

AGRICULTURAL RESEARCH AND EXTENSION

HEARING

BEFORE THE

SUBCOMMITTEE ON CONSERVATION, CREDIT,
RURAL DEVELOPMENT, AND RESEARCH

OF THE

COMMITTEE ON AGRICULTURE
HOUSE OF REPRESENTATIVES

ONE HUNDRED EIGHTH CONGRESS

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AGRICULTURAL RESEARCH AND EXTENSION

MONDAY, MARCH 29, 2004

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON CONSERVATION, CREDIT,
RURAL DEVELOPMENT, AND RESEARCH,
COMMITTEE ON AGRICULTURE,
Athens, GA.

The subcommittee met, pursuant to call, at 10:02 a.m., in the Masters Auditorium, Center for Continuing Education, University of Georgia, Athens, GA, Hon. Frank D. Lucas (chairman of the subcommittee) presiding.

Present: Representative Burns.

Staff present: Ryan Weston, subcommittee staff director; Claire Folbre, and Andy Johnson.

OPENING STATEMENT OF HON. FRANK D. LUCAS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF OKLAHOMA

Mr. LUCAS. Good morning and I would like to thank all of you for being here today, and I would like to thank Congressman Burns for hosting the subcommittee for this field hearing today. Congressman Burns has been a fantastic addition to the subcommittee. Coming from an educational background, he is a strong advocate for agricultural research and extension programs, and we are excited to have a chance to learn about the great work being done here in Georgia.

This is my first field hearing in the Southeast since becoming subcommittee chairman before the 2002 farm bill. We have had hearings in the middle of the country and plan to have some more farther west. By traveling around the country we have the unique opportunity to hear what is happening in the world of agricultural research and extension outside of Washington, DC—yes, there is a world outside of Washington DC—and to see how the rubber meets the road with Federal and State funds, and some of us are quite aware that the business of researching never stops and the benefits to everyday consumers are many times overlooked unfortunately.

By taking a brief look at the statistics, it is easy to see how important agricultural research is in the United States, and in the 1960's, we should remember, that one farmer supplied 25.8 people in the United States and abroad with their food. In 1994, one farmer supplied food for 129 people in the United States and abroad. The efficiency of U.S. farmers also benefits the United States consumer in the pocketbook. U.S. consumers spend approximately 9 percent of their income on food compared with the 11 percent in

the United Kingdom, 17 percent in Japan, 27 percent in South Africa, and 53 percent in India. Those are amazing statistics.

Only through the best research in the world have U.S. producers been able to become so efficient and productive; however, we cannot take past successes for granted and become complacent. We need to get the word out what agricultural research has accomplished. November 2, 2003 marked the 50th anniversary of the establishment of the Agricultural Research Service. Although the Agricultural Research Service can trace its heritage back to the early 19th century seed collection efforts of the U.S. Patent Office, as an agency ARS is only 50 years old.

Events such as ARS' anniversary gives us the opportunity to highlight the benefits society has received from agricultural research. Such as the fact that infant formula today is more like a natural mother's milk than ever before and the peanut allergens and avian flu outbreaks will be more controllable, or are much less likely to occur in the future because of agricultural research.

This subcommittee is a great champion in working to help improve the historic successes of Agricultural Research Education and Extension programs. To do this, however, we need sound ideas regarding how we might achieve structural improvements in order to garner and efficiently use future increases in this essential investment.

I would like to remind every one that nearly all funds for Agricultural Research Extension and Education come out of discretionary funds controlled by the Appropriations Committee. Those entitlement funds that were set aside in 1996 through the fund for rural America, and in 1998 and 2002 farm bills through the initiative for future agriculture and food systems were limited or prohibited from being used by appropriators. And in so doing, these efforts were offset to fund other priorities such as nutrition programs, food safety inspections, plant and animal health inspection. In the coming years, the budgets will not be any easier to balance for the authorizing committees or the Appropriations Committee.

We need sound arguments to show why these programs are deserving of the current and higher levels of funding. While I am certain that many of us up here on this dais—all of us would love to find additional resources for research, education and extension programs—our role is not to appropriate, but as authorizers instead to establish policy not only on how these funds should be used but in addition how we might leverage Federal investments by encouraging investments by State, local governments and the private sector. That is why today I am asking for clear direction on what the subcommittee can do to improve the structure and administration of these programs. If we can continue to demonstrate that the programs available are being used efficiently, effectively and in the best interest of the public then we have a better chance of ensuring the necessary support to increase Federal investment in these programs.

I know that we must continue to do current research, start new research initiatives, and use the universities and extension to get the applied benefits out to consumers. Help us let the consumers know what a great job you are doing. I look forward to today's tes-

timony as we review research and extension programs. And I turn now to my colleague Mr. Burns for any comments he may offer.

OPENING STATEMENT OF HON. MAX BURNS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF GEORGIA

Mr. BURNS. Thank you, Mr. Chairman; first of all, good morning. It is good to be in Athens, it is good to be at the University of Georgia. I welcome you to an agriculture field hearing. This is the second field hearing that I have had an opportunity to participate in this spring. A few weeks back Chairman Lucas and I and others in the Agriculture Committee were in Houston to talk about animal identification and BSE. One of the things I found is that we learn more from getting out of Washington than we ever learn from staying in Washington. So, I want to thank the University of Georgia. I would like to thank our witnesses for being here this morning and I certainly want to thank Mr. Lucas as the chairman of the Subcommittee on Conservation, Credit and Rural Development, and Research for holding this field hearing.

The university has been very gracious in allowing us to use their facilities and the story here at the university itself is an important part of agriculture in Georgia. In 1784 the Georgia General Assembly set aside 40,000 acres of land for the university and Georgia became the first State to charter a State supported university on January 27 the following year.

Since that time, Georgia has greatly expanded its economy to include services and manufacturing, but there is no doubt that agriculture is still our No. 1 product. Research that is conducted here at the university is critical to maintaining our agricultural base and ensuring that we will also be the most agriculturally productive Nation on Earth. The continued funding of agricultural research as an ongoing cooperation between the State of Georgia and the Federal Government should make the future of agriculture in our State as bright as the past.

I look forward to the comments and insights of our witnesses today and I thank them for their positive contribution to American agriculture.

Thank you, Mr. Chairman, I yield back.

Mr. LUCAS. Thank you, Mr. Burns and for the sake of proper procedure, I will note that this is a call to order of the Subcommittee on Conservation, Credit, Rural Development and Research to review Agricultural Research and Extension Programs and to note that due to time constraints we attempt to operate under the 5-minute rule and we encourage all of our witnesses whenever possible to summarize their testimony and to note that their entire written statements will be included in the hearing record, and with that, let us turn to our first panel today.

Dr. Gale Buchanan, dean, College of Agricultural and Environmental Sciences, University of Georgia, here in Athens, and also, Dr. Sharon Nickols, dean of the College of Family and Consumer Sciences, University of Georgia, here in Athens, also. The witnesses may proceed when they are ready.

STATEMENT OF GALE BUCHANAN, COLLEGE OF AGRICULTURAL AND ENVIRONMENTAL SCIENCES, UNIVERSITY OF GEORGIA, ATHENS, GA

Mr. BUCHANAN. Thank you, Mr. Chairman, members of the subcommittee, I appreciate very much the opportunity of appearing before you this morning. Those of us at America's land-grant universities thank you for your interest and support of agricultural research, extension and education programs. It is also an honor to have you on the campus, Athens campus, of the University of Georgia.

America's agricultural research, extension and education system as you know is one of the finest in the world. Even though the systems traces its lineage back to the 1800's, it is still relevant today and very much a part of modern agriculture. Unfortunately, the system is in great jeopardy, not because of a failure to perform but really because it has performed too well and too often is taken for granted.

The Morrill Act of 1862, which created the land-grant university system, was truly some of the most innovative and creative legislation ever conceived by man in this country or any other country.

Subsequent legislation in 1887, which created the Hatch Act providing for our unified system of Agricultural Experiment Stations, and in 1914 the Smith-Lever Act, which provided for our Cooperative Extension Service put the tripartite mission of the land-grant university in place.

Unfortunately, in recent years, Federal support has rapidly diminished, particularly in the past decade. In fact, in the past year due to severe financial constraints Federal budgets for these programs was reduced 10 percent for 33 different programs in the Cooperative State Research, Education and Extension Service. This Act has certainly impacted on us here in Georgia. Clearly our agricultural research, extension and education program is in great jeopardy because of the failure to provide adequate funding.

Base support for programs at the University of Georgia in the College of Agriculture and Environmental Sciences includes \$4.6 million for support of research through the Hatch Act and \$9.8 million for extension through the Smith-Lever Act. Just to illustrate, if we look at the appropriations for the Cooperative Extension Service from Federal support, it has been essentially flat for the past decade. If you factor in salary adjustments which we have had to make from other sources you get the middle line and if you add inflation to that you get the bottom line which clearly shows we lost over half of the buying power of Federal appropriations for these programs. If you go to the Experiment Station, we have about the same picture, even though we did have a nice bump in 1999, the bottom line is that we lost half of the buying power for Federal support for research in only a decade.

I think you will agree with me that if this trend continues in only a couple of decades Federal support for research and extension will be insignificant in the grand scheme of things. I quickly acknowledge that this is only support for base programs. We have made up a lot of this through competitive grants for special earmarks and other sources of funding.

A key question is why have we lost capacity for these programs when other Federal agencies have experienced phenomenal growth in recent decades. I am not sure I can answer the question definitively, but I do have some thoughts. While the executive branch still recognizes ownership of research and development in most Federal agencies, this does not appear to me to be the case with agriculture, forestry, families, and veterinary medicine.

Another problem exists with no easy answer. When research, extension and education programs are put in the same ring with commodity programs, I can tell you who wins every time. Our situation demands an urgent response because the future of this Nation greatly depends upon its successful agricultural sector. Research and education are critical to that success.

As Congress debates its budget and appropriations strategies for this fiscal year, we are asking for support for programs funded through the U.S. Department of Agriculture's Cooperative States Research, Education and Extension Service. These formula funds are administered by the Cooperative States Research, Education and Extension Service, they include the Hatch Act funds, McIntire-Stennis, Evans-Allen, Smith-Lever, Animal Health, 1890's funding that support all of the programs that are an important part of the land-grant university.

Other vital CSREES efforts include the National Research Initiative and similar competitive grant programs. USDA is only able to fund about 15 percent of its proposals. Other agencies such as the National Institutes of Health, National Science Foundation and others provide almost twice as many funding projects as occurs in agriculture.

To combat nutritional illiteracy and the epidemic of obesity, land-grant universities conduct research into the root causes of obesity and manage education and outreach programs such as Expanded Food and Nutrition Education Program known as EFNEP. To protect their farms and food supplies from natural or introduced threats, we are developing innovative practices and technologies that help shore up our vulnerability to damaging agents and enable rapid response to any type of outbreak that might occur.

To foster environmental stewardship, we promote farm, forest and rangeland health, reduce water and air contamination, enhance fish and wildlife, reduce farm production waste, conserve biodiversity, and limit the impact of land use development on natural resources. In order to meet the critical need to maintain agricultural programs, we prioritized our needs for the coming year into four major categories and I will mention those briefly.

Restore the \$20.6 million in 33 CSREES programs that was cut by 10 percent.

Increase funding for facilities and capacity building in the Nation's land-grant universities at the 1890 schools.

Restore the cuts made to the EFNEP program and increase competitive grants to the NRI to the \$180 million level.

I believe these are modest requests in order to meet the needs of American agriculture. The American consumer today still spends less of his disposable income for food than does any other consumer in the world. Indeed, support for research, extension and education should be viewed as an investment in our future.

Thank you for the opportunity to make these comments.

[The prepared statement of Mr. Buchanan appears at the conclusion of the hearing.]

Mr. LUCAS. Thank you, Dean.

Dean Nickols, whenever you are ready.

STATEMENT OF SHARON NICKOLS, DEAN, COLLEGE OF FAMILY AND CONSUMER SCIENCES, UNIVERSITY OF GEORGIA, ATHENS, GA

Ms. NICKOLS. Thank you.

I appreciate the opportunity to be with you today to share with you the human side of some of the agricultural and rural development issues. And as Dean Buchanan mentioned, we are part of the land-grant university, the teaching research and extension programs. The College of Family and Consumer Science's motto is putting knowledge to work, when we work with the extension program.

I would like to share with you just a little bit of information about the State of Georgia prior to commenting on the work we do through extension and experiment stations. We have 8.6 million population in our State. We have a fast growing State, we added 1 million to the population during the last decade. We are the tenth largest population in the country. We have increased population diversity as a result of that growth and particularly in terms of our Latino population. Georgia's a young State, we have 30 percent of our population under the age of 18. That is a little higher than the national average, but we are getting older.

We also suffer from persistent poverty, and among the 11 States that were included in a recent study, 242 counties were identified as persistent poverty over three decades. Unfortunately, 91 of those are in the State of Georgia, 1.1 million Georgians are in poverty. And even among those who have a relatively secure economic situation, we do have financial difficulties including having the third highest bankruptcy cases in the Nation.

Georgia ranks 41st, that is tenth from the bottom, in quality of life for children. One of the issues that we face is the challenge of providing adequate child care, especially in rural areas where there are few opportunities for training for child care.

Dean Buchanan mentioned the issue of obesity which leads to the chronic diseases of diabetes, heart disease and cancer and all of these data are higher for Georgia than is the national average.

We also have the challenge of food safety in our food service systems. And we are meeting all of these, including attention to housing, which is becoming increasingly of concern to us with our growth in population.

So what are we doing? We cover all of these areas. We have focused on the priorities that are listed here, the five priority areas, and working in particular with at-risk audiences, 63 percent of our program participants are from low income families.

One of our main areas is nutrition and health and also, the food safety initiative. Dean Buchanan mentioned the Expanded Foods and Nutrition Program. We also have the Food Stamp Education Program which in Georgia we call the Family Nutrition Program,

and programs to reduce obesity though attention to diabetes, weight reduction as well.

Our Food Handler Program is one that helps to assure economic growth in our population. We have reached 10,000 people with the Food Handler Education Program, providing certification that leads to job security, and better provision of food safety. The University of Georgia hosts the National Center for Food Preservation; and yes, indeed people do continue to preserve food at home.

We provide child care training to this \$1 billion industry in our State and as you know the early years of development, the first 3 to 5 years of life, are critical for early brain development for children which leads to their further academic success. And as I mentioned this is one of the few opportunities for our citizens in rural areas to receive this training, through the extension service.

We have a partnership with the Governor's Office of Highway Safety in which we provide large number of training programs particularly for infants, seatbelt safety, and we believe we have saved the lives of 125 children in the past year. We also have received the CYFAR Grant and this grant for the coming 5 years is focusing on young boys at academic risk and also, Latino families.

In order to address the financial security issues that we have in the State we are providing financial education to consumers. We brought back to the State \$1.3 million in tax refunds by enabling people in some of the counties to get their earn income credit. That of course goes directly back into the Georgia economy.

And in the area of housing and environment, we are working on indoor air quality, availability of housing, and affordability of housing and environmental issues of water, energy, and waste. One of the unfortunate impacts of the reductions in support from both Federal and State budgets has been our inability to completely serve the counties of the State. We went to a multi-county model a few years ago, in which our county agents in Family and Consumer Sciences are serving three or two counties in some cases. And this has left us with a result of 62 counties without services now in the State. We would actually need 80 county agents to adequately serve Georgia.

And just to briefly summarize some of the work that we are doing in the area of research which also addresses all of these problems and in addition the textile industry which is so vital and important to the State of Georgia. Our research on textile quality is addressed in cotton, applications of enzymes to cotton fiber and fabric which will have a direct positive impact on the environment and improving the accuracy and efficiency of testing the quality of cotton fibers, which will certainly help our Georgia farmers.

In the area of nutrition research, we are looking at bone density among young girls, the role of soy in preventing osteoporosis at the middle years and vitamin deficiency effects on hearing loss and cognition in older adults. And of course the issue of obesity must have attention on our research agenda. A recent study of children across Georgia indicates that there is a 20 percent incidence of overweight among these groups. It is higher among rural children and higher among the younger children. Other nutrition research addresses functional foods or nutraceuticals asking the question

how do plant foods and elements protect against chronic disease? And we have other state of the art research.

Our housing research is primarily focused on manufactured housing, which is an important part of the rural economy in Georgia. And we have a small project looking at online grocery shopping, its effects and impacts on the types of products that individuals are buying.

I would like to make the point, as my title indicates, that investing in Research and Extension for Family and Consumer Sciences is a very good investment of taxpayers' dollars. For every \$1 in Georgia Experiment Station funds that we receive, we generate \$4.40 from other sources, and for every \$1 invested with the State Family and Consumer Extension faculty they are generating \$7.05 from external sources. That is a great return on investments.

To summarize our strength, we are focused on critical human issues affecting productivity and our national strength. We leverage our investment to secure additional resources, and we are collaborating with many groups at the State, Federal and local level. We do need to have our EFNEP funds restored so that we can meet the most nutritionally at-risk needs, we need the infrastructure support so that we can continue to leverage the resources and we need attention to obesity. As we say, it is on the President's list, it is one of the priorities in President Adams' legislative initiative and it certainly would help us to further meet the needs of our State to better understand this problem and to intervene in it.

So I hope you will take the opportunity to reflect again on these needs and I thank you so much for your past support and for your attention today and your continuing support. Thank you very much.

[The prepared statement of Ms. Nickols appears at the conclusion of the hearing.]

Mr. LUCAS. Thank you, Dr. Nickols. Just a few questions if we might, starting with you.

You said you had how many extension people to serve 8 million Georgians?

Ms. NICKOLS. We have 45 positions now. Mel, can you help me is that 45 or 47?

Mr. GARBER. I think it is 45.

Mr. LUCAS. You have how many counties in Georgia and how many unserved at the present time?

Ms. NICKOLS. We have 159 counties. Because of the multi-country arrangement, we are short 62 counties so if you can do the math—sorry.

Mr. LUCAS. So you folks are covering a lot of ground.

Ms. NICKOLS. They are covering a huge amount of responsibility.

Mr. LUCAS. You mentioned in your testimony all of the things that you attempt to do and one of the challenges that we face in properly funding extension is that there is still a perception among the number of my colleagues in Congress—and remember that the vast majority now come from the most inter-urban areas and the suburban part of the world—there is a feeling, a misguided confusion that extension still strictly reflects the life out in the countryside. Whereas your programs now touch everyone across your landscape. How, from your perspective, do we go about convincing our

fellow citizens that your work on nutrition and housing issues and extension, I should say, efforts in all those areas, that that benefits everybody, not just the family that lives at the end of the dirt road in the smallest county in any particular State?

Ms. NICKOLS. I think we need a effort in public awareness, for one thing. We are doing excellent work and in areas where we get that in the news media, that is one way to go about that. I think more and more people do turn to their extension office for things that they need in terms of their home care. But it is a low profile program, I am afraid and we do need additional effort to make the public aware of our successes.

Mr. LUCAS. My district in Oklahoma is a very rural district, I basically have the northwestern half of the State, starting from almost the northeast corner and running to the southwest corner of Oklahoma. My biggest community is 60,000 people when school is in session in Stillwater, Oklahoma State University. I represent an unusual congressional district in America any more. In Oklahoma, we have a very diverse culture just like yours and in particular when you talk about obesity and the health issues, we have 39 recognized Native American tribes in Oklahoma, 19 of which are in my district. And of my constituent groups they are particularly susceptible to the diabetes and these health related issues. Tell me for a moment about—expand if you would about the work in the dietary issues here in Georgia that your extension is involved in.

Ms. NICKOLS. I know that district pretty well I lived in Stillwater for 10 years. And I still love it dearly and I have six degrees in my family of my children and in-laws from Oklahoma State.

Mr. BURNS. And Oklahoma thanks you, I am sure.

Mr. LUCAS. Exactly.

Ms. NICKOLS. I think that responding to the issue of obesity takes a community partnership. And that is one of the models that we are using here in Georgia. We are working in Washington, Wilkes area in a partnership program where the community has made input into the kind of program that they want and that they feel will be effective. Part of our role is to raise awareness and so we have our demographer work with people in terms of giving them the bare hard facts of the incidence of the disease and what its cost is to the community and then we got people involved from the local community, the churches. Of course in Oklahoma, the tribal groups would be important in deciding how to go about making change, all the way from intervention at school to creating walking paths and improving the parks in the community for better exercise opportunities. And the educational programs that are at the level that people can accept them and understand them. So, it is a partnership approach that I think will be effective and I think that is borne out in the research projects that we are doing as well.

Mr. LUCAS. Dean Buchanan, you noted no doubt in my opening comments a little bit of some might say whining, a little bit of sarcasm. As an authorizer, in the last couple of farm bills, we have tried to steer more resources towards research and unfortunately, in the way Congress works we set money aside over the life of the farm bill, and occasionally our good friends on the Appropriation Committee choose to redirect our funds—I say our funds—redirect

those wisely allocated resources, Congressman Burns, and that makes for challenges in your shoes.

Tell me about how this reduction in research funds, what the potential impact you believe has been. What has your university not been able to do because of these dollars that did not make it to you the way we had intended.

Mr. BUCHANAN. First, I am very much aware of the difficulties between the authorizers and the appropriators and of course the position that we took while I was Chair of the National Association of the State University and Land-Grant Colleges' budget committee—we did not care which kind of dollars they were we could spend them all the same, but that did not carry much weight either.

But really, it has been frustrating because we can see and I made a point that in days past it seemed like that these programs in the land-grant universities were really executive driven. But in recent years it seems to be that these programs have not been at the forefront of the executive budget, and this is in most of our States and as well as the Federal level. And that means we have to do most of our effort in trying to generate support strictly through the legislative process. And if you do not get in the executive budget then that makes it more difficult to get funding for these programs. And certainly what is happening in many of our States is actually what happened to the Federal level.

In fact, I could have shown one more chart showing what is happening at the county level. And county funding for support of extension has been the only growth area we have had in the last decade. We have lost buying power both at the State level and Federal level but we have gained buying power at the county level. And of course in one sense that is encouraging because that illustrates the people we are closest to has appreciation for what we do, and if we had not had that I do not know where we would be today. We would be in much worse shape in the extension than we are already.

But the lack of funding support means that we have lost a lot of positions; in fact, we have lost over 400 positions in the last decade in the Experiment Stations through State funding. And while it is difficult to put a dollar value on not doing research, clearly if you do not have the people that is out there doing the kinds of things that we all know need to be done, you are not going to have as many discoveries and you are not going to have as many things develop, so in the long run I think we will suffer. Clearly I think that the challenge we have is to make the case that the dollars we put in research and education agriculture do not cost. In fact, they pay and pay well. In fact, many definitive studies have shown that the value of investments in research and education pays much, much better than any place you can get at any bank.

Mr. LUCAS. Very good point, Dean. Max, questions?

Mr. BURNS. Thank you, Mr. Chairman, I appreciate the testimony.

What percentage of your budgets—and realizing we have a research focus, education focus, and extension focus—what do you have to do as far as pulling things together? One of the things I noticed in both of your testimony is that funding has to come from

a lot of different places. And I believe, Dean Buchanan, your point was that the programs that were established to support ongoing research have not been funded at adequate levels. So now, what percentage of your work has to be done through competitive grants or earmarks, do you have an idea?

Mr. BUCHANAN. Clearly—I am not sure I can give you a percentage, but the percentage that is funded through earmarks and funded through competitive grants and other grant sources is increasing rather dramatically. And while that is important and, of course, that is one of the arguments that we get told repeatedly is we need to have more of our funding through the competitive grant programs such as the National Institutes of Health and the National Science Foundation, and those sources and we do not argue with that. But, we do argue that many of our programs are base programs that you have to have a base of expected support because that is where you hold onto your long term personnel. So while grants and contracts are very important and I sure Dean Nickols will agree with me that it is very important, that is not the way to build programs for the future. We have to have base that we can count on.

Mr. BURNS. Dean Nickols.

Ms. NICKOLS. I completely concur with that summary and unfortunately, I do not know the figure just off the top of my head in terms of the percentage of resources that we use that are research external funding. But it has increased.

Mr. BURNS. Would you say that it is probably disproportionately high; in other words, we are lacking the base funding or having to rely too substantially on the—I hate to say that you want to be competitive and I understand that University of Georgia is—but we have moved the model from having program support to being more focused at least in the research probably in the areas of more grant support.

Ms. NICKOLS. And we call that the entrepreneurial model and there is nothing wrong with being entrepreneurial, but you have to have a foundation to work from, and that is what is at risk now, is to have what I would call the infrastructure, the people that are there on a regular continuous basis to support the work—for example, technician losses. And Dean Buchanan mentioned that in his testimony. Same is true with us, where we have taken some of our losses, the cuts that we have had to take so that we can hang onto our faculty. But then it puts the faculty in a position of having then to find the money to hire their own technicians, which really ought to be a part of the system of infrastructure.

Mr. BUCHANAN. Can I add one other comment? The difficulty we have is when you look at the breadth of research that occurs in most experiment stations, not just ours but throughout the country, there are many areas where there are opportunities for competitive grant support, certainly in our basic research program in genetics and genomics, biotechnology—those areas that we do have opportunity, but there is a lot of areas where there is simply not many opportunities. For example, if you are doing research in forage production and cattle gains and that sort of thing, there are simply not many opportunities. So there is a lot of area in research that is still important. Particularly at the applied level and particularly

in some areas where there is simply not opportunities for faculty to find competitive grants.

Mr. BURNS. And I am aware, Mr. Chairman, that the University of Georgia, with the resource restraints that you have had, you had to make some tough choices. And we had to discontinue certain activities that all of us would like to see continue and really grow but we just had to make tough choices in Georgia as I am sure you had to make in Oklahoma. And I think one of the things that as a Congress we need to do is go back to the base funding and make sure there is that stable base of support so that we could add to that the competitive portion of the grants, but not have to rely on them as a ongoing funding source.

One final comment because I think it is very important and I want to ask Dean Nickols to maybe elaborate a bit, but there is going to be and there already is a national focus on obesity and you do point that out. Whether we are talking about nutrition, we are talking about education, we are talking about lifestyle, we are talking about wellness, it is critical as a Nation that we gain an understanding of that challenge because certainly in the 12th district of Georgia and throughout Georgia, as you point out in your district, we have a population that may be more susceptible to problems with diabetes and problems with heart disease because of just poor eating habits and poor life choices when it comes to food consumption. If you would, Dean Nickols, just take a brief moment and share your focus in that area.

Ms. NICKOLS. We have two areas that we are working on. We have scientists that are doing laboratory research with animal models to look at the molecular level mechanisms, and I am way out in deep water when I start talking about this, because I need to bring those scientists in to really speak to that issue.

Some aspects of obesity are related to genetics and just the factors that people are dealt when they get their gene pool in their life, and so, that is one thread that our research is doing those kind of fundamental what you would call pure research or basic research to try to understand those biological mechanisms.

The other focus we have is on the behavioral and the community intervention model. Assessing the problem, one of the things that is a concern to us that many of our colleagues around the country are trying to address is that some of the previous studies that were done by the CDC or some of the other large groups simply were a self-report of weight and you know we all like to under-report that. So, we are not so sure that what was reported by some of the national studies is not under-estimating so that is why the child prevalent study was under taken. They actually went out to the schools all across the State, measured skin fold, weighed kids, took their height, asked for their dietary practices, their activity level. So we will have a much richer understanding of what is going on with those kids' health patterns. And then, based on that understanding, we are looking at the intervention model to test the efficacy of what really works to bring down the weight issue and to improve fitness and health.

And as you both mentioned before this is an investment, it is going to reduce health care cost if we can just get the focus on the

early intervention and the prevention rather than continuously putting the money into taking care of our problems.

Mr. BURNS. I thank the witnesses, I thank the chairman. I would make one final observation. Dean Nickols was wise enough to leave Oklahoma and come to Athens, GA, we are very grateful.

Ms. NICKOLS. But I still love Oklahoma.

Mr. BURNS. Thank you, Mr. Chairman.

Mr. LUCAS. Thank you, Mr. Burns.

While we are changing panels I would note that I would like to thank Dean Buchanan and Ann Young from his office for helping set up this hearing and making it possible. I think it would be a good time to introduce from the U.S. Department of Agriculture, Washington, DC office I believe we have Christopher Smith with us today. Hello Chris, and from Sanford Bishop's office, Thomas Daniels, his assistant district director. Thank you for coming.

While the panel is coming forward I would like to introduce Dr. Melvin P. Garber, associate dean, University of Georgia here in Athens; Dr. Clifton Baile, GRA eminent scholar in agricultural biotechnology, University of Georgia; Dr. David Swayne, director, of the Southeast Poultry Research Laboratory, here in Athens representing the Agricultural Research Service, USDA; and Dr. Wayne Reeves, Director, the J. Phil Campbell Senior Natural Resource Conservation Center, in Watkinsville, GA, representing ARS also, U.S. Department of Agriculture. Whenever, you are ready, you may begin, Dr. Garber.

**STATEMENT OF MELVIN P. GARBER, ASSOCIATE DEAN,
UNIVERSITY OF GEORGIA, ATHENS GEORGIA**

Mr. GARBER. Thank you. I am Mel Garber, associate dean for extension. Today I will be commenting or representing both the Agricultural Experiment Station and the Cooperative Extension Service. As far as the Extension Programs, Dean Nickols has already commented on some of the Family and Consumer Science Programs.

Today I will go through research and extension programs that are represented in the College of Agricultural and Environmental Sciences in the Warnell School of Forest Resources. I should mention that, as Dean Nickols implied, that these colleges come together or are integrated at the county delivery level, and that, as Dean Nickols mentioned, has been a real challenging area for us in terms of the numbers, and perhaps we can come back to that at the end.

What I did today was take the text that I prepared for you in terms of our major programs and grouped those according to the Federal goals that we report against. The first one being the agricultural production system that is highly competitive in the global economy. And you see here listed five of our representative areas that address that. University is very competitive, active, and successful in development and release of plant varieties and that covers from peanuts, to soybeans, to ornamentals. These are used throughout the southeast United States, and some of them internationally.

The area water quality and quantity is extremely important to agriculture competitiveness. Many parts of the country have suf-

ferred shortages of water in recent years, and water quality is an issue as well. Agricultural water use is another issue for the agricultural industry and in the case of Georgia with the recent drought, we have had to begin documenting just how much water we actually use and that has been a major program for us.

Ventilation techniques for the poultry industry is just an example of research that has been conducted that has allowed the industry to be more competitive, and in that case to broaden the area that poultry production can occur, and make for instance, south Georgia a much more viable area for poultry production. That represents an opportunity for added value and diversification in that part of the State.

Forest resources, again an important part of the agricultural area in the State. We have programs dealing with production practices, silvaculture practices in the forestry area as well as resource management.

The second goal, safe and secure food and fiber system. We have in the State of Georgia one of the best centers for food safety in the country and internationally focuses on food-borne illness under the directorship of Dr. Mike Doyle. In that area we have active programs in fruit and vegetable production. This being—certainly the fruits and vegetables being an important item of dietary consumption that relates to food supply. The State, we were one of the first ones to implement the HACCP Program, looking at critical stages of fruit and vegetable production and safety associated with that. I should mention while I am on that we are part of the Southeast Small Food Center which is a multi-state research, education and extension integrated program.

The next goal is a healthy, more well-nourished population. Certainly Dean Nickols mentioned the Family Consumer Science Programs in this area, which are very important. The fruit and vegetable projects, both on the research and the extension side are an important component of that.

Our programs range from production practices in that area, increased production, but go from the production to the distributor all the way to the consumer. And it is an area where the production side of agriculture and the family side come together.

I should also mention that Georgia has the largest 4-H Youth Development Program in the country, and this is an area that is included in our curriculum for the youth. We think this is really important, addressing and preventing health problems in this area. If we can educate our youth as we proceed, then I think we have great chances for improvement in that area.

The next goal, greater harmony between agriculture and environment. Most of our programs that we have in the college relate to this. We have for instance a center for urban agriculture. The question was raised earlier about addressing urban audiences. Through this center, we have partnered with the Atlanta Regional Commission, which is a coordinating agency for governments in the Atlanta area, to work with them on their clean water campaign. Again this focuses on urban audiences. In the area of water quality and quantity, we are addressing these issues in urban landscapes as well as row crop agriculture. We are looking at water use again in the urban as well as the rural areas.

Ventilation techniques in the poultry industry address odor concerns which are increasingly important as we have this greater interface between the urban and the rural segments.

Natural resource management, one of the key areas that we focus on there has been nutrient management plans. This is extremely important in a number of our segments, poultry has been a leader in this area. And in 4-H and youth development, we have a major environmental education center at our Rock Eagle 4-H center, which, not only educates the youth that are involved in 4-H, but other youth in urban areas that attend that center.

The fifth goal is enhance economic opportunity and quality of life for Americans. Again, through our Center for Urban Agriculture, we have programs that train Hispanic workers, particularly in the landscape area, which is a major employer of Hispanic workers. We also have certification programs that allow individuals to increase their skill level and increase their earning capacity. We have a very good Center for Agribusiness and Economic Development that focuses on value-added agriculture and new products and this center has been successful in working with groups from established agricultural areas to development of completely new products.

We have a major effort again in natural resource management that relates to this goal. I would summarize this as saying in many cases success in the natural resource management area is going to determine or make the difference as to whether somebody is in business or is out of business. As we know this is—environmental issues are increasingly important to profitability and success of many of our industries.

In the 4-H and Youth Development area, we are increasingly addressing urban audiences and minorities in our programs. And that addresses the increasing diversity, the demographics in the State, as pointed out by Dean Nickols.

In the forest resources area, clearly our programs and success in this area is very important not just from wood production but for management of those forest resources that provide many environmental services and increasingly are recognized as valuable green space particularly where we have the urban/rural interfacing, and that is becoming increasingly important in the State of Georgia.

And if I can finish by just highlighting a few of the future needs. In terms of research and extension base funding, we have identified the first three item areas that we would like to see increase funding—water quality, quantity, conservation. Clearly it is a statement that we believe water and the management of water is important not only to agriculture, but society as a whole. Additional resources for value-added research and development activities, clearly one of the ways to add profit sustainability to agriculture is to add margin and certainly that is a way to do it.

Another item more in the basic research area, the parasitism genes basically is a way to address nematodes which have major impact on crops around the world.

The last three items are slightly different, the cost effective solution to accountability reporting—we have seen, as Dean Buchanan pointed out, that increasingly the dollars come from State sources. Increasingly States have demanded more accountability and I guess what I am asking for is that particularly to the extent that

we have level funding, one way we can use those dollars more effectively is to help reduce the costs associated with accountability. And we can do that by allowing some flexibility at the Federal level to utilize those State programs that we develop. Also, just a reaffirmation of the stakeholder input process, that has been the basis for priority development over the long history of the Extension Service and the Experiment Station, and we would like to continue that process, let that process help drive those priority areas that we address.

And finally, I mentioned E-Extension that is an effort by extension directors throughout the country, basically to develop a web based information delivery system for all program areas across the country that is available at all times to the citizens in the United States.

Thank you and I appreciate the opportunity to address the needs of the Experiment Station and the Extension Service in Georgia.

[The prepared statement of Dr. Garber appears at the conclusion of the hearing.]

Mr. LUCAS. Thank you Dr. Garber. Dr. Baile.

STATEMENT OF CLIFTON BAILE, GRA EMINENT SCHOLAR IN AGRICULTURAL BIOTECHNOLOGY, UNIVERSITY OF GEORGIA, ATHENS, GA

Mr. BAILE. Thank you for the opportunity to make a statement regarding Federal support for agricultural research with special emphasis on the role of basic research.

Clearly, the United States has led the world in many sectors of the research community, and certainly agriculture has been one of these sectors.

I would like to comment on four examples of the role of basic research in which I have had an opportunity to participate. Clearly, biotechnology is changing the way we think about biomedical and agricultural problems and solutions. We have tools available that none of us could have imagined 25 years ago.

Like many biologists, I joined the biotechnology efforts in the early 1980's just after there was some definition of what was meant by this new descriptor. I learned first hand how basic research impacts agriculture while directing a group of several hundred people working to develop the first animal biotechnology product to enter the marketplace. As has often been the case, the basic research for this application had been funded for biomedical research purposes. In this case, hundreds of millions of dollars had been spent to discover how to engineer microbes to synthesize complex proteins in a matter of hours. Using traditional chemistry, this kind of process would previously have required teams of many people for many years. Those of us working in the agricultural sector took this knowledge and developed a product, Posilac or bovine somatotropin, which has now been marketed successfully for over 10 years.

Only through the Federal support of basic research would this ever have been possible. Many new biotechnology tools required for such applications came directly from federally-sponsored basic research projects. This product for dairy cows has required production plants that annually produce many times more protein drug

than any other plant in the world, for either human or animal applications. For example, capacities exist to produce over 50 tons of this protein annually now, and the largest of these production plants is located in Augusta, Georgia.

A second truly amazing application of basic research to agricultural problems has been the production of and the delivery to the marketplace of genetically modified plants. Thousands of federally-funded projects generated the biotechnology tools that were applied to move genetically modified plants from the discovery stages to where they are now, producing nearly 20 percent of the world's cotton, soybean, corn and canola. The adaptation rate of these revolutionizing crops over the past 8 or 9 years has been unprecedented. During the early 1980's, scientists like Dr. Michael Adang, now at the University of Georgia, had much to learn in order to engineer plants to produce microbial toxins, such as Bt. Dr. Adang, the inventor on numerous patents in this field, and others, applied the basic information available at the time to modify the codes for protein synthesis by microbial genes so that they could be used by plants to produce high levels of these unique and very specific toxins for selected insects. The application of these biotechnology tools and innovations will continue to change crop production practices and productivity in extremely positive ways for the foreseeable future. Clearly, these tremendous gains in crop productivity were possible due to the investments by society in basic research, with results of helping provide food for the several billions yet to be added to the world population.

A third example of basic research applications to developments in agriculture is the new technology of livestock cloning. This is another area in which I have personally been involved helping to make Georgia a leader in this area. The understanding of embryology and developmental biology has been enhanced by billions of dollars spent by both the Federal Government and private industry. The very basic research in these areas has been fueled by the need to understand embryonic and genetic diseases, human reproduction, cancer, et cetera.

This basic research has led to the development of the remarkable ability to reproduce animals with high-value genetics through cloning. The cloning of plants has been practiced by plant breeders for centuries, and animal cloning, although much more complex, has several applications for enhancing highly desirable genetic traits, such as disease resistance. Application of this technology is still in the early stages, but it offers tremendous potential for improving productivity in animal agriculture and also for animal genetic preservation. Dr. Steve Stice, an internationally known University of Georgia scientist, has led this effort, produced KC a calf produced from kidney cells collected from a carcass after it had been in a typical meat cooler for 48 hours. This technology has many potential applications for the selection and proliferation of very superior and proven livestock genetics. Dr. Stice and I and others, founded a Georgia-based company, Prolinia, which is now merged with ViaGen which is in the process of commercializing this livestock cloning technology.

The fourth and final example I want to give is associated with a technology that is believed by many to be the greatest scientific

feat yet accomplished by man, sequencing of the human genome. Most of the technology and knowledge base for this huge endeavor was developed from thousands of publicly-funded research grants, basic research grants. While a university professor, a University of Georgia professor, I happened to be consulting for Celera Genomics when the sequencing of the human genome was being done. As the human genome sequencing was nearing completion, there was a window of opportunity for animal agriculture to take advantage of the unused capacity. Decisions were made to sequence three livestock genomes using the expertise, hardware and software that were in place for sequencing the human genome. Amazingly, thanks to the previous genomes having been completed, the additional three animal genomes were sequenced in a matter of months and at a fraction of the cost. These genomes are starting to be used by the private sector, for example, by MetaMorphix, Incorporated, a company with which I work closely as a member of the Board of Directors, along with former Secretary of Agriculture, Jack Block.

These application are likely to have a greater impact on animal genetics and productivity than any previous single technology. The genomes and the associated large sets of single nucleotide polymorphisms allow for a paradigm shift in the way livestock can be managed to produce the highest quality of meat at the lowest cost, and with a built-in, molecular-based identification system. Applications of combining livestock genomics and cloning are expected to revolutionize animal productivity and will likely make it possible to meet the demands of high quality food and fiber for an ever-increasing human population.

These novel technologies will soon be in the marketplace, and due to publicly financed basic research primarily for medicinal purposes, animal agriculture will reap many benefits.

I strongly support the funding of basic research to make possible the application of new technologies to agriculture for continued increased efficiency of food and fiber production. These changes in productivity enhancement are critical to continue to meet the needs of human populations, and the pressure is ever increasing due to additional demands for improved product quality and environmental issues. Our society deserves to be congratulated for our past funding of the strongest federally-financed scientific infrastructure found in the world.

Thank you.

[The prepared statement of Dr. Baile appears at the conclusion of the hearing.]

Mr. LUCAS. Thank you, Doctor. Dr. Swayne.

**STATEMENT OF DAVID SWAYNE, DIRECTOR, SOUTHEAST
POULTRY RESEARCH LABORATORY, ATHENS, GA, REP-
RESENTING THE AGRICULTURAL RESEARCH SERVICE, U.S.
DEPARTMENT OF AGRICULTURE**

Mr. SWAYNE. Mr. Chairman, and members of the subcommittee, my name is David Swayne and I am the director of the Southeast Poultry Research Laboratory located here in Athens, Georgia. Our research facility is part of the Department of Agriculture's Agricultural Research Service which I will call ARS. I would be remiss if I did not mention that ARS is celebrating its 50th anniversary. Al-

though, ARS can trace its origins back to the early 19th century with the seed collection efforts, it was not officially established by the current name until 1953.

In recognition of the agency's accomplishments and future promise, ARS labs all over the country are reflecting on our research that affects the lives of so many people in the food we eat, the clothes we wear, and the environment in which we live. Southeast Poultry Research Lab is very proud of the impact that it has made in the ARS Poultry Disease Research Program and I appreciate this opportunity to discuss our contributions as well as opportunities and challenges for the next 50 years and beyond.

As you know, poultry is the No. 1 agricultural industry in Georgia as well as several of our other southern States. That makes it extremely important to the economy not only in our State but for all those States in the South. Nationally, poultry industries generate over \$22 billion in receipts each year with an average of \$2.25 billion of poultry products being exported each year for the years 1999–2003. Stated another way, the United States controls 40 percent of the world exports of poultry and poultry products.

Established in 1962, the Southeast Poultry Research Laboratory provides critical research information to solve health problems of the poultry industries in order to maintain their economic viability and expanding trading opportunities.

The scientific staff at our lab includes a diverse pool of professional expertise, including veterinarians, microbiologists, immunologists, pathologists, molecular virologists, and an agricultural engineer and a physiologist in order to tackle the complex poultry health problems we face today. The laboratory complex consists of specialized facilities, designed and operated to contain highly infectious diseases of poultry, and to allow research on these diseases to be performed without posing a threat to the environment, the public, or to the poultry industries. Throughout four decades of service, Southeast Poultry Research Lab has maintained close ties with industry, academia and other Government agencies, consistently striving to provide an open and responsive research environment.

Specifically, our mission at Southeast Poultry Research Lab is to provide scientific solutions to national and international exotic and emerging poultry disease problems through a comprehensive research program emphasizing basic and applied research in diagnostic, prevention, and control strategies, prediction of disease outbreaks, molecular epidemiology, and understanding disease pathogenesis. The disease and organisms studied include avian influenza, Newcastle disease, intestinal viruses of turkeys which includes poultry enteritis mortality syndrome, avian metapneumovirus, West Nile virus, SARS-coronavirus and Salmonella enteritidis. Research is also directed at acquiring fundamental knowledge of the chicken and turkey's immune responses to infectious diseases and to develop and evaluate vaccines.

Immunologically and genetic—and molecular genetic techniques are used to enhance diagnostic capabilities by improving the detection, identification, and characterization of infectious agents. All laboratory programs are research-oriented and no routine diagnostic services are provided. Some of our products meet agricul-

tural needs included in the Department of Homeland Security's programs.

Southeast Poultry Research Lab is committed to responding to challenges of both the poultry industries and regulatory agencies through both our basic and applied research programs. Our contributions and importance are highlighted in recent accomplishments which include studies with the H5N1 highly pathogenic avian influenza in Asia, and in those studies we determined which birds are susceptible or resistant to this virus.

We provide research for development and assessment of effective poultry vaccines, understand the source and the movement of these viruses, and assist public health agencies such as CDC in research on avian influenza zoonotic issues.

And two, we develop rapid tests for avian influenza that are now used by the USDA National Veterinary Services Laboratories as the official test for avian influenza diagnostics.

Third, we provided research data to U.S. representatives to overcome non-tariff trade barriers on egg products and meat exports.

Fourth, we partnered with the California Food and Agricultural Diagnostic Lab and USDA National Veterinary Services Labs in co-development of rapid tests, the RRT-PCR test, to detect Newcastle disease which was rampant in California at the end of 2000 and the first of 2003.

Fifth, we determined that poultry are not involved in infection or dissemination of SARS in Asia.

Six, we determined that chickens and turkeys are not amplifiers of West Nile virus, but domestic geese can be amplifiers and infect mosquito vectors.

And finally, we have developed vaccines that allow differentiation of vaccinated birds for Newcastle disease and avian pneumovirus from those that are field exposed.

These challenges and accomplishments are prime examples of the need for sustained Federal funding of research programs to address national and international disease problems. Particularly important are those diseases that affect the poultry industries in terms of economic viability, international trade, and food safety.

The success of our research at Southeast Poultry is dependent not only upon our own scientists and facilities, but also the collaborations we have with other government agencies and academia. Our university partners are especially important in that they provide needed expertise outside of our own scientists. Our recent successful collaborations include wild bird surveys in North and South America and Pacific Rim countries looking for avian influenza and Newcastle disease viruses. These collaborations were conducted with the Museum of Natural History at the University of Alaska, Fairbanks; the Department of Veterinary Preventive Medicine at Ohio State University; and here in Georgia, the Southeastern Cooperative Wildlife Disease Study at the College of Veterinary Medicine at the University of Georgia.

We also have a project looking at rapid test development to detect and differentiate respiratory pathogens from avian influenza, Newcastle, this is co-development project with the Department of Avian Pathobiology at the University of Minnesota, Department of Avian Medicine here at the University of Georgia, the College of

Agriculture at the University of Delaware and the College of Veterinary Medicine of the University of California.

We have developed international partnerships though an agreement we have with the Iowa State University College of Veterinary Medicine, to be able to reach out and send information on avian influenza and Newcastle disease diagnostics.

We have a joint vaccine and molecular epidemiology study program on influenza with the Influenza Branch of the Centers for Disease Control and Prevention as well as the National Institutes of Health.

We have enjoyed fruitful and productive collaborations with these partners and we look forward to building on these investments as well as developing new partnerships.

It should be recognized that the Southeast Poultry Research Lab's world class, problem-solving research is a result of the responsiveness of the President and the Congress to the needs of the poultry industries. When emergency situations have arisen such as outbreaks of avian influenza and Newcastle disease, the President's budget requests have included funding for emerging diseases. Congress has appropriated funds to support this work at various locations, including the Southeast Poultry Lab for research to address such problems.

Mr. Chairman, thank you for giving me this chance to tell you and the subcommittee about the effective research conducted at the Southeast Poultry Research Lab. We still have much work to do and many challenges to undertake. We are very grateful for your support and we look forward to working with Congress toward that end.

Thank you.

[The prepared statement of Dr. Swayne appears at the conclusion of the hearing.]

Mr. LUCAS. Thank you, Doctor. Dr. Reeves.

STATEMENT OF WAYNE REEVES, DIRECTOR, J. PHIL CAMPBELL SENIOR NATURAL RESOURCE CONSERVATION CENTER, WATKINSVILLE, GA, REPRESENTING THE AGRICULTURAL RESEARCH SERVICE, U.S. DEPARTMENT OF AGRICULTURE

Mr. REEVES. Thank you for inviting me here today to represent the J. Phil Campbell, Senior, Natural Resource Conservation Center. The center is one of more than 100 research locations in the Agricultural Research Service, which is the primary intramural research agency in the U.S. Department of Agriculture. Since its creation in 1937, the center has recognized the critical role that agricultural research plays in solving natural resource problems of broad significance to the public. Over the past 66 years center scientists have researched soil, plant, animal, atmosphere systems to provide invaluable information for designing practical approaches to land management for optimum use and conservation of our Nation's natural resources. Our research ranges in scope from improved understanding of biological, chemical and physical processes that limit agroecosystem productivity and up through interactions of ecosystems and entire landscapes.

The goal of the center is to develop and transfer successful agricultural systems to land owners and managers to protect and sustain the natural resource base, to build accord with non-agricultural sectors, and support healthy rural economies. We carry out this goal with a dedicated and highly trained staff.

We have 10 research scientists and 15 technical and administrative support personnel. We also employ University of Georgia support personnel and students to help conduct research. Our close proximity to and historical relationship with the University of Georgia College of Agriculture and Environmental Sciences enhances and strengthens our complementary programs for developing efficient and economical farming practices.

Mr. Chairman, your letter inviting me to testify at this hearing said the subcommittee was interested in learning about our funding stream, how we use the funds, and what changes were needed to make the research more effective. We are very pleased that the President's proposed budget for ARS has an increase of approximately \$5.2 million for the Climate Change Research Initiative. Under this initiative, ARS research will identify and develop cost-effective strategies for increasing carbon storage in soils, reducing greenhouse gas emission from agriculture, generating renewable energy from animal waste. A key part of this approach is accurate and rapid measurement of greenhouse gas emissions from agricultural systems. If adopted by Congress, the center is expected to receive \$350,000 of the Climate Change Research Initiative funding for the research programs that would measure and manage methane emissions from livestock production systems. Currently, the fiscal year 2004 Federal base funding, which is the net to my location for the center is \$2,809,489. The center also received approximately \$420,000 in temporary funds generated by grants and cattle sales during this fiscal year. These soft funds, as we call them, are critical to meeting the mission of the center. Current discretionary funding used by research scientists is for the supplies, equipment, travel, laboratory analyses, and extra labor.

Research at the center is designed to enhance soil and water nutrient processes in southern Piedmont pasture and cropping systems, also to develop sustainable crop and animal production systems suitable for the entire southeast, to prevent pathogen transport in landscapes from poultry and other animal production systems, and to measure and mitigate air emissions from animal production systems. To ensure that our programs are relevant to priority needs, they are based on recommendations from many sources. Among them, the administration, the Congress, commodity organizations, customer and stakeholder groups, collaborators and co-operators, such as University of Georgia, advisory committees, and action and regulatory agencies in and outside the department. Our research is closely coordinated in Washington, DC by the ARS Administrator and National Program staff to avoid duplication, and to help maximize and transfer research benefits.

Some of the center's recent accomplishments include: Determining that the source of most microorganisms used to indicate pathogen contamination in water from the Upper Oconee River watershed was associated with wildlife and not agriculture.

Determining that farm ponds are an effective environment management practice to clean manure-associated bacteria from water.

We have identified the best tillage practice to maximize net returns, while reducing erosion and improving soil quality for cotton producers in the southern Piedmont.

The center scientists have discovered that well-fertilized endophyte infected fescue pastures have the potential to reduce carbon dioxide in the atmosphere by storing more carbon in soil than non endophyte infected fescue.

Since 1940 we have collected intensive data and have a database that has been used to validate the critical need to protect southern Piedmont farmlands by maintaining vegetative cover all year around. Working with the U.S. EPA, we have discovered that iron and clay soils, common in the southeast helps reduce nitrate contamination of groundwater. Center scientists have developed methods to accurately measure trace gas emissions and confine animal feeding operations and identify management practices to mitigate these emissions.

We determined that poultry litter applied to cropping systems does not pose a risk of contaminating surface waters with two sex hormones, estradiol and testosterone, that are of recent concern to the public.

And working with other ARS units, scientists have discovered that cutting alfalfa in the afternoon provides high quality forage preferred by animals than when cut in the morning. This has led to major recommendation changes in the western States as to how alfalfa hay is cut.

As others here have pointed out, we have been taking great strides as far as conservation for crop and animal production systems, but this increasing urbanization in the southeast is continuing to add stress to the Nation's need for research solution. The research challenges and opportunities that we see for the near and long term future include:

Developing improved guidelines for utilization of land application of animal manures.

Developing improved management practices to store carbon and mitigate trace gas impacts from agricultural activities.

To develop and coordinate a national system for bacterial source tracking, based on DNA fingerprinting, of fecal bacteria in contaminated water.

To develop organic production methods for grain to be used in a rapidly growing market for certified organic poultry production.

To develop integrated crop livestock systems that are profitable, environmentally friendly, and efficient for major physiographic regions in the southeast.

Mr. Chairman, Dr. Swayne has already talked to you about this being the 50th anniversary of ARS and we are very proud of this, and we look forward to continuing another 50 years of research to help the Nation. The quality of ARS research stems from our dedication to independent and objective research for the public good. This research cannot be duplicated in the private sector. The type of dedication was personified in J. Phil Campbell, Sr., the man Congress honored in 1997 when it passed legislation renaming our laboratory. Mr. Campbell was a dedicated public servant from this

area whose contributions to agriculture, not only in the southeast but throughout the Nation, are well known and widely recognized. We thank you for linking this remarkable man to our lab and especially for the support Congress has provided the center for continued research programs.

Thank you again for this opportunity to testify.

[The prepared statement of Dr. Reeves appears at the conclusion of the hearing.]

Mr. LUCAS. Thank you, Dr. Reeves.

Dr. Garber, I represent a district where on the eastside we average 48 inches of rain a year in Osage County and in Cimarron County on the westside of the district we average 13 inches of rain which will come in about 4 nights. Could you expand for a moment on your work on the C.M. Stripling Irrigation Park? Talk about that for a moment.

Mr. GARBER. It is a recently established research park in southwest Georgia and the intent there was to put in state of the art technology in terms of irrigation systems—overhead pivots, drip irrigation—to where we can run replicated field trials, research to help document and develop improved practices in terms of water application. And the driving force behind that is, you know, we have come to a realization in Georgia perhaps behind some of—or later than some of the western States, that water is in fact a limited resource and there is not this unlimited supply out there. And so, as I mentioned, we are at the stage of better understanding and documenting just how much we use, just how much it takes for the crop and through C.M. Stripling Research Center how can we improve the way we use the water.

Mr. LUCAS. And I would also like to note, Doctor, that I was a strong supporter of the national dialog funds in the last farm bill for 4-H. It is good to see how well 4-H is doing in Georgia.

Mr. GARBER. Thank you, I just would have to mention we are the largest 4-H program in the country.

Mr. LUCAS. Dr. Baile, your topic is one of those that is very intense not only in certain parts of this country but in other parts of the world. And just for the record one more time, the classic question, the ultimate goal, what you attempt to do, whether it is work done in that sector in field crops or in livestock, but ultimately is to come up with plants and animals that, for instance on plants, that use fewer fertilizers, fewer chemicals, to more consistently produce a high quality product.

And from the other perspective on the animal side you are doing things that those of us in the beef cattle business for instance have worked for thousands of years in a very hit or miss fashion to try and accomplish, but ultimately your goal is better product, more consistent product, a safer product, ultimately society benefits directly. Contrary to arguments made on certain parts of the planet.

Mr. BAILE. Yes.

Mr. LUCAS. So the progress we have made, how do you see this playing out. If you have the proper resources, if the people working within this area, who are working with the same intensity you are, have the proper resources, how do you ultimately see this continue, is the sky the limit, so to speak?

Mr. BAILE. The point I am trying to make is with the tools that have become available; yes, the sky is the limit. We could not imagine being able to invent things that are now being invented because the tools just were not there 10 years ago, and 20 years ago. We are probably naive about even the tools we will have 5 years from now. But the fact that it really comes out of just basic research funding, the applications come later, especially those of us in agriculture I think have that opportunity to see where these tools can be applied to specific problems which give you sustainable solutions to the really difficult problems of feeding the world and providing fiber. So, I do not think we have any evidence of a limit yet, and of course we do not know how many people we may have to feed as well. And the sooner we are working on those problems, the better.

Mr. LUCAS. So, are we producing the appropriate number of graduate students and Ph.D. people who focus in these areas? The research dollars on the pure side, are we making those resources available so that we will continue the stream of people?

Mr. BAILE. We are, but I think there is a real deficiency in the agricultural areas of the support for graduate students, and post doctoral training especially for people that are interested in U.S. problems. As you probably know, we have many of these positions filled by people coming from other countries and they often stay, but I think the real change in my lifetime has been the makeup of the people that are in these departments, and working on problems that we have.

Mr. LUCAS. Dr. Swayne, you have a very challenging subject matter to work on, and we live in a world where travel is easier and we are more accessible to each other and the variety of the topics—avian flu and Newcastle and those kind of things—seem at least in the international media to be a greater and greater challenge every day. From your perspective doing the work you do, are we keeping up with what our society is forcing upon us with greater travel and greater exposure to all of these different viruses so to speak that seem to travel around the world at will?

Mr. SWAYNE. I think we have come into a new era in that 30 years ago the concern we had with these exotic diseases, as far as impact on animal health and impact on human health through zoonotic infections was a much lower level concern. And today, because of this modern transportation as well as global trade being a very common way of generating income for countries then the risk of transmission of those between countries is much greater.

Fortunately for us in the United States, we have a very good Department of Agriculture, especially our Animal, Plant Health Inspection Service and then our Plant Quarantine Bureau who work very diligently to protect our borders and try to minimize the impact of movement of products into the United States. Unfortunately, there is still some risk because we cannot control illegal activities which tend to be the area of highest risk. And I have recently returned from a trip in Asia as part of an international team to investigate the outbreaks of avian flu in the eastern part of Asia. And one of the concerns that many of those countries have and the data I had seen and part of the epidemiology was that a lot of these outbreaks appear to originate from illegal movement of live poultry

or poultry products between countries. And that is very frustrating for those countries and I think it is very frustrating for us. Even here in the United States, our Customs agents have confiscated tons of illegally imported poultry products from these Asian countries that have high path flu, and so the diligence there both on border patrol as well as in legitimate trade needs to be continuing monitor work done.

Mr. LUCAS. You mentioned that the administration has responded well when we needed additional resources to counter particular emergencies in the area of quicker tests, you mentioned that also expedited ways of determining what these threats are, and their presence. Is that a budgeted for part of your operating budget, this particular research that is ongoing from day to day?

Mr. SWAYNE. Yes, that is correct. We have direct funding in our CRIS project budget to work on rapid diagnostic tests, and we have some supplemental funds from Department of Homeland Security. And I think that Congress has been very good in supporting funding these needs as they have arisen, and mainly exotic and emerging viral diseases of poultry. But one of the areas where we have had difficulty is in facility expansion, the funds for providing additional laboratory bench space and animal housing have been elusive, and to give you an example, in 1962 when the Southeast Poultry Research Labs were created by Congress there were four scientists and a total staff of 20. Today I supervise 16 scientists and a staff of over 60 people, and we have had only one small addition to the building, and that was in 1976. So, one of the challenges we have is Congress has been very good in providing additional funds for us to meet these emergency needs, but we also need the infrastructure portion, which is the buildings. And we are in dire need of additional facilities.

What we have done is we maintained our research productivity at the highest level possible in a safe environment. What happens is you have to prioritize research projects and that means putting off experiments that need to be done because you do not have the actual bench space or the animal housing space to conduct those experiments. And in some respect there is additional funding needed for avian influenza emergencies and things like that that come up because our funding system is made for mission oriented research to a particular item. And so, last summer we had an issue that arose about SARS and CDC had asked us to look at could SARS be transmitted by poultry. We did not have the funding source or that money. So, we ended up getting approval from our international office in Washington to allow us to take some of our current funding and move it to work on SARS and do an experiment and then go back. So, what happens is you have to stop your influenza research to do that SARS research. So, we still have some issues of funding especially emergency funding to do emergency research and get people on board to do that.

Mr. LUCAS. Thank you. Dr. Reeves, your particular area is of great interest to me because in Oklahoma a dozen years ago in my district we raised 100,000 pigs a year. We now raise 4 million a year in an industry that is still growing and it has many consequences, social as well as otherwise in the community. Tell me

for a moment if I understood your comments about DNA tracking and fecal material.

Mr. REEVES. Yes, one of our scientists is a microbiologist and they have had an initiative that has been fed upwards in ARS, that there is a collective, at least exploration group of our national program staff to look at DNA, a rapid method of collecting a database. DNA fingerprinted *E. coli* bacteria so that they could have some source tracking. In other words, if an outbreak of some contaminated water supply came from some place they would be able to track it back to the source. And this would require a coordinated national effort to do. And I guess ARS would be ideally suited to do that working in partnerships with the university and private sectors.

Mr. LUCAS. Congressman Burns.

Mr. BURNS. I appreciate the input this morning. I will start off with maybe Dr. Garber and Dr. Reeves, I want to talk about water.

As you pointed out, Dr. Garber, Georgia is a little behind in our realization that this is a resource that we must manage wisely. And one of the things I did this past Saturday is I had the chairman of the Agriculture Committee down in the 12th district in the heartland portion of our district visiting five counties, and one of the things we were focusing on was water use. And I know that the Extension here and the work at the research center is focusing on wise use of water. Our wells are capped, we in Georgia could no longer drill an agriculture well. We are in a model now of mandatory metering, and we are challenged with trying to balance both the urban and suburban need, and industry needs and the agricultural needs.

Help me understand where you think we need to be going in Georgia as it relates to water. And what research we need to be doing from Federal level to make sure we are prepared. I think that is also a part of what we need to discuss.

Mr. GARBER. Well, it is interesting, we definitely need additional research on water requirements by crop, more efficient methods of delivery. There is some information out there. We have some, we know that drip is effective as compared to other methods, but not all crops can use drip irrigation for instance. So, we need—again how much does a crop need, how do we apply it effectively, and then, it is hard to separate in that case the water and the nutrient management. They will tend to go together, but we need to as a part of that be sure we also have an element that is water quality. Because essentially any operation that we have in the State, somebody is probably looking at the water leaving that operation and what the quality of that is. So, that is certainly some of the areas on the research side.

You know, on the extension and education side we have engaged a large number of our county agents and specialists in that area. And so, we need, for instance—what would be nice, for instance, is if they have an extension specialist in the water area for each of our watersheds in the State. So that we can coordinate our programs more on the watershed type basis. And that is a way to integrate a lot of the input and elements. We are attempting to move in that direction, but that is an example of one of the things that

we have not been able to do because of very limited resources that we have.

Mr. BURNS. Dr. Reeves.

Mr. REEVES. I agree with everything that the colleague over there has said. And one of the things I know that UGA is doing a very good job of is looking at site-specific irrigation, and managing on a very specific basis the need for irrigation so they can reduce the need for irrigation and get the same crop response. I think another thing that has been vastly overlooked is the impact of conservation tillage. We have done research that shows that you essentially get four-fold increase in storage and use of water from natural rainfall, from a thunderstorm, for example, and a 2 inch thunderstorm for example in some of those research has shown that with conventional tillage that you could get 3 days worth of supply, about 75 percent of the water ran off. And if you use conservation tillage and high residue producing crops that you can carry that through and get 95 percent of that water infiltrated. So, that is something that we need to work on in the southeast. About 53 percent of cotton I believe in the southeast is grown with conservation tillage, but a lot of that is not really—it is in name only. And Georgia I think has a long way to go in that, I think about something like 18 percent of the cotton is grown with conservation tillage, something that we need to focus on.

Getting back to your comments I think, there are strides and I think great payoffs will be coming with biotech and breeding drought tolerant crops and that is right around the corner I do believe.

And finally, on the water quality issue, the center has done a lot of work, as their University of Georgia cooperators, as have other cooperators at Auburn and University of Florida. That is something we need to focus on but my personal opinion is I think that we are doing a pretty good job on water quality, it is the water quantity that we need to be working a little bit harder on.

Mr. BURNS. Thank you. Dr. Garber, I would like to commend Georgia and the University of Georgia in this 4-H program, I am a product of that program, I participated in that as a young man, my sons participated in it. And I was a Rock Eagle counselor so, Mr. Chairman, we have an excellent program here in Georgia and we are proud of it and it is one of things we need to continue because, as you know, 3, 4 percent of 4-H members now are really rural, the rest are either small communities or suburban and urban and they need to learn a host of skills that this program can provide.

Dr. Baile, you have the distinction of having the highest profile challenge out there because you are in the news virtually constantly and again I want to commend the research done at the University of Georgia in biotechnology, because that is, as you suggest, a future that we could only imagine where it is going to take us.

If we look at the biotech crops and we look at the percentage of biotech crops that are now being grown throughout the world, certainly, soybeans ranks right up there, but yet we have some friends in Europe who will not accept certain crops because of their bio-engineering. How do we address that issue?

Mr. BAILE. That is an easy question, is it not?

Mr. BURNS. Yes, it is.

Mr. BAILE. I spent years as a Monsanto employee working on issues relatable to plant and animal and with the problems of Europe and so, I guess it is only pleasing to find out that United Kingdom has recently decided that they could approve corn, and so maybe there is progress. But it has taken a long time. I do not know if you could say it is education, there has been plenty of that. The politics involved there are just very, very tough and there are those philosophical concerns, so I am hoping that in time that compassion for people that need the products, that need the food, will override philosophical differences that we have had to deal with and I see that is starting to occur. So I am hopeful, but as far as any solution, the need and the potential has been there for a long time, but when people are willing to pay much more for things and let other people not have things, it makes it very difficult to apply our technology.

Mr. BURNS. Many of the crops that you provide as biotech engineered varieties, as you say, are drought resistant, they are disease resistant, and they are pest resistant, and they provide us quality product for the consumer and yet in some cases we cannot provide those to areas of the world that need it most. And that is a bit frustrating certainly for Congress and I am sure for the academic community that is faced with that.

I do understand that maybe some in the world are beginning to allow our corn and our grains to be fed to cattle and then consumed in the local marketplaces, so perhaps we are making progress in that area.

As you look at your research and the variety of both animals and plant research that you are focusing on, can you look in that crystal ball—and I realize it is mighty cloudy—but can you look in that crystal ball and say as we have in grains, where will we be in research and research needs over the next 5 to 10 years as far as funding for continued biotechnology research. Based on what you have known as a basis, what kind of demand are we going to see over the next half decade or so?

Mr. BAILE. I guess the area that I especially want to comment on has to do with really continually developing these tools because that is what is fueling all this activity. And as we get better and better at what we are doing, you do it much faster, you start to apply it to niche markets and so you really solve a lot of the problems, whether it is Georgia or across the southeast, you can address those problems so much quicker and effectively. I personally have had experience at just how it changes how you do agriculture. I am a Missourian by birth and have a farm in Missouri still and the change in conservation tillage is just amazing to me and how people live. But the conservation of soil and water has changed so much by the transgenetic crops that are available.

So what I was speaking for was let us continue to fuel that basic research that provides these tools because people will find how to apply and what we are after is how to get solutions faster and more efficiently.

Mr. BURNS. One of the things that I found very interesting in your prepared remarks was the fact that you were able to take the human genome project and then very quickly develop this for an

animal species in months—we are talking months and a fraction of the cost.

Mr. BAILE. That technology got so good to where we started out with a 15-year project that it was possible to do what was required for a single species of livestock in 1 month. And it just shows how fast technology can grow and improve and of course there was an infrastructure in place. That is what I think is so important about how we have fueled this basic research with all our money.

Mr. BURNS. One of the struggles that we are having right now in Congress is the area of animal identification and one of your comments may be related to some form of molecular base ID system. Could you maybe comment a bit on that and say is that something we need to continue to investigate?

Mr. BAILE. Well, I definitely think so, but I must point out I have a conflict of interest, because I am part of a company that has made a proposal to the USDA that is being considered. But yes, it is a very effective way to track animals and a very cheap way from birth all the way through our system and even can involve—and it is not that different of a thing that is talked about down here with the waste issues. But in this case you can track each animal and find in the meat source where those animals had come from and their whole life history, so it is going to change I think how we can think about how to track animals and food production in many ways.

Mr. BURNS. Thank you, Dr. Baile.

Dr. Swayne, poultry is a critical industry in the United States of America, a critical industry to Georgia. I appreciate the work that you do here with the USDA and ARS in the area of diseases and protection. You know one of the challenges that you commented on—one of the big challenges that we face again is trade and the ability to safely export our products around the world and to have other countries accept these and to recognize the quality and the safety of this food source. Can you comment on your activity in that arena, as far as verifying the ability for our product to move safely to international markets and then to be accepted there.

Mr. SWAYNE. I think this is to say Amen to what you said, we do have one of the safest food supplies in the world, and one of the problems we face is convincing other countries that dealing with non trade tariff to prohibit importation is not based upon science, and time and time again this has become an issue. And I have been before trade arbitration panels providing scientific input to them against other countries who were embargoing U.S. products when they were not doing it based on scientific information. This is an ongoing issue and hopefully in the future more of these issues will be resolved as more of the WTO is implemented especially the animal health part of that which gives more specific guidelines of what is and what is not legitimate trade barriers.

Mr. BURNS. I want to compliment the ARS and the poultry lab here. We have done an excellent job as a nation in preparing and dealing with various diseases that could jeopardize our food supply, and I recognize the criticalness of the research and the resources that are necessary to do the things that must be done to continue to have poultry and the safety of our source.

If you look at consumption as you look at various protein consumption and like the chairman I have beef cattle so, I guess there is a bias there. It was interesting to find out that we now know where all the pork production went from Georgia, it must have went to Oklahoma, but we do not have nearly the pork in Georgia that we once had, and we have an enormous amount of poultry. As you look the percentage of product as it were that poultry now represents again from a research perspective are our research resources commensurate with the demand on this particular commodity?

Mr. SWAYNE. Yes, that question is sort of the decision that has to be made by Congress and USDA as far the headquarters offices on how they divide up funding and how funding is requested for, percentage wise. But yes, I think poultry is a continued important food source. It has grown in the last three decades as far as consumption and I think if you look in rural communities, one of the major animal protein sources is poultry because of its low cost.

And as we look in the future to issues such as government, should they be involved in density determination of how poultry are raised or how eggs are produced, things like that, if we do make changes we will have an impact on rural nutrition because we will increase the cost of that commodity as it goes out into our communities and then as the cost increases there will be less funding available for individual households to purchase that very high quality low cost protein source for food.

Mr. BURNS. Dr. Reeves, finally, you have already talked about water. We have challenges in our air quality as well especially as it relates to our more urban environments. I was very interested in some of the work you have been doing and your organization has been doing in air quality and removing carbon from the soil or using the soil to take carbon out of the air. Is this going to be a viable commercializable type of a venture where we can go out there and actually clean the air with agricultural practices.

Mr. REEVES. Again, I will pass the buck like David Swayne did awhile ago about that is a decision that the Congress and the President has to make. I know that there has been discussions and plans and it see-saws back and forth over the last few years about carbon credits, for example, which is something that would provide producers another incentive to do an environmentally friendly thing, which is to get more organic matter in the soil, more carbon into the soil which has to come from the atmosphere. Other nations are doing it, whether or not we choose to follow suit is something that has to be decided above my pay grade, but I think it does have potential to help producers do something that is good for the environment and it also has potential to—regardless of whether a program comes up to pay people to do it—to reduce or mitigate somewhat the impact of trace gases or greenhouse gases in the environment.

Mr. BURNS. The green industry in Georgia is one of the fastest growing industries that we enjoy. And as we deal with horticulture and as we deal with extension and horticulture and support again issues of—water qualities issues, air qualities issues, of just environmental support, what types of programs do you see need to be

focused to support horticultural, the green industry, not only here in Georgia but around the Nation?

Mr. GARBER. Definitely, the green industries are referred to as the fastest growing segment of agriculture, it is also the most profitable segment of agriculture. In terms of the green industry programs to support them, we have through our center for urban agriculture, which is our sort of coordinating unit within the college, help for instance urban agriculture coalition, which is a accumulation of these green industries, but some of their needs relate to, for instance, as with other segments of agriculture, they employ a lot of Hispanic workers, and we have put programs in place to help with training in Spanish and development of that workforce, because that is key from their end. It is an industry that in general has products that can enhance the environment—the trees, the shrubs, the sod that is put out—is critical in terms of helping manage water quality in an urban environment, as well as being a valuable product. So, their needs and the focus that we have has a lot to do with the environmental issues, that is why I have mentioned in my report the interest in establishing an education center on the Griffin campus in the area of erosion and sedimentation control. That is viewed in the State as the No. 1 source of water quality problems, just the erosion of soil and the commercial development going into the streams.

So, from the research and education and from the university, there are some things we need to do and we are limited by resources there. From the industry end they are active in trying to play a more constructive role through their products to help solve that problem. So, I am very optimistic, I think that is going to be a major area of focus for our college, our research and extension programs, it is going to be a major segment of agriculture in the future—it is that bridge.

The question or point was brought up earlier how do we sort of manage that bridge between the perception that agriculture is just rural and this increasing urban population. I think the urban agriculture industries represent that bridge for us, if we will all work together.

Mr. BURNS. Thank you. One final comment. Dr. Reeves, we did have a chance on Saturday to visit a farm with a 20-plus year old pivot system that was being monitored and calibrated appropriately for water conservation and then conservation tillage as you pointed out is one of the best practices that we have out there right now, from the standpoint of water utilization and I appreciate the efforts that both extension and your facilities and research has provided us in those areas.

Thank you, Mr. Chairman, I appreciate the opportunity.

Mr. LUCAS. If there are no further questions, I would like to thank the witnesses on both panels for their time and effort to appear before the subcommittee on all of these important issues. And I certainly would like to thank our host, Congressman Burns, for assisting the subcommittee with preparations for the hearing. When we had our organizational meeting last year and discussed the various topics that we would go over, he made it very clear that we needed to come to Georgia and in particular to the University of Georgia where we could in a very quick time put together a very

outstanding set of witnesses. And I must say, Mr. Burns, you are exactly right on that and I appreciate your efforts and everyone's time today as we discussed important issues that agriculture research and extension faces.

And with that, the record will remain open for ten days to accept statements and any additional information and the subcommittee is adjourned.

[Whereupon, at 11:48 a.m., the subcommittee was adjourned.]

[Material submitted for inclusion in the record follows:]

Testimony of
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in Agricultural Biotechnology
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Before the
Subcommittee on Conservation, Credit, Rural Development, and Research
Committee on Agriculture
U.S. House of Representatives

Georgia Center for Continuing Education
Athens, Georgia
March 29, 2004

Thank you for the opportunity to make a statement regarding Federal support for agricultural research with special emphasis on the roles of basic research. Clearly, the United States has led the world in many sectors of the research community, and certainly agriculture has been one of these sectors.

I would like to comment on four examples of the role of basic research in which I have had an opportunity to participate. Clearly, biotechnology is changing the way we think about biomedical and agricultural problems and solutions. We have tools available that none of us could have imagined 25 years ago.

Like many biologists, I joined the biotechnology efforts in the early eighties just after there was some definition of what was meant by this new descriptor. I learned first hand how basic research impacts agriculture while directing a group of several hundred people working to develop the first animal biotechnology product to enter the market. As has often been the case, the basic research for this application had been funded for biomedical research purposes. In this case, hundreds of millions of dollars had been spent to discover how to engineer microbes to synthesize complex proteins in a matter of hours. Using traditional chemistry, this kind of process would previously have required teams of people many years. Those of us working in the agriculture sector took this knowledge and developed a product, Posilac or bovine somatotropin, which has now been marketed successfully for over ten years. Only through the federal support of basic research would this ever have been possible. Many new biotechnology tools required for such applications came directly from federally-sponsored basic research projects. This product for dairy cows has required production plants that annually produce many times more protein drug than any other plant in the world, for either human or animal applications. For example, capacities exist to produce over 50 tons of this protein annually now, and the largest of these production plants is located in Georgia. By applying many of the basic research tools and processes, this complex protein is produced under Good Manufacturing Practices and marketed at a retail cost of about \$10 per gram.

This is less than one-thousandth of the cost of similar products sold for medicinal purposes, due to both volume of production and extraordinarily efficient production processes.

A second truly amazing application of basic research to agricultural problems has been the production of and the delivery to the market place of genetically modified plants. Thousands of federally-funded projects generated the biotechnology tools that were applied to move genetically modified crops from the discovery stages to where they are now--producing nearly 20% of the world's cotton, soybean, corn and canola. The adaptation rate of these revolutionizing crops over the past eight or nine years has been unprecedented. During the early 1980s, scientists like Dr. Michael Adang, now at the University of Georgia, had much to learn in order to engineer plants to produce microbial toxins, such as *Bacillus thuringiensis* (BT). Dr. Adang, the inventor on numerous patents in this field, and others applied the rudimentary information available at the time to modify the codes for protein synthesis by microbial genes so that they could be used by plants to produce high levels of these unique and very specific toxins for selected insects. The applications of these biotechnology tools and innovations will continue to change crop production practices and productivity in extremely positive ways for the unforeseeable future. Clearly, these tremendous gains in crop productivity were possible due to the investments by society in basic research, with results of helping provide food for the several billions yet to be added to the world population.

Biotech Crops

Billion Hectares

Crop	Global Area	Biotech Area	% Biotech
Soybean	72	33	46
Cotton	34	7	20
Canola	25	3	11
Corn	140	10	7
Total	271	53	19

A third example of basic research applications to developments in agriculture is the new technology of livestock cloning. This is another area in which I have personally been involved, helping to make Georgia a leader in this area. The understanding of embryology and developmental biology has been enhanced by billions of dollars spent by both the federal government and private industry. The very basic research in these areas has been fueled by the need to understand embryonic and genetic diseases, human reproduction, cancer, etc. This basic research has led to the development of the remarkable ability to reproduce animals with high-value genetics through cloning. The cloning of plants has been practiced by plant breeders for centuries, and animal cloning, although much more complex, has similar applications for enhancing highly desirable genetic traits, such as disease resistance. Application of this technology is still in the early stages, but it offers tremendous potential for improving productivity in animal agriculture and also for animal genetic preservation. Dr. Steve Stice, an internationally known University of Georgia scientist who led this team effort, produced KC, a calf cloned from kidney cells collected from a carcass after it had been in a typical meat cooler for 48 hours. This technology has many potential applications for the selection and proliferation of very superior and proven livestock genetics. Dr. Stice and I, with others, founded a Georgia-based company, ProLinia, Inc., that is now merged with ViaGen, Inc., which is in the process of commercializing this livestock cloning technology.

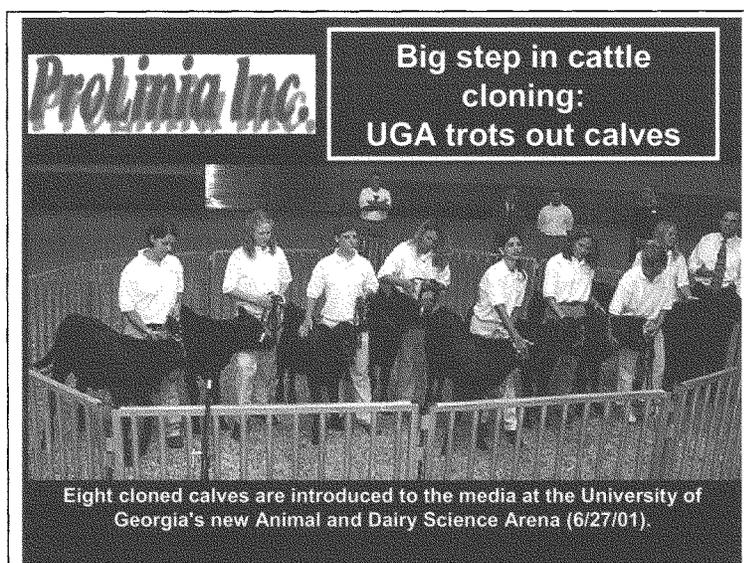




Photo: UGA Public Affairs

"K.C." (for kidney cell), the world's first calf cloned from the cells of a slaughtered cow, represents a breakthrough in cloning technology.

The fourth and final example is associated with a technology that is believed by many to be the greatest scientific feat yet accomplished by man, sequencing of the human genome. Most of the technology and knowledge base for this huge endeavor was developed from thousands of publicly-funded basic research grants. While a University of Georgia professor, I happened to be consulting for Celera Genomics when the sequencing of the human genome was being done. As the human genome sequencing was nearing completion, there was a window of opportunity for animal agriculture to take advantage of the unused capacity. Decisions were made to sequence three livestock genomes using the expertise, hardware and software that were in place for sequencing the human genome. Amazingly, thanks to the previous genomes having been completed, the additional three animal genomes were sequenced in a matter of months and at a fraction of the cost. These genomes are starting to be used by the private sector, for example, by MetaMorphix, Inc., a company with which I work closely (as a member of the Board of Directors, along with a former Secretary of Agriculture, Jack Block). These applications are likely to have a greater impact on animal genetics and productivity than any previous single technology. The genomes and the associated large sets of single nucleotide polymorphisms allow for a paradigm shift in the way livestock can be managed to produce the highest quality of meat at the lowest cost, and with a built-in, molecular-based identification system. Applications of combining livestock genomics and cloning are expected to revolutionize animal productivity and will likely make it possible to meet the demands of high quality food and fiber for an ever-increasing human population. These novel technologies will soon be in the market place, and due to publicly financed basic research primarily for medicinal purposes, animal agriculture will reap many benefits.

I strongly support the funding of basic research to make possible the application of new technologies to agriculture for continued increased efficiency of food and fiber production. These changes in productivity enhancement are critical to continue to meet the needs of human populations, and the pressure is ever increasing due to additional demands for improved product quality and environmental issues. Our society deserves to be congratulated for our past funding of the strongest federally-financed scientific infrastructure found in the world.

**Testimony of
Gale A. Buchanan, Dean and Director
College of Agricultural and Environmental Sciences
University of Georgia**

**Before the
Subcommittee on Conservation, Credit, Rural Development, and Research
Committee on Agriculture
U.S. House of Representatives**

**Georgia Center for Continuing Education
Athens, Georgia**

March 29, 2004

Mr. Chairman and members of the subcommittee, I appreciate the opportunity to appear before you this morning to reiterate the critical importance of federal financial support for our nation's agricultural research, extension and education system. Those of us at America's land grant universities thank you and your congressional colleagues for your continued interest in and support of these vital programs. And let me also say that it is a distinct honor and pleasure to host you here on the Athens campus of the University of Georgia.

America's integrated agricultural research, extension and education system is - as you know - the finest in the world. Although the system traces its roots back to the 1800's, its technologically advanced programs could not be more relevant to modern agriculture and the American way of life. Unfortunately, today the system is in great jeopardy, but not because of a failure to perform. Quite the contrary, it has performed exceedingly well for over 100 years. Rather, the system is in trouble because it is often taken for granted.

The Morrill Act of 1862, which created the land-grant university system, was truly some of the most innovative legislation ever enacted in any country. Passed during the height of the Civil War, this legislation took the only resource our developing nation had in abundance in those days - which was land - and used that resource to support the creation of a higher education system, not for the elite, but for the average person, and with agriculture and mechanic arts as the primary focal points.

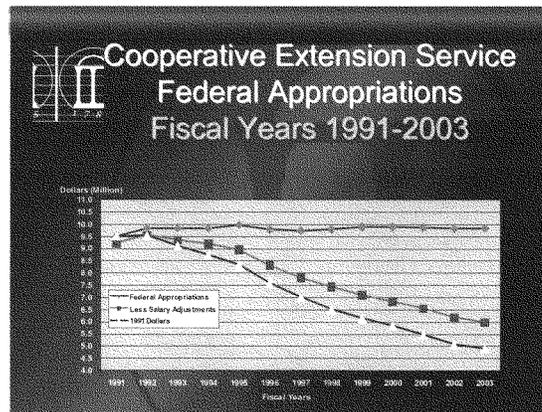
Subsequent legislation provided for two additional components. In 1887, a unified system of Agricultural Experiment Stations was established to conduct relevant research. And in 1914, the Cooperative Extension Service was created to deliver research-based information to farmers, homemakers, and others who could put such information to practical use.

Throughout our history, America has invested wisely in food, agriculture, forestry, and family related research and education programs. These university-based programs have worked exceedingly well and are the envy of the world. Our system, for many years, was nurtured by the executive branch of the federal government and supported by the legislative branch. Such support was bipartisan and widespread.

Unfortunately, in recent years, federal support has rapidly diminished, particularly in the past decade. In fact, just this past year, due to severe fiscal constraints, the U.S. Congress chose to reduce by over 10%, 33 different programs of the Cooperative State Research, Education and Extension Service (CSREES). This action has caused us here in Georgia to lose many critical positions in research and extension. Clearly, today our agricultural research, extension and education system is in great jeopardy. I would like to illustrate using some Georgia data.

Base support for agricultural programs is provided through the Hatch Act for research and through the Smith-Lever Act for extension. The University of Georgia receives \$4,602,173 for research through the Hatch Act and \$9,843,902 for extension through the Smith-Lever Act.

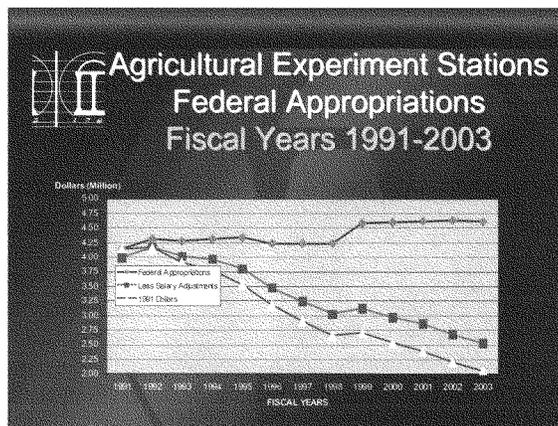
CHART 1



In Chart #1, you can see that we have not had any appreciable increases in federal appropriations in the Smith-Lever account for the Georgia Cooperative Extension Service over the past decade. In Georgia, over 75% of these funds are used to pay personnel salaries. Consequently, we must budget salary increases from other sources. This cost, along with inflation, greatly diminishes the buying power and capacity to conduct

extension programs. Indeed, as the bottom trend-line on this chart indicates, almost one-half of the buying power from this funding source has been lost in a little over a decade.

CHART 2



In Chart #2, we see a similar situation in the Agricultural Experiment Stations (AES). Even though we had a small increase in 1999, we have lost, in real terms, approximately one-half of the buying power and capacity to carry out research programs in a decade. In addition, the technological cost of conducting state-of-the-art research in terms of modern equipment has escalated to the point that we often have difficulty in competing with private industry.

I believe you will agree with me that if this trend continues, in only a couple of decades federal support for research and extension will be insignificant.

I quickly acknowledge that these data pertain only to formula funds, which are used to support base programs. Obviously, we have made up some of these losses through competitive grants, special earmarks and other sources of funding.

A key question is, “Why have we lost capacity for these programs when other federal agencies have experienced phenomenal growth, particularly for research, in recent decades?” I am not sure I can answer this question definitively, but I do have some thoughts to share with you.

Over the years, agricultural research, extension, and education programs have been highly successful and are, unfortunately, often taken for granted. Also, while the executive branch still recognizes ownership of research and development in most federal agencies, this does not appear to be the case with agriculture, forestry, families, and veterinary medicine. Consequently, we must depend upon the legislative branch of government. We all know this approach is always a harder sell.

Another problem exists with no easy answer. When research, extension and education programs are put in the same ring with commodity programs, it is obvious who wins. It is exceedingly difficult for those of us who work for research, extension and education when we know that increases for our programs will perhaps compete with our own farmers and may diminish funds for commodity support.

Our situation demands an urgent response because the future of this nation greatly depends on a successful agricultural sector. Research and education are critical to that success. Those of us in the system are working hard to develop a budget request that takes into account our needs in order to be successful.

As Congress debates its budget and appropriations strategies for this fiscal year, we are asking for support for the full panoply of programs funded through the U.S. Department of Agriculture’s CSREES. The formula funds administered by CSREES – including Hatch, McIntire-Stennis, Evans-Allen, Smith-Lever, Animal Health and 1890s extension funding – support America’s agriculture and natural resources research, extension and education system.

Other vital CSREES efforts include the National Research Initiative (NRI) and similar competitive grant programs. The NRI is the premier competitive research program impacting agriculture. USDA is able to only fund approximately 15% of the quality proposals submitted. Other agencies such as the National Science Foundation and the National Institutes of Health are able to provide about twice the funding. Clearly this leaves many areas related to farming practices, commodity production, nutrition, conservation, and other important unmet needs.

To combat nutritional illiteracy and the epidemic of obesity, land-grant universities conduct research into the root causes of obesity and manage education and outreach efforts, such as the Expanded Food and Nutrition Education Program (EFNEP), which brings better nutritional practices to low-income parents and children.

To protect our farms and food supplies from natural or introduced threats, researchers, teachers, and extension agents at the nation’s land-grant institutions develop and distribute innovative practices and technologies that help shore up our vulnerability to

damaging agents and enable rapid responses when outbreaks occur.

To foster environmental stewardship, CSREES-funded teachers and scientists promote farm, forest and rangeland health, reduce water and air contamination, enhance fish and wildlife, reduce farm production waste, conserve biodiversity, and limit the impacts of land use development on natural resources.

In order to meet the critical need to maintain agriculture, we prioritized our request for 2005 into four major categories.

1. Restore the \$20.6 million in 33 CSREES programs that was cut by 10% in last year's Omnibus appropriations bill.
2. Increase funding for facilities and capacity building at the 1890s and other minority-serving institutions by providing funding in the following amounts:

1890s facilities and capacity building.....	\$49.0 million
1994s research and extension	\$8.0 million
Hispanic education partnership	\$5.1 million
U.S. territories programs.....	\$1.0 million
3. In order to restore cuts made to the EFNEP program last year and to begin increases designed to bring the minority serving institutions into eligibility for the program, fund EFNEP at \$62.0 million.
4. Increase the competitive grants programs to better address critical nutrition, food security, and environmental needs:

National Research Initiative.....	\$180.0 million
Institution Challenge Grants.....	\$6.0 million
International Science & Education Grants.....	\$1.5 million

I believe that these are extremely modest requests for providing the critical federal support necessary for agriculture in the United States. The American consumer still today spends less of his disposable income for food than does any other consumer in the world. Indeed, support for research, extension and education should be viewed as an investment in our future.

Thank you for the opportunity to present this statement. I will be happy to answer questions.

STATEMENT OF DONALD WAYNE REEVES

Mr. Chairman, and Members of the Subcommittee, thank you for inviting me here today to represent the J. Phil Campbell, Senior, Natural Resource Conservation Center (JPCNRCC). The Center is one of the more than 100 research locations in the Agricultural Research Service (ARS), the primary intramural research agency in the U.S. Department of Agriculture. Since its creation in 1937, JPCNRCC has recognized the critical role agricultural research has played in solving natural resource problems of broad significance to the public. Over the past 66 years JPCNRCC scientists have researched soil-plant-animal-atmosphere systems to provide invaluable information for designing practical approaches to land management for optimum use and conservation of natural resources. Our research ranges in scope from improved understanding of biological, chemical and physical processes that limit agroecosystem productivity and sustainability, to interactions of ecosystems within landscapes.

The goal at JPCNRCC is to develop and transfer successful agricultural systems to land owners and managers to protect and sustain the natural resource base, build accord with non-agricultural sectors, and support healthy rural economies. We carry out this goal with a dedicated and highly trained staff. We have 10 research scientists and fifteen technical and administrative support people. We also employ University of Georgia support personnel and students to help conduct research. Our close proximity to and historical relationship with the University of Georgia College of Agriculture and Environmental Sciences enhances and strengthens complementary programs for developing efficient and economical farming practices.

Mr. Chairman, your letter inviting me to testify at this hearing said the subcommittee was interested in learning about our funding stream, how we use the funds, and what changes were needed to make the research more effective. We are very pleased that the President's proposed budget for ARS has an increase of approximately \$5.2 million for the Climate Change Research Initiative (CCRI). Under this initiative, ARS research will identify and develop cost-effective strategies for increasing carbon storage in soils, reducing green house gas emission from agriculture, and generating renewable energy from animal waste. A key part of this approach is accurate and rapid measurement of green house gas emissions from agriculture systems. If adopted by Congress, JPCNRCC is expected to receive \$350,000 of the CCRI funding for our research program on measuring and managing methane emissions from livestock production systems. Currently, the fiscal year 2004 Federal base funding (net to the location) for the Center is \$2,809,489. The Center will also receive approximately \$422,000 in temporary funds generated by grants and cattle sales during this fiscal year. These funds are critical to meeting the mission of the Center. Current discretionary funding used by research scientists is for supplies, equipment, travel, laboratory analyses, and extra labor. Research at JPCNRCC is designed to enhance soil-water-nutrient processes in Southern Piedmont pasture and cropping systems; developing sustainable crop and animal production systems suitable for the Southeast; preventing pathogen transport to Southern Piedmont landscapes from poultry and other animal production systems; and measure and mitigate air emissions from animal production systems. To ensure that our programs are relevant to priority needs, they are based on recommendations from many sources; among them, the Administration, the Congress, commodity organizations, customer and stakeholder groups, collaborators and cooperators, advisory committees, and action and regulatory agencies in and outside the Department. Our research is closely coordinated in Washington, D.C. by the ARS Administrator and National Program Staff to avoid duplication, and to help maximize and transfer research benefits. Some of our recent accomplishments include:

- Determining that the source of most microorganisms used to indicate pathogen contamination in the Upper Oconee river watershed was associated with wildlife and not agriculture.
- Determining that farm ponds are an effective environmental management practice to clean manure-associated bacteria from water.
- Identifying the best tillage practice to maximize net returns, reduce erosion, and improve soil quality for cotton producers in the Southern Piedmont.
- Discovering that well-fertilized endophyte-infected fescue pastures have the potential to reduce carbon dioxide in the atmosphere by storing more carbon in soil.
- Identifying that haying of bermudagrass, even with broiler litter fertilization, is an effective management tool to reduce phosphorus contamination of surface waters; excess phosphorus causes algae growth and reduces oxygen available to fish and other aquatic life.
- Using intensive data collected since 1940 to validate the critical need to protect Southern Piedmont farmlands by maintaining vegetative cover all year around.

- Working with US-EPA to discover that iron in clay soils, common in the Southeast, helps reduce nitrate contamination of ground water.
- Developing methods to accurately measure trace gas emissions from confined animal feeding operations (CAFOs) and identifying management practices to mitigate these emissions.
- Determining that application of poultry litter to cropping systems does not pose a risk of contaminating surface waters with two sex hormones, estradiol and testosterone, of recent concern to the public.
- Working with other ARS units, determining that cutting alfalfa in the afternoon provides higher quality forage preferred by animals than when cut in the morning.
- As important as these strides have been in providing conservation practices for crop and animal production systems, the increasing urbanization of the Southeast continues to make additional research solutions vital and urgent. The research challenges and opportunities that we see for the near and long-term future include:
 - Developing improved guidelines for utilization of land application of animal manures.
 - Developing improved management practices to store carbon and mitigate trace gas impacts from agricultural activities.
 - Developing and coordinating a national system for bacterial source tracking, based on DNA fingerprinting, of fecal bacteria in contaminated water.
 - Developing organic production methods for grain to be used in the rapidly growing market for certified organic poultry production.
 - Developing integrated crop-livestock systems that are profitable, environmentally friendly, and efficient for major physiographic regions in the Southeast.

Mr. Chairman, before concluding my testimony, I would like to say that this year marks the 50th Anniversary of the Agricultural Research Service. We are taking this year to reflect on the Agency's accomplishments over the past five decades and the promise of ARS to continue outstanding research in the next 50 years and beyond. The foundation for past and future successes is ARS' dedication to finding better ways to produce food and fiber while preserving our natural resources. The quality of ARS research stems from our dedication to independent and objective research for the public good; this research cannot be duplicated in the private sector. This type of dedication was personified in J. Phil Campbell, Sr., the man Congress honored in 1997 when it passed legislation renaming our Laboratory. Mr. Campbell was a dedicated public servant from this area whose contributions to agriculture, not only in the Southeast but also throughout the Nation, are well known and widely recognized. We thank you for linking this remarkable man to our lab and especially for the support Congress provides JPCNRCC to continue our important research programs.

Thank you again for this opportunity to testify. I would be happy to respond to any questions you might have.

STATEMENT OF DAVID E. SWAYNE

Mr. Chairman, and Members of the Subcommittee, my name is David E. Swayne and I am the Director of the Southeast Poultry Research Laboratory (SEPRL) located here in Athens, Georgia. Our research facility is part of the Department of Agriculture's Agricultural Research Service (ARS). I would be remiss if I failed to mention that ARS is celebrating its 50th anniversary. Although, ARS can trace its origins back to early 19th century seed collection efforts, it wasn't officially established by the current name until 1953. In recognition of the agency's accomplishments and promising future, ARS labs all over the country are reflecting on our research that affects the lives of so many people in the food we eat, the clothes we wear, and the environment in which we live. SEPRL is very proud of the impact it has made in the ARS poultry disease research program and I appreciate this opportunity to discuss our contributions as well as the opportunities and challenges for the next 50 years and beyond.

As you know, poultry is the number one agricultural industry in Georgia as well as several other southern states. That makes it extremely important to the economy not only in our state but for most other southern states as well. Nationally, poultry industries generate over \$22 billion in receipts each year with an average of \$2.25 billion of poultry products being exported for 1999-2003. Stated another way, the United States controls 40 percent of the world exports of poultry products.

Established in 1962, the Southeast Poultry Research Laboratory provides critical research information to solve health problems of poultry industries in order to maintain their economic viability and expand trading opportunities. The scientific staff at our laboratory includes a diverse pool of professional expertise, including veteri-

narians, microbiologists, immunologists, pathologists, molecular virologists, an agricultural engineer and a physiologist in order to tackle the complex poultry health problems of today. The laboratory complex consists of specialized facilities, designed and operated to contain highly infectious diseases of poultry, and to allow research on these diseases to be performed without posing a threat to the environment, the public, or to poultry industries. Throughout four decades of service, SEPRL has maintained close ties with industry, academia and other government agencies, consistently striving to provide an open, responsive research atmosphere.

Specifically, our mission at SEPRL is to provide scientific solutions to national and international exotic and emerging poultry disease problems through a comprehensive research program emphasizing basic and applied research in diagnostics, prevention, and control strategies, prediction of disease outbreaks, molecular epidemiology, and understanding disease pathogenesis. The diseases and organisms studied include avian influenza, Newcastle disease, intestinal viruses of turkeys (such as poult enteritis mortality syndrome [PEMS]), avian metapneumovirus, West Nile virus, SARS-coronavirus and Salmonella enteritidis. Research is also directed at acquiring fundamental knowledge of the chicken's and turkey's immune responses to infectious diseases and to develop and evaluate vaccines. Immunological and molecular genetic techniques are used to enhance diagnostic capabilities by improving the detection, identification, and characterization of infectious agents. All laboratory programs are research-oriented and no routine diagnostic services are provided. Some of our projects meet agricultural needs included in the Department of Homeland Security's (DHS) programs.

SEPRL is committed to responding to challenges of both poultry industries and regulatory agencies through both basic and applied research programs. Our contributions and importance are highlighted in recent accomplishments which include: (1) studies with the H5N1 highly pathogenic avian influenza in Asia that determined which birds were susceptible or resistant, provided research for development and assessment of effective poultry vaccines, understand the source and movement of these viruses, and assisted public health agencies such as CDC in research on avian influenza zoonotic issues; (2) developed rapid tests for avian influenza now used by the USDA National Veterinary Services Laboratories as the official test for avian influenza diagnosis; (3) provided research data to U.S. representatives to overcome non-tariff trade barriers on egg products and meat exports; (4) partnered with California Food and Agricultural Diagnostic Lab and USDA National Veterinary Services Laboratories in the co-development of rapid tests (RRT-PCR) to detect Newcastle disease in California; (5) determined that poultry were not involved in infection or dissemination of SARS in Asia; (6) determined that chickens and turkeys are not amplifiers of West Nile virus, but domestic geese can be amplifiers of the virus and infect mosquito vectors; and (7) developed vaccines that allow differentiation of vaccinated from infected birds for Newcastle disease and avian pneumovirus. These challenges and accomplishments are prime examples of the need for sustained Federal funding of research programs to address national and international disease issues. Particularly important are those diseases that affect the poultry industries in terms of economic viability, international trade, and food safety.

The success of our research at SEPRL is dependent not only upon our own scientists and facilities, but also the collaborations with other government agencies and academia. Our university partners are especially important in that they provide needed expertise outside of our own scientists. Our recent successful collaborations include: (1) wild bird surveys in North and South America, and Pacific Rim Countries for avian influenza and Newcastle disease viruses with Museum of Natural History at the University of Alaska-Fairbanks, the Department of Veterinary Preventive Medicine at Ohio State University, and Southeastern Cooperative Wildlife Disease Study at the University of Georgia; (2) rapid tests to detect respiratory pathogens and differentiate these from avian influenza and Newcastle disease, co-developed with the Department of Veterinary Pathobiology at the University of Minnesota, Department of Avian Medicine at the University of Georgia, the University of Delaware and the University of California; (3) develop international partnerships for detection of avian influenza and Newcastle disease, with assistance of the College of Veterinary Medicine at Iowa State University; (4) and joint vaccine development and molecular epidemiology studies on avian influenza with the Influenza Branch of the Centers for Disease Control and Prevention. We have enjoyed fruitful and productive collaborations with these partners and we look forward to building on these investments as well as developing new partnerships.

It should be recognized that SEPRL's world class, problem-solving research is a result of the responsiveness of the President and Congress to the needs of the poultry industries. When emergency situations have arisen such as outbreaks of avian

influenza and Newcastle disease, the President's budget requests have included funds for emerging diseases. Congress has appropriated funds to support this work at various locations, including the Southeast Poultry Research Laboratory for research to address the problems.

Mr. Chairman, thank you again for giving me this chance to tell you and subcommittee about the effective research conducted at SEPRL. We still have much work to do and many challenges to undertake. We are very grateful for your support and we look forward to working with Congress toward that end. I will be happy to answer any questions at this time.

STATEMENT OF SHARON Y. NICKOLS

Mr. Chairman, members of the Subcommittee, staff, and guests, thank you for the opportunity to present testimony regarding the activities of the College of Family and Consumer Sciences as partners in the delivery of Cooperative Extension programs and contributors to the research endeavors addressing human capacity building, environment, and economic development. Investing in family and consumer sciences research and educational programs delivered through the Georgia Cooperative Extension Service results in a healthier and more educated workforce; saves state and Federal agencies, and families, the cost of expensive remedial treatment for nutrition-related diseases; contributes resources to local economies; and enhances the quality of life for families and consumers in rural and urban areas.

I would like to set the stage for why Georgia needs family and consumer sciences research and Extension programs. Then, I will mention just a few highlights of the programs in Cooperative Extension and some of the research projects that address the needs of the state. The scope of our research and public service go far beyond the things that are in the spotlight today, not to mention our teaching programs. One of the sterling qualities of the land-grant university is the ability to integrate these functions and to work collaboratively with campus-based colleagues such as those in the College of Agricultural and Environmental Sciences whose work is being presented by Dr. Melvin Garber. Finally, I can't pass up the opportunity to share with you some of the things we need to continue serving the public and fulfilling our mission.

THE NEED: WHO ARE GEORGIA'S FAMILIES AND CONSUMERS?

There are 8.6 million citizens living in the State of Georgia in 2004. Georgia is not only a large state geographically, but we have the tenth largest population of any state in the nation. During the decade of the 1990's, Georgia's population grew by 26 percent.

This population growth brought more diversity to the state. African Americans comprise 28.7 percent of the population, the fifth highest percentage of African Americans in any state. An estimated 300 percent growth in the Latino population moved Latinos from being hardly a blip on the population charts in 1990 to being a significant figure in 2000. Officially Latinos are 5 percent of the population, although our demographer estimates that 13 percent is probably a more accurate figure. Immigrants from many other parts of the world have dramatically changed the composition of communities in many areas of the state.

Georgia is a "young" state in terms of population statistics. About 26 percent of the population is under the age of 18, a higher proportion than most other states, with 20 percent more children ages infancy to four than in the previous decade. But, the state's population is also growing older. Georgia recorded a 52 percent increase in those age 65 and older during the past decade, and the predictions are that this trend will continue as Georgia is a highly desirable retirement destination.

In Georgia, a higher percentage of parents of young children are employed than the national average. The parents are employed in 61 percent of Georgia's families with preschoolers and 73 percent in families with children 6 to 17 years of age. Child care is the third highest household expense for most families of young children. The need for high quality child care is evident when we understand these numbers and the fact that early brain development sets the stage for later school success and fosters emotionally secure, self-confident children. Concern about the overall development of our children is raised by Georgia's low ranking at 41 out of 50 states on overall quality of life on ten indicators including health, adequacy of income, and educational attainment.

Georgia has traditionally had low income levels. Today, the percentage of persons living in poverty in Georgia is higher than the national figure. Although the rate of poverty (the percentage living below the poverty line) declined somewhat during

the economic boom of the 1990's, the actual number of Georgians below the poverty line increased along with the increase in population. It is estimated that 1.1 million Georgians (approximately 13 percent) live at or below the poverty line. Of the 242 counties designated as "persistently poor" in a recent study of 11 Southern states, 91 are located in Georgia. Money management is a challenge for low-income households, but it is also a challenge for those at higher income levels. Consumer debt continues to rise and approximately 1 in 46 Georgia households file for bankruptcy, the third highest rate in the nation. Consumer fraud is a problem too. Over 5,000 complaints of fraud and identity theft were reported in 2001.

Housing is again on the agenda of concerns about families' quality of life and the status of the rural economy in Georgia. Housing construction is virtually nonexistent in nearly half of Georgia's counties. The absence of housing construction contributes to a lack of housing choices for consumers, the aging of the existing housing stock, and limited economic development in communities. Workforce housing (i.e., housing that is affordable at the prevailing wages of workers) is in scarce supply in most rural areas. Many environmental hazards associated with chronic health conditions are present in aging housing stock of Georgia.

Over 400,000 Georgians have been diagnosed with diabetes, a disease that contributes to many other chronic illnesses, including kidney disease, stroke, heart disease, and blindness. Georgia has higher rates of cardiovascular disease than most other states. These problems are likely to get worse because the precursor of many of our health problems is overweight and obesity. Approximately 14 percent of children, 12 percent of adolescents, and over 55 percent of adults in Georgia are overweight or obese. Georgia has the highest rate of obesity in the nation, a dubious distinction that costs the state and our citizens millions of dollars in mostly preventable health care expenditures.

Another cost in medical expenses and productivity losses is due to food borne illnesses. Household audits of food safety practices indicate at least one critical food safety violation in 74 percent of all households. Forty percent of the participants cited lack of knowledge as the reason for food safety violations. Over 16,000 eating establishments in Georgia employ more than 256,000 employees and make over \$9 billion in sales annually. The need for knowledge about safe food and utensil handling among food service employees in both business and institutional settings is great.

PRIORITY PROGRAMS IN FACS EXTENSION: PUTTING KNOWLEDGE TO WORK

How is the College of Family and Consumer Sciences (FACS) addressing these issues and the needs of Georgia's individuals, families, consumers and communities? We have set priorities on the issues and targeted the most at-risk families and consumers. Along with focusing our resources on the most critical needs, we are leveraging those resources to secure funding from other sources, thus multiplying the impact of our work. The priority areas for Family and Consumer Sciences Extension are: Food Safety, Nutrition and Health, Child and Family Development, Financial Security, Housing and Environment.

In 2003, we served 170,000 Georgians with educational workshops and programs. About 63 percent of program participants were low-income. In addition, innovative educational curriculum materials, web-based information, media presentations, health fairs, and other educational activities reached thousands more and were used by Extension personnel in other states. A few highlights from these priority areas illustrate our "reach and results."

Food Safety/Food Handler Education. FACS Extension reached over 10,300 participants, including commercial and institutional food handlers and school food service personnel with 30,300 food safety educational contact hours. Such educational programming is required for employment in a food service enterprise. As part of a USDA funded project, two new curriculum packages for kindergarten through third grade were introduced to teach food safety based on the Fight BAC! curriculum. The program has reached 1,500 children in Georgia in 2003 and over 3,000 books and 400 curriculum kits have been sold nationwide. (Project funding from USDA: \$539,600)

National Center for Home Food Processing and Preservation. The University of Georgia, College of Family and Consumer Sciences and Georgia Cooperative Extension, are home to this center, which evaluates and provides home food preservation recommendations. Training was provided to 1,405 participants in 2003, and thousands of copies of So Easy to Preserve were sold. The web site <http://www.uga.edu/nchfp/> receives hundreds of hits weekly. (USDA funding: \$2.4 million over 5 years.)

Child Care Training. Approximately 12,000 child care workers received training and 17,000 parents, grandparents, and others who care for children participated in

programs focusing on Better Brains for Babies and Basic Health and Safety in the Early Childhood Classroom. FACS Extension is the largest single source of community-based education for Georgia child care providers, and is particularly important in rural areas where other sources are not available. Such training is required for centers to maintain state licensing. (Georgia Child Care Council funding: \$215,274 over three years.)

CYFAR: Children, Youth & Families at Risk. Community based programs to building youth skills serves 32 fourth and fifth grade boys performing below grade level in Candler County. The goal is to increase academic success and leadership development, while supporting parents in their parenting role. The Voz de la Familia project in Colquitt County focuses on migrant farm worker adults and youth in their families, to improve English language skills and enhance consumer knowledge and family well-being. (USDA funding: \$500,000 over 5 years.)

Nutrition Education, EFNEP, FNP. Foods and nutrition education programs reached 101,000 Georgians in 2003, including 5,600 individuals participating in the diabetes education program. The Walk-A-Weigh program increased exercise and promoted weight loss, reduced blood glucose level (67 percent of participants), reduced high blood pressure (56 percent), and decreased total cholesterol (45 percent). The Expanded Foods and Nutrition Education Program (EFNEP) reached 12,500 individuals, including 8,500 youth in Georgia. Graduates of the EFNEP program saved approximately \$11.30 per month on food and increased their vegetable consumption 30 percent. Matched 100 percent with local and state funds, the federally-funded Family Nutrition Program provided classes in food safety, healthy food choices, and food budgeting to Food Stamp and Food Stamp-eligible clients. Para-professionals employed by EFNEP and FNP increased their household incomes and improved their educational levels and leadership roles in their communities. (USDA funding: \$2.1 million for EFNEP; \$1.3 million for FNP.)

Consumer Financial Literacy Program. Consumers in ten rural counties in Southwest Georgia increased their knowledge about financial management, debt reduction, and improved consumer decision-making. More than 80 percent of the clientele were able to claim the Earned Income Credit and other tax credits, resulting in a total value of more than \$1.3 million in tax refunds returned to the local economies. An additional 10 counties were added in 2004. (Funding from Governor's Office on Consumer Affairs: \$500,000.)

Housing and Environment. FACS Extension obtained certification from the U.S. Department of Housing and Urban Development as a housing counseling agency based on previous programs providing home buyer education. A study of workforce housing in Georgia identified barriers to housing affordability in rural Georgia. Then collaborations with employers, bankers, and community agencies were developed to promote access to decent housing, a goal especially important to the many new Latino residents in the state. Programs in collaboration with the Georgia Department of Natural Resources and the U.S. Environmental Protection Agency enabled nearly 5,000 families to test their homes for radon gas. (Funding in excess of \$250,000 from various state and Federal sources.)

RESEARCH—KNOWLEDGE FOR REAL LIFE

As with the Cooperative Extension programs, family and consumer sciences research, which is supported with assistance from the Georgia Agricultural Experiment Stations (GAES), focuses on relevant issues to Georgia's food and fiber industries and the ultimate use of these products by consumers to meet nutritional, economic, and community goals. Seventeen College of Family and Consumer Sciences faculty members direct studies with GAES connections. Their appointments are equivalent to 3.5 full-time positions. They are assisted by 8 technicians supported by the Agricultural Experiment Stations.

The main areas of study which have Agricultural Experiment Station support are: Cotton Processing and Barrier Effectiveness of Textile Materials, Nutrition, Consumer Behavior, Housing, and Poverty

Cotton Processing. The study of new applications of enzymes to cotton fiber and fabric to produce improved properties is designed to reduce the negative environmental impact of traditional chemical treatments. Preliminary studies conducted in collaboration with scientists at the Russell Research Lab indicate the use of enzymes is both viable and realistic economically. A relatively recent line of inquiry involves studies to improve accuracy and efficiency in assessing the quality of cotton for use simultaneously by fiber producers, ginners, and textile manufacturers. This could reduce the duplication and costs of testing and improve fiber quality for the market, thus strengthening the economic position of Georgia's cotton producers and processors. Finding alternative and additional uses for cotton is being explored with

the combination of cotton and flax. Identifying the value-added properties and possible end uses for these non-woven fabrics for industrial uses is the objective of this study. Since both cotton and flax are biodegradable, the combination may provide a more environmentally and socially acceptable product versus fabrics based on petroleum products. (Funding from industry and the Georgia Traditional Industries program in excess of \$246,000.)

Nutrition. Nutrition research reflects the approach of the College of Family and Consumer Sciences to address human well-being across the life span, thus some projects focus on children and others on older citizens. Nutrition research also reflects the variety of research methods such as a) experiments using animal models and laboratory analysis of samples from human subjects, b) surveys measuring behavior and characteristics of population groups, and c) intervention studies to test the efficacy of educational programs and experiences.

The study of obesity by family and consumer sciences faculty is comprised of all three approaches. Example of A: Mechanisms that direct how energy is partitioned between heat loss and deposition as either fat or lean tissue is being studied under conditions of environmental stressors using an animal model. The goal of the project is to understand why humans do not necessarily respond to conditions that are expected to reduce body weight.

Example of B: The Georgia Childhood Overweight Prevalence Survey was designed to collect actual data from subjects (3,470 students in 4th, 8th, and 11th grades) rather than self-report data typical of previous studies of the incidence of overweight and obesity. The incidence of overweight among all age groups was 20 percent vs. 15 percent reported in a national self-report survey. Children in rural areas had a higher prevalence of overweight, as did those in 4th grade compared to 8th- or 11th-graders. Detailed analysis of food and activity records will shed further insights on the contributing factors.

Example of C: A behavioral-based model nutrition intervention program increasing fruit, juice, vegetable, and low-fat food consumption among low-income African American children and their families tests a multi-component intervention designed to bring about behavior change in the home. The project is currently being conducted in 22 schools in Atlanta with the cooperation of School Food Service administrators. Shaping early food habits is considered to be a key factor in changing the customary high fat diets, and resulting overweight and obesity, to a long-term commitment to healthy food consumption and exercise.

Other projects in the area of nutrition include the following:

Study of how common vitamin deficiencies, such as B12 and D, adversely affect the health of older citizens. These impairments include hearing loss, cognition, and ability to do everyday tasks. The project is conducted in collaboration with several Georgia Area Agency on Aging units and the USDA Food Stamp Nutrition Education Program.

Examination of the effect of iron nutrition on oxidative stress and the interaction of iron and flavonoids will contribute to knowledge of mechanisms by which plant foods protect against chronic disease. Another study in the area of "functional foods" or "nutraceuticals" involves testing the effects of a fraction of grain sorghum wax to lower cholesterol and reduce weight gain. Beyond the goal of enhanced nutrition for consumers, these projects can help to identify food ingredients representing value-added commodities that either are or could be produced by Georgia farmers.

The area of proteomics involves identification of key molecules involved in zinc homeostasis, as well as other state-of-the-art proteomic techniques to better understand protein expression.

(Funding beyond Agricultural Experiment Station support for these and related projects comes from the USDA NRI competitive grants, the National Dairy Council, National Institutes of Health, National Institutes of Mental Health, various Georgia state agencies, and businesses, totaling more than \$3 million.)

Consumer Behavior, Housing, and Poverty. A study of consumer food purchases using on-line grocery shopping offers insights into an alternative food acquisition method most often used by more affluent, two-earner households. Other potential users include consumers for whom in-store shopping is difficult, for example, temporarily or permanently disabled consumers or consumers shopping for geographically distant family members. On-line shopping may have implications for the volume of consumption of certain food items such as fresh fruits and vegetables and highly perishable products, and thus ultimately affect food producers and processors if the practice becomes more common.

Many parts of Georgia rely on manufactured housing to meet their housing needs; however, there has been little research on the demographic and economic profile of residents of manufactured housing and residents' attitudes toward their housing compared to those living in stick-built homes. Not only does manufactured housing

meet consumer needs, it is a source of employment and economic development in many locations. This project led to an externally funded study sponsored by the Southwest Georgia Housing Development Corporation for an elderly housing market analysis and needs assessment in five counties in that region. Both projects are in the early stages.

The study of poverty and financial hardship among young families with children is testing long-held assumptions about traditional measures of poverty and its relationship to financial hardship (for example, credit problems and debt). Along with the study of financial hardship, this study seeks to develop a measure of financial resiliency and has implications for programs aimed at promoting savings and wealth accumulation among low- and moderate-income families.

FUNDING OF EXTENSION AND RESEARCH PROGRAMS AND DELIVERY SYSTEMS

As Dr. Garber states in his presentation, "Maintaining funding for support of Agricultural Research and Extension programs is a constant challenge." That challenge is shared by Family and Consumer Sciences because of our inextricable connection to the Cooperative Extension delivery system—the best method of reaching the public with educational programs ever designed, especially the at-risk audiences that predominate Family and Consumer Sciences clientele. The decline in system-funded county agent positions assigned to Family and Consumer Sciences is especially troublesome at the very time that the state faces these and other challenges:

- the population has increased,
- the economic downturn puts more families at the margin or below the poverty line,
- chronic health problems are increasing along with the rate of obesity,
- the segment of the population in need of dependent care (children and the elderly) is growing.

The litany of challenges is long, and 62 of Georgia's 159 counties are without the services of a Family and Consumer Sciences Extension agent. On the research front, reductions in state funding have necessitated reduction in force of the support staff, cuts in graduate assistants, and reduced operating funds to conduct the research.

Faculty in the College of Family and Consumer Sciences have been aggressive and successful in securing external funding from USDA, other Federal and state agencies, and private industry. Overall, all faculty in the College of Family and Consumer Sciences secured nearly \$14 million of external funding in fiscal year 2002. Faculty with Agricultural Experiment Station appointments were responsible for \$1.3 million of those funds. For every AES dollar, they brought in \$4.40 to support the aforementioned research programs. That's a yield anyone would find desirable in today's economy!

FACS Extension secured over \$6 million in external funding in fiscal year 2003. In addition, \$1.5 million of USDA "pass-through" funds were used to match local and state funds in providing nutrition and food education to Food Stamp recipients and radon education and test kits to householders. FACS Extension's payoff is \$7.05 for every dollar of state and Federal funds in faculty salaries.

This level of creativity and productivity is impressive. It is made possible by the superior quality of our faculty, support team, and the remaining FACS County Agents. However, our record of success is vulnerable due to the erosion of infrastructure support from the state and Federal entities. Furthermore, the extensive list of collaborators involved in our projects require continuous communication and relationship maintenance. Replacement of basic financial support is critical to preserve and renew these wonderful systems for the 21st century.

Wish List: Restore funding to the Expanded Foods and Nutrition Education Program by 10 percent.

Increase NRI funding targeted to priorities that meet address human needs.

Support the University of Georgia's request for ear-marked funding for the Center for the Prevention of Obesity and Related Disorders (GCORD, a.k.a The Obesity Center).

Again, thank you for the opportunity to report our successes in fulfilling the mission and serving Georgia's citizens, and to present our concerns about our ability to do so in the future.

STATEMENT OF MELVIN P. GARBER

Mr. Chairman and members of the Subcommittee, thank you for the opportunity to comment and present testimony regarding the effectiveness of Agricultural Re-

search and Extension programs and to share with you some of my thoughts regarding the future.

The Georgia Agricultural Experiment Stations has strong research commitments in both basic as well as applied research. The Cooperative Extension Service has major efforts in three program areas including Agricultural and Natural Resources, Family and Consumer Sciences and 4-H and Youth Leadership. I am pleased to share with you that the Agricultural Experiment Stations and Cooperative Extension Service have played, and continue to play, a vital role in the success of Georgia agriculture. Clearly, our programs are aligned with the clientele we serve including farmers, as well as all others who produce or add value to agricultural commodities.

I'd like to share with you just a few of the programs which illustrate the effectiveness and the role that they play in Georgia. I will mention only the high points, but you will have a copy that provides greater detail about each of these programs.

1. Development and Release of Plant Varieties for use in the Southeastern United States (and in some instances, nationally). During the last several years, the College has released peanut varieties, which presently account for well over 90 percent of the acreage in the Southeastern United States. Valuable varieties of soybeans, fescue, clover, alfalfa, wheat, blueberries, sod, and ornamentals have also been released. In addition, turfgrass developed on the Tifton campus in cooperation with ARS are used on numerous golf courses and many sports arenas throughout the Southeastern U.S. and internationally.

2. Center for Urban Agriculture. The Center, under the direction of Dr. Gil Landry, is located on the Griffin campus within a fifty mile radius of over 50 percent of Georgia's 8 million population. The urban agricultural industries represent the fastest growing segment of U.S. and Georgia agriculture, major sources of new employment and a bridge between rural and urban interests. Partnerships have been formed with commercial organizations and regional urban governing organizations that reach major urban audiences. The Center is establishing new ways to coordinate programs state-wide for county agents that should reduce duplication and allow for specialization among county agents. The Center is providing support for the newly formed Hispanic Working Group, under the leadership of Dr. Jorge Atilas. We expect this effort to result in the establishment of a regional training center for first generation immigrants to include programs such as safety training for Hispanic workers in Spanish. Because many of our farm workers, both in rural and urban settings, are increasingly Hispanic, we need to have a far greater commitment to training Hispanic and other first generation immigrant workers in areas that will enable them to be more effective in supporting Georgia agriculture and Georgia agribusiness endeavors.

3. The Center for Food Safety. The Center, directed by Dr. Mike Doyle and located on the Griffin campus, has an internationally recognized research program in the detection and prevention of foodborne pathogens. The program develops and utilizes new microbiological methods for the practical alleviation of foodborne illnesses. Many of the major food producing companies in the United States collaborate with the Center on a routine basis.

4. Center for Agribusiness and Economic Development. The Center, under the direction of Dr. John McKissick, has provided leadership to the Value-Added Agriculture efforts in Georgia through feasibility analysis, agent training and industry conferences. Dr. McKissick's group was instrumental in establishing the Southwest Georgia Cooperative Development Center, an incubator for Cooperatives. This was made possible by USDA grant funds. The Center will help people in Georgia form cooperatives and thus lower costs, increase bargaining power, expand markets and improve products and services. This should lead to more jobs and income to a poor rural part of Georgia.

5. Water Quality and Water Quantity. The C. M. Stripling Irrigation Research Park is in its second year of operation. Underground and surface drip irrigation systems have been added to the six center pivot and two lateral systems. Irrigation scheduling, sensor and monitoring equipment, and alternative application technologies are being developed and evaluated to determine optimal recommendations for both crop profitability and water conservation. Demonstrations and education workshops are allowing rapid transfer of new knowledge to water users. This work is fully integrated with, and complimentary to, research and commercialization efforts underway at NESPAL and the Technology Development Center on the Tifton Campus.

6. Agricultural Water Use. Base line information on agricultural water use is essential for state wide water planning and the ongoing negotiations (court determination) between Georgia, Florida and Alabama. The Georgia Environmental Protection Division contracted with UGA Research and Extension faculty to meter a sample of agricultural water permits. Over 800 systems have been metered from 1999 to

2003. This data will provide a better understanding of quantities of water used by farmers throughout the season in response to crop and rainfall conditions.

7. Ventilation Techniques. Ventilation techniques developed by University of Georgia scientists have essentially eliminated mortality and other negative heat related production effects occurring in poultry production. The techniques were directly responsible for the rapid expansion of the poultry industry into South Georgia, an area previously unsuitable for poultry production due to excessive heat. It is estimated these new systems improved the bottom line of Georgia poultry farmers by \$5 million per year, collectively.

8. Natural Resource Management. Every academic department and county office is involved in addressing environmental issues that affect production agriculture and management of natural resources. The Poultry Science Department developed the innovative Georgia Voluntary Nutrient Management Planning Program conducted in cooperation with the Georgia Poultry Federation and the county Extension agents. Success in the area may be the difference between staying in business and burdensome restrictions that limit profitability. Specialists and county agents conduct water conservation workshops for row crop agriculture, greenhouse and nursery operations, landscape companies and homeowners. A primary contributor to poor water quality in Georgia is soil erosion on residential and commercial construction sites. Georgia specialists are working to establish a regional training and education center, on the Griffin campus, for Erosion and Sedimentation Control. Extension efforts in this program area will help ensure continued existence and profitability of producers and demonstration that Extension expertise can help solve critical urban environmental issues.

9. Fruit and Vegetable Production. Production of small fruits—such as blueberry, strawberry and blackberry—and vegetable crops has increased substantially in the last ten years. This continues to be an area of great promise for growth, diversification and value-added for Georgia farmers. Georgia county agents and state specialists were instrumental in organizing the Georgia Fruit and Vegetable Growers Association, the current annual Conference and Trade Show and publication of their bi-monthly magazine. There is close teamwork with county agents and state specialists, researchers, industry, academic disciplines and governmental agencies.

The four-state Southern Region Small Fruit Consortium is a good example of multi-state, joint Research/Extension activities. No one state had sufficient resources for high impact, but together the Consortium has made a difference. In Georgia alone, the estimated impact on the blueberry industry is \$8M over two years.

10. 4-H Youth Development. Georgia 4-H is the largest youth program in our nation. There are 191,695 youth enrolled in Georgia 4-H. The students are primarily age 9–19 and about equal boys and girls. About 52 percent of 4-H membership lives in towns and cities while 48 percent live in rural areas, and 3.5 percent live on farms. Minorities account for about 38 percent of membership. The primary delivery of information is in cooperation with school systems in Georgia. Two large components are the 4-H Environmental Education Center and 4-H camp. The program enjoys a large diverse following of avid supporters throughout the state.

11. Forest Resources. Forestry is a major industry in Georgia and an important component of natural resource management. The Warnell School of Forest Resources, under Dean Richard Porterfield, use both McIntire-Stennis and Renewable Resource Extension Act (RREA) funds. The RREA funds have been utilized to support eight forestry Extension faculty member's salary and travel, the annual award winning Forestry Advanced Specialty Agent Training sessions, youth education activities at the Mary Kahrs Warnell Forest Education Center in Savannah, and to facilitate construction of the outreach center at the state's forestry arboretum. Federal dollars are used to leverage state, county and private fund sources.

12. e-Extension. e-Extension is a national web-based information and education network that provides 24/7/365 access to objective science-based information of land-grant universities. It is coordinated with a community-based educational system of the Cooperative Extension Service and may be obtained via any Internet-accessible device, including computers, cell phones and PDAs. It is designed for new and traditional communities of interest—such as food safety, homeland security, lawn and garden, agriculture and natural resources, environment, energy, youth development and health/obesity. Focused on answers to users' questions, problems and life events, e-Extension provides information in a variety of formats (e.g., frequently asked questions, brief fact sheets, chat and discussion groups, decision support tools, conferencing and streaming video, distance diagnostics, and educational modules).

Nationally, Extension directors and administrators support the concept of e-Extension, recognize it as necessary to meet the needs of current and future clientele,

and have agreed to provide cash and in-kind resources to begin development and implementation. In addition, new funding of \$6 million annually is needed.

FUNDING OF RESEARCH AND EXTENSION PROGRAMS

Maintaining funding for support of Agricultural Research and Extension programs is a constant challenge. We employ multiple sources to maintain the viability of our programs. The bulk of our support for both Research and Extension is derived from state appropriations. Approximately 55 percent of the Research budget and 50 percent of the Extension budget are state appropriated dollars. Of course, a major funding source for Extension is through county governments and boards of education at the local level. In Research, 32 percent of the funding is derived from grants and contracts. Both Research and Extension receive approximately 7 percent of their budget from sales and services. As pointed out earlier, the Federal support for Research through the Hatch Act and Extension through Smith-Lever is a very important part of base support for these programs. As you saw in the earlier presentation, these funds are not keeping pace with salary adjustments or inflation. Consequently, I'm deeply concerned that the Federal support for Research and Extension has rapidly become a minor part of support for these programs.

FUTURE NEEDS IN RESEARCH AND EXTENSION

One can not argue about the merits and importance of Research and Extension and the success of Georgia agriculture. Indeed, our leadership role in agriculture is to a great extent based on our successful applied Research and Extension programs. While basic research is often times successfully supported through competitive grant processes, much of our applied Research and Extension effort does not lend itself nor are there opportunities for extramural funding. Consequently, we are far more dependent upon state, Federal and commodity support for these activities. Some of the areas that we, here in Georgia, clearly believe are relevant and important for the future are in the area of water quality and water quantity and water conservation. While this is already a major thrust of our Research and Extension efforts, we are not committing sufficient resources to address the needs as we see them. Certainly, the importance of water conservation and the urban landscape, as well as erosion and sedimentation control, are important areas that are not adequately investigated at the present time. We also see the need for greater support of the fruit and vegetable industry which continues to grow dramatically particularly in the Southern part of our state. We believe we should be committing far more resources to improving processing and marketing of Georgia fruit and vegetables. This ties in closely with the need for more value added research and development. These are clearly the purviews of the Experiment Station and the Extension Service, and while this is one of our priorities and we are committing some resources to this area, our efforts are far short of what is ideal in this particular area.

One of the areas we simply are not addressing adequately is the newly discovered parasitism genes that will provide potential targets for intervention in the parasitic process used by nematodes. Plant-parasitic nematodes are responsible for over \$100 billion in annual crop damage worldwide. Georgia certainly accounts for a significant part of that loss. Research in this area will certainly provide the foundation for development of novel strategies for controlling these economically important plant pathogens without the use of agricultural chemicals.

The percentage of state and local funding has continued to increase over Federal funding, and the programming accountability to states and local governments has also continued to increase. An accountability system to document the impact of public funds is important. The cost of this accountability doubles if state and Federal requirements are not compatible. We encourage CSREES to work with states to find cost effective solutions to accountability reporting that will meet the needs of Federal, state and local requirements. To complicate this issue, we have also received conflicting instructions concerning the accountability requirements of multi-state and integrated activities as part of the Agricultural, Research, Extension and Education Reform Act (AREERA).

We rely heavily on the stake-holder input process to guide program direction as required in the AREERA. This planning process is also used to guide the use of state and local dollars. We continue to encourage this grassroots process as the ideal tool to set direction for the state's use of Federal funds.

What we need: Probably the most significant point I would like to make this morning is that we clearly recognize several facts.

- (1) Agricultural Research and Extension are critically important for the future of our state and nation.
- (2) These programs are substantially under funded.

(3) If we are going to be successful and meet the expectations of the people of our state, as well as the consumers in our society, we must do a better job of conducting research and extension programs. Obviously, the key to that success is more, as well as consistent, funding for Research and Extension efforts.

The National Association of State Universities and Land Grant Colleges (NASULGC) Board on Agriculture Assembly/Budget Advocacy Committee has long championed the need for increasing base support for these programs. I urge you to give careful consideration to the information provided in the first presentation this morning. Clearly, support for the NASULGC budget position is a step in the right direction. We realize full well that support for Research and Extension is a challenge during these tough economic times, but it is truly, as the Dean pointed out, an investment in our future.

STATEMENT OF LOLA SCHOENRICH

We wish to thank Chair Gutknecht and the committee for coming to Minnesota on March 15, 2004 to convene a hearing on renewable energy development. We wish also to thank you for the opportunity to provide this statement for the record.

The Minnesota Project and the above-mentioned groups believe that renewable energy development offers the American people a number of critical benefits. These benefits include creating economic opportunities for farmers and rural communities and reducing the environmental impacts of fossil fuel production and use. The members of the committee were able to see first hand the results of the convergence of Federal and state policies with the investment of time, money and energy by Minnesota entrepreneurs. All three were critical ingredients to Minnesota's success.

In order to continue the advancement of renewable energy development in Minnesota, and the nation, there is a continuing need for Federal policies that encourage investment in renewable energy.

WIND ENERGY DEVELOPMENT

As you saw and heard, Minnesota has been a true leader in wind power development in the United States. Only two states, which are much larger than Minnesota, have more installed wind power capacity. Minnesota's public policies have clearly moved the state out ahead. However, Federal policies provide critical support to this success as well. Most notable is the Federal production tax credit (PTC). The Federal PTC works with the State policies to create the dynamic market for wind energy.

However, the current status of the PTC places Minnesota's wind energy market in a very difficult position. There is uncertainty about cost and prices in the market. While there is a wide spread assumption that the PTC will be reauthorized, it is not clear when. This essentially limits the ability of project developers and utilities to negotiate contracts. In the mean time, projects are being delayed. No business can thrive with on again/off again public policy. Uncertainty over Federal policy needs to be removed in order for the Minnesota wind energy industry to continue forward.

In the short term, it is crucial to restore the PTC as soon as possible. We cannot afford to wait until there is consensus on a comprehensive energy bill. The House needs to move forward

In the longer term, there are opportunities to improve the PTC. Locally owned and developed wind projects provide significantly better economic returns to local communities. When there is a local ownership stake in the project, profits stay local. The profits then expand and multiply the economic benefits to host communities. However, only investors with significant existing tax liabilities can fully take advantage of the PTC as it is currently structured. The PTC also serves as a credit against passive income, further limiting its value to many wanting to invest in wind energy development. This places locally owned wind projects at a competitive disadvantage to larger projects owned by outside investors. Many of the local projects developed in Minnesota have, in fact, used unduly complicated ownership structures bringing outside investors into the project just to make the PTC work. The PTC needs to be modified in order to facilitate wind investment by farmers and other local entrepreneurs. Discussion needs to begin now so that we are ready to enact an even better PTC at the next renewal.

RENEWABLE ELECTRICITY STANDARD

At the field hearing in Rochester you heard from the Presidents of the Minnesota Soybean and Corn Growers Associations how much a renewable fuel standard could benefit the renewable fuels industry, rural communities, fuel consumers, and farmers. The same can be true for a Federal Renewable Electricity Standard (RES).

A study completed by the U.S. Department of Energy's, Energy Information Administration (EIA) found that a 10 percent RES by 2020 would virtually have no impact on consumer electricity prices in comparison to the business as usual model. By 2025, electricity prices would only be 0.1 cents per kWh higher with an RES than without it. Further, the EIA found that an RES would reduce natural gas prices, potentially producing net savings for consumers.

According to an independent analysis by the Union of Concerned Scientists, the renewable electricity standard provision of 10 percent by 2020, which was passed by the Senate last year, would provide \$43.8 billion in new capital investment in renewable energy in America and create new opportunities in the manufacturing and high tech sectors—both of which have experienced severe cutbacks and employee layoffs over the past year. Wind and photovoltaic energy create 40 percent more jobs per dollar invested than coal.

An RES would also generate more than \$5 billion in new property tax revenues for local communities. Moreover, the market demand created by an RES would bring jobs to rural areas, where it is estimated that wind energy alone could create 80,000 new jobs. The U.S. solar photovoltaic industry directly employs nearly 20,000 people now, a number that should grow substantially in the next decade.

The benefits do not stop there. The same analysis shows that a 10 percent RES would stimulate nearly \$17 billion in new investment, provide over \$1 billion each year in property tax payments to cities and towns, and provide over \$400 million each year in lease payments to farmers for wind power alone. Consumers could be saving money while the United States makes a commitment to 10 percent renewable electricity. Consumers and taxpayers could see a net savings of nearly \$3 billion by 2020 with a combination of a 10 percent RES and tax credits already passed by the Senate.

Each state would also see significant benefits to the economy. For example in Minnesota alone a RES would produce:

- \$72 million in new capital investment
- \$32 million in new property tax revenues for local communities
- \$20 million in lease payments to farmers and rural landowners from wind power

A renewable electricity standard is a step in the right direction to decrease our dependence upon foreign sources of energy. A diversified fuel mix in the electricity system would make the current energy supply more secure and reliable. A 10 percent RES by 2020 is a sensible first step toward a balanced approach to meeting future energy needs, with renewable technologies, and is far more responsible and reliable than continuing to invest our energy dollars in dirty, dangerous power sources. Further investments in renewable energy keep energy dollars in the United States rather than exporting our dollars to import our energy. Renewable energy investments provide economic advantages to farmers, rural communities, energy consumers, and small businesses. A 10 percent Renewable Electricity Standard is a win-win for all Americans.

Support for renewable energy is broad and deep in Minnesota as well as in the nation. We need to continue the momentum. We urge the House to pass the renewable energy priorities of a production tax credit for wind energy and the renewable electricity standard.

