. A researcher hurt or killed or a building loss due to fire can be devastating to a research program. We cannot afford not to protect ourselves. We need to serve the people.

I think you people are doing a good job in an essential business. I was surprised to learn of your organization and I must say that, at least in Missouri, your organization is not well-known. You need to do a better job of

promotion for recognition. I thank you for the opportunity to visit about the concerns as I see them in order for us to develop an effective approach to accident prevention within our Colleges.

RESEARCH CENTER SAFETY PRACTICES FOR TENNESSEE

John I. Sewell[1] and Timothy G. Prather[2]
University of Tennessee
Knoxville, TN

The Tennessee Agricultural Experiment Station's safety program is a part of the overall Institute of Agriculture Safety Program. The Station program is operated by the Institute Safety Officer[1], the Safety Coordinator[2], and various branch-station safety representatives who are appointed by superintendents. The Safety Officer is appointed by the Vice President for Agriculture and he is responsible for planning, implementing, and supervising the overall safety program for the Institute of Agriculture. The Institute of Agriculture includes research, teaching, extension and veterinary medicine functions.

While the Safety Coordinator is often directly involved in the various aspects of carrying out the program, his primary responsibility is to serve as a consultant, instructor, resource person, and facilitator for safety activities. The Safety Coordinator works closely, on an informal basis, with The University of Tennessee, Knoxville Department of Environmental Health and Safety who provide him with training materials, technical information, and program assistance.

The Institute Safety Program addresses specifically branch-station safety needs through the development and implementation of several policies, programs, and procedures which include:

* Institute of Agriculture Safety Manual
* Pesticide Management Policy
* Safety Self-Inspection Program
* Accident Investigation Procedure
* Occupational Health Program
* Respiratory Protection Program
* Right-to-Know Law Compliance.

The Safety Coordinator prepares and presents safety training programs, distributes safety literature, and serves as a safety and health consultant for station personnel. Some activities and functions supervised and/or carried out by the Safety Coordinator include:

* Accident and incident reporting and investigation
* Hazardous materials inventories
* Pesticide utilization, storage, and disposal practices
* Provision of needed safety literature and catalogs.

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[1]Associate Dean, Agricultural Experiment Station.

[2]Extension Assistant, Agricultural Engineering. (Mr. Prather has one-fourth time Agricultural Experiment Station commitment.)

More specifically, the details of some of our major safety activities and programs follow.

Safety Training and Visits

The Safety Coordinator and the Safety Officer make annual safety visits to each of the eleven branch stations. The Safety Coordinator presents two-hour training programs tailored to the needs of the individual stations. Recent safety topics covered include farm machinery operation; machinery repair, welding, tools, and hoisting; electrical safety and wiring; pesticide storage, application practices, waste pesticide disposal, container disposal and personal protection equipment; chain saw operation; operating silos and grain bins; large animal handling, diseases transmissible to man, storage of medications and paraphernalia, and personal protection equipment; lifting and back injuries; towing, hitches, and safety chains; safety belts; fire safety and extinguishers; food safety; and the Right-to-Know Law. The on-site inspections emphasize electrical, shop, farm machinery, structures, work area, and pesticide safety. Deficiencies are noted and superintendents are required to respond concerning corrections made.

Self-Inspection Program

Each branch station is required to develop its own safety policy and procedures statement and to designate one or more safety representatives. Each year, branch stations conduct one or more "in-house" inspections and report the findings and corrective actions to the Safety Officer.

Pesticide Management Policy

This policy contains guidelines for all phases of pesticide usage including ordering, acceptance of experimental products, storage, container disposal, excess tank mix and rinsewater disposal, spill cleanup, personal protective equipment, pesticide transport, first aid, and emergency planning. The Respiratory Protection Program specifically addresses personal protective equipment to include degrees of protection provided by various types of respirators against certain classes of pesticides; proper respirator use procedures; and respirator care, maintenance, and storage.

This policy emphasizes employee training for all branch station employees who handle, mix, store or use pesticides. Employees who mix and store pesticides must have Tennessee Department of Agriculture Pesticide Applicator's Certification.

Occupational Health Program

This program, which is directed toward employees who work with animals, emphasizes the prevention of illness/injuries at work sites. Station employees who work with animals receive immunizations and may participate in health status monitoring under this program.

Accident Investigation Procedure

All accidents/incidents involving University employees or station visitors are investigated and reported through administrative channels. Branch station superintendents or station safety representatives conduct the investigations. Serious accidents are reported immediately by telephone, and the Safety Coordinator reviews with the superintendent by phone the circumstances of the accident. The Safety Coordinator often later conducts a personal investigation of serious accidents when the site of the accident is some distance from Knoxville.

Experiment Station safety personnel recognize that safety begins at the work place and that interest in and attention to safety matters depend directly on local leadership--in our case primarily the branch station superintendents. Safety visits are always conducted from a constructive standpoint in that their purpose is to encourage safety education and to identify and correct deficiencies to provide a safe work environment for all employees. We believe that because of this approach, the Experiment Station's safety program is well received by supporting personnel, the professional staff, and superintendents.

The Tennessee Agricultural Experiment Station is dedicated to meeting the provisions of Federal, State, and industry safety laws, standards, policies, and guidelines. Our goal is to provide the safest and healthiest environment possible for all Experiment Station employees and visitors.

SAFETY PROGRAMS AT RESEARCH CENTERS IN FLORIDA

William J. Becker
Department of Agricultural Engineering, IFAS
University of Florida, Gainesville, FL

STRUCTURE AND SERVICES

At the University of Florida, the Environmental Health and Safety Division, Office of Administrative Affairs, has the primary leadership role for all environmental health and safety concerns, on and off campus, including all research centers, farms and county extension offices. This Division is staffed with approximately twelve professionals in the areas of biological safety, fire safety, occupational health and safety, radiation and radiological services, and pest control. Their function is "to ensure a safer environment for the entire University community." They accomplish this mission by:

* Conducting inspections to identify hazards and urging units to correct hazardous conditions.

* Promulgating rules and regulations (with limited enforcement authority), developing safety manuals and distributing safety information.

* Providing safety programs, as requested, to the various University units.

* Investigating serious hazardous conditions, accidents, repeat problem situations or individuals.

The size of the University, plus the distance from campus of many of the research centers, prohibits the Division of Environmental Health and Safety from providing much personal assistance to the centers. Most of the assistance comes in the form of safety manuals, other print materials, and via telephone communications. A visit to a research center by a member of the Division's staff is rare, and these generally result after a serious safety problem has been identified.

The safety and health manuals, plus some other safety information, are the major contribution of the Division to the centers. The safety and health manuals available are:

* Accident Prevention Manuals - Parts I-II-III
* Laboratory Safety Manual
* Fire Safety Manual
* Biological Safety Manual
* Radiation and Radiological Safety Manual

These five manuals provide the majority of the health and safety policies and procedures, rules and regulations under which the research units are expected to operate. One additional Institute for Food and Agricultural Sciences (IFAS)

publication entitled Pesticide Policies and Procedures Handbook was developed by an IFAS faculty committee two years ago.

Naturally, State and Federal laws related to health and safety also apply to center personnel and activities: OSHA, EPA, Workers' Compensation, Highway Safety, etc.

IMPLEMENTATION AND SUPERVISION

The implementation and supervision of the safety program is the responsibility of the unit director, known as the research center director. He is expected to develop, implement, conduct, finance and supervise the health and safety program at his center. Since center directors vary in interests and priorities, the emphasis and leadership of individual health and safety programs also varies.

At some centers, a safety coordinator has been designated, safety committees have been established, effective pre- and in-service health and safety training and inspections are conducted, and accidents are thoroughly investigated. At other centers, a thorough investigation will conclude that the health and safety program is well hidden or non-existent!

A short survey instrument (see copy attached) was mailed to the fourteen research and education center directors across Florida; there were thirteen responses. There are a total of twenty-two centers under the leadership of these fourteen directors. The purpose of the survey was two-fold: 1) to determine the assistance provided to the centers by the Division of Environmental Health and Safety and 2) to determine the extent of safety programming at the centers.

Following is a summary of the thirteen the center directors' responses:

* Only five directors indicated that they had copies of all the major safety manuals at their center.

* Eight directors indicated that the available manuals were used to in-service new employees.

* Nine directors indicated that the available manuals were used to in-service existing employees.

* Four directors indicated that they have additional written safety policies and procedures for their research center.

* Ten of the research centers have assigned an individual to provide leadership to their safety program.

* Nine centers have a safety committee. They meet 0-12 times annually, on an average of four times per year.

* Six centers hold regular safety meetings, ranging from 1-8 per year; the average number of meetings is less than three. At four centers,

attendance at these meetings is mandatory for the professional staff members and technicians.

* All thirteen center directors reported that they do receive service from the Division of Environmental Health and Safety. The services provided are:

    - o Inspection of facilities and operation (8)
    - o Providing safety materials and programs (8)
    - o Providing training programs (5)
    - o Accident investigation/processing of claims (4)
    - o Cholinesterase testing (2)

* Nine centers indicated that they use local community resources to supplement their safety program. These resources are:

    - o Fire department personnel (6)
    - o Suppliers of safety equipment (5)
    - o Machinery, equipment, pesticide dealers, etc. (5)
    - o Law enforcement agencies (4)
    - o Health professionals (3)
    - o Local educational resources, community college personnel, American Red Cross, OSHA and electric company personnel.

Two of the center directors indicated that the Division of Environmental Health and Safety provides limited help: distance from the campus was one given reason. There were requests for additional safety publications, updates, resources, relevant posters, "canned" safety programs, an "updated" fire safety course, and more assistance in implementing the Community Right-to-Know regulation and the Hazard Communication Standard.

IFAS SUPPORT FOR SAFETY

The perceived support provided by the administration of the Institute of Food and Agricultural Sciences is mixed. To conclude that safety is a "top" priority would be false, but to conclude that the research centers and other units are required to "flounder" on their own is equally false.

Considerable resources have been put into pesticide facilities. The development and implementation of a comprehensive Pesticide Policies and Procedures Handbook and an in-depth analysis of accidents during 1987, and again in 1988, are evidence of a commitment to a viable safety effort.

The Extension Safety Specialist and Pesticide Information Coordinator have been encouraged to make themselves available as resource persons to the centers and units to provide information, materials and programs. Some centers and units use these resources, others do not.

Faculty members and technicians, however, are not totally enthusiastic about the safety efforts. They point out examples of obsolete, unsafe equipment and conditions which have not been corrected. They also emphasize the lack of safety and personal protective equipment.

CONCLUSION

Safety resources are available to the research centers through the Division of Environmental Health and Safety, from the Institute of Food and Agricultural Sciences and from numerous local resources. Policies and procedures, rules and regulations are in place. A commitment to safety and health is present both at the University and IFAS administrative levels. However, limited staff of health and safety personnel and limited financial resources restrict the full implementation of this commitment.

The major determinant of an effective safety program at a research center, either within an on-campus unit or at a county extension office, is the leadership and commitment of that unit's administrative head. Several research centers in Florida have excellent health and safety programs; others have room for improvement. The differences are the leadership, commitment, time and priorities established by the research center director.

My continuing slogan is, "PUT MORE SAFETY IN YOUR PROGRAM". The evidence is clear: dollars spent to prevent accidents is a much more productive use of financial resources than are the dollars spent as a result of an accident.

SAFETY PROGRAM SURVEY
IFAS RESEARCH CENTERS

The University of Florida and IFAS have three documents on safety policies and procedures. They are the:

* Accident Prevention Manual Parts I, II, and III
* Laboratory Safety Manual
* Pesticide Policies and Procedures Handbook

We ask the following questions at each center.

1. Do you have these three publications available for reference at your research center? Yes____, no____.

2. Are these manuals used to inform <u>new</u> employees of existing safety policies and procedures? Yes____, no____.

3. Are these manuals used to retrain or upgrade <u>existing</u> employees of safety policies and procedures? Yes____, no____.

4. Do you have any additional published safety policies and procedures for your research center? Yes_____, no_____. (If so, I would appreciate receiving a copy of these.)

5. Do you have an individual at your research center assigned the responsibility to coordinate or provide leadership to your safety program? Yes____, no____.

6. Do you have a safety committee(s) at your research center? Yes__, no__. If yes, how often does the committee meet per year? Number of meetings per year _____.

7. Are regular safety meetings held at your research center? Yes___, no___. If yes, how many safety meetings were held during 1988? Number_____. If yes, is attendance mandatory? Yes____, no____. For professional staff members? Yes___, no___. For technicians? Yes____, no____. For clerical type personnel? Yes___, no____.

8. The University of Florida's Environmental Health and Safety Division is responsible for providing safety and health leadership for all university units. Does this division provide any assistance to your research center? Yes___, no____. If yes, in what areas?

_____ Accident investigation/processing of claims
_____ Inspection of facilities and operations
_____ Providing training programs
_____ Providing safety materials, posters, programs
_____ Other areas, explain_____
_____.

9. Do you use community resources in your safety program to provide training, inspections, advice, etc.? Yes___, no___. If yes, which of the following community resources have you used in the past year?

_____ Health professionals, doctors, nurses
_____ Law enforcement agencies
_____ Fire department personnel
_____ Insurance company representatives
_____ Local educational resources, community colleges, etc.
_____ Suppliers, representatives of safety equipment
_____ Machinery, equipment, pesticide dealers or representatives
_____ Other, explain_____
_____.

10. What additional services or resources should the University of Florida, the Environmental Health and Safety Division and/or IFAS provide to assist you to make your safety program more effective?

a. _____
_____.

b. _____
_____.

c. _____
_____.

PLEASE return this completed survey to Bill Becker, Extension Safety Specialist, using the addressed envelope enclosed on or before January 16, 1989. Thank you for your cooperation.

RESEARCH CENTER SAFETY PRACTICES

Ed Worley, Superintendent
N.W. Georgia Branch Experiment Station
Calhoun, GA

Last February I had attended the SAAS meeting and returned to my job at the Northwest Georgia Branch Experiment Station on Thursday, February 4, 1987. On Friday everything was moving along smoothly--we were experiencing no apparent problems. About 2:00 PM I was running some errands up town, about a mile from the station. Suddenly my secretaries distressed voice came over my radio "Jim, Dan is hurt; go to him!". There was a pause and Jim came back "Quick, call an ambulance!". I didn't know what had happened and couldn't raise anyone on the radio. I hurried back to the station, getting there ahead of the ambulance. I saw some vehicles pulled off the road near our beef cattle feeding area. When I arrived on the scene I was horrified to find Dan McReynolds, sitting on his tractor, with his left leg amputated just below the knee.

Dan had been working alone, approximately 200 yards off the road, in an area not readily seen from the road. He was putting cattle feed in a self feeder with a two-wheel feed trailer equipped with an auger driven by the tractor PTO shaft. The trailer unloaded from the front and as the front became lighter it tilted to the rear. Dan had stepped up on the hitch to balance the trailer and keep it level. His pants leg was caught by an unshielded PTO shaft and in a split second the damage had occurred. We still marvel at how he was able to extract himself from the machine and do what he did next.

He managed to climb back onto the tractor and, maneuvering through gates, drove to the road and flagged a passing truck. When the truck driver saw what had happened he left his truck, which was headed in the opposite direction, and ran the quarter mile to our office and said "You have a man down the road who has his leg cut off. The secretary said "Who is it?" The man replied, "I don't know, but he has a patch on one eye." She knew immediately that this was her husband.

It would be hard for anyone outside his family to realize what Dan had endured. He spent weeks in the hospital and has been in surgery numerous times since. He still has a long way to go. He is looking forward to returning to work, and we look forward to having him back.

Dan blames himself for this terrible accident, saying that he should have been more careful. But to me, this doesn't diminish my responsibility for what happened. The following Monday morning I directed a thorough inspection be made of all our equipment and note made of <u>any</u> missing safety shields. Many were missing, but all were in place within a very few days. All of our people are now very conscience of the importance of their shields. It's too bad we had to have this terrible accident to get our attention.

The operation of farm equipment is very hazardous. I don't believe we do enough to impress this fact upon our employees. Our extension engineering department has some good programs to make us more aware of the kinds of accidents

we could experience and the best way to prevent them. We are now taking advantage of this program. The saving of one life or one limb will make all the effort worthwhile. Most of our EMT's know little or nothing about extracting someone from a piece of farm equipment, because they are not familiar with the equipment.

Of course there are many other areas where we must be safety conscious, the storing and handling of pesticides for instance. We could spend hours discussing all these areas. I just hope we can do a better job of prevention instead of reacting to a hazard after the accident occurs.

NORTH CAROLINA WORKPLACE REQUIREMENTS FOR SAFETY AND HEALTH AND SAFETY PROGRAMS FOR RESEARCH STATIONS

Fred Cumbo
Horticultural Crops Research Station
Clinton, NC

The State of North Carolina must meet its responsibilities to the State employees regarding their personal safety and health. All state agencies are mandated under General Statute 95-148 to develop a model program of safety and health.

Each State agency head is required to designate a safety and health officer to be responsible for assuring that agency's Workplace Requirement Program for Safety and Health is implemented and maintained. Other responsibilities can include the development of a risk-assessment methodology for use in correcting workplace hazards on a priority basis, development of the agency's safety and health documentation system for review of effectiveness and establishment of long-range safety and health performance goals.

Each supervisor is responsible for providing safe working conditions for employees and for following up reports of violations of safe working conditions. They are also responsible to know the safety and health guidelines, investigate and report accidents, and to advise higher management of appropriate situations. Each employee in turn is to place safety and health requirements as first importance in the performance of work. The safety and health program is the responsibility of each employee, supervisor and manager and should be an important factor in the evaluation of the work performance of each.

INSPECTIONS AND COMPLIANCE REQUIREMENTS

This requirement is designed to assist in the development, administration of, and operation of an effective occupational safety and health program in State agencies. These factors must be measured, evaluated and reported periodically as to in a quantitative way to determine effectiveness and continuing improvement.

INSPECTIONS AND REPORTS

* Annual inspection is required of all agency physical facilities, and the function performed therein, and the results are to be documented in permanent record form. Each inspection report, prepared by the safety officer, will record pertinent safety and health violations, non-compliance items, and observed deficiencies.

* Employee(s) directly involved in the use or operation of the facilities or function being inspected is to participate in the inspection process.

NOTIFICATION OF VIOLATIONS AND CORRECTIVE ACTION

* Observed violations of safety and health standards, deficiencies, and non-compliance items will be reported in written inspection reports.

* Notification of all recorded violations will be given to the person in charge of the facility or function being inspected, the local safety and health committee, and the director of physical plant. The responsible person must respond to the safety and health officer, indicating the corrective action accomplished with regard to each reported violation.

IMMINENT DANGER ACTION

* Any manipulation, process, action or condition which in the opinion of the safety and health officer is considered to constitute an immediate threat to the life of an employee or public may be terminated or modified by the safety and health officer.

REPORTS

* The safety and health officer will make periodic reports as required by the NC Department of Labor and the NC Office of State Personnel.

RIGHTS OF EMPLOYEES

* Any employee of the State agency who has a direct personal involvement in the facilities being inspected is to be permitted and encouraged to participate in inspections, including calling possible violations to the attention of the inspector.

* Any employee may report to the safety and health officer any observed violation or deficiency. An investigation of the complaint by the safety and health officer, and notification of the results is to be given to the employee originating the complaint.

* The rights of the employee, who files a complaint on matters affecting occupational safety and health, shall be exercised without retaliation on the part of any other person. (Workplace Requirements Program Manual for Safety and Health. The State of North Carolina Office of State Personnel, Raleigh, NC October, 1985. pp. 2.4.1-2.4.2.)

The increased emphasis on safety and the ligitious nature of our society, have caused the Division of Research Stations to implement a Program Advancement Review (PARS). This is a self-assessment program for outlying research stations. A committee composed of five Division Office employees and two Superintendents is involved in each station audit. Three or four stations are audited each year and the following program areas looked are evaluated:

- o Personnel
- o Financial Records
- o Maintenance and Shop Activities
- o Safety Activities and Conditions

MANAGEMENT PROCEDURES AND METHODS

The committee holds a conference with all employees to inform them of the review purpose and involve them in the process. The committee divides into groups to review each of the program areas. Each employee has an opportunity to privately discuss the station program with one of the team members. This allows them to be open and honest in their comments. The audit generally requires about three to four hours. The safety areas reviewed are chemicals and chemical storage, fuel storage, tractors and other equipment and protective equipment. Areas of deficiency are designated in writing and suggestions provided for correction. PARS will occur at each station every three or four years in addition to annual safety inspections by the NCDA Safety Officer.

PARS allow station superintendents to see their programs from a different perspective. The sharing of different management styles can enhance a program. It is possible to pick up from other superintendents insights to new rules and regulations, areas of deficiency which need correction or rules which you have overlooked. The superintendent recognizes that others enjoy some of the same "problems" or "opportunities" for program improvement. Superintendents who are on the review committee can readily see how parts of their program might need attention.

Even though only 3 or 4 stations are reviewed each year, the involvement of superintendents on the PARS committee really means 9 to 11 stations can benefit from them. These PARS can have a positive impact on station operations if used constructively. Also, the Division Office has a better understanding of each station operations.

The Horticultural Crops Research Station at Clinton has a safety committee composed of three employees and a supervisor. The committee meets on a need-to basis, generally twice a year and has established safety rules published for employees. Safety meetings are held with all employees at least on a quarterly basis and pesticide safety, equipment operation, use of safety equipment, employee attitude and its impact on safety, and other safety topics which are appropriate to the station program are discussed.

A quarterly report is filed on any occupational injuries or illnesses which have occurred on a yearly summary is posted for employees to see. A Safety and Health Handbook is provided to each permanent and temporary employee. They have a tear-out page to sign acknowledging receipt of the handbook and that it is their responsibility to become familiar with and abide by these instructions in the performance of their duties.

The research station furnishes each employee with rubber boots, gloves, rainsuits, hard hats, ear plugs, and safety glasses. The mechanic is

furnished with safety shoes. In addition, disposable suits, gloves, and respirators are provided for pesticide application.

In summary, safety in the workplace is essential for the well-being of the employees and the State. Accidents and unsafe practices are costly. It is in the best interest of everyone to put forth the effort to make every day a safe day.

HIGHLIGHTS OF A CENTER DIRECTOR'S RECENT VISIT TO THE PEOPLE'S REPUBLIC OF CHINA

David V. Calvert, Center Director
Agricultural Research and Education Center
Fort Pierce, FL

It was my good fortune to serve from October 19 until November 9, 1988 as one of a thirty-nine member citrus delegation to China composed of citrus producers and technologists and organized by the Citizen Ambassador Program of People to People International of Spokane, Washington. We visited Chinese citrus producers, orchards, major research facilities, and agricultural universities to observe their practices and discuss topics of mutual interest in citriculture. Citrus as an agricultural crop is recorded as far back in Chinese history as 2286 B.C., and the commercial industry has been well developed in China since the tenth century A.D.. Since most citrus species are native to China, it is the recognized home of most of the world's commercial citrus. Citrus still grows as a wild plant in some areas of China.

The primary purpose of our visit to China was to share and exchange information about citrus genetic resources. In technical meetings, field visits, and informal sessions with our Chinese colleagues, we discussed the production of citrus, including fertilization, irrigation, frost protection, and pruning methods; rootstocks; scion varieties; nursery practices; crop harvesting; marketing; and most important, management and control of pests, including insects, pathogenic diseases, and weeds. Special emphasis was given to production and marketing of citrus.

Our Chinese hosts discussed subjects relating to citrus production in China, including practices which are very advanced, and in some cases, quite novel. The Chinese are involved in disease forecasting, insect taxonomy and systematics, biological control of insects and deployment of insect parasites and predators -- research that is unrivaled and is of value to citriculturists throughout the world.

The project enabled us to become acquainted with members of the Chinese agricultural community, observe their production practices, and discover how they solve problems relating to their citrus industry. In addition to organized meetings and technical discussion sessions, we talked informally with our colleagues in each area, and we had firsthand observation of Chinese citrus production. We also had the opportunity to view some of China's fascinating culture. Through this slide presentation, it is my hope to give you a glimpse of some of China's vast technical knowledge in citriculture as well as some of it's unique cultural heritage.

MAPPING FOR FIELD HISTORY IN NORTH CAROLINA

George Clark
Central Crops Research Station
Clayton, NC

Mapping for field history or to establish field records is time-consuming, tedious and generates ample paper each year. My purpose in this address is to introduce you to a computer software program developed specifically to help to map field history and manage land resources. I will attempt to introduce you to the complexity of the research data files at the Central Crops Station and the need to develop a better field mapping system. I will also briefly describe the developmental process that was undertaken to establish our land management computer system. Becky Westmoreland will follow with a description of the mechanism to establish the software.

Central Crops Research Station is one of 15 branch stations in North Carolina. We are located approximately 15 miles from the North Carolina State University campus on 489 acres of university-owned property and 29 acres of rented land. Our research program involves more than 70 research scientists in 11 major fields of study on 30 crops, and fish and swine.

We had 189 studies located on 124 permanent fields in 1988. Many of these fields were sub-divided to handle multiple research studies. Some fields were in research studies in both the summer and winter months with different crops. Our cropland has 15 soil types, diverse fertility levels and different rotational schemes and soil conservation practices. Cultural practices vary with the crop and result in specific row widths, tillage practices, pesticides and nutrient and water requirements and etc. Each year more than 80 different pesticides are applied to field crops and many fertilizers of various analyses are used.

Because of this complexity, it is extremely difficult to manage land resources in a productive and efficient manner. Maintaining records of individual research studies without a good field mapping system is impossible.

The land management computer system that we will describe came about as part of a centralized computer package developed for our research stations. We assessed the role that computers could have to improve our overall operation. We identified three areas that we believed could become more efficient as a result of computerization; 1) bookkeeping, 2) administrative duties and 3) land management. We also identified three major problems that computers would present to our organization; 1) the acquisition of funds, 2) training for personnel and 3) computer acceptance by our staff. Our careful study indicated that, despite possible drawbacks, computers would enhance our operation and we made a commitment develop the program.

Experts in the field advised us that we needed a main frame computer based system, not a PC type. That was based primarily on our desire to have interacting communications with Raleigh and other stations. It was likewise decided that the system should operate through the North Carolina State Information Processing Service which already handled other state agency computer

needs and services. Finally, we designated a team to develop this system and it then became apparent that our most difficult task lay ahead.

That difficulty was acquainting programmers with the basics of our operation. Computer programmers generally have little knowledge of soil types, pesticides, fertilizers, cultural practices, land measurements, and how they are applied. The team had to understand our operation thoroughly and thus they spent time with the research personnel at several of the stations in an effort to learn.

A committee of an assistant director and several superintendents was formed to help the team develop and refine the software package. Several workshops were held by this group. Computer hardware development and delivery began in the early summer of 1988.

Five research stations are presently equipped with computer systems which are on line with the state information processing service. Computer hardware systems are currently being delivered to five additional stations. Software packages consisting of Lotus 1-2-3, DBase III plus, and Word Perfect are used for bookkeeping and administrative duties, respectively. There are long-range plans to have software programs for bookkeeping and administrative duties on line with the main office in Raleigh. The land management software program is designed specifically for field mapping and land management.

Files and records relative to field plots, which had been kept in notebooks or on paper, were manually transferred to special forms prepared for each field plot area. These records were again copied, coded and transposed to other specifically prepared forms and submitted to the directors office at NC State University at the end of each year. The field data that were generated could be entered into the computer at any time thereafter by the secretary or the supervisor. These records are stored indefinitely on disk and can be retrieved in whole or in part to meet the needs of the station. Inquiries can be made as to the status of fields by soil types, acreage, project leader or crop as well as cultural practices. We believe the land management computer system will revolutionize field mapping in the North Carolina Agricultural Experiment Station.

A COMPUTER SYSTEM FOR FIELD MAPPING

Becky Westmoreland
State Information Processing Center
Raleigh, NC

The North Carolina Information Processing Service for whom I work is a computer operation center for state agencies which do not have computer capabilities. The North Carolina Department of Agriculture (NCDA) and North Carolina State University have mainframe computers which process information for many other state agencies. We have a telecommunications link to all these agencies and that gives us tremendous capacity.

I am a consulting computer systems analyst whose job is to determine which tasks in the operation of other agencies can be computerized. I must also establish a system that can retrieve information, bring it together and allow it to be summarized or used in the best possible way for that operation.

I became involved in the field mapping program through a five-year development plan which was conducted by the NCDA. This type of program had been going on for a number of years with the research staff, which was quite small. NCDA wanted to convert all of these programs to computer. Therefore, the processing staff spent a lot of time getting information from the research staff. I traveled extensively to many off-campus stations to look at all of the activities as they were going on. I have been involved with many aspects of business-corporate taxes, and corporation registrations, but I had never worked with anyone or anything in agriculture. It turned out to be an exciting and interesting project. I saw many different stations and operations. I never realized, for instance, that so many things could be done with animals.

It was apparent early that one of the biggest needs was an ability to track what had happened in the past, what is happening and what will be likely to happen. Thus, land management systems became our first priority. We brought the system up last October and have 5 station on line. We have not finished the project by any means and are presently designing for more growth. We want to build enough flexibility into the system that we will be able to adapt to different situations in the future.

One element we hope to be able to incorporate into the program is the Computer Assisted Drafting System (CAD) which is presently being used by engineers in our central office. Should we be able to successfully tie this in with land management, we will then have graphics capabilities. Although we have worked exclusively with the 5 branch stations up to now, we hope to expand to cover the office management systems of other state farms.

Some of the specific situations we encountered involved field plots at the stations which may have had permanent crops such as orchards, woodlands, irrigation ponds and pastures. Other situations involved temporary or annual crops and treatments that were constantly changing. Many of the experiments and plots are maintained for 5 to 10 years with a particular treatment going

on. This may render a plot of ground unusable for many years because of the variability induced into the soil by a set of treatments. A history and inventory available through a computer system can be an asset because you can trace the effects of prior treatments over the years.

Future aspects include future use of the land, who will use it, how much and for what purpose. This was the essence of our challenge. We took all of this information, recalculated and printed it out in a different format that would be easy to use and would best fit the needs of the outlying stations.

We had to develop a system that would consider past and future use of the land. We had to take it from an agriculturally based format, recalculate it manually, and print it out in a different format. Several factors needed to be considered. Every single activity, the time frame in a single field for a particular research project with many different tests at each of the 15 stations.

We had to decide whether it was best to use a PC or mainframe. We knew the data were going to probably be kept for at least 10 years. We also realized they would have to have some sort of backup system for data security. Also any data entered at the station level must be accessible at the central office. Generally, the system operates off a PC.

I would like to show you a few examples of how we have setup some of these systems. This is a fully interactive on line system primarily menu driven which we tried to make as simple as possible. We use a control file on which we have the names of all chemicals, for instance. We have to ensure that all spelling is correct, since some words can be spelled different ways, e.g. k-o-r-n and c-o-r-n.

The primary objectives of our Land Management System and how these function interact are given in Fig. 1. All field notations, assignments and daily tasks are tied back into a permanent field data root. The system menu (Fig. 2) covers the various aspects listed. The data flow (Fig. 3) shows that we start with a control file and flow through to a record of field activities.

Obviously, it would be impossible to show you all the formats we have established. The few I have shown are to give you an idea of how we approached the problem. Should you desire more information, you can contact me.

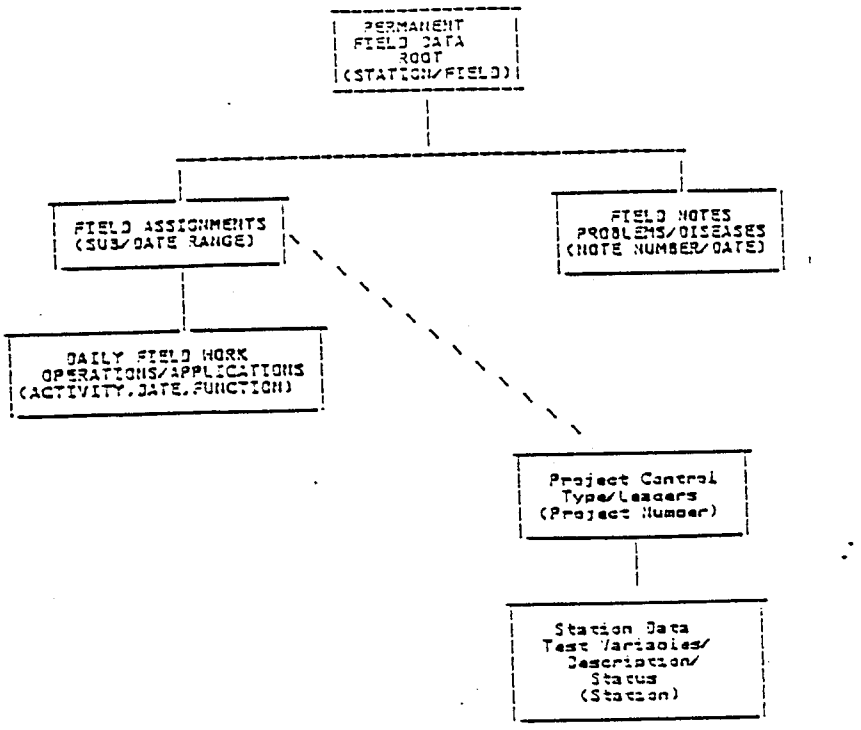

Fig. 1. General Flow Diagram for North Carolina Department of Agriculture Land Management System Data Base.

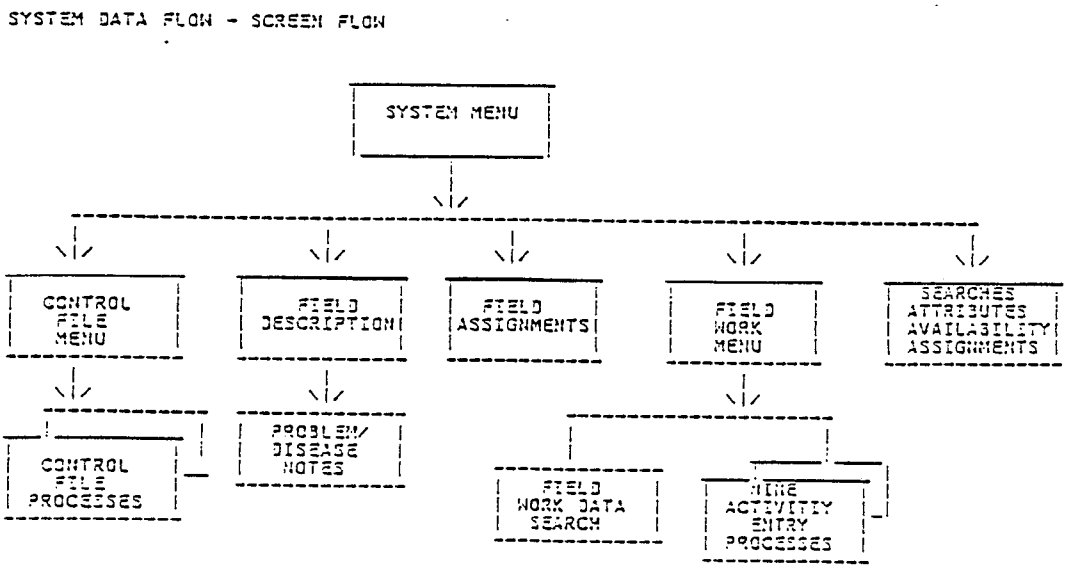

Fig. 2. Flow Diagram for Categories and Options Available with the North Carolina Department of Agriculture Land Management System.

SYSTEM DATA FLOW - INITIAL ENTRY

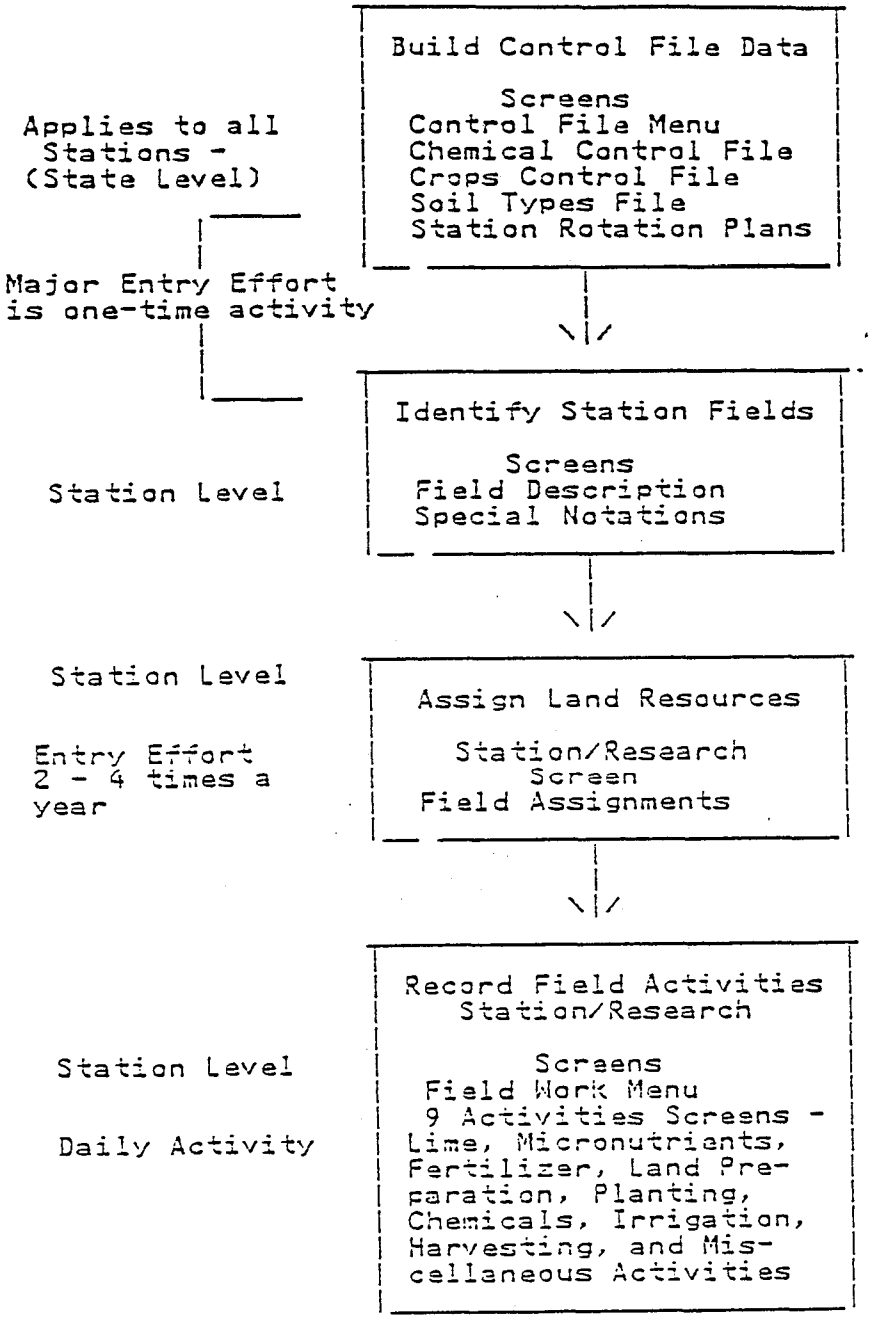

Fig. 3. System Data Flow Initial Entries for North Carolina Department of Agriculture Land Management System.

```
QF00              RESEARCH STATION LAND MANAGEMENT SYSTEM              02/07/89
                            SYSTEM MENU

SELECTION   FUNCTION

   01       SEARCH RESEARCH PROJECTS
   02       SEARCH PERMANENT FIELD DATA
   03       SEARCH UNASSIGNED FIELDS INFORMATION
   04       SEARCH ASSIGNED FIELDS INFORMATION
   05       UPDATE RESEARCH PROJECT INFORMATION
   06       UPDATE PERMANENT FIELD INFORMATION
   07       UPDATE FIELD NOTES/PROBLEM/DISEASES
   08       UPDATE FIELD ASSIGNMENTS
   SUBMENUS
   10       CONTROL FILE MENU (VALID CROPS, CHEMICALS, SOILS, ROTATION PLANS)
   20       FIELD WORK MENU (DAILY APPLICATION/OPERATIONS)


         KEY SELECTION CODE AND PRESS ENTER __

 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX ERROR MESSAGES XXXXXXXXXXXXXXXXX
 PF1-MENU PF2-PREV SCRN                                PF6-HELP CLEAR-EXIT
```

Table 4. Typical Menu for Options Available in North Carolina Department of Agriculture Land Management System.

```
QF06              RESEARCH STATION LAND MANAGEMENT SYSTEM              MM/DD/YY
                  PERMANENT FIELD DESCRIPTION INFORMATION
FUNCTION _    STATION ____
FIELD ID ____    DATE EST MM/DD/YY  MAJOR USE _________________ OWN/RENT/LEASE _
TOT ACRES 000.00  USEABLE ACRES 000.00  USEABLE DIMENSIONS 0000.00 X 0000.00

NUM ROWS 000  WIDTH 000    NUM ROWS 000  WIDTH 000    NUM ROWS 000  WIDTH 000
NUM ROWS 000  WIDTH 000    NUM ROWS 000  WIDTH 000    NUM ROWS 000  WIDTH 000

ROTATION PLAN _____________________
IRRIGATION TYPE _____________________
 ACRES  SOIL       CONDITION          ACRES  SOIL     CONDITION
000.00 XXXXXX XXXXXXXXXXXXXXXXXXX   000.00 XXXXXX XXXXXXXXXXXXXXXXXXX
000.00 XXXXXX XXXXXXXXXXXXXXXXXXX   000.00 XXXXXX XXXXXXXXXXXXXXXXXXX
000.00 XXXXXX XXXXXXXXXXXXXXXXXXX   000.00 XXXXXX XXXXXXXXXXXXXXXXXXX
000.00 XXXXXX XXXXXXXXXXXXXXXXXXX   000.00 XXXXXX XXXXXXXXXXXXXXXXXXX

SOIL VARIABILITY _____________    SLOPE __ TO __ %

SPECIAL NOTE(S) IN NOTES/DISEASE/PROBLEM RECORD _

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX ERROR MESSAGES XXXXXXXXXXXXXXXXX
PF1-MENU PF2-PREV SCRN                    PF5-NEXT REC PF6-HELP CLEAR-EXIT
```

Table 5. Typical Use Sheet for Crops and Soils Under the NCDA Land Management System.

```
QF03          NCDA RESEARCH STATION LAND MANAGEMENT SYSTEM          MM/DD/YY
                        SEARCH UNASSIGNED FIELDS
          MM YYYY   MM YYYY
DATE(S)   __ ____ - __ ____

SEARCH GROUPS (YOU MAY ENTER INFORMATION FOR ONE SEARCH GROUP)

     MAJOR USE _________________

     MAJOR USE _________________  ACREAGE. ________

     MAJOR USE _________________  ACREAGE  ________
     ROTATION PLAN _____________  CROP _____________________

     MAJOR USE _________________  ACREAGE  ________
     ROTATION PLAN _____________  SOIL TYPE ______

     MAJOR USE _________________  ACREAGE  ________
     SOIL TYPE ______

XXXXXXXXXXXXXXXXXXXXXXXXXXXX  ERR  MESSAGES  XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
 PF1-MENU PF2-PREV SCRN                              PF6-HELP CLEAR-EXIT
```

Table 6. Typical Field Description Sheet Used in the NCDA Land Management System.

FOLLOWING IS A LISTING OF THE PROGRAMS OF THE RCAS, BEGINNING WITH THAT OF 1973, COMPLETE THROUGH 1988.

THESE PROGRAMS SHOULD BE USEFUL IN IDENTIFYING DISCUSSION TOPICS, AND PERHAPS SPEAKERS, FOR FUTURE PROGRAMS.

Southern Association of Agricultural Scientists
Atlanta, GA

February 1973
Quality Hotel Central, Room 208

Dr. C. F. Douglas, Chairman

Presiding: Preston H. Reid, V.P.I. and SU

9:00 AM WELCOME AND COMMENTS - Chairman Charles F. Douglas, University of Georgia, Tifton, GA.

9:15 AM HANDLING ANIMAL WASTE - McCaskey (Alabama).

9:45 AM PANEL DISCUSSION - Method employed in purchasing and disposing of products and equipment from research stations - Braselton (Georgia).

10:15 AM BREAK

10:40 AM LABOR AND LABOR PROBLEMS AND MANAGEMENT - Eastwood (Florida).

11:15 AM LABOR SAVINGS DEVICES FOUND TO BE USEFUL ON RESEARCH STATIONS - J. O. Futral

12:00 PM LUNCH

Presiding: PM H. V. Marshall Jr., North Carolina State University

1:30 PM ROLE OF AGRICULTURAL RESEARCH STATIONS IN URBAN AND RURAL DEVELOPMENT PROGRAMS - James Anderson (Mississippi).

2:10 PM GROUP DISCUSSION - How problems relating to vandalism, hunting and requests from outside groups are handled.

2:30 PM BREAK

2:45 PM NEW OR PENDING FEDERAL OR STATE LAWS OR REGULATIONS CONCERNING SAFETY EQUIPMENT, PESTICIDES, ETC.

3:15 PM QUESTION PERIOD

3:30 PM KEEPING PLOT LAND UNIFORM AND USEFUL

4:00 PM GROUP DISCUSSION - Helpful hints, tricks of the trade and other short cuts to success.

6:30 PM ATTITUDE ADJUSTMENT HOUR

7:00 PM BANQUET

SPEAKER: Dr. W. P. Flatt, Director of Experiment Stations in Georgia

SHORT BUSINESS SESSION

Southern Association of Agricultural Scientists
Memphis, TN

February 1974
Sheraton-Peabody Hotel, Airlines Room

Dr. D. M. Gossett, Chairman

Presiding: Vice-Chairman T. E. Corley, Assistant Director, Alabama Agricultural Experiment Station, Auburn, AL.

8:45 AM **WELCOME AND ANNOUNCEMENTS** - Chairman D. M. Gossett, Assistant Dean, Tennessee Agricultural Experiment Station, Knoxville, TN.

9:00 AM **RESEARCH PROGRAM DEVELOPMENT AND EXECUTION** -
Wallace Dickens, Superintendent, Border Belt Tobacco Research Station, Whiteville, NC.
B. B. Webb, Superintendent, Agronomy Research Stations, Stillwater, OK.
Orien, L. Brooks, Associate Agronomist and Superintendent, Southeast Georgia Branch Station, Midville, GA.

10:00 AM **BREAK**

10:30 AM **EXPERIMENT STATION LABOR** -
J. R. Owen, Superintendent, Dairy Experiment Station, Lewisburg, TN.
Preston H. Reid, Director, Tidewater Research and Continuing Education Center, Holland, VA.
Lavern Brown, Superintendent, Lower Coastal Plain Substation, Camden, AL.

Monday PM Presiding - Chairman D. M. Gossett, University of Tennessee, Knoxville, TN.

1:30 PM **BRANCH STATION PUBLIC RELATIONS** -
C. G. Shepherd, Superintendent, Delta Branch Experiment Station, Stoneville, MS.
W. A. Nipper, Superintendent, Dean Lee Agricultural Center Experiment Station, Alexandria, LA.
E. L. McGraw, Head, Department of Research Information, Alabama Agricultural Experiment Station, Auburn, AL.

2:30 PM **BREAK**

3:00 PM **DISPOSAL OF ANIMAL WASTE, PESTICIDE CONTAINERS, AND PESTICIDES** -
B. J. Stojanovic, Professor and Agronomist, Department of Agronomy, Mississippi Agricultural & Forestry Experiment Station, Mississippi State, MS.
J. I. Sewell, Associate Professor, Department of Agricultural Engineering, Tennessee Agricultural Experiment Station, Knoxville, TN.
P. H. Reid, Director, Tidewater Research and Continuing Education Center, Holland, VA.

4:00 PM **SPECIAL EQUIPMENT AND EQUIPMENT MODIFICATIONS FOR RESEARCH** - James A. Mullins, Associate Professor, Department of Agricultural Engineering, Tennessee Agricultural Experiment Station, Knoxville, TN.

4:30 PM **ADJOURN**

7:00 PM **BANQUET** - Room to be announced

Southern Association of Agricultural Scientists
New Orleans, LA

February 1975
Braniff Place Hotel, Imperial Room

Henry Marshall, Chairman

9:30 AM REGISTRATION, COFFEE AND ANNOUNCEMENTS

PRESIDING - Vice-Chairman W. A. Nopper, Superintendent, Dean Lee Agricultural Center, Alexandria, LA

10:00 AM THE ROLE OF THE L.S.U. AGRICULTURAL EXPERIMENT STATION IN FOOD AND FIBER PRODUCTION. - Doyle Chambers, Director, L.S.U. Experiment Station, Baton Rouge, LA.

10:30 AM ACTIVITIES OF THE NEAR ORLEANS PORT. - Walter Paddy Ryan, Advertising and Promotional Director, Port of New Orleans, New Orleans, LA.

11:00 AM BUSINESS

11:30 AM DUTCHTREAT LUNCHEON AT BRANIFF PLACE HOTEL

Monday PM Presiding - Chairman H. V. Marshall Jr., Superintendent-In-Charge, University Research Farms, Raleigh, NC.

1:00 PM DEPART BRANIFF PLACE HOTEL VIA CHARTERED BUS FOR AGRICULTURAL RESEARCH TOUR.

2:00 PM VISIT CITRUS PRODUCTION-PLAQUEMINES PARISH EXPERIMENT STATION - Ralph T. Brown, Superintendent, Port Sulphur, LA.

3:15 PM VISIT FREEPORT SULPHUR CO. - Jessie B. Holder, Supervisor, Agricultural Research, Port Sulphur, LA.

5:00 PM HOSPITALITY HOUR, COURTESY OF FREEPORT SULPHUR CO.

6:00 PM RETURN TO NEW ORLEANS

Southern Association of Agricultural Scientists
Mobile, AL

February 2, 1976
Malga Inn - Fiesta Room

Dr. T. E. Corley, Chairman

8:00 AM **REGISTRATION**

CHAIRMAN - Dr. T. E. Corley, Assistant Director Alabama Agricultural Experiment Station, Auburn University, Auburn, AL.

9:00 AM **THE ROLE OF THE SUPERINTENDENTS IN THE AGRICULTURAL EXPERIMENT STATION SYSTEM** - Dr. R. Dennis Rouse, Dean and Director, Alabama Agricultural Experiment Station, Auburn University, Auburn, AL.

9:30 AM **PUBLIC RELATIONS PANEL**

Dr. Jere McBride (LA)	9:30 - 9:45
Dr. J. A. Morris (MS)	9:45 - 10:00
Dr. R. D. Freeland (TN)	10:00 - 10:15

10:15 AM **COFFEE BREAK**

10:45 AM **RESEARCH PROGRAM DEVELOPMENT AND RELATIONSHIP WITH PROJECT LEADERS**

Dr. W. E. Waters (FL)	10:45 - 11:05
Dr. M. D. Faulkner (LA)	11:05 - 11:25
Dr. H. V. Marshall (NC)	11:25 - 11:45

11:45 AM **LUNCH**

1:15 PM **WASTE DISPOSAL**

Dr. J. R. Owen (TN) - Animal	1:15 - 1:30
Mr. W. W. Kilby (MS) - Animal	1:30 - 1:45
Dr. W. K. Porter (MS) - Chemical	1:45 - 2:00

2:00 PM **SPECIAL RESEARCH EQUIPMENT AND TECHNIQUES**

Mr. T. E. Corley (AL)	2:00 - 2:15
Dr. J. P. Craigmiles (TX)	2:15 - 2:30
Dr. C. G. Shepherd (MS)	2:30 - 2:45
DISCUSSION	2:45 - 3:00

3:00 PM **BUSINESS MEETING**

6:00 PM **SOCIAL HOUR**

7:00 PM **BANQUET** (location to be announced)

Southern Association of Agricultural Scientists
Atlanta, GA

February 7, 1977
Sheraton Biltmore - Hall B

Dr. H. Rouse Caffey, Chairman

8:00 AM **REGISTRATION**

CHAIRMAN - Dr. H. Rouse Caffey, Associate Director, Louisiana Agricultural Experiment Station, Baton Rouge, LA.

9:00 AM **THE GEORGIA AGRICULTURAL SYSTEM WITH EMPHASIS ON BRANCH STATIONS - THEIR MISSION AND OPERATIONAL PROCEDURES** - Dr. William P. Flatt, Director, Georgia Agricultural Experiment Station, Athens, GA.

9:30 AM **EVALUATING AND IMPROVING COOPERATIVE RESEARCH PROGRAMS AT BRANCH STATIONS** -

Dr. D. M. Gossett, Director's View, Tennessee	9:30- 9:45
Dr. J. L. Tramel, Jr., Project Leaders's View, Virginia	9:45-10.00
Mr. J. G. Starling, Superintendent's View, Alabama	10:00-10:15

10:15 AM **COFFEE BREAK**

10:45 AM **ORGANIZING FIELD DAYS AT THE TEXAS A&M RESEARCH AND EXTENSION CENTER, LUBBOCK, TX** - Dr. George G. McBee, Department of Soil and Crop Sciences, College Station, TX.

11:05 AM **SYSTEMS EMPLOYED IN THE MAINTENANCE OF EQUIPMENT AND PHYSICAL FACILITIES AT THE DELTA BRANCH EXPERIMENT STATION** - Dr. C. G. Shepherd, Superintendent, Stoneville, MS.

11:25 AM **LABOR SAVING PLOT EQUIPMENT ON EXPERIMENT STATION FARMS** - Dr. J. A. Mullins, Ring Around Products, Montgomery, AL.

11:45 AM **LUNCH**

1:15 PM **BUS TOUR** - Georgia Agricultural Experiment Station, Griffin, GA.

7:00 PM **BANQUET**

GUEST SPEAKER - Dr. E. Broadus Browne, Associate Director
Georgia Agricultural Experiment Station and Resident
Director, Coastal Plain Station, Tifton, GA.

Southern Association of Agricultural Scientists
Houston, TX

February 6, 1978
Marriott - Suite C

E. G. (Gene) Morrison, Chairman

8:00 AM **REGISTRATION** - Dr. Joe High, Jr., Superintendent, Middle Tennessee Experiment Station, Spring Hill, TN.

8:30 AM **CHAIRMAN REMARKS** - Mr. E. G. Morrison, Brown Loam Branch Experiment Station, Raymond, MS.

8:40 AM **THE TEXAS AGRICULTURAL RESEARCH SYSTEM** - Dr. Dudley Smith, Assistant Director, Texas Agricultural Experiment Station, College Station, TX.

9:05 AM **OWNING VERSUS LEASING OF TRACTORS AND EQUIPMENT BY EXPERIMENT STATIONS** - Mr. Charles Perry, Assistant Superintendent and Agricultural Economist, Southeast Georgia Branch Experiment Station, Midville, GA.

9:30 AM **PURCHASING PROCEDURES AND LIMITATIONS FOR MACHINERY EQUIPMENT, SUPPLIES AND REPAIRS** -

PANEL:

Mr. George D. Pendergrass, Director of Management Operations, College of Agriculture, University of Kentucky, Lexington, KY.

Dr. Rouse Caffey, Associate Director, Louisiana Agricultural Experiment Station, Louisiana State University, Baton Rouge, LA.

Dr. A. D. Seale, Associate Director, Mississippi Agricultural Experiment Station, Mississippi State, MS.

10:00 AM **COFFEE**

10:20 AM **UNIFORMITY IN RESEARCH PLOTS AND EQUIPMENT - ADVANTAGES AND DISADVANTAGES** - Dr. Bill Webb, Superintendent, Agronomy Research Stations, Department of Agronomy Oklahoma State University, Stillwater, OK

10:45 AM **DISPOSITION PROCEDURES FOR SALEABLE PRODUCTS AND NORMAL USE OF FUNDS -**

PANEL:

Mr. Wallace Williams, Resident Director, Delta Branch Station, Clarkedale, AR.

Dr. Calvin E. Arnold, Center Director, Agricultural Research Center, Monticello, FL.

Mr. Wallace Griffey, Superintendent, Piedmont Substation, Camp Hill, AL.

Mr. Lawson Safley, Superintendent, Highland Rim Experiment Station, Springfield, TN.

11:25 AM **BUSINESS** - Chairman Morrison presiding

11:45 AM **LUNCH**

1:00 PM **BUS LEAVES FOR "PORT OF HOUSTON"**

1:50 PM **BOARD YACHT "SAM HOUSTON" FOR TRIP DOWN HOUSTON RIVER CHANNEL** - Smith-Douglas Fertilizer Co. host.

2:00 PM **YACHT TOUR OF "THE PORT OF HOUSTON"** (capacity 100) - Port of Houston Authority

4:00 PM **DEBOARD "SAM HOUSTON' AND RETURN TO MARRIOTT BY CHARTERED BUS**

5:00 PM **ARRIVE MARRIOTT HOTEL**

6:00 PM **SOCIAL AND RICE DISPLAY** - Suites C & D

7:00 PM **BANQUET** - Chairman Morrison presiding

Introduction of Guest Speaker - Dr. Julian P. Craigmiles, Professor and Resident Director, Texas A&M Research and Extension Center, Beaumont, TX.

GUEST SPEAKER - Reagan V. Brown, Commissioner,
Texas Department of Agriculture.

Southern Association of Agricultural Scientists
New Orleans, LA

February, 1979
North Hall A, Grand Hotel

Robert Moss, Chairman

7:45 AM **REGISTRATION** - Dr. Julian P. Craigmiles, Research Director, Texas A&M University, Agricultural Research and Extension Center, Beaumont, TX.

8:20 AM **CHAIRMAN'S REMARKS** - Mr. Robert B. Moss, Superintendent, South West Georgia Branch Station, Plains, GA.

8:30 AM **INTRODUCTION OF PROGRAM BY PROGRAM CHAIRMAN** - Dr. Joe W. High, Jr., Superintendent, Middle Tennessee Experiment Station, Spring Hill, TN.

8:40 AM **FARM SAFETY** - Mr. James B. Wills, Jr., Extension Agricultural Engineer, University of Tennessee, Knoxville, TN.

9:00 AM **EQUIPMENT MAINTENANCE** - Dr. C. G. Sheppard, Superintendent, Delta Branch Experiment Station, Stoneville, MS.

9:20 AM **FIELD DAYS SUPERINTENDENT'S VIEW** - Dr. L. A. Smith, Superintendent, Black Belt Experiment Station, Marion Junction, AL.

9:40 AM **FIELD DAYS EXTENSION SERVICE VIEW** - Mr. Haywood Luck, District Supervisor, Agricultural Extension Service, University of Tennessee, Jackson, TN.

10:00 AM **BREAK**

10:20 AM **FIELD DAYS INDUSTRY VIEW** - Dr. W. R. Thompson, Jr., Potash Institute, Starkville, MS.

10:40 AM **FIELD DAYS DIRECTOR'S VIEW** - Dr. W. P. Flatt, Director, Agricultural Experiment Station, University of Georgia, Athens, GA.

11:00 AM **FIELD DAYS SUPERINTENDENT'S VIEW** - Dr. Robert F. Freeland, Superintendent, Plateau Experiment Station, Crossville, TN.

11:20 AM **PANEL DISCUSSION OF FIELD DAYS** - All program participants on Field Days.

11:50 AM **BUSINESS MEETING**

12:00 PM **ADJOURN**

1:00 PM **DEPART GRAND HOTEL FOR BUS TOUR OF "CITRUS LANDS OF LOUISIANA" AT BELLE CHASE** - Dr. Lee F. Mason, Superintendent, Southeast Louisiana Experiment Station, Franklinton, LA.

5:00 PM **RETURN TO GRAND HOTEL**

7:00 PM **BANQUET - PLACE TO BE ANNOUNCED**
"The Art of Communication" - Mr. Sidney C. Ory, Specialist, Tax Sheltered Programs, Lafayette, LA.

Southern Association of Agricultural Scientists
Hot Springs, AR

Monday, February 4, 1980
Downtowner Motor Inn

Dr. Joe High Chairman

8:00 AM **REGISTRATION** - Dr. F. J. Peterson, Superintendent, Idlewild Experiment Station, Clinton, LA.

8:30 AM **CHAIRMAN'S REMARKS** - Dr. Joe W. High, Jr., Superintendent, Middle Tennessee Experiment Station, Spring Hill, TN.

8:40 AM **OVERVIEW OF ARKANSAS AGRICULTURE** - Dr. James E. Martin, Vice President for Agriculture, University of Arkansas, Fayetteville, AR.

9:00 AM **OBTAINING GRANTS FOR FIELD DAYS AND OTHER USES**

Options and Procedures - Dr. James W. Stansel, Scientist in Charge, Beaumont Center Western Division, Eagle Lake, TX.

The Grantor's Viewpoint - Dr. Harold B. Rice, Extension Forage Specialist, University of Kentucky, Quicksand, KY.

The Director's Viewpoint - Dr. L. O. Warren, Director, Arkansas Agricultural Experiment Station, University of Arkansas, Fayetteville, AR.

10:00 AM **COFFEE BREAK**

10:20 AM **PANEL DISCUSSION: LABOR, LABOR PROBLEMS AND MANAGEMENT**

Locating, Training and Keeping Labor - Mr. John R. Owen, Superintendent, Dairy Experiment Station, Lewisburg, TN.

Motivating, Disciplining and Rewarding Personnel - Mr. Rhea Foraker, Superintendent, Sandyland Research Station, Mangum, OK.

When and How to Counsel and Discipline - Dr. Johnny H. Davis, Superintendent, Iberia Livestock Experiment Station, Jeanerette, LA.

Handling Abuses of Sick Leave, Job Injuries, Coffee Breaks, and Working Hours - Dr. Norman E. Justus, Superintendent, Southwest Center, Mt. Vernon, MO.

Panel Discussion (cont'd)

Controlling Absenteeism, Alcoholism, and Job Dissatisfaction - Mr. James W. Dobson, Jr., Superintendent, Georgia Mountain Branch Station, Blairsville, GA.

Questions and Discussion for Panel - Audience Participation.

11:40 AM **BUSINESS MEETING, ELECTION OF OFFICERS** - Dr. Joe W. High, Jr., Chairman.

12:00 PM **LUNCH**

1:30 PM **TOUR OF AGRICULTURE IN THE HOT SPRINGS AREA**

7:00 PM **BANQUET** - Downtowner Motor Inn

SPEAKER - Mr. John L. Philpot, Extension Specialist, Television, University of Arkansas, Little Rock, AR.

Proposed Fees:

Registration (coffee)	-	$ 1.00
Bus Tour	-	4.00
Banquet	-	10.00

Southern Association of Agricultural Scientists
Atlanta, GA

Monday, February 2, 1981
Sheraton Hotel - Coastal Room

Julian P. Craigmiles, Chairman

8:00 AM **REGISTRATION** - Mr. Wallace A. Gariffey, Superintendent, Piedmont Substation, Camp Hill, AL.

8:30 AM **A HISTORY OF THE SUPERINTENDENT SECTION** - Dr. John Ewing, Dean (Retired), Agricultural Experiment Station, University of Tennessee, Ten Mile, TN.

9:00 AM **A SURVEY OF PERSONS ATTENDING TENNESSEE AGRICULTURAL FIELD DAYS** - Dr. Frank Leuthold, Professor of Rural Sociology, University of Tennessee, Knoxville, TN.

9:15 AM **EFFECTIVE EMPLOYER-EMPLOYEE COMMUNICATION** - Mr. Ted R. Holms, Head, Editorial and Publication Department, Louisiana Agricultural Experiment Station, and Leader, Communication Division, Cooperative Extension Service, Louisiana State University, Baton Rouge, LA.

9:30 AM **BRIDGING THE GAP BETWEEN BRANCH STATION AND MAIN STATION PROJECT LEADERS** - Dr. H. Rouse Caffey, Vice-Chancellor for International Programs, Center for Agricultural Science and Rural Development, Louisiana State University, Baton Rouge, LA

9:45 AM **CONVENIENT FILING SYSTEMS SUITABLE FOR AGRICULTURAL RESEARCH AND ADMINISTRATION** - Ms. Dorothy Keegan, Record Systems Analyst, Georgia Archives and History, Atlanta, GA.

10:00 AM **BREAK**

10:30 AM **AN OVERVIEW OF GEORGIA AGRICULTURE** - Dr. E. B. Brown, Associate Director, Southern Georgia Experiment Station, and Resident Director, Coastal Plain Experiment Station, Tifton, GA.

10:45 AM **SAFE USE OF PESTICIDES AND EQUIPMENT** - Dr. James B. Wills, Jr., Extension Agricultural Engineer, University of Tennessee, Knoxville, TN.

11:00 AM **ENERGY CONSERVATION AS RELATED TO FARM TRANSPORTATION AND FIELD RESEARCH** - Mr. J. R. Williford, Agricultural Engineer, Delta Branch Experiment Station, Stoneville, MS.

Monday, February 2, 1981

11:15 AM **BUILDING DESIGN, LOCATION, AND MAINTENANCE FOR EFFICIENT OPERATION AND ENERGY USE** - Mr. Dennis R. Stipe, Assistant to the Director (Facility Planning), Louisiana State University, Baton Rouge, LA.

11:30 AM **BUSINESS MEETING** - Dr. Julian P. Craigmiles, Section Chairman, Resident Director, Texas A&M University, Agricultural Research and Extension Center, Beaumont, TX.

11:45 AM **LUNCH**

1:30 PM **BUS TOUR** - To be Announced - Depart Sheraton Hotel

5:00 PM **BUS TOUR** - Return to Sheraton Hotel

7:00 PM **BANQUET** - Place to be announced -

SPEAKER - Honorable Thomas T. Irvin, Commissioner of Agriculture, Atlanta, GA.

Southern Association of Agricultural Scientists
Orlando, FL

Monday, February 8, 1982
Sheraton Twin Towers - Indian River Room

Freddie Peterson, Chairman

8:00 AM **REGISTRATION** - Dr. Bill Webb, Superintendent, Agronomy Research Stations, Oklahoma State University, Stillwater, OK.

8:30 AM **CHAIRMAN'S REMARKS** - Dr. F. J. Peterson, Superintendent, Idlewild Experiment Station, Clinton, LA.

8:40 AM **COOPERATIVE RESEARCH ON THE BRANCH STATION: ITS IMPORTANCE AND ITS PROBLEMS**

THE SUPERINTENDENT'S VIEW: Mr. Harley E. Blackwell, Superintendent, Mountain Horticultural Crops Research Station, Fletcher, NC.

THE PROJECT LEADER'S VIEW - Mr. Milton E. Walker, Agronomy Department, Georgia Coastal Plains Experiment Station, Tifton, GA.

THE DEPARTMENT HEAD'S VIEW: Dr. Lloyd F. Seatz, Head, Department of Plant and Soil Science, Institute of Agriculture, University of Tennessee, Knoxville, TN.

THE DIRECTOR'S VIEW: Dr. Gale A. Buchanan, Dean for Research and Director, Agricultural Experiment Station Auburn University, Auburn University, LA.

9:50 AM **OVERVIEW OF FLORIDA AGRICULTURE** - Dr. F. Aloysius Wood, Dean for Research, Institute of Food and Agricultural Science, University of Florida, Gainesville, FL.

10:15 AM **BREAK**

10:30 AM **HOW TO INTEREST SCIENTISTS IN DOING APPLIED RESEARCH ON THE BRANCH STATIONS**

Dr. J. Preston Jones, Head, Agronomy Department, Center for Agricultural Science and Rural Development, Louisiana State University, Baton Rouge, LA.

Dr. L. Aubrey Smith, Superintendent, Agricultural Experiment Station, Black Belt Substation, Marion Junction, AL.

Monday, February 8, 1982

11:00 AM **IMPROVING AND MAINTAINING EMPLOYEE MORALE** - Dr. Joe W. High, Jr., Superintendent, Agricultural Experiment Station, Middle Tennessee Experiment Station, Spring Hill, TN.

11:20 AM **BUSINESS MEETING** - Dr. F. J. Peterson, Section Chairman

12:00 PM **LUNCH**

1:30 PM **BUS TOUR** - Dr. Gary W. Elmstrom, Center Director, Agricultural Research Center, Leesburg, FL.

1:30 PM - Depart Sheraton Twin Towers
2:00 - Visit commercial foliage grower
2:45 - Visit University of Florida Agricultural Research Center, Apopka, FL
3:45 - Drive through Muck Farm Area
4:00 - Visit University of Florida Agricultural Research Center, Zellwood, FL
5:30 - Arrive at Sheraton Twin Towers

6:00 PM **SOCIAL HOUR** - Duval/St. John's Room, Sheraton Twin Towers

7:00 PM **BANQUET** - Duval/St. John's Room, Sheraton Twin Towers

8:00 PM **SPEAKER** - Mr. Henry Swanson, Retired Orange County Extension Director, Winter Park, FL.

Research Center Administrators Society
Atlanta, GA

Monday, February 7, 1983
Sheraton-Atlanta Hotel, Coastal Room

Wallace Griffey, Chairman

8:00 AM **REGISTRATION** - Dr. Gary W. Elmstrom, Center Director, Agricultural Research Center, Leesburg, FL.

8:30 AM **CHAIRMAN'S REMARKS** - Mr. Wallace A. Griffey, Superintendent, Piedmont Substation, Camp Hill, AL.

8:40 AM **OVERVIEW OF GEORGIA AGRICULTURE** - Dr. E. Broadus Browne, Director of Agricultural Experiment Stations, University of Georgia, Athens, GA.

9:10 AM **AGRICULTURE IN OKLAHOMA** - Dr. Charles B. Browning, Dean, Division of Agriculture, Director of Cooperative Extension, and Director of Agricultural Experiment Station, Oklahoma State University, Stillwater, OK.

9:40 AM **AGRICULTURE IN VIRGINIA** - Dr. James R. Nichols, Dean, College of Agriculture and Life Sciences, Virginia Polytechnic Institute and State University, Blacksburg, VA.

10:10 AM **BREAK**

10:30 AM **RESEARCH STATION RESIDENTIAL PROBLEMS AND SOLUTIONS** - Dr. Lee Mason, Superintendent, Southeast Louisiana Dairy and Pasture Experiment Station, Franklinton, LA.

10:50 AM **RESEARCH STATION PERSONNEL MANAGEMENT** - Dr. William C. Loe, Director, Southwest Research and Extension Center, Hope AR.

11:10 AM **RESEARCH STATION PERSONNEL MANAGEMENT** - Dr. Howard Malstrom, Resident Director, Texas A&M University Agricultural Research and Extension Center, El Paso, TX.

11:30 AM **BUSINESS MEETING** - Mr. Wallace A. Griffey, Section Chairman.

12:00 PM **NOON - LUNCH**

Monday, February 7, 1983

1:15 PM **BUS TOUR** - Mr. James W. Dobson, Superintendent Mountain Branch Station, Blairsville, GA

1:15 PM - Depart from Sheraton Hotel - Visit Dogwood Farms, Greenville, GA.
2:15 - Visit Georgia Kraft Lumber and Paper Company.
5:30 - Arrive at Sheraton Hotel.

7:00 PM **BANQUET** - Georgia Ballroom, Sheraton Hotel

8:00 PM **SPEAKER** - Mr. Bobby Rowan, Farmer and Manufacturer, Enigma, GA.

Research Center Administrators Society
Nashville, TN

Monday, February 6, 1984
Opryland Hotel - Commodore Room

Bill Webb, Chairman

8:00 AM **REGISTRATION** - Dr. Norman Justus, University of Missouri Southwest Center, Mt. Vernon, MO.

8:30 AM **CHAIRMAN'S REMARKS** - Dr. Bill Webb, Department of Agronomy, Oklahoma State University, Stillwater, OK.

8:40 AM **OVERVIEW OF AGRICULTURE IN TENNESSEE** - Dr. D. M. (Pete) Gossett, Dean, Agricultural Experiment Station, University of Tennessee, Knoxville, TN.

9:00 AM **OVERVIEW OF AGRICULTURE IN KENTUCKY** - Dr. C. O. Little, Associate Director Agricultural Experiment Station, University of Kentucky, Lexington, KY.

9:20 AM **URBAN IMPACT ON THE UNIVERSITY RESEARCH UNITS AT N. C. STATE UNIVERSITY** - Ms. Ivey S. Daughtridge, North Carolina State University, Raleigh, NC.

9:40 AM **BREAK**

9:50 AM **PANEL - ORGANIZATIONAL STRUCTURE AND FUNCTION OF BRANCH STATIONS: STRENGTHS AND WEAKNESSES -**

Arkansas - Dr. W. C. Loe, SW Research & Extension Center, Hope, AR

Florida - Dr. W. E. Waters, University of Florida, Agricultural Research and Education Center, Bradenton, FL

Georgia - Mr. Robert B. Moss, University of Georgia, SW Georgia Branch Station, Plains, GA.

N. Carolina - Mr. R. D. Coltrain, Peanut Belt Research Station, Lewiston, NC.

Texas - Dr. James Stansel, TAMU Agricultural Research & Extension Center, Beaumont, TX

11:30 AM **MEMBERSHIP QUESTIONNAIRE RESULTS** - Dr. Jere McBride, Red River Research Station, Bossier City, LA.

Monday, February 6, 1984

11:45 AM **BUSINESS MEETING** - Dr. Bill Webb, Chairman-Presiding

AGENDA - Election of Officers
Discussion of Membership Questionnaire

12:00 PM **LUNCH**

1:00 PM **BUS TOUR** - Dr. Joe W. High, Jr., Middle Tennessee Experiment Station, Spring Hill, TN

1:00 PM - Depart Opryland Hotel
1:30 - Tour Nissan Truck Plant, Smyrna, TN
3:45 - Tour Middle Tennessee Experiment Station (different tour for women)
5:00 - Tour Rattle and Snap Farm (cocktail hour)
6:30 - Banquet (sirloin strip and trimmings)
8:30 - Return to Opryland Hotel

Research Center Administrators Society
Biloxi, Mississippi

Monday, February 4, 1985
Convention Center - Room 16

Gary Elmstrom, Chairman

8:00 AM **REGISTRATION** - Dr. Robert Freeland, Plateau Experiment Station, Crossville, TN.

8:30 AM **CHAIRMAN'S REMARKS** - Dr. Gary Elmstrom, Agricultural Research Center, Leesburg, FL.

8:40 AM **OVERVIEW OF AGRICULTURE IN MISSISSIPPI** - Dr. R. Rodney Foil, Director, Mississippi Agricultural and Forestry Experiment Station, Mississippi State University, Mississippi State, MS.

9:10 AM **OVERVIEW OF AGRICULTURE IN MISSOURI** - Dr. Kenneth Schneeberger, Assistant Director, Agricultural Experiment Station, University of Missouri, Columbia, MO.

9:40 AM **RESEARCH PROJECT PLANNING** - Dr. Lee Mason, Resident Director, Southeast Research Station, Franklinton, LA.

10:00 AM **BREAK**

10:30 AM **THE TEAM APPROACH TO GETTING THE JOB DONE** - Mr. J. W. Dobson, Jr., Superintendent, Georgia Mountain Branch Station, Blairsville, GA.

10:50 AM **RESEARCH DIRECTION ON BRANCH STATIONS IN NORTH MISSISSIPPI AS INFLUENCED BY EXTENSION-PRODUCER ADVISORY COMMITTEE** - Dr. Joseph R. Johnson, Superintendent, North Mississippi Branch Experiment Station, Holly Springs, MS; and Dr. Hiram Palmertree, Superintendent, Pontotoc Ridge - Flatwoods Branch Experiment Station, Pontotoc, MS.

11:10 AM **MOTIVATING TEAM MEMBERS FOR PRODUCTIVITY** - Dr. W. Nelson Philpot, Resident Director, Hill Farm Research Station, Homer, LA.

11:30 AM **CHAIRMAN REMARKS AND ADJOURN**

Monday, February 4, 1985

1:15 PM **BUS TOUR** - Mr. E. G. Morrison, Brown Loam Branch Experiment Station, Raymond, MS.

1:15 PM **DEPART BROADWATER BEACH HOTEL** - Tour Mississippi Gulf Coast Marine Industry.

5:30 PM **SOCIAL HOUR** - Westside Community Center, Gulfport, MS.

6:00 PM **BANQUET** (shrimp boil) - **BANQUET SPEAKER** - Dr. Louis N. Wise, Vice-President, Agriculture, Forestry and Veterinary Medicine, Mississippi State University, Mississippi State, MS.

7:30 PM **RETURN TO BROADWATER BEACH HOTEL**

Tuesday, February 5, 1985

8:00 AM **VICE-CHAIRMAN'S REMARKS** - Dr. Norman Justus, Southwest Missouri Center, MT. Vernon, MO.

8:05 AM **APPLICATIONS OF MICROCOMPUTERS ON BRANCH STATIONS** - Mr. Steve Micinski, Instructor, Red River Research Station, Bossier City, LA.

8:40 AM **USE OF WORD PROCESSORS ON BRANCH STATIONS** - Mrs. Phyllis S. Frye, Administrative Assistant, Hill Farm Research Station, Homer, LA.

9:00 AM **LOUISIANA AGROCLIMATIC INFORMATION SYSTEM** - Mr. Richard Thompson, Research Associate, Agricultural Engineering Department, Louisiana State University, Baton Rouge, LA.

9:30 AM **KEYS TO SUCCESSFUL COORDINATION AND INTEGRATION OF FIELD STATIONS** - Dr. Donald Hegwood, Dean, College of Agriculture, University of Maryland, College Park, MD.

10:00 AM **COUNTERPRODUCTIVE FACTORS WITHIN AGRICULTURAL EXPERIMENT STATION SYSTEMS** - Dr. William A. Young, Resident Director, Calhoun Research Station, Calhoun, LA.

10:20 AM **BUSINESS MEETING** - Dr. Gary Elmstrom, Chairman, presiding.
AGENDA - Election of Officers and Presentation of Bylaws.

1:30 PM **COMPUTER DEMONSTRATIONS** - Dr. Jere McBride, Resident Director, Red River Research Station, Bossier City, LA.

Research Center Administrators Society
Orlando, FL

Monday, February 3, 1986
Room: Lake Room

Norman Justus, Chairman

8:00 AM **REGISTRATION** - Dr. Jere McBride, Resident Director, Red River Research Station, Bossier City, LA.

8:30 AM **CHAIRMAN'S REMARKS** - Dr. Norman Justus, Southwest Missouri Center, Mt. Vernon, MO. **Presiding:** Dr. Robert Freeland, Plateau Experiment Station, Crossville, TN.

8:40 AM **OVERVIEW OF FLORIDA AGRICULTURAL RESEARCH** - Dr. James Davidson, Assistant Dean, University of Florida, Gainesville, FL.

9:10 AM **IN SUPPORT OF THE UNIVERSITY MISSION.**

A. The Education Continuum

1. Involving High School Students in the Educational Process.
   a. C. V. Tart, Jr., Assistant Director, Div. Res. Stations, Raleigh, NC.
   b. Dr. Neva Olsen, Director, School of Home Economics, LSU Agric. Center. Baton Rouge, LA.
   c. Dr. Norman Justus, Supt., Southwest Missouri Center, Mt. Vernon, MO.

10:10 AM **BREAK**

10:30 AM 2. Involving Adults in the Educational Process Through Field Days - John Bradley, Supt., Milan Expt. Sta., Milan, TN 38358.

10:50 AM **B. Seeking Sources of Funds** - Dr. B. B. Webb, Agronomy Research Stations, Stillwater, OK.

11:10 AM **C. Representing the University While Living In a Changing Community** - Dr. Joe High, Jr., Supt. Middle Tennessee Experiment Station, Spring Hill, TN.

11:30 AM **FUNCTIONS OF RESEARCH CENTER ADMINISTRATOR EXECUTIVE COMMITTEE** - Dr. Gary Elmstrom, Agricultural Research Center, Leesburg, FL.

BUSINESS MEETING - Presiding, Dr. Norman Justus, RCAS Chairman

12:00 PM Chairman's Remarks and Adjourn

Monday, February 3, 1986

1:00 PM BUS TOUR AND BANQUET - Presiding: Dr. Gary Elmstrom. Leave by bus from Sheraton-Twin Towers, north entrance.

2:00 PM ARRIVE DOVER, FLORIDA AREA. Tour U.F. Research Center and/or strawberry production.

3:00 PM LEAVE DOVER

3:40 PM ARRIVE LAKE ALFRED: TOUR U.V. CITRUS RESEARCH CENTER

4:40 PM LEAVE LAKE ALFRED

5:00 PM ARRIVE AND TOUR DONALD DUCK CITRUS PROCESSING PLANT

6:00 PM LEAVE DONALD DUCK

6:15 PM ARRIVE LAKE REGION YACHT AND COUNTRY CLUB, WINTER HAVEN

7:00 PM DINNER

7:45 PM SPEAKER, DR. H. A. ROBITAILLE, Manager, The Land, EPCOT Center. Topic: "Managing The Land".

9:00 PM ARRIVE SHERATON-TWIN TOWERS.

Tuesday, February 4, 1986
Pinellas/Hillsborough

8:00 AM **VICE CHAIRMAN'S REMARKS** - Presiding: Dr. Jere McBride, Resident Director, Red River Research Station, Bossier City, LA.

8:05 AM **PROFILE OF A RESEARCH CENTER ADMINISTRATOR - RESOURCES AND RESPONSIBILITIES.**

A. R. A. Moore, Upper Coastal Plain Substation, Winfield, AL.
B. Dr. William C. Loe, Southwest Research & Extension Center, Hope, AR.
C. Dr. J. B. Pitner, Pee Dee Experiment Station, Florence, SC.

9:05 AM **TECHNOLOGICAL ADVANCES USEFUL IN CENTER ADMINISTRATION.**

A. Management Area - Howard Malstrom, Research Director, TAMU, Agricultural Research & Extension Center, El Paso, TX.
B. Scientific Area - Dr. Jere McBride. Research Director, Red River Research Station, Bossier City, LA.
C. Service Area - Dr. John Gerber, Grants Office, University of Florida, Gainesville, FL.

10:10 AM **BREAK**

10:35 AM **ISSUES WITHOUT ANSWERS** - Items of general concern discussed informally. May include, but not limited to, topics such as:

A. Ways of communicating with other research centers.
B. Maintaining individuality within community.
C. Problems associated with being isolated from main campus.
D. Land use decisions (income generation versus project use).
E. Selling produce.
F. Applying State and Federal regulations to local employment situations.
G. Controlling damage from wildlife.
H. Impacting the budget process.
I. Other

12:00 PM **ADJOURN**

3:30 PM Optional Special Tour of EPCOT Center. Dr. H. A. Robitaille, presiding. (Meet in area of "The Land" exhibit of EPCOT.)

RESEARCH CENTER ADMINISTRATORS SOCIETY
NASHVILLE, TN

Monday, February 2, 1987
Room: Knoxville B

Robert Freeland, Chairman

8:00 AM **REGISTRATION** - Dr. W. C. Loe, Center Director, Southwest Research & Extension Center, Arkansas Agricultural Experiment Station, Hope.

SESSION CHAIRMAN - Dr. Robert D. Freeland, Superintendent, Plateau Experiment Station, Tennessee Agricultural Experiment Station, Crossville.

8:30 AM **RESEARCH CENTER ADMINISTRATOR'S SOCIETY CHAIRMAN'S REMARKS** - Dr. Robert D. Freeland.

8:40 AM **OVERVIEW OF THE TEXAS AGRICULTURAL EXPERIMENT STATION** - Dr. Neville P. Clarke, Director, Texas A&M University, College Station.

9:10 AM **FIELD DAY PANEL DISCUSSION**

Dr. Gary W. Elmstrom, Professor, Agricultural Research and Education Center, University of Florida Institute of Food and Agricultural Sciences, Leesburg, Panel Moderator.

Dr. Richard Mattus, Assistant Superintendent, Southwest Missouri Center, Missouri Agricultural Experiment Station, Mount Vernon.

Dr. Richard D. O'Barr, Resident Director, Pecan Research - Extension Station, Louisiana Agricultural Experiment Station, Shreveport.

Mr. James W. Dodson, Jr., Superintendent, Georgia Mountain Branch Station, Blairsville.

10:00 AM **SPECIAL RECOGNITION** - Presented by Robert D. Freeland.

10:15 AM **BREAK**

10:30 AM **STRESS MANAGEMENT** - Dr. Kenneth N. Anchor, Peabody College, Vanderbilt University, Nashville.

12:00 PM **LUNCH**

Monday, February 2, 1987

SESSION CHAIRMAN - Dr. Howard Malstrom, Center Director, Texas A&M University Agricultural Research and Extension Center, El Paso.

1:00 PM **DON'T RUN SCARED ON PERSONNEL PROBLEMS** - Dr. James D. Netherton, Assistant to the Dean for Personnel and Affirmative Action, Oklahoma State University, Division of Agriculture, Stillwater.

1:30 PM **ADMINISTRATIVE LIABILITY AND RISK MANAGEMENT** - Mr. David McCleod, Attorney, North Carolina State Department of Agriculture, Raleigh.

2:15 PM **BREAK**

2:30 PM **RESEARCH MANAGEMENT PANEL DISCUSSION** - Dr. Howard Malstrom, Panel Moderator.

Dr. Hiram D. Palmertree, Superintendent, Pontotoc Ridge - Flatwood Station, Mississippi Agricultural Experiment Station, Pontotoc.

Dr. Will E. Waters, Center Director, Gulf Coast Research & Education Center, University of Florida Institute of Food and Agricultural Sciences, Bradenton.

Dr. Charles R. Long, Resident Director, Texas A&M University Agricultural Research and Extension Center, Overton.

Dr. Joe A. Musick, Resident Director, Rice Research Station, Louisiana Agricultural Experiment Station, Crowley.

3:30 PM **ENHANCING COMMUNICATION, MOTIVATION, AND PRODUCTIVITY** - Dr. W. Nelson Philpot, Resident Director, Hill Farm Research Station, Louisiana Agricultural Experiment Station, Homer.

4:00 PM **ANNUAL BUSINESS MEETING**

7:00 PM **BANQUET** - Details to be Announced.

Tuesday, February 3, 1987

7:00 AM **TOUR OF NISSAN PLANT** - Bus to Depart at 7:00 AM, Breakfast in route - Dr. Joe W. High, Jr., Middle Tennessee Experiment Station, Springhill.

10:30 AM **RETURN TO OPRYLAND**

11:00 AM **GENERAL SESSION** - Southern Association of Agricultural Scientists.

12:00 PM **LUNCH**

Room: Jefferson B

SESSION CENTER CHAIRMAN - Dr. Jere McBride, Resident Director, Red River Research Station, Louisiana Agricultural Experiment Station, Bossier City.

1:00 PM **DIMINISHING BUDGETS** - Dr. R. Rodney Foil, Vice President for Agriculture, Forestry, and Veterinary Medicine, Mississippi State University, Mississippi State.

1:30 PM **HAZARDOUS WASTES - REGULATIONS AND COMPLIANCE** - Sussie Riddle, Representative, Environmental Protection Agency, Region 4, Atlanta, GA.

2:00 PM **FRUSTRATIONS OF THE HAZARDOUS WASTE ISSUE** - Dr. David Teem, Assistant Director, Alabama Agricultural Experiment Station, Auburn.

2:20 PM **BREAK**

2:35 PM **CONFRONTING THE HAZARDOUS WASTE ISSUE** - Dr. Vernon Perry, Assistant Dean, University of Florida Institute of Food and Agricultural Sciences, Gainesville.

2:55 PM **STORAGE FACILITIES FOR PESTICIDES AND HAZARDOUS WASTES** - Mr. Ed Shaw, International Consulting & Design, Inc., Shreveport, LA.

3:15 PM **A SYSTEM FOR MANAGING HAZARDOUS WASTES** - Mr. Ed Shaw, International Consulting & Design, Inc., Shreveport, LA.

3:45 PM **DEMONSTRATION OF SYSTEM**

Research Center Administrators Society
New Orleans, LA

Monday, February 1, 1988
Room: Versailles

Jere McBride, Chairman

7:30 AM **REGISTRATION** - Mr. Ed Worley, Superintendent, Northwest Georgia Branch Station, Calhoun.

SESSION CHAIRMAN - Dr. Jere McBride, Resident Director, Red River Research Station Louisiana Agricultural Experiment Station, Bossier City.

8:15 AM **RESEARCH CENTER ADMINISTRATOR SOCIETY CHAIRMAN'S REMARKS** - Dr. Jere McBride.

8:20 AM **OVERVIEW OF THE LOUISIANA AGRICULTURAL EXPERIMENT STATION** - Dr. Oran Little, Director, Louisiana Agricultural Experiment Station, Louisiana State University, Baton Rouge.

8:40 AM **PERSPECTIVE ON THE LOUISIANA AGRICULTURAL EXPERIMENT STATION** - Dr. Nelson Philpot, Resident Director, Hill Farm Research Station, Homer, LA.

GRANT AND CONTRACT FUNDING

9:00 AM **PUBLIC SECTOR** - Dr. J. D. Dodd, Assistant to the Director for Grants and Contracts, Texas Agricultural Experiment Station, College Station.

9:40 AM **PRIVATE SECTOR** - Dr. James Watson, Agronomist and Vice President for Customer Relations, The Toro Company, Minneapolis, MN.

10:05 AM **BREAK**

EMPLOYEE RELATIONS AND RIGHTS

10:20 AM **EMPLOYEE MOTIVATION** - Dr. A. J. Turgeon, Head, Department of Agronomy, Pennsylvania State University, University Park.

10:50 AM **EMPLOYEE MOTIVATION** - Dr. Charles Laughlin, Associate Director, Human Resource Management Division, Louisiana State University Medical Center, New Orleans.

11:20 AM **EQUAL EMPLOYMENT OPPORTUNITY** - Mr. Gary Hirokawa, Acting Director, Human Resource Management Division, Louisiana State University Medical Center, New Orleans.

12:00 PM **LUNCH**

Monday, February 1, 1988

1:00 PM **TOUR** - Bus departs for Baton Rouge. Tour of museums and historical sites in New Orleans-Baton Rouge area.

6:00 PM **COCKTAILS** - Burden Research Plantation, Baton Rouge.

7:00 PM **DINNER** - Burden Research Plantation, Entertainment by Dave Pettijean, Cajon Humorist, Crowley, LA.

9:00 PM Bus departs for New Orleans.

11:00 PM Arrive New Orleans.

Tuesday, February 2, 1988

Room: Grand

SESSION CHAIRMAN - Dr. Bill Loe, Center Director, Southwest Research and Extension Center, Hope, AR.

8:30 AM **BIOTECHNOLOGY IN AGRICULTURE** - Dr. Fred Davidson, College of Veterinary Medicine, University of Georgia. Athens.

9:15 AM **SALES CROPS AND REVENUES AT BRANCH STATIONS PANEL DISCUSSION** - Dr. Bill Loe, Panel Moderator.

Dr. Glenn Taylor, Resident Director, Wes Watkins Agricultural Research and Extension Center, Lane, OK.

Dr. A. M. Schubert, Superintendent, Plant Disease Research Station, Yoakum, TX.

Dr. Tom Evrard, Center Director, Northeast Branch Station, Keiser, AR.

10:30 AM **BREAK**

11:00 AM **GENERAL SESSION** - Southern Association of Agricultural Scientists.

12:00 PM **LUNCH**