Institute of Agricultural and
Environmental Research (IAgER)
Tennessee State University
3500 John A. Merritt Blvd.
Nashville, TN 37209-1561

Office of the Dean

April 15, 2004

Dr. Cheryl Oros, Director
Planning and Accountability
USDA-CSREES
800 9th St. SW
Waterfront Center
Washington, D.C. 20024

Dear Dr. Oros:

Enclosed is the Plan of Work for Tennessee 1890 Agricultural Research, Institute of Agricultural and Environmental Research, Tennessee State University. This Plan of Work is our proposal for what we intend to implement during the period October 1, 2004 through September 30, 2006. Thank you very much for allowing us the extension for submitting this plan.

Regards,

Stephen H. Kolison, Jr.
Dean and Research Director

SHKJr/gg
Enclosure

Plan of Work

TENNESSEE 1890 AGRICULTURAL RESEARCH

INSTITUTE OF
AGRICULTURAL AND ENVIRONMENTAL RESEARCH

Tennessee State University

Federal Fiscal Years
2004-2006

April 2004

Point of Contact: All questions and comments regarding this Plan of Work should be directed to the Research Director at Tennessee State University.

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EXECUTIVE SUMMARY

The Institute of Agricultural and Environmental Research (IAgER) at Tennessee State University is excited for the opportunity to partner with the United States Department of Agriculture, and the State of Tennessee, industry, the academic community, and other public sector entities to improve the quality of life for all citizens of our state and people in other regions. This Plan of Work represents our commitment to address the needs of our state, and society in general. It is also a manifestation of our efforts to build strong, realistic, and mutually beneficial partnerships, to remain relevant to our stakeholders, and to pursue new frontiers in agricultural and environmental research.

This Plan of Work was developed with input from internal stakeholders (faculty, researchers, students, staff, Cooperative Extension personnel and administrators at Tennessee State University) and external stakeholders (private citizens and industry). This Plan of Work is what we intend to undertake during the period October 1, 2004 through September 30, 2006 and is, to a large extent, a modification and continuation of our Plan of Work for the period October 1, 1999 through September 30, 2004. The research endeavors included were planned under the National Research, Extension, and Education (REE) goals set by the United States Department of Agriculture. The goals are as follow:

1. An agricultural system that is highly competitive in the global economy;
2. A safe and secure food and fiber system;
3. A healthier, well-nourished population;
4. Greater harmony between agriculture and the environment;
5. Enhanced economic opportunities and quality of life for Americans.

Under the REE goals, we plan to implement 14 multidisciplinary programs. The programs will address some of the concerns of Tennessee's small farmers, larger producers, and families. It will seek to make our food and environment safer, and explore economic opportunities for our citizens.

PLANNED PROGRAMS

Fourteen research programs have been planned to address the needs of our stakeholders. These programs are as follow:

GOAL 1. AN AGRICULTURAL PRODUCTION SYSTEM THAT IS HIGHLY COMPETITIVE IN THE GLOBAL ECONOMY

Program 1. Alternative Livestock and Poultry
Program 2. Nursery Crop/Green Industry Enhancement
Program 3. Small Farms Viability
Program 4. Forest Management for Minority Landowners

GOAL 2. A SAFE AND SECURE FOOD AND FIBER SYSTEM

Program 5. Innovative Methods for Rapid Detection of Food Borne Pathogens
Program 6. Bacteria in Fruits and Vegetables
Program 7. Food Refrigeration Practices of Economically Disadvantaged Citizens

GOAL 3. A HEALTHIER, MORE WELL-NOURISHED POPULATION

Program 8. Nutrition Education for Disadvantaged Populations
Program 9. Healthier Eating

GOAL 4. GREATER HARMONY BETWEEN AGRICULTURE AND THE ENVIRONMENT

Program 10. Integrated Pest Management
Program 11. Soil Quality
Program 12. Water Quality
Program 13. Improving Environmental Quality

GOAL 5. ENHANCED ECONOMIC OPPORTUNITIES AND QUALITY OF LIFE FOR AMERICANS

Program 14. Economic Opportunity Enhancement

PLANNED MULTI-INSTITUTIONAL, MULTIDISCIPLINARY, MULTI-STATE ACTIVITIES

The planned programs for Tennessee State University Institute of Agricultural and Environmental Research for the period FY 2004-2006 are all multi-disciplinary in nature, and will be carried out by multi-disciplinary research teams. Some of the planned programs are multi-state and multi-institutional. The matrix below provides a list of planned programs that will be multi-institutional and multi-state.

Planned Programs	Institutions	States
Program 1 (Meat Goat Research Component)	Langston University	Oklahoma
	Prairie View A&M University	Texas
Programs 2, 4, and 10	University of Tennessee	Tennessee
Program 9	Kansas State University	Kansas
Program 12	Fort Belknap College, and Salish-Kootenai College	Montana
	Florida A&M University	Florida
	Oklahoma State University	Oklahoma
	Texas A&M University	Texas

PLANNED INTEGRATED RESEARCH AND EXTENSION ACTIVITIES

Tennessee State University's 1890 Research and Extension collaborate in a number of areas. This collaboration is expected to grow further during the FY 2004-2006 period with Research activities fully integrated with Extension activities. The matrix below gives the planned integrated Research and Extension activities that we intend to implement.

Unit	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5
TSU 1890 Research	Programs 1, 3, and 4	Programs 7	Program 8		
TSU 1890 Extension	Programs 1, 3, and 4	Programs 7	Program 8		

PROGRAM DESCRIPTION

GOAL 1. AN AGRICULTURAL PRODUCTION SYSTEM THAT IS HIGHLY COMPETITIVE IN THE GLOBAL ECONOMY

PLANNED PROGRAMS

Program 1. Alternative Livestock and Poultry
Program 2. Nursery Crop/Green Industry Enhancement
Program 3. Small Farms Viability
Program 4. Improving Income and Forest Stewardship of Minority/Limited Resource Forest Landowners

STATEMENT OF THE ISSUES

Livestock and Poultry

To enhance the competitiveness of animal agriculture in Tennessee, production systems for alternative livestock and poultry should be explored. This is necessary because of the following:

1. The limited acreage typically found on small farms and the decreasing amount of available pastureland affect the economic viability of producing beef cattle;
2. The desire for alternative meat is increasing because of an increasingly diverse U.S. consumer demographic;
3. The demand for tobacco products, a major cash crop in Tennessee, is decreasing due to health concerns.

In addition to exploring alternatives to traditional livestock and poultry production, other issues that currently affect the production of traditional livestock must also be addressed. For example, cattle and other livestock grazing on tall fescue forage infected with a fungal endophyte develop a condition known as fescue toxicosis. This condition affects growth and reproductive rates. Therefore, if livestock producers in Tennessee are to be competitive, factors affecting growth and reproduction, must be addressed. Our plan of work for animal agriculture includes research for finding alternatives to traditional livestock and poultry production and assessing the impacts of nutritional management and fescue toxicosis on reproduction and growth in grazing livestock operations.

The potential of guinea fowl production for food and as an alternative poultry appears to be promising. However, guinea fowl production and reproduction efficiencies are poor owing to the paucity of information on their genetic makeup, growth patterns, management, and nutritional requirements. Understanding these features will aid in minimizing production cost in creating a competitive and profitable guinea fowl production enterprise. Our plan of work includes the use of biotechnological approaches

to understand the genome of guinea fowl relative to other poultry species. Approaches to elucidate biochemical and molecular processes will be employed to aid in the improvement of guinea fowl production and reproduction efficiencies.

Nursery Crop/Green Industry

The nursery and landscape industry, often referred to as the green industry, has emerged as one of the most important economic sectors in Tennessee. Among agricultural crops, only cotton, soybeans and tobacco surpass the green industry in Tennessee cash receipts. While the overall number of farms in Tennessee has decreased over the past twenty years, the number of farms growing ornamental crops has steadily increased over the same time period. This steady increase in size and value of the Tennessee green industry has been attributed to the aging of the 'baby boomer' generation. As this generation reaches its peak earning and leisure years, it is expected that more of their income will become available for items such as landscaping and pleasure gardening.

The growing importance of the green industry to the economy of Tennessee and the nation necessitates the development of research programs that will address some of the problems that the industry faces, with the overall goal of making it more competitive and profitable. Some of these problems include the limitation of the number of plants with year-round interest, the shortage of well trained personnel for the industry, and the lack of current information that can be used in policy making that could benefit the industry. Therefore, our program will focus on providing the market with (1) higher quality ornamental crops that are resistant to certain diseases, (2) more ornamental crops with year-round interest, (3) critical information on plant production practices that can be used by producers and policy makers, and (4) the training of highly qualified graduates for the green industry.

Small Farms

Operators of small farms in America own about 71 percent of all farmland and contribute 41 percent to the agricultural sector's assets. Many of these farmers are facing a number of challenges including the reduction of government subsidies for crops such as tobacco, the decline in farm-generated incomes, and the loss of markets due to aggregation by major corporations. Currently, many small farm operators need off-farm jobs due to their inability to obtain an adequate return from farming. Research aimed at enhancing the productivity, profitability, and viability of small farms is needed. Furthermore, there is a need to explore and introduce non-traditional, high value niche crops that can be used by these operations to remain economically viable. This research will focus on assessing further the problems faced by small farmers with the goal of providing more viable solutions. Also, our research will lead to the development and introduction of medicinal plants as alternative agronomic crops for these farmers.

Forest Stewardship and Income Improvement

A significant number of minorities or limited resource individuals in the U.S. South own forestland. It has been found that these lands are not contributing significantly to the income of these owners. Among the reasons that have been attributed to this condition is the lack of sustainable forest management knowledge among these owners. In view of this, our research will continue to assess the constraints faced by minority or limited resource forestland owners in Tennessee, and develop innovative technical assistance programs that will empower them to generate more income from their lands.

Performance Goal 1.1: Development of a Competitive Animal Production System for Limited Resources Farmers in Tennessee

Output Indicators

- Refereed scientific publications, presentations at scientific meetings, popular press articles, exhibits at trade shows, presentations to industry groups, web sites, field days conducted relative to the objectives of the program
- Number of farmers served

Outcome Indicators

- Enhancement of research capacity
- Better understanding of animal production systems for the limited resource farmer
- New information on poultry and livestock production in Tennessee
- Availability of alternatives to traditional poultry and livestock production
- Income opportunities for small farmers in Tennessee
- New and easy access to markets for alternative livestock for producers as well as consumers

Key Program Components

1.1a. Develop and introduce a competitive goat production system for small farmers in Tennessee as an alternative to beef cattle production, tobacco farming, and other farming activities for which they are losing markets, or are likely to lose market share.

1.1b. Provide an alternative to traditional poultry production to small farmers in Tennessee by developing and introducing management practices for improving reproductive efficiency of guinea fowl.

1.1c. Assess physiological indices in cattle and goats consuming endophytic tall fescue to identify mechanisms through which ergopeptine alkaloids linked to fescue toxicosis reduce productivity in the beef cattle and meat goat production.

1.1d Assess constraints to marketing alternative livestock such as meat goat in the United States.

Internal and External Linkages
- Collaboration with other departments at Tennessee State University
- Collaboration with Cooperative Extension Program at Tennessee State University
- Collaboration with other 1890 institutions involved in goat research
- Collaboration with industry representatives and organizations

Targeted Audiences
- Farmers
- Students
- Researchers
- Public officials
- Consumers of goat meat, beef, poultry, and other foods

Program Duration

Two to five years

Performance Goal 1.2: Increasing the Competitiveness of the Nursery Crop/Green Industry in Tennessee

Output Indicators
- Refereed scientific publications, presentations at scientific meetings, popular press articles, exhibits at trade shows, presentations to industry groups, web sites, field days conducted relative to the objectives of the program.
- Number of farmers and green industry personnel served

Outcome Indicators
- Enhancement of research capacity
- New, improved cultivars released
- Quantity of sales of the improved genera
- Number of producers growing the improved cultivars
- Increased market demand for the genera improved
- Income opportunities for small farmers in Tennessee

Key Program Components

1.2a. Improve selected plant genera to broaden their appeal to consumers and thus improve the competitiveness of the nursery industry in Tennessee.

1.2b. Develop a system for introducing selected improved plants to small farmers in Tennessee as alternatives to tobacco farming and other farming activities for which they are losing markets or are likely to lose market share.

1.2c. Improve or transform selected ornamental plants for resistance to selected pathogens.

1.2d. Assess fertilization and irrigation practices for selected ornamental plants to maximize efficiency of nutrient and water use.
1.2e. Monitor and assess the size of selected segments of the green industry and determine the economic impact and environmental benefits of the nursery industry in Tennessee.
1.2f. Monitor and assess the key factors affecting consumer demand for nursery products and landscape services.
1.2g. Assess growth prospects of the nursery industry under short-, medium-, and long-term scenarios.
1.2h. Identify and evaluate market channels, marketing and merchandising practices, and barriers associated with the development of domestic and international markets for nursery/greenhouse products.
1.2i. Train students for employment and entrepreneurial opportunities in the green industry.

Internal and External Linkages

- Collaboration with other departments at Tennessee State University
- Collaboration with Cooperative Extension Program at Tennessee State University
- USDA ARS
- Collaboration with other land grant universities
- Collaboration with private companies in the green industry
- Collaboration with Tree Advisory Committee of Metropolitan Government of Nashville and Davidson County
- Tennessee Nursery and Landscape Association
- Middle Tennessee Nursery Association
- Tennessee Flower Growers Association
- Tennessee Urban Forestry Council

Targeted Audiences

- Researchers
- Public officials
- Ornamental plant producers
- Plant propagators
- Garden center personnel
- Landscape architects
- Landscape maintenance companies
- Green industry organizations
- Ornamental plant consumers
- Farmers
- Students

Program Duration

Two to five years

Performance Goal 1.3: Enhancing the Income of Small Farmers through Innovative Marketing Approaches and Developing Alternative Agronomic Crops

Output Indicators
- Refereed scientific publications, popular press articles, exhibits at trade shows, presentations to industry groups, web sites, field days conducted relative to the objectives of the program
- Number of farmers served
- Availability of alternatives to traditional agronomic crops
- Student training

Outcome Indicators
- Enhancement of research capacity
- New information for policy making on small farm issues
- New cultivar release
- Enhanced income opportunities for small farmers in Tennessee

Key Program Components

1.3a. Identify, breed and propagate plants with pharmacological values for introduction to small farmers in Tennessee as an alternative to tobacco farming, and other farming activities for which they are losing markets or are likely to lose market share.

1.3b. Develop a system for introducing medicinal crops farming to small farmers in Tennessee as alternative agronomic crops.

1.3c. Assess production and marketing practices of small farmers with the goal of enhancing the productivity, profitability and viability of their farms.

Internal and External Linkages
- Collaboration with other departments at Tennessee State University
- Collaboration with Cooperative Extension at Tennessee State University
- USDA ARS
- Collaboration with other 1890 institutions on medicinal crop research
- National Institutes of Health
- Collaboration with community-based and non-profit organizations

Targeted Audiences
- Small farmers
- Extension Service
- Researchers
- Public officials
- Ornamental plant producers
- Plant propagators
- Nursery and ornamental scientists
- Health care industry

Program Duration
Two to five years

Performance Goal 1.4: Enhancing the Income of Minority or Limited Resource Forestland Owners through Sustainable Forest Management Practices

Output Indicators
- Better understanding of forest management constraints faced by minority or limited resources forestland owners
- Refereed scientific publications, presentations at professional meetings, popular press articles, exhibits at trade shows, presentations to industry groups, web sites, field days conducted relative to the objectives of the program
- Number of minority or limited resource forestland owners served

Outcome Indicators
- Enhancement of 1890 research capacity
- New information on forest management constraints faced by minority forestland owners
- Enhanced income opportunities for minority forestland owners

Key Program Components

1.4a. Identify and minimize the forest management constraints faced by minority or limited resources forestland owners in Tennessee.

Internal and External Linkages
- Collaboration with Cooperative Extension at Tennessee State University
- USDA Forest Service
- Collaboration with other 1890 institutions
- Collaboration with Tennessee Department of Agriculture – Division of Forestry

Targeted Audiences
- Minority forestland owners
- Students
- Researchers
- Public officials

Program Duration
Two to five years

GOAL 2. A SAFE AND SECURE FOOD AND FIBER SYSTEM

PLANNED PROGRAMS

Program 5. Innovative Methods for Rapid Detection of Food Borne Pathogens
Program 6. Reduction of Bacteria in Fruits and Vegetables
Program 7. Food Refrigeration Practices of Economically Disadvantaged Citizens

STATEMENT OF THE ISSUES

Food borne illness has been rated as one of the greatest health problems in the United States. In recent times there have been several food poisoning incidents that have resulted in death or life threatening conditions. As many as 80 million illnesses and 9,000 deaths per year are attributed to food contamination. The cost for treating these illnesses is estimated to range from $6 billion to $37 billion annually.

Bacteria and other microorganisms that are found widely throughout nature cause food borne illness. Among these microorganisms is salmonella. This bacterium is usually found in poultry. Considering the high degree of consumption of poultry by Americans, it is not very difficult to understand the importance of salmonella as a threat to food safety.

In addition to salmonella in poultry, other sources of food borne illness are bacteria found on or in fruits and vegetables. Contaminated fruits and vegetables pose tremendous hazards given that they are eaten raw. Furthermore, and extremely important is that consumers are encouraged to consume vegetables and fruits. This can pose a serious problem for high-risk persons, including children, the elderly, pregnant women, and individuals with compromised immune systems. The consequences of consuming unsuspecting contaminated fruits and vegetables are likely to be more severe for them than other population groups. Recognizing this serious health care threat to the American public, our plan of work includes the evaluation of current methods used to detect and reduce bacteria and other microorganisms on fruits and vegetables.

Food refrigeration is also a food safety concern of this plan of work. A refrigerator is one of the most important pieces of equipment in the home for keeping food safe. However, it has been shown that many consumers lack adequate knowledge about safe food refrigeration factors and practices that potentially increase susceptibility to food-borne illness. Additionally, with the increasing wide variety of pre-prepared foods, it is important for consumers to understand the safe storage practices for these foods. Thus we plan to explore consumer practices related to storage of selected food products, refrigerator temperatures, length of time refrigerated food is kept, awareness and knowledge of food labeling, and knowledge and beliefs related to food safety and refrigeration of limited resource individuals, particularly targeting those in low income housing and less affluent areas of Tennessee.

Performance Goal 2.1: Improving the Safety of Food through Detection and Surveillance

Output Indicators

- Increased understanding of the strengths and weaknesses of current methods for detecting dangerous food borne pathogens
- Increased understanding of the strengths and weaknesses of current methods for reducing dangerous microorganisms on fruits and vegetables
- Increased understanding of the food refrigeration practices of economically disadvantaged citizens
- Refereed scientific publications, presentations at scientific meetings, exhibits and presentations at scientific conferences, popular press articles, exhibits at trade shows, presentations to industry groups, web sites, field days conducted relative to the objectives of the program
- New/improved methods for detecting dangerous food borne pathogens

Outcome Indicators

- Enhancement of 1890 research capacity
- More effective methods for rapid detection of food borne pathogens
- A more informed public about food safety issues
- A more cautious public about food borne illness
- Reduction in the number of persons affected by food borne illness

Key Program Components

2.1a. Developing rapid immunoassays for the detection of food borne pathogens.

2.1b. Assess the levels of bacteria on fruits and vegetables that are usually eaten raw, and evaluate current methods used by consumers for reducing the incidence of food borne illness.

2.1c. Assess the food refrigeration knowledge and practices of economically disadvantaged citizens in Middle Tennessee and develop programs to enhance knowledge.

2.1d. Techniques for effective recruiting of minority and other hard-to-reach populations for participation in consumer health-related studies.

Internal and External Linkages

- Collaborations with other departments at Tennessee State University
- Collaboration with Cooperative Extension at Tennessee State University
- USDA/FSIS
- Department of Health and Human Services/FDA-CFSAN
- Public Health Organizations

Targeted Audiences

- Families
- Researchers

- Public officials
- Consumers of poultry, fruits, and vegetables
- Health care industry

Program Duration

Two to five years

GOAL 3. A HEALTHIER, MORE WELL-NOURISHED POPULATION

PLANNED PROGRAMS

Program 8. Nutrition Education
Program 9. Healthy Eating

STATEMENT OF THE ISSUES

Nutrition Education

The United States has a longstanding commitment to food and nutrition security. There are currently fourteen food assistance programs that are federally funded, and an almost uncountable number of non-federally funded programs. Unfortunately, few of these programs provide nutrition education. Access to nutrition education messages by individuals in lower income levels may be limited. A recently published article recommended that greater emphasis be placed on nutrition education for disadvantaged groups. The National Cancer Institute initiated the "5 A Day" Program several years ago in response to the Year 2000 Health Goal for all Americans to eat at least five servings of fruits and vegetables a day. Although this is an aggressive program, the progress that has been made in achieving the "5 A Day" goal is not as great for limited resource persons. The reasons for this lack of progress among limited resources persons may include the lack of funds to purchase such items and the lack of knowledge of what is included in the fruit and vegetable group.

Thus, the nutrition educational challenge becomes three-fold; i.e. educating consumers with limited resources about dietary needs, providing them with ideas on how to use the food items that are available, and advising them in their purchasing practices. Therefore, we propose to evaluate the nutrition knowledge of individuals receiving food assistance, design appropriate educational materials that meet their specific needs, and evaluate the effectiveness of these materials.

Healthy Eating

An understanding of food consumption and the difficulties in changing consumption patterns are critical to improving human health and well-being. One of the barriers to

understanding consumption is the difficulty in measuring what people eat. This is especially profound when it comes to fruits and vegetables, given that they vary in size and shape. While researchers have established "size choices" i.e. small, medium, or large as reporting options for some fruits, there is limited knowledge on whether these terms mean the same to the general public. Thus, when one is reporting that he or she has eaten a "medium" size serving of a food, there may be a discrepancy in the actual amount consumed.

Portion size estimation aids are a primary component of the method used to collect food consumption information in national and regional surveys. These aids are critical to assessing the dietary status of Americans. To understand and change food consumption behavior, we must know what and how much an individual consumes. Included in the ten-year comprehensive plan for the National Nutritional Monitoring and related research program is the need to "identify ways to increase comparability within a dietary method." In view of the foregoing, we propose to evaluate methods of reporting portion size for selected fruits and vegetables with the overall goal of improving existing methods, or developing new and more effective ones.

Performance Goal 3.1: Improving the Nutritional Well-being of the Citizens of Tennessee

Output Indicators

- Increased understanding of nutrition education needs of persons receiving food assistance
- Increased understanding of barriers to fruit and vegetable consumption by food assistance recipients
- Increased understanding of the problems associated with dietary assessment
- Increased understanding of the strength and weakness of current methods used to measure food consumption
- Refereed scientific publications, presentations at scientific meetings, popular press articles, exhibits at professional meetings and presentations to industry groups, web sites.
- New methods for estimating portion size
- Enhancement of research capacity

Outcome Indicators

- New information on healthier eating
- A more informed public about the benefits of proper nutrition
- A public more informed about the health benefits of fruits and vegetables
- Increased consumption of fruits and vegetables by participants in food assistance programs
- New information on the role of portion size

Key Program Components

3.1a. Improve or develop more effective methods for assessing fruit and vegetable consumption

3.1b. Assessing barriers to food and vegetable consumption by economically disadvantaged groups

3.1c. Improve or develop means of teaching food assistance program recipients about the benefits of fruit and vegetable consumption

Internal and External Linkages

- Collaboration with other departments at Tennessee State University
- Collaboration with Cooperative Extension at Tennessee State University
- Collaboration with USDA
- Collaboration with Kansas State University

Targeted Audiences

- Families
- Students
- Researchers
- Public officials
- Consumers of fruits and vegetables
- Food assistance program participants

Program Duration

Two to five years

GOAL 4. GREATER HARMONY BETWEEN AGRICULTURE AND THE ENVIRONMENT

PLANNED PROGRAMS

Program 10. Integrated Pest Management Nursery Crops
Program 11. Soil Quality
Program 12. Water Quality
Program 13. Improving Environmental Quality

STATEMENT OF THE ISSUES

The nursery industry, the second largest industry in Tennessee, shows promising trends for the future. However, the invasion of highly destructive nursery crop pests and diseases has necessitated the rapid development of pest and disease control programs, mainly based on the use of highly toxic chemical pesticides. Heavy use of these chemicals is often unnecessary and may lead to environmental degradation. The environmental safety of these chemicals begs for studies on their persistence and movement in soil and surface water, as well as the evaluation and development of alternative pest and disease control methods. Therefore, we plan to continue research during the next two to five-year period that will develop integrated approaches to managing pests that economically affect nursery crops in Tennessee. This plan also includes the development or enhancement of sustainable agricultural practices, surface water protection, and the overall improvement of the environment.

Other pest control concerns in Tennessee involve the Japanese beetle (*Popillia japonica* Newman) and imported fire ant (*Solenopsis* spp.). Presently, both Japanese beetle and imported fire ant quarantines affect ornamental producers in the eastern U.S. The life cycle of fire ants and Japanese beetles involves substantial underground components. Therefore, any nursery plant material with soil or potting media attached to the roots is regulated against these insect pests. Fire ants impact the ability of southeastern states to ship nursery products to northern and western markets, which can account for as much as 80% of the trade from some southern states. Japanese beetles are already established in most of the northeastern U.S., and therefore, impact the ability of northern and southern states to ship to the mid-western and western U.S. The lack of effective, practical, and environmentally sound treatment methodologies for Japanese beetles and fire ants will seriously jeopardize green industry trade, and therefore, industry profitability. Treatments that are feasible for growers literally can determine whether an entire industry is able to sell nursery products.

Performance Goal 4.1: Reduction of Environmental Contamination in Nursery Crop Operations

Output Indicators

- Better understanding of agricultural practices that take into consideration environmental protection
- Refereed scientific publications, popular press articles, exhibits at trade shows, presentations at scientific meetings and to industry groups, web sites, field days conducted relative to the objectives of the program
- Availability of sustainable alternatives to traditional pest control methods
- New methodologies for managing diseases and pests
- New methodologies for decreasing environmental degradation
- Demonstration blocks
- Well-trained graduates

Outcome Indicators

- Enhancement of 1890 research capacity
- Reduction in environmental contamination
- The development of alternative methods that will provide a safer, more cost-effective solution to pest and disease control, and will benefit all people by reducing environmental contamination
- Increase in exports/sales of nursery crops from Tennessee

Key Program Components

4.1a. Evaluate and develop effective alternative control measures for Fire Ant, Japanese Beetle and other potential insect pests in nursery crop production.
4.1b. Evaluate and develop environmentally friendly alternatives to fungicides for powdery mildew disease management in dogwood production.
4.1c. Establishment of spatial information systems for nursery pest and disease management in Tennessee
4.1d. Assessment of triclopyr persistence in soils
4.1e. Salt loading assessment of nursery soils
4.1f. Phytoremediation for mitigating intrusions of man made (xenobiotic) chemicals into vulnerable water resources

Internal and External Linkages

- Internal, multi-disciplinary linkages will combine the expertise of research scientists in the fields of entomology, plant pathology, soil physics, and environmental chemistry, and represent both the main TSU campus and Nursery Research Center in McMinnville, Tennessee.
- External, multi-institutional and multi-disciplinary linkages will involve collaborations with scientists representing USDA-ARS, USDA-APHIS, Michigan State University, University of Tennessee, the nursery crop producers in Tennessee, and the Tennessee Department of Agriculture.
- EPA

Targeted Audiences

- The nursery, turf, landscape, pesticide, and environmental protection and cleanup industries.
- Undergraduate and graduate students.
- Private citizens practicing horticultural pest and disease control and plant maintenance.
- Research and regulatory agencies in state and national government.
- Research and development scientists in university and private industry arenas.

Program Duration

Two to five years

GOAL 5. ENHANCED ECONOMIC OPPORTUNITIES AND QUALITY OF LIFE FOR AMERICANS

PLANNED PROGRAMS

Program 14. Economic Opportunity

STATEMENT OF THE ISSUES

The nursery crop sector of the green industry is one of the most profitable and important economic sectors in Tennessee. As an agricultural crop, only cotton, soybeans and tobacco surpass nursery crop production in the state. Conspicuously absent from the overall ownership of this lucrative sector are minorities. A study conducted by Tennessee State University in 1996 found that most minorities in the green industry occupied or had ownership in the less lucrative landscaping or lawn care sector of the industry. As minority or limited resource farmers are forced out of farming traditional agronomic crops such as tobacco, they will need viable alternative crops. Hence, we propose to continue to study the constraints to entry into the nursery crop sector by minority or limited resource farmers.

Performance Goal 5.1 Assist Minorities to Gain Entrance into the Lucrative Nursery Crop Industry in Tennessee

Output Indicators

- Better understanding of the constraints to entry into the nursery crop sector by minority or limited resource farmers
- Refereed scientific publications, exhibits and presentations at scientific meetings, popular press articles, exhibits at trade shows, presentations to industry groups, web sites, field days conducted relative to the objectives of the program
- Number of farmers served

Outcome Indicators

- Enhancement of 1890 research capacity
- New economic information on the nursery crop sector in Tennessee
- Availability of viable alternatives to traditional agronomic crop production
- Enhanced income opportunities for minority or limited resource farmers in Tennessee

Key Program Components

5.1a. Investigate factors affecting entry into the nursery industry by minorities in particular and rural residents in general.

Internal and External Linkages

- Collaboration with other departments at Tennessee State University
- Collaboration with Cooperative Extension at Tennessee State University
- USDA

Targeted Audiences

- Minority and limited resource farmers
- Students
- Researchers
- Public officials

Program Duration

Two to five years

Fiscal and Human Resources Allocated
(Based on FY-03 Data)

GOAL 1: An Agricultural Production System that is highly Competitive in the Global Economy

Program	Description	FTE	Budget
Program 1	Alternative Livestock and Poultry	7.0	$611,721
Program 2	Nursery Crop/Green Industry Enhancement	13.0	1,210,380
Program 3	Small Farms Viability	6.5	561,651
Program 4	Forest Management for Minority Landowners	1.5	87,078
Total		**28.9**	**$2,470,829**

Goal 2: A Safe and Secure Food and Fiber System

Program	Description	FTE	Budget
Program 5.	Innovative methods for rapid detection of food borne pathogens	2.1	$181,557
Program 6.	Bacteria in Fruits and Vegetables	1.3	108,847
Program 7.	Food refrigeration practices of economically disadvantaged Citizens	4.0	348,311
Total		**7.3**	**$638,715**

Goal 3: A Healthier, More Well-Nourished Population

Program	Description	FTE	Budget
Program 8.	Nutrition Education for Disadvantaged Populations	4.0	$348,311
Program 9.	Healthier Eating	4.0	348,311
Total		**8.0**	**$696,621**

Goal 4: Greater Harmony Between Agriculture and the Environment

Program	Description	FTE	Budget
Program 10.	Integrated Pest Management	7.9	$687,914
Program 11.	Soil Quality	1.0	87,078
Program 12.	Water Quality	2.0	177,638
Program 13.	Improving Environmental Quality	1.3	110,589
Total		**12.2**	**$1,063,218**

GOAL 5: Enhanced Economic Opportunities and Quality of Life for Americans

Program	Description	FTE	Budget
Program 14.	Economic Opportunity Enhancement	1.5	$130,617
Total		**1.5**	**$130,617**

STAKEHOLDER INPUT PROCESS

The development of this Plan of Work began with the establishment of the Vision Committee. The committee was established to develop a preferred vision and a corresponding research direction for the Institute of Agricultural and Environmental Research (formerly the Cooperative Agricultural Research Program – CARP) at Tennessee State University. The committee consisted of faculty, scientists (those who conduct research) and staff members. There was also representation from Cooperative Extension (those who use research). This was the first stage of our stakeholder-input process. The second stage consisted of forming research teams. The research teams had the responsibility to insure the relevance of our research direction, or thrust, to the State of Tennessee by seeking inputs from external stakeholders (those who conduct and use research results). The external stakeholders consisted of persons associated with the nursery industry in the state and individuals from many walks of life. Some of these stakeholders are listed in the sections dealing with internal and external linkages.

To insure the relevance of our research programs during the proposed period and beyond, the stakeholder input process will be a continuous one. The process for this will be both formal and informal. The formal process will seek to utilize statewide surveys, Townhouse type meetings, and inputs from the internal vision committees. The informal process will take the form of engaging small farmers, commodity and advisory groups, underrepresented groups, students, staff members, and policy makers in dialogues aimed at gathering information or inputs regarding the agricultural issues that concern them the most.

SCIENTIFIC PEER/MERIT REVIEW PROCESS

The process used to select the planned programs was consistent with the Merit Review process for 1890 Evans-Allen research proposals published in the Administrative Manual for Evans-Allen Cooperative Agricultural Research.

CERTIFICATION:

Stephen H. Kolison Jr., Ph.D.
Dean and Research Director