

Louisiana State University Agricultural Center

Annual Report, FY 2005

October 1, 2004-September 30, 2005

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Louisiana State University Agricultural Center

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Overview

The mission of the LSU Agricultural Center is to enhance the quality of life for the people of Louisiana through research and education programs that develop the best use of natural resources, conserve and protect the environment, enhance the development of existing and new agricultural and related enterprises, develop human and community resources, and fulfill the acts of authorization and mandates of state and legislative bodies.

In realizing this mission, the LSU Agricultural Center in FY 2005 directed research and extension education programs under five goals established by USDA-CSREES in pursuance of the mandate of the Agricultural Research, Education, and Extension Reform Act of 1998 (AREERA). This report updates information about several of the ongoing programs which were included in previous year's reports and provides information on new initiatives and projects undertaken during FY 2005. Research projects and extension reports are included under each goal. The reports are followed by information about the processes used for stakeholder input and merit review of programs, and allocation of federal appropriations to multi-state and multi-function activities.

The five federal goals under which accomplishments are reported are as follows:

Goal 1 – An organized agricultural system that is highly competitive in the global market

Goal 2 – A safe and secure food and fiber system

Goal 3 – A healthy, well-nourished population

Goal 4 – Greater harmony between agriculture and the environment

Goal 5 – Enhanced economic opportunity and quality of life for Americans

Research Project Summary

Louisiana Agricultural Experiment Station scientists, located on the Louisiana State University and Agricultural and Mechanical College campus and at branch Research Stations located across the state, continue to serve stakeholders by conducting research relevant to Louisiana agriculture. Research results are disseminated to producers, consultants, agribusiness, government agencies, and other stakeholders, both directly and through extension educators. With a considerable number of farmers now using a computer as an integral part of their operation, in FY 2005, 3,340,849 visits were made to the LSU AgCenter web site. Six new research publications were released, one of which is available on-line. Additionally, one research publication was revised.

Extension Program Summary

Education programs of the Louisiana Cooperative Extension Service were conducted in all five federal goals. In FY 2005, professional Full Time Equivalents (FTEs) totaled 377.16, and 6,251,726 educational contacts were made. The distribution of professional FTEs and educational contacts by federal goal was as follows:

Federal Goal	Number of Extension FTEs	Educational contacts
1	122.177	1,653,129
2	5.303	94,233
3	65.101	892,555
4	18.868	1,636,426
5	165.711	1,975,383
Total	377.16	6,251,726

The LSU AgCenter technology initiative has led to increased usage of its web site to supplement the traditional print method of educational information dissemination. A number of printed publications have now been placed on-line for extension stakeholders to access, download, and/or print copies to meet their needs. A monitoring system to record stakeholder use has been developed, and in FY 2005, 3,340,849 visits were made to the AgCenter web site. These on-line visits are in addition to the educational contacts noted in the table above. Although on-line educational material is now in demand by our stakeholders, print media continues to be widely used. Printed publications on a wide range of topics were issued for dissemination to adult and youth stakeholders in support of educational programs. Twenty-four new publications were developed, 27 publications were reprinted, and 29 publications were revised. Twenty-nine of these publications are available on-line.

GOAL 1

LSU AgCenter Goal 1 is to achieve an agricultural production system that is highly competitive in a global economy.

Goal 1 – Extension Program Reports

Cotton Insect Pest Management Educational Programs

Ralph D. Bagwell, Northeast Region

Key Theme: Invasive Species

The objective of cotton insect management educational program is to maintain production at a profitable level by reducing insect pests to the point they cause no economic losses. Program needs were identified by stakeholder meetings, county agent meetings and one on one interaction with stakeholders. A stakeholder meeting is conducted yearly to identify cotton IPM needs for the year. Needs and recommendations are identified for cotton IPM are identified. Recommendations developed during this meeting are presented to cotton producers, county agents, agricultural consultants and include the latest cultural, biological and chemical practices for cotton insect. IPM programs are designed to accomplish cotton IPM at reasonable costs with minimum adverse effects on human health and the environment. Such a blend of chemical and non-chemical insect control practices provides insect control with the minimum amount of insecticides and results in more efficient control of the pest insects.

The latest technology in cotton IPM was disseminated to the cotton industry in Louisiana. Educational efforts included result demonstrations, county agent training sessions, producer meetings, professional meetings, and through newsletters. Specifically, there were 21 result demonstrations conducted on recommended scouting procedures, treatment thresholds, application techniques, cultural control options, and biological control. There were 34 presentations on cotton IPM at local and national grower meetings. Cotton IPM education was also disseminated through various print media.

100% of Louisiana cotton is produced using IPM techniques. Insect control costs for Louisiana cotton in 2005 were \$99.45/acre or \$52,211,250 for the state. If Louisiana's cotton crop was produced without IPM, insect control costs would be at least \$160.94/acre or \$84,493,500 statewide. Thus, IPM saved Louisiana cotton producers at least \$61.49/acre or \$32,282,250.

Source of Funds

Smith-Lever 3 b, c
Private industry

Scope of Impact

Multi-state: 35% of 4.15 FTEs were devoted to multi-state cotton IPM programs at a value of \$80,136 per FTE. Thus, the dollar value for Multi-State cotton IPM programming is \$116,398.

Multi-function: 30% of 4.15 FTEs were devoted to multi-functional cotton IPM programs at a value of \$80,136 per FTE. Thus, the dollar value for multi-functional cotton IPM programming is \$99,769.

Level-Basin Irrigation of Rice, Cotton and Soybeans

Bill Branch, Biological and Agricultural Engineering; Glen Daniels, Dan Thomas

Key Theme: Agricultural Profitability

Irrigation is considered essential for growing rice and desirable for cotton and soybeans in Louisiana. Capital investments for installing irrigation systems are very large. Precision grading to very low slopes (>0.1%) improves drainage, increases irrigation efficiency and improves machinery efficiency. Grading to zero slope (level-basin) offers increased savings in water use but costs \$400-\$500 per acre. Level basin irrigation works well for rice and crawfish but has not been used for cotton and soybeans which cannot survive inundation.

County Agent Glen Daniels, the Biological and Agricultural Engineering Department and the USDA Agricultural Research Service have worked with growers in Concordia Parish to learn how to irrigate soybeans and cotton on low-slope, precision-graded fields and on level-basin fields in a high-rainfall climate.

The use of spin ditches (shallow drainage ditches cut across the fields) and 15-inch diameter polyethylene irrigation tubing have decreased the time required to irrigate cotton or soybeans on low-slope, precision-graded and level-basin fields, thus decreasing the risk of losing the crop to inundation. This allows the grower to diversify cropping plans for these fields designed for growing rice. The pumps supplying these fields for rice production have much less capacity than convention suggests is required, thus reducing both investment cost and fuel consumption.

Source of Funds

The LSU AgCenter provided funding for faculty and some of the supply cost. The USDA Agricultural Research Service provided funding for the graduate student and some of the supplies. The land owner provided land, irrigation and equipment. Local agri-businesses provided funds for supplies.

Louisiana Master Horseman Program

Clinton G. Depew, Animal Sciences

Key Theme: Animal Health

Several surveys of the Louisiana Horse Industry have indicated that Louisiana horsemen have not adopted many of the major technical advances in the production and care of horses. Additionally, their knowledge of training techniques and skills are not adequate to be competitive on a national basis. The surveys also indicated that their primary source of information is other horsemen. Therefore LSU AgCenter personnel set about to design a program that would increase the knowledge and skill level of horse industry leaders to address the needs of the industry. This program was dubbed the Master Horseman Program.

The Master Horseman Program was designed and developed to provide training to a select group of key industry leaders. These leaders would in turn have the responsibility to teach others the scientific concepts that they learned. The program was designed to capitalize on the tendency for horsemen to learn from each other. Therefore, key industry leaders would influence the rest of the industry and raise the knowledge and skill of the entire industry. The program consists of 8 three-hour sessions. Each session consists of approximately 1 hour of lecture on scientific and technical advances in nutrition, health, management and care of horses, The second hour is devoted to a demonstration of recommended training techniques and the third hour is an opportunity for participants to practice the skills learned. Each session utilizes the three learning techniques of listening, watching and doing to enhance the learning experience. Additionally, a test is given each week over the material from the previous week to reinforce the learning and evaluate the effectiveness of the program. When leaders complete the training they are required to volunteer 40 hours of service to teaching other horsemen and youth.

Nineteen Master Horseman programs have been conducted and 281 leaders have been trained. Evaluations indicate a high level of satisfaction, success and competence. The leaders have subsequently been very active in the 4-H horse program in conducting camps, clinics, seminars and workshops. Master horsemen are now conducting Master Horsemen programs in their parishes. They are taking leadership roles in industry associations and the level of knowledge, competence and leadership in the equine industry is increasing rapidly. Additionally the demand for Master Horseman programs has increased dramatically. The program is creating a vision for the future of the Louisiana Horse Industry.

Source of Funds

Most of the funds for the Master Horsemen program are self generated with the specialist and agent travel coming from state funds.

Scope of Impact

Multi-state: An estimated 40% of the horse program is a result of multi state activities [40% X 4.46 FTEs X \$80,136 = \$142,962] at a value of \$142,962.

Multi-function: Researchers and their research are directly involved in the development, delivery and evaluation of the program and activities of the horse program. The value of the multi function effort is \$178,703. [50% X 4.46 X \$80,136 = \$178,703].

Production of Quality Milk

Chuck Griffin, Northwest Region

Key Theme: Animal Health

The dairy industry in DeSoto Parish contributes over 7.4 million dollars to the local community. Mastitis, inflammation of the udder, remains the most common and expensive disease of dairy cattle throughout the United States. Research has shown that the average loss due to mastitis is \$27,750 for a 150 cow herd. The loss of milk production, increase cost for veterinarians, antibiotics and loss of incentive payments due to mastitis could cost DeSoto Parish dairymen over \$59,000 per year.

The LSU Agricultural Center conducted the Northwest Louisiana Dairy Day in which two speakers discussed producing quality milk. A workshop was held at Jerry Holmes dairy in which a demonstration of checking milk equipment for proper function and proper equipment cleaning was conducted. Farm visits were made to area dairyman to check proper functioning milking equipment.

Eighty five percent of the dairy farmers in DeSoto Parish gain knowledge of producing quality milk at the 2005 Northwest Louisiana Dairy Day. Malfunctioning equipment was found at 20% of DeSoto Parish dairy farms which could contribute to poor milk quality. Six dairy farmers received Quality Milk Awards for 2005.

Source of Funds

State; Smith-Lever 3 b, c

Farm Financial Management

Kurt M. Guidry, Agricultural Economics and Agribusiness; Gene Johnson, Mike Salassi, Ken Paxton, John Westra

Key Theme: Agricultural Profitability

Agricultural producers are faced with constantly changing production and marketing environments. In order to continue to prosper, producers must react to these changing conditions and develop their management strategies that offer the best opportunity for success. Higher input costs require that producers look for ways to decrease total costs without affecting production. Changing government policy often requires that producers change amount and type of commodity they produce. New technologies must be examined to determine if it brings increased profitability to the enterprise.

Throughout the year, Extension Economists work in a variety of farm management related areas. Each year, more than 150 cost and return budgets are developed for major agricultural commodities in the state. Also, each year, Extension Economists coordinate the development of planning prices for over 60 commodities for the state Farm Service Agency office. During the reporting period, a cost of production survey was conducted with cotton producers in the state. A study was conducted to examine the economic feasibility of group harvesting of sugarcane. Another study was conducted to examine the potential financial impact of proposed changes in government programs to rice operations in the state. A spreadsheet based decision tool was developed to assist producers in determining the number of rice acres to plant in response to increased production costs and weak commodity prices. Finally, each year, a summary of the production and value of agricultural commodities in each parish of the state is developed.

Each of the efforts in farm financial management provide needed and extensively used information for the agricultural

industry in the state. The planning prices developed for the Farm Service Agency form the basis of cash flow projections used in making operating loans to producers. The enterprise budgets are probably the single most widely used information developed by the LSU AgCenter. Farm lenders throughout the state use these budgets as the basis for projecting cash needs of the clientele and in developing farm plans for producers seeking operating loans. In an effort to lower production costs, there was increased interest by the sugarcane industry as a whole in group harvesting sugarcane to be able to harvest more cane with fewer harvesters and therefore lower fixed harvesting cost per ton of cane. The study conducted surveyed producers to determine current harvest costs and was used to form the basis of discussion for the potential of group harvesting. Changes in government program payments can have devastating affects on agricultural operations. Proposed cuts to government program payments in an effort to moderate the federal budget was expected to have negative affects on rice producers. A study was conducted to show how these changes would affect the financial position of rice operations in the state. The study indicated that a 5% reduction in farm program payments would reduce net farm income by more than 20%. Reductions in loan deficiency payments would reduce net farm income from 40% to 50%. This study was used as a basis for policy makers and commodity organizations in opposing such drastic program changes. Other farm management efforts such as the cost of production survey and the rice production spreadsheet are widely used by producers to help serve as a basis for making crucial farm management decisions.

Source of Funds

State and Federal (Smith-Lever 3 b, c)

Scope of Impact

Multi-state: It is estimated that the multi-state value of the ANR Financial Planning & Resource Mgt. program is \$103,856. (3.6 FTEs x \$80, 136 per FTE x 36%)

Multi-function: It is estimated that the multi-function value of the ANR Financial Planning & Resource Mgt. program is \$95,202. (3.6 FTEs x \$80,136 per FTE x 33%)

Digital Diagnostic Program

Clayton A. Hollier, Plant Pathology

Key Theme: Invasive Species

Disease, weed and insect diagnosis has been an important educational and service function of the Louisiana Cooperative Extension service for years. Approximately 2,500 samples are diagnosed annually. Traditionally, samples are received by mail and “drop-in” service. The turnaround time by mail is slow and many times unacceptable for serious commercial pest problems.

Agricultural agents, through personal communication and feedback from training sessions, have had several streamlining and clarification suggestions that have been implemented by incorporation or changing within the digital distance diagnostic network. These suggestions have come from use of the network and network programmers have responded to those suggestions. Agricultural agents and large commercial agricultural production operations now have a faster way to send pest samples and to receive the identification or diagnosis.

A digital distance diagnostic network was developed with the University of Georgia. Named the Louisiana Distance Diagnostic Network (LDDN), approximately 2,000 digital image samples were received and diagnosed during its first years. The savings to Louisiana clients are being calculated, but preliminary estimates are approximately \$1,000,000. More savings are expected during upcoming years of operation.

Source of Funds

Smith-Lever and state funding for technology enhancement.

Scope of Impact

Multi-state: Time and money allocations for 64 agricultural agents and nine and extension specialists have averaged 3% with the PI averaging 10% in multi-state efforts. The dollar equivalent of multi-state extension work is \$183,507 (73FTEs x 80,136 per FTE x .03) + (\$80,136 per FTE x .10 FTE).

Multi-function:

Asian Soybean Rust: Identification and Disease

Clayton Hollier, Plant Pathology; Gerard Berggren, Raymond Schneider, Boyd Padgett, Donald Groth, Patrick Colyer, David Lanclos

Key Theme: Invasive Species

Asian soybean rust (ASR) was discovered in Louisiana on November 6, 2004 and positively identified by USDA-APHIS on November 10, 2004. This find was the first positive identification of ASR in North America. Yield losses due to ASR in other regions of the world range from 10 to 90 percent. The US discovery concerned the entire country soybean production infrastructure because of those losses.

An Asian soybean rust team was formed to respond to questions by the soybean industry in Louisiana and the region. Intensive training sessions, grower meetings, workshops, field days, a web site and publications have all been developed to educate the industry of all that is known about ASR. ASR sentinel plots were grown in 20 locations around the state to detect early development of the disease.

The ASR team educated thousands of people from many walks of life about ASR. It is felt that what is known about the disease has been shared with all who have had interest in the disease, how it works and its potential impact. One industry representative stated that the Louisiana soybean industry is probably one of the best informed in the country because of the efforts of the ASR team. The efforts have saved the soybean production industry millions of dollars due to the fact that the team monitoring of ASR development in the country allowed us to inform the growers that we were not in immediate danger of an epidemic.

Source of Funds

Smith-Lever and APHIS sentinel plot funding.

Scope of Impact

Multi-state: Time and money allocations for three agricultural agents and seven research and extension faculty 5% with the PI averaging 30% in multi-state efforts. The dollar equivalent of multi-state extension work is \$64,108 (10 FTEs x 80,136 per FTE x .05) + (\$80,136 per FTE x 0.3 FTE).

Multi-function:

Maintaining the Sustainability and Profitability of Louisiana Dairy Producers

Charles Hutchison, Dairy Science

Key Theme: Agricultural Profitability

The dairy industry is a very valuable enterprise to the local parish economies of several rural parishes in the state. The total economic contribution from dairying in Louisiana, including milk sales, animal sales and further processing is usually in excess of \$200 million. The dairy industry also helps support other allied agriculture enterprises that form the infrastructure of the dairy industry. However, Louisiana dairy producers are continuing to exit the industry due primarily to lower milk production per farm. More milk production per farm can be accomplished by milking more cows and/or increasing the production per cow. Most dairy farms can not increase cow numbers due to land availability at an economical price.

A dairy strategic management team was formed that consisted of both extension and research personnel to help the dairy producers in the state to remain sustainable and profitable. Through the use of newsletters, parish, regional and statewide field days, conferences, workshops and research verification trials; producers were able to gain more knowledge concerning research based recommendations, new technologies and techniques in the areas of feeding management and nutrition, replacement heifer programs, producing quality milk, dry cow management, herd health and overall herd management.

Producers are beginning to adopt newer technologies and techniques. Producers are implementing more of the research based recommendations in their herd management. This is evident by reviewing the number of feed and forage samples along with the quality and types of forage and feed that come through the Southeast Forage testing laboratory. Also, in 2005 according to the data from the Louisiana Agriculture Summary, milk production increased by 759 lb per cow for an increase of 6.0 percent. Cows per farm only increased by 0.8%, but milk production per farm increased by 104,140 lb for an increase of 6.8% for the year compared to 2004.

Source of Funds

State; Smith-Lever 3 b, c

Scope of Impact

Multi-state: 65% of the program is a result of these meetings and materials. 4.07 FTEs were devoted to the adult dairy effort, with an FTE valued at \$80,136. Therefore, the dollar value of the multi-state effort was \$212,000.

Multi-function: Researchers, extension specialists and agents collaborated on the development of recommendations, publications, newsletters, educational programs and training of agents and producers in group settings and one on one visits for an 80% multi-functional effort. The dollar value of the multi-functional effort was \$260,923.

Weed Science Education Program

Steven T. Kelly, Northeast Region

Key Theme: Invasive Species

Louisiana producers are faced with a variety of weedy pests and have several options to deal with them. These options range from new herbicide resistant cotton to new herbicides. Widespread adoption of Roundup Ready technology has led to the need for new herbicides and a means for injecting new herbicide mode-of-actions to combat potential weed resistance to glyphosate.

A comprehensive extension education program for crop producers was implemented. The goal of this program was to demonstrate the critical need for proper weed identification and herbicide selection for controlling the specific weeds present. The diverse weed spectrum present in Louisiana makes proper weed identification imperative.

An agent-training session was conducted to educate LSU Agricultural Center faculty, working in crop production, of the latest weed control recommendations, new herbicides, proper weed identification and herbicide symptomology (20 agents). The state weed specialist in cooperation with county extension agents and private consultants conducted six on-farm demonstrations including Liberty-Link cotton (cotton resistant to the herbicide Ignite), Roundup Ready Flex cotton (second generation of Roundup Ready Cotton) controlling winter vegetation in reduced tillage situations, demonstrating new cotton herbicides, and corn weed control programs. A cotton newsletter was distributed to producers, consultants, and agribusiness personnel throughout the growing season via electronic mail (300 contacts) and printed media (200 copies). The newsletter contained updates on recommendations and kept clientele informed of current events and potential situations that they may see in their crops. Seven news articles were written and distributed. LSU AgCenter weed control publications were revised, updated and made available on the LSU AgCenter website. County agents, producers and consultants were made aware of new herbicides, label changes, etc. through the use of electronic mail.

Source of Funds

State; Smith-Lever 3 b, c
Private industry

Scope of Impact

Multi-state: Roundup Ready Flex cotton technology meeting – 8 FTEs with a 5% effort were devoted to the program, for a total multi-state effort of \$32,054. (8 FTEs x \$80,136 per FTE x .05). Weed Workers Meeting – 5.5 FTEs with a 20% effort were devoted to the for a total multi-state effort of \$88,149. (5.5 FTEs x \$80,136 per FTE x .20)

Multi-function: Researchers and extension specialists collaborated on the development of publication, training of agents, consultants, agribusiness personnel, and farmers for a 100% multi-function effort of \$1,582,686. (19.57 FTEs x \$80,136 per FTE x 1.0)

Continued Use of Recommended Practices in Louisiana Production Agriculture

David Lanclos, Central Region; Rob Ferguson, Donna Morgan

Key Theme: Agricultural Competitiveness

In Louisiana, soybean, corn and grain sorghum acreage accounts for over one-half or more of the state's acreage annually. Economically, these crops have an impact of over \$350 million dollars a year annually. Several primary factors play key roles in the successful production of crops. Influencing factors that can impact yield include using recommended cultural practices including recommended varieties or hybrids in addition to following suggested cultural and agronomic guidelines. It has always been a challenge to convey that research data generated by experiment stations actually can be used successfully in full-scale agronomic production. As a consequence, some producers are not as profitable as they could be. This fact, in addition to general economic conditions being tougher than they have been in the past several years forces the extension specialist to continue to improve educational outreach for the financial well-being of clientele. The challenge is conveying research data in a clear, understandable and useable manner to large agronomic operations. Thus, the need to demonstrate or verify research-based recommendations on large scale acreage is necessary.

For the past several years, clientele across the state have continued to express more interest in recommended hybrids or varieties planted over a wider geographic area. To accommodate this request in 2005, there were 21 corn demonstrations conducted over 160 acres, 4 grain sorghum demonstrations conducted over 8 acres and 35 soybean demonstrations conducted over 100 acres. In 2006, more than 70 demonstrations are planned in 22 parishes making the Louisiana Crop Demonstration programs one of the largest in the US. The 2005 soybean verification program consisted of 6 parishes and in 2006 there will again be 6 locations. In 2005, a yield record of 50 bushels/A was achieved in the program. These verification fields are visited weekly by a specialist, county agent or extension associate. Recommendations are generally made on tillage practices, fertilization, weed control, and insect and disease control. All production expenses are recorded from planting to harvesting with economic analysis being conducted also.

The crop demonstration program and the soybean verification program are intended to demonstrate the most cost-efficient production practices, thus increasing the confidence of county agents and other clientele in their recommendations. Through these efforts and other outreach methods promoting these program's effects, more than 3,500 producers and agribusiness clientele were able to increase their knowledge of recommended practices and varieties by attending field days or grower meetings. These programs give clientele additional data to make informed decisions on variety/hybrid selections. In addition to recommended hybrids/varieties, producers get to evaluate what these recommended varieties/hybrids look like growing in the field under non-research growing conditions. These demonstrations also stress the importance of using the correct fungicide, insecticide or herbicide treatments and show producers what can happen to certain varieties/hybrids without the correct pesticide treatments. As a way to facilitate teaching for county agents and specialists, these programs have increased confidence in recommendations but allowed extension personnel to collaborate with researchers on new or desirable research projects. These programs have confirmed that research-based recommendations are valid, adjusted outdated recommendations and educated all involved about feed grain and soybean production in Louisiana.

Source of Funds

Louisiana Soybean and Grain Research and Promotion Board ; State; Smith-Lever 3 b,c

Scope of Impact

Multi-state: Participation in and information sharing from multi-state conferences as well as national meetings with a total multi-state effort valued at \$142,322 (5.92 FTEs x \$80,136 per FTE x 0.30). Feed grains - Participation in and information sharing from multi-state conferences as well as national meetings with a total multi-state effort valued at \$97,606 (4.06 FTEs x \$80,136 per FTE x 0.30).

Multi-function: Soybeans - Researchers and extension specialists collaborated on preparing publications, development and training of agents, consultants, agribusiness personnel, and producers for a multi-function effort valued at \$474,405 (5.92 FTEs x \$80,136 per FTE x 1.0). Feed grains - Researchers and extension specialists collaborated on preparing publications, development and training of agents, consultants, agribusiness personnel, and producers for a multi-function effort valued at \$325,352 (4.06 FTEs x \$80,136 per FTE x 1.0).

Better Management of Nematodes in Cotton Using Precision Agriculture

Charles Overstreet, Plant Pathology; Eugene Burris, Boyd Padgett, Maurice Wolcott

Key Theme: Invasive Species

Plant-parasitic nematodes represent one of the most important pests to cotton production in Louisiana. From 1999-2004, nematode losses have averaged between 6.5-8% a year with total losses during this time over 100 million dollars in our state. Although management strategies such as nematicides and crop rotation are used to reduce losses, nematodes still are difficult pests to manage. Precision agriculture is still in the early stages of development in cotton but may provide additional tools to further reduce losses caused by nematodes.

A number of LSU AgCenter scientists have been involved in developing precision agriculture for nematode management. The strategy is to identify nematode damage or areas in fields that are likely to suffer losses from nematodes using some of the new technologies such as classification of soil into textural classes or zones based on soil electrical conductivity, aerial imagery, or yield monitors. The use of the Veris 3100 soil EC mapping system has been particularly effective in classification of soils based on textural differences. Nematodes such as the southern root-knot are particularly favored by light, sandy soils which can easily be classified using this system. Additionally, work conducted during the past two years has been focused on further defining areas of a field which have nematodes present and actually respond to the application of a nematicide. Nematicides are fairly expensive and often applied to areas of a field where little if any benefit is derived, thus adding to the cost of cotton production.

Preliminary studies have shown that in fields where the southern root-knot nematode is present, the use of soil electrical conductivity can be used to readily predict where in a field this nematode occurs and even further define where the nematode is likely to cause damage. If site-specific application of nematicides is used only where yield responses occur, increased profits can be expected. However, over-treating or under-treating areas in a field with nematicides usually resulted in substantial losses. The application of some of these new technologies should reduce losses and increase profitability. If the losses caused by nematodes can be reduced by a modest 15-30%, this would result in an increase of \$2,500,000 to \$5,000,000 per year for our producers. Additionally, nematicide application would be more environmentally sound since they would be used only in areas that really need them rather than across entire

Source of Funds

State and Industry, U.S. Environmental Protection Agency Pesticide Initiative, Cotton Incorporated.

Scope of Impact

Multi-state: It is estimated that 20% of the extension cotton nematology program is multi-state, with a value of \$22,438 (1.4 FTEs x \$80,136 per FTE x .20).

Multi-function: It is estimated that 35% of the extension nematology program is multi-function, with a value of \$39,267 (1.4 FTEs x \$80,136 per FTE x .35).

Commercial Nursery and Landscape Systems

Allen Owings, Horticulture

Key Theme: Ornamental/Green Agriculture

Louisiana commercial nursery and landscape systems program provides service to clientele engaged in commercial green industry activities. This includes wholesale nursery growers, retail garden center managers and personnel, landscape contractors, landscape architects, landscape and horticulture maintenance personnel, arborists and others. Commercial turfgrass producers and service providers are also included in this effort. The LSU AgCenter has increased participation in certification of retail garden center personnel in the state and is now serving as the lead agency in providing continuing education opportunities for licensed arborists in Louisiana. Stakeholder input is requested quarterly during the year at meetings attended by representatives of the Louisiana nursery and landscape industry. Clientele surveys are also conducted to obtain program input.

Topics being addressed currently include promotion and marketing of plant material, best management practices for irrigation and fertilization management (primarily for nursery crop producers), pest identification and control, and improving efficiency and profitability by adopting other recommended production practices. Nursery and landscape professionals are more aware of educational programs now offered by the Louisiana Cooperative Extension Service. As a result of these program efforts the following has been accomplished: (1) increased use of county agents and regional horticulturists for problem diagnosis and problem prevention, (2) introduction of new plant material, (3) retailers are providing training opportunities for their employees, (4) increased industry awareness of TMDLs, best management practices, and similar environmental issues, and (5) water quality is being recognized by nursery and landscape professionals as a key part of their production and maintenance programs. Primary program delivery has been accomplished by education programs (in-state and collaboratively with Arkansas, Mississippi, Alabama, and Texas), on-site farm visits, e-mail updates, web page development, mass media, and newsletters. Cooperative and collaborative efforts are maintained and are ongoing with the following: Louisiana Nursery and Landscape Association (newsletters and education programs), Louisiana Turfgrass Association (newsletters and education programs), Texas Nursery and Landscape Association (five-state educational program effort), and the state cooperative extension services in Arkansas, Alabama, and Mississippi (Gulf States Horticultural Expo and Mid-South Greenhouse Growers Conference).

Licensed nursery and landscape professionals receive information from the Louisiana Cooperative Extension Service commercial nursery and landscape systems program annually. Approximately 40-50% participate in the education programs on a regular or occasional basis. Many make production changes based on information learned. These changes are primarily in the areas of irrigation and fertilization management and selling new plant material. Landscapers are adopting improved pest management strategies and learning to improve horticultural services provided to their clientele using LSU AgCenter recommendations.

Source of Funds

State; Smith-Lever 3 b, c

Scope of Impact

Multi-state: Approximately 30% ($0.30 \times 5.95 \text{ FTE} \times \$80,136 = \$143,043$) of the program in commercial nursery and landscape systems is attributable to multi-state efforts (primarily Gulf States Horticultural Expo, Mid-South Greenhouse Growers Conference, and Nursery/Landscape Expo educational short course).

Multi-function: Approximately 25% of the commercial nursery and landscape systems program is multi-function valued at \$119,202 ($0.25 \times 5.95 \text{ FTE} \times \$80,136$).

Cotton Disease Management in Northeast Louisiana

Boyd Padgett, Northeast Region

Key Theme: Invasive Species

Cotton is a major row crop grown in Northeast Louisiana and ranks third among field crops in the state; therefore, it is critical to maintain and maximize its profitability. State acreage has decreased since 1995 due in part to escalating production costs and depressed commodity prices. Cotton diseases are an annual problem that directly impact production. From 2000 to 2004, diseases reduced Louisiana cotton yield and quality by 13 to 15%. The predominant diseases affecting cotton in Louisiana are seedling diseases, nematodes, and boll rots. The occurrence and severity of some of these diseases are sporadic and hard to predict; therefore, control measures may be implemented unnecessarily. To effectively manage these diseases, producers may have to spend more than \$30.00/A. Therefore, LSU AgCenter researchers and specialist are generating information to help producers optimize profits by improving disease management.

LSU AgCenter extension agents, extension specialists, and research scientists conduct research on experiment stations and on-farm to evaluate new fungicides and disease management strategies, as well as, study how specific environmental parameters and production practices impact disease development. This research is conducted predominately at the Macon Ridge and Northeast Research Stations and on producer farms located in northeast and central Louisiana since 1999. Research is directed toward evaluating the efficacy of fungicides/nematicides applied to the seed or in-furrow for managing seedling diseases and nematodes, evaluating foliar fungicide applications for managing hardlock, and quantifying the impact of the environment (soil moisture and temperatures) and reduced tillage systems on seedling disease and pathogen populations. Information from these tests is utilized to: 1) formulate fungicide use recommendations, 2) develop fungicide use patterns and define effective rates, 3) determine how effective new products and practices are for managing seedling disease and 4) to teach individuals about cotton disease management (field days, tours, etc).

Individuals involved in the cotton industry have and continue to utilize this information to reduce input costs and make better informed decisions. LSU AgCenter research has been used to demonstrate the threat of seedling disease is slightly higher in fields where reduced-tillage practices are implemented compared to conventionally-tilled fields. Soil temperatures at planting in these fields are usually cooler than temperatures in conventionally-tilled fields. Effective seed treatments for managing seedling disease and nematodes have been identified and their benefits and limitations have been defined. When feasible, using seed treatments instead of in-furrow products to managing seedling diseases and nematodes reduces the pesticide load on the environment and can result in a cost savings of over \$15.00 per acre. Since seed treatments are usually applied prior to packaging, pesticide exposure to the producer is reduced compared to on-farm treatments. This is especially important since in-furrow nematicides are highly toxic to mammals. Other research documented the impact of stinkbugs and fungi on hardlock development. Preliminary results have been used to determine that stinkbug injury can increase the incidence of hardlock and fungicides may have a limited negative effect on hardlock development. Vascular cavitation (boll dangle), a malady in cotton once thought to significantly reduce cotton yields, has been shown to have limited impact on cotton production.

Source of Funds

State; Smith-Lever 3 b, c ; Additional funding is provided by the agrichemical industry.

Scope of Impact

Multi-function: It is estimated that 90% of the program is multi-function, working with research scientists and extension specialists in the areas of agent training, on-farm demonstrations, publications, and field visits with producers, accompanied by agents. The multi-function value of the program is \$18,031. (.25 FTE x \$80,136 per FTE x .90)

Twentieth North Louisiana Fruit and Vegetable Growers Conference

John Pyzner, Northwest Region; Rafash Brew, Denyse Cummins

Key Theme: Small Farm Viability

Most fruit and vegetable growers are small land owners and often have limited access to production and marketing information. These growers often grow several different crops and often try new crops with little production knowledge. Marketing can often be a problem for growers that try new crops and new growers with limited marketing experience.

The annual Fruit and Vegetable Growers Conference was planned based on topics suggested by grower evaluations from the 2004 Fruit and Vegetable Growers Conference. Topics presented included Disease and Insect Control, Irrigation, Direct Marketing, Valued Added Grants for Farmers, Organic Production, and Equipment Maintenance. The LSU AgCenter cooperated with Southern University, United States Department of Agriculture and agriculture support companies in producing the conference.

The Conference attracted 64 fruit and vegetable growers and agriculture support industry personnel. Growers from Southern Louisiana and the Louisiana Florida parishes also participated in the North Louisiana Fruit and Vegetable Growers Conference. Evaluations indicated that 100% of conference attendees increased their knowledge. Topics listed as most helpful were Direct Marketing 53%, Disease Control 47%, Insect Control 29%, Irrigation 24%, Valued Added Grants 24% and Organic Production 6%.

Source of Funds

LSU AgCenter, Southern University, USDA, Gowan Company, Irrigation-Mart, Farm Chemical Group, Bayer-Crop Science, Dow Agro Sciences

Scope of Impact

Multi-state: Approximately 30% of the program effort was devoted to multi-state collaboration. A total of 9.06 FTEs were devoted to the fruit and pecan program. Hence, the dollar value of the multi-state effort = \$217,810 (0.3 X 9.06 X \$80,136).

Multi-function: Integrated research-extension efforts are estimated at 75% of the total number of FTEs expended in the program. These efforts include research-extension collaboration in agent training, formulation of recommendations, publications and field trouble shooting during the growing season. The dollar value of these multi-function effort = \$544,524 (0.75 X 9.06 X \$80,136)

Beef Extension Programming Impact

Jason Rowntree, Animal Sciences

Key Theme: Animal Production Efficiency

National Agriculture Summary Statistics data suggest that over the last twenty years Louisiana cow numbers and cattle producers have declined 20%. This is a linear decrease overtime and does not reflect cyclical fluctuation of cattle numbers. Thus, my goal is to improve Louisiana beef cattle production sustainability. Last year the Louisiana cattle business generated over 400 million dollars and is certainly a viable economic entity. Economically speaking, cattle producers and all businesses that generate income from beef cattle producers are a target audience. Also, the Louisiana consumer should be very aware of the strides taken to produce beef in a wholesome and safe manner.

Three focus areas have been established to improve the sustainability of the Louisiana beef cattle producer. Areas of focus are programs that: 1) increase returns of cattle producers; 2) increase cattle production efficiency and 3) emphasize environmental stewardship. The LSU AgCenter attempts to address the focal areas by local and statewide programming. Statewide programs include The Louisiana Calf to Carcass Program, The Louisiana Master Cattle Producer Program, the Louisiana Forage Bull Test Program and the Louisiana Grain Bull Test Program. Along with these statewide programs, we have also presented at two distance education series: Nutrition, and Breeding and Genetics. Further Beef Extension has also participated in a joint Heifer Replacement Development and Stocker program with Mississippi State University. Along with these programs the LSU AgCenter was very active in both Hurricane Katrina and Rita rescue and recovery efforts. County agents along the gulf coast with beef responsibilities worked endless hours to aid others in need. Our state office assisted the Louisiana Cattlemen Association with monetary, feed and other material donations. The state office also worked to distribute information relative to animal health, nutrition, and other relief efforts.

The Louisiana Master Cattle Producer program has been highly attended. This year we graduated 280 members bringing the total graduate numbers to around 400. Since the program inception, seventeen lecture series have been presented across the state. Missouri, North Carolina and Mississippi have inquired about using material from our program. Another benefit of this program is that it represents cooperation with two other entities actively involved with beef cattle. The Louisiana Natural Resources and Conservation Service along with the Louisiana Cattlemen Association are actively involved in the program. The Mississippi, Louisiana, and Alabama Genetics short-course ended in November. Although survey data has not been calculated, producer and county agent testimonials have been positive. The short-course had six speakers; all from different states, present the most updated information on genetics. Not only did this program have high quality talks, but also was cost effective as three states were involved and only small costs were incurred using across state multimedia. I believe Beef Extension's greatest impact was in the services provided to producers and cattle during both Hurricane Katrina and Rita. Thousands of bales of hay were secured by AgCenter employees via national donations. Three AgCenter newsletters generated monetary and material donations from across the nation. Storm related interviews were conducted across the nation bringing attention to this disaster.

Source of Funds

Louisiana Cattlemen Association; State; Smith-Lever 3 b, c

Scope of Impact

Multi-state: It is estimated that 25% of the overall beef education program is multi-state, valued at \$182,109. (9.09 FTEs x \$80,136 per FTE x .25)

Multi-function: It is estimated that 30% of the overall beef education program is multi-function, valued at \$218,530. (9.09 FTEs x \$80,136 per FTE x .30)

Louisiana Rice Research Verification Program

John K. Saichuk, Southwest Region; Jeremy P. Hebert

Key Theme: Agricultural Profitability

In the recent past many rice growers had expressed the opinion that results of experiments in small plots on the Rice Research Station did not relate to what happens in their fields in the real world. County agents also indicated they needed more hands on training in the area of rice production. Some researchers also felt their research findings needed validation in grower field situations to provide confidence of both the grower and researcher in the applicability of their recommendations in grower fields.

The Louisiana Rice Research Verification Program was designed to demonstrate the most cost-efficient production of rice, increase confidence of rice growers in LSU AgCenter recommendations, increase confidence of county agents and specialists in their recommendations, educate county agents and growers in all aspects of rice production, develop an economic database for rice production, and relay real world problems to researchers in an effort to enhance scientific studies. In 1997, three fields were followed throughout the year with all recommendations on cultural practices and pest management being made by LSU AgCenter personnel, more specifically the Extension rice specialist and/or the local county agent. The pilot program

was successful enough to warrant funding and expansion. In 1998, the project received funding and 10 fields were selected. Each year since then 10 to 12 grower fields have been involved even though more than this number of growers volunteer to participate in the program. The program was initially funded for five years but because of popularity and success has been funded through 2006. County agents have reported it to be one of the best educational tools available to them. Researchers have benefited from the identification of problems needing further study, as well as confirmation of the accuracy of on-going research. The program has also identified problems in need of further study. The first year the pyrethroid insecticides were introduced the scouting procedure had to be modified based on experiences in verification fields. Recognition of the need to quantify both amount and cost of irrigation water required to grow rice led to a separately funded water use study. The appearance in verification fields and other commercial fields of a problem of unknown cause led to another project. The first year of the study indicates iron toxicity, which has been reported in other countries but not in the U.S. or, more specifically, Louisiana.

Source of Funds

Funding has come from the Louisiana Rice Research Board, which is based on grower check-off funds. Crop protection chemical companies have demonstrated their support through donation of products to the program. State; Smith-Lever

Scope of Impact

Multi-function: Multi-function (integrated extension-research) efforts are estimated at 35% of the total number of FTEs expended in the program. These efforts included research-extension collaboration in agent training, formulation of recommendations, publications, and trouble-shooting during the growing season. The dollar value of the multi-function effort is \$113,032. (4.03 X 80,136 X .35)

Cotton Agronomic Production Practices and Recommendations

Alexander M. Stewart, Central Region

Key Theme: Agricultural Competitiveness

Cotton is a major row crop in the Louisiana agricultural landscape and occupied approximately 615,000 acres of production in 2005. Cotton is an integral part of the economy of the state, especially the rural economy with gins, warehouse, agribusinesses, and associated industry relying on profitable cotton farming operations. Cotton production has changed rapidly in recent years with introductions of transgenic varieties, increases in minimum tillage systems, new weed control systems, and introductions of new crop protection chemicals. Costs of production have also risen with the advent of new technology. Producing cotton in an economically viable, efficient, and environmentally responsible manner is a major challenge for cotton producers. Cotton quality is also a challenge due to increased export of US cotton and a decline of the domestic textile industry. Louisiana cotton producers will need to meet the quality demands of the export market in the future.

Research-based dissemination of information for cotton production continues to be the focus of extension educational efforts in Louisiana. Research has been conducted to evaluate new cotton varieties, the effect of reduced seeding rates, fertilizer applications, plant growth regulator usage, harvest preparation, weed control systems, and emerging technologies and their effect on yield, quality, and environmental impact. Educational efforts through 29 presentations at producer meetings, 3 field days on research stations, and 12 off-station demonstration plots have provided a vehicle for technology transfer. The LSU AgCenter has introduced two new extension publications in 2005, titled Plant Growth Regulator Use in Louisiana Cotton, and Cotton Defoliation Guidelines. These and other publications related to Integrated Pest Management, Weed Control, and Variety Selection have been disseminated to cotton producers and related industries through county agents, meetings, and electronic means. Moreover, mass media radio and television, as well as the farm press publications have been utilized to disseminate research-based information.

A survey of Louisiana cotton producers in 2004 indicated that 95% of the respondents utilize LSU AgCenter information for making production decisions on their farm. There is no reason to believe that this level of utilization has declined in 2005. Cotton producer interest in emerging technologies and production practices remains high. Yield data from 2005 indicate that Louisiana produced an estimated 839 pounds of lint cotton per acre, which is the second highest yield on record behind 2004. While yields are highly dependent on growing conditions, these data do indicate that Louisiana producers are very efficient

and effective with their production practices. The LSU AgCenter remains a leader in providing the latest and best information possible for producers to remain profitable. The quality of Louisiana cotton has improved with fewer bales incurring discounts of some kind in 2005 compared with previous years, indicating that variety selection and cultural practices for producing high quality cotton has improved. This fact can be partially attributed to intense educational efforts by the LSU AgCenter to provide non-biased and accurate information for cotton variety performance, harvest preparation, and irrigation management. The LSU AgCenter cotton research and extension programming efforts remain a viable and critical part of the cotton industry in Louisiana.

Source of Funds

Cotton Incorporated State Research Support
Agricultural Industry Grants-In-Aid
State Support Funds; Smith-Lever

Scope of Impact

Multi-state: It is estimated that 20% of the extension cotton program is multi-state, with a value of \$58,820 (3.67 FTEs x \$80,136 per FTE x .20).

Multi-function: It is estimated that 40% of the extension cotton program is multi-function, with a value of \$117,640 (3.67 FTEs x \$80,136 x .40).

Weed Control Demonstrations Reduce Ornamental Nurseries' Reliance on Manual Labor

Ronald Strahan, Agronomy and Environmental Management

Key Theme: Invasive Species

Weed control is one of the most costly and difficult tasks facing nurseryman. Nurseryman must control weeds to not only improve plant growth but must maintain completely weed-free conditions for aesthetic reasons. Economic losses due to weed infestations have been estimated at about \$7000/acre in nursery crops. The use of chemicals for weed control is potentially the most labor saving and economical method of weed management. However, many container production nurseries in Louisiana depend heavily on costly hand labor for weed control. Reliance on hand labor causes increased production cost and reduces average production goals per nursery. It has been estimated nurserymen spend \$500 to \$4,000/acre (\$1,235 to \$9,880/ha) for manual removal of weeds in containers. Our extension program has focused on educating producers on the proper use of herbicides for weed management.

In order to instruct growers about the use of herbicides for weed management, 7 weed control demonstrations were conducted at container nursery operations in Louisiana. Demonstration plots consist of the use of various different labeled herbicides (treatments) applied directly to ornamental crops. Before demonstration plots are implemented, growers, agents, and specialists identify problem weeds and assess herbicide options based on the crops grown and the weed spectrum. Growers have the opportunity to observe the progression of the demonstration and monitor the differing levels of control achieved by the herbicide treatments. Both the producers and county agents are heavily involved in the planning and implementation of the demonstrations to address particular weed management concerns.

Producers were able to observe the impact that herbicides can have on weed populations directly at their nurseries and assess crop injury potential. Weed control demonstrations provided excellent training opportunities for growers because they were able to learn proper herbicide use, calibration of equipment, and weed identification. Demonstration plots also provided an opportunity to introduce new herbicides technology directly to producers. The knowledge gained from the demonstration plots and the interaction with specialist and agents gave participating producers the confidence to plan successful, cost effective weed management programs for their nurseries.

Source of Funds

Herbicide industry

Scope of Impact

Multi-function: Multi-function (integrated research /extension) efforts are estimated at 30% of the total number of FTEs expended in the program. These efforts include research/extension collaboration in agent training, formulation of recommendations, publications, stakeholder meetings, and responding to stakeholder questions and problems. The dollar value of this multi-function effort = [.30 (estimated % of program) x 2.0 FTEs (FTEs devoted to extension program) x \$80,136 (\$ equivalent of 1 Extension professional FTE)] = \$48,082.

Effects of Hurricane Rita on South Louisiana Forage Resource

Ed Twidwell, Agronomy and Environmental Management; Andrew Granger, J Cheston Stevens

Key Theme: Rangeland/Pasture Management

Hurricane Rita struck the coast of southwest Louisiana on September 24, 2005 as a major storm. Storm surges of 15 to 20 feet were reported in the parishes of Calcasieu, Cameron, Vermilion and Iberia. Large areas of land were covered by saltwater from the Gulf of Mexico. The water persisted in some areas for as long as two to three weeks. The cattle industry is vital to the economy of this region of the state. The hurricane caused damage to thousands of miles of fence, destroyed thousands of tons of baled hay and also thousands of cattle were lost. After the storm, livestock and forage producers in the area were concerned about the damage caused by saltwater intrusion and flooding to their pastures and hayfields.

In an attempt to determine soluble salt levels in the soil, six locations in Vermilion parish were sampled in mid-October. Core samples were taken from the top three inches of the soil profile. Salt levels ranged from 2200 to 3600 parts per million (ppm). These sites were sampled again in late-December and salt levels at that time had declined to 972 to 1600 ppm. In addition to this sampling study, information on salinity and flooding issues on forages was disseminated to extension agents in the affected areas. Articles on this topic were written for two popular press magazines. These issues were also discussed at several public meetings held in the affected parishes.

This sampling study demonstrated that while soluble salt levels were relatively high immediately after the storm, they had declined dramatically within a two month time period. This information was valuable to producers who were interested in planting annual ryegrass for winter grazing, even as late as December. Annual ryegrass can tolerate salt levels of about 2000 ppm. It was observed on the late-December sampling date that most stands of Bermuda grass were green and did not appear to be negatively impacted from the storm. Bermuda grass, a common forage species grown in this region, can tolerate salt levels of about 4,000 ppm. It is anticipated that, in most cases, Bermuda grass should make a full recovery and be productive in 2006. Many livestock and forage producers in the affected areas read the information on salinity and flooding issues on forages that were written by LSU AgCenter personnel. This information allowed them to make management decisions regarding their forage resource after the storm.

Source of Funds

State; Smith-Lever 3 b, c

Scope of Impact

Multi-function: Multi-function (integrated research-extension) efforts are estimated at 30% of the total number of FTE's expended in the program. These efforts include research-extension collaboration in agent training, formulation of recommendations, publications, stakeholder meetings, and responding to stakeholder questions and problems. The dollar value of this multi-function effort = [.30 (estimated % of program) x 7.26 FTE's (FTE's devoted to extension program) x \$80,136 (\$ equivalent of 1 Extension professional FTE)] = \$174,536.

Goal 1 – Research Project Reports

Evaluating Annual Ryegrass for Adaptation Throughout Louisiana

Montgomery Alison, Northeast Region, Macon Ridge Research Station; W. D. Pitman, E. K. Twidwell

Key Theme: Plant Production Efficiency

Cattle production in the southeastern USA, including Louisiana, is primarily based on a cow/calf system. Animals are maintained on farm for the entire year in this production system and food resources must be available throughout the year. Forage production from pastures throughout southeast USA is heavily based on productivity of warm-season perennial grasses. Growth from these warm-season grasses is limited to about 6 or 7 months of the year. Annual ryegrass is high quality cool-season grass that can be used to extend the period when forage is available for grazing. Numerous varieties of annual ryegrass have become commercially available during the past several years and understanding the relative production potential from these varieties throughout Louisiana would certainly be beneficial.

A cooperative research project is conducted throughout Louisiana to evaluate forage productivity of annual ryegrass varieties in the state. Replicated field experiments are planted annually at four to five locations in the state. These experiments include commercially available varieties and genotypes that are being selected in forage breeding programs for potential commercial release. Nitrogen fertilization is uniform among the different locations and the plots are harvested mechanically five or six times each year. An annual report indicating forage dry matter production is made available each year but data has also been used periodically to provide long term insight into genetic improvement and response to prevalent climatic conditions.

Many of the annual ryegrass varieties that have become commercially available during the past decade have been shown to have adequate adaptation to conditions prevalent in Louisiana. A few on the other hand have not performed to a standard level in the evaluation trials. Results also indicate there is considerable variation in performance among annual ryegrass varieties with some varieties responding favorably to certain climatic conditions in some years without having below normal production in any year. Use of the information derived from these comparative and independently conducted trials should certainly benefit clientele when formulating plans to avoid production problems through the growing season. Winter feeding costs are normally considered the largest expense in a cow/calf production enterprise and much of the cost is associated with conserving a quality feed during one period to be fed in another period of the year. Utilizing cool season forage crops such as annual ryegrass can reduce the dependence on stored forage and purchased supplements for winter feeding in Louisiana and throughout the southeast USA. Thus the derived information concerning the dependability and productivity of annual ryegrass varieties provides a valuable basis for decisions when making plans to effectively minimize costs associated with maintaining a cow herd. This information is also pertinent to plant breeders when making decisions as to the suitability of selected plant material for commercial release as a variety.

Source of Funds

State and Hatch Funds

Cotton Production Systems for the Macon Ridge Area of Louisiana

Donald Boquet, Northeast Region, Macon Ridge Research Station

Key Theme: Agricultural Profitability

Cotton, corn, soybean and grain sorghum are some of the most economically important crops in Louisiana and the southern U.S.A. These crops have traditionally been grown as a monocrop following winter fallow, which meant that fields were unproductive and not protected with ground cover during the winter and spring high rainfall seasons. This type of continuous monocropping of summer crops only, contributes to soil erosion, excessive runoff and sediment and plant nutrient losses into surface water bodies. On the other hand, diverse BMP cropping systems require more intensive management and may increase the risk of production. Research was needed to demonstrate to producers alternative production practices that would be productive and economic while protecting soil and water quality.

A number of alternative production and cropping practices with potential for reducing sediment and nutrient losses were evaluated for yield and dollar returns per acre. These cropping systems included combinations of reduced tillage, year-round ground cover provided by cover crops, winter and summer crops and crop residues, and reduced fertilizer nitrogen rates.

Year-round multi-crop, cover crop and rotational systems considered to be BMPs produced summer crop yields that were equal to (or were reduced by no more than 10%) yields from traditional monocropping of one summer crop per year of cotton, soybean, corn or grain sorghum. Because there were few or small negative effects of the multicrop systems on summer crop yields and some had additional yield of 65 bu of winter wheat, BMP systems were as productive, or were more productive, than monocropping. BMP systems with no till also benefited from having lower input costs than tilled systems for labor, machinery and fuel. The total economic picture, however, was not as positive as yield effects. Although highly dependent upon commodity prices that frequently change, as well as productivity, only a few BMP systems consistently produced annual net returns above variable costs that were equal to or greater than monocrop cotton, which averaged \$112.00 per acre per year. The highest annual net returns of \$164.00 per acre were realized with a year-round crop sequence of winter wheat followed by cotton. Annual net returns from a rotational double crop system of wheat/sorghum/cotton were \$101.00 per acre, which was equivalent to continuous monocrop cotton. Cropping systems with emphasis on grain crops rather than on cotton had lower returns per acre that ranged from \$62.00 to \$88.00 per acre. Monocrop grain systems had the lowest net returns. These studies provide producers with information on the potential yield and economics of traditional and BMP cropping systems that demonstrate which systems will produce high yields and net returns and which are likely to produce lower net returns. This information will be an important consideration when deciding which systems are practical to implement for water quality protection because net returns from cropping systems varied widely and some BMP systems will likely have lower net returns than monocrop cotton.

Source of Funds

Hatch; Louisiana state funds, Cotton Incorporated, Louisiana Soybean and Grain Research and Promotion Board, Grants from seed and fertilizer companies.

Variation in Semen and Calf Crop Sex Ratio

John E. Chandler, Dairy Science; Anita Canal, Tara Taylor

Key Theme: Animal Production Efficiency

For years dairy producers have suggested that the calf crop sex ratio varied among bulls. Most frozen semen is maintained and sold on a first in, first out inventory basis, thus keeping the semen obtained from one collection (lot) together. This practice is primarily for inventory control and would impact the proportion of male calves that the end user observes. Dairy producers are impacted by this phenomenon because if the skew in sex ratio results in disproportionate number of bull calves than this will reduce the number of heifers that can be used for replacement animals. Conversely, if beef producers had too many heifers, it would result in a reduction in pounds of beef.

The polymerase chain reaction (PCR) technique was used to evaluate the variation between the ratio of X- and Y- chromosome bearing sperm cells in lots within bulls. The same semen was used in breeding trials.

It has been shown that the lot to lot variation in calving and semen PCR data were significantly correlated. By evaluating each lot for %Y-bearing spermatozoa, the information would give dairy producers the opportunity to change the sex ratio of their calf crop. Alternatively, this information could be used in the semen processing and inventorying protocols to minimize the impact of apparent disproportional sex ratio within lot.

Source of Funds

State and Hatch

Biobased Nonwoven Composites

Yan Chen, Human Ecology

Key Theme: New Uses for Agricultural Products

A major goal of the National Energy Policy is to secure the U.S. energy supplies by using diverse domestic renewable resources. The vision goal for biobased products states that by 2010 production of chemicals and materials from biomass will be substantially increased to 12% of the current production of targeted U.S. chemical commodities. To achieve this goal, many challenges are being faced with, among which is a thrusting point to develop biomass technologies that enable producing bioenergy and biobased products more efficiently and economically. It is reported that the U.S. thermoplastic market was increased from 77,640 million pounds in 2001 to 86,101 million pounds in 2004, with a compound growth rate of 2.6%. However, estimated current capacity of producing biobased products (diverse chemicals, ethanol, starch, sorbitol, soybased products, cellulose polymers, etc.) is about 12,500 million pounds. The potential of expanding the production and use of the biobased products is huge.

The research focus was on the production and applications of biobased composites from fiber crops and crop residues. Fiber composites of bagasse, kenaf, ramie, hemp, and flax were investigated in terms of processibility, mechanical properties, hygral properties, thermal properties, and acoustical properties. Feasibility of these composites for use in auto interior manufacture was studied. A research highlight was the improvement of processing technology for making bagasse-based nonwoven composite. A protocol of producing pure bagasse fiber composite using a nonwoven technique was developed. No chemical treatment was needed for bagasse fiber extraction and no binder was needed for hot-pressing. The bagasse composite was fully biodegradable. Compared to the control sample 50/50 bagasse/polypropylene composite, the pure bagasse composite had much higher tensile and bending moduli and equally good bending strength. Another progress was a study on acoustical properties (both sound absorption and transmission loss) of commercial auto floor materials made of recycled foams and recycled synthetic fibers. This would help develop new biobased nonwoven composites to compete with those commercial petrobased auto interior products.

The developed research protocol of producing the biobased composites indicated some advantages including shortened processing steps and elimination of the use of chemical binders. Therefore, there was a great potential to lower production costs and achieve economic performance for marketing the biobased composites. Two out-of-state companies indicated their interest in this research and have signed confidentiality agreements with AgCenter for further discussion and access to the technologies developed in this research.

Source of Funds

Governor's Biotechnology Initiative, State, Hatch, and Multi-state.

Scope of Impact

Multi-state: Contribution to S-1007

Managing Viruses to Maintain the Preeminence of the Beauregard Sweet Potato

Christopher Clark, Plant Pathology; Mary W. Hoy, Arthur Q. Villordon, Don R. LaBonte, Rodrigo A. Valverde

Key Theme: Plant Health

Because sweet potatoes are propagated vegetatively from seed, roots and vine cuttings (slips), viruses and other pathogens can accumulate in the planting stock. This contributes to a phenomenon known as cultivar decline, or the gradual reduction in yield and quality of the crop over years of production. In some cases, the decline is so great that varieties run out and are abandoned. Beauregard, released by the LSU AgCenter in 1987, has been the mainstay of both the Louisiana and U.S. sweet potato industries since shortly after its release. However, some farmers began seeing early signs in the 1990s that their Beauregard stock may have declined in yield and appearance. The goal of foundation seed programs is to prevent this decline by maintaining high quality planting stock. The program has been successful in producing foundation seed for growers that has minimal virus infection, however, there is little information available to guide farmers in how to best maintain the quality of their seed, which they keep for about three years.

The LSU AgCenter Sweet Potato Foundation seed program was converted to production of virus-tested seed in 1999. Tissue culture techniques are used to produce Beauregard plants that were virus-tested (VT) in the Plant Pathology & Crop Physiology Department (PPCP). These VT tissue cultures are increased by a private partner, Certis USA, and then grown out at the Sweet Potato Research Station (SPRS) in Chase, LA to produce about 10,000 bushels of VT seed each year. In addition, approximately 30 other cultivars and breeding lines are increased in tissue culture in PPCP and provided to SPRS each year. Five viruses have been identified in sweet potato in Louisiana and methods have been developed to detect and diagnose infections by these viruses. A complex of three aphid-transmitted potyviruses was found to be common in commercial production and it was found that they can reduce yields up to 15-20%. In addition, whitefly-transmitted geminiviruses were found in ornamental sweet potatoes and it was determined that they can reduce yield of Beauregard by 25-30%. Research also was initiated to develop methods for improving virus resistance in sweet potato. Preliminary results indicate that there are great differences in resistance to the geminiviruses and research is ongoing to investigate heritability of this resistance and to incorporate it into horticulturally acceptable breeding lines. However, there is evidence that other as yet unidentified viruses may be involved in the cultivar decline complex and research is ongoing to isolate and identify them.

In preliminary studies, it was determined that graft inoculating VT Beauregard with infected plants from farmers fields could reduce yields by as much as 30-50% and could also reduce quality by causing changes in skin color of the sweet potatoes. Louisiana sweet potato farmers now can purchase VT seed from the Sweet Potato Research Station. Estimating a modest yield and quality increase of 10-15%, this program will have provided economic benefit to the industry for the 2003 Louisiana crop of \$5,000,000 to \$7,000,000. This was calculated using a long-term average of \$12/box for number one sweet potatoes (January, 2005 prices are \$15-16/ box). Research emphasis has shifted to try and understand how and when these viruses spread in the field so that measures can be devised to help farmers reduce spread and keep planting stock cleaner longer. Other studies are focused on developing sweet potato lines that are resistant to these viruses to reduce the need for other more expensive methods of controlling viruses.

Source of Funds

State and Hatch, Louisiana Sweet Potato Advertising and Development Commission, Louisiana Sweet Potato Association, International Potato Center, USDA, ARS Southern Insect Management Unit at Stoneville, MS.

Using Performance Tested Beef Bulls

Danny Coombs, Central Region, Dean Lee Research Station

Key Theme: Animal Production Efficiency

Louisiana is considered a cow-calf state. Therefore, most beef calves produced here as well as in other southeastern states are sold at weaning and moved to other parts of the country for growing and finishing. Louisiana beef cattle producers are not taking advantage of our climate and resources to add value to their calves. One method of doing this would be to use performance tested beef bulls to produce these calves.

Calf weaning weight is a highly heritable trait. Beef sires that gain weight rapidly also sire calves that gain rapidly. Performance testing of beef sires is a tool that can be used to identify sires that have the genetic ability to gain rapidly under uniform environmental conditions. Louisiana beef cattle producers could add additional pounds of calf sold per cow just by using performance tested bulls to sire these calves. The performance testing program at Dean Lee Research Station has evaluated more than 7,000 beef bulls since 1958.

It is estimated that there are over 670,000 beef cows in Louisiana. If performance tested beef sires were used the weaning weight of calves produced could be increased. Since most calves are sold at weaning this could increase the revenue of Louisiana cattlemen. It has been estimated that weaning weights are below 500 pounds per calf. If weaning weights were increased by 10 pounds per calf by using performance tested beef sires, it would add \$3.5 dollars to Louisiana cattlemen's income.

Source of Funds

State and Louisiana Bull Performance Testing Association

Inhibition of an Important Bacterial Pathogen Causing Disease in the Bovine Respiratory Tract by cecropin B Transgene Expression in the Nasal Mucosa of Calves

Richard Corstvet, Veterinary Science; Charles M. Boudreaux, Richard K. Cooper and Frederick M. Enright

Key Theme: Animal Health

Mannheimia haemolytica S1 is the primary cause of bacterial pneumonia (bovine respiratory disease or BRD) in transported calves. This pneumonia greatly adds to the cost of the end product which is meat and meat products used by the consumer. Antibiotics and vaccines have not been successful in greatly reducing this disease's cost impact, and the use of antibiotics may leave an unwanted residue in meat or meat products for consumers. Utilizing gene therapy as a novel molecular biology method the calf produces an antimicrobial (cecropin B) locally in the upper respiratory tract. The antibacterial effect produced by the 100ug of plasmid/nostril diminishes between 3-4 weeks and the transgene cannot be detected 21 days after aerosol.

Calves 136-237 kg were aerosoled with 25, 50, or 100 ug of plasmid DNA/nostril while controls received only the transfection reagent. Antibacterial activity against *M. haemolytica* was observed in all calves transfected with 100ug of DNA/nostril and only in 2 of the 4 calves transfected with 50ug /nostril. This experiment was repeated with a larger group of calves (6) for the 100ug of plasmid DNA/nostril. The results were the same as previously with the additional finding that a bacterial inhibitory concentration of cecropin B was produced for 14 days after the aerosol. Further analysis of the data may show that this protection lasts for at least 21 days post aerosol. This is an adequate time for protection during shipment and the early critical days in the feedlot. Future work will use other bacterial and viral agents involved in BRD and gene therapy. The mechanism of enhancing cecropin B production in the calf will be explored.

An animal used for human consumption protected against important diseases by the method described is beneficial and important to the consumer in that the deleterious effect from antibiotics and other drug residues will not contaminate the meat or meat products. Additionally, the grower and processor save money by negating the need for antibiotics and drugs and the cost of debilitated and dying cattle. If it is substantiated on a field basis that cecropin B has an antibacterial and antiviral role in controlling BRD then use of this methodology will be bolstered for use in other animals used for human consumption. This novel approach will impact favorably on market price and interstate and international import/export potential of the animals. States and owners from those states that have a reputation for calves with low risk of BRD will have calves that readily sell at a premium price at market. If it is substantiated that cecropin B or a like compound may be naturally produced by cattle and other food animals as a defense mechanism, it will bolster this methodology in animals used for human consumption. The finding that this gene therapy causes production of a potent antimicrobial which has a short but effective presence in the calf is of great importance in control of BRD.

Source of Funds

State, Hatch, Private, and Multi-state

Scope of Impact

Multi-state: Contribution to NC-107

Sugar Research at the Audubon Sugar Institute

Donal Day, Audubon Sugar Institute

Key Theme: Plant Production Efficiency

Sugar production is a major component of the economy of the state of Louisiana with an annual value of about \$600 Million. Domestic farm policy has frozen expansion of this industry in its traditional market (food) and World Trade policy (CAFTA) is driving down the price of its primary product. Industry survival requires increased efficiency with associated cost reductions, diversification and new non-food markets for products. The Audubon Sugar Institute operates programs addressing these issues for the sugar manufacturer. Analytical and engineering services are offered to help managers cope with immediate problems in the factory. Short term research on how to minimize losses in factory operation and maximize efficiency and longer term research programs on alternative products from sugarcane are conducted. Results are disseminated through a variety of mechanisms including specialized short courses for sugar mill operators and semester long course on sugar operations for both the engineering student and the professional.

Audubon operates an analytical service for determining on a weekly basis, from the amount of sugar left in molasses, how well each Louisiana sugar mill is making the sugar from the cane received. This has created competition between mills to improve operation in order to be first for a week, resulting in incremental improvements in efficiency each year. Service engineering is also provided on mill setting (increasing extraction), boiler efficiency (reducing natural gas usage) and pollution control. Short term research has reduced sugar losses due to cane washing, improved control of dextran in the mill, changes in mud filter operation, again reducing sugar losses, elucidating fluid flow in evaporators and sugar pans, producing changes in design that improved operation and currently we are focusing attention on inadequacies in clarification and centrifugal operation. Research on new products has taken two direction, producing white sugar at the raw sugar mill to remove dependency on a limited number of refiners (the shut down of the Domino refinery in New Orleans due to hurricane Katrina emphasizes the importance of this) and production of products (ethanol, oligosaccharides, fiber products) from bagasse.

In spite of crop variation, hurricanes and mill closures, Louisiana now produces almost half of the domestic cane sugar. Sugar mills have become more efficient than 5 or 10 years ago and currently natural gas usage is almost nil. Sugar mills now no longer wash cane, except in unusual circumstances. Dextran is no longer an unsolvable problem but one that is handled routinely on the mill floor. More and more attention is being paid to minor losses in processing such that sugar recovery has increased an estimated 10 lbs per ton of cane processed. The LSU Ag Center via the Audubon Sugar Institute is increasingly becoming the first resource when there is a problem at the sugar mill. Three new products are relatively recent spin-offs from longer term research at ASI. A commercially available test kit developed for dextran is in wide use in the sugar industry. A sugar base "nutraceutical" prebiotics is being commercialized. This has a potentially large market in poultry feed as well

positive anti-diabetic properties. Also, in an early commercialization stage is a cold sterolant that has a wide range of applications, from military to infection control in hospitals, that came from research toward developing a better biocide for sugar mills. The financial impact of these last two developments is in the range of 10-100 million dollars for Louisiana.

Source of Funds

State, US Department of Energy, American Sugarcane League, and LA Board of Regents

Plant Growth Regulators and Improving Rice Production and Profitability

Richard Dunand, Southwest Region, Rice Research Station

Key Theme: Agricultural Profitability

Seedling vigor is important in crop establishment and survival. Slow emergence and seedling growth extends the time between planting and flood establishment. As this emergence period is extended, plant population declines and water and herbicide use increase. Seed placed below the soil surface have a limited amount of time in which to produce a seedling at the soil surface. If seedlings do not emerge in a timely manner, they eventually die below the soil surface and plant population is inadequate for maximizing grain production. With an extended emergence period, water use is increased as the frequency of flush or surface irrigation is increased to aid emergence and prevent crop desiccation after emergence. In addition, herbicide use is increased to control weeds prior to flood establishment and before the resultant weed control benefits that arise from submerging the soil under water.

Seed and seedling treatments with gibberellic acid were evaluated on several varieties, experimental lines, and hybrids. The results showed that emergence and seedling establishment occurred 10 days early with a 20% increase in plant population, and seedling height was increased up to 3 inches within 7 days after treatment. Entries were categorized according to their responsiveness to gibberellic acid.

At planting and during the period of crop establishment, plant growth regulators were shown to reduce seed, water, and herbicide costs. Calculated savings were 20% in seed costs and \$15 to \$25 per acre in water and herbicide costs.

Source of Funds

State funding and Louisiana Rice Research Board and Industry grants

VTRS-1, a Rough *Brucella suis* Vaccine for Use in Swine and Cattle as a Model for Wildlife

Philip Elzer, Veterinary Science

Key Theme: Animal Health

Vaccinating animals against brucellosis, specifically cattle and swine, with a vaccine that is safe and efficacious aids in the protection of domestic and wild animals from this zoonotic or potential agroterrorist pathogen.

A rough vaccine candidate of *Brucella suis* is being evaluated in cattle for potential use in wildlife, primarily elk. Previous data in mice and swine demonstrates that this vaccine strain provides protective immunity against virulent smooth strains of *Brucella* species. The purpose of this project was to determine if the candidate VTRS-1 lead to sufficient colonization of cattle without any adverse pathology, primarily abortions. Preliminary results indicate that non-pregnant cattle are transiently colonized with the strain which does not cause any abortions in pregnant animals. This rough vaccine strain is also being evaluated in swine to protect against brucellosis. The purpose of this project was to determine immune responses, safety, and efficacy of the vaccine. Thus far the vaccine induces measurable humoral immune responses, has proven to be non-pathogenic in pregnant sows, and is efficacious against virulent *B. suis* challenge.

A disease-free food animal population is imperative to the well-being of all individuals. The regulatory disease addressed in this study deleteriously impacts the economics of cattle and swine producers, directly affecting the market price and interstate

and international import/export potential of the animals, which in turn influences all consumers. As zoonotic organisms, *Brucella* species pose a human health threat, hence a protected animal population benefits the general public. Brucellosis animal vaccine work has a significant impact in protecting the human population since *Brucella* species are also known as bioterrorist agents or “agents of mass destruction.”

Source of Funds

Animal Health, USDA cooperative agreements, State, and industry funds.

Development of an Integrated Control Program for Stable Flies

Lane D. Foil, Entomology

Key Theme: Animal Health

Insects and acarines cost the U.S. livestock producer in excess of \$3 billion annually; loss of over \$2 billion annually is suffered by the beef cattle industry. The stable fly, *Stomoxys calcitrans*, is considered to be the second most important pest of cattle, and there are no effective control measures available for the adult flies. The stable fly has emerged as a tremendous pest of pastured cattle due to the increased use of large, round hay bales as hay supplementation for cattle. Residues from these round bales are trodden upon by cattle, and mixed with dung and urine; this mixture may constitute the greatest single stable fly breeding medium in the South.

Electrocution techniques were used to determine if treated targets similar to those used for tsetse control could be developed for stable fly control. In two experiments, a half blue and half black (UK) 1 m² target constructed of cotton poplin was determined to be acceptable for development studies. In one experiment, an average of 350 stable flies per hr (maximum 794 flies in 1 hr) was collected using the UK target and in the other experiment, an average of 527 flies (maximum 1,335 flies per hour) was collected. We also conducted studies to determine the influence of weather and time on the mortality of stable flies exposed to targets treated with 0.1% lambda-cyhalothrin. Even after the targets were outside for three months, 100% of the flies exposed to treated targets for 30 seconds were dead within 30 minutes. A time-delayed circuit trial using untreated UK targets demonstrated that stable flies remained on or around the targets for at least 30 seconds. Two experiments were conducted with time-delayed circuits and UK targets treated with 0.1% lambda-cyhalothrin, and similar results were obtained. The number of flies collected with UK trigger targets was 6.1-fold higher than that for Alsynite traps in two experiments.

The results of this study indicate that treated cloth targets may be a viable addition for stable fly control programs. It has been demonstrated that permethrin-treated Alsynite traps at a rate of one per five head of cattle at two sites in Florida provided a more than 30% reduction of a stable fly population. The results of our trap comparison studies indicate that our targets will be much more effective than these traps, and that we should be able to achieve adult stable fly control with a reasonable and manageable number of targets. The data indicate that one treated target could have a potential to eliminate over 10,000 adult stable flies per day. Protecting growing cattle from moderate stable fly infestations has been shown to result in approximately 50 pounds of additional weight gain over a 100 day period, which could result in a sixty dollar difference per head in today's market.

Source of Funds

State, Hatch, and Multi-state
Development of an Integrated Control Program for Stable Flies. SRIPM; Funded May 2003- September 2006.

Scope of Impact

Multi-state: Contribution to S-1005

Genetic (co) Variance of Parasite Resistance, Temperament, and Production Traits of Traditional and non-Bos Indicus Tropically Adapted Breeds (S-1013)

Donald Franke, Animal Sciences, Larry V. Cundiff (NE), Thomas D. Bidner

Key Theme: Animal Genomics

Efficient cow-calf production in the Southern region is dependent on heat tolerance and parasite resistance in cows and calves. The Brahman breed has supplied these traits in the past, but because of a perceived toughness and low quality carcasses from Brahman cross calves, a search for other breeds to replace the Brahman is worthwhile. The Bonsmara from South Africa and the Romosinuana from Columbia in South America are potential breeds that might make a contribution to cattle production in the southern region.

Angus and MARC III cows at the USDA Meat Animal Research Center in Clay Center NE were mated artificially to Beefmaster, Brangus, Bonsmara, and Romosinuana sires over a two year period. About half of the first cross females from these matings were trucked to LA at weaning and the remaining half remained in NE. This resulted in a design to evaluate a genetic x environment interaction for performance traits exhibited by these cattle. Puberty, reproductive, and maternal traits are being evaluated in the females and growth and carcass traits are being evaluated in MARC III and Charolais sired progeny. Two calf crops have been produced through 2005.

Neither sire breed or sire breed x location was significant for puberty or first exposure calving rate. Beefmaster sired heifers tended to gain faster postweaning and Brangus sired heifers reached puberty slightly earlier than other heifers. Heifers in NE weighed slightly more at breeding than LA heifers but reached puberty a few days later. Brangus and Beefmaster sired heifers had a slightly higher weaning rate for the first calf than Bonsmara and Romosinuana sired heifers. Heifers in LA had smaller calves at birth and less calving difficulty than those in NE. Beefmaster sired heifers weaned heavier calves than Brangus, Bonsmara, and Romosinuana sired heifers, which were not different. Calves produced in LA were lighter weight at weaning than calves produced in NE. These data are preliminary as 3 more calf crops will be produced in this multi-state project. Carcass data on calves will be collected the next three years. The LSU AgCenter is contributing significantly to this important research. This study should help determine if either Bonsmara or Romosinuana will contribute significantly to calf production in LA.

Source of Funds

State, Hatch, and Multi-state

Scope of Impact

Multi-state: Contribution to S-1013

Growth and Carcass Characteristics of Paternal Half-sib Brahman Steers

Donald Franke, Animal Sciences; Thomas D. Bidner

Key Theme: Animal Production Efficiency

Many commercial cow-calf producers in Louisiana use Brahman cross cows because of their adaptability to our environment. Feeder calves showing 50% or more Brahman inheritance have been discounted when sold at weaning because of the perception that meat from their carcasses will be less tender and of lower quality. Only limited information on genetic variation for tenderness and carcass quality was available on Brahman cattle. This situation resulted in discussion of research to understand the nature of genetic variation for tenderness and carcass quality in Brahman cattle so that selection procedures could be used to correct the situation.

The Louisiana Brahman Association agreed to work with us in this effort. Brahman breeders agreed to sell us a sample of male calves at weaning from their herd sires. About 80 male calves were purchased each year over a five year period. A total of 428 calves were purchased from 68 herd sires. The number of calves per sire ranged from two to 25. Calves were

castrated, dehorned, backgrounded, grazed on ryegrass until April and then fed to harvest weights at a south Texas feedlot. Carcass data were collected on all calves and a rib section was returned to the Animal Science Department for measurement of tenderness. Statistical analyses were conducted to estimate heritability of all traits, including tenderness and carcass quality. Expected Progeny Differences were predicted for all 68 sires. Results from the study indicated that genetic variation for carcass and tenderness traits in Brahman cattle was similar to that in other breeds. This meant that selection among Brahman sires based on progeny testing procedures could be effective in improving carcass quality and increasing tenderness. Sire Expected Progeny Differences for most traits were clearly useful for selection among sires. Accuracies for sire EPD's were above .75 when at least 15 progeny per sire were available, suggesting that a sire EPD was important as a measure of genetic merit. Because of the interest in our study, the American Brahman Breeders Association (ABBA) developed a steer feedout program for their members based on our procedures. Steers were handled in a similar manner and the same carcass and tenderness data were collected. Because of the importance of this study, other similar data from the USDA Research Station in Brooksville FL and our data were added to the ABBA study to increase numbers. We in the Animal Science Department agreed to help the ABBA analyze the data in order to predict EPDs for some 250 Brahman bulls. We update the EPDs each year by adding additional data to the data file. The ABBA now publishes a Brahman Sire Summary for carcass traits. The LSU AgCenter truly made a difference in the way Brahman sires are evaluated for carcass traits.

Source of Funds

State, Hatch, Beef Industry Council, and Louisiana Brahman Association.

Sugarcane Variety Improvement Program

Kenneth Gravois, South Central Region, St. Gabriel Research Station; Keith P. Bischoff

Key Theme: Agricultural Competitiveness

The development of improved sugarcane varieties has been a major factor in sustaining a competitive sugarcane industry in Louisiana. With stagnant sugar prices, new sugarcane varieties have offered higher yields, reduced production costs through insect and disease resistance, and improved stubble longevity. Most recently, the declining yields of LCP85-384 have hampered an industry that had 89% of its 2005 acreage in this variety. New sugarcane varieties have been developed by both the LSU AgCenter and the USDA-ARS sugarcane breeding programs since the late 1920s. Sugarcane variety development is a cooperative process involving the LSU AgCenter, the USDA-ARS, and the American Sugar Cane League. Making available new high yielding sugarcane varieties is one of the highest priorities in the LSU AgCenter.

The LSU AgCenter sugarcane breeding program is a continuing project with the goal of developing improved sugarcane varieties for Louisiana growers and processors. The current program is a 12-year process that began with crossing of elite parents and ends with seed distribution to the growers. On May 3, 2004, L 97-128 was released to Louisiana sugarcane growers and processors. The LSU AgCenter participated in the release of the USDA-ARS sugarcane varieties HoCP96-540 in 2003 and Ho95-988 in 2004. In 2006, it is anticipated that two new AgCenter sugarcane varieties, L99-226 and L99-233, will be released to Louisiana sugarcane growers. These new varieties offer high sugar yields, early maturity, resistance to sugarcane rust disease, and good stubbling ability.

LSU AgCenter sugarcane varieties have played an important role in sustaining the Louisiana sugarcane industry. In 2005, LCP 85-384 was grown on 89% of the state acreage. Its impact since its release in 1993 is unparalleled. With the predominance of a single variety, LCP85-384, the Louisiana sugar industry has experienced declining sugar yields due to problems associated with a monoculture. When LCP 85-384 was released, the new variety was resistant to sugarcane rust disease found in Louisiana. Beginning in 2000, LCP 85-384 began showing increasing signs of susceptibility to sugarcane rust disease and other factors contributing to yield decline. All available seed cane of the new variety L 97-128 was planted by Louisiana sugarcane growers in 2005. The three newly released varieties and two 2006 releases will give Louisiana's approximately 750 sugarcane growers other variety selection options for maintaining high sugar yields. The Louisiana sugar industry exists due to the continuing efforts of the sugarcane variety development programs of the LSU AgCenter and its partnering agencies. The AgCenter is committed to sustaining the Louisiana sugar industry through the development of superior sugarcane varieties.

Source of Funds

State, Hatch, American Sugar Cane League

Integrated Weed Management in Louisiana Sugarcane

James Griffin, Agronomy and Environmental Management; Kenneth Gravois

Key Theme: Invasive Species

Estimates of annual yield losses due to weeds in Louisiana sugarcane using current weed management practices are \$1.5 million. From an economic standpoint, the need to manage input costs and to avoid application of inappropriate or unnecessary herbicides has perhaps never been greater. The primary role of weed scientists is to conduct research aimed at development of cost effective weed control programs. Weeds can be controlled with integrated pest management (IPM) practices including mechanical cultivation, crop rotation, and herbicides. Louisiana producers currently use all these practices, but herbicides serve as the foundation for successful weed control programs. Weed management decisions are complicated by the high population of both annual and perennial weeds present in sugarcane fields. The efficacy of herbicides and other suppressive tactics is dependant upon weed species and environmental conditions. Since herbicide discovery is not a role of the university, researchers are dependent on agricultural chemical companies to provide new products and technologies. Few herbicides are developed solely for use in sugarcane due primarily to the small acreage compared with other crops in the United States. University researchers often take the lead role in evaluating new herbicide technology. Crop and environmental safety, flexibility in application timing, and broad spectrum weed control are desirable traits of any herbicide. Our research program focuses on these areas and is a cooperative effort with the sugarcane breeding project, USDA, and the American Sugarcane League.

Research related to weed management in sugarcane has addressed 1) crop response and weed control with herbicides applied at planting, in spring, and at layby; 2) johnsongrass, red morningglory, and nutsedge biology to include factors affecting seedling emergence, growth, and seed production, and competition with sugarcane; 3) alternative crops for fallowed sugarcane fields and weed control programs for perennial weeds; and 4) reduced tillage weed control programs.

Research has contributed to the registration and availability of cost effective herbicide technologies and has delineated the competitiveness of weeds in sugarcane. Integration of weed control tactics have helped to maintain high yield and profitability. The adoption of reduced tillage practices both in the sugarcane crop and in fallowed fields has reduced production costs and has had positive environmental implications.

Source of Funds

State, Hatch, and American Sugarcane League

Screening for Resistance to Multiple Rice Diseases

Donald Groth, Southwest Region, Rice Research Station; S. D. Linscombe, M.C. Rush, A.K.M. Shahjahan

Key Theme: Invasive Species

Rice diseases pose a major threat to rice production. The three major diseases, sheath blight, blast, and bacterial panicle blight, cause significant yield and quality reductions that cost farmers millions of dollars each year. Disease resistance is the best control, but often, it is not available or breaks down after varietal release and requires constant efforts to improve and maintain.. Major problems are encountered when screening for disease resistance, including limited seed supplies, not enough plot area to run multiple trials, interference between diseases expressions, and economic restraints. Screening for multiple diseases in the same plot would reduce these limitations and increase efficiency of screening programs. The objectives of these studies were to develop effective and accurate rice disease screening methods that allow screening of multiple diseases in the same plot.

Experiments were conducted at the LSU AgCenter Rice Research Station, Crowley, LA, in 2004 and 2005. Small plots consisted of three rows, 2 m long, of various varieties drill seeded with 18-cm row spacings. Planting dates, seeding rates, fertility, and pest control followed current recommended practices. Treatments were organized into a randomized complete block design with four replicates. Sheath blight epidemics were initiated at green ring by inoculating one half of the plots with a rice grain/rice hull culture. Bacterial panicle blight epidemics were initiated at the boot split on the other half of the plots by spraying a 24-hr old culture of bacteria on emerging heads twice at 2 to 4 day intervals. Blast and minor foliar diseases were from natural sources. Disease severities were assessed using 0-9 rating scales 2- to 4-days before harvest maturity.

Rice disease resistance ratings were successfully collected simultaneously for multiple diseases in small plots, including sheath blight, blast, bacterial panicle blight, and secondary foliar diseases. Strategies to evaluate multiple disease development without interference were developed. The first reactions of rice to bacterial panicle blight were published in the 2006 Rice Varieties and Management Tips publication. Several varieties were identified with multiple resistances to all three major rice diseases including the recently released LSU AgCenter variety Jupiter. Higher percentages of resistant varieties will be released due to the development of these screening methods.

Source of Funds

Hatch; State funding and Louisiana Rice Research Board grants

Development of Wheat and Oat Varieties for Louisiana

Stephen Harrison, Agronomy and Environmental Management; HJ `Rick` Mascagni, G. Boyd Padgett

Key Theme: Agricultural Competitiveness

Small grains are an important crop in Louisiana that provide cash flow during the early summer and fit into many cropping systems. Wheat is also widely used as a cover crop for cotton and in winter pasture for cattle. Oats have become the preferred crop for wildlife food plots and are widely used as winter pasture. There is only one private wheat or oat breeding program left in the entire southern US, because, unlike other crops, growers can save seed from year to year and therefore variety wheat development is less profitable. There is a continued demand for wheat varieties and mid-size seed companies are anxious to fill that niche given the opportunity to exclusively license new varieties. It is important to Louisiana growers and commercial concerns that small grain varieties adapted to the region are developed and commercialized.

The LSU AgCenter small grain breeding and genetics program was established in 1985 to provide improved varieties of wheat and oats in support of agricultural enterprises in Louisiana and surrounding states. Development of new varieties is a long-term commitment that requires at least ten years from the initial hybridization to variety release. The breeding program makes new hybridizations each year and evaluates thousands of experimental lines across the state. The plant breeding program is a collaborative effort involving scientists at research stations around the state and also has cooperative research agreements with university breeders across the southern US.

The LSU Agricultural Center small grain breeding program has released eight wheat and oat varieties since 1998 and each of these has been commercialized. These varieties are widely grown by farmers in Louisiana and surrounding states. They are high yielding, are adapted to the unique environment of Louisiana, and require fewer chemical inputs for disease and insect control. LA841 wheat, released in 2002, accounted for well over 50% of wheat sales in Louisiana during the 2005-06 growing season. This high-yielding and disease resistant variety significantly increased economic viability of the Louisiana farms and also the Louisiana-based company that markets the variety across the region. LA95181 wheat and LA9810 oat were released in 2005 and will be soon available for growers to produce. Oat varieties developed by this program are marketed by several companies for wildlife food plots across the region. These varieties provide significant economic return to two Louisiana seed companies and increase the recreational value of hunting in Louisiana. Plant breeding programs require a large commitment of time and resources but provide a very high rate of return to the citizens of Louisiana.

Source of Funds

State, Hatch, Louisiana Soybean and Grain Research and Promotion Board, Royalties, USDA grants

Peach Variety Evaluations

Charles E. Johnson, Horticulture

Key Theme: Plant Production Efficiency

Variety selection is one of the most important decisions a peach grower can make. There are hundreds of varieties from which to choose, but only a few are adapted to South Louisiana conditions. Varieties vary tremendously in fruit maturity times, disease resistance and chilling hour requirements. Chilling hours are the number of hours below 45 F that occurs in a given area during the dormant season. Each peach variety has a particular chilling hour requirement and will not grow properly if this requirement is not met. A typical peach grower will grow five or more varieties in his orchard to span the marketing season. Any one variety will ripen over a 6-10 day period. Several varieties are needed in a commercial orchard to span the marketing season from May through August.

The LSU Agricultural Center has a peach breeding and variety evaluation program at the Idlewild Research Station with the goal of developing peach varieties for south Louisiana. Each year breeding selections generated from crosses at Idlewild and varieties developed from other similar programs are evaluated for fruit and tree characteristics. These selections are evaluated for market potential in South Louisiana. These fruit characteristics evaluated include shape, size, color, freeness of stone, and eating quality. Each selection and variety is evaluated independently for traits that would lend it for commercial use. Variety recommendations are posted on the Idlewild Research station website for public access.

Selecting the proper variety for a particular area is a critical component of successful peach production. Growers depend on unbiased variety evaluations when making decisions on what to plant. When growers make variety selections based on unbiased information for particular location their chances of success increase dramatically. Over 60% of peach production in Louisiana is from varieties developed by LSU Agricultural Center. Over 90% of production in the state is from varieties recommended by the Ag Center. This program will continue to support peach growers by furnishing up to date information on varieties.

Source of Funds

State and Hatch

Determination of Optimum Fertilizer Nitrogen Rates for LCP85-384 and Other Sugarcane Varieties

Charles Kennedy, Agronomy and Environmental Management; Ben Legendre

Key Theme: Agricultural Competitiveness

The increased yield potential of LCP85-384 resulted in speculation about the amount of fertilizer nitrogen needed to meet that potential. The speculation occurred because fertilizer response experiments had not been conducted in Louisiana for 20 years and had not included any recent variety releases.

In 2005, a 5-year, multi-location, large-plot experiment determining the optimal fertilizer N rate for LCP85-384 was completed. Results from 18 environments within the 5 year period indicated LCP85-384 produced optimal yields (usually 90%+ of the maximum yield and not statistically different) at fertilizer N rates that were generally 20-40 lb/a lower than the older established fertilizer N rate recommendations. Small plot fertilizer N rate studies were conducted in 2005 on older (CP70-321), contemporary (HoCP91-555), and newer (L97-128 and Ho95-988) varieties compared to LCP85-384. The preliminary results indicated that, although absolute yields varied, relative responses were similar for fertilizer N rate among the varieties tested. Although preliminary, this would suggest that the change in fertilizer N rate response and subsequent fertilizer recommendations may be due more to changes in the philosophy of making recommendations than in biological differences among the varieties. Further research is needed to substantiate this.

Anecdotal evidence from farmers who have reduced the fertilizer N rate applied by 20-40 lb/a, indicate the new recommendations are effective not only for LCP85-384, but for other contemporary varieties. These recommendations may also extend to more recent variety releases, pending additional testing. Using the new fertilizer N rate recommendations based on optimal yield may be more cost effective as opposed to the older recommendations which may have used a philosophy of higher "sure rate." Based on present N fertilizer costs and approximate production acreage, a 20-40 lb/a reduction in fertilizer N rate would amount to a savings of \$8.75 - \$17.50 /a and result in a \$3.5-\$7 million reduction in production costs within the industry.

Source of Funds

State, Hatch, and American Sugar Cane League

Evaluation of Heat Tolerance in Bedding Plants

Jeff Kuehny, Horticulture; Seenivasan Natarajan

Key Theme: Ornamental/Green Agriculture

High temperatures in late spring and summer can limit the production and establishment of bedding plants. Heat stress during this period of year severely damages young transplants in production units and poor or complete failure of establishments in landscapes. Development of heat tolerant cultivars through meticulous screening and selection could help ease heat incurred stress by transplants and improve establishment of bedding plants in landscapes.

Though many bedding plants have been labeled heat-tolerant or given names that imply heat tolerance, they often perform poorly in the heat of the Southern Gulf states. While some of these series or hybrids may have a heat-tolerant trait, most lack a combination of morphological and physiological characteristics that help a plant to withstand high temperatures. Despite the continued increase in popularity of bedding plants, the lack of available scientific data on the effects of heat stress on these plants and well-defined screening techniques for selecting true heat-tolerant lines represent a major obstacle for cultivation and breeding.

Heat tolerance of cultivars of annual salvia species *Salvia splendens* "Vista Red" and "Sizzler Red" were compared with a known relatively heat tolerant perennial salvia, *Salvia coccinea* "Lady in Red." Heat tolerance of these three salvia was determined on physiological and morphological levels by using a cell membrane stability test, transpiration rate, growth and overall marketable quality under heat stress. Another experiment focused on inducing heat tolerance of these three salvia. "Sizzler Red" was found to have more membrane leakage than "Vista Red" and "Lady in Red." This indicated that "Vista Red" is more closely related to "Lady in Red" in terms of membrane stability and heat tolerance. A decline in transpiration rate during the initial period of growth of transplants during heat stress reduced the ability of the "Sizzler Red" plant to cool itself and its rate of photosynthesis. This resulted in poor root and shoot growth and plant quality compared to that of "Vista Red" and "Lady in Red." The preconditioning treatment induced heat tolerance in Sizzler Red in that they were able to withstand high temperatures after growing on compared to those that were not preconditioned. We are currently planning to screen several cultivars of salvia, pansy and other popular bedding plant species in order to group cultivars with various degrees of heat tolerance and degree of successful heat preconditioning. Our goal is to not only help growers and landscapers determine the best plant material to use for production and in landscapes during high temperatures, but also which plants can be preconditioned for heat tolerance. We also hope that by determining the true heat tolerance (both physiological and morphological) of these plants, that plant breeders will use this information in their breeding programs to provide plants that are truly heat tolerant.

Source of Funds

State, Hatch, and Board of Regents Support Fund

Adapting and Validating Precision Technologies for Cotton Production in the Mid-Southern United States

Billy Leonard, Northeast Region, Macon Ridge Research Station; Randy Price, Ken Paxton, Ralph Bagwell, Keith Morris

Key Theme: Precision Agriculture

Arthropod pests have been responsible for economic losses in cotton greater than \$1 billion during each of the past three years. These losses have occurred in spite of management strategies that ranged from \$50 to \$60 per acre. Arthropod pest management represents one of the largest variable production expenses in cotton production. Low commodity prices and higher input costs are responsible for the gradual decline in profitability of U.S. cotton. Producers are constantly evaluating new tools and techniques to increase the efficiency of their farming operations. New technologies allow producers to quantify yield variability in small areas of the field, characterize areas with similar productivity potential, and apply variable inputs such as pesticides, fertilizers, and seeding rates based on this variability. Knowledge of within-field variability allows producers to identify site-specific management needs of an individual field or management zones within a field. A promising site-specific technology that can reduce arthropod management inputs is based upon spatially variable insecticide (SVI) applications. These research efforts comprise a multidisciplinary approach to the development of a SVI application system.

These studies compared the efficacy and value of SVI (yield-based and crop profit-based prescriptions) applications to whole-field broadcast treatments over four years of experiments (2002-2005). Yield and crop profit maps were created from previous cotton yield/production data and were used to develop site-specific prescriptions for SVI applications. Treatments included whole-field broadcast sprays (producer standard), yield-based SVI sprays, and profit-based SVI sprays. The prescription for pesticide application in the SVI-yield and SVI-profit treatments only included those management zones that yielded in the upper 80 percentile or produced profitable yields as determined with economic analyses. Twenty-two insecticide applications were successfully accomplished during this period of testing. Initial post-treatment samples of selected arthropod pests indicated infestations were present in the non-sprayed zones of the SVI-treated plots but were less common in the sprayed zones of the whole-field broadcast and SVI-treated plots. Using standard statistical analyses, no significant differences in yields between the SVI prescriptions and whole-field broadcast treatments were detected. Insecticide inputs were reduced by \$5 to \$14 per acre and the actual sprayed acreage was reduced 13% to 32% using the SVI prescriptions compared to whole-field broadcast sprays. These data suggest that management zones for reducing insecticide inputs in cotton can be developed from geo-referenced yield and crop profit maps and can be effectively used to improve production efficiency.

SVI technology reduced arthropod pest management expenses, but did not significantly impact yield. The reduction in insecticide-treated acreage improves environmental stewardship by reducing total pesticide load and decreasing off-target spray drift. SVI applications support general IPM principles by temporally and spatially restricting insecticide use strategies. These results confirm SVI technologies as an opportunity to moderate arthropod pest management costs and contribute to the integration of precision agricultural technologies into cotton IPM.

Source of Funds

Hatch, State, NASA AG 2020 Program, Cotton Incorporated, National Cotton Council

New Clearfield Variety Offers Advantages to Rice Industry

Steve D. Linscombe, Southwest Region, Rice Research Station

Key Theme: Agricultural Competitiveness

The introduction of Clearfield rice technology in 2002 has revolutionized southern U.S. rice production. This technology (developed at the LSU AgCenter Rice Research Station) allows for the selective control of red rice in a commercial rice field. This technology has allowed for yield and quality improvements. In addition, the use of this technology has led to environmental improvements by allowing producers to use dry-seeding instead of water-seeding systems (which often necessitates release of rice field floodwater with high sediment loads). The initial varieties used with this system were

somewhat low yielding and lodging susceptible compared with the best current conventional varieties. The Rice Breeding Project at the Rice Research Station is developing new rice varieties with the gene for resistance to imidazolinone herbicides that allow their use in the Clearfield system. These new varieties will have improvements in yield and other important agronomic characteristics. The new variety CL131 was developed in an expedited program. This variety was developed in five years (from initial cross until the release of foundation seeds). This is the least amount of development time for any variety ever developed at this station. This was accomplished through intensive use of winter nursery facilities on the island of Puerto Rico, which allowed multiple generations to be produced each year during the development cycle. CL131 has a yield advantage over CL161, which is the predominant variety used with the Clearfield system. In addition, the new variety is shorter in height and earlier in maturity.

The release of CL131 will make the use of Clearfield technology more competitive economically. The new variety will allow producers using the Clearfield system to produce higher yields. In addition, the shorter plant height will allow the new variety to be more resistant to lodging. Lodging leads to reduced yields and harvest efficiency. The variety was grown on a limited acreage in 2005 but will be grown on numerous acres in 2006 as seed should be readily available. Thus, the expansion of the use of the technology will offer economic viability to the industry. In addition, this technology will allow more producers (and thus acres) to employ more environmentally friendly management practices.

Source of Funds

State and grant funding

Influence of Cultural Practices on Corn Production on Northeast Louisiana Alluvial and Loessial Silt Loam Soils

Henry Mascagni, Northeast Region, Northeast Research Station

Key Theme: Agricultural Profitability

Corn acreage has fluctuated widely in recent years partly due to changes in government programs, prices, and wet planting seasons. Growers have recognized the important rotational benefits of corn in cropping systems. For maximum yield and seed quality, corn must be managed to minimize plant stress during the growing season. Plant stress, not only affects yield, but also seed quality. Cultural practices such as hybrid selection, row spacing, nitrogen rate, seeding rate (plant population) need to be defined that will better ensure maximum yield potential, profit and seed quality.

Field experiments were conducted on Mississippi River alluvial silt loam and clay soils at the Northeast Research Station, St. Joseph, LA, and on loessial silt loam soils at the Macon Ridge Research Station, Winnsboro, LA, to better define cultural practices that maximize corn yield and seed quality. Cultural practices, including hybrid selection, row spacing, seeding rate, nitrogen rate and cover crop management were evaluated. Hybrid performance trials were conducted on both alluvial silt loam and clay soils and loessial silt loam soils. Two planting patterns, twin-rows (9.5-inches apart) and conventional, single rows, were planted on 40-inch wide raised beds and were compared at four seeding rates and four nitrogen rates. The influence of irrigation, cover crop, plant population and nitrogen rate on yield and soil salt levels was investigated on a drought-prone, loessial silt loam soil. In-furrow starter fertilizer was tested on both alluvial silt loam and clay soils. Experiments were conducted on two soil types to determine the efficacy of nitrogen fertilizer applied as late as early silk.

There were 94 hybrids evaluated in 2005, with mean yields of 152 bu/acre on Sharkey clay and 181 bu/acre on Commerce silt loam. There were 24 hybrids on the clay and 22 hybrids on silt loam recommended for the 2006 growing season. Recommended hybrids varied across these two soil types, suggesting an interaction between hybrid and soil type. It is very important that a grower selects hybrids tested on soil types similar to the ones on their farm. Yield differences between row planting patterns, twin- versus single-rows, was only 1.1 bu/acre (194.8 versus 193.7 bu/acre), with optimum seeding rate of 30,000 seed/acre and optimum nitrogen rate of 180 lb/acre. These one-year results confirm current recommendations. On the loessial silt loam, yield was not different when applying six furrow irrigations (2.5-inch soil moisture deficit) compared to nine furrow irrigations. Soil salt levels were 23% lower in plots that were watered the fewer times, six versus nine. There was a significant seeding and nitrogen rate interaction for yield, with highest yield occurring at 200 lb nitrogen/acre and seeding rate of 33,000 seed/acre (28,900 plants/acre). There were little or no yield responses to the application of an in-furrow starter fertilizer on alluvial silt loam and clay soils. However, there were consistent early growth responses to applied starter,

particularly on silt loam soils. Although yield responses to starter fertilizer are sporadic, early growth responses are beneficial by providing a quick canopy closure and reducing weed competition. Yields were increased by nitrogen applications applied at early silk on both alluvial silt loam and clay soils. If nitrogen deficiency occurs late in the season, remedial action can be taken to, at least, partially correct the deficiency.

Source of Funds

State, Hatch and Louisiana Soybean and Grain Research and Promotion Board

Aspects of Crawfish Reproduction with Implications for Affecting Production

William R. McClain, Southwest Region, Rice Research Station; R.P. Romiare

Key Theme: Aquaculture

Due to historically low farm commodity prices, many rice farmers in Louisiana now depend on revenues from crawfish harvests to supplement the farm income. However, crawfish production is often highly variable from year to year and from pond to pond. This unpredictability hinders producers from investing necessary funds for capital improvement and even contributes to under-funding of necessary operating expenditures, which exacerbates the problem of unpredictability of production and contributes to other problematic aspects, such as marketing. Crawfish reproduction is the most likely contributor to production variability. Unlike most other forms of aquaculture, crawfish production does not rely on stocking of known numbers of young produced in hatcheries; rather, it depends solely on natural reproduction from indigenous and/or supplemented broodstock. Reproductive success is most crucial in rice/crawfish rotational cropping systems, the prominent strategy in use in Louisiana, because these systems cannot rely on carryover populations but depend on annual stockings of limited numbers of adults.

Few research efforts have focused on reproductive biology of the Louisiana crawfish as it relates to production, partly because of the inherent logistical difficulty of investigating this complex biological function which occurs in subsurface burrows. Research efforts have intensified in the LSU AgCenter on reproductive biology of crawfish. Laboratory methods of spawning crawfish that closely simulates natural conditions in the burrow were perfected and employed at two facilities (Aquaculture and Rice Research Stations) to ascertain various facets of crawfish reproduction. The ecology of natural burrows within experimental production ponds were examined over different seasons by monitoring temperature, burrow depth, presence and volume of water within the burrow, and documenting crawfish survival. Natural burrows have also been systematically examined for crawfish emergence, and crawfish have been extracted from self-constructed burrows to determine effects of various treatments (such as supplemental feeding) on body condition and reproductive success. The relative amount of energy reserves and spawning rates for mature females were also compared for pre- and post-burrowed crawfish.

Significant findings, although preliminary, have emerged from this research. Supplemental feeding of crawfish in ponds for 4 weeks prior to reproduction in 2005 resulted in increased energy deposition in the digestive gland of brood females and significant increases in survival (14%) and reproduction (43%) compared with non-fed animals. If corroborated by future studies, short-term feeding prior to crawfish burrowing may become an important management tool for improving crawfish reproduction and predictability of production. It was also observed that crawfish extracted from self-constructed burrows had significantly increased survival (56%) and reproduction (133%) than animals collected from open waters via baited traps. The important inference for this observation is that trap-harvested crawfish may not be conditioned for immediate reclusion to the burrow. Because all introduced broodstock are trap-harvested, the practical implication of this would be a required holding period from pond stocking to draining. Pond draining soon after stocking, a common industry practice, may result in low juvenile recruitment. In addition, by determining crawfish emergence from burrows on levees after pond flood-up, extrapolating the number of offspring from lab spawned cohorts, and using actual yield data from those ponds, it was determined that approximately 55% of projected recruits are harvested. This approximates independently derived estimates (56%) for survival and capture rate of recruits from other studies. Thus, burrow emergence counts might become one tool for estimating annual crawfish yield. Currently, the industry has no accurate means of estimating yield. Though these findings are preliminary, they provide some important insights into aspects of reproductive biology that may be useful in developing management recommendations to improve crawfish production and, perhaps as important, the predictability of crawfish production.

Source of Funds

State funds, USDA CSREES Special Grants - Aquaculture Program; Louisiana Crawfish Promotion and Research Board

Improving Market Channel Communication for the Meat Goat Industry

Kenneth McMillin, Animal Sciences; Andre P. Brock

Key Theme: Animal Production Efficiency

The numbers of meat goats in the U.S. have increased rapidly in the past decade. The marketing systems for goats and meat are underdeveloped and inefficient compared with other red meat species. Although live animal and carcass classification systems and Institutional Meat Purchase Specifications (IMPS) for goat meat have been developed to facilitate the flow of products and market communications, these have not been sufficiently publicized to allow widespread use by producers, processors, and institutional purchasers. The development of written and electronic media to update industry market communication information and to modernize it through educational efforts would improve the marketing status of the goat meat industry. The different segments of the entire goat meat industry would be benefited from having uniform pictorial standards of animal and carcass evaluation and presentations explaining the standards.

Live animal and carcass classification systems and carcass evaluation procedures were developed in previous projects. Pictures of different goats and goat carcasses were reviewed by expert panels to determine the appropriate selection classification scores and their suitability in depicting a specified conformation for use by individuals in the goat industry. Representative pictures were selected for inclusion in a printed manual and explanations of the pictures were developed by a panel of individuals with experience in live goat and goat carcass evaluation. Presentations were developed to explain the selection classification standards and to link them with a status of the meat goat industry in the U.S. and various marketing options so that trained extension and industry personnel would have guidance in disseminating information on the selection standards to their clientele. The presentations were made to groups of meat goat producers to test the amount of information that could be given in a presentation and to gauge the response of the producers after receiving information about the industry, classification of goats, marketing options, and goat meat.

The pictures of goats depicting the different classification groups and the presentations to producer groups that describe the industry, goat meat marketing, and the selection classification schemes were enthusiastically received. The explanations of the different marketing options and how the selection classifications are used by market news reporters in reporting prices for different types of goats seemed clear to the producers who attended the presentations. The producers indicated that the pictures initially selected for inclusion in the selection and evaluation manual were acceptable, but pictures that would show the differences among goats of different selection classifications even more clearly would allow a producer to use the pictures without additional guidance. Based upon this information, replacement pictures were reviewed and selected by the expert panel members to replace some of the original pictures. The manual and presentations will be disseminated to extension and industry professionals for use in training additional producer, processor, and institutional users about the meat goat industry, marketing of products, and segregation and evaluation of live goats and carcasses with the selection classifications and carcass criteria that have been developed. The standardized pictures and materials promote uniformity and consistency on classification of meat goats and carcasses throughout the various production, slaughter, processing, and meat marketing segments of the meat goat industry. The expertise and leadership of scientists in the LSU AgCenter have resulted in effective presentations and pictorial standards that will allow the meat goat industry to continue improvements in marketing, product differentiation, and competitiveness of meat goats and goat meat.

Source of Funds

State, Hatch, and USDA National Sheep Industry Improvement Center Sheep and Goat Industry Improvement Grant Program

Soybean Weed Control Research In Northeast Louisiana

Donnie E. Miller, Northeast Region, Northeast Research Station

Key Theme: Invasive Species

Soybean producers in Northeast Louisiana plant a majority of their crop to Roundup Ready varieties and utilize conservation tillage practices in their soybean production systems. Additionally, a number of soybean acres are rotated with cotton, leading to increasing situations where volunteer Roundup Ready cotton plants serve as weeds in subsequent Roundup Ready soybean crops. Producers need reliable, timely information on conservation tillage weed control systems and competition effects of volunteer Roundup Ready crops as weeds.

Research has focused on the identification of cost effective weed control programs that offer producers the maximum amount of success in producing soybeans in conservation tillage systems. Research has identified that with the weed spectrum that exists, co-application of herbicides is most often the most appropriate means of control. In addition, utilization of different herbicide chemistries may delay onset of weed resistance issues currently plaguing neighboring states. Research has also been initiated to measure the competitiveness of volunteer Roundup Ready cotton in a subsequent Roundup Ready soybean crop through density and timing of removal studies.

Soybean producers in Northeast Louisiana have relied on LSU AgCenter research results and incorporated multiple herbicide chemistries in their preplant conservation tillage weed control programs. Results have been compiled in extension recommendation guides utilized by producers and consultants in formulating weed control strategies. By following LSU AgCenter recommendations for co-application of herbicides, producers have managed to delay resistance in winter weeds currently documented in other states and controlled weeds in a more cost effective manner. Volunteer Roundup Ready cotton competition research has indicated that when compared to other weeds, these plants are weak competitors with Roundup Ready soybean. Results will be used to formulate control strategies in weed control recommendation guides.

Source of Funds

Sources of funding for the Soybean Weed Control Research program in Northeast Louisiana include state funds, Louisiana Soybean and Grain Research and Promotion Board, and agrichemical industry grants; Hatch

Performance and Evaluation of Commercial Corn Hybrids and Soybean Varieties in Louisiana

Steven H. Moore, Central Region, Dean Lee Research Station; Jason Bond, Don Boquet, Ernie Clawson, Mildred Deloach, Jose Liscano, Rick Mascagni and John Richard

Key Theme: Agricultural Competitiveness

Corn and soybeans were reportedly produced on over one million acres in Louisiana in 2005, amounting to over 40 per cent of the total field crop acreage in the state. One of the most important decisions Louisiana producers make is what varieties to plant. It is important for producers to get good and unbiased data on yield and agronomic performance of available commercial varieties in order to help maximize their profit.

In 2005 and in previous years, corn and soybean variety performance trials were conducted at multiple locations around the state by the Louisiana Agricultural Experiment Station. Ninety-four corn hybrids and 181 soybean varieties were entered into the test by commercial companies. Yield and agronomic performance were measured at most locations where successful tests were completed. Data were analyzed and distributed to Louisiana producers through the Louisiana Cooperative Extension Service and through publishing on the LSU AgCenter website. Varieties which met performance criteria were specifically recommended for production.

Corn and soybean variety performance data are distributed throughout the state and used to varying degrees by Louisiana producers. If one third of the corn and soybean producers in Louisiana used variety test data resulting in a 5-bushel increase, then over an estimated ten million dollars of profit increase would be realized in a typical year. Variety trials also help producers to avoid varieties that might perform poorly. The variety testing program is considered to be a valuable service conducted within the LSU AgCenter for corn and soybean growers.

Source of Funds

State and LA Soybean and Grain Research and Promotion Board

Specific Precision Ag Technologies as Components of NRCS-EQIP Projects

Keith Morris, Biological and Agricultural Engineering; Roger Leonard, Ralph Bagwell

Key Theme: Precision Agriculture

International agricultural markets have forced producers to develop production practices to improve yields while alleviating environmental degradation concerns. In response to these concerns, site-specific agriculture is paving the way for agricultural producers to be competitive in a global market. Also, the application of geospatial data and the variety of tools for managing data and information delivery is a major topic of interest and concern in agriculture, for natural resources management and application to homeland security. The demand in agriculture and natural resources management for reliable and timely information as a basis for making decisions is increasing in Louisiana. Traditionally, producers have assumed that fields are homogeneous in nature, and management practices seek to apply inputs based on what is best for the field as a whole. However, farmers also have realized that there is a natural variability that exists within every field. Precision agricultural technologies capitalize on this variability. Therefore, the overall goals of precision agriculture are to reduce inputs/costs thereby increasing net profits, and benefit the environment from precise application of nutrients and other crop production products. Precision farming is a compilation of several different technologies such as GPS sampling and mapping and GIS analysis. Perhaps the most important facet of these technologies is the capacity to enable a farmer to manage specific areas within a field by recognizing both the spatial and temporal variability with respect to soil nutrients, pest populations and crop characteristics. Many precision agriculture technologies are commercially available as separate components. Yield monitors, electronic controllers that spatially vary fertilizer applications, and site-specific soil sampling are just a few of the technologies currently available to Louisiana agricultural producers.

This project was initiated at the request of Louisiana cotton producers. The objective of the proposal was to incorporate selected precision farming technologies into the list of practices that are approved for the Environmental Quality Incentives Program (EQIP) funds available through the Natural Resource and Conservation Service (NRCS). Considerable potential for spatial data sets and allied technologies in the broader community exists in the area of precision agriculture, land use and land management, natural resources management, etc. Considerable evidence supports the use of precision agriculture technologies to reduce costly agricultural inputs without significantly affecting yields. Opportunities to reduce crop production inputs such as fertilizers, would have positive environmental benefits by reducing total quantities and overall exposure rates. In addition, these technologies can spatially restrict applications not only to those areas in fields that most require inputs, but also reduce the impact to environmentally sensitive areas. Finally, the outcome is an actual historical application record documenting those areas that received treatment. Technologies such as site-specific soil sampling and variable rate application (VRA) of fertilizers, using grid- or zone- based prescriptions, have enabled producers to apply the correct crop production solution in the right place (spatially) and at the right time (temporally). Following the use of these practices, a yield monitor is used to quantify the value of the site specific practice.

The EQIP incentive payments encourage producers to incorporate land management practices such as site-specific nutrient management, waste utilization, and irrigation water management into conventional production practices to improve crop margins and the environment. In the 21st century, producers, consultants, and agribusiness must be increasingly aware of the fact that the environment is a closed system. Applied crop inputs do not disappear; they are only redistributed. Environmental awareness must not be considered a nuisance, but a prerequisite for sustainability of farming enterprises. The general principles of many precision agricultural technologies support the goals of best management practices (BMPs) that are currently recommended to reduce environmental pollution from pesticides and fertilizers.

Source of Funds

State and Federal

Workshop: Can Organic Work for Louisiana Farmers?

Carl E. Motsenbocker, Horticulture

Key Theme: Organic Agriculture

There is great interest in sustainable agriculture, including organic production, in Louisiana and the Gulf South region. Commercial organic production and extension information, however, is limited in the region. The workshop was initiated with the goals of providing information to potential growers and extension personnel as well as bringing together those with similar interests from around the state. The topics of the workshop were selected to include the practical issues of organic certification, and farm management and marketing; issues that are critically important for expansion of organic production in the Deep South.

The workshop was held October 24-25, 2005 on the Southern University campus in Baton Rouge, La. The event attracted over 90 participants from Louisiana and the Southern US representing growers, private industry, academia, county agents, state and federal government agencies, Louisiana Master Gardeners, and students. The program evaluations and feedback were very positive and it is proposed that a similar workshop should be held on an annual basis.

The LSU AgCenter was co-host of the event with Southern University. This was the first event of its type in Louisiana and brought together varied groups from different academic institutions and locations around the state. The workshop provided information on organic certification, the basics of soil fertility and pest management, marketing and budget issues, record keeping as well as growers providing insight into their operations. The workshop culminated in a tour of a successful organic farm on the second day. It is anticipated that the workshop will be held at the LSU AgCenter Burden Research facility next year and the organic research activities being conducted there will be showcased.

Source of Funds

State, Hatch, and grant funds

Plant Derived Biodegradable Textile Materials

Ioan I Negulescu, Human Ecology; Jonathan Chen, Michael Saska, Nicolas Gill, Xiaoqun Zhang

Key Theme: New Uses for Agricultural Products

What is expected of the industry in the present time is to produce biodegradable materials, such as textile-related, while being aware of the environment. However, biodegradable polymer technology can at present only offer a limited range of materials. The biochemical industry (food, grain, sugar) is in an ideal position to build capacity for biobased biodegradable plastics at the expense of the petrochemical industry. Recent advances in research, such as the development of cost-effective methods for producing/extracting plastics from microbial and plant agents, have opened the door for an economical and ecological response to these problems. Fibers derived from annual plants, together with low quality greige cotton fibers or low value textile waste consisting predominantly of cotton fibers that could not be used directly in the apparel industry, have a high potential in the manufacturing of composite nonwovens that are quite promising materials in the insulation market.

Our investigations focused primarily on preparation and characterization of industrial nonwoven textiles based on biobased materials. The project allowed the preparation of fire retarded biodegradable nonwoven composites made of bagasse and waste cotton fibers and stabilized by bio-derived polyesters. The foreseen applications are in buildings and auto industries. Fire retarding, mechanical and thermal properties have been investigated and reported. Progress has been made also on a project aimed to preparation of biobased plasticizers for polymer industry. In view of the advances in technologies for recovering aconitic acid from sugar cane that should lower its cost and continued need within the sugar cane industry to find

alternative products, the study was undertaken to re-evaluate the industrial potential of aconitates and provide its comparison as a polymer plasticizer with citrates and phthalates. It has been shown that the activity of aconitates for plasticization of polyvinyl chloride is at least the same if not better than that of citrates and phthalates.

It is important to realize that after the extraction of the sugar the remnants of the crushed sugarcane plant (viz., bagasse) must be disposed of at a cost to the industry. The economic impact of a process for converting residual waste biomass into marketable products would be substantial and would present a much needed diversification option to the economically hard-pressed sugar industry. By using plant-derived polymers and bagasse, biodegradable industrial textiles can be made as farm-derived composite nonwovens. At the same time aconitic acid might become a valued byproduct of the sugarcane industry, too. Finding a sustainable market for the byproducts of sugarcane processing could become a rather pivotal point for the future of Louisiana industries.

Source of Funds

State, Hatch, Multi-state, LA Board of Regents, Consortium for Plant Biotechnology Research, Inc., and LSU College of Agriculture Undergraduate Research Fund

Reducing Blowdown of Containers in Commercial Nurseries

Richard Parish, Southeast Region, Hammond Research Station

Key Theme: Ornamental/Green Agriculture

Trees grown in nursery containers are very susceptible to blowdown by wind. Economic losses to nurserymen from blowdown include cost of resetting, plant damage from blowdown, plant damage from lack of irrigation while down, and loss of surface-applied fertilizer. Commercial container nurseries need an economic method to reduce or prevent blowdown.

The Hammond Research Station initiated a study in 2004 at a local container nursery involving several commercial tree restraint systems and the grower's standard that consisted of steel stakes driven through the containers into the soil. The test was conducted on three tree species in 15-gallon containers. A second test was conducted on two species of trees in 4-gallon containers involving horizontal steel rods (rebar) over the containers and staked down. All installation costs as well as number and cost of resets were monitored through the 2004 season. All of the commercial restraint systems were effective at controlling blowdown, but all were expensive relative to the grower's standard. Even when the cost of resets was considered, the grower's standard was considerably less expensive for the nursery. The horizontal rod system on small containers was not effective due to inadequate staking. In 2005, a new test was initiated on 15-gallon containers using only steel rods (longer and deeper, multiples, ribbed/rebar vs. smooth). A new test of the horizontal rod system was also initiated using longer, multiple, and ribbed stakes. These 2005 tests had to be aborted due to damage from Hurricane Katrina.

The results of this work was reported at local, state, and regional nursery conferences and has been well received by growers. This work showed growers that the simple, inexpensive grower's standard system was more economical overall than commercial restraint systems.

Source of Funds

State and Louisiana Nursery and Landscape Association

Texas Bluegrass as a Potential Cool-Season Pasture Plant for Louisiana Coastal Plain Uplands

W.D. Pitman, Central Region, Rosepine Research Station

Key Theme: Range Land/Pasture Management

The beef cattle industry in Louisiana is based on summer grazing of productive warm-season perennial grasses. Winter feed costs for purchased feeds, hay, or temporary grazing of cool-season annual forages are substantial. On droughty Coastal Plain uplands, winter annual forage options such as ryegrass increase both environmental cost on erosive sites and risk of

establishment failure or delay each year.

Forage species with potential to grow during the cool-season were assessed for adaptation and particularly ability to survive from year to year on Louisiana Coastal Plain uplands at Rosepine, Louisiana. A few individual plants of some tall fescue varieties persisted, but only Texas bluegrass grew during the cool-season and increased in stand density from year to year. Texas bluegrass formed a protective sod, produced high-quality forage during the cool season, responded to nitrogen fertilizer with increased forage growth, and gradually increased in area and density of stands during a 10-year period.

Texas bluegrass has potential to provide cool-season perennial pasture to complement existing warm-season perennial pastures for enhanced economy of production for the cow-calf industry in the Coastal Plain region of West Louisiana. On sloping upland pastures, soil erosion, risk associated with planting annual forage species each year, and winter feed costs for beef cattle herds could all potentially be reduced by the use of Texas bluegrass as a cool-season forage.

Source of Funds

State Funds; Hatch

Discovery of Asian Soybean Rust in the U.S. and Its Impact on the Soybean Industry

Raymond Schneider, Plant Pathology; G. B. Padgett

Key Theme: Invasive Species

Asian soybean rust (ASR), caused by the fungal pathogen *Phakopsora pachyrhizi*, was first reported in the early 20th century in Asia where it caused substantial yield losses. In the 1990s the disease spread to South Africa where it also devastated crops within a year of its first discovery. These areas are relatively minor producers in the world market, and the U.S. soybean industry was not particularly concerned with this disease as a threat. Then in 1999/2000, rust was found in Brazil, and within two years yield losses of more than 40% were being reported. Occurrence of this disease in South America was then considered to be a significant event in the U.S. because it could easily spread north of the Equator and eventually find its way into North America. Because of this possibility and because the pathogen could readily be used as a weapon for agro-terrorism, the pathogen was listed by the USDA as a Select Agent. Furthermore, there are no soybean varieties that are resistant to the disease. Thus, once introduced into a new area, the entire soybean industry is at risk. The industry, including seed producers, processors and pesticide manufacturers, began preparing for its eventual entry into the U.S. Research scientists and extension specialists increased their vigilance and developed reaction plans and an extensive array of educational materials related to disease diagnosis and control. Finally, on November 6, 2004, ASR was discovered by LSU AgCenter plant pathologists and confirmed by USDA scientists for the first time in North America near Baton Rouge, LA.

This discovery set off a nationwide chain of events that is still unfolding more than a year later. Fortunately, the discovery was made late in the 2004 season, which provided ample time for training sessions and for the agricultural chemical industry to ramp up their production of fungicides for possible use in 2005. Countless sessions were conducted throughout the country before the 2005 season to train county agents, growers and consultants on how to diagnose the disease. ASR is easily confused with other foliar diseases in its early stages, and this is problematic because control measures must be initiated at disease incidence levels of less than 5%. LSU AgCenter research and extension personnel developed training materials and authored a portion of a manual that was distributed nationwide. One of our major contributions to this effort was the production of about 1,500 clear acrylic resin blocks that encased symptomatic soybean leaves. These leaves were collected in South Africa during the winter of 2004, embedded in the resin, and distributed to virtually every soybean-producing county in the U.S. by the end of January 2005. These materials formed the basis of training sessions in which the actual disease could be viewed and compared to other diseases with similar symptomatology. Also, because of the fortuitous discovery of ASR late in 2004, rather than during the middle of the 2005 season, there was time to discuss and develop nationwide fungicide control strategies and tactics. These protocols were adapted for regional use, and recommended practices were posted on websites in each state. The discovery of ASR was momentous in itself, and the ensuing timely development of educational materials and flurry of training sessions are unprecedented. Also, informative websites were developed by the USDA, media outlets, and commercial interests in anticipation of the 2005 season.

Probably the most significant development arising from the original discovery of ASR in Louisiana was the establishment of sentinel plots in every soybean producing state. These plots consisted of multiple soybean maturity groups planted well in advance of normal planting times, and they were designed to provide an early warning that ASR was in the area so that

producers could activate their disease control tactics in a timely manner. This, too, was unprecedented in the annals of plant pathology. The industry was well prepared for the onset of ASR.

During the 2005 season, ASR was first found in February in a small kudzu patch near Tampa, FL. It then spread onto soybeans in the Florida panhandle, Georgia, Alabama, Mississippi and other southeastern states. Luckily, it was not detected in the major soybean producing states in the Midwest and the Ohio Valley, although presumptive spores were found in Illinois, Minnesota, Missouri and other states. It is likely that the disease did not develop outside of the southeast because of the extreme drought conditions that prevailed from the central gulf coast northward through Mississippi, Arkansas, Missouri and Illinois. The soybean industry was granted a reprieve in 2005, and this gave us time to refine our nationwide sentinel plot program and to evaluate fungicides for control of ASR in Florida and Georgia and for other foliar diseases in Louisiana. It is critically important to know which fungicides are effective against diseases other than ASR because these diseases also must be controlled. The soybean pathology program at the LSU AgCenter mounted a very extensive fungicide evaluation program and was successful in developing disease control tactics for *Cercospora* leaf blight. The soybean industry in the gulf south is now prepared to cope not only with the potentially devastating Asian soybean rust but also our recurring diseases such as *Cercospora* leaf blight.

Source of Funds

State, Hatch, Louisiana Soybean and Grain Research and Promotion Board, several agricultural chemical companies, North Central Soybean Research Program, and USDA

Development of Medium-Grain and Special Purpose Rice Varieties for Louisiana

Xueyan Sha, Southwest Region, Rice Research Station; Steve Linscombe, S. Brooks Blanche

Key Theme: Agricultural Competitiveness

Medium-grain rice is the second most popular type of rice grown in Louisiana (with long-grain rice being first). The current predominant medium-grain variety “Bengal” has been grown for over 13 years. The development of medium-grain varieties with much improved yield potential, as well as disease resistance, will certainly help the rice industry not only in Louisiana but also in the southern rice growing region. The demand for special purpose aromatic rice has increased dramatically over the past two decades. Most of the aromatic Jasmine and elongating Basmati rice in the U.S. market is imported, and the volume of such imports is increasing every year. Special purpose rice varieties that can be economically grown in Louisiana and the southern United States will fit that fast growing and high value niche market.

Field tests in 2005 included 129 transplanted F1s, 127 space-planted F2s, and 18,629 progeny rows, ranging from F3 to F8 generations. Preliminary yield tests included 69 replicated entries and 168 single plot entries. Twelve experimental lines were tested in the Uniform Regional Rice Nursery in five southern rice producing states and/or Commercial Advanced tests in eight locations across Louisiana. A total of 455 new crosses were made. Of these, long-grain, Clearfield, Liberty-linked, medium-grain, and specialty-purpose crosses accounted for 114, 128, 14, 71, and 128, respectively. Of 18,629 progeny rows planted this year, 725 rows were bulked for next year’s yield tests. Three new medium-grain experimental lines LA2028, LA2125, and LA2137 consistently showed superior yield potential, high milling yield, and ideal grain appearance and will be closely evaluated for the potential varietal release. LA2177, a Basmati-type specialty line, has continued to show promise both in yield and quality. A small increase of this line will be planted next year for a potential varietal release.

Although the advancement of rice production technology played an important role in recent yield increases, the majority of these yield increases can be attributed to new varieties developed in this program, such as Bengal. Rice growers in Louisiana and other southern states are facing new challenges, such as low prices, conservation issues, and tight regulation of pesticide use. Improved medium-grain varieties with high yield potential and pest resistance can help rice growers to increase production while reducing the cost and meeting conservation goals. Development of improved special purpose rice varieties adapted to Louisiana environmental conditions will help the Louisiana rice industry obtain a sizable portion of this fast growing, high value rice market, both domestically and internationally.

Source of Funds

State funds and Louisiana Rice Research Board grants

DNA Marker Approaches to Genetic Improvement of Rice

Herry S. Utomo, Southwest Region, Rice Research Station

Key Theme: Precision Agriculture

In a competitive agricultural market, successful crop production depends heavily on cultivar development. The availability of complete rice genome sequences and recent advancement in various molecular techniques, such as DNA markers, provide new tools that can be used to increase the efficiency of cultivar development. DNA markers can be used to improve the rate of success in selecting agronomically important traits and to speed up the breeding process. To maintain a competitive edge and continue delivering superior varieties to the rice industry, it is necessary to integrate this molecular marker technology into the breeding program.

Marker-assisted breeding (MAB) was conducted to accumulate major disease (blast) resistance genes during cultivar development. Marker selection was carried out in both the greenhouse and the field to speed up the breeding process. Selection of superior agronomic characters was conducted in the field last summer, along with marker selections. Hundreds of selected lines carrying markers for disease resistance showed superior agronomic traits and high yielding characteristics with more productive tillers, longer panicles, and bigger panicle size. These lines will be advanced in the next planting season for cultivar development. Promising lines that already possessed homozygous blast resistance alleles will be subjected to rigorous selection for other phenotypic traits and will no longer be subjected to marker screening. DNA marker detection is a laboratory-derived technique. To fully support actual breeding cycles, it was necessary to modify the technique to become easy to perform, fast, and economical. About 800 DNA samples can be extracted a day. One person can generate 400 data markers per day with an average cost of 34 cents per single marker (data point); 1 cent for DNA extraction, 29 cents for PCR reaction, and 4 cents for gel electrophoresis. The procedure developed allowed a wide-scale MAB in cultivar development.

Incorporation of marker technology improved the efficiency of the breeding program in developing rice varieties. Using currently available markers, blast resistance genes were accumulated and incorporated into conventional, Clearfield, and special purpose rice varieties. Marker approaches can increase the efficiency of the breeding program and shorten varietal development by 2 years.

Source of Funds

State and Louisiana Rice Research Board

Sweet Potato Production Studies

Arthur Q. Villordon, Northeast Region, Sweet Potato Research Station

Key Theme: Agricultural Profitability

Louisiana sweet potato growers face a variety of constraints in sustaining the economic production of sweet potatoes. Research at the Sweet Potato Research Station (SPRS) as well as other tests conducted by LSU AgCenter researchers indicate that "Beauregard" has the potential to yield 400-800 bushels/acre of the economically important US#1 grade sweet potatoes. However, the reported parish and state average yields have generally been lower by as much as 25-50%. The goal of the production-oriented research at the SPRS is to identify practices and efficiencies that will assist growers in attaining sustainable economic yields.

The production-oriented research at SPRS focused on the following areas: varietal/mericlone uniformity and stability (VMUS), irrigation, transplant quality and survivability, and fertilizer practices. The VMUS studies specifically address

mericlone performance and yield stability issues. The conversion into a virus-tested program has led to the emergence of `Beauregard` mericlones. This study answers this specific question: Which mericlone does better in a given growing environment? The irrigation study seeks to answer questions about when and how much to irrigate.

The varietal/mericlone uniformity and stability study confirms that B63, a mericlone selected under Louisiana growing conditions, continues to yield more than B14 (selected under North Carolina growing conditions). In certain soil types (light loamy or sandy) however, B14 has the tendency to produce roots that possess better shape attributes compared to B63. On the other hand, the study also confirms that B14 tends to develop short and rounded roots in heavier soils (silt loam or similar). Thus some producers grow both B63 and B14-based seedstock while others grow exclusively B14. We have also identified a mericlone (H3-5) that can potentially be planted "late" (late June to early July plantings). The irrigation studies strongly suggest that 15-20 in. of total rainfall and supplemental irrigation is required to produce 400 to 525 bushels per acre of US#1 storage roots in "Beauregard." This translates to about 1 inch per week of rainfall or supplemental irrigation during a growing season of 115 days. During dry periods, a grower can schedule irrigation applications based on this benchmark, potentially reducing over-irrigation and contribute to overall efficiency in the use of production inputs. We know of one grower who is evaluating the use of H3-5 for late-season planting. This same grower is also using the data from our irrigation study in scheduling his irrigation applications.

Source of Funds

State and Louisiana Sweet Potato Commission

Development of High Protein Rice

Ida Wenefrida, Southwest Region, Rice Research Station

Key Theme: Biotechnology

Almost half of rice produced in the United States is exported. Long-grain rice is the most commonly grown and traded type of rice in the world. U.S. rice commands a premium in many export markets. The amount of rice traded in the world is very low, averaging less than 5%. The market highly fluctuates due to variations in climatic conditions that determine the success or failure of rice production in some major rice consuming countries. Among competing countries in the export markets are Thailand, Vietnam, India, and Pakistan. Improved nutritional values, such as high protein content, will provide U.S. rice industry with competitive advantage against its competitors. This added value to the already premium quality will secure its premium price.

A total of 612 lines have been recovered from various in vitro screenings and other methods aimed to improve protein or lysine content in rice. These lines were planted in the field last summer with a seeding rate of approximately 50 seeds per a 6-foot row. Nitrogen fertilization followed the recommended rate. Herbicides and pesticides were used as needed to control weeds and diseases. About 200 lines exhibited partial sterility, ranging from mild to severe. The remaining lines, however, were fertile with grain appearance and grain production comparable with their respective original parental lines from which they were derived. A sample of panicles from an individual plant has been collected and will be used in total protein content analysis and amino acid profiling. Out of 163 lines that have been evaluated, 129 lines showed a significant increase in their total crude protein content, ranging from 5 to 96%. Lines with the highest protein content were fertile, with grain morphology closely resembling the parental line. Eight high protein lines were selected and being grown in the Puerto Rico winter nursery this fall.

High protein rice will directly benefit the whole industry, from farmers to exporters. Improved nutritional quality of rice will strengthen the competitive value of U.S. rice. Since rice is a staple food for more than 3 billion people, high protein/lysine rice will not only benefit the rice industry economically but also bring positive implications to the health of a great portion of the world's population. Since rice is an excellent source of complex carbohydrate, high protein rice may become more appealing to the beer and cereal industry and, therefore, will create new domestic and international demands for U.S. rice.

Source of Funds

State funds

Sugarcane Rind as Alternative Raw Material for Strand Composite Manufacturing

Quinglin Wu, Renewable Natural Resources, Rich Vlosky, Michael E. Salassi, Benjamin L. Legendre

Key Theme: Adding Value to New and Old Agricultural Products

Structural wood-based composites such as oriented strandboard (OSB) are gaining increased use in both residential and commercial applications. With continuing production growth and decreasing wood supply, the cost of wood fibers used to manufacture OSB has more than doubled in the past 20 years. Thus, development of alternative material for OSB production is of great practical significance. Comrind, a useful product from sugarcane processing, is one of the potential raw materials for this purpose. Comrind represents high-quality fibers in the outer layer of the cane stalk, which is approximately 50% of the dry weight of the stalk. Comrind can be extracted at a commercial production scale through a cane separation process.

This study was conducted 1) to establish technical information for producing mixed comrind and wood composites through laboratory testing; and 2) to provide an economic feasibility analysis of the process.

The result suggests that well-processed comrind strands have desired strength and swelling properties for OSB manufacturing. These strands can be combined with wood strands in both face and/or core layers to make satisfactory OSB products at the competitive resin loading level. Feasibility analysis of the cane separation process also shows favorable economic benefits from the extracted components of the cane stalks. The use of the comrind for structural composite manufacturing can add significant value for the sugarcane processing and, at the same time, to help lower raw material and manufacturing costs of wood-based strand composites.

Source of Funds

State, American Sugarcane League, and Louisiana Department of Economic Development

Intensive Management Practices Improve Yields and Economic Success of Loblolly Pine Forests

Michael Blazier, North Central Region, Hill Farm Research Station

Key Theme: Forest Resource Management

Pine forests of the southeastern United States currently produce nearly 25% of the world's forest products. Timber production is vital to the rural economies of these states; for example, forests of Louisiana constitute its most valuable agricultural crop. This prominence as a timber-producing region is being challenged by the rise of short-rotation timber production in Central and South America as well as the loss of forestland capable of producing forest products via urban sprawl and forest fragmentation. As such, it is vital to increase productivity in forests in which timber production is a primary objective with intensive management practices that promote crop tree growth. The economic feasibility associated with intensive management practices must also be explored because some costs (labor, equipment, fuel) are rising while the timber market is becoming more volatile.

A series of studies were conducted at the LSU AgCenter Hill Farm Research Station within research project LAB03469 to explore the loblolly pine plantation yields and rates of return associated with intensive management practices, specifically: (1) seedling type (container vs. bareroot), (2) planting density, (3) underbrush suppression, (4) thinning harvest intensity, and (5) fertilization.

The information gained by this research may bolster the success of the forest products industry in the southeastern United States by improving the management skills of forest owners and managers. These studies provide evidence that adopting the planting of container seedlings and reducing the typical number of crop trees planted will improve the economic success of managing loblolly pine forests. Planting container seedlings increased timber yields by 20% and rates of return by 10% relative to conventional bareroot seedlings; this increase in yield may also shorten rotations by approximately 5 years. Keeping the number of trees per forest relatively low by planting 740 to 1000 trees per hectare (approximately 40% lower than conventional planting protocol) and partially harvesting plantations between ages 15 to 19 to residual densities of 494 to

247 trees per hectare increased returns on investment by 30% relative to typical forest management strategies. Fertilization with a nitrogen- and phosphorus-containing fertilizer was effective in promoting tree growth and economic returns, particularly when done 3 years after a thinning harvest. Growth rates of fertilized loblolly pine were 30% greater than that of unfertilized loblolly pine; this growth response was great enough to pay for the cost of fertilization within 3 years. Rotation lengths may be shortened by as much as 5 years by fertilization, which will allow forest owners to recover the costs of establishing and managing loblolly pine forests sooner.

Source of Funds

State, Hatch, Weyerhaeuser

Goal 2 – Extension Project Summaries

Critical Regulatory Compliance Support for Louisiana Meat & Poultry and Seafood Processors

Joseph Bankston, Food Science

Key Theme: Food Security

Louisiana has a multitude of meat, poultry and seafood processing firms which must produce a safe product and meet the requirements of regulatory agencies. These firms are predominately small employers. Compliance can be difficult for these small processors, even when they are producing a safe product, because of their limited resources, changing regulatory requirements and regulatory language which can often be confusing. This is particularly true if the processor produces either a non-standard product or utilizes unique equipment or methods to produce the product. This also results in a lack of applicable guidance documents from regulatory agencies who formulate their guidance material with more standard products and processes in mind. While the variety and uniqueness of Louisiana's culinary products and methods present problems in meeting regulatory requirements, this same variety and uniqueness contributes greatly to Louisiana's reputation for good food and the tourist sector of its economy.

Food Science Extension faculty conducted a multi-faceted program which included formal classes, meetings and individual assistance. Formal classes included two three-day Seafood HACCP, a three-day Better Process Control School, and a three-day Acidified Food School. All of these classes are required by either FDA, USDA or both. In addition, a basic retail HACCP class was developed and three sessions of the one-day class were taught at the request of the Louisiana Department of Health and Hospitals and one session at the request of Allen Canning. The quarterly meat and poultry processors roundtable, an informal meeting of processors, regulators and academics to discuss food safety and regulation issues, was continued. The third annual Louisiana Food Processors Conference (LAFPC) was held and featured breakout sessions covering various regulatory compliance issues. Extension faculty provided individual assistance to processors on processing methods, HACCP compliance, sanitation; and, particularly for individuals considering entering the food processing business, information on regulatory compliance. Extension faculty also served as processing authorities rendering opinions on the status of food products that had not met the required parameters under HACCP plans.

Approximately 100 individuals received required training in food safety. The roundtables and the LAFPC advanced the integration of regulatory requirements into existing operations without placing undue hardships on the processors. The roundtables provided an informal venue in which regulators and processors were able to exchange ideas and information. LAFPC breakout sessions resulted in improved understanding of the HACCP process and regulatory requirements. Individual site visits included approximately 10 instances in which withdrawal of inspection was pending because of either inadequate HACCP plans (including hazard analysis) or failure to properly carry out the HACCP plan. As a result of the visits and resulting corrective actions of the processors, all pending withdrawals of inspections, except one, were canceled. In that one instance, the processor voluntarily withdrew from federal inspection in favor of state inspection. Processors that have had inspection withdrawn may not process. In addition, Extension faculty assisted a processor who had had inspection withdrawn because of an inadequate HACCP plan, failure to follow the existing HACCP plan and sanitation issues. Approximately a week was spent working with this processor in assisting him understand the HACCP system, and in revising his HACCP plan. As a result, the processor successfully revised his operation and is currently operating. (Regulatory officials indicate that this processor is doing well and now understands and implements the HACCP concept and produces a safe product.) Acting as process authorities, extension faculty evaluated approximately 20 instances in which a processors HACCP plan prescribed parameters were not met. In approximately 2/3 of these instances, the findings were that the product had not been adulterated by the deviation. Because of these analyses, these products were allowed to enter commerce. In the other 1/3 of evaluations, processing data was not sufficient to preclude adulteration and thus the product was destroyed.

Source of Funds

State and Louisiana Sea Grant

Scope of Impact

Multi-state: 90% of the program is a result of federal regulations and directives, and multi-state programs such as shrimp quality. 1.44 FTEs were devoted to the seafood products effort, with an FTE valued at \$80,136. Therefore, the dollar value of the multi-state effort was \$103,856.

Multi-function: Multi-function (integrated extension-research) efforts are estimated at 16% of the total number of FTEs expended in the program. These efforts included research-extension collaboration in agent training, formulation of recommendations and applied research. The dollar value of the multi-function effort is \$18463. (1.44 FTEs x \$80,136 per FTE x .16).

Food Safety

Elizabeth S. Reames, Human Ecology

Key Theme: Food Safety

According to Centers for Disease Control (CDC) estimates, the toll from foodborne illness is 76 million illnesses, 325,000 hospitalizations and 5,000 deaths in the United States each year. Those most at risk of serious harm are very young children, elderly people and people with immune systems compromised by HIV, cancer treatment, diabetes, lupus and other disorders. Pregnant women are also at risk; some foodborne disease can cause miscarriages. Research shows that proper food handling and preparation can prevent 90 to 95 percent of foodborne illnesses. Recommended food safety practices to prevent foodborne illness include cooking foods thoroughly, not allowing raw meats to contaminate other foods and washing hands.

In 2005, LSU AgCenter Extension agents and specialists provided food safety information to Louisiana citizens, childcare providers and food handlers throughout the year, with increased emphasis on food safety issues related to power outages and flooding following hurricanes Katrina and Rita. Food safety information has been provided to Louisiana residents by one FCS nutrition specialist and 38 Extension agents who completed the National Restaurant Association SERVSAFE safe food handler program and have been registered as food safety instructors with the Louisiana Department of Health and Hospitals, Office of Public Health and the National Restaurant Association. Extension agents continued to conduct workshops using the Serving Food Safely curriculum for food service organizations, and the curriculum was included in the Disaster Recovery resource packet.

In FY 05, an estimated 100,000 Louisiana consumers and food handlers gained knowledge about recommended food handling practices from attendance at community and state food safety educational presentations; through mass media efforts, including news articles, radio & TV, and circular letters; and through the Safe Food Handler training program presented to food handlers at fairs, festivals, delis, schools, day care, nursing homes and other food service establishments. More than 100 New Orleans Jazz and Heritage food service personnel participated in a safe food handler training. Serving Food Safely workshops were conducted for approximately 500 food recovery agency personnel and volunteers. Ninety-eight percent of participants demonstrated improved knowledge of recommended food safety practices based on pre- and posttest results. Three oyster food safety public service announcements, developed by nutrition and food science specialists, were aired by radio and television stations in the state.

Source of Funds

Smith-Lever 3b, c; Family Nutrition Program - funded by USDA, FNS, through the Louisiana Dept. of Social Services, Food Stamp Program; USDA CSREES Restricted Fund S/L

Scope of Impact

Multi-state: In FY 2005, an estimated 8.9 FTEs were spent on food safety education. Based on an FTE cost of \$80,136, the total cost of the program was \$713,210.40. Of this effort, 40% is involved in the acquisition of sharing of resources and information through multi-state efforts, valued at \$285,284.16 (8.9 FTEs x \$80,136 per FTE x .40).

Multi-function: Contributions from research counterparts included assistance in determining program needs through focus

groups, meetings, development of food safety education materials, agent training and presentations for clientele. It is estimated that 30% of FTE allocations to this program is attributable to multi-function work. The dollar equivalent of multi-function work is \$213,963 (8.9 FTEs x \$80,136 per FTE x .30).

Agricultural Vulnerability Assessments and Mitigation

Patricia Skinner, Human Ecology

Key Theme: Food Security

Critical Infrastructures are systems and assets so vital to the United States that the incapacity or destruction of such systems and assets would have a debilitating impact on security, national economic security, national public health or safety, or any combination of these matters. The fundamental need for food, as well as great public sensitivity to food safety makes assuring the security of food production and processing a high priority. Agriculture and Food is a Sector to be protected in the National Strategy for the Physical Protection of Critical Infrastructures and Key Theme Assets (February 2003). States and counties were directed by the federal government to conduct vulnerability assessments for critical infrastructure - including agriculture - and to develop plans for reducing that vulnerability. Funding for training and equipment would be contingent on successful completion of these vulnerability assessments.

The Louisiana Cooperative Extension Service, in partnership with the Louisiana Department of Agriculture and Forestry (LDAF), provided resources and participated in meetings to identify the top 20 agricultural enterprises in each parish, based on their economic significance and their vulnerability to terrorist attack. LDAF was funded under a contract from the Louisiana Office of Homeland Security and Emergency Preparedness to conduct the assessments, establish a framework for state and parish agricultural responses teams, and identify training needs. The vulnerability assessments were completed using specific homeland security protocols and forms, so they could be entered into the national system. The AgCenter disaster programs coordinator worked directly with LDAF & Public Practice Veterinarian in developing a plan for conducting the assessments and organizing Extension participation. Extension agents were involved in every parish assessment across the state. Other participants included representatives of Farm Services Agency, the Natural Resources Conservation Service and the parish emergency managers.

The national vulnerability assessment of critical infrastructure was handed down to the states directly to the Governor & designated representative for homeland security. In Louisiana, homeland security went to the Office of Emergency Preparedness, now the Office of Homeland Security and Emergency Preparedness. OHSEP works directly with the parish emergency management community. Completely separate from the parish emergency management system, USDA has County Emergency Boards, which manage agricultural economic recovery from disasters. Since neither of these had the complete range of knowledge and skill needed to respond to a major agrosecurity incident (outbreak of a foreign animal or plant disease), they needed to be brought together. The primary benefit of the Ag Vulnerability Assessment project was establishing a relationship between parish emergency managers and county emergency boards. With the Agricultural Vulnerability Assessments having been completed, the state is ready to form a State and Parish Agricultural Response Teams (SART), of which Ag Extension educators will be a part. By completing the assessment, LDAF is eligible to apply for homeland security funding for training and equipping the members of the team. The County Agent brought local knowledge of the agricultural industries and commodity producers to the process. Extension participation was essential to the success of the Ag Vulnerability Assessment project. The LSU AgCenter makes a difference to agrosecurity in Louisiana and nationally not only through its direct interaction with producers and agribusiness, but by contributing to interagency efforts such as these and by using its resources to support and enhance the efforts of others in the agricultural industry.

Source of Funds

No external funding was provided to the AgCenter. LDAF received homeland security grant funding from the Louisiana Office of Homeland Security and Emergency Preparedness.

Goal 2 – Research Project Summaries

Antimicrobial Effect of Cetylpyridinium Chloride Against *Listeria monocytogenes* Growth on the Surface of Raw and Cooked Retail Shrimp

Marlene Janes, Food Science; Tracie Dupard, Richelle L. Beverly, Jon Bell

Key Theme: Food Safety

Listeria monocytogenes is currently one of the major foodborne pathogens of concern for the seafood industry. It has been isolated from soil, sewage, dead vegetative matter, aquatic environments, fecal material, fish, crustaceans, and domesticated animals. In some seafood environments *L. monocytogenes* has been isolated from drains, floors, condensate lines, crates, door handles, and conveyor belts. Due to its biological characteristics, resistant to high levels of salt, freezing, drying, pH levels of 4.1 and above, as well as refrigerated temperatures and heat, *L. monocytogenes* has been difficult to control in food products (Ray 2001). Cetylpyridinium Chloride (CPC) has been shown to have antimicrobial effects in decontaminating raw produce, fresh beef, and poultry. The concentration of CPC that would be effective for the removal/destruction of *L. monocytogenes* from the surfaces of shelled or unshelled shrimp that was either raw or cooked was investigated.

Shrimp (5 g) were dipped into a 24 h culture of *L. monocytogenes* (decimally diluted in PBS) for 1 min to yield about 7.0 log CFU/g then allowed to dry for 1 hour. The shrimp samples were treated with different concentrations of CPC (0.05, 0.1, 0.2, 0.4, 0.6, 0.8 or 1.0%) solutions for 1 min, with or without a water rinse for 1 min. The samples were bagged, stored at 4 degrees C for 24 hours, and the log CFU/g determined after plating on Oxford selective media. All CPC concentrations with a water rinse reduced *L. monocytogenes* counts on the surface of cooked shrimp by about 2.5 log CFU/g. Conversely, without a water rinse *L. monocytogenes* counts on the surface of cooked shrimp were reduced 3.0 log CFU/g with 0.1, 0.2 or 0.4% CPC, 5.0 log CFU/g with 0.6% CPC, 6.0 log CFU/g with 0.8% CPC and 7.0 log CFU/g with 1.0% CPC as compared to the control non-treated samples.

To date, the use of CPC has been approved by the FDA at a level not to exceed 0.3 grams of CPC and should also contain propylene glycol at a concentration of 1.5 times that of the CPC per pound of raw poultry carcass. Although the use of CPC as an antimicrobial agent for seafood has not been approved by the FDA, we have shown in this study the strong potential of cetylpyridinium chloride as a washing solution to reduce *L. monocytogenes* on the surface of raw and cooked shrimp.

Source of Funds

Hatch and State

Goal 3 – Extension Program Reports

Food Stamp Nutrition Education Program in Louisiana

Annrose Guarino, Human Ecology; Heli Roy, Catrinel Stanciu, Emily Whelan

Key Theme: Human Nutrition

Conditions of poverty are significant in Louisiana. In 1999, 19.6% of Louisiana's population lived in poverty, and the rate is highest among young families and female-headed households. Children younger than 18 are Louisiana's poorest age group and 26.3% live in poverty. Poverty makes it difficult for families to meet basic human needs for food and good health. Also, 37.1% of people 65 years and over live below 150% of poverty rate. Research shows that rates of overweight, obesity and other chronic diseases are higher among low-income, low-literacy populations than among other groups. According to the Office of Public Health, over half of Louisiana deaths are due to heart disease and cancer, illnesses with risk factors that we can control through changes in our behaviors (e.g., improved nutrition).

Extension Family and Consumer Science agents covering fifty-five (55) parishes and twenty-five (25) nutrition educators in targeted parishes conduct Family Nutrition Programs (FNP) to assist food stamp recipients and potential food stamp recipients improve their diets and budget their food dollar. All FNP parishes have been actively involved in community education and outreach programs. Twenty-five parishes have a paraprofessional to help conduct the FNP program. The main nutrition topics covered by FNP included the Food Guide Pyramid, Dietary Guidelines for Americans, fruits and vegetables, fats, physical activity, healthy weight, food safety, food buying/budgeting, and gardening education. A monthly newsletter covered different nutrition topics: physical activity, fats, nutritional content and benefits of different foods, and commodity foods. Reported sites for the FNP outreach program included OFS, commodity distribution sites, WIC, eligible low income schools, and Head Start centers. FNP program faculty received a list of parish Food Stamp recipients. The 55 FNP parishes provided direct contact with selected Food Stamp recipients with telephone numbers and current address to offer access to the program and to collect input.

Over 464,992 people in 55 parishes were reached with information on nutrition, diets and health, food safety, gardening education, and food buying through the FNP program (183,473 direct contacts and 281,519 indirect contacts) The most significant achievement was collaboration with eligible schools, reaching and educating low-income children about nutrition, healthy eating habits, and importance of regular physical activity. Agents and nutrition educators conducted programs in eligible schools, for over 87,287 youth (pre-K -12th grade) in FNP schools statewide. Impact statement data from parishes showed that after participating in FNP, the majority of individuals indicated that they learned about several nutrition and health-related concepts. More specifically, over three-fourths of those surveyed indicated that they learned to read the nutrition labels to make health food choices and over 90% to use the food guide pyramid when planning meals for the family. Additionally, over 80% of individuals surveyed indicated that they learned to choose a diet abundant in fruits and vegetables, with at least 2 servings of low-fat dairy products, moderate in sugar, and lower in salt after participating in FNP. FNP program evaluation exit surveys indicated: 81% of those tested will choose a diet moderate in sugar; 89% of those tested will reduce the number of calories they eat from fat to less than 30%. 85% of those tested will wash hands with hot, soapy water before handling food.

Source of Funds

State; Smith-Lever 3 b,c

EFNEP Teaches Middle School Students to Take Charge of Their Health

Bertina M. McGhee, Crescent Region, Orleans Parish Nutrition Educators; Erica Simon, Lillie; Mae Stokes, and Shercon Tasker

Key Theme: Health Care

The problem of childhood obesity continues to escalate in Louisiana and the nation. One-third of Louisiana's children are classified as overweight or obese. Studies have proven that overweight and obesity in youth increase the risk of becoming overweight adults and developing chronic diseases that are associated with being overweight. The goal of this program was to increase the awareness of the importance of developing healthy eating habits and the benefits of physical activity to students of Martin Luther King Middle School in Orleans Parish.

A series of nutrition lessons were presented by an EFNEP Agent and (3) Nutrition Educators from the Take Charge of Health curriculum, developed for adolescent audiences by the Wellness Corporation. The lessons were taught each week for eight weeks to six 7th and 8th grade health and P. E. classes. 478 students were given a pre-test to determine their level of nutrition knowledge and eating behavior prior to teaching the nutrition lessons. At the conclusion of the eight week lessons, students were given a post-test to determine knowledge gained and possible changes in behavior. Students also participated in a fun & fitness day at the end of the eight week program, consisting of games, that reinforced the nutrition information presented in the classes; physical activity challenges; and tasting several healthy snack recipes including foods from each of the food groups discussed.

Following eight "Take Charge of Your Health" nutrition lessons, 467 Martin Luther King Middle School students in Orleans Parish were surveyed. After receiving these lessons, 42% (196) reported that they now practice healthy eating behaviors, compared to the 32% (153) of 478 surveyed prior to receiving the lessons. Another 39% (182) indicated they now eat a variety foods compared to 33% (158) pre-tested. Students post-tested reported that 44% (205) of them now make healthier food selections compared to 36% (172) prior to the lessons being taught. More than 50% (238) indicated they gained knowledge compared to the 38% (177) pre-tested. Both the students and P.E. teachers benefited from the nutrition lessons taught by the Orleans Parish Extension staff. The teachers reported that they now understand how to read food labels using the % Daily Value. They were also observed participating in some of the physical activity challenges and tasting the nutritious food items at the Fun Fitness Day. The principal reported that this was a fun and beneficial event for the students and would like to involve more parents in the next Fun Fitness Day.

Source of Funds

State; Smith-Lever 3 b, c

Portions Healthy Weight Program

Elizabeth Reames, Human Ecology

Key Theme: Human Nutrition

Louisiana's obesity rate is one of the highest in the nation, with nearly one-third of Louisiana adults being obese (BMI > 29.9). Louisiana leads the nation in childhood obesity and almost one in three school-aged children is overweight. Obesity leads to increased risk of many medical conditions including heart disease, type 2 diabetes, stroke, hypertension, gall bladder problems, sleep apnea, osteoarthritis, infertility (women) and high blood cholesterol levels, as well as breast, prostate and colon cancer. Obese individuals are 90% more likely to have type 2 diabetes and 50% more likely to have high blood pressure than those who are not obese. In children, obesity leads to high blood cholesterol levels, high blood pressure, type 2 diabetes, asthma and early maturation. Obesity related diseases account for nearly half of Louisiana's healthcare budget. The state has the highest average yearly reimbursement per recipient for chronic illnesses associated with high-risk behavior.

The Portions Healthy Weight curriculum, a nine-lesson curriculum emphasizing healthy lifestyles, was developed to address Louisiana's growing obesity problem by a team of five LSU AgCenter FCS nutrition specialization agents and a nutrition specialist. Portions was launched in spring 2001. Currently, Portions workshops have been conducted in approximately one-third of Louisiana's parishes for more than 1300 people. PARS reports indicate that Portions workshops were conducted in 10 parishes in 2005 for approximately 250 people.

In 2005, Extension agents conducting Portions workshops reported that most participants indicated the intent to make lifestyle changes related to achieving or maintaining a healthy weight. One agent reported that on follow-up two years after participation in a Portions workshop, 11 people continued to follow recommended lifestyle changes and to maintain their weight status after losing from 4 to 8 pounds during the program. Initial data from Portions participants showed that ninety-seven percent of Portions Program participants indicated that they had made at least one recommended lifestyle change. Most reported learning the importance of moderate exercise most days of the week, but many cited finding time as an obstacle to regular exercise. Many participants reported starting a walking or other exercise program. Some groups formed walking clubs or asked for a fitness class. Although the number of pounds lost was not emphasized, a healthy weight loss of an average of 4-8 pounds was experienced by participants during the 9-week program statewide. But more importantly, over 90 percent of the participants (where beginning and ending health assessment were taken) improved their cholesterol, blood pressure or blood glucose levels. Comments from participants about what they learned included: "My portion sizes of food have been much too large"; "I've been eating too much saturated fat"; "I've been skipping meals to lose weight." FCS Agents reported a change in the participant's attitudes and sense of well-being after the nine weeks with comments like "I feel so much better." Participants reported that the program helped them break habits that had led to overeating and not being physically active. The discussion on fad diets revealed that participants had tried numerous fad diets. Observations by FCS Agents showed knowledge gained by participants and a resolve never to go on an unhealthy fad diet again.

Source of Funds

Family Nutrition Program (FNP) and State funds

Scope of Impact

Multi-state: In FY 2005, an 75.83 FTEs were spent on nutrition and health education. Based on an FTE cost of \$80,136, the total cost of the program was \$6,076,712.80. Of this effort, 40% is involved in the acquisition of sharing of resources and information through multi-state efforts, valued at \$2,430,685.10 (75.83 FTEs x \$80,136 per FTE x .40).

Multi-function: Contributions from research counterparts included assistance in determining program needs through focus groups, meetings, development of nutrition education materials, agent training and presentations for clientele. It is estimated that 30% of FTE allocations to this program is attributable to multi-function work. The dollar equivalent of multi-function work is \$1,823,013.80 (75.83 FTEs x \$80,136 per FTE x .30).

Expanded Food and Nutrition Education Program

Heli Roy, Human Ecology; Sharman Charles, Cathryn Robinson, Connie Aclin, Carolyn Robinson, Bertea Rogers, Kathy Mauthe, Bertina McGhee, Kay Parnell

Key Theme: Human Nutrition

Louisiana's poverty rate is 19.2% ; the second highest rate in the nation, and the highest in the South according to the U.S. Census Bureau. In addition more than 26% of Louisiana children live in poverty and about ten percent of the babies born in Louisiana are low birth weight. Louisiana also has the highest percentage in the nation of families with children headed by a single parent --35%. (2000 Kids Count Data Book). Single parent and impoverished families are at high risk for nutritional deficiencies and inadequate diets leading to high incidence of chronic diseases such as obesity and diabetes.

The Expanded Food and Nutrition Education Program (EFNEP) is designed to assist limited resource audiences in acquiring the knowledge, skills, attitudes, and changed-behavior necessary for nutritionally sound diets, and to contribute to their personal development and the improvement of the total family diet and nutritional well-being through an experiential learning process. EFNEP is delivered as a series of 10-12 or more lessons, over a year, by paraprofessionals and volunteers. EFNEP provides nutrition education at schools as an enrichment of the curriculum, in after-school care programs and through 4-H EFNEP clubs, day camps, community centers, and neighborhood groups. In addition to lessons on nutrition, food preparation, and food safety, youth topics may also include fitness, avoidance of substance abuse, and other health-related topics. County extension home economists provide on-the-job training and supervise paraprofessionals and volunteers who teach EFNEP. Paraprofessionals recruit and enroll families. Delivery methods include one-to-one situations; group classes, mailings and telephone teaching. Volunteers assist in delivering the lessons to groups of adults and youth.

In Louisiana, 10 parishes participated in the EFNEP program in 2005, with 33 nutrition educators teaching 12 nutrition lessons to 1,897 low income families, and 7,568 youth. 247 volunteers assisted in delivering the program. Tests on behavior change indicate that there was a 65% improvement in individuals in planning meals, 58% improved in comparing prices, 50% improved in being able to provide meals throughout the month, 61% improved in using a grocery list, 59% improved in serving healthier foods, 40% indicated they would use less salt, 72% indicated they would now read labels, and 49% improved in serving and having breakfast. Food safety practices improved as well. Sixty-one percent now report thawing food correctly and 45% improved in storing food safely.

Source of Funds

State; Smith-Lever 3 b, c

Scope of Impact

Multi-state: The EFNEP Coordinator and Technology Support Associate participated in monthly conference calls with southern region EFNEP coordinators from Texas, Arkansas, Mississippi, Alabama, Florida, South Carolina, North Carolina, Oklahoma, Kentucky, Georgia, Tennessee, Virginia and Puerto Rico. They attended regional, and national EFNEP coordinators meetings on planning the program, sharing educational materials, presentation of curricula and evaluation of impact of the program. The Texas Agricultural Service and other southern region Extension services participate in EATSMART curriculum, a certification program for EFNEP paraprofessionals. The state EFNEP Coordinator and Field Coordinator developed CCEP modules to be used for agent training together with other southern states. The multi-state effort was \$162,275. (6.75 FTEs x \$80,136 x .30)

Multi-function: The LSU School of Human Ecology has collaborated with EFNEP to develop evaluation protocols, a nutrition research teaching nutrition lab, and preceptor supervision for dietetic interns. Contributions from research counterparts included assistance in determining program needs through focus groups, meetings, development of nutrition education materials, agent training and presentations for clientele. They were also instrumental in developing a certification program for the nutrition educators. It is estimated that 30% of FTEs (\$80,136) allocated to this program is attributable to multi-function work. The dollar equivalent of multi-function work is \$144,244 (6 FTEs x \$80,136 per FTE x .30).

Goal 3 – Research Program Reports

Probiotic Dairy Foods for Improved Health of the Human Gastrointestinal Tract

Kayanush J. Aryana, Dairy Science

Key Theme: Human Health

Our gastrointestinal (GI) tract is home to good (beneficial) and bad (putrid) bacteria. There are more than 400 different species of bacteria weighing one and a half kilograms (3 pounds) in the GI tract. This is a large quantity of working bacteria. Low levels of friendly bacteria in the GI tract are associated with unhealthy conditions such as strep throat, acne, eczema, premature ageing, migraines, urinary tract infections, yeast infections, immunosuppression, bloating, bowel wind etc.. The good bacteria provide several health benefits, namely; improve the immune system and lactose digestion; reduce side effects of antibiotics; prevent intestinal infections and cancers; alleviate bowel wind, bloating, belching; and protect us against harmful bacteria, fungi and viruses. Good bacteria (probiotics) are sold in Good bacteria (*Lactobacillus acidophilus*, *Bifidobacterium bifidus*, and *Lactobacillus casei*), incorporated in ice cream mix at the usage levels of 0, 0.002, 0.02 and 0.2% v/v ice cream mix. Characteristics studied on the ice cream mixes were viscosity and pH. Color ($L^*a^*b^*$), meltdown time for first 15 ml, meltdown ml after 60 minutes, sensory flavor, body and texture of the ice cream were determined.

Inulin, a prebiotic (food for the good bacteria) of various chain lengths small, medium and long were incorporated in the manufacture of yogurt with the above mentioned probiotic (good) bacteria. Yogurt attributes studied were syneresis (released serum), viscosity, pH, color ($L^*a^*b^*$), flavor, appearance and body texture. The good bacteria did not alter the color and meltdown of ice cream, but lowered the ice cream mix viscosity and pH. These lower values of viscosity and pH were within acceptable limits. Good bacteria can be used in the manufacture of ice creams without adversely affecting its quality.

The use of long chain prebiotic resulted in low syneresis which is desirable. Yogurts with short chain prebiotic had a significantly lower pH than the control but had comparable flavor scores. Prebiotic inulin of various chain lengths did not affect apparent viscosity, $L^*a^*b^*$ and appearance of yogurts manufactured with the good bacteria. Food for the good bacteria can be incorporated along with good bacteria in the manufacture of yogurts having health benefits over and above the normal.

Consumers are becoming increasingly aware about the health implications of what they eat. This research indicates that quality characteristics of ice creams and yogurts are not compromised by the incorporation of good bacteria.

Source of Funds

State and Hatch

Targeted Treatments for Human Prostatic and Breast Cancer

Fred M. Enright, Veterinary Science; William Hansel, Carola Leuschner

Key Theme: Human Health

Throughout the world, prostatic cancer in men and breast cancer in women are among the most common causes of cancer related deaths. Following spread of these cancers from their primary sites, current therapy is largely ineffective. Both prostatic and breast cancer cells in at least 20% to as many as 40% of these patients express functional receptors for either or both gonadotropin-releasing hormone and luteinizing hormone.

A research team at the LSU Agricultural Center and Pennington Biomedical Research Center has discovered and tested several novel cancer treatments which use the receptors on both breast and prostatic cancer cells to target the cancer destroying compounds to both primary and metastatic cancers. These compounds are composed of the protein hormone or a portion of the protein hormone linked to a membrane disrupting peptide. Importantly, these compounds cause little side effect other than temporary loss of fertility.

The compounds hold great promise for effectively treating both early and advanced stages of prostatic and breast cancer without serious side effects. A startup Louisiana-based biotechnology company has been formed to further develop these compounds. Such diversification of businesses in the state is a necessary element in enhancing economic development in our region.

Source of Funds

State, private foundations, Department of Defense, private investors.

Use of Non-digestible, Fermentable Resistant Starch in the Fight Against Obesity

Michael J. Keenan, Human Ecology; Jun Zhou, Maren Hegsted, Kathy McCutcheon, Anne Raggio, Richard Tulley, H. Gale Bateman, Roy Martin

Key Theme: Human Health

Overweight and obesity have dramatically increased over the last 20 years and are still increasing. These conditions are associated with increased risks for type 2 diabetes, coronary heart disease and some types of cancer. Americans in general are consuming too much energy in relation to their energy expenditure and thus are in positive energy balance. Our research group is focusing on trying to reduce energy consumption and reduce body fat. Food companies have developed raw products such as cornstarches that are high in resistant starches. One type of resistant cornstarch is high in amylose (as opposed to amylopectin) and is in compact starch granules that are resistant to digestion by the enzyme amylase in the small intestine and is fermented by bacteria in the large intestine. This results in less energy consumption as bacteria in the gut are fed, and production of fermentation products (short chain fatty acids) that may be beneficial to health.

Our group has demonstrated three effects of resistant cornstarch in rat diets: dilution of the available energy, a bulking or fiber effect, and increased signaling from the gut. We compared rats fed a diet containing either non-digestible, fermentable resistant starch or non-digestible and non-fermentable methylcellulose or cellulose fiber. Because the latter are neither digested nor fermented, they do not provide energy to the rat. The energy value of the resistant starch we used was 2.8 kilocalories per gram. It was not possible to control for both fiber and energy of these food products in one diet, and therefore rats fed resistant starch were compared to two groups of rats. One group had similar fiber and lower energy, and the other had similar energy and lower fiber. When available energy was similar, rats fed resistant starch had less abdominal fat. However, when fiber was similar, the two groups had similar amounts of abdominal fat. In both studies rats fed resistant starch had greater gut signaling. We believe that the fermentation with increased gut signaling is the major reason for beneficial effects of resistant starch. The major short chain fatty acids, acetate, propionate and butyrate, produced by fermentation of resistant starch have been tested in large intestine cell culture experiments. Cells are most sensitive to butyrate and produce gut peptide hormones.

LSU AgCenter researchers teamed with researchers at the Pennington Biomedical Research Center have demonstrated several beneficial effects for resistant starch in the rat: energy dilution, bulking effect, and fermentation with increased gut signaling. These results are somewhat similar to results other researchers are observing with human subjects. However, the research in rats at the LSU AgCenter is aimed at finding the mechanisms or reasons for beneficial effects of inclusion of resistant starches in the diet. Further research is needed to determine if resistant starch has a greater effect on body fat than simple dilution of energy with non-fermentable fiber. However, resistant starches are more readily incorporated into foods than are purified fibers and should in the least be extremely effective in diluting the available energy and reducing energy consumption by Americans. In addition, studies by other researchers indicate increased gut signaling is beneficial to health. LSU AgCenter researchers believe that fermentation of resistant starch to short chain fatty acids is responsible for the increased gut signaling in the form of peptide hormones such as peptide YY and glucagon-like peptide 1. These hormones are believed by the obesity research community to signal to the brain and regulate energy balance in the body. Human obesity has been characterized as peptide YY deficient rather than resistant. Future studies are planned to treat human obesity with injections or with inhalation of peptide YY. The work of LSU AgCenter researchers may ultimately result in prevention or treatment of obesity by dietary means by incorporating bioactive functional foods, resistant starches, into food products such as breads. Incorporating starches isolated from corn or rice or other food crops, that are resistant to digestion, but fermentable, into food products is a more “natural”; and a less expensive approach for increasing peptide YY in a person than injection or inhalation.

Source of Funds

State, Hatch, National Starch, Biotechnology Education for Students and Teachers Program, and The Louisiana Biomedical Research Network (NIH #P20RR16456)

Lutein From Corn to Help Prevent Vision Loss

Jack Losso, Food Science; Kayanush Aryana, Sonja Jones

Key Theme: Human Health

People are living longer nowadays. The increased lifespan is associated with a multitude of degenerative diseases such as vision loss, Alzheimer’s, Parkinson’s and cancer. Once an individual has lost vision, it is at a point of no return. There are no real cures. Researchers at Harvard Medical School have identified lutein, an orange dark red pigment found in green leafy vegetables as capable of preventing vision loss when consumed early, regularly and in large amount. Most doctors are advising people to eat more leafy vegetables to prevent vision loss. But most foods do not contain sufficient levels of lutein for a daily intake. For instance one has to eat one bowl of kale salad a day or two pounds of corn daily to get the daily intake of lutein. But there is not enough kale for everybody in the city or town. Lutein sold as tablets is expensive.

We have identified corn as a very economical source of lutein. Millions of bushel of corn are produced annually. We have developed a method to isolate lutein from corn so that the isolated lutein can be added to food products and help people have their daily intake of lutein. We have developed a cheddar cheese rich in lutein and a salad dressing formulation that is also rich in lutein.

Corn growers and processors have been particularly interested in this work because they can develop new high valued products such as lutein from corn. Because of the high price of lutein, corn growers and processors have reason for increasing corn production. At the same time, all other products usually obtained from corn, such as oil, proteins and starch are also obtained during the process. This new process and source of lutein will help increase availability of lutein, help people fight vision loss, and help corn growers and processors make some additional income from the very same corn that cost almost nothing in the past.

Source of Funds

State and Hatch
Louisiana Soybean and Grain Promotion and Research Board

Meeting the 2005 Dietary Guidelines for Americans: A Daunting Challenge for Food-stamp recipients in Southeast Louisiana

Carol E. O'Neil, Human Ecology; Jeffrey Gillespie, Pamela A. Monroe

Key Theme: Human Nutrition

The Dietary Guidelines for Americans (DGA) provide the nutrition agenda for the nation; however, because of new, more stringent nutrition recommendations, meeting the 2005 DGA has been called a daunting challenge for the public. A key element of any set of guidelines is that it should be feasible, affordable, and able to be communicated effectively to all target audiences. In general, low-income women have diets that compromise their health. Low levels of food intake, coupled with poor food choices, specifically in food insufficient/food insecure women with hunger, increases the likelihood of vitamin and mineral deficiencies, thereby affecting adversely nutritional status. Moreover, low-income females are more likely than middle- or high-income females to be overweight/obese and to report having poorer overall health or a chronic disease. Thus, it is important to determine whether low-income can actually meet the new guidelines.

Previous work has shown that female food-stamp recipients in Southeast Louisiana are on average obese and have diets that exceed the recommendations for fat, saturated fat, and sodium and do not meet the recommendations for calcium; potassium; folate; vitamins A, D, and E, and dietary fiber. Diets of these women are correspondingly low in fruits, vegetables, and dairy; preliminary studies suggested that these food items are more expensive in Louisiana than the national average. Thus, we know that these individuals do not meet diet recommendations, but it is not clear whether the cost and availability of the requisite foods would allow them to meet the guidelines if resources including nutrition education, were available to them. The average energy needs of the population was calculated using the new MyPyramid program, and market baskets consisting of 100-200 low cost healthy foods that meet the calculated recommendations were designed. Food items were priced in 32 grocery stores in which these women shop, and linear programming models are being developed to determine cost-minimizing market baskets of food that meet the 2005 DGA. We are also comparing the foods that women actually purchase and the low-cost market baskets that were developed.

The research findings will be useful in training service providers, community leaders, and volunteers in how to help low-income families meet nutrition recommendations. The information garnered from this study will also be given to nutrition educators, such as the directors of EFNEP and the Family Nutrition Program (the Food Stamp Education Program in Louisiana), to help them develop education modules on nutrition, health, and food shopping for low-income individuals. Finally, these data could be used to help update or revise the USDA's four official food plans, especially the Thrifty and Low-cost Food Plans.

Source of Funds

State, HATCH Project 940-36-3106; SRDC 940-36-6116

Goal 4 – Extension Program Reports

Wild Woods Wanderings Environmental Education Camp

Michele Abington-Cooper, 4-H Youth Development

Key Theme: Natural Resources Management

The 4-H Wild Woods Wanderings Environmental Program was developed to expose 4-H teens to the characteristics of bottomland hardwood forested wetland ecosystems and the challenges related to their management within an agriculture-based economy. The curriculum for the camp was developed by an Advisory Committee of professionals from agencies and associations involved with funding, managing, and conducting the camps: the LSU AgCenter; U.S. Fish & Wildlife; NRCS/Northeast Delta R.C.& D.; Louisiana Department of Parks, Recreation and Tourism and the Tensas River Refuge Association. The camps, which draw 4-H members and volunteers from throughout Louisiana, were initiated in 1995.

Two sessions of this camp were held in the summer of 2005, reaching 46 4-H teens, 3 science teachers, 2 adult volunteers, and 2 4-H Agents. The camp was held at the Poverty Point State Commemorative Area near Epps, Louisiana, which is one of the most important archaeological sites in the United States, and on the Tensas River National Wildlife Refuge. At the beginning of the six-day camping session, participants take a pre-test and are also given a real-life public policy issue to solve: The reduction of flooding of agriculture lands from the Tensas River in Madison Parish. Throughout the camping session, participants study: how man has utilized the lands in what is now northeast Louisiana from as far back as 4000 years, water quality, soil science, wildlife and hardwood forest management, row crop agriculture and the environment; stream monitoring and management. These lessons are taught by extension specialists and researchers of the LSU AgCenter, U.S. Fish & Wildlife, Louisiana Department of Environmental Quality, Poverty Point State Commemorative Area, LSU interns, and 4-H volunteers from both Louisiana and Mississippi. Peer teaching of 4-H members is also used as groups of member participants prepare a lesson to teach the rest of the participants. Each lesson is designed to build upon the previous one, and much hands-on participation is encouraged. The lessons, as well as newsletters received by campers each day of the camp are also designed to give participants the information/knowledge needed to solve a public policy issue. Each group of campers presents their “plan” at a mock meeting of the Madison Parish governing body (Police Jury). The next morning these plans are critiqued and campers learn how the Tensas River Basin Commission is actually addressing this issue. Campers take a post-test and complete an evaluation of the camp before leaving for home.

Campers in 2005 used a new type of evaluation. A total of 41 questions identifying terms, practices and concepts related to environmental topics common to the bottomland hardwoods ecosystem were addressed by youth participants. Students were asked to identify prior knowledge and post-knowledge by multiple choice answers. Four (4) possible answers were given for each of the questions tested, and were identical for each of the 41 questions given. Students identified pre- and post-knowledge or understanding by selecting the possible answers listed: A. Never heard of it B. Know something about it C. Know quite a bit about it D. Knowledge and experience with application. Analysis of the data collected assigned numerical information for the possible answers. Values assigned to the data were as follows: A = 1 B = 2 C = 3 D = 4, Based on the numerical assignment, data could be analyzed as: 1-2 = Little or no knowledge or understanding of the term, practice or concept; 3 = Substantial knowledge or understanding of the term, practice or concept; 4 = Knowledge/understanding and experience applying the term, practice or concept. Results were as follows: Answers to the 41 questions in the pre-assessment resulted in a score of 1.726667, less than the 1.873403 for 2004. Answers to the 41 questions in the post-assessment resulted in a score of 3.052667, greater than the 3.029036 average for 2004. The increase toward substantial knowledge or understanding and experience applying the terms, practice or concept for 2005 was 1.35. This is an increase of .19 over the scores for 2004. The average ranking for all activities during the week was 4.43 on a Likert scale of 1-5, with 5 being the highest score. The average ranking for curriculum activities was 4.32. The most popular activities were Night Maneuvers at the Tensas National Wildlife refuge and map and Compass Skills. The Public Policy Activity average ranking was 4.38. In answer to the question, “Would you participate again?” the reply was 4.91. Throughout the years of conducting this camp, 4-H agents, volunteers, and campers have reported a significant increase in student science and math scores, career changes, and greater environmental awareness after attending Wild Woods Wanderings.

Source of Funds

EPA 319 funds channeled through the Louisiana Department of Environmental Quality and Northeast Delta R.C. & D. as well as Smith/Lever funds. A private donor contributed \$500. The Tensas River Refuge Association provided funds for the food for the camp as well as Advanced Camp.

Scope of Impact

Multi-state: It is estimated that the dollar value of the Wild Woods Wandering Environment Camp is \$300,510. (15 FTEs x \$80,136 per FTE x .25)

Hurricane Damage Assessment and Response

Rex Caffey, Agricultural Economics and Agribusiness

Key Theme: Weather and Climate

In the initial period following Hurricanes Katrina and Rita, a Hurricane Recovery Resources website was developed by the Marine Extension Program (MEP), a collaborative outreach project sponsored jointly by the LSU AgCenter and the Louisiana Sea Grant program. The site provides answers and information linkages to more than 100 Frequently Asked Questions (FAQs).

More than 10,000 visitors have found hurricane-related information on topics such as wetlands, water quality, ports, fisheries, seafood safety, economic impact, and rebuilding concerns. The development of these FAQs provided the basis for more prescriptive recommendations for guiding the short-term recovery process.

An initial list of recommendations was recently submitted to the Louisiana Governor & Coastal Advisory Commission. The initial list of near-term recommendations provides specific guidance on dealing with three controversial issues: 1) expanding the Louisiana Recovery Authority; 2) closing the Mississippi River Gulf Outlet; and 3) maximizing the capacity of fresh water diversions. In the last quarter of 2005, MEP faculty have been featured in numerous media reports seeking to focus on the natural resource aspect of these two hurricanes. Some examples of these media outlets include, CNN, NPR, MSNBC, the Boston Globe, the New York Time, and the Washington Post. The first meeting of the of the President's Forum on Meeting Coastal Challenges initiative was held in January 2005. About 120 scientists, policy-makers, and local officials met to discuss ways to redouble and redirect university resources toward more near-term challenges resulting from Louisiana's coastal land loss crisis, which was exacerbated by Katrina and Rita.

Source of Funds

State, Sea-Grant

Scope of Impact

Multi-function: It is estimated that 20% of the FTEs expended in the coastal and wetland resources are multi-function, for total multi-function value of \$27,887 (1.74 FTEs x \$80,136 per FTE x .20).

Safeguarding Louisiana Rice Fields from Invasive and Destructive Insect Pests

Boris Castro, Entomology

Key Theme: Integrated Pest Management

An invasive species is a non-native or non-indigenous species which threatens habitats, ecosystems or other species. Non-native pest problems are introduced intentionally or not by man and by forces of nature such as hurricanes. When an insect pest is introduced into new areas, the absence of natural enemies and lack of management practices facilitate rapid pest population expansion and often result in millions of dollars in losses due to failed crops, expensive treatments, quarantine restrictions, sanitary sanctions, market loss, human health problems, habitat destruction, etc. Louisiana rice is threatened by several approaching invasive and destructive pests. The main objectives of our project include monitoring and surveying of rice areas for aggressive and potentially destructive pests new to this country or not yet widely distributed; development of educational materials to recognize these problems before they establish; and delineation of guidelines to contain or prevent further expansion of invasive species.

A new fly maggot was reported for the first time in North American history, destroying several rice fields in southwest Louisiana in 2004. Led by the LSU AgCenter in collaboration with USDA, Texas A & M and the Smithsonian Institution, the insect was traced back to South America. The common name South American Rice Miner (SARM) was proposed and accepted for this new pest. A field survey in 2005 revealed the SARM is distributed in eight Louisiana parishes and several Texan counties representing major rice producing areas. Several extension and scientific publications and presentations were provided on biology and recognition of this new insect. A complete guide was developed and distributed to other rice producing states on sampling procedures for the SARM. All rice areas of LA were surveyed in 2005 for the presence of the panicle rice mite, a destructive mite of recent introduction to Caribbean and Central American countries and associated with 80 and 100% yield loss in rice. The mite was not found in Louisiana. Our project reported the first infestation of the European corn borer (ECB), a common pest of U.S. corn, causing severe destruction to a rice field in northeast LA in 2003. This became the first world record of a new host for the ECB. Additional ongoing surveys include the dreaded rice delphacid, rice thrips, and the destructive Mexican rice borer already present in Texas and only one county away from the Louisiana border.

The SARM was discovered in the US and was associated with 100% loss of a 200-acre rice field in Cameron plus undetermined but significant yield losses in several other rice areas of southwest LA. The discovery of the SARM unveiled urgent needs for research and opened new opportunities for collaborative research and extension projects and for potential multi-state funding. Research, extension and regulatory personnel benefited from our extension and scientific publications to recognize the SARM in field infestations. The LSU AgCenter recommendation to avoid late rice plantings in affected areas will probably save entire rice communities from the effects of this devastating insect as researchers focus on finding additional management practices. The panicle rice mite was first described from an isolated collection in Louisiana in the 1960s and never reported again in the state. However, Louisiana was in danger of being imposed quarantine measures by other countries where U.S. rice and seed are being exported. Not finding the panicle rice mite in LA rice fields in the extensive survey of 2005 is the first step towards declaring the state free of the panicle rice mite in the short term, although additional inspections are required. Data from the panicle rice mite survey and information produced in our project strengthened regulatory and quarantine surveillance activities to prevent the re-introduction of this destructive and highly invasive rice pest. A scientific report and presentations were delivered to producers and other rice stakeholders to inform them of this quarantine pest problem. In an era of increased international trading and elevated hurricane activity, safeguarding Louisiana rice from invasive and highly destructive insect and mite pests represents millions of dollars in potential savings and the well-being of the entire rice industry and the economy of the state.

Source of Funds

Check-off funds from Louisiana rice producers through the Louisiana Rice Research Board, USDA/APHIS, and RiceTec.

The LSU AgCenter Extension Natural Resources Program

Michael Dunn, Agricultural Economics and Agribusiness

Key Theme: Natural Resources Management

The most recent data available reveals that forest -related enterprises in Louisiana provide well over \$1 billion in gross farm income and over \$5 billion in primary value added to Louisiana`s economy. These forest resources are predominantly owned by private landowners and managed by the private sector. In order to achieve and ensure economic and environmental sustainability, the LSU AgCenter`s Extension Natural Resources program develops and implements diverse educational programming for natural resource stakeholders.

The Extension Natural Resources Program (ENR) is comprised of four area forestry/wildlife agents and five specialists. As a group, ENR develops and implements a broad spectrum of programs designed to provide clientele such as forest landowners, forestland managers, loggers, arborists, and public sector stakeholder groups with the latest in technical, environmental, policy, and economic information. These programmatic efforts include regional forums, field days, short courses, continuing education for natural resource professionals, publications, and personal communications.

In 2005, ENR developed and implemented over 30 unique programs that were delivered to various clientele, including landowners, professional natural resource managers, loggers, arborists, the general public, wood utilizing companies and sole proprietorships, and nature enthusiasts. These programs included formal workshops, regional workshops, regional forums, 4-H educational programming, publications, websites, and other individual methods. Over \$207,000 in self-generated funds helped pay for these programming efforts, which is more than double the amount provided by state and federal governments for programming activities. The ENR program directly reached over 30,000 people through public events such as Expos, 4-H sponsored events, and direct communications. ENR directly worked with approximately 2,345 clientele through professional, organized educational programs. Program evaluations have shown that, overall, clientele attending our educational programs place a personal value for these programs at approximately \$2,250 per individual per workshop, which equates to a net positive impact of \$5,276,250, or a benefit multiplier of approximately \$40.59 for every \$1 appropriated by state and federal government for natural resources extension programming. In addition, for specific programming efforts attendees have reported by as much as 66% that the knowledge received will better assist them in natural resources conservation and management. Evaluations of some programming efforts revealed through surveys that, on a 1 to 5 scale, attendees knowledge increase from 2.7 before to 3.9 after attending.

Source of Funds

Renewable Resources Extension Act (RREA), State and Federal Appropriations, Self-generated funds

Scope of Impact

Multi-state: For 2005, 27.24% of the Extension Natural Resource (ENR) Program`s activities contained a multi-state component, including multi-state workshops and regional funded extension related grants. The extension Planning And Reporting System (PARS) lists FTEs associated with ENR activities to be 11.93 FTEs. Therefore, FTEs devoted to multi-state programming in 2005 was 3.25. Using an annual FTE value of \$80,136, this equals \$260,442.

Multi-function: For 2005, 73.18% of the ENR Program`s activities contained a multi-function component, which included research-based presentations at forums, field days, and publications. PARS lists FTEs associated with ENR activities to be 11.93 FTEs. Therefore, FTEs devoted to multi-function programming in 2005 was 8.73. Using an annual FTE value of \$80,136, this equals \$699,587.

Restarting of the Basic Fishery Infrastructure in Post-Katrina Plaquemines and St. Bernard Parishes

Albert “Rusty”Gaude, Crescent Region; Nancy Weikel (FEMA)

Key Theme: Natural Resources Management

The fishery industry for the two parishes of St. Bernard and Plaquemines have been devastated by Hurricane Katrina. In excess of 85% of the boats used in the harvest of the finfish and shellfish were disabled to various degrees. Many of the boats were totaled but a large percentage are repairable. In addition to the harvest sector, buying docks, which also furnish components like ice and fuel, were 100% disabled, even if the fishing vessel was fortunate enough to have escaped destruction, the essential components that are needed to ensure safety and product quality were not available. The fishing community was severely traumatized by the physical and economic damage of Katrina.

During the first post-Katrina entry days, I quickly joined forces with the FEMA fishing industry liaisons for Plaquemines Parish. In assessing the damages and remediation methods we could use, we determined that each region should have at least one “critical facility” that could provide essential components to the devastated fishing community. Similarly, we attached ourselves to the U.S. Coast Guard vessel salvage effort and implemented the initial organization meetings between the parish officials, USCG and the vessel owners. It was soon apparent that the vessel owners were handicapped by a lack of repair equipment at the public staging area for disabled vessels. Our efforts ignited a recovery effort at several buying docks and developed into a long distance, high value, donation of crucial transport units from the City of Valdez (AK) to the citizens of Plaquemines, La. Based on the experience our group gathered, additional programs were then started in St. Bernard Parish to achieve similar results.

With the combined efforts of all the eventual participants (LSU AgCenter, La. Sea Grant, FEMA, USCG, National Guard, EPA, NOAA Fisheries) we have successfully put several buying docks back into operation. These docks are effectively serving the outgoing, as well as the incoming vessels with their catch. Not only has this dramatically improved the financial situation of those fishing families that have serviceable, seaworthy boats, but it has been a source of inspiration for those other families to expedite repairs to their vessels. The situation surrounding vessel handling at the USCG/parish staging areas in Port Sulphur was dismal due to the destruction of the mobile “travelift” which was used to transfer the disabled vessels. This unit was used to secure safe positions for the operators to do their vessel repairs. The donation of this unit by the people of Valdez was enabled by collaboration between me and the Washington Sea Grant Program, Alaska Fishing Industry Relief Mission (AFIRM) and the Port Authority of Valdez. Air transport (Military C130) of the 45,000 lb unit was accomplished with the help of the Alaska Air National Guard.

Source of Funds

The funding for the various direct costs of disassembly, air tickets and housing for factory mechanics, and related overhead was provided by the AFIRM organization. Donated labor and materials were furnished by many individuals and organizations. State: Smith-Lever 3 b, c

21st Annual Ark-La-Tex Forestry Forum

Ricky Kilpatrick, Northwest Region

Key Theme: Forest Resource Management

Forestry continues to be the largest single land use and number one crop in the Ark-La-Tex region. Over 60% of these forests are owned by small, non-industrial private landowners. This group is often lacking in knowledge of forest management planning, wildlife management, forest taxes and other topics of importance concerning forest land ownership. This results in much of the privately owned forestland producing way below its potential. Uneducated forest landowners are also at a big disadvantage when it comes to marketing their timber products. This, in turn negatively impacts our entire state and region...if landowners undersell their products, severance taxes to the state are lowered. Also, this kind of situation sheds a negative image on the forest industry.

Each year, forest landowners are given the opportunity to increase their knowledge concerning forestry and wildlife management and marketing at the annual Ark-La-Tex Forestry Forum. An advisory committee made up predominantly of forest landowners meets in the fall to determine specific topics that need to be addressed and presented to forest landowners. This meeting results in the development of the program for the annual forum held the following spring.

The 21st Annual Ark-La-Tex Forestry Forum was held in March 2005. Topics included forestry taxes, accessing aerial photos from the internet and wildlife management. There was also a panel of legal experts to discuss property rights. Two hundred twelve people attended the forum, representing over 20 Louisiana parishes and five other states. The audience owned or managed a combined total of over 1.5 million acres of forestland. Evaluations rated the program very high, and those who responded gave the forum an average value of over \$2,900 per person. Landowners gained knowledge in the above mentioned subjects, which were deemed important by the landowners of the advisory committee. Many of the participants now call on the LSU AgCenter again for forestry advice as a result of the forum.

Source of Funds

State; Smith-Lever

Evaluation of Lagoons and Constructed Wetlands Designed to Treat Dairy Wastewater Effluent

Brian LeBlanc, Southeast Region; Vinicus, Moreria

Key Theme: Agricultural Waste Management

The dairy industry is a vital component of the economy in the Lake Pontchartrain Basin. There are nearly 230 dairies (120 cows/farm) currently operating in the northern-most regions of the Basin, near the border between Louisiana and Mississippi. In the recent past, dairy waste effluent has been cited as a source of nutrients and coliform contamination to the northern basin tributaries and ultimately the Lake itself. Consequently, all dairy operations have been required to install single-stage lagoons. The single-stage treatment is a BMP that provides limited treatment. The main objective of this study is to evaluate the use of Pickerelweed in constructed wetlands following two-stage lagoons. The secondary objective is to determine the efficacy of wastewater treatment in a two-stage lagoon system.

The Dairy Wastewater Treatment Evaluation System (DWTES) consists of replicated two-stage lagoons and constructed wetlands. Approximately 7,000 gallons of untreated dairy waste and wash-water enters the system twice daily (am and pm). Wastewater is pumped to the distribution box and is equally split between two 156 x 93 x 9 foot anaerobic lagoons. Wastewater flows by gravity through the system, independently for each of the replicates. The effluent enters the next treatment stage, two 232 x 134 x 6 foot aerobic lagoons, at each new influx of wastewater. The outflow from the aerobic lagoons is distributed among six 102 x 42 x 3 feet tertiary treatment cells (constructed wetlands). Wetlands 1, 3, 4 and 6 are control cells consisting of spontaneously emerging native wetland plants, comprising of filamentous algae and duckweed. Wetland 2 and 5 were each planted with 175 Pickerelweed (*Pontederia cordata*) rhizomes of similar masses (treatment cells). Water quality monitoring began June 1, 2005 and has been conducted bi-weekly at all sites, starting with the untreated dairy wastewater and at the terminal end of each stage of the treatment system. Samples were analyzed for several characteristics including total solids (TS), total suspended solids (TSS), total diluted solids (TDS), fecal coliforms, *E. coli* (*Escherichia coli*), nitrate (NO₃), nitrite (NO₂), total Kjeldahl nitrogen (TKN), ammonia N (NH₃-N), total phosphorus (TP), chlorophyll-A, chemical oxygen demand (COD), dissolved oxygen measured at the surface (DOs), dissolved oxygen measured at mid-depth (DOm), pH, temperature, among others.

This report includes samples collected for 5 months, including late spring until late summer 2005. Hurricane Katrina compromised the stands of Pickerelweed after August 2005. Sampling was suspended for a month. Plants in both constructed wetlands appeared to have been affected similarly and were expected to recover to pre-Katrina densities, until wild hogs attacked and destroyed the stands completely. Consequences to the project design remain uncertain. On the other hand, some preliminary trends can be gleaned from the data. Most water quality characteristics seem to improve as wastewater moves through the treatment system. This is especially noticeable between anaerobic and aerobic stage lagoon treatments (pH, COD, TSS, TDS, TS, TKN, NH₃-N, NO₃, TP, Cl, Br, SO₃, logTC, logFC, and logE. coli). Less obvious, a decrease in the concentration of some parameters (COD, TDS, TS, TKN, NH₃-N, NO₃, TP, SO₃, logFC and logE. coli) may suggest further potential for treatment with wetlands cells. Planted wetlands had little impact on characteristics estimated (pH and chlorophyll-A). We see no clear trend suggesting that heavy biomass of Pickerelweed plants are any more effective than

naturally occurring wetland plants such as duckweed and filamentous algae at improving water quality parameters. In fact, it may actually have a negative effect on fecal coliforms and E. coli, likely caused by wildlife contamination. This suspicion is being addressed by DNA fingerprinting.

Source of Funds

NOAA

Scope of Impact

Multi-function: Multi-function efforts are estimated at 45% of the number of FTEs expended in this program. These efforts included research-extension collaboration including project design, data collection and analysis, presentations to clientele, and preparation of publications. The value of this multi-function effort is \$90,153. (2.5 FTEs x \$80,136 per FTE x .45)

Sugarcane Burn Management

Benjamin L. Legendre, South Central Region

Key Theme: Agricultural Waste Management

In recent years, agricultural burning policy recommendations were prepared by the U.S. Department of Agriculture (USDA) Agricultural Air Quality Task Force that would help farmers implement provisions of the Clean Air Act while retaining the valid use of fire as a management tool. The policy addresses two goals: 1) to allow the use of fire as an accepted management practice, consistent with good science, to maintain agricultural production on agricultural land; and 2) to protect public health and welfare by mitigating the effects of air pollution emissions on air quality and visibility. Farmers burn sugarcane to reduce the amount of extraneous material (trash), consisting of leaves and tops, delivered with the cane to the factories for processing. This trash contains no sugar. Trash can actually reduce the ability of the factory to extract sugar. Further, the ability of farmers to burn is a significant economic factor for the survival of the individual farmer and the industry. It is estimated that the industry would spend more than \$24 million in extra transportation and processing costs if this trash was not removed.

The Louisiana sugarcane industry has been proactive in its efforts to improve air quality by developing the Certified Prescribed Burn Manager Program administered by the Louisiana Department and Forestry (LDAF). The LDAF, the American Sugar Cane League of the U.S.A., Inc. (ASCL) and the LSU Agricultural Center developed a training curriculum in 2000 entitled "Louisiana Smoke Management Guidelines for Sugarcane Harvesting." Over 1,400 sugarcane farmers and their employees attended the initial training sessions although the program was voluntary. Additional educational materials were made available to the public through the printed media, television and radio. Electric companies funded educational programs on the proper protocol for burning under high voltage electric transmission lines. In 2005, the LSU AgCenter, along with its cooperators, received a \$15,000 grant from Entergy to produce a training film for use in recertification. Extension agents received additional training from specialists and, in turn, provided farmers with the opportunity to recertify by showing the training film. Researchers with the LSU Agricultural Center, USDA-Agricultural Research Service and the ASCL are continuing studies to find alternatives to burning, i.e. varieties that shed their leaves, use of biological agents to decompose residue following green cane harvesting, use of conservation tillage, etc. Research is also continuing to provide for a residue management program that reduces nutrient runoff that also has a positive impact on water quality as well as air quality. Other research initiatives have shown that the residue left on the field following green cane harvesting may help suppress weeds and offer some freeze production during the winter months. However, research has shown a reduction in yield in the subsequent stubble (ratoon) crop of 10 to 15 percent if the residue is not removed. Collaborators in these efforts include the Florida Sugar Cane League, the Rio Grande Valley Sugar Growers, Inc., USDA-NRCS, Louisiana Department of Environmental Quality, Environmental Protection Agency, the USDA Forest Service, the National Weather Service and Entergy.

Louisiana is not the only state, nor is sugar production the only industry, facing the challenges posed by burning as an agricultural management tool. Every industry that uses burning recognizes that a cost-effective mechanism for reducing or eliminating open field burning is a high priority research topic. A total of 1,422 producers and/or their employees attended the original Certified Prescribed Burn Manager Program training sessions from 2000 to 2004 attaining certification for a five-year period. Further, approximately the same number of farmers and their employees were recertified in 2005 for another

five years as Certified Prescribed Burn Managers by attending one of 10 sugarcane field days hosted by the LSU AgCenter and viewing a 13-minute training film on burn and smoke management produced by LSU AgCenter Communications and funded by Entergy. The American Sugar Cane League of the USA, Inc. (ASCL) provided monthly reminders to its producers regarding burn management in its publication, The Sugar Bulletin, which is mailed to most producers within the state. It appeared that the overall training programs have continued to work exceptionally well, with only 12 complaints made by the general public during the 2005 harvest season. This is significantly below the more than 300 complaints received prior to the Certified Prescribed Burn Manager training program. Further, the two power companies serving the area, Entergy and CLECO, reported that there have been no power outages caused by the burning of sugarcane near their high voltage distribution systems. The Louisiana Department of Agriculture and Forestry (LDAF) and ASCL responded to all complaints with a letter to the farmer(s) cited for improper activities with regards to their burning practices. Since 2000, numerous studies have been completed in an attempt to improve the efficiency of harvesting operations without the need to burn; however, to date, no method has been proposed. During the 2005 harvest season, it is estimated that approximately 70 percent (as compared to 90 percent during the 2004 crop) of the crop will be harvested green. The reason for the increase in burning is a direct result of the lodged condition of the crop following the passage of two hurricanes just prior to the harvest. Along with the increase in the number of acres of sugarcane being burned has been an increase in the number of complaints when compared to the 2004 crop. Overall, the LSU AgCenter and its cooperators, LDAF and ASCL, have received excellent feedback from the general public in their attempts to improve air quality for all its citizens as a result of this program.

Source of Funds

State; Smith-Lever 3 b, c (federal funds)

Scope of Impact

Multi-function: Multi-function efforts are estimated at 25% of the program. These efforts included research-extension collaboration in agent training, formulations of recommendations, publications, and field visits during the sugarcane harvesting period. The dollar value of this multi-function effort is \$55,695. (2.78 FTEs x \$80,136 per FTE x .25)

Impacts of the Master Farmer Program on Agricultural Producers and Louisiana

Carrie C. Mendoza, Coordinator, Donna S. Morgan

Key Theme: Water Quality

According to the Clean Water Act of 1972, agriculture falls into the non-point source pollution category, and consequently, is not formally regulated by government or any government agencies. Growing concern that agriculture's pollution contribution was increasing water quality problems in Louisiana caused the LSU AgCenter and Farm Bureau to create the Master Farmer Program. This voluntary program targets all agricultural producers to address environmental issues related to production agriculture. This is accomplished through completing three phases of the program, including 8 hours of environmental lecture, touring of a "Model Farm," and the development and completion of a comprehensive conservation plan. Agricultural producers are located across the state, so this program could not be offered at one centralized location.

After initiating the program in 2001, Phase I has continued to be taught by watershed across the state. In 2005, 12 Master Farmer trainings were conducted in the Mermentau, Vermilion-Teche, Ouachita, Red River, Calcasieu, Pontchartrain, and the Barataria-Terrebonne watersheds. Approximately 565 agricultural producers enrolled in the program during the past year. The "Model Farm" phase, Phase II, of the program, was implemented in the spring of 2005. Twelve farms were selected in five watersheds (Mermentau, Ouachita, Red River, Calcasieu, and Vermilion-Teche) to represent commodities in those areas of the state. Commodities represented are cotton, soybeans, rice, crawfish, cattle, poultry, corn, wheat, and sugarcane. Data will be collected over the next two years to show the impact that specific Best Management Practices have on runoff coming from these farming operations. These BMPs will vary by commodity, soil type, and location. Sampling equipment was installed on all 12 farms and sampling began in the early 2005. Six Model Farm field days were held, specifically in the Ouachita, Vermilion-Teche, Mermentau, and Calcasieu watersheds in 2005. Approximately 321 producers attended these field days, which fulfilled their requirement for Phase II of the program.

To date, more than 2,023 agricultural producers are enrolled in the Master Farmer Program, representing approximately 1.8 million agricultural acres of land. Because the program is consistently promoted at field days, production meetings, and state-wide conferences, it is becoming a more widely recognized program throughout the South. An MOU was signed by Mississippi, Arkansas, and Texas to begin development of a Master Farmer program in those states. Because of additional interest, a program "How-To" guide and template was developed for use in these states and in the southern region. The Natural Resource Conservation Service (NRCS) is a very involved partnering agency with the LSU AgCenter and the Master Farmer Program. They assist in teaching the instructional portion of Phase I and are also involved in the development and implementation of conservation plans on producer operations. As an incentive, NRCS stated that they, as an agency, will award producers who are applying for cost share through EQIP, an additional 2 points in their ranking system. This will assist some producers in acquiring additional funding for BMP implementation on their operations.

Source of Funds

State; Smith-Lever 3 b, c

Scope of Impact

Multi-state: Multi-state efforts are estimated at 10% of the total number of FTE's expended in the program. These efforts include multi-state collaboration in program development, implementation, publications and coordination. The dollar value of the multi-state effort is \$84,383 (10.53 FTEs x \$80,136 x .10)

Multi-function: Multi-function (integrated extension-research) efforts are estimated as 15% of the total number of FTEs expended in the program. These efforts included research-extension collaboration in Model Farm demonstration design, calibration of water quality monitoring equipment, selection of Model Farm best management practices and analysis of water quality sampling results. The value of the multi-function effort is \$126,575 (10.53 FTEs X 80,136 per FTE x .15)

Roughin' It-Forestry Environmental Education

Walter Moon, Jr., North Central Region; Joe Barrett, Cindy Smith, Julia McLain, Hubert Wilkerson, Christy Corley, Becky Kelley, Barry Crain and Ricky Kilpatrick

Key Theme: Forest Resource Management

Natural resources play a vital role in the livelihood of Louisiana. Forestry, hunting, fishing and other wildlife commodities comprise over six billion dollars of the Louisiana economy. It is critical that each resident take a more in-depth look at ways to better utilize and manage the states' valuable natural resources. Proper management and utilization of these resources is at a critical stage due to the recent hurricanes that damaged our Gulf Coast region, virtually wiping out some of our fisheries. As a result, it will take time for the fisheries to rebuild and get back to full capabilities. This is why North and Central Louisiana will play a more important role in the economy of Louisiana. Many of our natural resources have been abused and neglected, so it is time to take a stand.

Through the use of Title III Forestry Funds, the Winn Parish Police Jury and Winn Parish School Board designated funds to purchase equipment and supplies to help further the implementation of forestry/environmental education for surrounding parishes. The parishes involved are: Winn, Natchitoches, Red River, Grant, Sabine and Bossier. A committee has been implemented to help develop the program and purchase materials so that educational programs can be conducted. The committee is comprised of personnel from the U.S. Forest Service, Louisiana Department of Wildlife and Fisheries, Louisiana Department of Agriculture, LSU AgCenter, local 4-H volunteer leaders, the local Wild Turkey Federation and local businesses. This committee has developed a camp and other programs to address the critical needs associated with natural resources. The camp and other educational programs are designed to educate youth and adults on ways that they can better develop, implement, manage and utilize natural resources in a safe and efficient manner. The focus areas of the programs are forestry, wildlife, aquaculture, and environmental.

The use of natural resources plays a vital role in the economy of the six parishes that are members of this committee. The committee has developed and implemented a forestry/environmental camp which has reached over 160 4-H youth, adults and volunteer leaders from these parishes. For 2005-06, the group has enlarged the camp to allow for approximately 200 youth to participate in a three day camp relating to environmental education. The key to this camp is the collaboration among the different agencies and parishes. Each group plays an important role in the development, presentation and review of the program to ensure it is meeting the needs of the individuals. This is a "first time" experience for many who attend this event, to camp-out, shoot a bow, cook outdoors, measure the diameter of a tree, learn about and identify various insects, tour a sawmill, learn how to identify trees, use a compass and pacing, pull water samples from ponds and study the plant/animal life, learn proper hunting techniques, and study ways to improve timber stands for wildlife and maximize timber productions. This program is a new avenue for the LSU AgCenter to reach another group of youth and adults, as many who participate in this program do not participate in other activities associated with the LSU AgCenter.

Source of Funds

Title III Forestry Funds: Winn Parish Police Jury and Winn Parish School Board
U.S. Forest Service; State; Smith-Lever 3,b, c

Hurricane Recovery Efforts by the Greater New Orleans Area LSU AgCenter Staff

Alan Morgan, Entomology

Key Theme: Weather and Climate

Hurricane Katrina severely devastated the Greater New Orleans Area, including Orleans and Jefferson parishes. Homes and businesses were destroyed by wind and flood waters throughout vast portions of the area. It has been estimated that over 80 percent of Orleans parish has been totally devastated and close to 50 percent of Jefferson parish has been devastated. The infrastructure of the area, including housing, businesses, schools and local governments etc were affected. Over 1 million residents from these devastated areas have relocated to other areas of the state and nation until conditions allow them to return. These citizens have experienced loss of jobs or income cuts. They have also had to identify new schools for their children. Additional emergency housing needs and expenses are being encountered by residents on top of existing mortgages on homes that may or may not have been covered by insurance. This redistribution of the state's population has placed additional stress on an already fragile budget. The tax bases for many local governments within the devastated areas have decreased so dramatically that communities are facing financial burdens and possible bankruptcy.

The LSU AgCenter staff in the New Orleans metropolitan area, working out of a consolidated location in Jefferson parish, has reacted to immediate needs for educational materials and programs on topics ranging from chain saw safety to horticulture programs to mold remediation. Fact sheets, lessons, and PSAs were developed in the areas of Family Financial Management, Housing, Family Development, and Health and Nutrition. Folders entitled "Disaster Recovery Family and Consumer Science Resources" were compiled and distributed to administrators and FCS parish staff. The faculty distributed 25,000 copies of the Storm Recovery Booklet at locations to which the local population was returning. First contacts were made at local Home Depots, Lowes and other building and repair centers immediately after they reopened for business. AgCenter Faculty staffed LSU AgCenter recovery tables and distributed recovery information at major retail stores as they reopened, such as Walmarts and KMarts, realizing that these were the locations where they would be able to find the returning population. Community Centers and Recovery Centers in the area were used as distribution and contact sites for the returning public as were the local food banks. Educational materials were distributed at locations set up in City Hall and on the docks where cruise ships housed displaced residents. Nutrition educators partnered with the USDA Food Safety Mobile that was sent down from Washington DC and provided nutritional and food safety information at multiple locations throughout the area. The Jefferson parish libraries were used as disaster material distribution sites and various other social services agencies in the area were partnered with in recovery efforts. 4-H club members, working within the club structure, began identifying service projects around their schools to help in the recovery and clean-up efforts. Horticulture agents addressed the immediate needs of tree removal with programs on chain saw safety. Fact sheets, printed in bulk, were distributed at FEMA Recovery Centers. The Crescent Region Area FCS agent and the AgCenter's Disaster Programs Coordinator networked with State recovery personnel and are serving on several state committees promoting the AgCenter's ability to address recovery and rebuilding needs of families. A series of seven and one-half hour educational sessions addressing care and maintenance of trailers; identity theft, working with contractors and builders, indoor air quality, energy saving tips, stress, elder safety, and container gardening are scheduled in Jefferson Parish.

Within 6 weeks after the hurricane, LSU AgCenter agents had made contact with approximately 50,000 returning residents through distributed disaster and recovery educational material and workshops, disaster hotlines calls, and other personal contacts with businesses and government. Adults attending the workshops were made aware of mold removal guidelines for flooded homes, cleaning techniques for flood damaged homes, income reduction management strategies, suggestions and help on filing insurance claims, unemployment issues, and stress management. Residents attempting to remove fallen trees were trained in and made aware of proper chain saw safety procedures. Parish residents were directed to proper agencies in the parish for disaster relief if and help. Parish residents were helped with storm recovery issues and their questions were answered by means of the 800 storm hotline established and manned in the Jefferson office Parish residents were able to make better decisions and were better able to deal with issues concerning mold removal, food safety, health issues, landscape replacement, and other disaster related issues.

Source of Funds

State and Smith-Lever 3 b,c

Disaster Series Helps Crescent Region Residents

Alexis O'Dwyer Navarro, Human Ecology; Carolyn Leperi, Ramona Gentry, Terry Toombs, Deniese Zeringue

Key Theme: Weather and Climate

The Crescent Region (Jefferson, Orleans, St. Bernard, Plaquemines and St. Charles) was severely impacted by hurricanes Katrina and Rita. Homes, businesses and communities were devastated by wind and water forcing families to relocate to areas within and outside the state. There was 97% devastation in St. Bernard, 80% devastation in Orleans and Plaquemines and 45% devastation in Jefferson. The need for Crescent Region homeowners to find housing close to their homes needing remediation was imperative. The Jefferson Parish population increased by approximately 80,000 residents within one month. Research indicates that adversity due to a disaster increases stress levels from loss of home, job and life. According to Jefferson Parish President, Aaron Broussard, a goal of his is to assure residents that action is being taken to create a new normalcy within the community.

Recognizing the need to educate hurricane victims, Jefferson Parish libraries, Disaster Recovery Centers and Home Repair Centers collaborated with the LSU AgCenter Crescent Region to educate the population through a series of four workshops, distribution of 10,000 Storm Recovery bulletins and 40,000 Fact Sheets. Topics included "Avoiding Mold Hazards in Flooded Homes," "Financial Recovery after the Hurricane," and "Managing Stress after a Disaster. One hundred sixty five residents attended the workshops that were advertised through mass media efforts and presented by specialists and agents.

Adults who attended the workshops were made aware of mold removal guidelines for flooded homes, cleaning flood damaged homes, what to do when replacing important papers, managing on a suddenly reduced income, filing insurance claims, banking after the storm, unemployment issues, rights as a tenant and managing stress after a disaster. Comments and testimonials from workshop participants included, "I have been more cautious with handling mold items from my flooded home by bagging molded sheetrock and cleaning studs before disinfecting and allowing studs to dry thoroughly before replacing sheetrock. Another participant reported that the "Managing Stress after a "Disaster" class of the series was most beneficial to her in handling her handicapped husband whose routine has been upset since Hurricane Katrina. She reported having more patience and understanding with her husband since the class and had not associated the loss of her flooded home with the stages of grief until she was made aware of the grieving process. The majority of the participants stated they would implement and utilize our storm recovery educational materials to sustain quality of life in the community.

Source of Funds

State; Smith-Lever 3 b, c

Third Ark-La-Miss Wildlife Management Symposium Quality Deer Management: Button Heads to Big Bucks

Donald P. Reed, Southeast Region

Key Theme: Forest Resource Management

Large-antlered quality deer, when present on an area, bring landowners a premium priced lease rate. Information presented at this Symposium was designed to help private landowners achieve this goal.

A morning technical session along with an afternoon field session were used to convey the necessary information to attendees in order to demonstrate the management techniques needed to achieve the greatest possible quality within a given deer herd and habitat conditions.

The same test was given to attendees before and after the program. These pre and post test scores were documented to determine the knowledge gained by attendees. Results showed a 33% average pre-test score and a 70% average post test score. All 63 attendees had a higher post-test score, indicating that the program made a difference in knowledge gained.

Source of Funds

School of Forestry, La. Tech. University.
Calhoun Research Station, LSU AgCenter
Department of Biology, The University of Louisiana, Monroe.
U.S. Fish and Wildlife Service.
La. Department of Wildlife and Fisheries.

Scope of Impact

Multi-state: It is estimated that 40% of the program is multi-state, with a value of \$140,078 (4.37 FTEs x \$80,135 per FTE x .40)

Multi-function: It is estimated that 50 % of the program is multi-function, for a dollar value of \$175,097. (4.37 FTEs x \$80,136 per FTE X .50).

Area Deer Hunters Learn Techniques For Successful Food Plot Establishment and Maintenance

Rene G. Schmit, Crescent Region

Key Theme: Forest Resource Management

Many deer hunters throughout Louisiana are always seeking new and innovative ways to improve the quality of their food plots for attracting and holding deer. The establishment and maintenance of food plots can be a costly venture and quite often many hunters fail to achieve intended results. For these reasons, many hunters have expressed a need to receive training that could provide them an opportunity to increase their knowledge and understanding of the important techniques necessary for achieving successful food plot plantings.

A food plot seminar was planned and conducted to address the specific needs and interest of deer hunter clientele. This was accomplished through a partnering of the St. Charles Parish LSU AgCenter and Parish Hunter Education Advisory Committee. The seminar was conducted during late summer and involved wildlife specialists and local County agents with the LSU AgCenter who presented various training programs related to the successful establishment of food plots for deer. Also included for the seminar were displays and merchants from several of the local feed and seed and hunting supply stores. Training programs that were presented to participants included "Understanding Your Soil Test Analysis," "How To Determine The Correct Type and Amount of Fertilizer Needed," "What And When To Plant," and "Matching Plantings To The Site."

A total of 142 hunters from a 4 parish area participated in the 5 hour seminar that provided them instruction and training for utilizing proper techniques necessary for successful establishment and maintenance of deer food plot plantings. Through a written evaluation (presented at the end of the seminar) participants indicated they found each of the training programs to be very useful and that the seminar as a whole, was quite educational in having helped them to achieve a better understanding and knowledge of food plots. Many also included ideas for future seminars as well as a request that the seminar be continued on an annual basis.

Source of Funds

State; Smith-Lever 3 b, c

Marsh Maneuvers 2005

Mark G. Shirley, Southwest Region

Key Theme: Wetlands Restoration and Protection

Katrina and Rita showed the nation how vulnerable Louisiana's coastal communities and resources are. Young people across the state will inherit this problem. What they learned at Marsh Maneuvers will help them deal with coastal issues as they become our future leaders.

Four sessions of Marsh Maneuvers camps were held during July, 2005. Sixty-two high school students from 15 parishes participated. Activities focused on coastal ecology and resource management. A follow up camp was held, and students were anxious to share their newly gained knowledge of coastal Louisiana with family and friends. Post-camp test scores improved 23%.

Student comments included, "I did some things I've never done before, like cast netting, swim in the Gulf, and held live alligators," and "I learned why Louisiana is getting smaller and some ways we could possibly slow it down."

Source of Funds

Marsh Maneuvers 2005 was funded by contributions from coastal landowners. Cooperators who provided facilities and personnel included the La. Dept. of Wildlife and Fisheries, La. Sea Grant and the LSU AgCenter.

Louisiana Natural Resources Symposium

Todd Shupe, Renewable Natural Resources; Mike Dunn

Key Theme: Forest Resource Management

For many years the School of Renewable Natural Resources hosted the premiere forestry education event in the U.S. South, then known as the LSU Forestry Symposium. That symposium series has been inactive for several years, but a recent surge of interest has allowed us to reinstitute the symposium. The new symposium came with a new title that is more contemporary and reflective of the integration of all the natural resource disciplines. Accordingly, the topics and sessions of the symposium were selected to include the broad array of natural resource policy, management, and utilization issues that are critically important in the southeastern U.S.

The Louisiana Natural Resources Symposium was held on July 18-20, 2005 on the campus of Louisiana State University in Baton Rouge, Louisiana. The event attracted over 100 participants from over the continental U.S. representing private industry, academia, state and federal government, private non-industrial forest landowners, and nongovernmental organizations. The program evaluations and feedback were extremely positive. The event will now be held on a bi-annual basis.

The LSU AgCenter was the primary host of this event. Although the registration cost of the Symposium was \$100, the evaluation surveys completed by the attendees valued the Symposium at approximately \$10,000. The LSU AgCenter has led the effort to reestablish what was once known as the premiere forestry conference in the South. The event is now known as the premiere natural resources conference in the South and as such reaches a broader and more diverse audience that is reflective of the multi-disciplinary and integrated systems approach of contemporary natural resources management and conservation.

Source of Funds

Smith Lever 3b,c and state

Northwest LA Watershed Summit

Mimi F. Stoker, Northwest Region

Key Theme: Water quality

Water and water related issues are a major concern to urban and rural residents of Northwest LA. Residents in Northwest LA rely on surface and ground water to supply water to home and business. Municipalities depend on surface water from Cross Lake, Toledo Bend, Red River, and Sibley Lake to supply water to the residents of Caddo, Bossier, Natchitoches, Desoto and Sabine Parishes. Smaller water systems and rural residents depend on ground water to supply their homes, and business water needs. The quality and quantity of water in Northwest LA. is a concern to urban and rural residents as many areas have experienced problems in both areas. Water and watershed information is an area that few citizens fully understand, but many are very interested in learning about.

The North West Louisiana Watershed Advisory Committee was formed and began meeting in December of 2003, under the leadership of Mimi Stoker, Area Agent for Environmental Programs in Northwest LA. The first Northwest LA Watershed Summit was conducted in August of 2004. The 2005 Watershed Summit was conducted on August 11, 2005. Seventy five residents from six parishes participated in the Summit to learn about the water related issues affecting urban and rural citizens. The Louisiana Water Management Plan, Use of a Constructed Wetland and local water issues were the topics addressed by experts at the summit.

The LSU Ag Center responded to the request by the Advisory committee to assist in planning and conducting the Water Summit to bring together experts and citizens. The Summit speakers addressed issues of the official Water Management Plan for Louisiana, and the benefits of Constructed Wetlands on Agricultural land. The Water Summit also provided a vehicle to inform interested citizens of the role the LSU Ag Center is playing in water related issues for rural and urban residents. The Master Farmer Program along with the tour of the constructed wetland at the Red River Research Station illustrated the Ag Centers commitment to relating research based information to the public in the form of educational programs on environmental issues. The summit also brings together water professionals and citizens to form coalitions that result in long term relationships and continued communications on environmental issues.

Source of Funds

State; Smith-Lever 3 b, c

Louisiana Master Gardener Extension Volunteers

Robert Souvestre, Horticulture

Key Theme: Natural Resources Management

The Louisiana Master Gardener Extension Volunteer Program is a statewide volunteer program that strengthens LSU AgCenter's leadership and education in the area of consumer horticulture. It is a service and educational activity designed to recruit and train volunteers to help meet the educational needs of home gardeners while providing an enjoyable and worthwhile service experience for volunteers. There are 22 Louisiana Master Gardener programs encompassing 46 parishes which represents 96% of Louisiana's population centers. LMGs are partners with LSU AgCenter personnel and officially represent the LSU AgCenter. The program allows Extension to extend education to an ever-increasing gardening audience and meet the public demand for information. The increased need for consumer horticulture information and improved public access to the LSU AgCenter has proven that highly trained LMGs presenting research-based information are recognized in their community as a primary resource for unbiased information. No other one program has contributed more visibly and effectively to the overall productivity of the horticultural area of the LSU AgCenter in the last 12 years than the LMG Program.

The LMG program is comprised of two parts. The first being recruiting and instruction of new volunteers. Classes are taught by LSU AgCenter faculty, other university faculty, industry, veteran LMGs, and gardening experts. Upon completion of the course, volunteers are asked to perform a minimum number of required volunteer hours and continuing education hours each year to maintain their certification. Volunteer opportunities identified and approved by Extension faculty are varied and meet local parish needs. They include working with school and 4-H youth, nursing home residents, hospital patients, gardeners new to the area and new gardeners, answering telephone calls, performing on-site plant health care clinics, utilizing demonstration and community gardens, public presentations and workshops, pest identification and recommendations, best management practices, garden shows and plant sales, municipal and Habitat for Humanity landscape projects, media efforts (newsletters, cable TV broadcasts), partnering with civic organizations and municipal entities, educational tours, plant trials and evaluation, urban tree protection and preservation, state conference, and on-site consultations. Nationally, the Master Gardener program retention rate ranges from 15-30%. Louisiana enjoys a 65% retention rate.

The Louisiana Master Gardener program trained 346 new volunteers increasing the active number of LMGs to 1,094. These volunteers provided 39,043 hours of their time to Extension educational projects. Through the efforts of these volunteers 56,222 people were exposed to researched-based consumer horticulture information. This volunteer service, equivalent to 20 full-time employees, increases the human capacity of Extension by 13 percent. The economic value of this service translates to a \$698,585 dollar benefit to the State of Louisiana. As impressive as these numbers are, what really matters is what these highly trained and talented volunteers have accomplished. Tangipahoa Parish Master Gardeners volunteered at 26 schools teaching 756 students about growing vegetables and the importance of a healthy diet. Ouachita Parish Alternative Center students learned where food comes by planting 4-foot by 4-foot vegetable gardens. Participation in this LMG project helped reduce ADHD symptoms, build self esteem and complement math, science and English curricula. The Extreme Garden Makeover gardening contest was designed as a learning experience used to teach people about growing gardens in Louisiana involving Shreveport area Master Gardeners. Over 1500 people received gardening information and have the opportunity to view landscaping best management practices. St. Tammany LMGs proposed, developed and maintained a unique garden space created for patients requiring recreational therapy as part of their medical rehabilitation. The Slidell Memorial Hospital's Rehabilitation Garden is entirely container-planted for patient access. Lafayette LMGs designed, planted and maintained a comprehensive demonstration garden located at the ULL Ira Nelson Horticulture Center. Volunteers conducted 28 outdoor classes for 842 area students at their Children's Garden. East Baton Rouge LMGs implemented a speakers bureau, producing over 20 slide and Powerpoint presentations that were offered at 42 public venues reaching over 1,600 people. The Master Gardener program enhances Extension's capability to meet local educational needs. Their partnership with Extension personnel has allowed for a continued expansion of programs and increased educational outreach to new audiences.

Source of Funds

Smith-Lever 3 b, c ; self generated funds, parish LMG Associations, FNP funds.

Scope of Impact

Multi-function: Multi-function (integrated extension-research) efforts are estimated at 100% of the total number of FTEs expended in the program. These efforts included research-extension collaboration in agent training, educational presentations, program planning and support, formulation of recommendations, publications, and resource for subject matter questions and information. The dollar value of the multi-function effort is \$314,934.48 (3.93 FTEs x 80,136 per FTE x 1.00).

Goal 4 – Research Program Summaries

Fears of a Post-Hurricane Toxic Wasteland

Robert Beine, Agricultural Chemistry

Key Theme: Hazardous Materials

Immediately following Hurricane Katrina, there were many public concerns by residents and rescue workers that the New Orleans-Lake Pontchartrain area had become a vast toxic wasteland. There was an urgent need to determine the actual risk posed by the flood waters. Also, with reconstruction efforts underway, there is much cleanup work and construction on new and damaged buildings. The need to ensure quality and safe use of disinfectants, termiticides and other pesticides is essential with the influx of pesticide applicators, mold mitigation operations, and construction workers.

The Louisiana Department of Environmental Quality (LDEQ) asked the Agricultural Chemistry Department to help in testing several hundred water samples taken from the areas affected by Hurricane Katrina and later Hurricane Rita. The Agricultural Chemistry Department quickly developed a multi-class testing program targeted to detect the potential pesticide contaminations that might occur. While LDEQ inspectors took samples that their department tested for biological and inorganic hazards, Agricultural Chemistry simultaneously tested these same samples for pesticide residues. The Agricultural Chemistry Department is a joint program with the Louisiana Department of Agriculture and Forestry (LDAF). As such, the lab's LSU AgCenter and LDAF chemists continue to work side-by-side testing regulatory samples for disinfectant efficacy, proper strength of foundation termiticide treatments, pesticide formulation quality, and potentially harmful pesticide residues.

Analytical results on the LDEQ samples indicated that while much devastation had occurred, there were few problems related to toxic substances in the flood waters. Only such actual testing can reduce fears created by excessive speculation. Current rebuilding efforts will continue to be monitored for correct use and quality of products.

Source of Funds

State, LDEQ, and LDAF

Research Addressing Salt Contamination of Rice Soils Following Hurricane Rita

Jason A. Bond, Southwest Region, Rice Research Station

Key Theme: Soil Quality

On September 23 and 24, 2005, Hurricane Rita struck the coast of southwestern Louisiana and southeastern Texas as a Category IV storm on the Saffir-Simpson Hurricane Scale. Following landfall of Hurricane Rita, an unprecedented storm surge inundated the coastal parishes of southwestern Louisiana, including part of Calcasieu, Cameron, Jefferson Davis, Vermilion, and Iberia parishes. Some flooded areas were covered with freshwater from lakes and bayous pushed out of these bodies by the force of brackish and saltwater from coastal marshes and the Gulf of Mexico. However, other areas were covered by concentrated saltwater from the Gulf of Mexico. The flood persisted as long as three weeks in some areas. The storm surge affected a myriad of agricultural lands, but a majority of the impacted areas are located in the rice-growing region of southwestern Louisiana. These extraordinary circumstances made clear definition of the effects of the storm surge extremely difficult.

Efforts are underway to define the extent and severity of salt contamination, to interpret results of soil tests revealing levels of salt contamination, and to offer recommendations for remediation of the contaminated soils. Greenhouse bioassays and laboratory analyses are ongoing to address rice production issues associated with the storm surge. Soil from seven sites in the impacted areas was collected, and laboratory analyses determined that soluble salt levels in these soils ranged from 0.92 to 12.9 dS/m (590 to 8,270 ppm). The greenhouse bioassay showed that seedling emergence and plant dry weight 21 days after planting were not affected in soils with ECe values 1.5 dS/m (980 ppm), whereas seedling emergence was reduced at least 76% in soils with ECe values 10 dS/m (6,430 ppm). Other greenhouse research revealed that the negative effects of salt

contamination were more pronounced when rice was water-seeded than when it was dry-seeded.

The levels of soluble salts remaining after the floodwater receded are cause for major concern and have left the productivity of large tracts of rice soils in southwest Louisiana in serious question for the 2006 crop year. Soil test results have shown, however, that soluble salt levels at the seven sites tested in greenhouse research decreased 40 to 60% from October 25 to December 12, 2005. Based on results to date, rice should only be planted if soluble salt levels are < 1.53 dS/m (1,000 ppm).

Source of Funds

State and Louisiana Rice Research Board

Relationships Between Wildlife Species and Landscape Management

Michael Chamberlain, Renewable Natural Resources

Key Theme: Wildlife Management

As landscapes throughout the southeastern United States continue to change and be impacted by anthropogenic activities, wildlife populations are increasingly facing uncertain futures. Agricultural and forest management activities continue to intensify, which inevitably changes habitat conditions for a suite of wildlife species. Species and groups of particular sociological and ecological importance, such as the Louisiana black bear, northern bobwhite, and neotropical migrant songbirds, are witnessing declining populations or are already at critically reduced population levels. Other species of notable economic importance (i.e., eastern wild turkey, white-tailed deer) are being forced to adapt to rapidly changing habitat conditions throughout their range. Additionally, exotic species (e.g., red-imported fire ant) are placing additional stresses on native faunal populations, resulting in unknown consequences to ecological systems and a host of wildlife species.

To address how landscape management is affecting wildlife species of sociological and economic importance, several research studies were initiated to examine how specific management techniques (e.g., prescribed fire, herbicide application) affect ecology, distribution, and abundance of wildlife. Specifically, research is detailing effects of silvicultural activities on brood-rearing habitat quality of northern bobwhite, in addition to how these activities affect landscape-level abundance and distribution of northern bobwhite. A third study is focused on examining effects of forest management in bottomland hardwood systems on ecology of wild turkeys. A fourth study is addressing a similar research question, but is centered on neotropical migrant songbirds on herpetofaunal species and is recently completed. Specific to the Louisiana black bear, a statewide research project is ongoing. One facet of the study involves restoration of the bear to portions of its former range using an innovative release technique, which involves translocation of denning females and their cubs. A second facet is focused on determining population viability of bears throughout Louisiana, whereas a third facet is examining ways to best manage nuisance behavior exhibited by bears when in close proximity to humans. Lastly, to address potential effects of red-imported fire ants on wildlife species, a long-term study is in its final stages and is assessing community-level effects of ants on native invertebrates and herpetofauna.

Results of the black bear research have revealed that the restoration technique being used is effective. An additional breeding population of bears is being established in central Louisiana to improve genetic integrity and connectivity among existing populations of bears in Louisiana. Specific to the fire ant research, findings suggest that fire ants may substantially impact various species of native insects, many of which are important to game birds such as northern bobwhite and wild turkey. In regards to the various projects examining how land management strategies affect wildlife, each is producing information targeted at improving management plans practiced by state and federal agencies, as well as private landowners. The project focused on northern bobwhite is allowing landowners and managers to manipulate burning regimes to improve habitat for bobwhites, and also provide information on relative effects of herbicide applications on habitat quality. Similarly, managers are benefiting from findings of the wild turkey study, in that forest management plans are being developed with foresight of potential consequences to focal wildlife species.

Source of Funds

Hatch, Coypu Foundation Trust, US-DOI Fish and Wildlife Service, and The LA Department of Wildlife and Fisheries

Detecting Effects of Forest Regeneration Practices on the Productive Capacity of Pine Plantations

Thomas Dean, Renewable Natural Resources

Key Theme: Forest Resource Management

The productive capacity of the forests within Louisiana is threatened by several factors. In addition to the multiple croppings timberland Louisiana has experienced, modern management attempts to produce greater quantities of wood and fiber from timberland to replace a declining forest inventory. According to the last Resource Planning Act (RPA) assessment of forest resources released in 1997, harvests in the South Central region of the US exceed net production by a factor 1.1. Removals, which include timberland harvested and timberland removed from the timberland base, exceeded net production by a factor of 1.2 during the same period. Greater expectations from timberland in Louisiana is also expected from the migration of timber-related activities along the Atlantic seaboard to the west Gulf region because of urban sprawl. The nearly exclusive use of rapidly growing, resource demanding families of loblolly pine on industrial lands may also tax the productive capacity of timberland. The increased management intensity necessary to increase timberland output may affect the productive capacity of timberlands from several avenues. One means of increasing production is to increase the harvest frequency, which not only extracts greater resources from the site but also shortens the interval between soil disturbance. Increased management may also change the composition of competitive vegetation, and planting faster growing varieties may increase nutrients extracted from the soil. One of the main questions in sustainable productivity is whether nutrient production by soil microbes keeps pace with nutrients extracted from the soil.

In 1993, a cooperative between the USDA Forest Service, Southern Research Station, International Paper Company, Temple-Inland Forest Products Corporation, Willamette Industries (now Weyerhaeuser Co.), LA Tech University, and LSU Agricultural Center was formed to chronicle the effects of whole-tree conventional harvesting and subsequent establishment techniques on the growth a new generation of loblolly pine trees. The original name for the cooperative was Monitoring Pine Productivity and Environmental Quality in southern pine plantations. The original 4 studies installed by this cooperative were intended to complement and expand studies installed on the USDA Forest Service National Forest System designed to investigate the effects of soil compaction and organic matter removal, which were the two factors thought to be affected by harvesting that would effect tree growth (Powell et al. 1996). Since 1993, the name of the cooperative has changed to Cooperative Research in Sustainable Silviculture and Soil Productivity (CRiSSSP); one site was lost to fire during its fourth growing season; and two new sites have been installed. Roy O. Martin Timber Company has joined the cooperative and Willamette Industries was bought by Weyerhaeuser Company. The oldest sites are in their tenth growing season, and the youngest site is in its second growing season. During the last year, a study was installed on three of the sites to measure the balance between nitrogen production by soil microbes (mineralization) and uptake by the planted trees and understory vegetation.

During the 2005 growing season, a peak of 76 kg N/ha was mineralized. This was somewhat lower than the cumulative N taken up by trees and vegetation: 105 kg N/ha. The deficit between in N mineralization, however, did not limit N uptake; N uptake increased steadily with increasing N mineralization in these young plantations. Nitrogen uptake and mineralization were secondarily related to average tree height. In the youngest plantations, trees were relatively short and exhibited the lowest values of N uptake and mineralization; in the oldest plantations, trees were relatively tall and exhibited the highest values of N uptake and mineralization. Where treatment affected tree height, corresponding differences in N uptake and mineralization were observed. Based on these preliminary results, N uptake can exceed N mineralization in plantations less than 10-yr old without limiting uptake and presumably growth. Apparently, a sufficient reserve of usable N exists in the soil to offset the deficit. This reserve is likely to be exhausted as the plantation ages and trees become taller. Nitrogen fertilization would seem to be the most practical means to reestablish this reserve and minimize N limitation on future tree growth.

Source of Funds

State, McIntire--Stennis Project No. LAB93736, and USDA Forest Service Southern Research Station

Louisiana Agriclimate Information System (LAIS) Aids in Disaster Response

David Greenland, Biological and Agricultural Engineering; Richard Bengtson, Kappie Mumphrey, Jay Grymes, Royce Fontenot

Key Theme: Weather and Climate

The principal function of the LSU AgCenter's Louisiana Agriclimate Information System (LAIS) is to provide meteorological information for agricultural producers and researchers to help make decisions on field and other operations. However, for several years the LAIS has also been positioning itself to potentially aid in disasters that are related to Homeland Security issues. In many cases, the meteorological information can be most useful if it is available instantly or within a short period of time. The large geographical extent of the state gives rise to a variety of different weather conditions at any given moment. The hurricane disasters of the late summer of 2005 provided a good test of the ability of LAIS to provide important information.

LAIS is a network of 25 electronic weather stations throughout the state. Raw data, tabular, and graphical reports are available on the internet at <http://www.lsuagcenter.com/weather/>. The mission of the LAIS is to collect, process, and distribute detailed meteorological data relevant to agricultural production, natural resource management, environmental protection, and public safety. A recent research grant provided funds to improve the potential for rapid response and reliability of the system. The funding increased the ability of LAIS to monitor severe weather events and/or emergency management situations such as hurricanes by providing data collection backups to the stationary sites. In addition, steps are underway to more fully integrate the LAIS with the operation of the LSU AgCenter Information Technology group. A major addition was the development of a portable weather station that could be transported to locations requiring weather information. The portable station was tested at the AgCenter St. Gabriel Research Station during sugarcane burning operations in December 2004 and at the Ben Hur Research Station next to the LSU Fire and Emergency Training Institute. The operation of the portable station was also demonstrated at the Sugarcane Field Day in St. Martin Parish in last July.

Following Hurricane Katrina, the LAIS was asked by the State Office of Emergency Preparedness/Federal Aviation Administration to deploy its portable weather station to New Orleans International Airport. Weather data were required by the airport control tower since the National Weather Service (NWS) automated station was out of commission. Absence of weather data made airport operations even more hazardous than they already were. AgCenter employees Royce Fontenot, Jeremy Birch, and Jay Grymes, erected the portable station on the north side of the airport. They then installed a radio system to deliver the data directly back to the control tower. For several days the LAIS data was the only direct source of local weather data for the control tower. Thousands of persons using the airplanes and the large number of helicopters flying into and out of the airport on rescue and support missions, including the President of the United States, unwittingly benefited from the AgCenter weather data.

Post Katrina and Rita storm analysis of LAIS data is currently underway and important findings are emerging. First, the LAIS can be used to identify data uncertainties in more standard networks such as the NWS network. Second, the LAIS has the best meteorological data set in south Louisiana of any meteorological observing network. Third, peak wind velocities forecasted by the National Hurricane Center models were overestimates for Katrina and Rita and are likely to be overestimates for most storms. Fourth, the length of duration of high wind velocities can be of equal or greater importance than the magnitude of the peak wind velocities as far as structural and vegetation damage is concerned.

Enhancing emergency preparedness is an increasingly important goal in many sectors of today's society and one in which LAIS can help.

Source of Funds

State, Hatch, and LA Board of Regents Enhancement Grants

Instrumentation and Control Engineering to Improve Productivity and Environmental Sustainability of Aquacultural and Aquatic Biosystems

Steven Hall, Biological and Agricultural Engineering; Randy Price, Terrence Tiersch

Key Theme: Natural Resources Management

The use of instrumentation and control engineering in aquatic ecosystems can assist in improving productivity in aquaculture systems. Other applications include use of engineered reefs for reduction of coastal erosion (particularly in case of hurricanes), environmentally friendly methods to reduce pest pressures in aquaculture, and more effective ways to improve water quality.

During 2005, continued development of autonomous boats and automated fixed systems was pursued. Automation of geothermal heat was used to study channel catfish *Ictalurus punctatus* biology from a degree day perspective. Autonomous vehicles were used to capture water quality in ponds and natural water bodies, and that research is ongoing. Tests of autonomous small scale airplanes and ATVs were conducted for capturing information on agricultural and environmental parameters. Artificial reef technology was further developed, wavetank testing was done, and conclusions are presented in publications.

Automation that simultaneously reduces labor costs, improves environmental impact and increases production can be the difference between success and failure. Better understanding and improved production systems can also assist in success in this industry. Improved production of oysters and reduced or reversed coastal erosion is critical in Louisiana and other low lying coastal areas, especially in year 2005 which saw the destruction due to hurricanes Katrina and Rita. Industries, communities and farmers, from oysters to alligators, as well as shrimpers and recreational fishers all were hurt, and all will benefit from improved coastal health. It is pleasing to note that our work was very timely in this regard, and only sad that more work was not supported previously to better protect inland areas. Ongoing work is focused on further developing this work and working with farmers including oystermen and alligator farmers during recovery and rebuilding to benefit the many people living near the coast via improved coastal stability.

Source of Funds

State, USDA, private funds (industrial), SeaGrant, and Hatch funds

Advances in Sweet Potato Insect Pest Management Practices

Abner Hammond, Entomology

Key Theme: Integrated Pest Management

Pest management practices improve profits for sweet potato growers, packers and shippers. Insects have the potential to cause an average loss to the harvestable crop of about 27 percent and in some severe cases insect loss approaches 100 percent in some fields.

In cooperation with the USDA IR-4 program and the Louisiana State Department of Agriculture research based petitions for the use of Section 18 insecticides has been granted by the EPA. Estimated potential loss without use of IR-4 based Section 18s for sweet potatoes could have exceeded \$18 million.

Louisiana sweet potatoes were harvested on about 17,000 acres with a net value of ca.\$1700/acre. Root feeding insects damage on average about 27% of the roots in a field in any given season. Pre-plant soil applications of Lorsban and Mocap provide a reduction in damage to roots, thus saving growers as much as \$8.5 million. Sweet potato weevil and banded cucumber beetles can be a major cause of damage in the quarantine areas of Louisiana. Capture, a Section 18 material, and Pennacp M applied at 7 to 10 day intervals beginning 45 days post-transplant saved growers \$ 18 million, according to USDA and State of Louisiana estimates. Laboratory bioassays with technical grade insecticides of labeled products indicate a moderate change in insecticide susceptibility of field-collected Louisiana weevils compared to an untreated population from Texas. Resistance ratios indicate a 2-fold decrease in susceptibility for 4 of 5 insecticides evaluated against the two

populations. This research suggests that insecticide resistance monitoring is a necessary activity conducted by entomologists in the LSU AgCenter.

Source of Funds

Hatch and State Funds.
USDA, CSREES, RAMP Project.
USDA Cooperative Project with Principal Investigator.

Studies on Formosan Subterranean Termites: New Control Procedures and Methodologies

Gregg Henderson, Entomology

Key Theme: Integrated Pest Management

Formosan subterranean termites are the major pest insect in the southern US, causing approximately 1 billion dollars in damage and costs for repairs each year. The purchase of a home is often the most costly investment one can make and one that needs protection. Because of the cryptic nature of subterranean termites, damage can sometimes be caused “right in front of your eyes,” but actually behind a wall or brick facade. Termites are after cellulose the major constituent of wood. New directions and products that are safe and efficacious are needed.

Research has been multidisciplinary and has brought in the expertise of chemists and biochemists to bring new solutions to this century old problem. Natural products that are safe to humans have been isolated from several plants and tested and proven to be effective as wood treatments or soil treatments against Formosan subterranean termites. Chemicals isolated from plants include nootkatone and its derivatives from vetiver grass, 2-acetonaphthone from corn bud oil and matrinins from Ku Schen. The compounds are long-lived and have promise as termiticides and wood preservatives. Another chemical found in ball point pen inks, 2-phenoxyethanol, has been shown by our laboratory to be able to direct termites away from food sources needing protection and toward food sources that are laced with a toxicant. Colony decline has been shown in several laboratory studies. Field studies utilizing the Citrus Station in Port Sulphur are about to begin. Industry has expressed an interest in licensing several of these LSU AgCenter patents. On another front, studies are underway to understand how termites regulate their caste system, which is made up of reproductives, soldiers, white soldiers and workers. Caste regulation is the key to colony efficiency and devastation to commercial goods. Unlocking the mechanisms used for caste regulation can be used to destroy them. Presently, we have discovered that soldiers and white soldiers play a major role in this control based on their ability to regulate juvenile hormone in the colony. How they regulate this control is now under investigation.

The greatest impact is in providing both homeowners and pest control operators an awareness of the problems faced with termites and the means by which they can take control away from this hidden invader, the Formosan subterranean termite. The products and inventions developed are helping to bring revenue into the university so that more can be done in the development of safe and efficacious termite control. The simple invention of the pop-up termite indicator now provides a way for a homeowner to see into the darkness of the soil and expose foraging termites. When the location of a termite colony is known, the ability to control them is almost guaranteed. Moreover, looking into the colony dynamics of termites brings this mysterious, invasive pest into the light of a visible, controllable pest. New wood treatments and ways to manipulate termite foraging increases control while decreasing the need for a high volume of termiticide. Its a win-win situation for the people of Louisiana. Only the termite loses.

Source of Funds

State, Hatch, Industry support, and J. Bennett Johnston Fund

Assessing High Dose/Refuge Strategy for Managing Sugarcane Borer Resistance to Transgenic Bt-Corn in the Mid-Southern Region of the United States

Fangneng Huang, Entomology; B. Rogers Leonard, Xiaoyi Wu

Key Theme: Integrated Pest Management

Adoption of transgenic *Bacillus thuringiensis* (Bt)-corn has increased rapidly in the mid-southern region of the United States. Recently, the sugarcane borer, *Diatraea saccharalis* (F.), has emerged as a common pest in corn in some areas across the region, especially in Louisiana. Resistance management (IRM) for sugarcane borer might be critical for sustainable use of Bt-corn because this species has relatively high tolerance to the Bt Cry1Ab toxin. In addition, Bt-corn hybrids exhibit variation in efficacy against sugarcane borer. The current high dose/refuge IRM strategy for Bt-corn was developed to manage European corn borer and/or southwestern corn borer resistance. Information that can support an IRM strategy to manage Bt resistance in sugarcane borer does not exist. Research has been initiated at the LSU AgCenter to validate several key pre-requisites of the high dose/refuge strategy for managing sugarcane borer resistance to Bt-corn.

A cost-effective F2 screening method for detecting Bt resistance in sugarcane borer has been developed in the Department of Entomology at the LSU AgCenter. More than two hundred iso-line families of sugarcane borer collected from Louisiana were screened for Bt resistance during 2004 and 2005. A landmark discovery was the detection of a major Bt resistance gene in a Louisiana field population. The Bt-resistant insects successfully completed larval development on commercial Bt corn hybrids. Larval survival of homozygous Bt-resistant, heterozygous Bt-resistant and Bt-susceptible sugarcane borer were evaluated on commercial Bt- and non-Bt-corn hybrids during 2005. An average of 39 ±2% larvae survived non-Bt plants after 21 d. Larval survival on the seven Bt corn hybrids tested ranged from 0 to 4 % for Bt-susceptible insects, 1 to 7% for the heterozygous Bt-resistant insects, and 20-25% for the homozygous Bt-resistant insects. Preliminary data indicate that most of these commercial Bt hybrids qualify as high dose Bt corn against sugarcane borer. However, some hybrids may not produce sufficient levels of Bt Cry toxin to kill all heterozygous Bt-resistant insects.

The goal of this project is to secure the long-term success of Bt corn as a corn borer management tool for mid-southern corn producers. In addition, the modified F2 screening method has several advantages compared to screening on Bt plants. Using Bt plant leaf tissues as a diagnostic dose saves considerable space and thus reduce the cost and labor involved in the screen. Screening F2 progeny on Bt leaf tissues also has some advantages over diet assays. The F2 screening protocol for sugarcane borer developed in this study has been used for detecting Bt resistance in the southwestern corn borer, an important corn stalk borer in the Central and Southern United States. A Bt resistance monitoring program for sugarcane borer and southwestern corn borer using the novel F2 screening technique developed in this study has been initiated in Louisiana. The Bt-resistance in the sugarcane borer population found in this study is the first major resistance to commercial Bt-corn hybrids in any corn stalk borer species worldwide. Thus, the Bt-resistant strain has value in exploring and understanding mechanisms of Bt resistance in sugarcane borer as well as in other corn borer species. Cooperative studies on Bt resistance mechanisms in sugarcane borer are being established among several institutions in the United State, Spain, and Germany. In addition, the Bt-resistant insects derived from the present study make it possible to validate high dose expression of Bt corn hybrids.

Source of Funds

State, Hatch, National Science Foundation Center for IPM, and Louisiana Soybean and Feed Grain Promotion Board

Identification of Host Defense Factors Against the Protozoan Parasite *Perkinsus marinus* in Eastern Oysters (*Crassostrea virginica*)

Jerome F. La Peyre, Veterinary Science

Key Theme: Biological Control

Dermo disease caused by the protozoan parasite *P. marinus* causes extensive mortalities of eastern oysters and has prevented the development of intensive aquaculture of this species along the Atlantic and Gulf of Mexico coasts. In Louisiana, the yearly mortality rate due to *P. marinus* has been estimated at greater than 50% for market-sized oysters. Elimination of *P. marinus* from oysters and ultimately the development of disease resistant oysters would therefore offer direct economic gain

to the oyster industry as well as help restore ecologically beneficial oyster reefs.

The complete cDNA sequences of two lysozymes of the eastern oyster were determined and their expressions in oyster tissues were characterized by real-time PCR. High levels of lysozyme 1 gene expression were measured in oyster mantle, gills, labial palps and to a lesser extent, in hemocytes. The levels of lysozyme 1 gene expression increased following microbial challenge. This increase supports a major role of this enzyme in the oyster host defense. Lysozyme 1 purified from plasma, inhibited the growth of *P. marinus* and had greater antibacterial activity than lysozyme 2. High levels of lysozyme 2 gene expression were only measured in the digestive gland. Lysozyme 2 purified from crystalline styles had biochemical properties typical of lysozymes found in the digestive system of animals. The complete cDNA sequences of two protease inhibitors Cvsi-1 and Cvsi-2 were determined and their expressions in oyster tissues are being characterized by real-time PCR under various experimental conditions to evaluate their functions in the eastern oyster host defense against *P. marinus*. Cvsi-1 and Cvsi-2 originally purified from oyster plasma inhibited Perkinsin, a major protease of *P. marinus*.

The identified defense proteins can be used as selection markers for breeding disease resistance to *P. marinus* in eastern oysters and minimizing disease related mortality. Alternatively, these oyster host defenses can provide endogenous genes for developing disease resistant oysters by increasing their expression through genetic manipulation.

Source of Funds

State, Hatch, National Sea Grant, Louisiana Sea Grant, and National Marine Fisheries Service

Coastal Plants Program

Michael Materne, Agronomy and Environmental Management; Steve A. Harrison, Herry Utomo, Prasanta Subhudi, Gary Breitenbeck and Marc Cohn

Key Theme: Biological Control

Since the 1930s, one million acres of productive and protective Louisiana wetlands have been converted to open water by human activities and natural forces such as the hurricanes of 2005. Louisiana will lose another one million acres in the next 40 years without bold action on a scale never before attempted in the United States. Louisianans live, work, and play on the very edge of a crisis, and the continued loss of wetlands will directly affect our nation's security, navigation, energy consumption, and food supply. On a local level, the potential for loss of life, industry, ecosystems, infrastructure, and culture cannot be overstated. Consequently, there is a widespread consensus that we must begin a comprehensive construction program for the entire Louisiana coast. This program, which has been priced at approximately \$14 billion, will represent the largest environmental engineering effort in U.S. history.

The Coastal Plants Program (CPP), established in 1990, represents a long-term commitment by the LSU Agricultural Center to focus proven scientific technologies and outreach capabilities on issues critical to restoring the coastal ecology of Louisiana. The Coastal Plants Program combines the expertise of AgCenter plant breeders, biotechnologists, ecologists, and other plant scientists into a holistic program designed to facilitate the development and utilization of native plant resources to preserve remaining marshes and stabilize those that are being re-created. Plant scientists within the Coastal Plants Program are developing improved wetland plant varieties using the tools of ecology, agriculture, breeding and biotechnology to speed the development of man-made coastal wetlands to functional equivalency or superiority to natural wetlands. The objectives of the Coastal Plants Program are: to develop science-based information on factors affecting establishment and maintenance of wetland plant ecologies and restoration techniques and to conduct a systematic genetics and plant breeding program that incorporates ecological considerations and produces superior plant types for use in coastal restoration. This program should deliver enhanced, plant-based restoration technologies, establish an information exchange program for stakeholders, and release superior plant materials for restoration activities.

Beginning in 1990, the Coastal Plants Program, in cooperation with the USDA Natural Resources Conservation Service Plant Materials Program, implemented a program of wetland plant cultivar release to commercial nurserymen. Since 1990, the CPP with NRCS, has jointly released six cultivars for vegetative and wildlife restoration on barrier islands, saline, and brackish marshes. These released cultivars are used almost exclusively in contract restoration by the federal, state, and private restoration community, and have developed into a Louisiana wetlands nursery cottage industry. The CPP developed protocols for tissue culture plant regeneration, embryo development, and artificial seed. The CPP has conducted studies on

genetic diversity of species such as sea oats and smooth cordgrass. It has developed vigorous smooth cordgrass lines with enhanced seed production characteristics to reduce dependency on expensive transplant-based restoration through establishment of a more efficient seed-base program. Foundation plots are being established for a number of marsh plants to provide a reliable source of high quality planting materials that are improved and quality-assured, much like conventional seed and nursery industries. Improving wetland plant species and seed technology is a relatively new restoration concept, and the LSU AgCenter CPP is the only group to date to successfully demonstrate remediation of damaged marsh sites with aerial application of seed. The CPP will continue to develop a more comprehensive understanding of hydrologic-soil-plant responses that are essential before wetland plant restoration will approach the scientific standards required for acceptance of expensive, large-scale vegetative restoration. This program will add to the knowledge base, will advance coastal restoration technology, and will develop mechanisms that will provide coastal wetland project planners, designers, and builders with additional management strategies that will better incorporate vegetative diversity and productivity into coastal restoration.

Source of Funds

State, Hatch, USDA-CSREES Non-competitive grant

White-tailed Deer Abundance and Herbivory in a Coastal Bottomland Hardwood Forest

John Nyman, Renewable Natural Resources

Key Theme: Forest Resource Management

Throughout the U.S., white-tailed deer populations generally have increased since the 1950s. Correspondingly, deer have come into the forefront of forestry and wildlife management programs as a recreational resource and a pest. Even where deer harvest is prominent, deer herbivory on vegetation has reduced abundance of other wildlife such as songbirds. Projections that deer populations could continue to increase suggest that undesirable effects of deer herbivory on plant communities, and hence on other wildlife, could intensify. Effects of deer on forest vegetation have been studied in upland forests of northeastern and upper mid-western U.S., but there have been few studies in forests of the southeastern U.S., and even fewer in forested wetlands.

A field study was conducted at the Barataria Preserve, Jean Lafitte National Historical Park and Preserve in south Louisiana, where managers were concerned that deer were concentrating and altering forest vegetation near a walking trail where hunting is not allowed. We used aerial thermal imaging techniques to estimate deer abundance and distribution, which indicated there were at least 389 white-tailed deer after the hunting season, and that white-tailed deer concentrated in forests rather than in marsh. We excluded deer from some study plots with fences, and we simulated high juvenile tree abundance by planting. Deer did not affect the few naturally occurring juvenile trees, but reduced survival of the more abundant, planted juvenile trees. It therefore appears that deer reduce survival of native juvenile trees where they occur in high abundance, such as under gaps in the forest canopy. Gaps that we studied contained few native juvenile trees but many juvenile Chinese tallow (*Triadica sebifera*), which is an undesirable, exotic species.

Managers at Jean Lafitte National Historical Park and Preserve now have better information on which to base their deer management plan. Deer harvest there averaged 25 deer/year, but has been increasing slowly since 1985. Despite that increase, the vegetation data that we collected suggested that sport hunting has not reduced deer populations enough to protect juvenile trees where they are abundant. Even without the results of the herbivory study, the harvest there is considered minimal because it is widely assumed that white-tailed deer easily sustain a harvest of 25%/year, which would be equivalent to 98 deer/year from a population of 390. Such information is needed because managers must justify their decisions to competing interests such as hunting and anti-hunting segments of the public. Our study of the effects of deer on juvenile forest trees was only the second from bottomland hardwoods in the southeast, and was the first to attempt aerial thermal imaging. For these reasons, we were selected to share our finding with deer managers and researchers at the 29th Annual Meeting of the Southeast Deer Study Group (held 26-28 February, 2006). Our study demonstrated the need to document how white-tailed deer affect survival of naturally occurring juvenile trees where they are abundant, such as under canopy gaps. To facilitate such future research, we constructed six enclosures in canopy gaps at the Barataria Preserve, but we believe that all were destroyed by Hurricane Katrina, which probably also greatly increased the number and size of canopy gaps.

Source of Funds

State and United States Department of the Interior, National Park Service, Jean Lafitte National Historical Park and Preserve, Cooperative Agreement No. H7530-02-0014

Measurements of Productivity and Survival for Birds Using Wetlands Habitats in Louisiana During a Segment of Their Annual Cycle

Frank C. Rohwer, Renewable Natural Resources

Key Theme: Wetlands Restoration and Protection

Waterfowl and other wetland birds are of great importance to the economy and culture of Louisiana. The state has a long history of placing very high value on the recreation associated with duck populations. The recreational value of wildfowling translates directly into economic value to landowners and groups that provide services to waterfowl hunters. While the value of waterfowl to consumptive users is great, the value of wetland wildlife to non-consumptive users of wildlife may be even greater. Clearly, there is a great need to effectively manage wetland wildlife. That need is especially great for waterfowl, where the poor hunting seasons of the past two hunting seasons have led to Louisiana senate hearings to try and understand the causes of this problem that is of urgency to many Louisiana residents.

Numbers of ducks wintering in Louisiana are a function of population abundance and distribution. Louisiana sits at the base of the Flyway, so distribution is primarily influenced by fall and winter weather of northern states. However, duck populations are driven by two factors-- water on the prairies and duck nesting success. Most duck management is aimed at improving duck nest success. LSU AgCenter researchers have been working to determine the most cost effective ways to improve duck production. Our pioneering work on predator management has shown that seasonal reductions in medium sized mammals has more than doubled nest success on habitat plots ranging from 1 to 36 square miles. Moreover, brood survival of Mallards increased from 36% to 57% for control and trapped blocks, so predator reduction increases both nest success and brood survival. LSU AgCenter researchers have also worked to understand the causes of declines for species of interest, such as Pintails. This research revealed that shifts in farming in prairie Canada have left more standing grain stubble on the spring landscape, which is an ecological trap for Pintails. Pintails nest in the stubble and suffer high nest loss to predation and equipment used for spring planting.

LSU Agricultural Center information about predator management has led to major changes in waterfowl management. The US Fish and Wildlife Service has acknowledged the success of predator reduction by making this a viable management option in several management districts in the prairie region. The Commission for the LA Department of Wildlife and Fisheries has long recognized that Louisiana ducks are derived from prairie breeding grounds and has provided millions of dollars of support for waterfowl management on the breeding grounds. For the past several years much of that funding has been directed at predator reduction on selected blocks of excellent breeding habitat.

Source of Funds

State, Delta Waterfowl Foundation, Louisiana Department of Wildlife and Fisheries and the US Fish and Wildlife Service.

An Update of the U.S. Treated Wood Products Industry

Richard Vlosky, Renewable Natural Resources; Todd F. Shupe, James M. Fannin

Key Theme: Forest Crops

Our society depends on wood for a variety of uses. As population increases, so does our need for wood. In areas subject to a high risk of decay, wood that is preservative-treated is often recommended to prevent decay and ensure structural integrity. Currently, 42% of southern pine is treated, and 13%-15% of all U.S. wood is treated. Steel, concrete, plastic, and aluminum are some alternatives to treated wood in certain applications, but these materials often result in either higher costs, higher energy requirements in the extraction and fabrication processes, greater environmental degradation, or higher dependency on

foreign sources for imported materials. In addition, substitute materials may not be appropriate for some uses. For example, some types of steel may corrode, concrete may deteriorate in salt water, and plastic may not have the strength and durability and structural integrity. Numerous studies have shown that properly treated wood will perform well in adverse situations. Perhaps the greatest threat to the competitiveness of treated wood in the market comes from misinformation from mass media and substantial market penetration and marketing programs by treated wood alternatives. The end result has been a negative affect on society's perception of treated wood.

In 2005, a survey was conducted to continue previous statistical treated wood manufacturer studies conducted by James T. Micklewright. The last study published by Dr. Micklewright was Wood Preserving Plants in the United States, 1997.

Results convey the current status of the treated wood industry at the national level. Information will provide an overall scope of the industry including total production (shipments), distribution channels, species, preservatives, and products treated. Current and potential Louisiana treated wood producers can use this information to make business decisions and better competitively position themselves in national markets.

Source of Funds

State, Hatch, and Southern Forest Products Association

Organic Carbon Transformation and Sequestration in Coastal Wetland Soils

Jim Wang, Agronomy and Environmental Management

Key Theme: Wetlands Restoration and Protection

Global warming due to the increase of CO₂ emission from the burning of fossil fuels has caused alarming concerns over ecological changes in the earth environment we live in. The sea level rise as a result of global warming has a profound impact on coastal wetlands of Louisiana. Every year, the State loses about 35 square kilometers of coastal marshland due to frequent flooding caused by sea-level rise. This impact directly influences a major portion of agricultural production of the state. Vertical accretion of organic matter along with deposition of mineral sediments has been recognized as the two most important factors affecting stability of coastal marshlands. Therefore, the stability of soil organic carbon could greatly affect vertical accretion. Besides the significance to the coastal wetland stability, organic matter accretion could also play an important role in carbon sequestration in coastal wetland soils. Various approaches have been proposed to sequester atmospheric CO₂, but sequestering CO₂ as soil organic matter offers great potential at very low cost. The high organic input along with slow decomposition rate suggests that wetlands may serve as an important C sink for atmospheric CO₂. In addition, the current wetland restoration activities could provide an opportunity to incorporate carbon sequestration as part of future natural and constructed wetland functions. Currently, there is very little understanding of organic matter dynamics in coastal wetland ecosystems. This lack of understanding has greatly hindered our effort to manage carbon sequestration.

Both field and laboratory experiments were conducted in 2005 to (1) gain understanding of soil organic carbon transformation under existing soil conditions of major Gulf coastal wetland ecosystems: bottomland hardwood forest (Swamp), freshwater marsh, brackish marsh, and salt marsh, (2) determine the effects of major electron acceptors and cations on soil organic matter stability of different wetland ecosystems, and (3) assess the integrated effects of saltwater intrusion on soil organic matter stability of different wetland ecosystems. It was found that swamp soils had the lowest organic carbon content as compared to marsh soils. Slight different distribution of organic carbon moieties were observed in different ecosystems. In general, swamp soils contained more aliphatic carbon than marsh soils. More aromatic carbon and less polysaccharide carbon were observed in bottomland forest and saline marsh soils as opposed to those freshwater marsh samples. It was also found that swamp and freshwater marsh soils had higher N₂O production than salt marsh. The production of N₂O had no consistent trend across surface to subsurface profile of three different ecosystems. The potential denitrification rate correlated well with total soil organic carbon and different carbon moieties. These results are important in understanding soil organic carbon transformation dynamics in relation to N₂O production in coastal Louisiana wetlands. In addition, it was observed that increasing calcium and soil clay contents decreased the rate of carbon gas emission from wetland soils sediments in both swamp and freshwater marsh. Increasing salinity level also decreased carbon gas emission. Finally, it was showed that labile carbon determined by short-time incubation correlated well with polysaccharide carbon as estimated by ¹³C NMR analysis.

This project has particular significance to Louisiana, which has been losing coastal wetlands due to sea level rise caused by global warming. The organic matter accretion along with mineral sediments are considered as the two most important factors in controlling health of Louisiana coastal marshes. On the other hand, the organic matter stability will also increase organic carbon sequestration. Current activities on wetland restoration have created a unique management opportunity to “build in” carbon sequestration as a future function of natural and constructed wetlands. The result from this project will help us to develop an adequate ecological strategy to take advantage of wetland ecosystems to sequester global atmospheric CO₂ as well as to stabilize coastal marshlands.

Source of Funds

State, Hatch, USDA-NRI and Louisiana Board of Regents

Goal 5 – Extension Program Reports

Statewide 4-H Service-Learning Training: The Beginning of Great Things to Come

Janet Fox, 4-H Youth Development; Lisa Arcemont, Debbie Bairnsfather, David Bocage, Melissa Cater, Lanette Hebert, Chad Higgins, Debbie Hurlbert, Dawn Jason, Juanita Johnson, Kim Jones, Katie LeBlanc, Karen Martin, Jan Morgan, Karol Osborne, Todd Tarifa, Mark Tassin, Sarah Williams

Key Theme: Youth Development/4-H

Youth Professionals have been struggling with the lack of student engagement and youth who are not prepared for the future. “How can we engage youth to prepare them to become capable, competent adults who are equipped to lead their communities in the future?” According to Harold Howe of the Rockefeller Foundation, traditional teaching modes still dominate learning experiences where students are passive learners. Many learning opportunities neglect in-depth discussion, student responsibility for learning, and efforts to relate what is studied to their own lives and the world they live in, according to Dr. Howe. With service-learning, students move beyond the educational experience to see the relevance of learning in their real life experience. It enhances students` self esteem and sense of civic responsibility through making a difference in their communities. Service-learning enhances critical thinking skills and improves interpersonal skills.

The LSU AgCenter State 4-H Team, supported by local 4-H agents and 4-H members, has been laying the groundwork for the Service-Learning Initiative. To build a strong foundation, two Statewide Service-Learning Trainings were held to reach parish teams made up of staff, community collaborators, 4-H adult volunteers and youth. The goals of the Service-Learning Training focused on the four H’s: Head, Heart, Hands and Health. For the head, the participants developed an understanding and application of subject matter. For the heart, perspective transformation was targeted in order to build a team of caring, committed individuals through community collaborations. For hands, the training focused on citizenship skills and values focusing on developing youth interest in impacting the community as well as understanding the needs of the community. For health, the training focused on personal and interpersonal development focused on engaging youth and adults in partnerships for their community. The training offered participants information on Service-Learning, Youth Voice and Community Ownership, Needs Assessment, Service-Learning Planning and Preparation, Meaningful Service, Reflection, Evaluation and Celebration. Following the training, the teams will provide leadership for service-learning programs in their parishes and areas.

As a result of participating in the 2005 Service-Learning Training, over 200 youth and adult participants indicated the following: 91% of participants surveyed indicated they understood the difference between service-learning and community service as a result of the training. 91% of participants felt reflection is a good way for kids to learn from their service endeavors. 91% of participants felt it was important to include other youth service organizations in the planning stages of a service-learning project and 93% felt it was important to also include community leaders. 96% of participants reported they understood to involve community service leaders in their parish service-learning project. 93% of participants reported that they understood how to involve youth in their parish service-learning project. 94% felt it is important to evaluate their parish service-learning project. 95% of participants felt it was important to plan a celebration for the participants of a learning service-learning project. 97% of participants felt they understood what meaningful service is and that their community could benefit from service-learning endeavors. 97% of participants also felt it was important to report the results of the service-learning project to community leaders and government officials. 98% of participants felt it was important that youth take part in the decision-making process concerning service-learning projects. 99% of participants felt it was important to listen to youth when planning a service-learning project and also felt that the youth in their parish would benefit from participating in a service-learning project.

Source of Funds

State; Smith-Lever 3 b,c

Scope of Impact

Multi-state: It is estimated that the value of the Youth Development – Statewide 4-H Service-Learning Training: The Beginning of Great Things to Come program, is \$1,756,100. (109.57 FTEs x \$80,136 per FTE x .20)

Educational Support in Community Recovery

Ramona S. Gentry, Crescent Region; Jan Morgan

Key Theme: Community Development

Two thirds of the parish of Plaquemines has been destroyed by Hurricanes Katrina and Rita. All schools and communities in Southern and Eastern locations have been destroyed. The most Northern community of Belle Chasse escaped severe damage, and schools in Belle Chasse have reopened. Recovery efforts throughout the parish are slow, but progress is being made.

4-H and FCS agents have established enrichment programs at all functioning school locations. Approximately 250 students are participating in Organ Wise, Take 10, and Character Education. Educational materials on recovery have been distributed throughout the parish and in the schools to support families in crisis. The AgCenter faculty responded quickly to provide educational support in the community and schools.

6,000 copies of disaster recovery materials have been distributed in the parish. Agents broadcast services on local cable network and through local newspapers. Agents provided enrichment programs to 250 youth in nutrition/health, stress management, character education, 4-H. Schools are operating under extremely stressful conditions. Families, teachers and students continue to be displaced and disoriented. Providing programming and support to the schools and communities help to bring some sense of normalcy on the road to recovery.

Source of Funds

LSU AgCenter
FNP

Creating A Sustainable Workforce in Today`s World

Dora Ann Hatch, North Central Region; Cathy Judd, Deborah Cross, Karen Martin, Kay Lynn Tettleton

Key Theme: Workforce Preparation - Youth and Adult

Since 2003, approximately 360 employers and employees have been trained in Workplace Ethics. Knowing that 70% of those who leave jobs cite not being valued as their reason for departure, it's not surprising that some companies have requested the training to decrease their job turnover rate. Turnover means loss of productivity and loss of income. When employees feel they are important they are loyal and more productive. Relationships with other employees are equally important. Everyone wants and needs to be valued. Employees and employers, who treat others as they would like to be treated, generally have a better work environment and have lower employment turnover.

"Workplace Ethics" training is a series of eight modules that teach respect and conflict resolution; responsibility; trustworthiness; fairness; caring; citizenship; decision making; and team building. The 6 to 8 hour training is taught at the convenience of employers; some classes are taught in two or three hour blocks over a period of several weeks. The curriculum has also been used to help prepare those entering the job market for the first time. For the training to be most effective, LSU AgCenter parish agents interview employees and employers at the job site to determine their needs before providing the training.

Over 300 white and blue collar participants agree that "Workplace Ethics" training has enabled them to create a better work environment. Past program participants have included: utility companies, law enforcement officers, school systems, poultry processing plants, canneries, office personnel, entrepreneurs, accountants, engineers, and temporary assistance for needy families (TANF) clientele. Evaluations completed by participants after their training show that all of them valued the information and felt that they could improve their workplace ethics. Some said they would use the information to be a better role model in their workplace. When asked what was most helpful about the training, the range of answers included: learning how to work together, value each other, recognize that every action affects someone else, communicate, and use conflict resolutions skills when communication fails.

Source of Funds

LSU AgCenter
Pilgrim's Pride
Allen Canning
Manufacturing Extension Partners of Louisiana
Union Parish Police Jury
Claiborne Electric

4-H Youth Development Program Contributes to Life Skill Development

Lanette G. Hebert, 4-H Youth Development; Krisanna Machtmes, Robert Richard, Debbie Hurlbert, Chad Higgins

Key Theme: Youth Development/4-H

Through non-formal, research-based, experiential learning programming approximately 82,000 Louisiana youth gain knowledge and life skills to become positive, productive, capable and compassionate members of their communities. The 4-H Youth Development program combines the cooperative efforts of youth, 8,500 adult volunteers, state land-grant universities, federal, state, and local governments and the USDA.

Youth who participate in 4-H learn life skills through non-formal research-based, experiential education activities. Participating in 4-H enables youth to practice and develop life skills such as communicating and problem solving. Developing life skills such as these enable youth to become productive and capable members of their communities. A survey was developed to identify what level of influence 4-H had on the development of life skill as perceived by youth who had completed their eligibility in 4-H. The survey contained 30 life skills and two open-ended questions. The respondents were asked to rate how they perceived that 4-H had influenced their development of life skills using a Likert-type-scale (1=no influence, 2=minor influence, 3=moderate influence, 4=major influence). The life skills they were asked to rate were the following: being a responsible citizen, being honest and fair, caring for others, completing a project or tasks, communicating with others, having a positive view of the future, eating healthy, expressing emotions positively, interacting socially, keeping records, leading a group, learning through community service, making healthy lifestyle choices, managing financial resources, mastering computer technology, motivating yourself, planning and organizing, preventing personal injury, resolving conflicts with others, self esteem, setting and achieving goals, solving problems, talking in front of a group, thinking critically, using scientific methods, understanding how different systems works, valuing diversity, volunteering, working in a team. These life skills were obtained from the Four-fold Youth Development Model which is a research based youth model.

In June 2003, the LSU AgCenter 4-H Program surveyed more than 600 graduating 4-H senior members regarding their perception of how the 4-H program influenced their development of various life skills. The 2003 survey was issued via mail. There was an 8% (75 surveys) response rate. In June 2005, the survey was reissued to 832 graduating 4-H senior club members. The survey was web-based and there was a 5% response rate (39 surveys). Thirty-two of the respondents were females and 7 of the respondents were males. The majority of the respondents (84%) had participated in 4-H for eight years and longer. The respondents from 2003 and 2005 indicated that their development of the following life skills were highly influenced by their participation in the 4-H program:

- Communicating with others
- Interacting socially
- Caring for others
- Completing a project or task
- Leading a group
- Being a responsible citizen
- Making decisions
- Setting and achieving goals
- Working in a team
- Being honest and fair
- Volunteering
- Learning through community service

Life skills noted as having high influence by the 2005 respondents but not the 2003 respondents were:

- Having a positive view of the future
- Planning and organizing
- Talking in front of a group

Life skills noted as having high influence by 2005 respondents and only minor influence by 2003 respondents were:

- Making healthy lifestyle choices
- Keeping records
- Resolving conflicts with others

Respondent from 2003 and 2005 indicated that 4-H had only a minor influence in the following life skills:

- Valuing diversity
- Understanding how different systems work
- Preventing personal injury
- Using scientific method
- Mastering computer technology

Two open-ended questions were placed at the end of the survey. These questions were used to capture the respondents global thought concerning their participation in 4-H. The first question asked the respondents to describe the most important thing they learned from participating in 4-H. In the 2003 survey four main themes that arose from the analysis of this question: teamwork, leadership, responsibility, and communications. In the 2005 survey 3 main themes of volunteerism, responsibility and leadership emerged. Volunteerism was identified from the following clips: I feel the most important thing I have learned from the 4-H program is that volunteering in the community helps everyone. The most important thing that I have learned throughout my many years in the 4-H program is the value of volunteering. I have participated in numerous projects and activities to help out my community. I have learned that volunteering is one of the best ways to make friends and help others while having fun. I learned to look around me and notice others' needs rather than only think of myself. 4-H proved to me how important it is to be a good citizen and to be active in community service. Leadership was identified by the following clips: I learned how to be a leader and motivator of others. The most important thing I learned as a 4-Her was good leadership qualities. I learned how to plan and organize events and projects. Responsibility was identified by the following clips: I've learned many things in 4-H, and if I had to pick one, it would be responsibility. 4-H helped me to become a more responsible person. 4-H has taught me about responsibility. As a high school 4-H member I knew that younger 4-H members, including my younger siblings, looked up to me. The second question asked what the greatest contribution 4-H has made to your life. There were three main themes that arose from the analysis of this question in 2003 and they were: relationships, believing in yourself, and communications. In the analysis of 2005, two main themes of relationships and believing in yourself emerged. Relationships were identified by the following clips: The greatest contribution 4-H has made must be the involvement I have had in my life with so many different people. I love the friends that I have made and kept. I have a vast array of friends that now allow me to network through my life and future career. Believing in yourself was identified by the following clips: 4-H has molded me into a caring, determined, educated and hard working person. 4-H has contributed many things to my personal development, but in one word, they sum up to confidence. 4-H encouraged a positive self esteem and helped me be successful at things. I'm going to college largely because of my experience in 4-H.

Source of Funds

State; Smith-Lever 3 b, c

AgMagic 2005

Deborah Hurlbert, 4-H Youth Development; Frankie Gould, Elma Sue McCallum

Key Theme: Youth Development/4-H

With the move of the LSU AgCenter state livestock show off campus in 2004, AgCenter administrators felt it was time to make over and enhance the historically successful 4-H Mini Farm for children and adults in order to better inform the public about the value of agriculture and forestry in their daily lives. The makeover also was in response to the 2003 Ag Crisis

Summit of state agricultural leaders - in which summit participants identified public awareness about the importance of agriculture as the most important challenge currently facing farmers. In addition, state-wide community focus forums conducted by LSU AgCenter faculty in 2000 identified a need to build greater awareness of agriculture, nutrition and health.

LSU AgCenter initiated AgMagic to provide an interactive and educational event to show Louisiana children and families how food, nutrition, clothing, the environment and lumber are important to them. Visitors are able to experience AgMagic through hands-on exhibits, games and lesson plans. Current exhibit areas include: Animals Produce for You, Plant Products, Farming the Water and World of Wonder. AgMagic provides the public a glimpse of the abundance of products Louisiana agriculture provides to its citizens. The AgMagic educational and interactive Website continues to add resource material for educators, families and children.

Through hands-on, research-based exhibits, AgMagic builds agriculture awareness and helps participants in developing a greater sense of the origin of food and fiber products and the unique balance needed between the environment and the food chain. Further, older visitors are introduced to careers that the agriculture and health industries offer. The AgMagic educational Web site provides resources for teachers to use before and after AgMagic visits to reinforce the experience. This site will be constantly updated so that it can be a resource all year long. More than 9,000 children and adults visited AgMagic in April 2005, an increase of 30 percent over the inaugural year. Fifty eight percent of visitors were between pre k and kindergarten, twenty six percent grades 1 through 4, and sixteen percent grades 5 through 8. In addition, more than 170 volunteers staffed AgMagic as tour guides, Body Walk guides, greeters, and experts to answer questions.

Source of Funds

State; Smith-Lever 3 b, c

Scope of Impact

Multi-function: It is estimated that the multi-function value of the AgMagic program is \$160,272 (10 FTEs x \$80,136 per FTE x .20)

Youth Workforce Readiness Program

Juanita Johnson, 4-H Youth Development

Key Theme: Workforce Preparation - Youth and Adult

Louisiana ranks 48th in the percentage of the population over age 25 that has completed high school. This is a critical figure, since it is becoming increasingly difficult for anyone to earn wages that can keep them above the poverty level without a high school degree or GED. Research shows that the social and economic ills plaguing high school dropouts are significantly greater than those of students who attain a diploma. Likewise, those who complete postsecondary programs are more likely to achieve higher incomes and better employment. In addition, the state poverty rate remains one of the highest in the country at 17.0 percent (2003, U.S. Census Bureau), thereby ranking Louisiana 46th among the states in the percentage of the population living below the poverty level. These factors contribute greatly to youth in Louisiana reaching adulthood without the necessary knowledge, skills and experiences to succeed.

Youth entering the workforce immediately after exiting high school without the requisite workplace skills, especially dropouts, are shortchanging their futures. To address these concerns, the LSU AgCenter uses several strategies to help Extension agents and volunteer leaders meet the needs of youth and families. The predominant strategies are conducting Career Days and 4-H Club meeting programs. More than 3,700 youth received career readiness information at 4-H club meetings, and some 5,000 participated in 4-H Career Days where 99.5 percent reported gaining knowledge and skills. Other AgCenter strategies are engaging youth and volunteer leaders in workshops, expos, contests, and after school projects. The scope of activities and number of participants were: 4-H project work and workshops (3211); Newsletters (1100); Career development workshops (1900); Career assessment and planning activities (1472); and Conferences and expos (1645).

By engaging in on-going discussions with Louisiana youth, parents and other stakeholders, the LSU AgCenter's Department of 4-H Youth Development identified the need for workforce preparation curriculum for elementary, middle and high school programs as a priority. To meet this need, the Department organized the Workforce Preparation Initiative Implementation

Team (WPIIT) to ensure that 4-H agents are fully equipped to provide successful workforce readiness programs. The initiative has helped 4-H agents better engage in workforce preparation and promoted quality programming by providing tools, curriculum and best practices that have given support to youth discovering and exploring workforce opportunities. Eighty-nine percent of the youth (3,794) participating in 4-H Club meeting on workforce preparation indicated they learned how to obtain and maintain employment. Fifty-eight percent of the youth completed a resume for the first time using information from the Jump Start for Job Seekers 4-H project book. 4-H Career Day programs, designed to give youth a jump-start on their futures by providing them with opportunities to explore a variety of careers, provided youth (4,861) with career profiles on broad categories of career options based on their interests, strengths and competencies. Ninety-nine percent of the youth improved their career portfolios by adopting career planning practices based on career assessment results. There were 1172, 8th grade youth who increased their awareness and knowledge about job preparation and the decision-making process through participation in the Welcome to the Real World workforce readiness program. Six hundred youth demonstrated appropriate decision making about selecting attire for work environments through participation in the Dress for Success workforce preparation program. Thirty youth attended a Tri-State Workforce Preparation Conference where they received information on resume writing, workplace ethics and job-keeping skills. One hundred percent of the youth participants reported an increase in knowledge and skills that facilitated their participation in community workforce preparation after school activities.

Source of Funds

Smith-Lever, LSU AgCenter

Scope of Impact

Multi-state: It is estimated that the multi-state value of the Youth Workforce Readiness Program is \$125,012. (7.8 FTEs x \$80,136 x .20)

LSU AgCenter Helps Meet the Needs of Children and Families Through Child Care Provider Training in a Three Parish Area

Jamie Moon, Northwest Region

Key Theme: Child Care/Dependent Care

Child care issues impact all segments of society and when it is done well, not only do the children and their parents benefit, but society as a whole. Having access to quality child care is critical to parents that must work outside the home and there is a strong correlation between parents who are confident in the care their children receive and how productive they are on the job. Child development research supports the fact that high quality child care helps children meet their intellectual, social, physical and emotional development needs, therefore helping these children enter school ready to succeed. This is especially true of children from low income families. Research also indicates that almost half of the children in center based care and about one third of the children in family home care settings are not receiving quality care. Effective education and training of child care professionals is critical for the lives of children in Natchitoches, Sabine and DeSoto Parishes.

Since March 2005, Natchitoches and DeSoto FCS agents provided thirty-seven, three hour classes for child care providers working in centers and family home settings in Natchitoches, Sabine and DeSoto Parishes to help them meet their DSS certification requirements. Classes were advertised through the mail on a quarterly basis and were held at night, on weekends, and during regular working hours to meet the needs of the participants. A \$7.50 registration fee was charged for each three hour class. Most of the classes were held in local Extension offices but some were also held in a local day care center. Training topics offered during this period included: Right From Birth; Going To School; Sensory Activities for Young Children; Cognitive Development Activities for Young Children; Reading and the Young Child; Practical Solutions for Everyday Problems in Day Care; Music and Movement; Creating the Learning Environment; Group Routines; Understanding the Relationship Between Nutrition and Child Development; Observation and Record Keeping; and Ethics in the Workplace.

Five hundred certificates were presented to child care providers during this reporting period. Conducting these classes locally was important because it not only saved the providers time and money because they did not have to travel out of the parish, it also provided an opportunity for them to get to know and network with other professionals in their parish with the same

goals. Evaluation surveys were filled out after each class indicating what the providers learned and if they would use what they learned in their child care practice. Class evaluation summaries posted on the AgCenter FCS Evaluation Website indicate the providers are learning and using what they learned and are very satisfied with the training they are receiving. Some of the comments made by those participating included this one, "It gives us togetherness to trade ideas and comments. Thank you for this class. A break from our routine." Also, "I learn something in every class that I can use. Information is explained well." Feedback from the class indicated the providers liked the hands on activities and the fun, informal teaching atmosphere. As the providers continue to participate in these learning opportunities, the children in the three parishes served will truly experience all the benefits associated with quality child care.

Source of Funds

State; Smith-Lever 3 b, c

Claiborne Parish Character Education Continues to Grow

Teresa Price, Northwest Region

Key Theme: Character/Ethics Education

The LSU AgCenter Claiborne Parish Extension Service has been the source of character education for approximately nine (9) years. A parish wide CHARACTER COUNTS! training is held annually which also includes one (1) Arkansas school. These trainings reach approximately 130 students and coordinators. The annual training is viewed by parish stakeholders as an important part of services offered by LSU AgCenter because it makes students of area schools more aware of the effect of their actions on other people, both youth and adults. Students learn to communicate the Six Pillars of Character to teach youth in their schools. Principals and teachers note a difference in the teen's attitudes and actions after being trained. Local law enforcement agencies credit a decrease in truancy to CHARACTER COUNTS! trainings. Local businesses seek out CHARACTER COUNTS! team members as part time employees because they are more trustworthy, responsible, and show more respect to customers.

Annually agents from neighboring parishes and state specialists assist in providing hands-on experiences for youth team members. These experiences, along with support materials provided by the LSU AgCenter, prepare teams to teach youth in their schools about the Six Pillars of Character. Each year, new teens are encouraged to attend the training. The new members, along with past members, increase each school's base of teens that act as mentors. New community clubs such as Clover Buds (a club of pre-school to third grade youths) are now using the CHARACTER COUNTS! program, Character Critters, as the educational curriculum for their monthly meetings. Other curricula concerning bullying, sports, and writing skills are also made available. CHARACTER COUNTS! is worked into all programs offered by Claiborne Parish 4-H. Club leaders and teachers are encouraged to use the character pillar language for discipline issues.

The LSU AgCenter is instrumental in the change occurring in the community due to its involvement with the CHARACTER COUNTS! training and resource materials made available. Teachers report that using character pillar language makes discipline easier and students relate their actions to character. As a result of long-term character education, discipline issues will be reduced in schools and youth will become more employable, which will result in better community relationships. More educators are becoming aware of resources available and incorporate these resources into their daily lesson plans.

Source of Funds

Sources of support include: Claiborne Parish 4-H Foundation, Claiborne Electric Co-operative, Homer First Baptist Church, Coca-Cola Bottling Co of Minden, Claiborne Parish School Board, State Farm Insurance, LSU AgCenter; Smith-Lever 3 b,c

LaHouse and Rebuilding Stronger, Safer, Smarter Homes -- educational outreach initiative

Claudette Reichel, Human Ecology

Key Theme: Promoting Housing Programs

Hurricanes Katrina and Rita have caused an unprecedented amount of damage to homes and displaced hundreds of thousands in Louisiana. Families and the state's recovery is hampered by the lack of inhabitable housing and financial capacity to rebuild or restore damaged homes. The long power outages caused massive mold growth in damaged homes, creating health hazards, concern, confusion and very high remediation costs. The cost of natural gas has doubled since last year, causing sharply higher utility costs.

Compiled and updated comprehensive 30-page "Storm Recovery Guide for Homeowner" and "Cleaning Flood Damaged Homes" fact sheet within 3 weeks after Katrina. Developed new "Avoiding Mold Hazards" and "Mold Removal Guidelines" for consumers, training workshops for educators and volunteers and many mass media interviews and articles. Developed "Rebuild Stronger, Safer, Smarter Homes" plan of action; engaged national and local collaborators, FEMA, DOE, and others. Constructed a permanent sustainable housing "showcase of solutions" with multiple building systems and technologies for hazard-resistant, energy-efficient and healthy housing. Launched LaHouse Resource Center educational outreach via weekly Mid-Construction Open Houses, a press conference and numerous media features, offering free "Building Your Louisiana

House Homeowners Guides.” Conducted “Building for Extreme Climates” seminars by prominent building scientist and technical LaHouse tours for building professionals.

LSU AgCenter was among the first sources of storm recovery and housing information; distributed more than 100,000 guide books to storm victims. Many national and local media outlets and thousands of consumers turned to LSU AgCenter for credible answers and guidance in dealing with mold. The LaHouse showcase house and publications have been used by thousands to learn how to make their new or restored homes more hazard-resistant and energy-efficient. Hundreds have toured LaHouse, hundreds of thousands have been reached with local and regional print and TV media outreach. Roughly 170 diverse building professionals gained research-based knowledge to rebuild high-performance houses and commercial buildings.

Source of Funds

Smith-Lever 3 b, c; State

Cooperative Efforts Reinforce Energy Conservation and Safety

Carol B. Remy, North Central Region; Robin Bridges, Karen Martin, Teresa Price

Key Theme: Farm Safety

Currently energy prices are soaring due to weather conditions and economic growth. The cost for energy is projected to continue rising because of hurricane-related supply losses. According to the U.S. Department of Energy, energy cost is predicted to increase by 3.5 percent in 2005 and an additional 1.2 percent in 2006. According to the 2005 Kids Count Data Book, 30% of the children in Louisiana live at the poverty level and 15% live in extreme poverty. In 4 out of 5 parishes that participate in a Multi-Parish Energy Day program, the poverty rate is above the state average. Claiborne Electric Cooperative and the LSU AgCenter have a history of working together to enhance energy efficiency and productivity for both organization’s members/clients. Both strive to make a difference in the everyday lives of its citizens/members by enhancing their energy choices and their quality of life.

For the past fifteen years, LSU AgCenter and Claiborne Electric Cooperative have joined resources to teach youth age 9-18 about energy conservation and safety. 4-H members from Bienville, Claiborne, Lincoln, Union and Webster parishes attend a once-a-year 4-H Energy Day program. During the day they participate in a round-robin of classes taught by Claiborne Electric employees, LSU AgCenter agents and teen/adult volunteers. Topics covered have been “Mr. Wizard of Electricity” (a class that teaches how electricity is made), “Visit with a Lineman” (a class where a local lineman teaches about safety on the job and around power lines), “Careers in the Electric Field” (a class that exposes youth to the variety of jobs related to the industry), “Electric Safety” (educational games teaching the importance of home safety) and “Electric Conservation” (a class stressing ways to lower energy usage).

Each year, approximately 350 youth and adult volunteers participate in the program. In the fifteen year history, over 5,000 people have attended the program. The knowledge obtained has enabled youth to be more aware of their energy usage and methods they can use to help conserve energy, such as turning off unused appliances and utilizing energy efficient machines. They have become aware of the dangers and safety hazards associated with electricity and ways to prevent electrical accidents. How energy gets to their homes and the many sources used to make electricity are other areas they learn. Students have discovered new career choices and the vast impact electricity has on all careers. They have learned how a cooperative is organized and functions. This knowledge is also reinforced in the teen volunteer Jr. Leaders with an all-expense-paid overnight trip to various electric facilities in neighboring states. With the knowledge learned at Energy Day, this trip helps teens envision the possibilities of future careers and the importance of conservation. This trip also allows teens to broaden their perspectives concerning diversity issues while reinforcing character education learned through 4-H programs.

Source of Funds

Claiborne Electric Cooperative employees, trip, equipment, demonstrations, LSU AgCenter agent support

Participants pay a minimum amount to defray transportation expenses.

Parents Preparing for Success-Statewide

Diane D. Sasser, Human Ecology; Stefanie Toombs, Dr. Ann Berry, Dr. Jeanette Tucker

Key Theme: Child Care/Dependent Care

During state fiscal year 2004 Louisiana state tax dollars funded a whopping \$856,685,000 on food and cash benefits combined. The Parents Preparing for Success Program is geared toward providing skills training that will enable pregnant women or parents of children (under the age of one year) on public assistance in Louisiana to gain knowledge and skills in providing care for their children, child development, financial management, goal identification, decision making, and family strengthening. The aim is to equip our program participants with the necessary tools to become self-sufficient while transitioning from public assistance into the workforce.

The LSU AgCenter Family and Consumer Science educators are cooperating with the Louisiana State Office of Family Support, as well as local agencies in 43 parishes state wide to deliver parenting skills training to audiences comprised of recipients of public assistance within Louisiana. Parenting skills classes are offered continuously on a weekly basis in an attempt to service each participant referred to the program without impediment. More than 3,000 welfare recipients have participated in our program in 2005, and classes are presently in progress.

In 2005, 83% of participants referred (3,643 pregnant women or parents of children under the age of one year that receive public assistance benefits) have participated in parenting skills training. Of the number enrolled, 28% completed the series of five lessons taught. Of the number enrolled, 98% completed skills training evaluations to provide feedback regarding program content and knowledge gained. Over the five session period, participants offered comments about how this parenting skills training has impacted their lives; such as: "My mother and I both agreed that I need these classes. My mother was adopted and not nurtured. As a result I was not nurtured; I want to change things for my children," "My husband and I had an argument and I stayed calm and said what I needed to say without blaming or put-downs. What I have learned in this class has helped my whole life. When I read the communication blockers I said, man, I do all that." "I have used my time in this class for a lot of self-reflection," "I am learning how to take care of my baby and love my baby." and "I've learned to watch what I spend and how to take care of my children a whole lot better. And how to take care of myself as well. And I think that everyone that does not know about anything needs to come to these classes." For each individual that incorporates the skills that are taught in parenting skills training into their everyday life, there may be the reward of an individual with identified goals for future self-sufficiency, a self identified plan/system for money management, and a flourishing relationship between parent and child. For each child who benefits from the skills gained by their parents' parenting skills improvement, a child may develop more greatly toward their fullest potential and overall self sufficiency in the future. For each parent and child that becomes self-sufficient, a Louisiana tax dollar can be reallocated toward the advancement of our state in other key areas. For the over 3,000 parents who have participated in our skills training in 2005, the savings to Louisiana tax payers has the potential to be phenomenal.

Source of Funds

Louisiana State Department of Social Services, LSU AgCenter; Smith-Lever 3,b,c

Scope of Impact

Multi-state: In FY 2005, 10.30 FTEs were spent on parenting education resulting in over 50,000 contacts. Based on an FTE cost of \$80,136 the total cost of the program was \$825,400. It is estimated that 30% of the program effort is attributable to multi-state work, i.e., joint planning and implementation, and acquisition and sharing of information. The dollar equivalent of multi-state work is \$247,620 (10.30 FTEs x \$80,136 per FTE x .30).

Multi-function: Contributions from research counterparts included assistance in curriculum development, agent training and presentations to clientele are estimated at 20% of the program FTEs. The dollar equivalent of multi-function work is \$165,080 (10.30 FTEs x \$80,136 x .20).

Strengthening Communities and Facilitating Rural Economic Development

Deborah Tootle, Agricultural Economics and Agribusiness

Key Theme: Community Development

Roughly one quarter of the Louisiana population lives in rural areas where income and earnings are lower while unemployment and poverty are higher than in urban areas. The rural economy in Louisiana has traditionally relied on agriculture and manufacturing. However, those activities that encouraged rural development 10 to 20 years ago are no longer effective. Traditional agricultural enterprises and industrial recruitment can no longer be depended on to bring jobs to rural Louisiana. A shortage of jobs is eroding the population base and reducing the quality of life in rural Louisiana. The LSU AgCenter is committed to helping rural Louisiana identify and implement new rural development strategies.

The Community Economic Development (CED) Team is assisting rural communities in two ways. They are building the capacity of local citizens to be key players in the future of their communities, and they are fostering sustainable community and rural development by helping to create locally based economic opportunities. CED is building capacity through educational programming and assistance in leadership and by providing residents with the tools for making community-based decisions. Major educational programs include the Community Leadership and Economic Development (CLED) and Leadership Plenty. CED also teaches a variety of leadership skills and team members serve as “coaches” for community groups. CED has played a major role in hurricane recovery and rebuilding efforts throughout the state, working closely with Federal and State partners in these efforts. The Team helps to create locally based economic opportunities through programming and technical assistance in entrepreneurship and value added development, natural resource based tourism, and workforce development activities. The CED Team has provided workforce training for private and public workers and employers across the state.

Community and rural development is making Louisiana a better place to live. Participants in the AgCenter’s community and rural development programs are reporting short term (learning), medium term (actions), and long-term (community change) impacts. Participants have learned leadership skills and how to work together on community projects. Most of these projects focus on some aspect of rural development. One example of this is the development of the Louisiana Delta 65, Inc., in which more than 300 non-traditional local leaders and volunteers from five parishes are working together to develop rural tourism opportunities along Hwy 65 in North Louisiana. Another example is the Delta Outdoors and Wildlife Association, in which producers with marginal lands formed an association to promote economic diversification through recreation and conservation. In other communities, the CED Team is beginning to see long-term impacts from their programming and technical assistance efforts. In January 2006, residents of a small town in north central Louisiana took possession of a newly built multi-purpose building valued at \$150,000. These residents, interested in developing and maintaining a farmers market worked together to obtain funding from USDA Rural Development for infrastructure development. Participants in CED programs are also learning and implementing skills that will foster sustainable development. Nearly 75 percent of the participants in entrepreneurship training in south Louisiana have started small businesses. One farmer, who started an agri-tourism venture with the help of CED, reports that his business doubled in one year. Participants in CED programs are also learning how to improve the quality of the workforce in Louisiana. Participants in the Workplace Ethics, Customer Relations and Frontline Worker training are learning and implementing workforce development skills, such as communication, conflict resolution and teambuilding. Over 300 white and blue collar participants agree that CED workforce development programs have enabled them to create a better work environment. Past program participants have included utility workers, law enforcement officers, school systems, poultry processing plants, canneries, office personnel, entrepreneurs, accountants, engineers, and temporary assistance for needy families (TANF) clientele.

Source of Funds

State, Federal Smith Lever 3 b,c

Scope of Impact

Multi-state: It is estimated that 30% of the educational programming is multi-state. Therefore, the value of multi-state programs is \$144,245 (6 FTEs x \$80,136 per FTE x .30).

Multi-function: It is estimated the 20% of the educational programming is multi-function. Therefore, the value of multi-functions is \$96,163 (6 FTEs x \$80,132 per FTE x .20).

Financial Management for Limited Resource Audiences

Jeanette Tucker, Human Ecology; Ginger Boutwell, Ann Berry, Stefanie Toombs

Key Theme: Consumer Management

Almost one-fifth of all Louisiana families live in poverty, with nearly 30% of Louisiana children living in poverty. The per capita income for the state is \$16,912, compared to the national figure of \$21,587. Recognizing the impact that poverty has on the future of our state, Governor Blanco held the Solutions to Poverty Summit in December 2004. One of the sessions at the summit focused on building wealth through financial independence. Achieving financial independence will require individuals to be good managers of their money and make wise financial decisions. Many individuals become adults without having had the first class on budgeting, goal setting, credit, or saving and investing. Financial management can be difficult, especially on a limited income. Many low-income individuals and families have high consumer debt, have little or no savings, and use predatory lenders.

Educators with the LSU AgCenter identified limited resource audiences and tailored educational programs to meet their needs. Collaborations have been formed with the Department of Social Services Office of Family Support, Entergy, AARP Louisiana, Governor's Office of Elderly Affairs, Attorney General's Office, prison administrators, and Even Start directors. Primary audiences have been welfare recipients, parolees and probationers, the elderly, and parents of children in Even Start. Classes addressing financial and personal goal setting, developing a spending plan, saving for emergencies, debt reduction, avoiding predatory lenders, qualifying for the Earned Income Credit have been conducted across the state. In addition, a series of town meetings held around the state prompted Extension faculty to partner with AARP, Entergy, Governor's Office of Elderly Affairs, Legal Services, and others to conduct Scam Jam Consumer Fraud Expos in three cities to bring awareness to the elderly and minority communities about predatory lending practices and to identify specific issues from these groups.

Over 3,000 Office of Family Support referrals (welfare recipients) have participated in a series of money management lessons. Program evaluation of a selected portion of the training program indicated participants showed a statistically significant knowledge gain after attending four training sessions of the series. Comments from participants include: "I found today's lesson odd because me and my mom were discussion budgeting money just last night, hearing this information again really made a buzzer go off in my head." "I learned how to budget money so you would not get behind on your bills and be in debt" "Every time I come I learn more about budgeting. It's something I needed." "I enjoy the class and found out more information about income taxes that I don't know." "I learned how to better manage money and watch for people who try to take your money." As a result of the Predatory Lending Town Meetings, three Scam Jam Fraud Prevention Expos were held in June 2005 in Monroe, Baton Rouge, and New Orleans. They included educational programs addressing credit, predatory lending practices, frauds and scams, and identify theft. Approximately 400 limited resource participants participated. Comments from participants included: "Education is the key." "People need to know this information." "There should be policy against these practices." Many success stories have resulted with participants including employment, going back to school and reducing debt. Other participants learned the importance of setting goals and making decisions regarding their future and making spending changes so that they can pay their monthly bills on time. Some set goals to get their car repaired or to buy a used car. Others feel more comfortable using a bank. By reaching limited resource audiences with financial education, they will have the tools to manage their financial obligations and perhaps reduce or avoid excessive debt and increase their savings. A financially healthy population improves the state's economy by producing self-sufficient individuals and families and contributing to the economic development of the state.

Source of Funds

Louisiana Department of Social Services, LSU AgCenter, AARP, Entergy, Latin American Civic Association

Scope of Impact

Multi-state: Family Resource Management faculty collaborates with and has shared programs with extension educators and financial educators across the nation. It is estimated that 40% of the program effort is attributable to multi-state work in the acquisition and sharing of information. The dollar equivalent of this share of the program is \$323,429 (10.09 FTEs X \$80,136 x .40).

Multi-function: It is estimated that 30% of the program effort is attributable to collaborative work between research and extension in recommendations, curriculum development, agent training and presentations to clientele. The dollar equivalent of this share of the program is \$242,572 (10.09 FTEs x \$80,136 per FTE x .30).

Improving Childcare Quality in Louisiana

Rebecca White, Human Ecology; Cheri Gioe, Leanna Cathey, Diane Sasser

Key Theme: Child Care/Dependent Care

Everyday in Louisiana, thousands of children are left in childcare arrangements. High quality childcare is a critical issue for improving developmental outcomes and the quality of life for children. Although quality of childcare is critical, research indicates that most childcare is poor to mediocre. However, research has shown that education and training of childcare providers directly correlates with higher quality care environments for children. It is estimated there are over 20,000 childcare providers in Louisiana. The state of Louisiana requires all childcare providers in licensed centers or who are registered family childcare homes to obtain continuing education annually. There is a significant need to provide accessible education and training for these childcare providers.

The LSU AgCenter conducts the Louisiana Childcare Provider Training Program, providing continuing education classes throughout Louisiana for childcare providers. Louisiana childcare providers in center-based and family-based settings are offered educational opportunities to obtain required hours of childcare provider training. LSU AgCenter professional faculty members are providing the service in over 40 locations across the state.

Three hundred seventy-five (375) educational classes were conducted by 23 Family and Consumer Sciences agents for childcare providers in 2005. Seven thousand two hundred forty (7,240) training certificates were awarded to childcare providers who participated in three-hour training sessions offered by the LSU AgCenter. Program evaluation of a selected portion of the training program indicated childcare providers showed statistically significant knowledge gain after attending four training sessions in the Right from Birth training series. Additionally, it was found that childcare providers are using the information they learned, implementing more recommended care practices that are beneficial to children. A research study was conducted on a portion of the Louisiana Childcare Provider Training Program by Carrie Ota, a Masters candidate in Human Ecology (LSU Advisor Dr. Cynthia DiCarlo). This study examined the Right from Birth childcare provider training series as it related to changes in child caregiver responsive behaviors. The study found that average positive child caregiver responsive behaviors increased after attending the training series. Additionally, average negative child caregiver non-responsive behaviors decreased. Also, the increase in positive responsive behaviors and the decrease in negative non-responsive behaviors were maintained by the participating child care providers six weeks after the training series ended. These preliminary outcomes indicate that childcare providers are benefiting from the Right from Birth Training. Childcare providers trained in child development and appropriate care practices often provide higher quality care than providers who are not trained. Training such as Right from Birth may help improve the quality of child caregiver responsive behaviors and prevent children from experiencing developmental problems, help with school readiness, and promote positive mental health.

Source of Funds

Legislature, Louisiana Department of Social Services, participant registration fees; Smith-Lever, 3 b,c

Scope of Impact

Multi-state: In FY 2005 9 FTEs were spent on the child care program with over 40,000 contacts made for a total program cost of \$721,224. It is estimated that 20% of the FTEs expended on program is attributable to planning and implementation activities and to the acquisition and sharing of information on child care with other states. The equivalent dollar value of 20% of program FTEs for multi-state work is \$144,245 (14.5 FTEs x \$80,136 per FTE x .20)

Multi-function: It is estimated that 20% of the program FTEs on the child care program is attributable to integrated research-extension or multi-function activities in which extension and research counterparts collaborated in curriculum development and acquisition of information. The dollar equivalent of 20% of program FTEs for multi-function work is \$144,245 (14.5 FTEs x \$80,136 per FTE x .20).

Louisiana's CHARACTER COUNTS! Program Gathers Strength by Joining Service Learning Initiative

Sarah Williams, 4-H Youth Development; Janet Fox

Key Theme: Character/Ethics Education

According to a 2002 Josephson Institute of Ethics survey of 12,000 high school students, 74% admitted cheating at least once within the previous 12 months; almost half said they had cheated at least twice. Figures for lying and stealing are no more encouraging. Bullying among students happens more than people think. A new study from National Crime Prevention Council reveals that 60% of teens witness bullying at least once a day. Other studies show between 15% and 25% of U.S. students are bullied frequently; 15% report they bully others with some frequency (Melton et al., 1988; Nansel et al, 2001). Students who fear bullying often do not attend school and eventually drop out of school.

LSU AgCenter 4-H Youth Development Department provides a character education program, using the Six Pillars of Character (trustworthiness, respect, responsibility, fairness, caring and citizenship), the framework of CHARACTER COUNTS! created by the Josephson Institute of Ethics. Positive role models can be the strongest element for making a difference in the lives of youth who cause problems in our schools. State 4-H faculty and parish 4-H agents in Louisiana receive training that prepares them to provide appropriate materials and training to equip older youth, parents and educators to present programs that incorporate the Six Pillars of Character to younger youth. Enabling youth to reach out into their communities and conduct service learning projects is a strong tool for developing youth who are caring and responsible adults. In early summer 2005, our character education team collaborated with 4-H leadership to serve as co-workers and to provide curriculum materials for a statewide service learning training for over 200 4-H agents, community volunteers, and youth. Year-long project plans were created; reports of positive action are coming in as groups implement those projects. As a result of the training and planning, staff, volunteers and youth were well prepared to devise extraordinary service learning projects in the aftermath of hurricanes Katrina and Rita. Evaluation results for projects selected will be collected in the summer of 2006.

Character trainings for teachers and older youth who will deliver lessons to younger youth continue. Youth who become peer teachers plan presentations, deliver lessons to younger children and become role models for children. Across the state, 2005: 3,200 youth were trained to be peer mentors and trainers for younger students; 238,158 students received instruction from trained adults or peer mentors; 7,500 youth received lessons in after-school programs; 40,000 students received Principal's Principles statements, thoughts about the pillar of the month each school day; and 3,259 adult instructors received training from qualified, trained personnel. These instructors either trained students to present character lessons or they delivered lessons to students. Random parish reports, 2005: 240 junior high and high school students serve as teen teachers for the CHARACTER COUNTS! program in 85% of the elementary and junior high schools in Allen Parish. As a result of character education training in Caddo Parish, 343 teachers reached 6,121 youth. Thirty-eight teachers with 720 youth participated in a character kickoff, with youth sharing ways to promote good character. With skills gained, nine junior leaders in Bienville Parish planned and carried out responsibilities at a new Character Education Achievement Day with 179 members and 35 adults, an increase of 41% from last year. Twenty-four participants in character education training at 4-H Youth Development Department 4-H U Clover College, 2005, all responded "agree" or "strongly agree" to the statements: "am motivated to live a life where I make decisions based on the Six Pillars of Character, motivated to expand my role in 4-H in my parish and feel my decision skills have improved." Participants left with a plan for teaching other youth and connecting

lessons on the Six Pillars to service learning projects in their parishes.

Source of Funds

The Louisiana State Legislature appropriated \$300,000 for the LSU AgCenter to continue its character education program throughout Louisiana.

Scope of Impact

Multi-state: It is estimated that the value of the Character Education program is \$258,038. (12.88 FTEs x \$80,136 per FTE x .25)

Goal 5 – Research Program Reports

Family Stress and Children’s Cognitive Development

Mary E. Garrison, Human Ecology

Key Theme: Child Care/Dependent Care

Most U.S. families report that their lives are increasingly stressful. When stressors pile up, family members show signs of strain as manifested by changes in health status or in their sense of well-being. The effects of the family stress process on children’s development has not been examined. Our research of stress as a family process that includes both stressors and resources, rather than as an isolated event or situation, fills a gap in the scientific literature. Our work also advances the understanding of children’s development in an understudied age group, that of

A multi-year research project has been completed. Data were initially collected from 290 families of 1st and 3rd grade children from 19 different schools. Parents (278 mothers and 143 fathers) completed a self-report questionnaire distributed through the postal service. Children were interviewed at their schools during two interview sessions, once to assess their intellectual ability and once to assess their classroom motivation. To further assess classroom motivation, the children’s teachers completed a motivational instrument. To further assess children’s cognitive ability, grades were collected from the participating children’s schools. In wave two, the children, 2nd and 4th graders, originally from 19 schools were at 36 different schools. Using the same protocol as wave one, parents (165/280 mothers and 84/156 fathers) completed the self-report questionnaire and 210 children were interviewed; 100 2nd graders and 110 4th graders. To augment the quantitative data, qualitative data were collected the following year via in-depth, semi-structured interviews.

Results indicate that, as hypothesized, family stressors negatively influenced children’s cognitive development, although family functioning was not a powerful moderator of the relationships among family stressors and children’s cognitive development. Children’s motivation as measured both by child interviews and teacher’s perceptions was related to their academic achievement and cognitive ability but was not a powerful mediator of the relationship between family stress and children’s cognitive ability. One way daily hassles might operate to negatively affect children’s cognitive ability is by disrupting both the marital dyad and the parent-child dyad. When parents experience daily hassles they are more likely to interact negatively with each other and with their children (either through direct negative interactions or through withdrawal). These types of responses within the family to daily hassles may be interrupting the types of behaviors that children benefit from in the development of cognitive abilities. In additional analyses, living in a family environment characterized by frequent and negative daily hassles was negatively associated with children’s cognitive ability for children living in intact families. Family cohesion was positively associated with children’s cognitive ability for children living in intact families; whereas hardiness was positively associated with children’s cognitive ability for children living in single mother households. The results from the qualitative interviews in year three indicated that major sources of stress are family, work, balancing work and family/time management, traumatic events, and finances and effective coping resources are religious practices and beliefs, family and extended family, and the church family.

Source of Funds

State, Hatch, and Louisiana Board of Regents Support Fund

STAKEHOLDER INPUT

The LSU AgCenter regularly seeks stakeholder input on all research and extension education programs in order to maintain a focus on clientele needs and that its research and extension programs are delivered in a timely manner and have value and impact. During the programming year the LSU AgCenter placed emphasis on its Advisory Leadership System, which has as its primary goal that all research and extension education programs of the LSU AgCenter are: (1) effective in meeting the needs of stakeholders; (2) being delivered in a manner that makes them accessible to all people; and (3) constantly assessed for relevance to ensure that they maintain current. Regional Leadership Advisory Councils were added to the overall advisory system in 2002, in accordance with structural changes that were made in the AgCenter. These regional councils, comprised entirely of stakeholders, provide valuable service to the Regional Directors regarding how the LSU AgCenter can improve service to stakeholders in the region by marketing the AgCenter and its programs and identifying issues within the eight regions of the state. In the FY 2005 program year, all eight of the AgCenter regions conducted Advisory Council meetings with a total of about 112 stakeholders participating. Issues identified through the state-wide advisory structure that the AgCenter will continue to address during the coming year include: (1) research and extension focus on providing continued assistance to hurricane-ravaged parishes; (2) more effective marketing of AgCenter programs; (3) the need for public education regarding production agriculture; (4) increased partnerships and collaboration between the AgCenter and businesses, agencies, and organizations; (5) the future of extension in regard to staffing and maintaining a local presence throughout the parish; (6) the future of Louisiana agriculture; and (7) issues regarding rural/urban interface.

Research and extension faculty work closely with all major commodity associations, i.e., cattle producers, rice producers, cotton producers, sugarcane producers, grain producers, the Louisiana Farm Bureau Federation, family and community development associations, 4-H youth associations, and other groups to get input and guidance on AgCenter programs. These organizations not only give guidance but also support many of the AgCenter programs with monetary and physical assistance. Input and direction from these organizations and the entire stakeholder structure are the lifeblood of the LSU Agricultural Center.

Another dimension of obtaining stakeholder input for research and extension programs are the Agricultural Center Exchange (ACE) groups which meet in conjunction with the AgCenter Annual Conference. These groups cover all of the economically important commodities produced in Louisiana as well as environmental, value-added, family, youth, economic, and nutrition issues. Each session is attended by all AgCenter scientists and extension faculty (both parish-level and state-level) with programs in the respective subject-matter areas. Stakeholder input into research projects is provided by extension faculty, who bring a state-wide perspective of the highest priority needs and researchable problems. In turn, extension faculty are better able to understand the research perspective and status of progress on various on-going projects. Of considerable value is the camaraderie which has developed between research scientists and extension field faculty, many of whom did not know one another very well prior to the implementation of the ACE groups. Our human nature is to work better with people who we know, and because the ACE concept has allowed AgCenter faculty to have more contact with one another, the organization functions more efficiently and effectively.

Research Section

Louisiana Agricultural Experiment Station scientists and administrators continued to meet regularly with a number of stakeholder groups. A representative but not comprehensive list of some these commodity meetings is shown on pages 111 and 112. The generalized forum for these stakeholder sessions is a series of presentations of research findings and proposed research projects delivered by scientists directly to the stakeholder panels. This is followed by questions and discussions led by stakeholders, which provide focus, direction, and specific suggestions that are incorporated into the respective research projects.

On a broader dimension, Louisiana Agricultural Experiment Station scientists and administrators participate each year in the Louisiana Farm Bureau Federation annual meeting. This is the predominant agricultural organization in Louisiana, representing the entire spectrum of agriculture, natural resources, youth, and policy issues of concern in the state. Beyond the general sessions, scientists and administrators participate and interact directly in commodity advisory committees, which are constituted by stakeholders and provide another vital feedback opportunity relative to research needs and recommended directions.

Extension Section

The Louisiana Cooperative Extension Service conducted a series of community focus forums in every parish during the 1999-2000 program year involving a wide base of the citizenry and leadership of the state, including public officials and representatives of agriculture, business, industry, youth, and minority groups. The diversity of the state was captured by ensuring that gender, age, and ethnic groups were represented in the forums. Parish forums identified key issues and concerns needed to be addressed for a better future for parish residents. Based on the forums, LCES developed a state-wide strategic plan focused on 12 initiatives: After-school Education and 4-H Adventure Clubs; Economic Development; Master Farmer; Water Resource Management; Waste Management; Coastal Restoration; Environmental Horticulture; Family Financial Management; Farm Financial Management; Leadership and Volunteer Development; Nutrition, Diet and Health; and Parenting and Child Care. Parish extension faculty reported to their stakeholders the outcome of the forums, including strategic plans to address the identified issues. Initiative teams of extension faculty (parish and state) then developed action plans and curricula to enable parish agents to conduct educational programs in the identified subject-matter areas.

A follow-up to the initial focus forum, conducted in the 2003-2004 program year, was essentially a second round of meetings with stakeholders in every parish in the state. These forums were strategic planning sessions. Issues identified in the original focus forums were re-visited, with implementation progress reports presented by extension faculty regarding these issues. Additionally, stakeholders were asked for input on other issues of concern in the parish, and these concerns were included in the parish Plan of Work.

Stakeholder input also included a segment of parish program reviews, which were initiated in 2003. The reviews are conducted by a team of extension faculty housed outside the parish, for the purpose of reviewing on-going educational programs, recognizing program excellence, and recommending programming change if need be. As one part of the review, stakeholder focus groups are conducted in the three programming areas of agriculture, family and consumer sciences, and 4-H youth development. Results from the stakeholder focus groups are included by the review team in submitting the parish program review summation. As of the FY 2005 reporting year, parish program reviews have been conducted throughout the state. Hurricanes Katrina and Rita postponed parish program reviews in the fall of 2005, but reviews are hopefully scheduled to be renewed 2006.

Additionally, parish extension faculty continued to involve clientele in the traditional commodity and subject-matter advisory committees, in order to receive input on needs and problems, which could then be addressed in local education problems. From a state perspective, extension state-level faculty engaged representatives of their commodity or subject-matter area to gain input on stakeholder issues, needs, and problems.

MERIT REVIEW

Meetings with Stakeholders - (1998 - 2004)

Cotton Support Committee:	March 18, 1998 March 17, 1999 March 14, 2000 March 13, 2001 September 10, 2002 September 10, 2003 September 14, 2004 August 31, 2005
Rice Research Board:	October 28, 1998 December 16, 1999 December 14-15, 2000 November 12-13, 2001 November 21, 2002 November 18, 2003 November 16, 2004 June 30, 2005 December 15, 2005
Soybean and Grain Research & Promotion Board:	December 1-2, 1998 December 8-9, 1999 November 30 – December 1, 2000 November 28-29, 2001 November 19-20, 2002 November 20, 2003 November 18-19, 2004 November 10-11, 2005
American Sugarcane League:	February 3, 1998 February 4, 1999 February 23, 2000 January 28-29, 2001 February 19, 2001 January 28, 2002 February 19, 2003 February 25, 2004 February 23, 2005
Louisiana Beef Industry Council:	May 5, 1998 October 14, 1999 October 10, 2000 October 11, 2001 January 11-12, 2002 December 13, 2003 December 16, 2004 June 27, 2005

Meetings with Stakeholders – (1998 – 2004) - Continued

Louisiana Catfish Promotion and Research:	September 2, 1998 June 23, 1999 September 29, 1999 December 5, 2000 August 29, 2001 October 29, 2001 May 9, 2002 August 21, 2002 May 14, 2003 June 16, 2004 September 21, 2005
Louisiana Crawfish Promotion and Research Board:	May 19, 1998 August 10, 1999 July 17, 2001 February 12, 2002 May 9, 2002 May 28, 2003 June 16, 2004 April 13, 2005
Louisiana Sweet Potato Commission:	June 11, 1998 June 17, 1999 June 14, 2000 June 13, 2001 May 22, 2002 June 19, 2003 July 23, 2004 January 12, 2005
Louisiana Farm Bureau Federation:	July 3, 1999 July 15, 2000 July 12-15, 2001 July 10-12, 2002 July 12, 2003 July 8-11, 2004 July 5-9, 2005

PROGRAM AND PROJECT REVIEWS

Two comprehensive CSREES program reviews were held during the reporting period. A review of the statewide research and extension programs in Agricultural Economics and Agribusiness was held on November 15-18, 2004 and a review of statewide research and extension programs in Agronomy and Environmental Management was held on March 14-18, 2005. Each review was conducted by a panel consisting of CSREES leaders and research/extension peers from other universities. The focus of each review was directed toward the future roles of research and extension professionals working in an integrated manner to address Louisiana's needs in the respective program areas.

Project peer reviews of the proposed research activities of individual scientists continued according to CSREES guidelines as reflected in the Plan of Work. Approximately 51 project reviews were conducted which led to the establishment of approved projects with initiation dates during the reporting period 10/01/04 to 9/30/05. Following the established policy, review comments were solicited from peer scientists and extension specialists and the comments and a synthesis of recommendations were provided to the originating scientist by a member of the LAES administrative team. The changes made in the proposed project by the originating scientist were then reviewed at the LAES administrative level prior to final project approval.

EVALUATION OF MULTI-STATE ACTIVITIES

Research Section

The Louisiana Agricultural Experiment Station has traditionally encouraged and supported multi-state (formerly regional) research activities. LAES scientists have played significant leadership roles in many multi-state activities and they continue to do so today. In fiscal year 2005, LAES scientists were active participants in 43 approved multi-state projects. Of these 43 projects, 17 (40%) were North Central, North East, Western, or NRSP-based activities, which reflects the truly national scope of what we refer to as multi-state research. The other 26 (60%) were Southern region-based projects. The 43 projects address each of the five national goals. To further reflect the LAES support and involvement, scientists' travel expenses to annual technical committee meetings are currently being supported from administrative funds. Finally, to further indicate involvement and support, LAES Directors currently serve as administrative advisors to 7 active multi-state research projects.

Extension Section

The evaluation of multi-state activities has been beneficial in identifying ongoing activities and opening up new opportunities for collaboration between extension/research faculty, thus strengthening the overall cooperative effort. Effectiveness and efficiency in utilizing materials from other states, collaborating on research projects, and communication among professional faculty and staff in different states have improved. Multi-state efforts between Louisiana, Arkansas, and Mississippi on digital diagnostics, pesticide applicator training, and limited-resource management programs for young families continues. A tri-state collaborative agreement among Arkansas, Mississippi, and Louisiana began in FY 2004. The agreement included three program areas in four Delta counties in each state: Workforce Preparedness, Master Farmer program, and the Tri-state Community Development Initiative. Additional multi-state programmatic linkages occurred via the regional forester, master wildlife, and regional water quality programs. In addition, extension state faculty participated in the Southern Extension Research Association (SARE) exchange groups, the Southern Agriculture and Natural Resources committees, and numerous regional and national meetings. These exchanges provide extension faculty in different states new ideas and materials, and establish collaborations with counterparts that result in more effective and innovative programs not only in Louisiana, but in other contributing states as well. The economic development of the LCES has been greatly enhanced by collaborative work with the Mississippi-based Southern Rural Development Center, as well as the Foundation for the Mid-South, also located in Mississippi. The LSU AgCenter has taken an active role in rural economic development by establishing in 2004 the Delta Rural Development Center (DRDC). The mission of the DRDC is to enhance economic opportunities for people in the Delta. DRDC provides executive education programs for boards of any type, management teams in public and private organizations, assistance with grant writing, and other services. The LSU AgCenter is committed to helping people in the rural areas of the Louisiana Delta overcome poverty and other barriers to economic development. The establishment of the DRDC marks a new hands-on strategy to begin the difficult task of improving economic conditions in the Delta region.

INTEGRATED RESEARCH-EXTENSION ACTIVITIES

During 2002, the LSU AgCenter was reorganized to more closely align research and extension functions in addressing problems and issues of various client groups. At the campus level, extension specialists who had been centrally located in the Cooperative Extension building were moved into respective subject-matter departments and housed with their research counterparts under the administrative supervision of a department head. Several joint research-extension appointments have been made to promote integration. In the field, administrative lines were redrawn to create eight regional research and extension centers, subsuming parish extension agents and experiment station research personnel under their supervision. Regional Directors were appointed to provide administrative guidance and better integrate research and extension at the point of local program delivery.

In this way new competencies are brought to both extension and research clientele. This administrative approach includes placement of specialists at experiment stations around the state. Joint appointments continued to be made in FY 2005, and the joint appointment approach continues to be of value in accomplishing the mission of the LSU AgCenter.

Several "Summits" have been held over the last two years. Summits are in-house program reviews, essentially strategic planning sessions, attended by all subject matter faculty related to the program area being assured. Often, Summits follow CSREES program reviews and where appropriate are attended by multi-unit faculty from both on-campus departments and off-campus research stations. Extension field agents with major responsibility in the program area also attend the Summits. A faculty member from the AgCenter's Organization Development and Evaluation unit usually serves as the facilitator at Summits. The format is the identification of research and extension needs, followed by the development of an action plan. Summits are held in a retreat environment to remove participants from their daily work place and create a better setting for concentration on strategic planning. Administrative support for the Summits has been substantial. AgCenter Summits held in FY 2005 included: Biological and Agricultural Engineering; AgCenter Communications unit; Horticulture; AgCenter Information Technology unit; Aquaculture; and Biotechnology. The Agronomy and Environmental Management is scheduled to hold a Summit in early 2006.

Research and extension faculty continued to work closely to develop joint publications, coordinated research, and conduct educational programs. Concerted efforts have been made to improve communications between research and extension personnel so as to provide improved and rapid service to clients. Special initiatives such as water quality, fire ants, Formosan termites, the Master Farmer Program, the Master Gardener Program, the Master Cattle Producer Program, and the Master Horseman Program are being jointly conducted by extension and research faculty.

Each year, research and extension faculty (including field faculty) meet in AgCenter Exchange Groups (ACE). Researchers update extension faculty on the latest research projects and results, and extension faculty in turn share their educational programs and the issues and problems their clientele are facing for researchers to review and consider in their research agendas. In addition, teams of research and extension faculty meet in discussion groups two-to-four times a year to update one another on the current research and education programs.

In the plant sciences area, research and extension faculty meet each year to review research and make recommendations on new varieties, fertilizers, pesticides, and other cultural practices which subsequently form the management practices recommended to farmers.

The LSU AgCenter continues to rely on the AgCenter Faculty Council to provide rapid response and feedback to administration and increased communication and participation in policy to faculty. The Council includes 20 elected representatives proportional to faculty rank and divided between "on-campus" and "off-campus." Off-campus members include researchers and extension agents located throughout the state. Administration has worked closely with the Council, has accepted Council recommendations for increased participation of faculty in vice chancellor and department head reviews, and has seriously taken into consideration Council viewpoint in helping to guide administrative perspective.

INTEGRATED ACTIVITIES

Projected costs and returns for numerous Louisiana commodities were developed and/or updated and provided to farm management faculty. These “production budgets” are used cooperatively with extension agents and specialists and presented at producers meetings, often held in January and February. Among the crops covered are catfish, crawfish, beef, dairy, broilers, forages, cotton, soybeans, corn, grain sorghum, wheat, rice, sugarcane, and commercial vegetables.

Crop Genetics/Variety Trials/Variety Recommendations

Variety trials were conducted on corn, wheat, soybeans, rice, cotton, warm and cool season forages, sweet potatoes, and sugarcane. Trial results are published and provided to producers, seed dealers, and extension specialists/agents. Researchers participate directly with extension specialists as the varieties recommended for planting are being selected. Both research and extension faculty initially become involved in outreach activities in variety recommendations through participation in parish (county) agent training sessions and commodity producer meetings, held widely throughout the state.

Insecticide Efficacy/Insecticide Recommendations

Insecticide efficacy studies are conducted on all major Louisiana plant and animal pests. The data from the efficacy studies are provided to extension faculty, crop consultants, and producers at seasonal producer meetings and through direct contact. Research scientists participate directly with extension faculty to prepare insect control recommendation guides which are used extensively throughout the extension system in educational activities.

Plant Health/Treatment Recommendations

When extension faculty encounter plant health diagnosis problems they are assisted by research scientists. The scientists involved conduct applied research activities on the efficacy of disease preventing agents and are active in providing assistance in the formulation of disease-preventive agents used by extension faculty in educational programs.

Food and Agricultural Biosecurity

Following the 9/11 attack, the state’s agricultural community and government officials immediately sought to address future terrorists attacks, as well as the ever-present likelihood of the accidental introduction of damaging diseases and/or other pests into Louisiana’s food production system. In response, a state-wide conference was held to help make farmers and ranchers more aware of the problems that could arise from the introductions of plant or animal diseases or pests into their operation. The conference was a forum for participants to interact and exchange ideas with leading biosecurity and agrosecurity experts and key policy makers from Louisiana and the nation. The LSU AgCenter continues to monitor research and action on the federal and state level, in order to contribute to and stay abreast of issues and techniques in the fight against terrorism, particularly in regard to food and agricultural biosecurity.

Food Processing/Packaging/Safety

Research and extension faculty interact to develop food safety procedures and deliver food processing and food safety information. Extension faculty conduct HACCP training sessions, with participation and assistance from research scientists. A Muscle Food Laboratory is jointly used for research studies and extension demonstrations. Food Science Department research and extension faculty for the fourth consecutive year have conducted a Food Processing Conference, with 180 attending in FY 2005. The conference serves to address timely topics in (1) economics and marketing and (2) technology and business issues. Included in the conference for industry participants were both plenary and break-out sessions.

Animal Health/Treatment Recommendations

Veterinary science researchers conduct programs on aquatic animal health, anthelmintic delivery and efficacy, bovine respiratory disease, and brucellosis. Programs are closely coordinated with the extension veterinary specialist, the School of Veterinary Medicine Diagnostic Lab, and the Louisiana Department of Agriculture and Forestry.

Soil Testing/Fertility Recommendations

The Soil Test Laboratory is operated by the LAES, and all results are provided to the LCES soil scientist for fertility recommendations. Parish agents are heavily involved in the delivery of the fertilizer recommendations to the farmers.

Animal Waste Management

Major research and extension outreach activities in this area are closely integrated. Land application of poultry litter and runoff from extensive dairy operations remain the highest priority areas. Research scientists teamed with extension faculty to prepare the waste management sections for BMP manuals used in extension outreach programs

Master Farmer Program

The Master Farmer Program is a joint educational effort of research and extension that allows agricultural producers to be proactive and address environmental challenges using researched-based best management practices. The program's goal is the development of environmental stewardship as both a mindset and a practice of Louisiana farmers. A numerous group of agencies collaborate and cooperate extensively—in both planning and implementation—with the LSU AgCenter on this well-received educational program, some of which include USDA – Natural Resources Conservation Service; Louisiana Farm Bureau Federation; Louisiana Department of Environmental Quality; Louisiana Department of Agriculture and Forestry; Louisiana Department of Natural Resources; Louisiana Soil and Water Conservation Districts; National Oceanic and Atmospheric Administration; and state-wide producer associations, including rice, sugarcane, cotton, and cattle. To-date, a total of 2023 producers have completed the program or are presently enrolled.

Master Cattle Producer Program

The Master Cattle Producer program was designed and implemented by LSU AgCenter research and extension faculty, with collaboration and cooperation, both in program planning and delivery, with agencies and associations including the Louisiana Cattleman's Association, USDA-Natural Resources Conservation Service, and the Louisiana Farm Bureau Federation. The program curriculum includes both animal management and marketing, with specific stress on environmental stewardship. In accordance with this emphasis on the importance of environmental concerns, the participants are required to take the first phase of the Master Farmer Program, which is composed of eight hours of classroom presentations on environmental stewardship. To-date, over 400 Louisiana cattlemen have graduated from the program.

Master Horseman Program

The Master Horseman Program was designed and implemented by LSU AgCenter faculty to provide a comprehensive, in-depth educational program for horse-enthusiasts state-wide. The curriculum, composed of eight sessions, includes both classroom and hands-on instruction. Teaching faculty included both research and extension professionals from the Department of Veterinary Science and the Department of Animal Science. Although coordinated by state extension faculty, parish-level extension faculty members also teach in the classroom setting and conduct hands-on sessions. Parish horse associations, working in conjunction with parish faculty, help to promote and coordinate the program. A total of 19 programs have previously been held, and 281 participants completed the program. In FY 2005, five additional programs were held, with 77 horse enthusiasts participating.

Master Gardener Program

Louisiana's Master Gardener program has provided intensive training to serious gardeners for the past 12 years. This is a state-wide voluntary program that strengthens the LSU AgCenter leadership and education in the area of consumer horticulture. The program consists of two parts: horticulture classes are taught by AgCenter faculty, other university faculty, and industry representatives. Upon completion of the course, graduates are asked to perform a minimum number of voluntary hours and continuing education hours annually to maintain their certification. Volunteer hours are varied and meet local parish needs. They include among others a wide variation such as working with school and 4-H youth, nursing home residents, hospital patients, garden shows, and answering gardening-related phone calls in local parish extension offices. Presently there are 22 on-going programs in 46 Louisiana parishes, which represent 96% of the state's population centers. The program has recently trained 346 new volunteers, increasing the active number of master gardeners to 1,094. These volunteers have provided 39,043 hours of their time to LCES educational programs. This volunteer service translates to a

\$698,585 benefit to the people of Louisiana. The program nationally has a retention rate of 15-30%, but Louisiana enjoys a 65% retention rate. The program allows extension to “extend” education to an ever-increasing gardening audience and better meet the demand for information on horticulture.

Pest Management

Parish agent training meetings, commodity producer meetings, the Louisiana Agricultural Consultants Association annual workshop, and the annual meeting of the Louisiana Plant Protection Association are characterized by programming that included integrated activities engaged in by research and extension professionals in entomology, weed science, and plant pathology. These educational venues highlight integrated (research and extension) activities conducted throughout the year, and by their nature are multi-function academic activities.

Asian Soybean Rust

In May 2004, in anticipation of the arrival of Asian soybean rust in the U.S., LSU AgCenter research and extension faculty began work on a Louisiana Response and Action Plan. This planning process, conducted over a five-month period, was primarily a joint effort by the LSU Department of Plant Pathology and Crop Physiology research and extension faculty, although agriculture-related agencies were kept informed. The purpose of the plan was to outline pre- and post-confirmation of the establishment of Asian soybean rust. The document served as guide for detection, response and management of this destructive disease. The dreaded disease was first discovered near Baton Rouge, Louisiana on November 6, 2004 by an LSU AgCenter plant pathologist, and confirmed by USDA scientists as the first identification in North America. It was extremely fortunate that the discovery was made in late 2004, because it gave precious time for training sessions by land-grant university faculty for growers, consultants, and soybean industry personnel. The agricultural chemical industry was able to ramp up production of fungicides for possible use in the coming 2005 crop year. Perhaps the most significant development arising from the original discovery of Asian soybean rust in Louisiana was the establishment of sentinel plots in all soybean producing states. During the 2005 season, the disease was first found in February, near Tampa, Florida. It then spread sparsely through the Southeastern states, but in general the soybean industry was given a reprieve in 2005. This gave time for state and federal plant pathologists to refine the nationwide sentinel plot program and to evaluate fungicides for control of Asian soybean rust and for other foliar diseases in Louisiana. Because of the unprecedented preemptive measures taken by LSU AgCenter pathologists and their counterparts in other Gulf states, the soybean industry has greatly improved its position in striving to cope with the dangerous Asian soybean rust.

West Nile Virus

In 2002, the threat of mosquito-borne diseases was aggressively addressed by the LSU AgCenter. The mosquito web site was established in May 2002, and became a popular resource site, with comprehensive information on West Nile virus and other mosquito-borne diseases. In June 2002, a conference was held, raising awareness and providing research scientists, extension educators, and the media a means to assure that the best available material was provided to the general public. The West Nile Virus has abated, but AgCenter faculty members continue to stress the importance of mosquito abatement as the first line of defense. At this point, most of our population has been exposed to West Nile virus, and most horses have been vaccinated or have developed natural immunity. The probable outlook for the next few years is for the virus to be a somewhat minor problem for both humans and horses, but AgCenter research and extension faculty continue to be on guard against this health risk.

Hurricanes Katrina and Rita

With hurricanes Katrina and Rita coming ashore in 2005, the LSU family hurt deeply. Many extension agents and research scientists lost their homes. Initially, four parish extension offices and one research experiment station were closed, plus valuable research at other experiment stations was compromised. But overriding all personal tragedy, AgCenter faculty supplied tremendous aid and service to the people of the affected areas of the state. The following selected excerpts are from some of the full reports which are included in this volume:

Two-thirds of Plaquemines parish was destroyed. All communities and schools in the southern and eastern areas of the parish were demolished. Schools in the northern portion escaped severe damage, and schools eventually reopened. 4-H and FCS agents have established enrichment programs at all functioning school locations. About 6,000 copies of AgCenter disaster recovery materials were distributed throughout the parish.

It was estimated that over 80 percent of Orleans parish and close to 50 percent of Jefferson parish were devastated. The infrastructure of this entire area was affected, and over one million residents were re-located. The tax base for many local governments has declined so dramatically that communities are facing severe financial burdens and possible bankruptcy. The LSU AgCenter faculty and staff in the New Orleans metropolitan area, working out of a consolidated location in Jefferson parish, reacted immediately with educational programs and materials on topics ranging from chain saw safety to horticultural programs to mold remediation. Faculty distributed 25,000 copies of the AgCenter "Storm Recovery Booklet." Fact sheets, lessons, and PSAs were developed and distributed in the subject-matter areas of Family Financial Management, Housing, Family Development, Health, and Nutrition. As some of the major retail outlets, such as Walmart and Kmart reopened, AgCenter faculty established recovery tables to better reach people in need of help. Within six weeks of Hurricane Katrina, AgCenter faculty had made contact with about 50,000 returning residents through distributed disaster and recovery education materials, workshops, and disaster hotline calls. In addition to three of the more critical needs—mold removal, house cleaning techniques, and chain saw use—residents received instruction on filing insurance claims, unemployment issues, income reduction management, stress management, food safety, and general health issues.

The fisheries industry for the two parishes of St. Bernard and Plaquemines was decimated by Hurricane Katrina. In excess of 85 percent of the boats used in the harvest of finfish and shellfish were disabled. In addition, buying docks, which furnish critical components such as fuel and ice, were 100 percent disabled. The fishing community was severely traumatized by the physical and economic damage of the hurricane. Immediately following the destruction, LSU AgCenter faculty joined forces with U.S. Coast Guard vessel salvage efforts and the FEMA fishing industry liaison. The lack of boat repair equipment at the public staging area was immediately determined to be the greatest obstacle for the industry to overcome. The disabling of the mobile "travel lift" at the Port Sulphur staging area crippled any hope of boat repair. The people of Valdez, Alaska donated a similar unit, through the cooperation of the LSU AgCenter, the Washington Sea Grant program, the Port Authority of Valdez Air Transport, Alaska Fishing Industry, and the Alaska Air National Guard. This collaborative effort proved to be foremost in recovery effort of the fishing industry of the Louisiana southeast Gulf coast.

The first meeting of the President's Forum on Meeting Coastal Challenges was held in January 2005. About 120 scientists, policy-makers, and local officials met to discuss ways to redouble and redirect university resources toward more near-term challenges resulting from Louisiana's coastal land loss crisis, which was exacerbated by Hurricanes Katrina and Rita. An initial list of recommendations was recently presented to the Louisiana Governor's Coastal Advisory commission, which included: 1) expanding the Louisiana Recovery authority; 2) closing the Mississippi River Gulf Outlet; and 3) maximizing the capacity of fresh water diversion. Harnessing the best minds that science and industry possess is critical to understanding and implementing ways to contain coastal erosion/hurricane damage.

Immediately following Hurricane Katrina, weather data required by the New Orleans International Airport control tower was out of commission. The AgCenter Louisiana Agrilimatic Information System (LAIS) was as asked by the State Office of Emergency Preparedness/Aviation Administration to deploy its portable weather station to New Orleans. Three AgCenter faculty erected the portable station and then installed a radio system to deliver the data directly to the control tower. For several days LAIS was the only direct source of weather data for the control tower. Thousands of persons using airplanes and helicopters on rescue and support missions, including the President of the United States, unwittingly benefited from the LSU AgCenter weather data.

Following Hurricane Karina, public concern at the highest level was raised by fear of toxic waste. LSU AgCenter chemists worked side-by-side with chemists from the Louisiana Department of Environmental Quality. Only actual testing can allay fears caused by excessive rumor and speculation. Analytical results from the efforts of these chemists showed that there were few problems related to toxic substances in the flood waters.

Hurricane Rita struck the coast of southwest Louisiana as a major storm, bringing storm surges of 15 to 20 feet in southern parts of the parishes of Cameron, Vermilion, Calcasieu, Jefferson Davis, and Iberia. Some flooded areas were covered with freshwater from lakes and bayous pushed out of these bodies by brackish and saltwater from coastal marshes and the Gulf of Mexico. However, other areas were covered by concentrated saltwater from the Gulf. The flood persisted for as long as 3 weeks in some areas. The major agricultural crop enterprise affected was rice, the primary crop grown in southwest Louisiana. Efforts are underway by LSU AgCenter research and extension faculty to define the extent/severity of salt contamination and to offer recommendations for remediation of the contaminated soils. Initial testing has indicated that the negative effects of salt contamination were more pronounced when rice was water-seeded than when it was dry-seeded. Soil

tests show that soluble salt levels tested at 7 sites in greenhouse research decreased 40-60 percent from October 25 to December 12, 2005. Based on results to-date, rice should be planted only if soluble salt levels are <1.53 dS/m (1,000 ppm).

The southwest part of Louisiana affected by Hurricane Rita is by far the primary beef cattle region of the state, and as such beef cattle enterprises are economically vital to the entire southwestern corner of the state. The hurricane caused damage to thousands of miles of fence, destroyed thousands of tons of bales of hay, and thousands of cattle were drowned. After the storm, livestock and forage producers were deeply concerned about damage caused by saltwater intrusion and flooding on their pastures and hayfields. Six locations in Vermilion parish were sampled in mid-October 2005, and these sites were sampled again in late-December. In addition, AgCenter state-level faculty prepared material on salinity and flooding issues, which parish agents disseminated to producers in a timely manner. Articles on this topic were written for two popular press magazines, and several producer meetings were held by state and parish extension faculty in the affected parishes. The sampling study demonstrated that while soluble salt levels were relatively high immediately after Hurricane Rita, they had declined dramatically within a two-month period. The information on salinity produced by LSU AgCenter research and state extension faculty proved to be of immediate value to the cattle industry in southwest Louisiana. Annual ryegrass (for winter grazing) can tolerate salt levels of 2000 ppm., and some producers were able to plant as late as December 2005. Extension pasture & row crop state specialists observed in mid-December 2005 that most stands of Bermudagrass were green, and did not appear to be negatively impacted by the hurricane. Bermudagrass, a common forage species in the area, can tolerate salt levels of about 4000 ppm. The cattle industry, of course, was greatly aided by donations. Immediately following Hurricane Rita, cattle were starving to death, and vast amount of hay and fencing material were hauled by cattlemen nationwide into southwest Louisiana—as a donation—saving most of the remaining beef cattle and, of course, saved the livelihood of many cattlemen. Not only saving the livelihood of so many southwest Louisiana cattlemen, but also that of the vast network of area businesses which support the cattle industry—feed dealers, seed dealers, animal health suppliers, veterinarians, truckers, farmhands, stockyard operations, and many other enterprises. Louisiana cattlemen will never forget the generosity of other cattlemen from across the U.S.

U.S. Department of Agriculture
 Cooperative State Research, Education, and Extension Service
 Supplement to the Annual Report of Accomplishments and Results
 Multistate Extension Activities and Integrated Activities

Institution: LSU Agricultural Center

State: Louisiana

Check one: Multistate Extension Activities
 Integrated Activities (Hatch Act Funds)
 Integrated Activities (Smith-Lever Act Funds)

Title of Planned Program/Activity	Actual Expenditures*
	FY2005
Character Counts Youth Program	53,930
Commercial Nursery Production	29,896
Community & Economic Development	30,147
Cotton Production Practices	12,293
Cotton Disease Management	8,914
Cotton Insect Pest Management	24,327
Dairy Production	44,310
Digital Diagnostic Program	38,353
Expanded Food and Nutrition	33,915
Farm Financial Management	21,706
Feed Grains	20,399
Financial Management-Limited Res. Audience	67,597
Food Safety	59,624
Fruit & Vegetable Marketing	45,522
Improving Childcare Quality	30,147
Master Farmer	17,636
Master Gardener	65,821
Master Horseman	29,879
Natural Resource Management	54,432
Nematode Management	4,690
Parents Preparing for Success	51,753
Portions Healthy Weight Program	508,013

(continued on page 122)

*Expenditure from federal budget (Smith-Lever 3 b,c,d) in FY 2005 was 20.9% of total Cooperative Extension budget (state and federal). Multi-state (total) and multi-function (total) dollars multiplied by .209 to determine share of Smith-Lever funds attributed to multi-state and multi-function work.

U.S. Department of Agriculture
 Cooperative State Research, Education, and Extension Service
 Supplement to the Annual Report of Accomplishments and Results
 Multistate Extension Activities and Integrated Activities

Institution: LSU Agricultural Center
 State: Louisiana

Check one: Multistate Extension Activities
 Integrated Activities (Hatch Act Funds)
 Integrated Activities (Smith-Lever Act Funds)

Title of Planned Program/Activity	Actual Expenditures*
	FY2005
Soybean Production	29,745
Soybean Rust Management	13,399
Weed Science Education Program	25,122
Wildwoods Wandering Youth Program	62,807
Youth Service-Learning	367,025
Youth Workforce Readiness	26,128
Total	1,768,616



 Paul Coreil, Director

 3/27/01

Date

*Expenditure from federal budget (Smith-Lever 3 b,c,d) in FY 2005 was 20.9% of total Cooperative Extension budget (state and federal). Multi-state (total) and multi-function (total) dollars multiplied by .209 to determine share of Smith-Lever funds attributed to multi-state and multi-function work.

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Check one: Multistate Extension Activities
 Integrated Activities (Hatch Act Funds)
 Integrated Activities (Smith-Lever Act Funds)

Title of Planned Program/Activity	Actual Expenditures* FY2005
AgMagic Youth Program	33,497
Commercial Nursery Production	24,913
Community and Economic Development	20,098
Cotton Production Practices	24,587
Cotton Disease Management	3,768
Cotton Insect Pest Management	20,852
Dairy Production	54,533
Expanded Food and Nutrition	30,147
Farm Financial Management	19,897
Feed Grains	67,999
Financial Management-Limited Resource Audience	50,698
Food Safety	44,718
Fruit & Vegetable Marketing	113,806
Improving Childcare Quality	30,147
Hurricane Effect on Forage Resources	36,478
Lagoons and Constructed Wetlands	18,842
Master Farmer	26,454
Master Horseman	37,349
Natural Resources Management	146,212
Nematode Management	8,207
Parents Preparing for Success	34,502
Portions Healthy Weight Program	381,010
Rice Research Verification Program	23,624
Soybean Production	99,151
Sugarcane Burn Management	11,640
Weed Science Education Program	330,781
Weed Control on Ornamentals	10,049
Total	1,703,959



Paul Coreil, Director

3/27/06

Date

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Institution: LSU Agricultural Center
 State: Louisiana

Check one: ___ Multistate Extension Activities
 X Integrated Activities (Hatch Act Funds)
 ___ Integrated Activities (Smith-Lever Act Funds)

Title of Planned Program/Activity	Actual Expenditures FY2005
Farm Production Budgets/Market Economics	\$193,000
Crop Genetics/Variety Trials/Variety Recommendations	\$172,938
Insecticide Efficacy/Insecticide Recommendations	\$327,290
Herbicide Efficacy/Herbicide Recommendations	\$172,645
Plant Health/Treatment Recommendations	\$205,764
Food Processing/Packaging/Safety	\$73,395
Animal Health/Treatment Recommendations	\$61,268
Soil Testing/Fertility Recommendations	\$57,550
Animal Waste Management	\$92,957
Well-being of Rural Low Income Families	\$8,795
Total	\$1,365,602



 David J. Boethel, Director

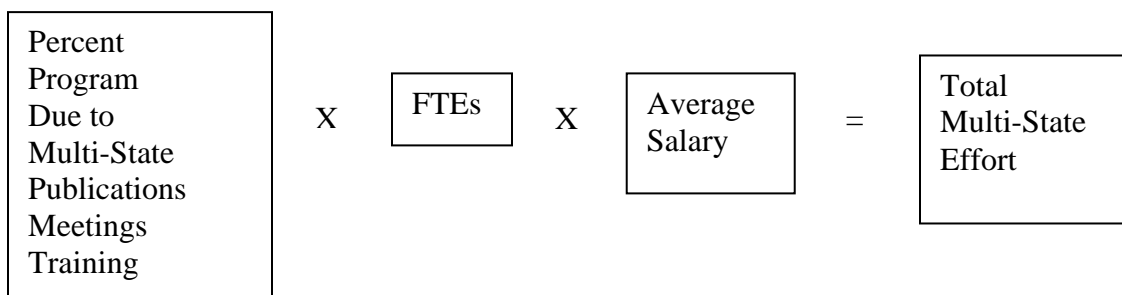
 3/27/06

Date

MULTI-STATE AND MULTI-FUNCTION BRIEFS

The LSU AgCenter is fully engaged with other institutions. Many of the materials, ideas, and programs have come from other states. The free sharing of materials, ideas, and programs at regional and national scientific meetings is the strength of the Land Grant system. Many state faculty assist with agent and producer training in the surrounding states, and those efforts are expanding continually. Additionally, all of the recommendations and educational programs are researched-based, and research faculty are used extensively in developing recommendations, publications, agent-training, and producers meetings.

To determine multi-state work, each extension state faculty member estimated the percentage of material, ideas, or programs that were obtained from other states through publications, meetings, and other avenues of contact. The percent multi-state effort was multiplied by the number of FTEs devoted to the program times the average salary per FTE.



The calculations indicate the total multi-state effort. The federal expenditure on multi-state programs is the actual amount of federal funds devoted to the faculty delivering the program. A similar logic model was used for multi-function (integrated) work, involving both research and extension faculty working together in a coordinated effort toward a common goal.

The reports for multi-state and multi-function are included in the body of the report. The total multi-state and multi-function activity and the federal funds accounted for are listed below:

	<u>Total</u>	<u>Federal Portion Accounted For</u>
Multi-State Activity	8,462,283	1,768,616
Integrated Activity	8,152,908	1,703,959

Total LCES Expenditure from Smith-Lever \$ by Federal Goal

Federal Goal	Total LCES expenditure from from Smith-Lever \$
1	2,046,272
2	88,817
3	1,090,339
4	316,009
5	2,775,398

Total Research Scientist Years and Federal Formula Funds Expended by Federal Goal

Goal	SYs	Federal Formula Funds \$
1	77.9	2,508,533
2	6.8	201,158
3	1.2	63,992
4	9.4	439,457
5	4.2	210,885