PROCEEDINGS OF THE 1990 PROGRAM OF THE RESEARCH CENTER ADMINISTRATORS SOCIETY

February 5 and 6, Little Rock, AR

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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College of Agriculture and Home Economics
Arkansas Agricultural Experiment Station
Southwest Research and Extension Center

Membership
Research Center Administrators Society
Southern Association of Agricultural Scientists

Dear Members:

Continuing the custom or tradition of a "State of the Society" letter, I am in agreement with past chairmen, that our organization has grown and is currently a much stronger organization. More involved members in each eligible state are needed to keep RCAS growing in number and influence and more people promoting agriculture will help improve our image to farmers and the consuming public.

Even though we have grown, I would offer the following challenges to the members and potential members of the RCAS group:

(a) Actively promote agriculture research and its value to our nation and world.
(b) All state representatives to be active in all executive committee meetings, promote RCAS in the home state, and promote attendance to the annual meeting.
(c) Promote an active membership in each eligible state.
(d) Keep agriculture administrators informed of RCAS activities.

As a collector of one-liners the following seems appropriate: "The greatest waste in the world is the difference in what we are and what we could be", Sunshine Magazine. What we can be as individuals in RCAS will certainly be a waste if we do not do our best to continue to grow and become what we could and should be as an association and as leaders in agriculture. The growth and development of individual members in RCAS will determine RCAS's influence for good in the future.

The privilege of serving as Chairman has been a significant event in my professional development and has allowed me to make friends and contacts that will continue to enrich my life in the future.

The RCAS has been as meaningful to me as any professional organization in which I have been active as a Research Center Director. I am sure that I gained more personally than I was able to contribute, but I appreciate the opportunity to serve as chairman in 1989-1990.

Sincerely,

Wm C Loe

William C. Loe
Center Director
1989-1990 Chairman

The University of Arkansas is an equal opportunity/affirmative action institution.

Acknowledgements

Every year the Proceedings become much easier to prepare and complete. This is due primarily to the authors of these articles who have gone to the trouble of preparing their text, not only on hard copy, but also on word processor diskette. Our gratitude is also extended to Ed Worley, program chairman, who made certain that the speakers prepared the final copy of the talk.

For the third consecutive year we wish to thank Mrs. Rosa Maese who formatted and typed final copies, duplicated copies and collated for the printer. We also thank other members of the Society for their help and support in the many ways they have done so. It is a great pleasure to work with all of the eager, willing and helpful members of this organization.

Editorial and Publication Committee.

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ARKANSAS AND AGRICULTURAL RESEARCH

Preston E. LaFerney
Vice President for Agriculture
University of Arkansas, Fayetteville, AR 72701

I would like to welcome you to my home state, Arkansas...a state with a rich agricultural past and traditions; and a state that will have a prominent role in providing both raw and processed food products throughout the country and the world in the next decade.

One hundred years ago, the state's agricultural economy was based primarily on cotton and apples. Today Arkansas is diversified in animal and crop agriculture, forestry and fish. Arkansas is the leading state in the production of broilers and rice. The state produces more than 40 percent of the rice grown in this country. Arkansas ranks second in catfish production, fourth in turkeys and cotton, sixth in eggs and seventh in soybeans. Arkansas also has a strong forestry industry, contributing 1.5 billion dollars annually to the state's economy. This diversification of plant, animal and forestry products allows the state's economy to maintain a steady course during times of recession and economic depression.

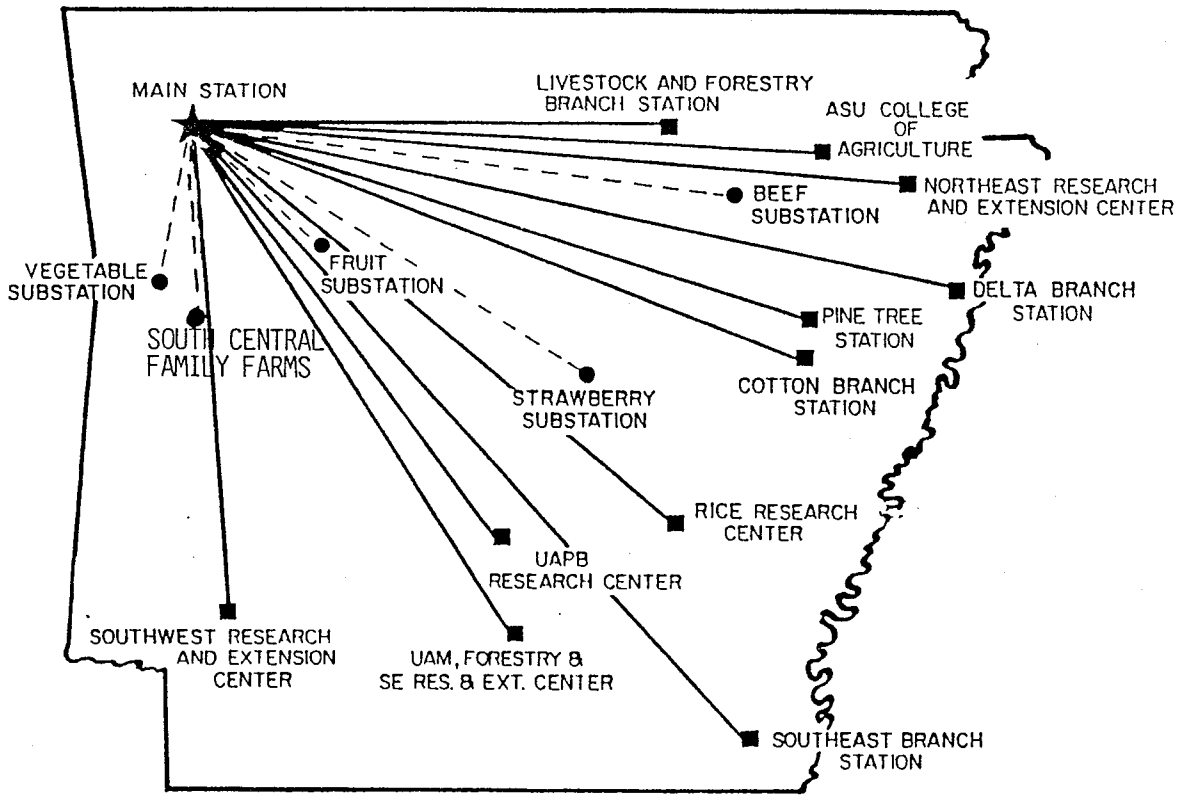
I wish to present a brief overview of the organization of the state's Agricultural Experiment Station. I will also show you how the agricultural and forestry industries complement the state's natural resources and how the Arkansas Agricultural Experiment Station keeps our producers competitive, our environment safe, and our citizens secure.

The Agricultural Experiment Station in Arkansas is the research component of the Division of Agriculture, which is one of the six campuses of the University of Arkansas. The headquarters for the Station are located on the land-grant campus in Fayetteville. The Station has 16 outlying research units located throughout the state, including 9 branch stations and 3 research and extension centers (Figure 1). Each research and extension center has both research and extension personnel, many on split appointment, with a director who manages program and personnel in close cooperation with appropriate academic department heads and extension section leaders.

The Station also has research facilities at two other campuses of the University of Arkansas. These include the agriculture and aquaculture programs at the University of Arkansas at Pine Bluff, the state's 1890 institution, which is celebrating its 100th birthday this year. The 1890 station is managed as an integral part of our state-wide system of research and extension. There is also the forestry research program at the University of Arkansas at Monticello.

The Station has cooperative programs with the USDA Small Farms Research Center in Bonneville and with Arkansas State University at Jonesboro. Arkansas also is fortunate to have cooperating scientists with the USDA Agricultural Research Service stationed at our Rice Research and Extension Center in Stuttgart. Dr. Jerry Musick is the Station director and also the dean of the College of Agriculture and Home Economics in Fayetteville. Each research facility is managed by a resident director, who reports to the Station Director.

Fig. 1. Location of 16 outlying research units.



Our faculty are proud to live and work in Arkansas, a state rich in natural resources; mountains and rolling hills; the delta in eastern Arkansas; and abundant water supplies. The state can be divided into three distinct regions. There's the mountainous upland, which comprise the Ozark and Ouachita Mountains, sometimes referred to as the northern and western Highlands. The dominant forms of agriculture in this region include poultry, which is the largest employer in the state; livestock, which is dominated by cow/calf operations; and food processing, which includes poultry, fruits and vegetables.

To the east, where the Mississippi River separates Arkansas from Tennessee and Mississippi, is the Mississippi Valley plain, known as the Delta region. Crop agriculture is the prime economic base here. Cotton, rice, soybeans, wheat, corn and grain sorghum can be found throughout this region. If you travel by air over this area you will notice hundred of ponds for raising catfish and other related aquaculture enterprises.

The third region is the Gulf costal plain, an uneven forested region. Almost half of Arkansas is wooded, 24 percent is in crops and 17 percent in pastures. Pasture land supports a $400 million beef-cow industry, and a $100 million dairy industry. Keeping our farmers competitive is a primary goal of our research programs, and that includes applied research in production agriculture.

Finding solutions to today's production problems through plant breeding, better pest control or new farm management practices is critical to the livelihood of our producers. We will continue our efforts in this area. Our researchers will develop the basic research necessary to meet the challenges of tomorrow, but we will not forget the immediate needs of our farmers and ranchers.

Following the lead of the state's highly structured poultry industry, the state's swine industry is one animal sector that is projected to expand dramatically in the years ahead as local food companies begin further processing of pork products. This area of food processing promises to be a major force in the state as we move into the 21st century. It's important to emphasize that producing the raw product is just one, albeit a very important one, component in Arkansas agriculture. The second and key factor to economic growth and development in the state is adding value to that product...food processing. This sector refers to those manufacturing establishments engaged in the processing of agricultural commodities, such as Tyson Foods, which is engaged in processing broilers; and Riceland Foods, which is engaged in milling rice; and Allen Canning Company, processor of horticulture products.

To illustrate the importance of food manufacturing to Arkansas' economy, from 1973 to 1987, the food processing industry provided 98 percent of all the new manufacturing jobs in the state. The non-food manufacturing sector grew by only 2 percent. Food manufacturing now has become big business in Arkansas, and it will continue to provide a major employment role in the future. But it's growth will be measured to a large extent through research, primarily in the area of food safety--one of our key research thrusts.

The Agricultural Experiment Station is in the second year of a multi-million grant from Congress to improve the safety of processed poultry, pork and beef. Arkansas coordinates the project with researchers at Kansas State and at Iowa State Universities. Researchers are developing new methods to isolate and detect food poisoning bacteria along the food chain, from the producer to the consumer; and then find ways to keep the product free of contamination. Protecting the health and safety of consumers is our responsibility as scientists.

Another primary area of research involves our water supplies. Arkansas is blessed with abundant water resources, including numerous lakes, streams and rivers, as well as large underground water supplies. The principal river is the Mississippi, which has five tributaries. The most important of which is the Arkansas River. Surface water in Arkansas has increased dramatically in the last 50 years as a result of several public works projects for flood and erosion control, navigation and irrigation. Yet the state's most bountiful source of water is rainfall, almost 50 inches per year.

As in many other states, water resources - as abundant as they are in Arkansas - are not equally distributed throughout the state. And that presents the Agricultural Experiment Station with an environmental challenge for the 1990s. It is yet another of our major research thrusts.

The challenge is to provide sufficient amounts of surface or ground water to agriculture, industries and municipalities in times of droughts and other

crisis conditions; and to use and protect this resource more effectively so future generations can be assured of a safe and reliable source of water for years to come. We will address the water issue on two fronts, politically and scientifically.

Politically, we will work with several constituencies, elected officials, and commodity organizations to develop regulations that comply with the state water law that will result in a more efficient allocation of water in the state. In research, our scientists will continually evaluate the impact of pesticides on surface and ground water quality. The Experiment Station has on-going nationally recognized program in the development of septic systems and waste-water treatment. Agronomists and agricultural engineers also are evaluating methods to utilize litter from the state's poultry industry more efficiently.

Water is the life blood of agriculture. We are committed to see it continue to flow, free of contamination, to meets the needs of our citizens today and our great grandchildren tomorrow. Keeping our water resources natural and free of contamination also will help develop one of the state's newest industries--that being the tourism-retirement industry.

Thirty-six of the state's 75 counties, mostly in non-metropolitan areas, have been designated destination-retirement counties. This holds much potential for the state's economy, particularly in rural areas. Our economists and rural sociologist work closely with private developers, and with state and local governments to develop more effective strategies to incorporate retirement into their economic planning. Using good farming management techniques, and following appropriate manufacturing and forestry practices will keep this retirement option a viable economic opportunity for rural Arkansas.

In keeping with the state's motto, the Natural State, we have made great strides to develop alternative and biological pest control strategies. This is another of our major research thrusts. Our commitment in this area is strong, both in dollars and in human capital.

Our new center for alternative pest control will focus on the use of naturally occurring organisms, such as fungal pathogens, viruses, bacteria and predators. The Experiment Station already has identified naturally-occurring fungi for the control of the weeds northern jointvetch and the Texas gourd. Researchers also have released a new species of lady beetles to control scale in ornamental plants and the Russian wheat aphid. The development of new biological controls for weeds, plant diseases, insects and nematodes will be integrated with our current programs in integrated pest management and in plant breeding. But besides alternative pest controls, we will be investigating alternative crops to provide a wider range of enterprise choices for our producers and to keep them competitive in the future.

When one thinks of alternative crops in Arkansas, horticultural crops usually come to mind. Horticulture is one of the fastest developing agricultural sectors in the United States, growing an average of 10 percent a year during the 1980s. In Arkansas, growing horticultural crops isn't new. The state ranks in the top 20 in the production of grapes, peaches, strawberries, pecans, tomatoes, snap beans and spinach. Station scientists are investigating the possibility

of producing horticultural crops in areas that have primarily been in cotton, rice and soybeans. The climate in Arkansas allows our farmers to produce vegetable crops throughout the year. This area holds much potential as a viable alternative.

Our commitment to develop new enterprises includes both raw and processed products. Since the 1960s, Station researchers have been instrumental in developing a blueberry and seedless table grape industry, and we are always looking for new crops, such as Shiitake mushrooms.

Our strength rests in our people...our faculty and staff, our farmers and producers, our business leaders and our consumers. They are supportive of our research programs and want to work with us. The state's commodity organizations, the farm bureau and the research and promotion boards work closely with our Station researchers and help us identify specific needs in agricultural production today and tomorrow. It's now up to us, our researchers, to keep them well supplied with the technology that they deserve to be competitive in the next century.

PESTICIDE RESIDUE PROGRAMS
"HOW SAFE IS OUR FOOD SUPPLY?"

Robert L. Gordon, Director
Food and Drug Protection Division
North Carolina Department of Agriculture
Raleigh, NC 27611

On behalf of the North Carolina Department of Agriculture and Commissioner Jim Graham, I would like to thank you for the opportunity to participate in your conference. It is a privilege for me to be here and consider your invitation a desire to ensure that fresh fruits and vegetables entering commercial channels are safe, wholesome, and free from illegal residues, especially pesticides and sulfites. The sharing of ideas, knowledge, and avenues of communication is essential if we are to meet our common objectives of protecting the food supply and ultimately the health of the consumer. It is also extremely important that we dispel the preconceived idea that there is a problem with our fresh commodities and/or food in general.

My invitation to speak to you requested that I address the division's pesticide programs relating to fresh fruits and vegetables; however, I feel compelled to mention sulfiting agents as well. On June 24, 1985 the North Carolina General Assembly ratified a bill entitled "An Act To Ban The Addition of Sulfiting Agents to Certain Food." The act became effective October 1, 1985. The legislation deems a food to be adulterated when a retail or wholesale establishment has added sulfiting agents including sulfur dioxide, sodium sulfite, sodium or potassium bisulfite and sodium or potassium metabisulfite, separately or in combination to any fresh fruits and/or vegetables intended for retail sale or consumption as fresh food products that will not undergo further processing. A working interpretation includes frozen fruits and vegetables sold as fresh fruit and vegetables (such as those placed on a salad bar).

Sulfiting agents have appeared on the FDA GRAS list since 1958 (GRAS list means a list of food additives generally recognized as safe) and were used on fresh fruits and vegetables to slow the development of off-flavors and color changes caused by chemical reactions that take place when foods are exposed to oxygen, moisture, heat or certain enzymes. The North Carolina Department of Agriculture initiated the action to ban the use of sulfiting agents on fresh fruits and vegetables to be sold at retail because the Federal Food and Drug Administration had received more than 500 complaints from consumers who had experienced adverse reactions (bronchial hyperactivity, nausea, diarrhea, headaches, and dizziness) and had documented 13 deaths which had been attributed to the consumption of fresh fruits and vegetables containing sulfiting agents. Deaths were due to anaphylactic shock.

The reason I am addressing the sulfiting agents is because, to my knowledge, more documented illnesses have been linked to sulfiting agents than to pesticide residues on foods. However, there are individuals and associations who are going to great lengths to misinform the public and apply political pressure to force state and federal agencies to expend resources to expand pesticide programs that will not enhance the safety of our food supply or further protect the consumers.

The net result of such unwarranted practices will ultimately cause either a shortage of fresh produce or an increase in prices.

Contrary to common belief, most of the fresh fruits and vegetables tested by the North Carolina Department of Agriculture, The Food and Drug Administration, and other states have shown little or no detectable pesticides residues. A vast majority of the products have been free of any pesticide residue. Additionally, a recent survey of apples, apple juices and infant foods containing apples revealed that all but one product was free from alar. That one product contained an extremely low amount of alar (4 ppm, whereas the tolerance is 20 ppm).

The Food and Drug Protection Division of the North Carolina Department of Agriculture has two sections which have specific pesticide programs (the pesticide section and the food section). Each of the sections is supported by the laboratory section which is among the best in the country.

To give you an overview, last year (1989) the division performed approximately 8,000 food and drug inspections, 6,500 pesticide inspections, and the division laboratories analyzed the following number of samples and performed the following determinations on these samples:

Microbiology -	Samples Assigned:	12,000
	Determinations:	40,000
Food -	Samples Assigned:	25,000
	Determinations:	40,000
Pesticide -	Samples Assigned:	6,000
	Determinations:	9,000

The Division totals were - samples assigned: 60,000; determinations: 316,000. These do represent, however, fertilizer and feed sampling as well.

The pesticide section's primary functions are to regulate the use, application, sale, storage, disposal and registration of pesticides. Pesticide applicators and consultants are subject to licensing requirements (we are in the process of recertifying over 50,000 private applicators at this time). Routine inspections are performed to ensure that pesticides are administered by licensed applicators, that pesticides are used according to label directions, that pesticides are stored safely, that pesticide containers are properly disposed of, and that pesticides are applied only to targeted areas. In addition to the inspections, all complaints of pesticides misuse are investigated. Violations are documented and, when warranted, evidence is presented to the Pesticide Board which has the authority to assess civil penalties up to $2,000 and/or suspend, modify, or revoke licenses.

The North Carolina Department of Agriculture <u>does not promote the use of pesticides</u>. <u>It does promote the safe use of pesticides</u> and the programs of the pesticide section of this division are developed and administered to make certain that registered pesticides are used according to label directions. The food

section administers ongoing raw agricultural commodity sampling programs to make certain that marketed products are free of illegal pesticide residues.

Annually, more than 39 North Carolina grown agricultural commodities are randomly sampled during the growing season from the fields just prior to being harvested. In the early spring, we start in the mountains with cabbage and follow the harvest season until it ends, i.e. sampling and testing strawberries, blueberries, etc. and end up in the mountains again with apples. Commodities that contain illegal pesticide residues are embargoed to prevent further harvesting and marketing of the adulterated commodity. Disposition of the adulterated commodity is agreed upon by the grower and the department. In most cases, the commodity is plowed under.

The Division's pesticide residue program is not limited to North Carolina grown commodities. Division inspectors randomly collect raw agricultural commodities from wholesale distributors and retail outlets having quantities that can be traced to the point of origin. When detected pesticide residues approach the tolerance level, additional samples are taken for analysis. The Federal Food and Drug Administration and the government agency in the state from which the commodity was grown are notified of our findings and they in turn initiate their investigations in that state. Commodities containing illegal residues are embargoed and destroyed (in the state of their origin).

We are proud of our pesticide programs and the support that we have received from FDA and other state program directors. We have received support as needed and are confident that appropriate action has been taken by these other states and the FDA to help protect the North Carolina consumer.

The Division's pesticide program includes raw milk, milk, and milk products. Every milk tanker is sampled semi-annually and if pesticide residues are detected, individual farms or producers are sampled and tested. Adulterated milk and milk products, when detected, are embargoed and destroyed.

On April 5, 1989 the Institute of Food Technologists released their report entitled "Assessing the Optimal System for Ensuring Food Safety; A Scientific Consensus." Forty-one scientists representing eighteen professional societies contributed to the report with the primary purpose being to evaluate the safety of the American food supply. They concluded that the American food supply is among the safest in the world--this despite a popular misconception that it is unsafe. They also concluded that current state and federal legislation is adequate to protect the consumers.

Many of us are concerned over the public's misconception of the risks associated with foods and the fact that these misconceptions create political pressures that are unwarranted. We must work together to develop a means to counter the public misconception of risks associated with pesticide residues. Most states are now coordinating their pesticide residue programs with the Federal Food and Drug Administration District offices to ensure wider coverage. The problem is our efforts to educate the public will be challenged by self-serving groups. I ask each of you to make an earnest effort to educate to public that you come in contact with as to the true picture, i.e. that our food supply is wholesome and safe.

SAFETY OF OUR FOOD SUPPLY - AN INDUSTRY PERSPECTIVE

THIN LINE - FEAST OR FAMINE

James R. Hudson, Vice President
ICI Americas, Agricultural Products
Wilmington, DE 19897

Film - Joshua in the Box

We could spend days just analyzing what each of us saw in Joshua. I ask you to accept a simple interpretation of Joshua and how it relates to this meeting. We're all in our own box with our own perceptions. Whether we represent the government, university, environmental group, farmer or the chemical industry, we all operate in our own box with our own view of the world and how we'd like it to be.

What I would like for you to do is step out of your box to take a look at some issues and common problems that face all of us. These are major problems that can't be addressed or solved if we are looking out from a box formed from our own personal perspective or limited from an agenda that has only one goal in mind. Let's step out and take a look around.

Our common problem is producing adequate and safe food while protecting the environment and paying the farmers a fair return. Without getting into my box too deep, I'd like to spend a few minutes on how the agricultural chemical industry is providing tools necessary for the farmer. I will use ICI as an example of how the agricultural chemical industry is assisting in providing for both quality and quantity of food production while protecting the land and the environment.

ICI is the third largest agrichemical company in the world and fifth largest in the United States. We market our products in 150 countries worldwide with overall company sales of $21 billion annually. Around $2 billion come from the sale of agricultural products. How we get our sales and provide stewardship service is as important as the final sales figures. Our company has a strategic mission and I want to share that with you because as a company we had to break out of our neatly defined box and address the bigger issues.

We at ICI and the agricultural chemical industry as a whole have clearly heard the concern of the public, our stockholders, our employees and our customers. There is increasing consumer concern for the quality of our water, air and food. "In our capitalistic system, when your customer speaks, you better listen." These concerns must be addressed on a candid, open basis with additional research using the latest technology and information.

At ICI we spend over $1 million per day on agricultural research (approximately 50% of these research funds are directed to environmental areas). Just as important as the dollars spent is the increasing management recognition of the environmental and social responsibility of our company. In the past year, ICI has beefed up our strategy to include increased recognition of leadership

in environmental concerns, stewardship and safety. We also have established an overall purpose or vision for ICI Agrochemicals which is "help farmers feed the world."

I believe we can all agree this corporate vision is the same as yours and we all need to refocus our attention to feed a hungry and growing world. I hope this bit of information on ICI was not too commercial. It should provide some insight into the fact that changes are happening in the way we produce food and protect the environment, and it is the recognition of this change that is vitally important. Let's look at a few facts on why change from all of us is essential.

Most of us in this room operate from a box that is comfortable and well stocked. We are fortunate to live in a country so well fed that we spend over $30 billion a year on dieting.

When you leave your box and look at the world, you see a thin line between feast or famine, and this is the problem that faces all of us in the coming decade and beyond.

- Approximately one billion people go to bed hungry every night.
- 500 million of those are considered chronically malnourished.
- Fifteen million children worldwide die each year from starvation.

Ladies and gentlemen, I'm not sure how many of you have personally seen starving humans - if you have you won't forget it!! We need to focus our $52 billion USDA budget and brain power on how to provide farm incentives to produce food and to export food versus our current boxed in thought process of non-production. Unfortunately most of our current resources are diverted incentives for non-production supported by some in government, universities and environmentalists. Let's get out of that box!

Take a look at the single key fact that affects all of us. Our world population is expanding at an unprecedented rate. The world population will continue to grow at a record rate. In 1880 there were 1.2 billion. In 1980 we had 4.5 billion people to feed. By the year 2000 that figure is estimated to be 6.1 billion, and not so far down the road, in the year 2050, the earth's population is estimated to reach 11 billion.

The problems so far in this presentation are clear. We in the U.S. are overfed and setting the standards for the world population which is hungry now and growing. We face a real challenge. In addition, as the population grows, our agricultural base remains constant or in cases of urban encroachment, it declines.

Let's look at the earth as if it were an apple. Slice it in quarters and take away three quarters--that represents the part of the globe covered by water. Take the remaining quarter and peal away the skin--this represents the fragile layer of topsoil that produces most of our food. This skin is about six inches deep. From that skin cut away one-third for forests and woodlands. Next cut away another third representing urban and other land that is too steep, too hot or cold, too salty or too rocky to cultivate. Then cut away one-quarter of the peel--this is permanent pastureland that provides some food through grazing, but

not great quantities. What you have left is about seven percent of the earth's surface that is suitable for cultivation.

What you have left is the small portion of our globe that produces the majority of the food for our growing population. And the part of the patch that resides in the United States gets reduced each year. Since 1950 we have decreased our crop acres by nine million and we're losing more each year to urban encroachment. This is probably our most successful farm program for the reduction of production!

How do we feed the growing population and also protect that little slice of the apple? Serving humanity and serving the environment are not mutually exclusive, eve though in many instances they are set up as choices against each other. We can and must protect the environment--it is in all of our interests to do so--let's get the dramatic fear tactics out and focus on how we can also increase the productivity of agriculture to feed a hungry world through improved technology, science and education.

The stumbling block to the whole process rests in part with the desire of some to create a "risk free" environment. Technology in this instance is being used as a two-edged sword. it is through advances in technology that we have increased agriculture production so dramatically in this country in the past 30 years. It is also through technology that we can pinpoint substances to "parts per trillion." And this is where the dilemma and the dramatics lie. This is where we box ourselves in with the concerns over measurement of parts per million or billion of a substance found in food. It's also where Hollywood dramatics can effectively create fear in our society.

With evolving technology we are pushing the old concept of absolute zero (or zero chemical residues that some environmentalists and consumers advocates who say they represent us all demand) further from our reach. Let's put it all in a term we can identify - a second. One million seconds would take 11 1/2 days to tick by. A billion seconds would take almost 32 years and a trillion seconds equals 32,000 years. Yet, because we can measure infinitesimal amounts of almost any substance, we seem to equate detection with hazard. Because a substance is present, does not make it harmful. It is the dose that makes the poison.

Chlorine in concentrated form is one of nature's most deadly poisons. There was resistance some fifty years ago to adding chlorine to the water supply. But, science has discovered that small quantities--added to water actually destroy diseases and infection while being safe to man. What people in the early years objected to as "enforced medication" and involuntary exposure is now an accepted risk for better health. Thank goodness Hollywood did not have TV or we might not have safe water supply today.

There are hundreds of examples of common chemicals necessary for personal health and productivity. Sodium chloride -- better known as table salt is something we all have on our dinner table. A shake or two is good but a handful or two can kill us. One or two aspirin can be of great benefit but the whole bottle can kill us. Are all important chemicals safe to use and handle--given the right dose? All can be deadly in the wrong amounts. Our fear of chemistry, science and technology must be put in perspective. Again, we must break out of

the short, tunnel vision box and look at the real benefits of technology to agriculture and our quality of life.

It isn't all bad. We live longer than previous generations. Since 1900, the average life span in the United States has increased from 47 years to 75 years and increasing. We have nearly doubled our life span. Much of this is due to the quality and quantity of food we enjoy. It's also due to the efficiency of agricultural production which now allows 98 percent of the population to concentrate on luxuries in life and as we are doing here today, take time to attend meetings and think about the future. Going without food for a few hours rearranges your schedule and priorities.

We in the U.S. should also have a great deal of confidence in our regulatory agencies (EPA an FDA). They are not perfect but they are considered world leaders in regulations to assure a safe food supply. We must be concern about our environment, because if we abuse it, we lose our ability to feed ourselves. But, our focus should not be on limiting our inputs and limiting our outputs, but our focus should be on increasing our ability to grow more food and paying farmers for their efforts.

Today, we as Americans spend only 11 percent of our income on food. Probably 50 percent of this is at McDonald's or Kentucky Fried Chicken. The benefits of our food production system are real. Our technology has produced and continues to produce new tools to help the farmer create quality and quantity food. Quantity is what counts.

As I stated earlier, too much of our $52 billion USDA budget goes to encouraging non-production. We need to change that and pay for production--pay farmers for producing food, not pay them for watching over idle acres. I don't have the solution to how to do this but if I had $52 billion and the brain power in this room, I'm sure we could find a solution! We must <u>be diligent to make sure LISA, IPM or alternative agriculture don't become the next farm programs encouraging or even enforcing non-production</u>.

How do we balance our stewardship of the environment while coaxing mother nature into producing more? We continue doing the job that private industry and government have done through basic research and extension programs. Here are just a few examples of how industry and government are jointly addressing some problems.

- One of our greatest tasks is already being addressed through soil conservation programs. Soil erosion is the greatest threat to our small piece of the world designed for cultivation. Worldwide each year we lose 26 billion tons of topsoil. U.S. farmers lose 2 billion tons of topsoil. Technology has and will play a vital role in correcting this problem. We need weed control measurements, special equipment and a cultural practice rotation that helps us No-till or "Farm Ugly" as we like to call it at ICI. Just a side point, <u>ICI</u> spends more to promote <u>"No-till" technology than the Government spends on LISA</u>. This is the way our capitalist system should work.

- We need to continue discovering new chemical compounds that are more specific in control, but pose little risk to the environment. We now have chemicals that are applied in ounces, and even grams per acre instead of chemicals that were applied in gallons and pounds some twenty years ago.

- We need to apply chemicals with precision delivery systems (tools) like the Electrodyne sprayer that actually charges the particles being sprayed so those particles attach themselves to the plant instead of the ground. This sprayer was designed by ICI and is being used in many countries around the world.

- We need to use more postemergent chemicals that are applied to the target weed plant and not to the entire field. We need to continue emphasis on precision application like banding and spot spraying to reduce the amounts and costs of pesticides used.

- We need to continue our work into crop rotations that improve pest control and increase yields without an added increase in inputs.

- And we have to forge ahead in the field of biotechnology where we envision wrapping the entire seed in protection that will last throughout the growing season. We will need biotechnology to help provide the quantum leap in production equal to that of the green revolution.

- And most importantly, we will need to have these tools ready for the farmer and to jointly train him to use them in the safest and most productive way--both for the farmer and the environment.

The tools we have today allow farmer to practice IPM, LISA or whatever. Farmers are already practicing low input agriculture and will continue to improve their methods as science and education provide them with better tools. We must never lose sight that systems like IPM are management tools that work best on an individual basis, not mandated by government to be used in all cases. Let's eliminate the dramatics and put agriculture back in the hands of sound good science.

In summary, I would like for you to remember a few facts as seen from our box in the U.S.A. versus the world box.

<u>U.S.A. Box</u>

- 30 billion spent on diets
- highly regulated and safe food supply
- 11% of income spend on food
- agriculture world standards are set in U.S.A.
- 2% of population
- $52 billion spent emphasizing reduced production

World Box

- o 1 billion go to bed hungry
- o 15 million children starving
- o food requirement doubles with population growth
- o 7% land resource is shrinking

Accomplishing our goal of helping farmers feed the world is going to take a joint effort from all groups and we all have a great task ahead of us. I believe John F. Kennedy summed up our situation succinctly in a 1963 speech to the United Nations when he said "never before has man had such capacity to control his own environment, to end thirst and hunger, to conquer poverty and disease, to banish massive human misery."

I extend to you a sincere invitation to work together to meet the challenge of producing food for tomorrow, the next decade and the next century. The world "literally" depends on us to look outside our box.

FUTURE OF STATE FUNDING OF AGRICULTURAL RESEARCH

A Legislative Perspective
Robert Adley, Chairman, House
Appropriations Committee, Louisiana Legislature

As a Louisiana legislator, it might be appropriate to begin my address by telling a story. I don't know how many of you know it, but George Washington was originally from Louisiana. One day as a young lad he cut down a pine tree in his backyard. His father upon seeing the downed pine tree asked George, "Did you cut down this tree?" George looked his Dad in the eye and said, "Yes Dad, I cannot tell a lie, I cut down that pine tree." Whereupon his father said "That's fine son. Pack your clothes, we're moving to Virginia. You'll never make it in politics in Louisiana."

I do want to share some truth and a lot of realities with you in the course of my discussion. Some of what you hear, you might agree with and like; other you might not like. I will share only my experiences in Louisiana. The foremost question you want me to address is why, when spending cuts are necessary, do we usually attack agriculture. You also want me to relay my thoughts on how you might change this unfortunate situation.

I became chairman of the Appropriations Committee in Louisiana 2 years ago at a time when the state hadn't had a balanced budget for 8 years. Our past debts amounted to $1.5 billion. Our total budget was only $4 billion and of that $2.7 billion was dedicated and could not be reduced. Therefore, I had $1.3 billion of discretionary funds to deal with a $1.5 billion deficit.

My initial investigations indicated that Louisiana spent more per capita on our government but taxed lowest per capita of all the southern states. Our taxes on business and industry were very high. The obvious result was that Louisiana was spending more than they were taking in taxes, especially on individuals. However, people don't like higher taxes so we began to look for programs in the budget we could cut.

It was obvious that many cuts could be made and they were. Today, 2 years after we began, we spend $141 per capita less than the southern state average. This represents over $600 million in lower spending. On the one hand, a politician enjoys telling this to taxpayers, but on the other hand it is not so pleasant to tell the constituents who are having budgets cut. The Agricultural Complex in Louisiana has absorbed $7 million in cuts and lost 350 jobs since 1985.

The FY 90 budget in Louisiana is $4.4 billion with a projected $855 million shortfall. Likewise, the amount of discretionary funding is $1.6 billion. The universities and agricultural centers, police and fire departments, teachers, prisons and correctional institutions, mental institutions, and welfare recipients are clientele who are funded from the $1.6 billion discretionary funds. Why is agriculture cut? This is pretty simple. A politician won't be re-elected if he cuts budgets of all the other folks.

We all know what agriculture means to your state and to my state. It is environmentally sound, replenishes itself and is critical to our state economy. Why can't you help me get the votes to stay in office to help you? The truth is that the general public does not know about you. The general public thinks that when I talk about ag centers I have a group of farmers standing around their cows shooting the bull with me. They don't know.

Your problem is like that of a lot of groups. You restrict yourself and your discussions to your ag research and your ag colleagues. You stay inside that box and you talk only shop from your perspective with your allies. You don't deliver the message to the public.

There are two things I think you people involved in ag research need to do. First, you need to let people know who you are and what you can do. Second, you have to reconcile the fact that there are no free rides in government any more.

Let me illustrate that last point. We used to raise about $1.5 billion annually from taxes on the oil and gas industry in Louisiana. Today, their taxes provide about $400 million. We lost over $1 billion in tax revenue when that industry became depressed. Prior to that, Louisiana had a free ride at the expense of oil and gas. We had the lowest taxes and highest expenditures in the South. Now we have a situation where the people have to pay for their government, pay for their services.

We have had to develop a leaner and more efficient government. The people are now getting their money's worth. However, we have another problem that a balanced budget today won't immediately correct. We have been stagnant, in deficit, for 6 years and we now have a desperate need for new programs and growth, not only in government but also in the private sector.

The free ride in Louisiana was over. We put together a package called "Fiscal Reform." This essentially restructed our tax base and shifted the burden of taxation to those people who had jobs and made individuals more responsible to pay their fair share. This proposal was submitted to the people for approval and we received over 40% favorable response. All urban areas in the state passed the measure, but every one of the rural areas voted against it.

The areas represented by the ag centers and their $47 million budget voted against it. As a politician and chairman of the Appropriation Committee, I was left to conclude that my major career goal should be to do away with the ag centers. This of course brought about an avalanche of protest and I decided there had to be a better way to deal with the rural vote.

The lesson we need to heed is that there are no longer any free rides -- not for any segment of the population. For some reason those folks from the rural areas refuse to accept this truth. You can't on the one hand say I want it, and on the other say I'm not willing to pay for it.

One of the messages I want to convey to you is that you need the public to understand that government does what it does because you are part of government. There are strength in numbers and you in ag need to get on board. I don't think that has occurred in Louisiana.

I also don't believe we need to just talk about taxes to keep you alive. I am a strong believer in user fees. What is a user fee? If your kid goes to college, he pays a user fee called tuition. At LSU tuition pays for about 30% of the cost to educate a kid. The Louisiana ag center which uses $47 million tax money only raises $2 million in outside funds. Those are user fees.

Some of the industries in Louisiana -- soybeans, crawfish -- contribute money to the ag centers because they benefit from the research. But one of the industries which benefits most from the ag centers -- the timber industry -- contributes nothing. There are no free rides and at some point the ag centers are going to have to help themselves -- if they are to survive. Your legislature is willing to help you help yourself if you are willing to try. It is far preferable to the alternative -- a tax increase.

Many of the ag industries claim they are providing jobs and this justifies their not directly supporting the ag centers. Well, to do that they have to be making money. They must participate in helping fund the technology production that allows them to make money. There are no free rides in government in the present days of tight budgets. You, the taxpayers, deserve good management of your money but beyond that nothing is free.

The second point I want to share with you is that your message to the public is critical. You don't spend nearly enough time explaining the economic development and jobs that you create. People don't know or understand what you do. You don't want to hear this, but they don't know because you don't work hard enough or smart enough to get the message across.

You have a message to deliver and its not being done. You have to work with government officials to assure that there is enough money available to get the job done. You can't have your cake and eat it too. You can't sit out there and draw your paycheck and not help us acquire those funds.

I want to close with a story -- a story which tells us a lot about life. An old man, a little boy and a donkey were on their way to town one day. They were both riding on the donkey. As people passed by they said, "Now isn't that terrible. Those 2 people riding on that beast of burden!" So the old man got off the donkey and walked.

Soon passersby began to say "Can you believe that! That child, young and healthy making that poor old man walk behind that donkey." So the old man said to the child, "I'll ride, you walk." Pretty soon people along the way began to say, "Can you believe that! That man with all of this maturity and strength rides while that child walks."

The old man made the child get off and they both walked. Soon people began to comment, "Now that is really stupid. Somebody could be riding that donkey." The old man, exasperated by this time, told the child that they would carry the donkey. They picked up the donkey, hoisted it on their shoulders and as they crossed a bridge, they lost their balance.

They vainly tried to grab the donkey but he fell -- over the side of the bridge into the water where he drown. The moral of that story is important to remember for all occasions. "If you try to please everybody -- you will surely lose your ...!"

ENHANCING RESEARCH AND EXTENSION RELATIONSHIPS

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INTRODUCTION

Thanks for the opportunity to talk with you about enhancing research and extension relationships at land-grant universities. I was a member of this group from 1978 to 1988 while serving as superintendent of the Pontotoc Branch Research and Extension Center and Northeast Branch Experiment Station, both located in northeast Mississippi. I was on your program last in 1986. During this time, you allowed me to serve as Mississippi's representative to the Board when your present name and by-laws were adopted.

You serve an important function in the land-grant system. You are located where the "action" is -- where the "rubber meets the road." You are located at a point where the information you collect and share is scrutinized daily and where the people with whom you come in contact are the same people you see day after day. You know what accountability means when you serve as a branch center staff member or as a county agent.

Perhaps I was chosen to present this topic because of my background. I spent five years on the MSU campus in research; 12 years on campus as an extension specialist; 10 years on a branch research station; and the last 15 months as director of the Cooperative Extension Service.

ENHANCING RESEARCH AND EXTENSION RELATIONSHIPS

It's important that we recognize that all of us, or most of us, represent the land-grant system. We all represent the university and are trained by the same people, regardless of the job we now hold with the university. The Ph.D. degree is a research degree, and all with this terminal degree are trained in research. Let's recognize and remember that most teaching and extension skills are developed, not taught. We specialize after our degrees are received based on our interests and inherent abilities.

Some people can perform all the functions of teaching, research and extension, but it takes special skills to perform all three well. Most of us can perform one or two of these functions satisfactorily. That's why we must specialize with "on the job training" after we receive our basic research training.

After we receive this specialization through on the job training, we begin to see some differences arise. Jealousy, ego, protectiveness, lack of team effort, personalities all develop as we proceed with our careers. These differences are caused in part by differences in pay scales and different work hours. It's unfortunate that these differences arise because we all should be interchangeable and should support each other according to the philosophy of the land-grant system.

SPECIFIC CHANGES IN MISSISSIPPI

The examples I'll use today are the specific things we have done in Mississippi during the last three years, and especially the last 12 months. Right or wrong, your program committee asked me to report on what we have done.

First you need to understand some background information. The budget crunch hit Mississippi in 1986 and the extension budget was reduced by $2.9 million (state funds). Since 90 percent of our funds go for salary and fringe benefits, we were forced to lay off 106 employees. The research budget was reduced also, but that reduction was taken primarily from commodities and contractual services, with a minimum of personnel numbers.

The number of farms in Mississippi have been reduced from 55,000 to 41,000. The average farm size is getting larger; now averaging 324 acres. The farmers remaining are the good ones and they are paying the bills. They expect more technical information than before and they want more planning work and less salvage work. We have to be more accountable and we have to respond quicker than in the past. Commercial farmers expect answers to their questions within 8 hours. They now have other alternatives if we don't respond.

We decided at Mississippi State that we wanted to continue to be leaders in commercial agriculture. We had to look at positioning ourselves for the next 25 years. To accomplish this we had two major obligations: response to clientele and employee career development.

Dr. Rodney Foil became vice president for agriculture, forestry and veterinary medicine in 1986. He appointed a committee to develop a 25-year strategic plan for the division, which consists of the College of Agriculture and Home Economics, the College of Veterinary Medicine, the School of Forest Resources, the Forest Products Utilization Laboratory, the Division of International Programs, the Agricultural and Forestry Experiment Station, and the Cooperative Extension Service. This focus study titled, "Focus on a Better Future," was completed in 1987 and contained 30 pages of recommendations.

During this time period, retirements and promotions permitted Dr. Foil to appoint all new unit heads. Dr. Verner Hurt became experiment station director; Dr. Dwight Mercer became dean of the vet school; Dr. Bill Fox became dean of the college of agriculture and home economics; Dr. Ron Brown became associate vice president; and I became director of extension.

These unit heads, along with Dr. Foil, make up the Division Council. We function as a team and meet weekly to take care of division business. The regular communication is a key to teamwork at the director level.

RECOMMENDATIONS IMPLEMENTED

We implemented some of the recommendations contained in the focus study. I appointed an internal organizational structure committee for extension, which included one research person. Some of the major changes made in the division are:

Comprehensive Departments. Starting in 1988, comprehensive departments consisting of extension, research and teaching were organized. The department heads have joint appointments, ranging from 10 percent to 50 percent extension. In these departments, an extension leader and a research coordinator are optional leadership positions.

To date all but three departments have been combined. Those not combined are agronomy, forestry and plant pathology. Some department heads came from research and some came from extension. Staff members in departments also can have joint appointments, some three-way, some two-way. However, most are single appointments.

Research and Extension Centers. Three kinds of Research and Extension Centers have been established with a fourth in the planning stage. Different organizational structures are established based on needs and local conditions and situations.

The North Mississippi Research and Extension Center at Verona is headed by Dr. Pat Bagley. Dr. Bagley has a 75 percent research and a 25 percent extension appointment. The center has no other joint professional employees at present. Two joint secretaries serve the research staff along with six extension specialists. One Area Extension Office is located at the center.

The Central Research and Extension Center at Raymond is headed by Mr. Gene Morrison. Mr. Morrison has a 75 percent research and a 25 percent extension appointment. This center is located on the Hinds Community College campus located 15 miles south of Jackson and five miles from the Brown Loam Experiment Station. A memorandum of understanding was signed between the presidents of Hinds Community College and Mississippi State University. A memorandum of agreement was also signed between Hinds, research and extension for operation of the center. The staff consists of four joint employees and two joint secretaries. The staff has faculty privileges at the college, a farm for conducting demonstrations and a teaching staff at the college they can draw from. Our staff also is available to help the college when needed.

The Coastal Research and Extension Center at Biloxi is headed by Dr. David Veal. Dr. Veal has a 50 percent research and a 50 percent extension appointment. This center combines a redfish research unit, a sea food processing laboratory operated jointly with the National Marine Fisheries Institute, the extension sea grant office, five county staffs and five extension specialists. Dr. Joyce O'Keefe is assistant head and coordinator of extension activities. Some staff members have joint appointments.

The Delta Research and Extension Center at Stoneville is in the final planning stage. Dr. Dave Ranney is head with an assistant to head and coordinator of extension activities ready to be announced. In addition to researchers, the center has 11 extension specialists and two area extension offices.

Extension Districts Changed. Four extension districts were reorganized into 10 areas. The 16 district staff members (four per district) were reduced to 10 area directors (one per area). The savings from this reorganization will result in $280,000 that can be redirected to other areas.

SOME DISADVANTAGES

The many changes we have made have been uncomfortable to some employees. Most of us resist change. For this type situation to work, a commitment is required from all administrators. These changes dictate a major deviation in the way of doing business. It takes time for the mind set to change. In the comprehensive departments, specialists can use the joint appointments as an excuse not to be productive or not to accept new challenges. I'm sure scientists can too. Some of the best agricultural producers who have been getting one-on-one help from specialists get nervous about this type help continuing.

These changes require a good public relations job; more bookkeeping and accounting procedures; and more communication with administration and all employees. An evaluation system also must be implemented. In some departments, it means moving specialists to other buildings across campus, rather than housing them all in one extension center.

SOME ADVANTAGES

This type organization structure pleases our decision makers at the county and state levels. The centers place administration at the local level and provide a better image of togetherness in the state. The centers also move specialists closer to county agents, the major point of program delivery. The organization allows a back-up system for quick response for county agents and clientele. We can provide expertise on short notice without employing additional personnel. And task forces can move in and out on an annual basis or as needed.

The organization provides an improved teaching component immediately. The system will attract more grant money with a broader interdisciplinary team approach and provides a better mechanism for preparing publications and educational materials. It allows a job description change to increase enthusiasm for 60 percent of employees who probably wouldn't change positions otherwise. Courses in administration teach that changes are needed about every five years.

The organization should encourage sabbaticals for additional training and help employees move from one unit to another. It enhances personnel development and career enhancement and hopefully improves extension-research relationships.

SUMMARY

I have listed what we have done to enhance research-extension relationships. It requires change and it requires good attitudes. You certainly don't need to change just for change sake. You should address the needs, the issues and determine your objectives. Then realign to achieve the objectives in the shortest period of time possible.

Be sure to bring in key political leadership and make sure you have employee input. Develop a plan, announce the plan and don't compromise, but be willing to make adjustments as needed. Allow room for administrative mistakes, but don't delay implementation once announced. Continue to communicate with employees, monitor progress, stay close to all levels and set a good example.

ENHANCING RESEARCH AND EXTENSION RELATIONSHIPS

By Ben U. Kittrell
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In the comic strip, Pogo, it was said "We have found the enemy and the enemy is us." We can become our own worst enemy when we curse the other fellow with whom we should be working. As a Vo-ag teacher, I heard other ag teachers curse county agents and I heard agents curse Vo-ag teachers. When I became an Extension Specialist, I heard specialists curse the county agent and agents curse the specialists. I also heard the specialist and agents in Extension curse the researchers and the researchers curse the Extension workers. Why should we be cursing each other when we are all working for the same clientele - the consumer.

At the Pee Dee Research and Education Center, we have eight Extension Specialists with 100% Extension, six research scientists with 100% research and three scientists with both Extension and Research appointments. We have moved from complete separation to complete integration since 1985 when we moved into our new building.

I believe that we must all admit to certain basic beliefs if we intend to weld research and Extension into a workable team:

- Those in research and Extension are equally important.
- Extension is dependent on research for factual information.
- Research is dependent on Extension for adoption by growers of research findings.
- We must recognize and allow for differences in personalities, travel, types of publications, schedules and clientele between research and Extension personnel.
- Research and Extension both serve the same ultimate audience - the consumer.
- Extension is better able to bring recognition to a researcher's efforts.
- Higher Administration must be committed to both segments working together.

Clemson University is committed to enhancing a cooperative relationship of these two important areas of a Land Grant Institution. The following examples are several of the things we are doing at the Pee Dee Research and Education Center to help:

- Make it easy to interact. Both research and Extension in the same building has helped greatly.

- Placing research and Extension counterparts in offices as close together as possible has allowed informal discussion and ideas to surface more frequently.

- Research and Extension faculty counterparts sharing the same secretary will not only help to understand each other's programs, but should help the secretary to become more knowledgeable and understanding and thus serve more efficiently.

- Serving on committees together help to enhance the importance of each person through the invitation and opportunity to express ideas and feel a sense of contribution and commitment to the group as a whole.

- Regularly scheduled faculty meetings provide the opportunity for all to feel equally important in expressing their ideas and concerns and help in the decision making process.

- Billing and accounting in one office creates an atmosphere of one unit even though research and Extension funds are kept separately.

- Encourage research scientists and Extension specialists to work cooperatively on both research and Extension endeavors.

- Encourage Extension and research counterparts to make grant proposals together and share the funds.

- Invite agents in to help with plans for field days, tours, etc. where they will be later involved. They should not be left out of the planning stage and be expected to bring in the growers later.

- Have a special time to bring agents in for indepth discussion of research being conducted.

We have not solved all of the problems, but we will never solve them by going our separate ways and continuing to curse each other. We need each other and time is too short to waste the talents of both research and Extension workers while we quibble about the frivolous.

ENHANCING RESEARCH AND EXTENSION RELATIONSHIPS: A DEPARTMENTAL ADMINISTRATOR'S VIEW

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Introduction

A number of land-grant universities are planning celebrations of their centennial year and the Cooperative Extension Service is celebrating its 75th birthday. These anniversaries represent monumental accomplishments in which we in agricultural research and education may take great pride. At the same time, we must redouble our efforts to ensure that we are delivering relevant products and programs.

The motives for establishing the research and extension missions of the land-grant system were explicit. Creation of this nationwide academic infrastructure brought the United States to global leadership in food and fiber production and in a remarkably short span of time. That this progress did not come easy is an understatement. Most of the benchmark achievements required overcoming seemingly insurmountable technological barriers. Yet, the greatest challenge to agricultural research and education was issued during the last decade or so. That challenge lies in reconciling societal concerns, learning to adapt to a dynamic sociopolitical environment and reinstating agricultural research and education as a national priority.

Our challenge then, is adjusting to a radically changing functional environment common to both the State Experiment Stations and Extension Services. We must anticipate changes, and then deal with them in the context of various givens including: support for programs continues to dwindle, the historical entitlement (formula funding) is not only diminishing in real terms but is steadily giving way to competitive granting systems; and local support has been reduced in many states. Faculties in general have grown older and may opt to comfortably argue the issue(s) as being frivolous with little or no intention of adjusting to deal with them. At the same time, enrollments in agriculture are decreasing and there is concern that we face a shortage of qualified agricultural scientists in the near future.

And likely most important, the sense of urgency to meet the world's needs for food and fiber has yielded to concern over environmental disturbances. Fears over excessive environmental perturbation, some perhaps only perceived and others real, include an array of issues such as global warming, reduced biodiversity, and water quality. Although agriculture is not necessarily cited as the sole cause of negative environmental change, it invariably appears as a prominent suspect.

These and other issues dictate that we in agriculture must change the ways in which we go about our basic business of research and education. I have every confidence that the agricultural technology system will rise to the tasks at

hand; indeed, changes are already apparent. Universally, administrators continue to develop strategies to deal with this changing environment.

At no time in our history has strategic planning been more important. A first and logical step is to consider internal relationships with an eye toward becoming more efficient and more relevant to our grassroots clientele and to society in general. In this regard, an emergent issue is internal relationships between research and extension. I submit two propositions for consideration in planning realizing that there are others of equal importance.

1. Institutional identification typically supplants functional responsibilities. The average farmer and rancher identifies first with the institution, the University, not the Experiment Station nor the Extension Service. He/she does not care to differentiate between agencies when searching for the answer to his/her real-world production problem; rather the expectation is that the institution will respond positively. This is especially true when the search for information goes beyond the local level where the county extension office or research station enjoys greatest day-to-day visibility. I believe this perception to be even stronger with the average citizen in the nonagricultural sector.

At no time in the past has the grass-roots support for agricultural research and education programs been more important. Administrators must work to enhance the visibility and acceptance of broad programs and avoid any appearance of competition between research and extension. This calls for a level of coordination and intra-agency communication heretofore not fully achieved in most states.

Research and extension specialists must be brought to, and kept on, "the same page" relative to the state of technology development. We must shorten the time span from creation of technology to the delivery of information about that technology. One example lies in the potential applications of biotechnology. Our clientele and society in general reads and hears about these new innovations and the great promise they hold on a daily basis. Most major universities have launched a research effort in one form or another that relates to biotechnology. However, have we responded through our extension programs to begin educating our publics about the "new" technology? I would guess that in general we have not because of the time-honored philosophy of delivering finished results to our producers. We must become more productive in selling progress by our institutions. Extension specialists must learn to deliver "research progress and prognoses" as effectively as they now deliver research results. They must work to keep our public aware of exciting potentials on the horizon at an institutional level. This, of course, will not be possible unless a concerted effort is made to ensure that our specialists are conversant with the most basic features of emerging technology.

We at Oklahoma State University have attempted with some success to intensify the exposure of area and state specialists to progress in our research laboratories through accelerated technical in-service sessions. These include actual discussion sessions in the laboratories, technical forums using a classroom format, and concentrating on topics such as biotechnology, water

quality and systems analysis. These interactions give the extension personnel a "feel" for research direction and progress. State and area personnel are encouraged to transfer the information, at least in a general sense, to county-level personnel and producers.

However, we must go further to decrease the time lag between institutional activities and public awareness. Extension personnel should be included at the very "front end" of the research process both as sounding boards and for technical input. They should be used as reviewers of research projects and technical research papers and vice versa within and among management units of Colleges of Agriculture. It is not inappropriate to structure research project planning, even for basic research, to include direct extension input. This may be accomplished now with applied research but how often are extension personnel asked to critique ideas leading to investigations in molecular biology or even genetics in general?

2. Field Research is Destined to Become Increasingly Sophisticated, Complex and of Greater Importance. Accepting this proposition implies that the recent emphasis on fundamental technologies is simply a normal prelude to field research. I believe that to be so and continually argue that the "new technologies" will lend even greater importance to field research in the future (Scifres 1989).

We have in the recent past (and still are) spending considerable time in "tooling up" for new research programs in basic biology, systems research, water quality and other areas. Given our finite fiscal means, precious resources have been redirected to accomplish new program development. We have rightly decided that agriculture must play more effectively on the stage of science in the broadest context, especially if we are to garner more resources. Department and college names are being (and many should be) changed to more accurately depict our determination to become more relevant to society as a whole. Yet, those needs and related activities should not purvey that there is some grand plan to abandon our clientele in agriculture. To the contrary, this series of changes should improve our abilities to better serve agriculture.

At no time has it been more important for administrators to share their visions for the future with research and extension faculty. In the absence of the understanding of the underlying motives for change, new faculty in molecular biology, biochemistry, cellular biology etc. have entered our systems too often to work largely in isolation from the context of our mission. This will not serve the overall system well as the time quickly approaches for field testing the new products and presenting them to our clientele. Relationships between research and extension in this setting can best be enhanced by a strategic plan which considers input from both entities and early in the design of research.

I argue, then, that we must simultaneously prepare our field researchers and extension specialists to accommodate the complexities of the new technologies in the settings for which they have been designed. Biotechnology is not the only and certainly not the most immediate example. Emphasis on systems research brings with it all the complexities of interpreting multiple interactions not heretofore faced when investigating the role of single factors in strictly controlled experiments. By its very nature, such research depends upon high

speed computing and its success hinges on development of computer-assisted decision aids, decision support systems and, ultimately, knowledge-based systems. Such ventures rely heavily on heuristics, the daily working backdrop for adapting specialized research information to a specific production setting by an effective extension specialist.

Systems research should embrace extension much more firmly than has past traditional research; there must be progressively closer and direct working relationships between extension specialists and research faculty. Indeed, many of the research activities, to be totally successful, must be three-way joint ventures which incorporate the input of producers as well as extension and research faculty. This need was obviously recognized by those who developed guidelines for competitive grants in low-input agriculture.

Thus, I predict an emerging relationship that will tend continually to fade the traditional lines between research and extension, and create a continuum of activities from the absolute research setting (e.g. the molecular biology laboratory) to the public education activities necessary for providing acceptance of the research product by its potential users. So it should be expected that researchers will become more active than in the past in what heretofore have been labelled as extension activities; and, that extension specialists will become more heavily involved in certain phases of research.

Benefits of the Research-Extension Continuum: Trapping the Synergisms

This idea raises questions concerning management and accountability that may discomfort some administrators. Yet, attention to planning and clear objective statements should allow us to convert the present research-extension symbioses to true synergisms.

This emerging philosophy is in line with the promotion of interdisciplinary activities, which has provided the fodder for numerous presentations during the last two decades. There are pitfalls, as with interdisciplinary research, especially the risk of diluting both functions; but there are also great potential benefits. Although the mechanisms and philosophies underpinning interdisciplinary (more accurately transdisciplinary or even nondisciplinary) research provide guidance for enhancing the research-extension continuum, there are issues unique to the proposition.

First, any lingering (often unstated) myth that extension personnel are "second-class" academic citizens must be dispelled. Indeed, history and mission of our education system have contributed to this situation. Doctoral programs are research programs by design; they do not create extension specialists (nor adequately prepare teachers or administrators). During the research heyday enjoyed for the past several decades, a special effort was made to place the brightest and best into the research track. An offshoot of this emphasis was the dogma that extension was the appropriate track for those who did not meet the lofty research criteria. Fortunately, that dogma has been resisted, especially of late, and some of the most technically competent have (and are) entering the extension arena by choice. Thus, we have available a reserve of technological expertise that is capable of effectively conducting research,

especially high impact research of immediate utility. We need to more effectively utilize that resource to the benefit of extension as well as to research.

The joint appointment is ideally suited to enhancement of the research-extension continuum. This proposition is made in full view of the primary weaknesses of joint appointments; that the faculty may be considered a hybrid who is really neither research nor extension, is expected by administrator to perform 100% in both capacities, and that there are the joint faculty who will try to leverage one function against the other (and consequently not perform well in either role). Certainly I am not suggesting sweeping change that would diminish the important role of the 100% extension specialist or researcher. I do believe, however, that research involvement to some extent enhances all extension functions. Thus, extension personnel, especially those who are subject-matter specialists, should be encouraged to involve themselves directly in research.

Research-extension interaction should be promoted by direct incentives, normally presented in the context of salary and tenure/promotion. However, there are indirect incentives of almost equal importance to direct administrative rewards; for example, access to research equipment and facilities. In this regard, we have worked to make facilities including land on our research stations available for specific extension-research projects. In one case a grazing experiment had been completed and the experimental pastures and grazing animals were left in place with no plan for future use. A work group of extension specialists and research faculty was assembled to propose best use of the facility. The proposal was to convert the experiment to a low-input demonstration and to design the result-demonstration treatment such that various research projects could be superimposed over the demonstration through time. Another research station not in high demand by the research faculty has been largely converted to a result-demonstration for forage production and soil conservation. Future ideas for development include superimposition of research and result-demonstrations of best management practices and water quality.

In another case, we converted a 100% extension position to joint research: extension appointment and moved the holder to one of our research stations. We then adopted the research and extension concept used by several other states for realigning management of the station. This specific test case seems to be working extremely well.

Again these ideas are not presented to frustrate the traditional research and extension obligations Rather, our efforts are directed toward the enhancement of both and, in the process, allow the institution to better serve its clientele. At the same time, these efforts will hopefully strengthen the system's ability to cope with impending change. Certainly, I do not propose that any changes should be implemented abruptly. In most cases progressive change based on careful planning will yield the best result. It is also recognized that a number of programs already embrace these approaches; those efforts should be nurtured.

Summary

I have attempted to build a case for creating a research-extension continuum which would, by its inherent nature, enhance research-extension relationships. This case was built on two propositions: (1) Institutional identification by our publics typically supplants identification by function; and (2) Field research is destined to become increasingly sophisticated, complex and of greater importance. If these propositions hold, research and extension personnel must work together more closely than ever before to create greater public awareness of the value of our programs.

Efforts to enhance relationships might include the following:

1. Research and extension specialists must be brought to, and kept on, "the same page" relative to the state of technology development. Extension specialists should be conversant with basic nature and direction of research well before the final product is to be delivered.

2. Relationships between research and extension in the present setting is characterized by change and uncertainty, and can best be enhanced by a strategic plan which considers joint and equitable input from the respective entities.

3. Systems research should embrace extension much more firmly than has past traditional research; its success will depend on progressively closer working relationships between extension specialists and research faculty.

4. Any lingering (often unstated) myth that extension personnel are "second-class" academic citizens must be dispelled.

5. The joint appointment is ideally suited to enhancement of the research-extension continuum. All extension specialists should be encouraged to involve themselves directly in research. But more is needed than just desire on the part of faculty. Administrative incentives to this end should include more than a general awareness and response in terms of salary adjustment and professional advancement; there should be direct investment of facilities in such efforts.

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NATIONAL INITIATIVE FOR RESEARCH ON AGRICULTURE, FOOD AND ENVIRONMENT

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The Experiment Stations' planning and budget subcommittee has recently completed its quadrennial update on strategic planning for experiment stations. Most work was done last summer by 70 people, 40 of whom were practicing scientists (first time they were involved). Thus, there was an input from a wide variety of professional and scientific societies, and industry. I am encouraged that the contributions from the scientists added much sharpness and crispness to the document.

The other document which has been prepared at the federal level and that I want to discuss in detail is the National Initiative for Research on Agriculture, Food and Environment. This proposal had its primary genesis as a major publication of the National Academy of Sciences National Research Council Board on Agriculture last October. It is a bold initiative which tries to project the important emerging issues and to make a case for substantial infusion of new money into the Agricultural Research Establishment.

Prospects are that this initiative will have as great an impact on the higher education element as it will the research mission. There is a substantial effort to bring new money into the graduate education programs and higher education in general through the USDA. The funding of these areas has been more difficult to achieve than the relatively more glamorous research.

There will be a strong emphasis not only toward basic research but also for the mission linked areas of applied research that can be coordinated with extension. This initiative is perhaps a little more broadly based that some of the USDA Competitive Grants Programs that emphasize basic research. There are good opportunities to support research, extension and teaching components.

The recent emphasis that you have heard from other speakers this morning is of shifting of priorities in agriculture. The biological revolution has given us an opportunity to address some of these shifting priorities. There is a need to increase our international competitiveness, the ability to compete with countries who have a better supply of natural resources and cheaper labor, and with countries which are beginning to make major investments in their agricultural research. Presently, the money available is insufficient to be able to accomplish these things. We hope to address the issues broadly, not only those important to people in agriculture, but also those important to all citizens in the US.

Funding for agricultural experiments stations has not been good. I have been working in this process for the past 10 years. The sum of all efforts by many states have convinced those in Washington that we are unified across the nation, we know what is important and what needs to be done. However, despite this progress, the ability to acquire new funds has been disappointing. We could

summarize the situation by saying that funding efforts have stagnated since the 1970s, traditional methods have been unsuccessful, the government support tends to be crisis oriented, and support for agriculture contrasts with support for the NSF basic sciences initiative.

In comparing funding for basic research over the past 12 years, USDA is ranked last whereas the Health and Human Services budget has been increasing exponentially. This funding is crisis oriented and we have had crises of health issues -- AIDS, cardiovascular diseases, etc.

Our initiative is broad based and directed to adding $500 million to our research funding. It is geared to addressing broad societal issues to restore and preserve the environment and natural resources, to ensure health and well-being of the populace, to enhance international competitiveness and to invest in excellence in science and education. The attitude within this Presidential Administration is toward competitive grants. The funding is proposed to be available to institutions outside as well as inside the land grant community and the federal laboratories.

The general structure of the initiative is linked to the consensus planning of the Joint Council on Food and Agriculture, to the National Ag Research Committee Plan which goes to the Joint Council and is integrated with extension and higher eduction plan.

The 6 elements of the National Academy of Sciences proposal are:

* Natural resources and environment
* Nutrition, food quality, and health
* New products, processes, and value-added
* Markets, trade, and policy
* Animal systems
* Plant systems

The proposal was presented to the USDA last August. It received wide-spread support and $500 million was requested from OMB. The OMB recommended $100 million for FY 91 and $60 million is new money. That represents the biggest increase in funding for any form of agricultural research by an administration in the past 20 years. Further, the OMB has committed to recommend to increase this request to $300 million per year over the next several years. Of course these are recommendations, not appropriations. A coalition, coupled with the land grant institutions is going to ask for a full $100 million increase in research spending for FY 91 in the President's budget.

About 70% of the new money will be targeted to basic science, 40% to individual investigator and 30% for multi-disciplinary approaches. At present, we are well-invested in the applied sciences and badly under-invested in the basic sciences. It is the objective to increase the total USDA funds on basic research to about 25%. Twenty percent of the proposal is mission linked for applied research and 10% is set aside as starter funds for some of the smaller institutions who do not have the inherent national competitiveness of larger ones.

Our strategy for support will continue the type of efforts most state experiment stations have followed. We want to emphasize broad-based planning, consensus and grass-roots support. We are building on the prestige of the report of the National Academy of Sciences. We must always be aware of and try to consider the agendas of the Secretary of Agriculture and the President. International competitiveness and environmental and food safety are important considerations.

We have formed a Coalition for Advancement of Research on Agriculture, Food, and Environment (CARAFE). An Executive Committee is an important part of this venture and consists of a leader of a major university (Dr. Theodore Hullar, Univ. Calif., Davis); an important industry leader (Mr. John Hagaman, Dow Elanco USA); a leader of an environmental advocacy group (Mr. Peter Berle, Natl Audubon Society); a dean of agriculture (Dr. Robert Thompson, Purdue Univ.); a director of a state extension service (Dr. Craig Oliver, Maryland); and a National Initiative Coordinator (Dr. Neville Clarke).

The Coalition is a relatively loose network designed to bring together groups of organizations--industrial, professional and academic--to advocate the initiative. Presently, we have about 140 institutional members, of which 70 are universities (25 are non-land grant). There are about 25 members of professional and scientific societies, industry groups, and umbrella organizations such as the National Agricultural Chemical Association in the Coalition.

The present status includes unprecedented advocacy by the National Academy of Sciences. This is the first time they have publicly and openly advocated a budget initiative. There is strong organization and support within the agricultural university family and the USDA supports the entire $500 million request. The Coalition is organized and joint hearings with the House and Senate were held last fall and were favorably received. The President has included it in the budget as an initiative.

We have established good momentum but we need to keep working. I would hope that any of you who might have an opportunity would speak in support of the Initiative to your elected representatives. We hope to make some progress in the FY 91 Budget and to improve the funding from that point forward.

Some may think that a high cost proposal like this during times of budget deficits is somewhat of a pipe dream. On the contrary, we think we have momentum and have changed some thinking. If all of us will try to do our share to advocate, no matter how we have to do that, this proposal has a good chance of success.

ACQUISITION AND USE OF SURPLUS PROPERTY EQUIPMENT

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The Division of Agriculture, Oklahoma State University is eligible to obtain excess property through Federal Excess Property programs by being associated with the U.S.D.A. in cooperative programs. The Oklahoma Cooperative Extension is eligible through an Act of May 8, 1914 (7 U.S.C. 341 dt seq) and the Oklahoma Agricultural Experiment Station is eligible through an Act of March 2, 1887 (7 U.S.C. 361 a et seq). An act of 1977 (7 U.S.C. 3195, 3196, 3221, and 3222) or the Act of October 10, 1962 (16 U.S.C. 582a et seq), also provides for the eligibility of National Agricultural Research, Extension and Teaching to obtain federal excess property through the Sec. of Agriculture.

The above stated Acts placed the cooperative agricultural programs in a priority rating position immediately below the U.S. Military. Therefore, it was initially recognized by the U.S. Congress the importance of having quality excess property available to the U.S.D.A. in support of Agricultural Teaching, Research, and Extension Programs.

This legislation was enacted many years ago. However, from time to time new administrators or division chiefs of various levels review and evaluate the statutes which in some cases result in differing interpretations. In these cases there is a disruption in accessing excess property through these procedures. The Division of Agriculture has been in a position, during the current accessing program, to obtain excess property since 1980.

The internal process utilized in accessing property is through the Dean and Director, Dr. C.B. Browning who has designated Mr. Ronald Fairchild, Asst. to Dean for Fiscal Affairs as the property manager and accessing coordinator. Mr. Fairchild maintains close contact with the GSA property disposal coordinators throughout the U.S., especially those in the Southern U.S. The departments within the Division of Agriculture advise Mr. Fairchild of the types of equipment needed. He then provides a screening service through which departments are advised when needed equipment becomes available.

Another approach utilized in accessing property is that faculty and staff on occasions will visit excess property locations and screen for needed equipment. In these cases a "freeze order" is initiated through Mr. Fairchild who then, provided he approves the request, processes the necessary documentation to obtain the requested property. Upon the property becoming available, the requesting department then takes delivery and makes assignment to the requesting station or project. Although title does not pass to the acquiring agency, major property is placed on the university inventory; however, disposable property is not placed on inventory. Upon termination of using the reportable property, Mr. Fairchild is notified and he can make arrangements to return to GSA. At that point GSA may take delivery, reassign or ask that the item(s) be disposed of locally in some established procedure.

In the past 10 years the Department of Agronomy and Agricultural Engineering have cooperated in a screening program with personnel located at the South Central Research Station, Chickasha. This is a very convenient location as this is about midway between Tinker Air Force Base, Oklahoma City and Fort Sill, Lawton which is less than 1 hour drive to each. Shepard Air Force Base is only about 1 1/2 hour drive. Mr. Don Hooper, Sr. Station Supt., and Mr. Galen McLaughlin, Mgr. Farm Research Lab. are very knowledgeable of the division's needs and assist Mr. Fairchild greatly in locating needed property. There are several other faculty and staff that occasionally screen for special needs and also assist in the accessing process through Mr. Fairchild.

The assignments made to the Agronomy Department are considered departmental property and are subject to constant utilization review with reassignments made if necessary to maintain utilization efficiency.

There are many types of property obtained in support of the Divisional Programs:

- Farm equipment - tractors, tillage equipment, trailers, trucks, pickups, etc.
- Shop tools and equipment
- Building supplies - lumber, steel, insulation, building packages and kits
- Irrigation equipment - pumps, engines, and pipe
- Petroleum products - oil and lubricants
- Engine cooling system coolants
- Office supplies and equipment

There will be a slide presentation of representative property obtained from excess property sources over the last several years. The acquisition value of property can be approximately $1,000,000 per year depending upon the kinds becoming available. This is a very valuable program to the Division of Agriculture, Oklahoma State University.

ANIMAL WASTE DISPOSAL SYSTEMS

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Some of the systems, philosophies and strategies for animal waste disposal used in North Carolina were developed at research stations and livestock and poultry farms. Some of these technologies are being put into practice statewide to improve efficiency and management. The environmental impact is a primary driving force in the selection of a system. We have also considered ways in which we could derive a return for the waste to help offset the cost of management.

At the branch station, the design has to not only consider the research and demonstration requirements but also the ease of daily use and maintenance. The objective may vary in perspective. The engineer, the animal scientist and the research station superintendent may all have divergent objectives. A facility planned by committee may not provide all of the goals desired by a particular individual.

In planning for these processing facilities, we should also consider the ultimate receiver, which usually is the soil, or the land. Not all land is suitable to receive processed animal waste. Crops differ in their response to and tolerance of these products. We have investigated field crops, grasses (for hay), and even some vegetable crops.

Systems with dairy farms are directed to dry storage to avoid daily hauling. We desire to have containers in which we can store the manure for 30 to 90 days to allow the farmer some flexibility as to when he needs to haul it away. Contamination in streams or water ways is always a problem. We use make of vegetative filtering (running the waste solution through a plant material before allowing it into a stream). We have developed many research demonstrations with grass filters to remove organic materials and nutrients. In order to keep the solids off the grass surface, we flush the waste through a settling basin first. The solids at the bottom are periodically cleaned out and spread onto the land.

The earthen storage pit designed for relatively long-term storage is also popular with dairy farmers. This is not a treatment pond, but a storage area. The material must be handled as a liquid slurry. It is important that the runoff not be collected in the storage pit. This would make the total mixture too thick to run through an irrigation system but also too watery to be able to haul. We recommend that a secondary holding pond or vegetative filter be used.

The holding ponds form a firm crust on top and this protects against odors until the crust is broken. This storage system allows the farmer to put out the fertilizer at the best time to benefit the crops and also allows more efficient use of equipment. These pits also foster the development of custom spreaders who clean out the pits.

Flush systems are now being used more and more in dairies in North Carolina. These systems give the dairy a sanitary look and avoid the problems of moving and scraping large amounts of solids. However, when using a flush system to a lagoon for biological breakdown, the fiber should be largely removed. The fiber does not breakdown readily. A flush system must be designed and constructed properly in order to work properly. The alley must be level from side to side, must have the proper slope and should have adequate water available. We recommend 40-50 gal per day per cow.

One of our new projects incorporates the covering of a lagoon, and collecting and using the methane gas. The gas is used to heat water for space heat. A floating polyethylene cover should be used.

Research on disposal of beef cattle waste incorporates techniques which have been used with swine for years. We put the animals on concrete slabs and flush underneath the slabs. We use a gravity settling basin rather than the mechanical separator as used in the dairy operation. The concrete basin is about 2 feet deep and removes solids well.

Swine systems utilize lagoons which work well in North Carolina because of the favorable climate. The liquid on the top of the lagoon is pumped off 3 or 4 times per year and the fertilizer value is thus sacrificed.

Attention must be given to possible leaking and ground water contamination from lagoons. This is generally not a serious problem but when it occurs, contamination is usually from ammonia nitrogen. When the ammonium is converted to nitrate, the problem exists because nitrate can be leached into the water table. We do not want to have to use plastic liners.

It is important to remember that waste management must begin as the waste leaves the animal. The proper technology must be utilized in the animal building for both animal and worker. The waste should be removed several times per day. The ammonia gas generated by waste can be unpleasant and in many cases damaging to the health of the animal and the worker.

Irrigation can be used in conjunction with settling ponds and pits. Some of the pits were drained and recharged 3 times per week to remove about 18 inches of sludge which accumulated. It took about 2 months to completely clean out the pits.

Results of a good animal waste disposal system can reduce animal mortality and medication and improve the animal's performance. Ammonia gas is usually the problem. The economics of various systems have to consider all of these factors.

Intensive grazing of pastures which have been irrigated with lagoon effluent is commonly done. A lot of the operations in North Carolina, ie. swine, do not have the extensive amounts of land available so they need to put waste on relative small areas. Irrigation on 5 acres of bermuda grass pasture costs about $5000 per year.

Irrigation systems from pit to pasture are done in 1/2 acre paddocks. All animals are moved from paddock to paddock on a daily basis. Cattle love the

fresh grass. Average daily gain is about 2 lbs and $1000 in income per year. Some swine producers maintain cattle only to utilize the pasture grass fed the waste material.

Poultry operations predominantly utilize lagoons. One farm utilizes a greenhouse for drying the manure and then sells it as compost. Turkey manure is of large volume and very high in nitrogen and phosphate. Not much land is suitable for disposal so composting is considered.

In summary, public image, along with technical and management aspects, is an important consideration in animal waste disposal. Environmental issues are extremely important from the standpoint of image. There are methods of manure management which, while not big money makers, can result in at least a break even. Some can be also used productively on pasture and crops.

IRRIGATION SYSTEMS AND EQUIPMENT

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CONSIDERATION FACTORS

Some of the factors which must be considered when selecting an irrigation system are as follows:

* Field size
* Topography/drainage
* Soil type
* Crops to be grown
* Water source
* Energy source
* Labor available
* Cost
* Special requirements to fit research needs

Each of these factors influences the decision on which method or methods of irrigation is best suited for an individual's particular needs.

SYSTEM CATEGORIES

We can classify irrigation systems into four distinct categories:

* Surface
* Subsurface
* Sprinkler
* Micro or drip irrigation

Each of these categories and the included systems or methods will be discussed in limited detail to give some general information concerning each of the systems.

SURFACE METHODS

The most common surface irrigation systems are flood, furrow, and border.

Flood

The flood method is usually accomplished by constructing levees (18" to 24" high) on a contour, such as is commonly done in rice production. The same method is then used on the rotation crop following the rice. For the row crop that is in rotation, the effort is not to maintain the flood but rather to flush across the field avoiding a prolonged flooded condition. Levee gates are installed in each levee and are used to control the water distribution from one bay to another. Flood irrigation is limited to land with slopes of 1% or less and is not well suited for sandy soils but is more applicable on loamy or clay soils.

The levees are usually surveyed on a 0.1′ to 0.5′ vertical interval distance. On flatter ground, the lower ($\leq$.3′) intervals are used, but on steeper areas, higher (>3") intervals are more common to avoid the levees being so close together. Precision graded ground allows for straight levees which enhances flood irrigation by reducing the acreage in levees and providing for better

management of the flood water. Flood irrigation is quite labor intensive due to the levee construction and levee gate adjustments that are required. Levee gates are usually not employed when flood irrigating row crops, but rather the levees are either broken in several places or plowed down in order to distribute water across the field. This too is quite labor intensive with the repairing or reconstructing of the levee that is required.

The suggested irrigation water capacity for flood irrigation is relatively high and ranges from 15 to 25 gpm per acre depending on the soil type. However, there is not a high equipment cost associated with this method and it can be quite effective on row crops which properly managed. Plots can be successfully irrigated with this method, and it can be used to induce or test flood-related effects on crops. There is also a certain amount of land shaping or smoothing that is usually required in order to get the ground surface as uniform as the natural topography allows.

Border

Border irrigation is similar to contour flooding except that the borders are put in a straight line on land that is either level or has a grade. Small (<12") berms are constructed parallel to the water flow direction and spaced 40-80 feet apart. They are used to direct the water through the field rather than to hold the water. The water output requirements are high - 25 to 50 gallons per minute per acre. Again, the land must have a minimal slope (<1%) and sandy soil would not be suitable because water would penetrate before the area could be completely covered unless multiple water inlets are provided down the field.

Border irrigation has been used on forage and pasture crops as well as in orchards. It is not equipment intensive or costly in comparison to other methods; however, it does have a relatively high labor requirement. The water can be quite difficult to manage if the surface grade is not uniform or level, and some areas (highs) may not receive water while other areas (lows) may get too much water. However, it can be quite effective if properly managed, and it can be successfully adapted to plot work if desired.

Furrow

Furrow irrigation can be done on a contour, but most of it presently is done on the grade. Again 1% is the maximum grade which can usually be used and the soils cannot be too sandy. Furrows are constructed between crop rows in the direction of irrigation and are used to irrigate all cultivated crops planted in rows. The water is introduced to the furrows through a ditch or pipe at the high end of the rows. Row lengths less than 1320' generally perform best, but longer rows can be effectively furrow irrigated if properly managed. A well-defined furrow must be maintained with cultivation. Irrigation capacity requirements generally range from 10 to 20 gpm per acre. Furrow irrigation can be a real art form once a person is experienced in what is required to properly irrigate a particular field.

Gated pipe (PVC or aluminum) is the standard method of applying water to the furrows. Operation of the pipe requires a rather high labor commitment

particularly if the pipe has to be moved in order to cover the whole field. A low pressure tubing has become quite popular in the last few years. The tubing material is polyethylene and comes in mil thicknesses of 5 to 10 mil and in diameters of 12" to 22". The tubing will not carry pressures over about 2 psi or run up and down slope changes. However, it works quite well when used on relatively flat turnrows as are usually associated with furrow irrigated fields. Holes (1/2" to 1" diameter) are punched in the tubing to serve as outlets into the furrow and are plugged in order to vary which rows are watered. The tubing is relatively inexpensive but is generally recommended for only year's use and then replaced.

A key factor with furrow irrigation is the precision dirt work that is usually required in order to prepare a field for this irrigation method. Row grades range from 0.1% to 0.5% and cross slopes are usually kept at or below the row slope. This initial dirt work can be quite expensive on undulating fields. Caution should be used if deep cuts are required that could get into a less desirable soil type. However, the precision graded soil surface does enhance surface drainage which is always very desirable in crop production.

Furrow irrigation can be well suited to plot work, and there are certain system automation options that are available and capable of reducing labor and/or improving effectiveness in certain situations (e.g., surge, cablegation).

SUBSURFACE METHODS

Subsurface irrigation is limited to relatively flat, coarse-textured soils and is a situation of primarily managing a water table. One method is to put in underground tile with a dual purpose. It can be used to drain excessive water or lower the water table. When conditions are dry, water can be pumped into the tile to subirrigated. Another method is to plow deep parallel ditches across the field and fill them with water to allow lateral distribution of water for the water table control. This technique can also help to manage salts by moving the salts in and out of the root zone.

The initial cost for the underground tile can be quite expensive, but once in place, the labor requirement would be very low. The cost associated with the parallel ditch type system would be relatively low, but the labor associated with maintaining and operating the system could be relatively high. The soil must have good internal drainage and lateral distribution characteristics for this method to be effective. It could be made to function quite effectively in plot type work if the right soil and field conditions existed for its use.

SPRINKLER METHODS

Sprinkler methods can involve a number of options--portable pipe, solid set, traveling gun, side rolls, center pivot, and linear move are the most common. Sprinklers are especially good for unlevel ground and can be adapted to a wide range of soil textures.

Portable Pipe

Aluminum is the standard for portable pipe with risers and sprinklers uniformly spaced down the lateral line. If you have enough pipe so that you can put it out and leave it, then it can be a good method. However, if you are caught where you are having to move pipe, it may be difficult to achieve a good application and keep up with the labor requirement. This is a pretty high cost item initially, since aluminum is very expensive. If you buy enough new equipment to put it out and leave it, the cost will probably be $600-$800 an acre.

Solid Set

Solid set is the takeoff of portable pipe. This is a situation where PVC laterals are buried and PVC risers with sprinklers are located at the strategic points in the field. Once this is in place, it is relatively permanent. A permanent solid set installation might be desirable for long-term variety or fertility studies since it can provide very uniform water application. You can control the application rates through nozzle sizing and placement. It's quite expensive, probably in the neighborhood of $700-$1,000 an acre but has a relatively low labor requirement. Portable pipe and solid set can both be equipped with control valves so that different zones or plots can be irrigated at different times. These valves could be electrically controlled if automatic operation is desired.

Environmental modification, such as frost protection, can be provided with either of the systems. The required irrigation capacity can be quite variable, but a minimum of 50 gpm per acre is usually recommended for frost protection. These systems are usually limited to relatively high value crops such as vegetables and fruits. However, they could perform quite well on plot work with other crops and can be effective in simulating the effects of rain on different crop or production variables.

Traveling Gun

Traveling gun is another sprinkler option to consider. Traveling guns offer the opportunity to fit rolling, irregular shaped fields. The first type of traveling gun that was developed was a soft hose or drag hose type. The flexible hose drags through the field as the sprinkler winches across the field on a cable. The newer type that is now more popular is the hard hose or vertical drum. The sprinkler gun travels across the field as the hose rolls up on the vertical reel. Once it gets back to the reel, it can be moved to another irrigation set where the soft hose type requires picking up the hose and stretching it back out before another set is made. The hard hose is much more expensive than the soft hose, but they have a lot less labor required for operation. There are several different sizes available for covering 10- to 100-acre fields. They can be used on forages, turf, and row crops, particularly, and on vegetable and fruit crops if the sprinkler droplets are kept controlled so that fruit damage would be avoided. A relatively high water volume and pressure are required to operate these systems, so the resulting operating cost can be quite expensive. They are portable and could be used to water fields or plots in different areas.

Side Roll

Side roll is a sprinkler option that operates basically like portable, lateral sprinkler line. The lateral functions as an axle that runs through large diameter wheels spaced about every 40 feet. Sprinklers along the length of the line area allowed to water for a period of time that achieves the desired irrigation amount. The lateral is equipped with a small (5-7 1/2 hp) engine that is geared to turn the axle and roll the line across the field for different irrigation sets about every 60 feet or so. This system is best suited for relatively short stature row crops, vegetables, fruits, forages, or turf on square- or rectangular-shaped, 40- to 60-acre fields. It will operate on varying soil types and on slopes up to about 10 percent. It requires a water supply line attached to the end of the line to provide the water. They are moderately expensive initially and also have a moderate to high labor requirement but do not require high water volumes or pressures. Irrigation capacities of 300 to 500 gpm at pressures from 50 to 60 psi are usually adequate for a 40- to 60-acre system. The length of the unit can be quite variable so the option exists for irrigating small plots or larger production size fields.

Center Pivot

Center pivot sprinklers are very popular as they offer the opportunity to cover varied acreages with a relatively low labor requirement. They offer the operator several management options that are usually quite desirable. One end of the pivot is anchored as the other end circles around this point. It is best suited to round- or square-shaped fields and can operate over the range of soil types and on slopes of up to 15 percent or so. Varying the speed of the system controls the amount of water being applied. The drive towers are capable of negotiating pretty demanding field conditions, such as wet spots, ditches, etc. However, bridges are usually required for crossing larger ditches.

Pivots can cover from 2 acres to 500 acre size fields depending on the length of the system. They provide the opportunity to control the amount of water applied and can be used to water a crop up and water seedling crops without damage to the plant. They can be used to activate herbicides, and it is possible to apply fertilizer and/or chemicals through the system by means of chemigation.

Pivots are not ideal for replicated plot work under the system because they don't lend themselves very easily to individual watering of the plots. However, one or two tower systems dedicated as a test plot have been used quite extensively and effectively.

Center pivots have relatively high initial costs but then operating costs are relatively low considering energy and labor costs associated with them. They don't require land grading under a system, but good surface drainage is needed if full benefit of the system is to be achieved.

Linear Move

This system is probably the best suited sprinkler system for production size plot work. The sprinkler line moves almost continuously across the field in essentially a straight line while providing a very uniform water application.

It is best suited for square- or rectangular-shaped fields and can be modified with plot booms to provide a lot of management options on replicated plot work. They can be designed to operate on a wide range of soil types and on rolling type ground. There were some early problems with the system's guidance system, but these seem to have been worked out in recent models. They also offer the opportunity for varying application amounts by varying the speed of the system across the field.

Linear move sprinklers are quite expensive and best suited for long rectangular fields so they are not as popular as center pivots for use in commercial production operations. However, they offer a lot of water management options at a relatively low requirement for operating cost and labor.

All of the sprinkler systems can offer application efficiencies in the range of 70 to 90 percent, but wind conditions can greatly affect this efficiency.

MICRO/DRIP SYSTEMS

The primary concern with most micro/drip irrigation systems is the requirement of a good quality irrigation water source to avoid or reduce plugging problems. This is due to the fact that small orifices serve as the water outlet device at relatively low pressures and water volumes. Micro/drip systems can be divided into the following three types: (1) line source, (2) point source, and (3) micro-sprays.

Line Source

Line source is the description for what has commonly been called drip tape. This is a low pressure tubing whose wall thickness varies from 5 to 12 mil, and it usually operates at pressures of 10 psi or less. The tube has a built-in passageway channeling system that stabilizes the water flow and pressure before the water exits the tubing by way of small diameter, precision formed holes. The hole spacing generally varies from 8" to 20" depending on what is preferred, and the resulting tubing flow ranges from 20 to 40 gph per 100 feet of tubing. Another line source device is commonly called soaker hose or sweat hose. This is a rubberized, porous tubing that is designed so that water will soak through the walls along the length of the tube. It does not offer the same level of uniform flow that is obtainable with the drip tape. However, it is low pressure and volume and can be effective if a precise level of water application is not a stringent requirement.

The line source devices are placed in close proximity to the plant or crop to be watered. They are best suited for close growing row crops particularly in vegetable plantings. There has been some success in burying the tubing at a desired depth dependent on the root zone and plowing or cultivation depths. However, when buried the importance of clean water is stressed even more. The close spaced outlets usually results in a wetted soil along the full length of the tubing. There are restrictions on the slopes the tubings can be used on and also on the length the tubing can be in any one direction. The tubing can be used for multiple years depending on its environment, upkeep, and its wall thickness. However, due to its relative inexpensive cost, it is sometimes

replaced each year in lieu of picking it up and having to store it while working equipment in the field.

This equipment is very applicable to plot type work and offers a high degree of water application control at minimum operating cost and operating labor. It can be quite expensive particularly if replaced very year, so it is usually best justified on high return crops such as vegetables and fruits. It can also be equipped with automatic controls as well as provide the opportunity for applying fertilizers and chemicals through the system.

Point Source

This system employs a thicker walled tubing than the drip tape and the water outlets are independent emitter devices installed in the tubing at spacings that vary over a wide range depending on the crop to be irrigated. The emitters serve to regulate the flow rate and to a lesser degree the pressure at which the water is applied. The emitters are punched into the tubing at the desired location in relation to the crop being watered. The emitters are available over a flow rate range that generally varies from 0.5 gph to 2 gph. Most emitter flow rates will vary with pressure, but pressure-compensating emitters are available that provide the same flow rate over a rather wide range of pressures. Emitters are usually designed to operate at pressures of about 15 psi unless they are the pressure-compensating type. There are many styles of emitters available to fit specific needs or requirements. These emitters have also been placed underground, but it is generally recommended that the water be ported to the soil surface with a small diameter distribution tube even if the tubing and/or emitters are placed below ground. This system is particularly adaptable to fruits, vegetables, and landscape crops where precise water control is desired.

In-line emitter tubing describes a point source system where the emitter is actually permanently mounted inside the tubing as it is manufactured. The emitters have the same characteristics as those previously discussed, and they have become quite popular in blueberry, grape, muscadine, and other similar crops. The in-line product is available in bulk roll lengths of tubing with emitter spacings ranging from 1 to 5 feet and with emitter outlet rates from 0.5 gph to 2 gph. This product is very adaptable to plot work and provides precise water control.

Micro Sprays

This is one of the newest devices in the micro irrigation market. These are low pressure, low volume spray heads that have a limited coverage area or diameter of coverage. The coverage pattern can be part circle to full circle depending on the need. They generally operate over a pressure range of 10 to 30 psi and a flow rate range of 4 to 40 gph. The average diameter usually ranges from 3 to 25 feet at different flows and pressures. The sprays have a slightly larger orifice than the drip devices previously discussed but they still require relatively clean water and/or filtration. These are basically used where more of a wetted area is desired than is usually available with drip lines. They are becoming popular for orchards and bigger landscape shrubs. They could be quite effective in plot type work if desired.

The need for clean water and filtration and even some chemical controls cannot be overemphasized when considering micro/drip irrigation. Fortunately, many good filters are available to satisfy different water treatment needs. Micro/drip irrigation provides precise application of water at low pressures and volumes but with high efficiency and low labor requirements. However, it does have restrictions on slopes, tubing lengths, etc., that must be adhered to before it performs to its capacity.

SUMMARY

So what is the best irrigation system? The answer is that any one of the systems that have been discussed could be the best depending on the particular field or situation that is being considered. The general description that has been presented for each of these systems should serve as a primer reference when working with an engineer, irrigation manufacturer, or system designer to choose the best system or combination of systems to meet specific irrigation needs.

MAINTAINING INDEPENDENCE IN RESEARCH USING OUTSIDE GRANT FUNDING

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Introduction

I was asked to address issues related to this subject from the "industry perspective" based on my former employment with a major agricultural chemicals firm. That experience, albeit brief, represents one of the more enriching periods of my career as an entomologist. As one who had only been in the land-grant university system prior to that time and since then, I will attest to the fact that one's perspective is broadened by working in an organization that survives because of its profit motive.

It is apparent from the title of this panel presentation that there are many concerns about not being able to maintain independence in research programs where extramural funds are used. In other words, it's akin to the "tail wagging the dog" syndrome. However, in my opinion, that descriptor need not apply, and further, we must seek extramural support for our programs in order to maintain or retain them!

I will address the industry perspective in a few, brief comments related to the objectives (or motives) of an industrial research and development or product development scientist. Then, I will center the remainder of my remarks on maintaining independence in our research programs.

The Industrial Representative's Objectives

The typical industrial scientist is expected to satisfy a set of technical goals (as opposed to marketing or sales goals) related to the development of a product or group of products. For a given product, this scientist must assess such aspects as its characteristic response or performance over time in appropriate environments as a means to evaluate its technical fit within various production systems.

Most agricultural products firms recognize that the best sources of sound, unbiased scientific data are the scientists located at our agricultural experiment stations. Thus, the typical industrial scientist attempts to establish strong working relationships with experiment station scientists who are pursuing areas of common interest. Such collaborative relationships are mutually beneficial to the scientists involved with significant long-term benefits also accruing to our producers.

Maintaining Independence in Research Programs

How often have we heard negative remarks to the effect that, we lose the authority for direction and management of our research programs by accepting extramural funds for their support? Indeed, at times there may be cause for concern because of the excessive review and reporting requirements imposed by

certain sponsors. However, such excess is not the norm, and furthermore, research administrators must be able to recognize excesses of this nature and to exercise their authority through refusing to approve proposals to or contracts from these sponsors. On the positive side, I will express the opinion that extramural support is an absolute essential component of our total support structure and, further, I believe extramural support significantly enhances our scientists' overall performance and productivity.

Then, how can experiment station administrators maintain independence in those research programs where extramural funds are used? There are three key components to my answer to that question:

1. The experiment station administration must establish a planning/priority-setting process as the basis of its management program with significant involvement of scientists, unit heads, leaders of collaborative organizations (e.g., USDA, Cooperative Extension, etc.), the central administration, and representatives from key producer and commodity organizations. Such planning and priority-setting processes are essential to execution of a program of excellence.

2. All persons involved in recruitment processes must be committed to hiring the very best scientists and support staff available. A critical mass of well-trained, highly qualified, highly motivated, vigorous, and well-supported scientists will naturally attract extramural funds from a variety of sources.

3. Experiment station administrators must foster an atmosphere that encourages scientists to achieve excellence in their research and must reward them for their achievement. Grantsmanship must be included as an important facet of the performance appraisal process for our scientists.

Finally, I should like to close by presenting a summary of expenditures by sources of funds within the Southern Region for 1988 (USDA/CSRS, September 1989) (Tables 1 and 2). Expenditure data for each of the SAES System regions are presented for your information; however, for sake of brevity, my remarks are restricted to the Southern Region. During the federal FY 1988, 21% of total expenditures for the Southern Region were from extramural fund sources with 79% of the total being from appropriated and self-generated funds (Table 1). In looking further at expenditures of extramural funds which totaled more than $111 million (Table 2), we find the following percentages by source: 27% from industry grants; 11% from CSRS competitive and special grants; 37% from USDA and other federal agency contracts, grants and cooperative agreements; and, 24% from all other non-federal grants and contracts.

I will make three, very opinionated statements about these data. First, we should be leveraging our appropriated funds against a higher proportional level of extramural funds in every category listed. In my opinion, we should be generating at least an additional 10% (or more than $81 million) in total extramural funds. Secondly, industry grants do not comprise a disproportionate share of extramural grants and contracts; in fact, this category should be

considerably higher (for reasons that I would share only in private conversation). Third, experiment stations across the Southern Region should be targeting all federal granting agencies as sources of extramural funds.

In summary, I should like to recap with the following statements:

We Must

- Remain as the administrators-in-charge of our research programs in their entirety. That is, we need not "sell our souls" to sponsors of grants and contracts.
- Establish and maintain good planning and priority-setting processes.
- Hire excellent scientists and support staffs.
- Reward excellence in achievement.
- Encourage scientists to become good grantsmen.
- Encourage scientists to establish working relationships as appropriate with industrial scientists.
- Target higher proportional levels of extramural support for the Southern Region.

Table 1. Expenditures by Source of Funds Within the SAES System for 1988 (all values are 000's). (Numbers in parentheses represent percent of total.)[a]

Source	Southern Region	Northeast Region	North Central Region	Western Region
Appropriated and Self-Generated Funds				
CSRS Approp.	80,042 (15)	31,495 (15)	51,104 (12)	31,691 (9)
State Approp.. and Self-Gen. Funds	348,441 (64)	111,203 (52)	239,210 (57)	209,346 (57)
Sub-Total	428,483 (79)	142,698 (67)	290,314 (69)	241,037 (66)
Extramural Funds				
Industry Grants	30,576	12,804	34,013	21,671
CSRS Comp. & Special Grants	12,426	7,515	18,684	14,863
USDA CGCA	13,265	4,064	13,571	11,260
Other Fed. CGCA	28,073	25,302	41,587	58,559
Sub-Total Fed. CGCA	41,338	29,366	55,158	69,819
Other Non-Fed.	26,890	21,166	24,084	18,927
Sub-Total Extramural	111,230 (21)	70,851 (33)	131,939 (31)	125,280 (34)
Total	**539,713**	**213,549**	**422,253**	**366,317**

[a]Source: "Inventory of Agricultural Research Fiscal Year 1988." USDA/CSRS (September 1989).

Table 2. Expenditures by Source of Extramural funds Within the SAES System for 1988 (all values are 000's). (Numbers in parentheses represent percent of total.)[a]

Source	Southern Region	Northeast Region	North Central Region	Western Region
Industry Grants	30,576 (27)	12,804 (18)	34,013 (26)	21,671 (17)
CSRS Comp. & Special Grants	12,426 (11)	7,515 (11)	18,684 (14)	14,863 (12)
USDA CGCA	13,265 (12)	4,064 (6)	13,571 (10)	11,260 (9)
Other Fed. CGCA	28,073 (25)	25,302 (35)	41,587 (32)	58,559 (47)
Sub-Total Fed. CGCA	41,338 (37)	29,366 (41)	55,158 (42)	69,819 (56)
Other Non-Fed.	26,890 (24)	21,166 (30)	24,084 (18)	18,927 (15)
Total	111,230	70,851	131,939	125,280

[a]Source: "Inventory of Agricultural Research Fiscal Year 1988." USDA/CSRS (September 1989).

MAINTAINING MAINTENANCE RESEARCH

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Agricultural research can have a very high payoff even if agriculture experiences little or no productivity increase. This is because productivity would not remain constant but would decline without continued research. Agricultural research depreciates over time, requiring maintenance to replace deterioration in past research gains.

Wheat leaf rust in Virginia, soybean stem canker in Alabama, spider mites and black rot in peanuts in North Carolina, angular leaf spot in cotton in Texas, ring nematodes in peaches in South Carolina, and coccidiosis in poultry in Georgia have all necessitated maintenance research in recent years. Not all, but much of the need for maintenance research stems from insects and diseases which evolve and render previous varieties, rootstocks, and chemical and other controls less effective.

In my remarks today, I will focus on 3 issues:

1. The nature of research depreciation and maintenance.

2. The magnitude of agricultural maintenance research.

3. The public policy implications resulting from the fact that a high proportion of new research must be devoted to maintaining gains from previous research.

To anticipate some of my conclusions, I will argue that the United States devotes roughly one-third of its total agricultural research budget to maintenance, with significant differences by commodity. In addition, the share of maintenance research in total agricultural research is likely to increase in the future unless total research increases at a rate faster than is now anticipated.

Nature of Research Depreciation and Maintenance

The output of research is new knowledge. For many types of research, this knowledge is imbedded in new technologies, products, policies, or institutions (4). The timing and need for maintenance research depends on the type of knowledge produced. In general, basic research depreciates less rapidly than applied research because the former is affected less by the physical, biological, and socio-economic environment.

For a similar reason, research depreciation and maintenance research vary by field of science. For example, research in entomology, plant pathology, and weed science is directed in large measure toward finding new solutions to the continually evolving pest complex. A significant amount of plant breeding research is concerned with developing pest-resistant varieties.

Ruttan, Plucknett and Smith (5) argue that as agricultural productivity increases, the proportion of research devoted to maintenance increases. If this hypothesis is correct, then the increase in agricultural productivity might decline over time unless research funding were increased.

Magnitude of Maintenance Research

The magnitude of maintenance research must be accounted for if the value of agricultural research programs is to be adequately assessed. Some studies have attempted to statistically or econometrically measure agricultural research depreciation and maintenance (1,2,3,6). For example, one study estimated maintenance research to be as high as 70% of all research (2). However, such measurements are complicated by the fact that research depreciation occurs with a lag and the depreciation lag is difficult to separate statistically from lags associated with research generation and adoption. Also, research depreciation results from both deterioration and obsolescence. Maintenance research is only aimed at replacing deteriorating research information.

Another study attempted to measure the extent of research depreciation in soybeans by examining the yield histories of three varieties (6). Experiment station data were used for the period 1951 to 1980. However, for these particular varieties examined, very little yield deterioration was observed. In a separate analysis using quantitative genetics principles, parameters of soybean breeding trials in Virginia, and yield data from actual experiments, a gap of 40% was measured between theoretical and actual yields (6). Much of this gap may be due to the need for maintenance research.

More recently, a questionnaire was developed and mailed to 2426 agricultural scientists in state agricultural experiment stations across the United States to obtain their assessments of the proportion of their own research devoted to maintenance research (1). The questionnaire was mailed with a letter which defined and provided examples of research depreciation and maintenance research.

Questions were asked about research objectives, observed examples of research depreciation, and maintenance research that was conducted to replace the depreciated research. Responses to these questions were used to assess the scientists' understanding of the definition of maintenance research, to provide examples of maintenance research for various crops and livestock, and to establish the commodity orientation, if any, of the scientist's program.

Scientists were asked about research operating budgets and the percentage of efforts devoted to maintenance research. This information was used to calculate the proportion of their research budgets spent on maintenance research.

Two pretests were used to refine the letter and questionnaire prior to the general mailing. The questionnaires were mailed to production-oriented agricultural scientists with research appointments in the U.S. State agricultural experiment stations.

The survey provided a broad representative picture of maintenance research by research field, by commodity, and by region in the United States. The mean

of the responses to each question with a quantitative response was calculated. Means were compared across commodities, across disciplines, and across states.

A total of 905 questionnaires were returned, or 38% of the total number mailed to the scientists. Of these 905 responses, 744 eventually were used in the analysis. Some of the remaining respondents had either retired, did not fully respond to the questionnaire, or, in a few cases, did not appear to have fully understood the concept of maintenance research. The distribution of the number of questionnaires mailed and the number of usable responses by field of research is reported in Table 1. Seventy-one percent of the respondents gave examples of research depreciation and 60% provided examples of maintenance research. These examples are briefly summarized in the Adusei and Norton papers referenced earlier. The percentage of the scientists' actual research effort devoted to maintenance research averaged 35%. The percentages of research effort devoted to maintenance research by commodity are presented in Table 2. In general, small grains and vegetables exhibited a relatively high proportion of maintenance research, livestock was at the bottom, and the percentages of maintenance research for most commodities fell between 27 and 40 percent.

Table 1. Distribution and Number of Questionnaires Returned, by Department.[a]

Department	Number Mailed	Number of Usable Responses
Agronomy, Crop Science, Plant Science, and Botany	885	291
Entomology	391	109
Plant Pathology	361	121
Horticulture, Pomology, and Vegetable Science	330	109
Soil Science	67	13
Animal Science and Dairy Science	278	68
Poultry Science	113	33
Total	2426	744

[a] Several additional variations of the disciplines listed above were included in department titles.

Using the U.S. definitions of regions in the Department of Commerce's Census of U.S. Agriculture, Table 3 presents the percentage of research effort devoted to maintenance research for each region. The Mid-Atlantic region had

the highest percentage of maintenance research (44.1), and the East South Central, the lowest (24.0). The latter relatively low figure was due to the particular commodity mixes in Tennessee and Kentucky. The regional differences in Table 3 were due primarily to differences in commodity mixes and secondarily to differences in the discipline mix of scientists responding to the survey. (The above results should be viewed as rough estimates, for two primary reasons. First, it undoubtedly was difficult for scientists to estimate the percentage of their research programs devoted to maintenance research. Second, it is possible that the respondents to the survey may have been more likely to be heavily involved in maintenance research than are the non-respondents. This potential selection bias problem, may have biased the maintenance research percentages upward).

Table 2. Percentage of Research Effort Devoted to Maintenance Research, by Commodity.

Commodity	Research Effort Devoted to Maintenance Research (%)
Barley	42.2
Vegetables	41.5
Wheat	41.1
Sorghum	40.6
Cotton	39.3
Potato	39.3
Oats	35.4
Fruits	35.1
Corn	34.2
Rice	33.6
Poultry	33.4
Hay	33.1
Other Crops	32.8
Tobacco	30.2
Soybeans	27.9
Peanut	27.6
Livestock	21.4
All Commodities	34.8

Table 3. Distribution of the Percentage of Research Effort Devoted to Maintenance Research, by Region.[a]

Region	Research Effort Devoted to Maintenance Research (%)
Mid Atlantic	44.1
Pacific	39.2
North Central - West	37.4
New England	36.7
Mountain	34.6
South Atlantic	32.9
South Central - West	31.8
North Central - East	31.1
South Central - East	24.0

[a] Regional definitions are:

East North Central: Wisconsin, Michigan, Illinois, Indiana, and Ohio.

East South Central: Kentucky, Tennessee, Alabama, and Mississippi.

Mid Atlantic: New York, Pennsylvania, and New Jersey.

Mountain: Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, and Nevada.

New England: Massachusetts, New Hampshire, Maine, Connecticut, Vermont, and Rhode Island.

Pacific: Washington, Oregon, California, and Hawaii.

South Atlantic: Maryland, Delaware, West Virginia, Virginia, North Carolina, South Carolina, Georgia, and Florida.

West North Central: North Dakota, South Dakota, Minnesota, Iowa, Nebraska, Kansas, and Missouri.

West South Central: Oklahoma, Texas, Louisiana, and Arkansas.

If one were to extrapolate the estimated maintenance research percentages to all research at the state agricultural experiment stations (SAES), the total

maintenance research budget would exceed $200 million (Table 4). In Table 4, the percentages of total research effort devoted to maintenance research from Table 2 were divided by 100 and multiplied by the total public research funds expended for the commodities. (Total research funds were 1985 figures from the U.S. Department of Agriculture, Inventory of Agricultural Research, Washington, D.C., from the Current Research Inventory System. These funds included operating costs, salaries, and other expenditures related to public research activities for each commodity).

Table 4. Estimates of U.S. Agricultural Maintenance Research at the State Agricultural Experiment Stations.

Commodity	Maintenance Research ($) ($ X 1000)
Livestock	45.58
Vegetables	28.20
Fruit	25.13
Hay	14.30
Poultry	13.90
Wheat	11.90
Corn	11.79
Soybeans	10.34
Cotton	7.43
Barley	5.71
Other Crops	5.41
Potato	5.33
Oats	4.79
Sorghum	4.30
Tobacco	3.24
Rice	2.74
Peanut	2.02
All Commodities	202.12 million[a]

[a] Total research funds for the State Agricultural Experiment Stations in 1985 were $1,146 million.

The resulting estimates indicate that maintenance research on livestock, a group of several livestock commodities, is substantial ($45 million) despite the low maintenance research percentage because of the sizable amount of total livestock research. Furthermore, vegetables and fruits, again groups of commodities, have relatively large maintenance research budgets. This result is not surprising in light of the importance of pest control research in fruits and vegetables.

Implications

The fact that roughly one-third of new agricultural research must be devoted to maintaining gains from previous research implies that if real research budgets are not maintained, agricultural productivity may eventually decline.

Examples of research depreciation and maintenance provided by scientists make it clear that the evolution of pests over time is a major cause of agricultural research depreciation. It appears that resistance of pests to pesticides and other measures has increased over time. Therefore, the share of maintenance research in total agricultural research is likely to increase unless total agricultural research budgets grow at a rate faster than is now anticipated. It is also evident that additional research specifically targeted at the resistance problem is needed.

Another implication is that economic assessments of the value of agricultural research must be careful to measure not only the benefits of productivity gains but the benefits of productivity losses avoided. There is broad acknowledgement within the scientific community of the existence of research depreciation and the resulting need for maintenance research. However, research administrators should not take it for granted that policymakers at the state and national levels show an equal awareness of the significance of maintenance research.

Author's note. This presentation draws heavily on E. O. Adusei and G. W. Norton. The magnitude of maintenance research in the United States. IR-6 Information Report 89-1, March 1989, and Journal of Production Agriculture, October-December, 1989.

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MAINTAINING INDEPENDENCE IN RESEARCH USING OUTSIDE GRANT FUNDING

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Abstract. A University or department or division within a University seeking external funding in support of its research programs is, by definition, participating in a competitive process. The opportunities for research are there, however, more individuals are involved searching for these funds than ever. The Universities must assist the faculty in searching for the research dollars.

I believe everyone here has heard the same story every year: the state legislature has cut the budget for education, be prepared to tighten your belts, freeze all hiring, and raises will be minimal. The same is true for formula funding received from the Federal government. While other agencies appear to be getting a larger slice of the pie, Agriculture never seems to catch up. The Investigator is caught in a situation where the research program can be stifled, or else he must get out and beat the bushes for external funding.

Conducting research is an expensive proposition. Laboratories must be furnished, supplies and equipment purchased, personnel employed, and qualified graduate students recruited. Universities cannot fund these programs without external funding and without highly qualified faculty to perform the research.

The University of Florida has taken an active role in research development, and encourages the faculty to seek external funding. The Institute of Food and Agriculture Sciences at the University of Florida, with the exception of a few other land grant institutions, has a unique structure. The main campus is located in Gainesville and throughout the state there are 14 Research and Education Centers (Fig. 1). These centers are under the direction of a Center Director with research faculty assigned as appropriate. The faculty assigned to the station hold tenure in a related department on the main campus. Some faculty may hold both extension and research appointments, however, the primary emphasis is on research. Although logistically separated from main campus, the faculty at the centers have been very successful in obtaining outside funding. Research awards for these centers have averaged over $4 million each year for the past 3 years.

The faculty at the research centers have a unique opportunity to interact with industry. Corporate representatives visit the centers knowing full time researchers are assigned, and establish a one on one relationship, thus satisfying a mutual need. There are also collaborative research projects between main campus and the centers and the faculty of both have managed to contact corporations and other private entities with research interests. Lake Alfred, one of the larger center's mission is to provide technical advances to meet the needs of the citrus industry through programs of research, extension, and education. This effort requires maintenance of close contact and communication with citrus growers, packers, processors and their respective organizations,

allied industries, and consumers for a reciprocal and accurate exchange of information.

Specific businesses and industries must be targeted to secure funding for support of new and on-going research programs. Communication links between Citrus Research and Education Center Administration and scientists are in the form of individual contacts or advisory committees. Currently, CREC interacts with the Industry Advisory Committee, Florida Citrus Packers Association, and the Department of Citrus Research Advisory Council. (1989 Annual report of Citrus Research & Education Center.) This effort is typical of all the research centers, whether it be citrus, peanuts, soybeans, lettuce, or tomatoes. Understanding the problem, and the interaction and cooperation with industrial sources is critical in the effective delivery of research advances to industry.

IFAS has received awards totaling over $30 million each year for the past 4 years from external sources. This figure does not include state appropriation or formula funding. IFAS maintains its own Sponsored Programs Office. An advantage to this arrangement is the faculty have a local contact point for their research proposals. They receive almost individual attention from the staff. The location of the office is convenient for the faculty to just drop in and discuss their proposals or problems. One of the functions of this office is to actively seek sources of funding by reviewing all publications announcing research opportunities. Over 500 faculty members at IFAS have submitted their research profile to the Sponsored Programs Office. When a research opportunity is announced, the faculty data base is searched and the announcement mailed to the appropriate faculty member.

At the University of Florida, we also realize that there will be lean times. A grant or contract will terminate and it may be a while before additional funds can be obtained.

Most University sponsored research offices avoid the fixed price contract, preferring the cost reimbursement contract. At the University of Florida, we have found it to our advantage to negotiate a fixed price contract. This document allows the faculty more flexibility in conducting their research, and the majority of sponsors prefer this arrangement. We have designed a 1 page "Sponsored Program Agreement", and find that the faculty member and the sponsor enjoy it's simplicity. Originally designed for small awards of 1 or 2 thousand dollars, it is now being used for larger dollar amounts. The indirect costs associated with this agreement are lower than our negotiated rate, primarily because the administrative costs associated with research efforts are reduced. The sponsor pays the University upon execution of the agreement. There is no accounting of expenditures, and any funds remaining at the end of the project are placed into a combined grants account which the faculty member is free to draw upon when needed. This allows the researcher to spend money which, in many cases, he would not otherwise have for equipment, GRA salaries, foreign travel and seed money for new projects.

With this approach, a successful faculty member can create a fund which is readily available to him, and has great flexibility. More importantly, it works. The faculty member realizes the budget constraints he must work under when proposing to perform the research. The sponsor, in turn, knows that he will not

be asked later in the research effort for additional funds. It is a good arrangement for both parties. The reduced overhead assessment for these programs is appealing to the faculty, as well as the sponsor. If the SPA is not used, we will still attempt to negotiate a fixed price contract, usually on a task by task basis. By using a task oriented budget, we are not required to submit a detailed breakdown of costs, only a fixed rate for each task. This arrangement facilitates purchasing power for the researcher. It does require close coordination between the faculty member and the Sponsored Programs Office, assuring everyone it meets with University approval. Another incentive for faculty is the return of a percent of the indirect costs associated with each project. While the return on each project may appear to be insignificant, a productive researcher can build a support base for future needs.

Another area which is beginning to show promise, is the collaboration between the faculty and the international area. Some of the research efforts are part of the direct result from Federal funding received from AID and USDA. The investigators establish a reputation in the country, and independent collaborative programs are initiated. I expect to see continued growth in this area. Also, don't forget your state and local Governments -- they can be excellent resources for research projects. Since water is a primary concern in Florida, we have been very fortunate in obtaining research funding from the State Water Districts.

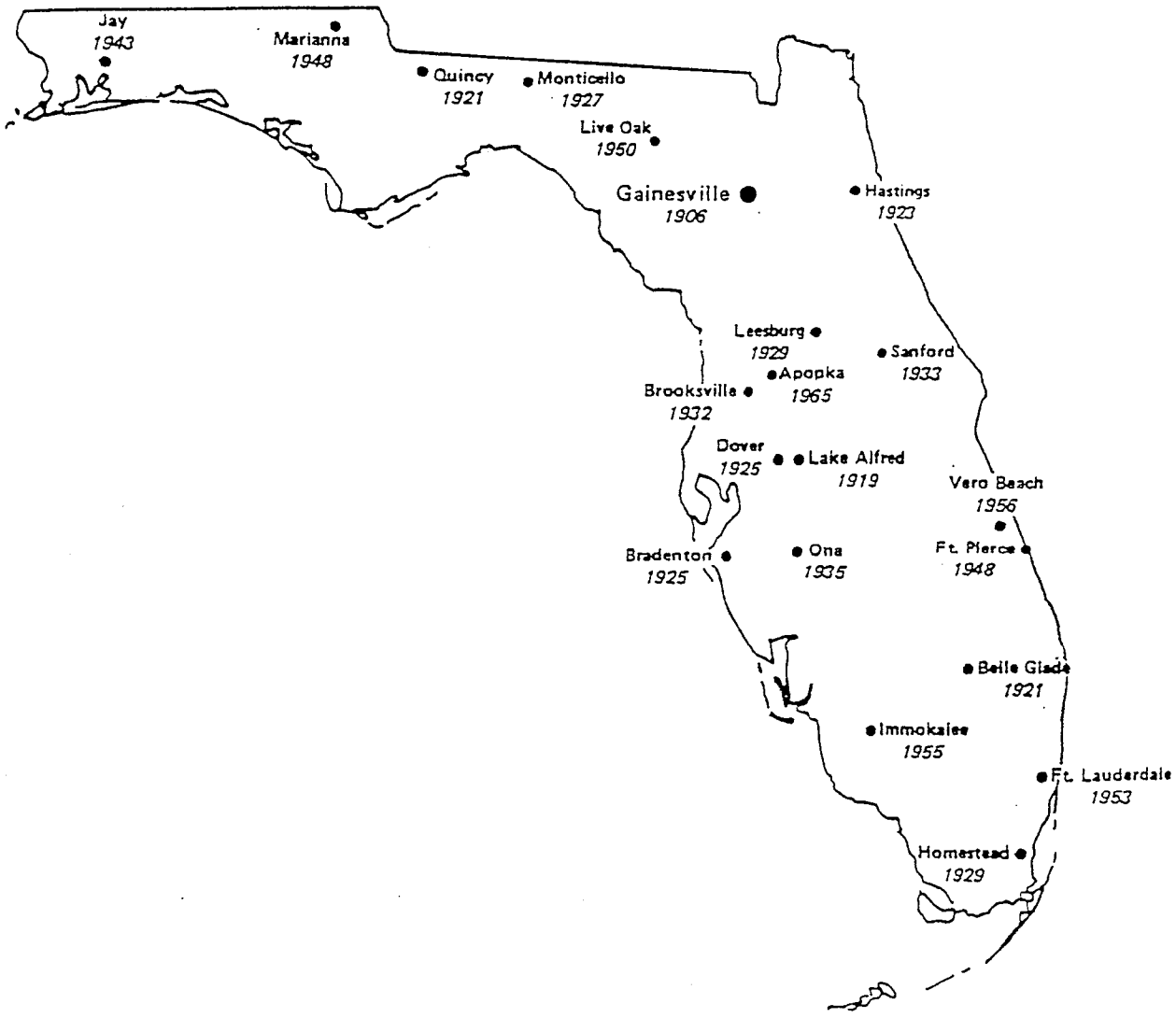
As Federal funding gets more and more difficult to obtain, research opportunities with industry become more appealing. Industry is generally receptive in contracting with Universities. They are, however, protective of any intellectual property, and any contractual obligations should be closely coordinated with the University Sponsored Research Office. They are also very specific about their contracting needs -- so before entering into any arrangements, be sure you can fulfill their requirements. Know your sponsor.

The opportunities for faculty seeking external funding are enormous. I do recommend that faculty contact their Sponsored Programs Office, discuss their research interests with them. Let them do a profile interest search. They may come up with sources of funding which you may never have known were available. One day a faculty member came to my office and said he had the opportunity of post Doctoral candidate from Poland, and did I know of any funding source which would pay for his salary? Well, I really didn't, but I said I would look into it. I found 3 organizations which showed promise. We will apply and see what happens.

I've left copies of the latest "For Your Information" which is prepared by the Division of Sponsored Research, which will give you an idea of the service provided.

The Sponsored Programs Office is there to serve the faculty. Utilize their services. You never can be aware of all resources.

Figure 1. Location of Research and Extension Centers and Research Stations as part of the Florida Agricultural Experiment Station, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, Florida.



EDITORS NOTE - Herein are the summarized results of two questionnaires, spaced by 6 years. Many of the questions are similar in nature but in both years the questions were worded to try to elicit the current feeling of the RCAS membership. Please remember the 1984 survey was done prior to the development of the by-laws and the publication of proceedings. Those survey results served as a strong rationale for the establishment of those activities. Please note differences in consensus response and ask yourself what voids in our present practices have been brought out in the 1990 survey? What does this survey indicate that this Society needs to address?

Summary of Questionnaire to Membership, 1984

Jere M. McBride, Resident Director
Red River Research Station
Bossier City, LA 71113

The Branch Station Superintendent's Section hit one of its high points in 1983 and the excellent meeting stimulated an interest among many of us to see this organization continue to grow and develop. While there were several ideas being tossed around - such as attaching to a national organization - the main interest seemed to be centered around increasing our membership numbers. We discussed two avenues to encourage attendance on the part of our membership - our membership considered to be all branch station administrators within the Southern Association - and by contacting associates in similar positions outside our areas, and encouraging them to join.

The consensus of opinion of those attending last years meeting seemed to be that the membership should remain within our region and that our efforts should be to improve our organization to make it a higher priority meeting for our membership. To initiate action in this regard, Wallace Griffey - Chairman for the 1983 meeting - appointed me to develop a questionnaire to get the members views of the Branch Station Superintendent's Section. Thus, this questionnaire was developed.

The questionnaire provided each member an opportunity to assess the status of the section and to express personal views. The results of the questionnaire would then serve as a basis for change if the group so desired.

The results of the questionnaire were tabulated from 40 of 43 that were returned. Only branch station administrator responses were used and my views were not included. In most cases there were a number of good comments and suggestions. Where appropriate, we analyzed the results of the questionnaire by looking at some of these comments.

Also, I would like to thank the participants and mention that many of you took this exercise very seriously.

Now the results --

1. What can be done to increase the interest and attendance of our members?

   Let's look at five of the suggestions.

   * Develop organizational goals and objectives that respond to membership needs

   * Make Directors aware of importance and scope of branch station administrator's section as a professional society
   * Ask Directors to encourage attendance

   * Meet separately from SAAS

   * Establish a Newsletter

2. If you do not attend on a regular basis, what are the main reasons?

   * Limited travel funds

   * Travel restrictions

   * Conflicts with other sessions at SAAS

   * Program quality

   * Meeting location in most years

   * Meeting a lower priority

Of the six reasons cited here, the lack of travel funds was cited most frequently; however, conflicts with SAAS functions or other meetings having a higher priority were also cited by several. Any upgrading of the organization would need to be designed to make this meeting a higher priority for all branch station administrators.

3. Does the association of the Branch Station Superintendent's Section with SAAS influence your decision to attend this meeting?

   Yes------- 30
   No ------- 10

Those answering yes generally indicated the joint meeting provided the opportunity to attend other sections of interest. Those answering no considered this meeting their main interest.

4. Would you attend on a regular basis if the organization were not associated with SAAS?

   Yes------- 30
   No ------- 10

Smaller cities such as Athens, Mobile, Baton Rouge, Shreveport, Jackson, etc. - less expensive and would provide excellent tour possibilities - particularly those near branch stations, land grant colleges, and major agricultural areas would provide excellent tour possibilities.

5. Do you feel this group should be attached to a national organization?

*Yes -- 4 **No -- 31

* Section A-7 - Am. Soc. of Agronomy
* Regional - SAAS
** Too many disciplines involved

6. Is the present structure -- morning presentations, afternoon tour, and evening banquet -- satisfactory?

Yes	33
No	4
No Opinion	3

The jest of this yes vote was as long as the group remains with SAAS, any significant change in structure would create conflicts with other SAAS sections and functions. However, several suggestions for change were made as you will see --

7. If you feel a change is needed in format, please comment on the following:

* Meeting length

  . 1-1/2 - 3 days
  . No change if meeting with SAAS

* Format and Allocation of Time

  . 1 day of presentations
  . Workshops - longer business meeting
  . Outside speakers - invited papers

* Banquet

  . Eliminate Banquet - citing cost
  . Luncheon in lieu of evening banquet
  . Include social hour

* Tour

  . Eliminate tour
  . Place emphasis on tour
  . Omit if good tour cannot be arranged

8. In your opinion, should the organization provide an opportunity for invitational papers?

   * Yes --- 36 ** No --- 2

   * Should be consistent with long term goals of the organization

   * Should include topics of interest to all disciplines

   * Appoint a committee to recommend appropriate topics and papers

   * Presentations may soon be necessary to justify travel

9. In your opinion, should invitations be extended to outside speakers-- politicians, business professionals, etc.?

   * Yes --- 31 ** No --- 7

   * Use caution with politicians

   * Especially politicians - budgetary matters

   * Management specialists, ag business professionals, audiovisual experts

   ** Generally opposed to politicians

   ** Encourage more members to participate

10. Please suggest five subject areas and potential program participants for future programs.

   Program Subjects

   * Personnel management and motivation

   * Improving relationships with the

     . community (public relations)
     . campus departments
     . Cooperative Extension Service
     . Industry
     . project leaders an/or cooperating scientist

   * Budget management

   * Facility management and maintenance

   * Specialized plot equipment

* Computers and word processors

* Future research needs

Potential Participants

* Deans, Directors, and Associate Directors singularly or in panels

* Scientist in non-ag fields

* Public officials

* Members

* Industry Officials

* Farmers

11. Do you feel "Branch Station Superintendents" adequately describes our section?

Yes	15
No	22
No response	3

Suggested Names for Section

* Branch Station Administrators

* Research Station Management

* Experiment Station Administrators

* Experiment Station Managers

* Agricultural Experiment Station Management

12. Information regarding respondents as Branch Station Administrators:

* Title

* Professional Rank

* Discipline

* Highest Degree Earned

* Age

* Length of Service

Titles

Superintendents	23
Resident Directors	14
Center Directors	3

Professional Rank

Assistant Professors	1
Superintendents	1
Associate Professors	10
Superintendents	7
Resident Directors	2
Center Directors	1
Professors	14
Superintendents	4
Resident Directors	8
Center Directors	2
Other	15
Superintendents	13
Resident Directors	2

Disciplines Represented

Agriculture	2	Dairying	2
Ag Business	1	Entomology	1
Agronomy	9	Horticulture	9
Ag Economics	4	Plant Pathology	1
Ag Education	1	Plant Physiology	1
Ag Engineering	1	Plant & Soil Sci	1
Animal Science	7		

Highest Degree Earned

B.S.	4
M.S.	11
PhD	25

Age

Range	26 - 62 years
Average	49 years

Service

Range	1 - 27 years
Average	11 years

Summary

The questionnaire has provided a considerable amount of information for use in directing the future of this organization. It has brought out the fact that many of our members look to this organization as their professional society. As such, they look to it for ideas and information for improving themselves as administrators. For this organization the challenge is clear - respond to the needs of its members.

In closing, I recommend we utilize the results of this questionnaire to put the ideas and suggestions of our members to work in meeting this challenge.

RESEARCH CENTER ADMINISTRATORS SOCIETY

1990 Questionnaire

Jere M. McBride, Resident Director
Red River Research Station
Bossier City, LA 71113

The Branch Station Superintendent's Section of the Southern Association of Agricultural Scientists initiated an effort in 1983 to reorganize. The first step was taken by Wallace Griffey, 1983 chairman, who appointed me to conduct a survey to determine the overall interest of the membership relative to the organization. Thus, the first questionnaire was developed and circulated to the membership. The results of the questionnaire indicated there was a large core of support for an organization that would contribute to our professional development as branch station managers.

Following the 1984 meeting, a group representing several states met in Jackson, Mississippi to develop the by-laws. The by-laws were accepted by the membership attending the 1985 meeting in Biloxi, Mississippi. This marked the documented beginning of the Research Center Administrators Society. The attendance at the annual meeting has increased from an average of 60 in the early 80's to over 85 the last five years with the attendance approaching 100 at some meetings. The RCAS is now an established professional organization. Much of the organization's success can be attributed to the Executive Committee's responsiveness to the needs and interests of the membership as delineated in the 1984 survey. In its efforts to continue its philosophy of listening, the Executive Committee asked for the 1990 survey.

Some of the ground rules for the survey should be explained. Administrators located at branch facilities in the Southern Region are members of RCAS. There are exceptions to this. An individual involved in branch station administration, but who is located on the main campus can also be a member. Those who attend the annual meetings are considered active members. However, views of inactive members who responded to the questionnaire were also included.

In 1984, approximately 188 questionnaires were mailed and there were 40 responses. In 1990, 178 questionnaires were mailed to the membership and there were 69 responses. The response was considered excellent both times. In 1984, the 40 responses represented 21 percent of the total membership or 67 percent of the active membership (based on 60 average attendance). The 66 responses to this year's questionnaire were 39 percent of the membership, or 81 percent of the active membership (estimated average attendance of 85). The attendance averages include only those paying registration fees. The active membership has increased by almost 42 percent in the last five years with a registered attendance of approximately 80 and above each year.

1990 RCAS QUESTIONNAIRE

1. In 1985 we changed the organization's name from "Branch Station's Superintendent's Section of SAAS" to "Research Center Administrators Society." Please indicate your impression of the name change?

(a)	Accurately describes the organization.	41
(b)	A good professional name.	41
(c)	Do not like name change.	4
(d)	No opinion.	5

Comments:

* The name change was an improvement, but I would prefer: "The American Society of Agricultural Research Station Superintendents."

* Suggest we drop "Centers" from the title.

* Change Society to Association

2. What influence do you think the name change has had on memberhsip interest and attendance at annual meetings?

(a)	Increased.	33
(b)	Decreased.	2
(c)	Made no difference.	22
(d)	Other impressions.	3

Comments:

* Cause and effect - attendance has gone up in last 3-4 years. Is this due to name change alone?

3. The Executive Committee strives to develop quality programs of interest to the entire membership. In terms of your interests, do you think the quality of the annual programs -

(a)	Increased?	49
(b)	Decreased?	2
(c)	Not changed?	8

Comments:

* Has been <u>one</u> reason for increased attendance.

* But please consider other dates because the present is always in conflict with the Virginia Corn-Soybean Conference.

* I have only attended one -- it was excellent.

4. Do you favor the change in program structure, i.e. from one day to 1 1/2 days?

(a) Yes. 47
(b) No. 9
(c) No opinion. 8
(d) Other comment. 1

Comments:

* The tour makes a full two day meeting

* Prefer to go to the sessions involving the type research conducted at my location.

* Provided quality program continues.

* Can't have a quality program in less time.

* But, would prefer that the RCAS meetings not conflict with the SAAS meetings, since I would like to attend both. I miss interesting SAAS meetings about current technical topics while attending RCAS meetings about management of stations.

5. Do you approve of the recent emphasis on programs of research management?

(a) Yes. 62
(b) No. 1
(c) No opinion. 1
(d) Other comments. 1

Comments:

* But, there needs to be variety, with all facets of our responsibilities eventually covered by program topics.

* Need an organization that is more practical to include more people. No item on the agenda was specific enough to be of interest to me and 2 of my peers who usually attend.

* This is our job for the most part.

* Continue with at least 1/2 day of this emphasis.

6. An informal and educational tour has been an integral part of the annual meeting. Do you think we should continue with the tour.

(a) Yes. 62
(b) No. 2

Comments:

* Always excellent.

* Optional -- Not absolutely necessary. Let local arrangements chairman decide if an interesting tour is available and coordinate with program chairman.

* If specific to research station management and local agricultural related industry.

* The tour should be scheduled so that it does not conflict with SAAS meetings. It should be held either before or after the SAAS meetings.

7. If answer to question six is yes, please respond to the following -

(a) Every year? 47
(b) Every other year? 9
(c) Other 3

Comments:

* As appropriate arrangements can be made.

* When new and different sites for the meetings are available.

* Not on a scheduled basis but dictated by availability of something good.

* If there is something to see.

* When opportunity for a good tour exists.

* The only drawback with a tour is that leaving the site of other sectional meetings limits participation in those sessions.

* I always learn something.

* Depends on number of times at location.

* If feasible -- 4 hour bus ride to see 2 hours of station/activity is questionable.

8. The Society published a "Proceedings" for the 1987-88 meeting in New Orleans. Did you receive a copy of the Proceedings?

(a) Yes. 53
(b) No. 13

9. If your answer to question eight is yes, did you read the Proceedings?

(a) Yes. **42**
(b) No. **10**

Comments:

* Just received it.

* Only the article on biotechnology.

10. If you answer to question nine is yes, approximately how much did you read?

(a) One to three papers. **12**
(b) Four to six papers. **7**
(c) More than six. **11**
(d) All papers. **11**

Comments:

Several times.

Partially

Only those of particular interest.

11. Do you favor publication of the Proceedings in the future?

(a) Yes. **53**
(b) No. **6**
(c) No opinion. **6**
(d) Other suggestions **0**

Comments:

* Good for reference.

* Years and topics should be optional for publication.

* If economically attractive.

* Within budget limitations.

* Yes, but I have serious doubts. It does make good record.

* Format needs modifications to allow shorter reports.

* Generally gets better preparation of presentation.

12. Do you think the Proceedings are of high enough quality to benefit the society?

(a) Yes. 48
(b) No. 2
(c) No opinion. 12

Comments:

* Good reference material.

* Need to be better.

13. Do you think the publication of the Proceedings justified an increase in the registration fee?

(a) Yes. 48
(b) No. 11
(c) No opinion. 12

Comments:

* Within reason.

* Somewhat. Publication guidelines and requirements need modification.

* However, the fee is at a high level and future publications will be difficult.

14. Would you support:

(a) An increase in registration fee. 46
(b) Implementation of a membership dues. 12
(c) Other 3

Comments:

* No. Fee increases and/or membership dues often have a negative effect.

* Outside support from industry rep., if necessary.

* Contributions.

* Probably not necessary now.

To support the following:

(a) Increasing the quality of programs. 35
(b) Obtaining special speakers. 33
(c) Special RCAS projects. 19
(d) Other 1

Comments:

* Career development, publication of open positions on research stations, membership certificates, lapel pins, hats, newsletter.

* Really good speakers would be worth the expense.

15. Do you see a need to establish an advisory committee (consisting of past presidents) as a resource group for the RCAS?

(a) Yes. **30**
(b) No. **20**
(c) No opinion. **10**

Comments:

* Develop ways to improve the image of RCAS beyond its membership.

* Develop a lifetime membership program.

* Develop an honorary membership program to those outside the RCAS who help and support the organization in exceptional ways.

* Probably not necessary.

* The Executive Committee can function in this regard.

* What's the purpose?

* Such groups are a valuable resource and have made a major contribution to other organizations.

* I'm not sure on this. I don't see how such a committee's responsibilities would interact with those of the regular officers and the Executive Committee.

* I believe that newly elected officers will bring new ideas to the organization, creating positive change for the organization. These officers should be adequately qualified to function without an advisory committee. Former presidents can provide input informally, as they so desire, without an advisory committee.

* As long as serve mainly in advisory capacity.

16. If you answer yes to question 15, name some important responsibilities you feel this group would have.

* Make recommendations to the Society and its officers

* Help the Society improve its actions and image

* Serve as needed

* Guidance in political matters

* Wise council

* Program development

* Continuity of the organization

* Give experience and wisdom for the future

* Program planning

* Officer development

* Long range planning

* Be certain all rules and bylaws were followed--such as the supreme court oversees the legislative and executive branches of our government

* Be sure that actions in the Society are done legally

* Advisory

* Supportive

* Directions

* Nominating Committee

* Could serve as steering committee for organization

* Help in contacting special program participants

* Source of ideas

* Determine which problems and goals are most common among all of us

* Keeping up interest in the organization

* Producing needed resultions

* Assist in identifying potential outside support for RCAS

* Special projects that society may undertake

* Responsibility for nominating personnel for society's positions

17. Relative to your association with RCAS, please rank the following factors in order of importance to you.

(a)	Professional development.	2
(b)	Professional interaction.	1
(c)	Educational tours.	4
(d)	Information interaction.	3
(e)	Other	5

Comments:

* New methods management/operations, equipment for research use.

* Promotion of professional image.

* Research station management is a profession, and we should promote our profession, for recognition, as well as to encourage college students to major in fields that would qualify them for positions in research station administration.

18. All administrators at the branch research locations are considered members of the RCAS. Many are not active members. Please rank in order of importance the reasons for the lack of participation of many of your colleagues.

(a)	Travel funds.	1
(b)	Time conflicts with other meetings.	3
(c)	Lack of interest.	2
(d)	Other.	4

Comments:

* They are not aware of the nature of this group.

* Lack of information.

19. What two or three things could the RCAS do to help you get more of your branch station managers interested and involved in the organization?

Comments:

* Try to avoid conflicts with other SAAS sessions.

* Have membership dues--people generally get involved if it cost them something--Lots of people want to be members of an organization that has an official membership roll

* Continue to improve quality of program.

* Contact Deans & Directors, let them know how RCAS can serve them

* Newsletter

* Get new members or younger members involved in programs and community

* Print an attractive brochure about the advantages of belonging to RCAS

* Continue to sponsor special speakers, esp. Directors of the Experiment Stations and colleges of Agriculture

* Have Experiment Station administrators to encourage members to attend meeting

* Send out letter letting them know more about RCAS and the advantages of joining

* All of RCAS members attend regularly.
* Get more encouragement from upper level administration

* Organize a New Resident Director's training session separate from the regular meeting

* Very little-motivation must come from within state

* Continue stimulating programs

* Encourage participation by those states who are not active

* Approach their director.Get administrators to push this section

* Personal contacts by active members

* Supply them with copy of proceedings of previous meetings

* Relevant programs

* Involvement

* Keep after other branch station leaders by letters, telephone, sending copies of the program, tours, etc. We need to contact people and personally urge them to attend our meeting. I think several would go to the RCAS meetings--but would not go just to SAAS.

* Vary location of meetings

* Change procedures for election of officers

* Provide membership certificates, lapel pins, and other items to publicize both the profession and the organization

* Need more hands on type programs that involve new ideas of research rather than means of philosophy

* Have mid-year summer tours

* Keep cost low

* Get administrators to fund travel

* Shorten meetings at night during SAAS thus allowing time to participate in regular meeting sessions

* Bring in outside speakers on selected topics

* Personal Contacts

DEMOGRAPHICAL INFORMATION

Titles Represented:

Resident Director	21
Superintendent	31
Assistant Director	2
Assistant to Head of Agronomy	1
Head	3
Center Director	7
Research Scientist in Charge-	1
Assistant to Superintendent -	1

Professional Rank Indicated:

Professor	28
Associate Professor	9
Research Associate	2
Sr. Research Scientist	2
Extension Specialist	1
Certified Public Manager	1
Not Indicated	24

Disciplines Represented

Agronomy	15
Ag Economics	2
Ag Engineering	2
Animal Science	14
Business Admin.	1
Dairying	2
Entomology	2
Horticulture	12
Plant Pathology	3

Plant Physiology	----- 2
Soil Science	----- 6
Weed Science	----- 6
Not Indicated	----- 7

Highest Degree Earned

B. S.	----- 9
M. S.	----- 11
PhD	----- 25

Age

Range	----- 30 - 65 years
Average	----- 49

Service

Range	----- 0.5 - 33 years
Average	----- 12

States Represented:

Alabama	----- 6
Arkansas	----- 5
Florida	----- 5
Georgia	----- 2
Kentucky	----- 1
Louisiana	----- 7
Mississippi	----- 11
North Carolina	----- 7
Oklahoma	----- 2
South Carolina	----- 3
Tennessee	----- 6
Texas	----- 6
Virginia	----- 2
No Response	----- 4

21. Please suggest topics for program themes in the future years.

Suggestions:

* Management of Resources

* Steps to curb Worker's Comp abuse and control its costs

* Personnel management (hiring, terminations, liability, etc.)

* Field Day preparations

* Pesticide management

* Effective management of small branch stations

* Enchancing support staff development on small station

* Role of branch stations in the year 2000

* Innovative ways to more effectively manage branch stations

* Integration of functions: Research, Teaching, Extension

* Will State-supported agricultural research (& extension) activities continue in the next century?

* Experiment Station funding

* Project Leader- Experiment Station personnel responsibilities

* Budget Management

* Outside funding

* Office management (filing systems, etc.)

* Motivational speakers

* Equipment

* Safety

* Enhancing public awareness of stations

* Attracting Grant funds

22. Please list potential participants for future programs, both members and nonmembers of RCAS.

Suggestions:

* Dr. R.H. Anderson, Southern Expt. Sta. Univ. of Minnesota

  Organizations & Characteristics of Agricultural Expt. Stations in the US.

* Jim Davidson, Dean for Research--IFAS

* Vince McClod, UF Environmental Officer--IFAS

* Carolyn Green, UF EEO Officer-- U of F

  EEO Compliance at Centers.

* John Woeste, Dean for Extension--IFAS

  Importance and Role of Extension Specialists at Centers

* Panel

  Center faculty involvement in International Projects, Pros and Cons

* Dr. R.L. Westerman, OSU Agronomy Department

  Fertilizer Mumtin Soils

* John Larson, EPA Region, VI, Dallas, TX

* Dr. Gordon Johnson, OSU Agronomy Dept.

* Water Quality

* Dr. Jim Stiegler, OSU Agronomy Dept.

* Extension involvement

* Dr. Gerald R. Zachariah, U of F Institute of Food and Agricultural Science

  Agriculture's Importance in an Urban State.

* Dr. James Davidson, U of F Institute of Food and Agricultural Science

* The importance of research conducted at Agricultural Centers.

* Dr. Walt Kender, U of F Citrus Research and Education Center, Lake Alfred, Florida Coordinating Multi-disciplinary research at a Large Agricultural Center.

* Will Waters, IFAS--Florida

  Grant Funding

* Outside speakers

* Leadership and handling

* W.N. Philpot, North Louisiana Hill Farm Research Station

  Strategic Planning

* K.W. Tipton, Louisiana Agricultural Experiment Station

  Strategic Planning

* Someone at Mississippi State

Sharing of Facilities and Equipment.

* D. Pitts, SW Fla. Research & Education Cntr Immokalee, Fla.

Research--Irrigation.

Comments:

* My idea of an interesting program would be not to have the administrator of the program at the RCAS meeting but to have the Senator or Congressman who is chairman of the committee which passes or enacts laws for administration, and to subject them to a Sam Donaldson type questioning. If law makers or not available perhaps some writers or editors of some articles which are opposite to findings of Agriculture Research could present some views of how they reached conclusions, etc.

Editors Note: It was agreed upon by the members at the February 4, 1990 meeting of the Executive Committee that business transacted by the Committee should be published for information to the entire membership. Therefore, we will publish the secretary's transcription of those meetings in the annual Proceedings. We will include the minutes of several meetings in these Proceedings, beginning with those of October, 1985.

Two Executive Committee meetings are held each year, one in conjunction with and at the site of the annual meeting. The other is held in September/October at a location decided by the Executive Committee. Traditionally, these have been rotated among members' states and are predicated by a state representative volunteering to make the arrangements.

Financial statements and status are given out at the annual business meeting for all membership and will not be published in the Proceedings. Questions or requests concerning financial status should be directed to the treasurer, or any of the officers.

We do not include the minutes of the February 4, 1990 Executive Committee meeting in these Proceedings because they have not been approved. In future Proceedings, we will publish the minutes of the preceding year's Executive Committee meeting during the SAAS meeting (February) and the following fall meeting minutes.

A copy of the current By-Laws which describe the function of the Executive Committee are published on pages 102 to 107. These By-Laws were adapted by the open membership at the 1985 meeting in Biloxi, MS as the official guidelines for operation.

RCAS Executive Committee Meeting Minutes
by Jere McBride, Secretary
Little Rock, Arkansas
October 1, 1985

The Executive Committee of the Research Center Administrators Society met at the Coachman's Inn, Little Rock, Arkansas on October 1, 1985. Gary Elmstrom called the meeting to order at 8:30 am.

Committee members attending were:

o Gary Elmstrom	- Florida
o Will Waters	- Florida
o W. C. Loe	- Arkansas
o Bill Webb	- Oklahoma
o Howard Malstrom	- Texas
o Jere McBride	- Louisiana
o Bill Young	- Louisiana
o Gene Morrison	- Mississippi
o Norman Justus	- Missouri
o Bob Freeland	- Tennessee
o Joe High	- Tennessee
o Wallace Griffey	- Alabama
o Ed Worley	- Georgia
o Carl Tart	- North Carolina

Norman Justus moved that the 1986 summer/fall executive committee meeting be held in Shreveport, Louisiana. Bill Young seconded, motion passed.

Bob Freeland moved that the committee meet the first Tuesday of October, 1986. Bill Webb seconded, motion passed.

Gary Elmstrom reviewed the arrangements being made for the 1986 annual meeting in Orlando, Florida. The RCAS meeting will be held in the Lake Room of the Sheraton Twin Towers, 5780 Major Blvd., Orlando 32819, telephone: 305/351-1000.

Elmstrom recommended we lodge at the Howard Johnson's Florida Center Hotel, 5905 Kirkman Rd., Orlando 32805, telephone: 305/351-3333. When calling for reservations, specify SAAS Conference.

Norman Justus indicated the officers should attend a meeting on Sunday, February 2, 1986, at 2 pm in the Cape Canaveral Room of the Sheraton Twin Towers. The Executive Committee will meet later in the evening.

Bob Freeland reviewed his ideas for the 1986 annual meeting program and opened the session for discussion. A program outline was put together and possible speakers were suggested.

Gary Elmstrom appointed an awards committee to be composed of:

Bill Webb - Chairman
Joe High
Wallace Griffey

Awards recognizing outstanding leaders of the past will be given, beginning in 1987 at the Nashville meeting. The state of the honoree is to pay the expenses of the recipient to the meeting.

It was the opinion of the committee that preregistration for the annual meeting should be encouraged. Norman Justus moved that for non-attendance, the preregistration fee may be refunded in full if the request is received by the secretary/treasurer by Thursday prior to the annual meeting and 75% of the fee may be refunded if the request is made within 10 days after the meeting. Joe High seconded, motion passed.

Joe High moved that the 1985 preregistration fee paid by members who could not make it to Biloxi due to adverse weather be used toward their 1986 preregistration fee. Wallace Griffey seconded, motion passed.

Members eligible for the use of the 1985 preregistration fee are:

James F. Brown	25.00	Jere McBride	25.00
Ricky Carlisle	25.00	Robert Moore, Jr.	25.00
Tom Evrard & Guest	45.00	W. Nelson Philpot	25.00
Joe Johnson	25.00	Lawson Safley	25.00

Total: $220.00

The bylaws were reviewed and several changes were made. Changes approved are to be incorporated by the secretary/treasurer and copies mailed to each committee member.

Meeting adjourned.

RCAS Executive Committee Meeting Minutes
by Jere McBride, Secretary
Orlando, Florida, February 2, 1986

The Executive Committee of the Research Center Administrators Society met at 2:00 p.m. February 2, 1986 in the St. John's Room, Sheraton Twin Towers, Orlando, Florida. The meeting was called to order by Dr. Gary Elmstrom, Chairman. Those attending were:

Bill Loe	Arkansas
Wallace Griffey	Alabama
Jere McBride	Louisiana
Gary Elmstrom	Florida
Bob Freeland	Tennessee
Norman Justus	Missouri
Gene Morrison	Mississippi
Jim Tramel	Virginia
Carl Tart	North Carolina
Bill Webb	Oklahoma

The minutes of the executive committee meeting held at Little Rock, Arkansas, October 1, 1985 were read and approved. Various aspects of the annual meeting agenda were discussed to minimize potential problems - registration, meeting rooms and projection equipment, tour and tour buses, and banquet and banquet speaker. Gary Elmstrom announced new arrangements for the Epcot VIP Tour. The tour as originally set up was cancelled. The secretary/treasurer was instructed to return all pre-registration fees collected for the tour. Gary also elaborated on plans for the tour and banquet.

Bill Webb, chairman of the Awards Committee presented the Committee's recommendation for recognizing individuals who have participated and provided leadership to the Society over the past years. Members of the Committee included Bill Webb, Wallace Griffey, and Gary Elmstrom. The Committee recommended the report be given at the annual business meeting with minor revisions. A copy of the revised report is attached.

Jere McBride reported on plans for the summer 1986 meeting which will be held October 7 in Shreveport, Louisiana. The committee will have an opportunity to visit several branch research stations located in northwest Louisiana.

There being no further business, the meeting was adjourned.

RCAS Executive Committee Meeting Minutes
by Bill Loe, Secretary
Bossier City, Louisiana
October 7, 1986

The meeting was called to order by Norman Justus at 8:10. Introductions were made and those in attendance were:

William A. Young - LA	Glenn Taylor - OK	Ed Worley - GA
Will E. Waters - FL	Bill Webb - OK	William C. Loe - AR
Howard Malstrom - TX	Norman Justus - MO	Freddie Peterson - La
Jere McBride - LA	Wallace Griffey - AL	Carl Tart - N.C.
Robert Freeland - TN	Gene Morrison - MS	

Jere McBride read the minutes of the Executive Committee meeting of February 2, 1986 and the minutes were approved.

Awards Committee Report

Bill Webb gave a report from the Awards Committee and recommended that John Ewing of Tennessee be the first individual recognized by RCAS and, if a second were recognized, the committee recommended Robert "Bobby" Moss of Georgia. Motion by Bill Webb and second by Robert Freeland that John Ewing be the individual recognized. Carried unanimously. It was pointed out that John Ewing was the founder of RCAS and discussion was given to including this idea on the plaque to be given him. Howard Malstrom moved and Will Waters seconded that the plaque include the fact that John Ewing was the founder. The plaque is to be presented to him at the annual meeting in Nashville, Tennessee in 1987. Motion carried unanimously.

Also, a plaque for the outgoing chairman was discussed. The Awards Committee Chairman, Bill Webb, was asked to get a plaque designed and available for presentation to the outgoing chairman in February, 1987.

Discussion on Suggested By-Laws Change

The proposed by-laws change by Ron Robbins of Louisiana was discussed. There was discussion on the 45-day minimum limit for by-law change proposals. Action on this proposal was tabled until the annual meeting in February, 1987.

Annual Meeting Program for February, 1987

Several items were discussed to be a part of the program for the annual meeting in 1987 as follows:

1. Hazardous Waste - Jere McBride was given responsibility for developing a program around explanation of the problem, systems of disposal and acceptable storage facilities.

   Several individuals from different states were suggested as possible speakers. The state representatives to the RCAS group are to check with the individuals from their state and get back to Jere McBride on

their willingness to speak on the chosen topic of hazardous waste and their availability to attend the annual meeting in Nashville in 1987.

2. Personnel Problems - Bill Webb is to check on a possible speaker from Oklahoma and get back to Jere McBride.

3. Experiment Station Director - Howard Malstrom is to check with the State Director in Texas and report back to Jere McBride on his willingness and availability.

4. Branch Station Profile - Representatives from Georgia, Oklahoma and North Carolina are to be contacted to present programs.

5. Declining Budgets - For this topic, the Assistant Director from Missouri and Hiram Palmertree of Mississippi were suggested.

The annual meeting is to be scheduled from 8:00 - 12:00 and 1:00 - 4:30 on Monday with a banquet on Monday evening. It will continue from 8:00 - 10:30 AM on Tuesday with a general meeting at 11:00. A tour is to be scheduled for Tuesday afternoon.

1987 Fall Executive Committee Meeting

The Executive Committee meeting for the fall of 1987 will be the first Tuesday in October. After an invitation by Carl Tart, Raleigh, North Carolina was chosen as the place for the meeting.

Committee for Retired Administrators

A committee was appointed to invite the retired RCAS administrators to the annual meetings by changing the by-laws to include those individuals. Norman Justus appointed Jere McBride as chairman of this committee and Bob Freeland, Gene Morrison and Freddie Peterson to serve on the committee.

State RCAS Organization Discussed

The need for state organization for the RCAS was discussed and encouraged.

ADDENDUM

William C. Loe commends the Louisiana group for excellent facilities, foods and tours. All comments heard were positive. My thanks to this group.

RCAS Executive Committee Meeting Minutes
By Bill Loe, Secretary
Nashville, Tennessee
February 1, 1987

The Executive Committee of the Research Center Administrators Society met at 3:00 PM on Sunday, February 1, 1987, at the Opryland Hotel in Nashville, Tennessee. The meeting was called to order by Dr. Norman Justus, Chairman. Those in attendance:

Wallace Griffey	Alabama
William C. "Bill" Loe	Arkansas
Will Waters	Florida
Edward Worley	Georgia
Donnie Davis	Kentucky
W. A. Young	Louisiana
Norman Justus	Missouri
Frank Matto	New Mexico
Will Webb	Oklahoma
Joe High	Tennessee
Howard Malstrom	Texas
Robert Freeland	Tennessee
Jere McBride	Louisiana
Gary Elmstrom	Florida
Jack Cooley	Missouri

After the call to order, Dr. H. Rouse Caffey, Chancellor for the Louisiana State University Agricultural Center, encouraged the RCAS group to get involved with training young researchers to understand the need for getting their research published and into a form useful to agriculture clientele. He expressed concerns of going too far back toward a liberal education and not making "a useful brick of biotechnology".

The Executive Committee discussed the need for a list of emeritus members including the old superintendents' section. This list would be compiled in order for these people to be included on the mailing list as well as be considered for recognition of past accomplishments and contributions. A motion was made by Jere McBride and seconded by Bill Webb that each state representative be responsible for providing this list for his state before the October meeting in Raleigh, North Carolina. The motion passed unanimously. The members listed will be carried by the state as retired RCAS members. Those retirees electing to attend the RCAS meetings as a part of the SAAS would not be required to pay the registration fee but would pay banquet costs, etc. Norman Justus will look into the possibility of a by-law change to cover this discussion.

There was a request from Ron Robbins for a by-law change to refer to the head of the group as "President" rather than "Chairman". This proposed change was discussed and it was pointed out that, according to the annual meeting brochure of SAAS, only two out of fourteen societies use "President". Joe High moved to reject the proposed by-law change; Will Waters seconded the motion. Motion carried and the by-laws will remain as written.

There was discussion on plaques for past chairmen. Wallace Griffey suggested that any past chairman wishing a chairman's plaque should be willing to pay the cost of securing the plaque. After some discussion of ways to pay for the plaques for past chairmen, no final conclusion was reached. A motion was made by Will Waters and seconded by Wallace Griffey that any past chairman desiring a plaque and being willing to pay the cost should send his request to:

Dr. Jere McBride
Red River Research Station
P. O. Box 8550
Bossier City, LA 71113-8550

It was emphasized that it is the responsibility of the state representative to get this information to the retired past chairman in their state. Hopefully, this would be completed before the Raleigh meeting in October.

Carl Tart was unable to attend the Executive Committee meeting and Bill Webb gave a report for him. The next Executive Committee meeting will be on Tuesday, October 6, 1987, in Raleigh, North Carolina at the Downtown Holiday Inn. Tentative plans include the Executive Committee meeting on Tuesday morning, a tour of research facilities Tuesday afternoon and a tour of R. J. Reynolds Company Wednesday morning with lunch following. The Executive Committee will adjourn after the noon meeting on Wednesday.

The Executive Committee meeting was adjourned.

RCAS Executive Committee Meeting Minutes
by W. E. Waters, Secretary
El Paso, Texas
October 4, 1988

1. The meeting was called to order by Chairman Jerry McBride at 8:15 AM.

2. Persons in attendance were:

Will Waters	Joe High, Jr.
Ed Worley	Robert Freeland
Jim Tramel	Jere McBride
Bill Webb	Norman Justus
Gene Morrison	Bill Loe
Wallace Griffey	Joe Musick
James Riley Hill	Carl Tart, Jr.
Jack Cooley	Howard Malstrom

3. Howard Malstrom - Welcomed the group and gave local arrangements information on activities planned including a tour of agricultural areas in west Texas, southern New Mexico and northern Mexico.

4. Status and review of RCAS - Bill Webb - Remarks:

   * RCAS is strong and doing well.

   * Milestone reached this past year in publication of first Proceedings.

   * Reviewed history of early organization and activities to the present time.

   * Concern expressed on ways to create interest and participation in RCAS membership. Suggestion made that each state representative keep the upper administration advised of RCAS activities and invite them as program speakers.

   * Group should always determine the interest and needs of the individual RCAS directors and involve them as program participants.

   Comment by Jerry McBride:

   Need to explore the possibility of split program sessions or some other ways of dealing with small vs. large research centers.

5. Historical Document Committee was appointed by Jerry McBride to develop historical document with early activities of this organization for publication in the Proceedings. Committee: Chairman - Bill Webb; Members - Joe High, Wallace Griffey and Howard Malstrom.

6. Annual Meeting Program (for 1989 meeting in Nashville) Reported by Bill Loe:

* Rooms available Monday and Tuesday for 125 people.

* Program deadline moved up to November 15.

* Several preliminary program ideas presented and discussed.

* Program in 1989 to be developed around (a) legal, (b) safety, (c) mapping research centers, (d) fundamental vs. applied research and (e) management topics.

* Tour, banquet, speaker, ladies activities approved as program items and a local arrangements committee appointed to handle these duties. Committee composed of Dennis Onks, Joe High and Robert Freeman.

7. Group voted a $50 gift certificate to Rosa Maese of the El Paso staff for typing and other assistance with publication of Proceedings. She was also given a copy of Proceedings autographed by all members present.

8. Membership - J. McBride Reported:

   * New group interested in joining RCAS (Business Managers of Experiment Stations). By-laws now allow other administrative persons to join and participate.

   * Sustaining membership discussed.

   * Committee appointed to evaluate sustaining and other types of new membership as follows: Jerry McBride, Chairman; Joe High and Joe Musick, members.

9. Secretary/Treasurer was directed to mail to Board of Directors a copy of by-laws change (Article 4, Section 6) passed at the January 31, 1988 Board meeting.

10. Management - Ed Worley. Motion by Norman Justice seconded by Wallace Griffey and passed directing Ed Worley to look into the possible locations for permanent bank accounts and follow through with Will Waters.

11. Future Officers - Norman Justus reported:

    (1) Survey of officer selection (attached).

12. Proceedings - Howard Malstrom Reported:

    * 1988 Proceedings Cost - $1200 for materials, $600 paid by society, sales of $120 for Proceedings. No labor charges involved.

    * Talks taped, transcribed, edited, reviewed by authors, returned and typed. About 6 weeks. One full-time secretary time and part-time for Malstrom.

* Comments and recommendations by Malstrom:

  (a) Challenges on how to effectively collect talks or manuscripts.
  (b) Recommended taping all talks at least for next year.
  (c) Recommended a Committee of 5 people to transcribe talks.
  (d) Emphasized all speakers to submit text of talk.
  (e) Howard Malstrom to collect and edit from the transcribers.
  (f) Reimburse for all costs.
  (g) Appoint assistant to help Howard Malstrom.

* Chairman McBride appointed a Publications Committee to implement these recommendations for next year and to develop publication guidelines. They are as follows: Howard Malstrom, Chairman; James Riley Hill, Carl Tart, Jack Cooley and Gene Morrison.

* Registration fees vs. publication cost. Jerry McBride requested that each individual discuss within each state group a $30 registration fee at annual meeting.

13. Awards Committee report by Wallace Griffey

* Joe High (Tennessee) was recommended and approved for Outstanding Contributions to RCAS.

* Awards Committee should be appointed by Chairman at Executive Committee meeting allowing one year to make selection of nominee.

* Recommend By-Laws change to make this permanent.

* Recognition of retirees - State reps send Wallace Griffey a list of retirees from each state during the past year or planned in the coming years.

14. Special Activities - James R. Hill. Discussed possibility of having tours not necessarily connected with SAAS meeting or RCAS Executive Committee Meeting.

    Motion by James R. Hill, Second by Bill Webb to study possibility of such tours. Committee appointed as follows: James R. Hill (Chairman), Bill Webb and Bob Freeland.

15. Fall 1989 Meeting - Discussed moving Executive Committee meeting to different time to avoid conflict with Agronomy meeting. Chairman McBride set the next meeting for September 26, 1989. Several locations were discussed; Columbia, S.C., Outer Banks, N.C., Middle Tennessee. Executive Committee selected Columbia, S.C. for site.

16. 1989 Awards Committee - appointed by Howard Malstrom as follows:
    Joe Musick (Louisiana) - Chairman
    Ed Worley (Georgia)
    Carl Tart (N.C.)
    Joe High (Tennessee)

Report at September 1989 meeting for vote (solicit nominees prior to February 1989 meeting).

17. Comments

(1) Executive Committee members are encouraged to bring an alternate to meetings to "get their feet wet."

(2) Meeting adjourned 4:10 PM.

RCAS Executive Committee Meeting Minutes
by Will Waters
Nashville, TN
February 3, 1989

1. Meeting called to order by Chairman McBride at 3:10 PM. Minutes of the El Paso meeting were distributed. Motion was made, seconded and passed to approve minutes as presented.

   Financial report was distributed by W. E. Waters who reported that 47 had pre-registered plus several who registered with SAAS. Balance of $3,225.25 as of February 3, 1989. Discussion followed relative to audit. Chairman McBride asked that Loe and Worley go over records with Waters in lieu of audit. Bill Loe moved and Gene Morrison seconded accepting treasurer report.

2. Program for annual meeting - Howard Malstrom reviewed meeting details for presentations. Bill Loe stated that program had few changes - add David Calvert who would give presentation on agriculture in China Tuesday.

3. Local arrangements report - Dennis Onks, Tennessee. Two buses are scheduled for tour and coffee ordered for all meeting sessions.

4. By-Laws Change - Motion by W. E. Waters and second by Wallace Griffey to approve the proposed by-law change of Article 4, Section 6 to add to the duties of Second Vice president duties the following: "Assist Secretary/Treasurer in registration at annual meeting." Motion passed.

5. Nominating Committee Report - Jere McBride reported that the Nominating Committee recommends Dr. James Riley Hill to the post of Secretary/Treasurer and all other officers be advanced to the next highest level office in accordance with by-laws. Recommendation will be presented to membership at business meeting for final action.

6. 1988 Retirement Report - Wallace Griffey. Requested each state furnish him with a list of retiring Center Directors/Superintendents for recognition at annual meeting.

7. Special checking account report - Ed Worley. Motion by Joe High and second by Bill Webb to request Ed Worley apply for employer identification number with the Department of Treasury. Motion passed.

8. Secretary and Treasurer position - Motion by Howard Malstrom and second by Joe High for Chairman to appoint a committee to study and report back at next September meeting the feasibility of appointing a permanent Secretary and Treasurer. Motion passed.

9. Fall 1988 Executive Committee report - Submitted by James Riley Hill and read by Ed Worley. Scheduled for September 26-29 with business meeting first day of meeting in Charleston, South Carolina. Tuesday, September 27 - Charleston area - for wives attending. Wednesday - proposed visiting Edisto Station and Savannah River Ecology Lab.

Thursday, September 28 - visit Charleston area and Coastal Hort Center, USDA Veg. Lab., USDA Forestry Lab and tea plantation, Kiwi Nursery, Middleton Plantation as possible sites.

Friday, September 30 - Brookgreen Garden, Hobcow Forestry Plantation, new golf course under construction and the P.D. research facility near florence, S.C. as possible.

Registration fee will be approx. $100 for all events.

Dr. Riley - Special activities. Asked about the possibility of inviting general membership to S.C. meeting. This was proposed by chairman McBride. Howard Malstrom, Ed Worley and W. E. Waters asked to meet with James Riley Hill to review trip activities.

10. Membership Committee Report - Jere McBride. Committee appointed at last Executive Committee Meeting composed of Joe High, Jere McBride and Joe Musick to evaluate different ways of enlisting sustaining members and report back on this at the next September meeting.

11. Publication Committee Report - Howard Malstrom. Gave update on 1988 Proceedings and plans for 1989. 1988 proceedings handled by Malstrom, who taped talks, transcribed and edited, sent to speakers for additional editing, returned and printed. Very time consuming job but did produce and excellent Proceedings. Cost to RCAS about $1,000 of which $600 has been paid to date.

    1989 - Malstrom agreed to follow these same procedures for one more year to produce 1989 Proceedings. Future Proceedings publication procedures must be resolved and funded.

    Special note of thanks by Executive Committee was expressed to Malstrom for the tremendous job and special effort put forth in printing the first proceedings.

12. Meeting adjourned.

RCAS Executive Committee Meeting Minutes
by James Riley Hill
Clemson, South Carolina
September 26, 1989

The 1989 Fall meeting of the RCAS Executive Committee was held on September 26, 1989 in the Nancy Thurmond Conference Room of the Thurmond Institute on the campus of Clemson University. The meeting had been rescheduled from Charleston, South Carolina because of damage done by Hurricane Hugo on September 22. The meeting was called to order at 8:00 a.m. with the following people attending:

David V. Calvert
Tom Evrard
Robert Freeland
Joe High, Jr.
James Riley Hill, Jr.
R. L. Horsburgh
Ben Kittrell
Carl Tart
Will Waters
Bill Webb
Ed Worley
Bill Loe
Jere McBride
Howard Malstrom
Gene Morrison
Joe Musick
Dennis Onks
Jim Pitts
Mike Schubert
H. P. Viator
F. T. Withers, Jr.

1. The meeting was opened by Howard Malstrom, Chairman of the Executive Committee. After each participant had introduced themself, Chairman Malstrom stated that the primary purpose of the meeting was to plan for the annual meeting to be held in Little Rock, Arkansas on February 5 & 6, 1990. He referred the group to the By-Laws and suggested that this committee probably needed to spend more time meeting than in previous years in order to cover all the business of the organization.

2. James Riley Hill, Sec/Tres and host for the meeting, welcomed the group and went over the local arrangements for the Executive Committee meeting and the events that would follow in South Carolina. Hurricane Hugo forced a number of changes and rescheduling of tours was explained.

   A discussion was held regarding refunds if any money is left over from that collected for the Executive Committee meeting and associated tours. Hopefully, some of the deposits made in the Charleston area will be refunded since the events in that area had to be cancelled. These refunds had not been received and the exact costs of the transportation for the rescheduled events had not been determined; therefore, no decision on refunds was made at this time.

3. A lengthy discussion of potential program topics and speakers was held to assist Ed Worley in preparing for the Annual Meeting. Some of the topics suggested were:

a. Information on mode of operating in the host state

b. Food Safety

c. Maintaining maintenance research and future funding for Agricultural Research

d. Acquisition and use of Surplus Property

e. How to keep control when contracting with industry

f. Literature searches that are available to Centers

g. Irrigation systems and water disposal

h. Research Centers in an urban environment. Example of the problem: 1000 people are coming into Florida per day. How is this being addressed?

i. Research/Extension relationships. Suggestion was made that we get as many free speakers as possible.

4. Local arrangements for the 1990 meeting were discussed by Bill Loe. Tentative plans are to tour Heifer Project International at Perryville, Arkansas and Winrock International at Morrilton, Arkansas on Monday afternoon. The banquet will be at Winrock International Headquarters. A tour for spouses is being planned for Tuesday. Bill Loe and Thomas Evrard will be in charge of local arrangements for the 1990 meeting.

5. Dr. Horace Fleming, Director of the Thurmond Institute at Clemson University welcomed the group and explained the history and function of the Thurmond Institute. The group enjoyed the use of the excellent conference room of the Institute.

6. The Historical Data Committee report was given by Bill Webb. Members were encouraged to help by providing historical information on the society.

7. Howard Malstrom gave an update on the status of the proceedings for the 1989 meeting. He is waiting on one paper. He thanked Bill Loe for getting papers from the speakers and requested a list of names of secretaries who helped transcribe the taped recordings so they can be acknowledged. The cost will be about the same as last year ($1,000 for 300 copies). This includes the cost of paper and binding. Howard Malstrom has copies of last year's report (1988). Anyone wanting copies of the old report should contact him. The 1989 proceedings will be sent to the state representatives for distribution.

Persons registering at the 1989 annual meeting in Nashville get a free copy. Additional copies are available for $5 per copy. Copies should be sent to libraries in the respective states.

Gene Morrison expressed thanks to Howard Malstrom for putting the proceedings together.

Bill Loe asked if Howard Malstrom had gotten reimbursed for all expenses related to the proceedings. Malstrom replied that the proceedings will probably cost $1,000, and this may require $600 from registration. Malstrom agreed to help prepare the 1990 proceedings. He asked that the same group as last year help with the 1990 proceedings. Those on the editorial/publications committee were James Riley Hill, Gene Morrison and Carl Tart. Pre-written manuscripts should be obtained from all speakers, if possible.

8. Howard Malstrom asked if the membership present felt comfortable with registration fees. Considerable discussion followed. Jere McBride reported that the membership committee will try to get help from industry sponsors. Joe High and Will Waters suggested that we need to look at the response to the recent questionnaire that was sent to the membership before making a decision on this matter.

9. Will Waters, past Sec/Tres, gave the financial report.

10. The consensus of the committee was that we charge the same registration fee ($25) for the 1990 meeting as in 1989.

11. Jere McBride gave the Membership Committee report and discussed the possibility of having sustaining memberships. By consent, the report was tabled until the regular meeting in February.

12. The Annual Meeting receipt should be changed to read registration and tour.

13. Howard Malstrom referred the group to Article II of the By-Laws dealing with State Representatives. He pointed out the need for continuity. After discussion of the issue, a general consensus was reached that the Executive Committee should go on record encouraging states to change state representatives on the Executive Committee after 2 years. No formal action was taken. By-Laws will not be changed at this time.

14. The Nominating Committee will supply names of nominees to Howard Malstrom. If current officers do not want to move up, they should let the Nominating Committee know. If everyone agrees to be considered for the office they are scheduled to move into, the only new nominee will be for Sec/Tres. Jim Trammel, Virginia was suggested for consideration.

15. Job descriptions are outlined in the By-Laws. All current officers are encouraged to expand on the job description of the job they hold. Each officer should take the current job description and add to it

any comments that they desire. These should be passed on to the new officers.

16. A discussion of the bank account was held. The Sec/Tres was instructed to get the ID number on the current bank account changed or changed the account to Barnwell, SC and use the RCAS ID number.

17. The Sec/Tres was instructed to bring the mailing list up-to-date.

18. Jere McBride discussed the questionnaire that was sent to the membership.

19. Recognition of members was discussed. Joe Musick requested nomination for awards to be sent to the Awards Committee. Forms requesting nominations for awards need to be sent out in time for the Recognition Committee to make a report to the Executive Committee. Since this cannot be done in time for the 1990 meeting, nominations were called for during the present meeting.

    Wallace Griffey and Jere McBride were nominated. Bill Loe made a motion to close the nominations, seconded by Joe Musick. After a discussion, Bill Loe, with the consent of the second, withdrew his motion.

    Nominations were reopened and Wallace Griffey, Jere McBride, Bill Webb and Henry Marshall were nominated. Joe High moved that the nominations be closed. Second by Carl Tart. The motion passed.

    A discussion of nominees followed. A vote was taken on the nominees. Bill Webb and Wallace Griffey received 7 and 6 votes, respectively.

    Mike Schubert moved that the Society make two awards this year. Seconded by Ed Worley. Motion passed. Based on this action, Wallace Griffey and Bill Webb will both receive an award for outstanding service to RCAS.

20. Will Waters moved that the Committee approve the Sec/Tres report on the Nashville meeting. After a second, the motion passed.

21. Jere McBride moved for the Executive Committee Chairman to appoint a committee to study a line of progression and determine how we could appoint a Treasurer for three year terms. Second by Bill Webb.

    Discussion pointed out that after the report is made, a change in By-Laws would be required. Motion passed. Howard Malstrom appointed Jere McBride (Chairman), Will Waters and James Riley Hill to study the matter of having a Treasurer with a 3 year term and to report at the Little Rock Meeting.

22. Announcements regarding evening events and tours were made.

23. Meeting adjourned at approximately 5:00 p.m.

BYLAWS
of the Research Center Administrators Society
of the Southern Association of Agricultural Scientists

Article I
Name

The name of this organization shall be "Research Center Administrators Society" and for the purpose of this document shall be frequently referred to as "Society."

Article II
Objectives

The objectives of the Research Center Administrators Society shall be to hold educational meetings; to provide opportunities for interaction with colleagues; and to enhance the profession within the scientific community.

Article III
Members

Section 1

The membership shall include superintendents, resident directors, center directors, and other individuals with various titles having administrative responsibilities involving a field station, branch station, research station, research center, or other branch research facility of a state agricultural experiment station or any other public or private agricultural research organization.

Section 2

Membership shall be composed of regular and active members. Any unit head of a branch research facility in any participating state shall be considered a regular member. Any individual, with administrative responsibilities involving a satellite research facility, who attends the annual meeting and pays the designated fees shall be considered an active member with all rights and privileges afforded by the Society.

Article IV
Officers

Section 1

The officers of the Society shall be a Chairman, a First Vice-Chairman, a Second Vice-Chairman, and a Secretary-Treasurer. These officers shall perform the duties prescribed by these bylaws and by the parliamentary authority adopted by the Society.

Section 2

The officers shall be elected by rising, show of hands, or by voice vote to serve for one year or until their successors are elected, and their term of office shall begin at the close of the annual meeting at which they are elected.

Section 3

No member shall hold more than one office at a time, and no member shall be eligible to serve more than one consecutive term in the same office.

Section 4

Duties of the Chairman shall include:

- o Serve as overall coordinator of Society activities;
- o Preside at annual meeting;
- o Prepare letters for distribution to State Agricultural Experiment Station Directors requesting them to invite and to encourage attendance of membership from their state at annual meeting;
- o Appoint Nominating Committee in accordance with bylaws;
- o Appoint Local Arrangements Committee Chairman;
- o Serve as a member and attend Executive Committee meetings;
- o As immediate past Chairman serve as Executive Committee Chairman.

Section 5

Duties of the First Vice-Chairman shall include:

- o Serve as Chairman of the Program Committee;
- o Mail copy of program to Secretary-Treasurer of the Southern Association of Agricultural Scientists at designated time;
- o Mail copy of program to all Society officers;
- o Serve as a member and attend Executive Committee meetings.

Section 6

Duties of the Second Vice-Chairman shall include:

- o Serve on Program Committee;
- o Perform other duties as Chairman assigns;

- o Serve as a member and attend Executive Committee meetings;
- o Assist the secretary with registration at the annual meeting.

Section 7

Duties of the Secretary-Treasurer shall include:

- o Serve as fiscal officer;
- o Responsible for registration at annual meeting;
- o Collect fees at annual meeting;
- o Prepare minutes of business session, prepare financial statements; prepare attendance roster from registration cards; and send copies of each to incoming and outgoing Chairman and Executive Committee officers.
- o Mail program and other appropriate information to membership.
- o Serve as a member and attend and serve as Recording Secretary of Executive Committee meetings.

Section 8

Duties of the Local Arrangements Representative:

- o Survey assigned meeting room well in advance of annual meeting and decide if adequate;
- o Set up and arrange for banquet and/or social;
- o Arrange for coffee breaks at annual meeting;
- o Arrange for visual aid equipment and other needed equipment;
- o Coordinate all of the above with other Program Committee Members;
- o Shall have the option to solicit additional assistance from the membership as needed;
- o Attend the Executive Committee meeting prior to annual meeting at the invitation of the Chairman.

Article V
Meetings

Section 1

The regular meeting of the Research Center Administrators Society shall be held annually and in association with the Southern Association of Agricultural

Scientists, unless otherwise ordered by the Society or by the Executive Committee.

Section 2

Special interim meetings can only be called by the Chairman in conjunction with the Executive Committee.

Section 3

Active members in attendance at any regular or special meeting shall constitute a quorum.

Article VI
Executive Committee

Section 1

The Executive Committee shall consist of current officers, the immediate past Chairman, and one representative from each participating state.

Section 2

The Executive Committee shall have general supervision of the affairs of the Society between its annual business meetings, fix the hour and place of meetings, make recommendations to the Society, and shall perform such other duties as are specified in these bylaws. The Committee shall be subject to the orders of the Society, and none of its acts shall conflict with action taken by the Society or the Southern Association of Agricultural Scientists.

Section 3

The immediate past Society Chairman shall serve as Chairman of the Executive Committee. In his absence, the current Society Chairman will serve as Chairman.

Section 4

State Representatives shall be selected by the regular Research Center Administrators Society membership of their respective state. Each state Representative will serve a minimum of two years.

Section 5

The Executive Committee shall meet at least twice annually. One meeting will be held during the summer and one meeting will be held the day prior to the annual meeting. The Chairman of the Executive Committee shall establish the date and place of the summer meeting.

Section 6

Duties of Executive Committee Chairman:

- o Preside over Executive Committee meetings;
- o Set date and place of summer meeting;
- o Establish program agenda;
- o Provide committee members with agenda 30 days prior to meeting;
- o Appoint Executive Committee sub-committees.

Article VII
Committees

Section 1

A Program Committee shall be appointed by the Chairman to be headed by The First Vice-Chairman and to include the Second Vice-Chairman and the Local Arrangements Representative. The duties of the Committee shall be to plan the annual program of the Society. This committee shall submit a progress report on the program plans to the Executive Committee at its regular summer meeting.

Section 2

The Chairman shall appoint a Nominating Committee consisting of three immediate past Chairmen. The Committee shall be appointed during the Executive Committee meeting held the day prior to the annual meeting. It shall be the duty of this committee to nominate candidates for the offices to be filled. The Nominating Committee shall report during the business session and prior to the election of officers. Before the election, additional nominations from the floor shall be permitted.

Section 3

Special committees shall be appointed by the Chairman as the Society or the Executive Committee shall from time to time deem necessary to carry on the work of the Society. The Chairman shall be ex-officio a member of all committees except the Nominating Committee.

Article VIII
Parliamentary Authority

The rules contained in the current edition of "Robert's Rule of Order Newly Revised" shall govern the Society in all cases to which they are applicable and in which they are not inconsistent with these bylaws and any special rules of order the Society might adopt.

Article IX
Amendment of Bylaws

Section 1 - **Amendment by Active Membership**

The bylaws can be amended by a two-thirds vote of the active membership during the business session of the annual meeting. Notice of the proposed change must be given to the Society Chairman one week prior to the annual meeting. The notice shall include the full text of the amendment.

Section 2 - **Amendment by Executive Committee**

The bylaws can be amended by action of the Executive Committee provided strict procedures are followed. A member proposing the amendment shall provide the Executive Committee Chairman with the full text of the proposed change. The Chairman shall distribute copies of the full text to the committee members 45 days prior to the voting deadline. At the time of distribution, the Chairman shall establish the voting procedure and deadline. Voting may be by letter, telephone with confirming letter, or by roll call if taken during an Executive Committee meeting. State Representatives of the Executive Committee are to review the amendment with their respective delegation and cast one vote reflecting the delegations view. A two-thirds vote of the Executive Committee members voting is required for adoption of an amendment. The Chairman shall announce the results, revise the bylaws to include the amendment and distribute the revised bylaws to the Society membership.