

“Providing excellence in tropical horticulture and natural resources research, extension and teaching”

## **STRATEGIC PLAN**

**Tropical Research and Education Center  
Institute of Food and Agricultural Sciences  
University of Florida**

**August 2005**

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# **STRATEGIC PLAN**

## **Tropical Research and Education Center Institute of Food and Agricultural Sciences University of Florida**

### **Executive Summary**

This strategic plan was designed to reassess the mission of the University of Florida, IFAS, Tropical Research and Education Center (UF-TREC) and to chart a direction for the next five to ten years to meet our vision and mission. The Tropical Research and Education Center is the premier research, extension, and teaching institution in Florida working on tropical fruit, vegetable and ornamental crops and natural resources in the subtropics. The warm subtropical climate, tropical horticultural industries, proximity to the several of the largest natural areas in the U.S., and the demographic diversity offer the UF-TREC unique opportunities to positively impact the lives and natural environment of Florida citizens while enhancing horticultural and natural resources research and education throughout the tropical world. This document elucidates the vision and mission for UF-TREC and puts current programs and impacts into historical perspective. The core programs are divided into 4 main categories: 1) tropical fruit crops, 2) vegetable crops, 3) ornamental crops, and 4) natural resources. The current strengths and weakness of each program are outlined with a focus on strengthening research, teaching, and extension activities in each of these program areas. Lastly, new personnel and infrastructure resources necessary for achieving and maintaining UF-TREC's mission are specifically outlined.

## **UF-TREC Aspirations and Beliefs**

### Vision statement

The Tropical Research and Education Center (UF-TREC) will be recognized locally, nationally, and internationally as a leading research and education institution for tropical and subtropical horticulture and natural resources and contribute to the economic development and enhancement of the quality of life in Florida.

### Mission statements

The mission of the UF-TREC is to develop and disseminate science-based information about tropical horticulture and natural resource sciences through basic and applied research, extension, and teaching to sustain and enhance the quality of human life and the natural environment.

### Condensed mission statement:

Providing excellence in tropical horticulture and natural resources research, extension, and teaching.

### Core values

- Excellence
- Global Significance
- Diversity
- Accountability
- Service to Florida

### Core constituents

- Florida's tropical agriculture (~\$1.04 billion annually)
- Natural resources (Everglades National Park and Biscayne National Park; adjacent natural areas)
- 17.4 million Florida residents
- International scientific and professional community

## **Background**

### University of Florida, Institute of Food and Agricultural Sciences (UF-IFAS)

The University of Florida has been committed to the development of Florida's agriculture since establishment in 1906. UF-IFAS traces its roots to the Morrill Act of 1862 and the reorganization of the University's College of Agriculture, School of Forestry, Agricultural Experiment Station, and Cooperative Extension Service into a single unit in 1964.

### Tropical Research and Education Center (UF-TREC)

UF-TREC is one of 12 centers comprising UF-IFAS. The Center is located 25.5°N latitude and 80.4°W longitude, along the southeastern coast of Florida approximately 30 miles south of Miami. Surrounded by water on 3 sides, south Florida's climate is marine subtropical with a mean annual temperature of 23.4°C, and a mean annual rainfall of 1650 mm with a wet

season from late May to October. Geographically and climatically south Florida is part of the Caribbean Region and Latin America. Due to the unique geographic location and climate UF-TREC offers the University of Florida an opportunity to have an impact well beyond the continental United States

UF-TREC was established in 1929 by an act of the state legislature in Miami-Dade County on land donated by the Krome family and Mr. Charles E. Schaff. Originally named the Subtropical Experiment Station, UF-TREC is dedicated to research, extension, and teaching in the areas of ornamental, vegetable, and tropical-subtropical fruit crops and natural resources. The agricultural industry served by the center has an annual farm gate value in excess of \$800 million with an annual economic impact on the local economy of over \$1 billion. Due to the region's humid, marine subtropical climate, UF-TREC is the only state university research center in the continental U.S. focusing on a large number of tropical and subtropical crops. In addition, the Center addresses natural resource and environmental issues that impact crop production over the shallow Biscayne aquifer and in proximity to Everglades National Park, Biscayne National Park, Big Cypress Preserve, and several other major natural areas.

The center's 65 ha (160 acres) consist of offices, laboratories, greenhouses, shadehouses, vegetable fields, fruit orchards, and ornamental plantings. There are 15 active faculty members, one assistant scientist, and several active emeritus and courtesy professors along with about 45 support staff.

Since UF-TREC's inception, programs in tropical-subtropical fruits, vegetable crops, and ornamental plants have been in place. The impact of UF-TREC's programs has reached well beyond Florida and the U.S. Historically, UF-TREC has been recognized locally, regionally, nationally, and internationally for excellence in basic and applied research, extension, and teaching in subtropical and tropical fruit crops. This was accomplished because of the multi-disciplinary approach to solving problems, productive applied and basic research faculty, extension of the research findings locally, nationally, and internationally, and interaction and cooperation with local, national, and international institutions.

In short, UF-TREC is unique because of its geographic location and climate and sustained research, extension, and teaching programs that address horticulture and natural areas of the U.S., Caribbean, and Latin American subtropics and tropics.

### Strategic planning

This strategic plan was developed to reposition UF-TREC to better service the needs of all its clientele including the local/regional agricultural community and that of the wider scientific community. This plan was devised against a backdrop of major changes occurring in the internal and external environment in which the institute operates. Chief among the internally important factors considered were: changes in long-term directions for the University of Florida as espoused in its most recent strategic plan; shrinking and limited availability of federal and state supported funds for carrying out UF-TREC's research, teaching, and extension mandate; and the aging of equipment and buildings for conducting research. Among the most important external factors influencing the formulation of this plan were: increased global competition faced by the local growers as a result of the proliferation of trade agreements; increased development pressure on farmland; increased urbanization in an agricultural area; unprecedented concerns regarding the integrity and safety of the food supply; growing concerns about the environment as pertains to issues such as improvement in water quality and quantity, the need for the development of sustainable food and plant production systems; and meeting the demands of

consumers who desire high quality of fresh produce year round at reasonable prices. These factors and trends present both challenges and opportunities for the work conducted by the Center.

In developing this plan, surveys were carried out and meetings and discussions were held with all of the major stakeholders spanning a 9- month period. Background documents were prepared to reflect the consensus of views for what were considered to be the most pressing issues, challenges, and opportunities. Following this, a series of internal meetings were held to fine tune these background documents. A final planning workshop was conducted to discuss ideas and coordinate information into a final document.

#### Brief assessment of current status of UF-TREC

UF-TREC has 15 active faculty (Table 1), 45 support staff, 7 buildings with laboratory and office space, 2 state-of-the art classrooms, 1 conference room, 11 glass/fiberglass houses, 7 shade structures, about 20 acres of orchards, 40 acres of land utilized in vegetable crops research, and 10 acres in ornamental palms and cycads.

The current research programs at UF-TREC focus on:

- Basic research in developmental botany and tissue culture of tropical and subtropical fruit crops and ornamental plants,
- Molecular and traditional plant breeding in tropical-subtropical fruit crops and vegetable crops,
- Integrated pest and disease management in ornamental, vegetable, and tropical and subtropical fruit crops,
- Basic and applied research in plant stress and reproductive plant physiology,
- Basic and applied research in soil science and hydrology of agricultural and natural systems,
- Applied research in agricultural economics, and
- Applied research in production horticulture of vegetable, ornamental and subtropical and tropical fruit crops.

The current teaching programs include:

- Undergraduate B.S. degrees in Environmental Horticulture and Landscape and Nursery Management,
- Graduate courses in subtropical and tropical fruit crops (Horticultural Sciences) and Environmental (ornamental plants) Horticulture,
- Graduate student training at the M.S. and Ph.D. level in entomology, plant pathology, agricultural economics, hydrology, soil and water science, horticultural sciences, and environmental horticulture, and
- Short-course training for professionals.

The current extension program areas include:

- Tropical and subtropical fruit crop production and environmental sustainability,
- Ornamental nursery production, pest management, and environmental sustainability,
- Vegetable production and environmental sustainability, and
- Natural systems and the environment.

## Current UF-TREC Research, Extension, and Teaching Programs

At a programmatic level the Center's research, teaching, and extension efforts are carried out within the framework of four program areas: Ornamental Crops; Vegetable Crops; Subtropical and Tropical Fruit Crops, and Natural Resources.

### *Ornamental Crops*

Traditionally, research and extension efforts have focused on tropical fruit and vegetable production and have been recognized for excellence in these areas on a local, national, and international basis. Newer efforts include soil and water sciences, environmental horticulture, and ornamental pest management. These new efforts create opportunities for UF-TREC to build on its current strengths and to excel in these new areas.

Although numerous faculty members have conducted research and extension activities on ornamental crops, there are currently two faculty members assigned to work on ornamental plants and several other faculty members working in other areas that influence ornamental plants. The general focus of the Environmental Horticulture Program is on ornamental plant production in southern Florida with specific focus on plant tissue culture and the development of micropropagation protocols for commercial production and/or conservation purposes. This program also focuses on commercial production and conservation of native orchids, clonal propagation of tropical flowering trees, and ornamental bedding plant production. The Ornamental Pest Management program is geared towards providing sustainable integrated pest management (IPM) systems for ornamental crops with a particular emphasis on invasive pests. In this effort, the program is testing current and experimental pest management products for efficacy, developing a research program to incorporate natural enemies into pest management practices, and identifying and developing methods of control for existing and potentially invasive pests that affect the ornamental plant industry.

Educational opportunities for graduate students and professionals continue to grow at UF-TREC. A student can now obtain a B.S. from the Department of Environmental Horticulture at UF-TREC. Classes are held at UF-TREC or are available through distance education technologies. Classes may be taken as part of the requirements for a degree program or for personal interest and professional development. Also available are degree programs via distance education in Environmental Sciences from the Soil and Water Sciences Department and in Entomology from the Department of Entomology and Nematology.

### *Vegetable Crops*

The vegetable crops programs at UF-TREC are locally, regionally, and internationally recognized for their diversity and excellence. Since the inception of UF-TREC, vegetable crops research has been a major effort and focus. Over the years, UF-TREC horticulture, entomology, and plant pathology faculty members have made significant contributions toward the development of production practices adaptable to the unique soils and climate of south Florida (specifically Miami-Dade County).

Current research and extension programs include integrated pest management, chemical and non-chemical alternatives to methyl bromide, variety evaluations (bush beans, cabbage, sweet potato, and tomato), breeding of squash and tomato, development of sustainable fertilization and irrigation practices, and offshore pre-emptive studies on invasive insect pests not yet in Florida. There are no undergraduate or graduate courses in vegetable crops taught at UF-

TREC, although high school students have conducted short term experiments relevant to vegetable crops at UF-TREC.

### *Tropical Fruit Crops*

UF-TREC has had a long and distinguished history of research, extension, and teaching with subtropical and tropical fruit crops. UF-TREC scientists have made significant contributions to the development of production practices adaptable to the unique soils and climate of south Florida. The fruit crops programs are locally, regionally, and internationally recognized for their diversity, comprehensiveness, and excellence.

Current research and extension programs include integrated pest management, aerial and soil borne disease control, agricultural economics and marketing information, development of sustainable nutrition and irrigation practices, cultivar evaluation and development, developmental physiology, and environmental stress physiology. The teaching program includes a graduate level course on tropical fruit production and research.

The highly productive and well-recognized fruit crops faculty currently includes four University of Florida Research Foundation Professors, an award given only to the most productive faculty members at the University of Florida. During the past 25 years, the current fruit crops faculty members have generated over \$10 million in grants. The international reputation of UF-TREC's fruit crops faculty is pantropic and its programs even more important with the decline in tropical and subtropical horticultural research and development programs internationally.

### *Natural Sciences*

Current and future research and extension programs in natural resources include understanding the hydrology of natural, agricultural, and urban areas; entomology and microbiology of natural resources; conservation of endangered plant species; balance between ecosystem restoration and agriculture sustainability; plant competition in natural ecosystems, particularly pine rocklands; nutrient and irrigation management of agricultural production systems; landscape ecology; water quality monitoring; and watershed-level water quality analyses. The Soil and Water Science Department is offering the M.S. degree in Environmental Science through a distance education program. Currently 2 graduate students are registered in this program at UF-TREC.

### **Center for Tropical Agriculture (CTA):**

The CTA was established at the University of Florida in 1965 to strongly and effectively foster scientific exchanges between university faculty and students and their counterparts in Latin America and the Caribbean, Asia, the Pacific, and Africa. The Center has supported faculty and students from more than 80 countries, providing counseling, scholarships, and travel funds. The Center is well suited to support activities in agriculture because Florida's climate, natural resources, crops, livestock, pests, and diseases all have significant similarities to those in many tropical countries.

The mission of the Center is to conduct research, education, and extension programs intended to raise the standard of living of people in tropical and subtropical regions, to substantially improve agricultural productivity and natural resources management, to protect and restore fragile natural ecosystems potentially affected by agriculture, and to prevent loss of biodiversity.

In 2000, the CTA was relocated from the main University of Florida campus in Gainesville and housed within UF-TREC, Homestead. This move provided the CTA with closer physical access to the Caribbean region and Latin America. The nearly identical mission of the CTA and UF-TREC provides UF-TREC an opportunity for the expansion and continued development of its programs in tropical horticulture and natural resources management and will enhance UF/UF-TREC to service the local, regional, national, and international community.

## **Highlights of the Importance of the Horticultural Industries and Natural Environment of South Florida**

### South Florida Ornamental Plant Industry

Nursery and floricultural crops are important agricultural commodities in the southern United States with Florida second only to California in national sales of these crops. An enormously diverse selection of ornamental crops places ornamental plant production among the largest Florida agricultural commodity groups. Florida dominates the U.S. market for tropical foliage crops with over 90% of national sales. Miami-Dade County leads the state in the number of certified nurseries (1,240) and in 2002 the county's ornamental plant sale values were \$434.3 million.

Southern Florida's subtropical environment supports a diverse and robust horticultural industry but it also creates a challenging situation for pest and disease management in ornamental plant production. The overall mild climate with hot, humid summers is very conducive to rapid pest development. The major nursery production areas also contain growing populous urban centers. Water quality and quantity issues have become critical because of the high water tables and extensive rainfall that increases the risk for contamination, and the very competitive demand for water supplies from the heavily populated areas. Additionally, central and southeast Florida counties drain into or border on the environmentally-sensitive areas leading to the Everglades National Park and Florida Bay. Due to trade and travel through the state, Florida tends to be a key site for new exotic pest and plant disease introductions. In spite of these challenging issues, nursery and greenhouse growers are producing an exceptionally diverse number of ornamental plants that are sold locally, regionally, nationally and internationally.

### *Major Constraints*

- Introduction of exotic insect and disease pests.
- Significant increases in land values slowing the establishment of new nurseries in Miami-Dade County.
- Increased environmental regulations and the associated costs .

### *Enabling Conditions*

- Increasing diversity of the crops grown and technological expertise of the industry.
- Continued expansion of the market for ornamental crops in the U.S.
- Increased UF number of core disciplines (i.e., research, extension, and teaching) at UF-TREC.

South Florida's Vegetable Crops Industry Although vegetable production in the area has declined somewhat, the industry remains a major contributor to Miami-Dade County and the south Florida Economy. In 2002, sales of vegetables from Miami-Dade County amounted to in excess of \$102 million, representing 17.75% of the total market value of agricultural products sold by the county. This had an earning impact of \$152 million and generated employment of about 1,700 full time jobs. The industry accounts for a little over one-third of the farm land in Miami-Dade with snap beans, squash, sweet corn, and tomatoes the dominant vegetable crops. In 2002, of the 33,871 acres of vegetables were harvested, snap beans accounted 17,924 acres (52.91%). This was followed by squash, sweet corn and tomato with shares of 15.71%, 14.53%, and 8.65%, of the total area harvested, respectively. The county ranks first in state in the value of production of beans, okra, sweet potatoes, and squash. Sales of 20 different tropical and specialty vegetables, herbs, and spices totaled \$21.7 million, with 90% of this sum was generated from sales of malanga and boniato.

#### *Major Constraints*

- Lack of land ownership and significant increases in land values and land leasing costs.
- Loss of land to development and conversion to other enterprises.
- Off-shore competition for large markets and high production costs.
- Eminent phase out of methyl bromide.

#### *Enabling Conditions*

- High value vegetable crop acreage is increasing.
- Land for vegetable production will be available in the short- and mid-term.
- Small to mid-sized operations engaged in direct marketing and alternative markets.
- Alternatives to methyl bromide are available.

#### Florida's Tropical Fruit Industry

Tropical fruit in Florida is worth approximately \$73.5 million annually with a statewide economic impact of over \$178 million. Tropical fruit acreage is estimated to be about 12,280 acres concentrated in the 12 southern counties. The main crops are avocado (~50% of the acreage), mango, carambola, lychee, longan, mamey sapote banana/plantain, papaya, and guava. Minor crops include sapodilla, jackfruit, sugar apple, atemoya, star apple, pitaya, passion fruit, canistel, and white sapote. The majority of the industry is located in Miami-Dade, Palm Beach, and Lee Counties. Demographically the commercial industry is very diverse with roughly 60% of all producers having limited horticulture background (novice growers) and 60% of all producers that are part-time commercial growers.

The specific needs of each commercial commodity group (e.g., avocado, mamey sapote, papaya, lychee, etc.) vary. Some commodities are in need of additional cultivars, which provide alternative harvest seasons and/or improved fruit quality. Others would benefit from superior rootstocks with tolerance to detrimental biotic and abiotic edaphic conditions. Information on the nutritional requirements of some tropical fruit crops would assist producers in improving their fertilizer practices. Development and improvement in postharvest handling, reliable flowering, and off-season fruit production procedures and technology for tropical fruit crops is needed.

Sustainable agricultural practices for tropical fruit culture have become a critical issue in south Florida as a result of the massive restoration efforts underway for the natural areas (e.g.,

Everglades National Park and Biscayne National Park). Water use, quality, and management issues are of great significance to the agricultural community and projects to address some of those concerns and develop best management practices (BMP's) has been in progress.

#### *Major Constraints*

- Significant increases in land values making establishment of orchards on leased property less likely in Miami-Dade County.
- Lack of information concerning specific production practices for some crops, e.g., sustainable fertilizer and irrigation management, IPM strategies, postharvest handling and processing, and economics/marketing.
- Cultural solutions to periodic wet/flooded conditions.
- Limited pesticide availability.
- Need for additional cultivars and development of “new” crops.

#### *Enabling Conditions*

- The only state supported tropical research center in the continental U.S. where many subtropical and tropical fruit crops can be commercially grown
- A long history of research with tropical fruits recognized nationally and internationally for its excellence and diversity.
- Acreage of some tropical fruits is increasing on owned land in Miami-Dade County and new acreage has been established in other south Florida counties which have resulted in about an 8% increase in tropical fruit acreage in Florida.
- Entrepreneurs are establishing new tropical fruit species and cultivars.
- Small to mid-sized operations are engaged in direct marketing and alternative markets.
- The industry is organized for generic marketing.
- Sustained number of core disciplines (i.e., research, extension, and teaching) at UF-TREC.

#### South Florida's Natural Resources

South Florida's has unique natural resources which are the object of tremendous restoration and conservation efforts. The Comprehensive Everglades Restoration Plan is the largest and most costly restoration project of its kind in the world with a 30-year time frame and an 8 billion dollar budget to date. South Florida, especially the Miami-Dade County agricultural region, occupies an environmentally sensitive area between the Everglades and Biscayne National Parks.

Economically viable and environmentally-friendly agricultural practices need to be developed and implemented to meet the needs of growers and to protect natural ecosystems. Water quality and quantity issues are of considerable concern because of the excessively porous, oolitic limestone soils that overlay the Biscayne Aquifer. The latter passes under the Everglades Protection Area and Miami-Dade County and empties into Biscayne and Florida Bays. These areas and bays represent large natural resources for water, recreation, and habitat for native flora and fauna, which must be protected from pollution. In addition, groundwater is the primary source of drinking water for Miami-Dade County. Agrichemicals have been measured in aquatic systems of south Florida at elevated concentrations indicating a need to pro-actively reduce agrochemical leaching through innovative management.

In addition to agriculturally related natural resource initiatives, it is becoming evident that urban sources of pollution (residential and city-urban) also need to be addressed. Hence, a more holistic approach to water quantity and soil and water quality conservation needs to be initiated that includes all point and non-point sources of pollution. The inclusion of watershed-based research and planning is vital to the future of natural resources in south Florida.

Conservation of endangered plant species and understanding plant competition in natural ecosystems is becoming increasingly important in South Florida. South Florida is well-known for its abundant plant species, being the only location within the continental United States where temperate flora intermingles with subtropical and tropical flora of the Caribbean and Latin America. Currently, UF-TREC personnel are involved in conservation of native cycad and orchid species and providing assistance with rare plant monitoring and restoration in the Everglades National Park.

The role of arthropods in natural habitats near agricultural areas in south Florida is poorly understood. Many arthropod species have not yet been described. Arthropod communities and their interactions in natural ecosystems must be studied to determine whether arthropods could usefully be included in the characterization of protected natural areas. Currently, UF-TREC entomologists are involved with characterization of arthropod communities in agricultural areas surrounding the Everglades Natural Park.

Invasive vascular plants, alien invasive arthropods and plant pathogens threaten the native flora of south Florida. On the other hand, arthropods and plant pathogens can be used as biocontrol agents to suppress exotic plant invasions of natural ecosystems such as Brazilian pepper and melaleuca. However, their use requires extensive background tests on host range and impact on native and crop plant species.

Many institutions and state agencies in south Florida have responsibility for natural resource research and extension. However, UF-TREC is the only institute possessing research and extension capability for both crop production and natural resources conservation. Strong relationships among UF-TREC faculty and the local agricultural industry is another advantage for UF-TREC in promoting natural resource conservation in south Florida.

#### *Major constraints*

- Intensification of the threat to limited water quantities available to all users in south Florida.
- Increased threat to water quality as the population of south Florida increases.
- Continued introduction of exotic plants, animals, diseases, and insect pests that threaten native species.
- Need for continued development and modification of sustainable agricultural practices.
- Need for development of sustainable urban lifestyle and reduction of the impact of development on natural areas.

#### *Enabling Conditions*

- Increased funding opportunities available to address natural resource problems.
- An increase in the number of core disciplines (i.e., research and extension) in the natural resources area at UF-TREC.
- Only institute possessing research and extension capability for both crop production and natural resources conservation.

### **UF-TREC Strengths**

- The unique geographic location and climate at UF-TREC offers the University of Florida impact well beyond the continental U. S. South Florida is a part of the Caribbean and Latin American region providing access to information, research, and extension opportunities that benefit the Florida industry.
- UF-TREC is located in the major production area for tropical and subtropical fruit, tropical and winter vegetable, and tropical ornamental plant production in the U.S. and Florida. The state's largest ornamental plant industry, third largest vegetable industry, and largest tropical fruit industry are located in Miami-Dade County.
- UF-TREC is located adjacent to major natural areas (Everglades National Park, Biscayne National Park) and the largest environmental restoration effort in the history of the U.S.
- The diversity of the faculty provides a multi-disciplinary approach and interaction for providing science-based information and solving complex problems facing the industry and natural environment.
- UF-TREC has research, teaching, and indoor plant environments, vegetable fields and orchards on-site available for research, teaching, and extension.
- There is excellent interaction and cooperation with the local industry which provides valuable assistance to research and extension faculty.
- The diverse faculty, unique research programs, and geographic location provides excellent opportunities for teaching undergraduate students, training graduate students, and offering professional training in subtropical and tropical horticulture, plant physiology, entomology, plant pathology, soil science, hydrology, and agricultural economics.
- UF-TREC has strong collaborative support from numerous private and public research and education institutions throughout Florida, the U.S., and the rest of the world.

### **UF-TREC Challenges**

- Enhance local agricultural competitiveness. Land costs are nearly eliminating establishment of new orchards and expansion of land available for vegetable and ornamental crop production. This has not, however, precluded redevelopment of existing lands into new or alternative crops.
- Identify new funding sources for research, teaching, and extension programs to overcome shrinking and limited state-supported budgets for research and extension programs. Due to the overall budgetary constraints facing all public universities and institutions, this periodically slows the research, development, and extension response time of the institution due to lack of personnel, programs, and infrastructure.
- Improve and/or establish permanent visiting scientist and graduate student housing. This will increase the attractiveness of UF-TREC as a place for sabbaticals and student research.
- Sustain and enhance existing programs with local, regional, national and international prominence (e.g., fruit crops, vegetable crops) while expanding programs in ornamental horticulture and natural resources.
- Expand and enhance natural sciences programs with local, regional, and international impact.

- Enhance and expand teaching and professional development programs relevant locally, regionally, nationally, and internationally.
- Develop and enhance the Center for Tropical Agriculture through grants, sustainable funding, and additional personnel to support international programs for training and teaching (e.g., short-courses, symposia), extension of information, and enhancement of research of regional/international concern.
  - External Factors to Address
    - Competition from other countries affecting farm-gate prices. For example, mangos from Mexico, Central and South America, avocados from the Dominican Republic and Mexico, and lychees from Taiwan and China.
    - The necessity for development of environmentally sustainable horticultural practices (i.e., best management practices). Improvements in irrigation and nutrient management and economic efficiency are required to reduce the impact of agriculture on the natural environment and enhance sustainability.
    - Urban development pressures on land use, land values, taxes, and sustainability of ancillary industries (e.g., chemical and irrigation companies, packinghouses) necessary for horticulture to flourish.

## **Program Themes**

### Environmental sustainability

1. Development of science-based sustainable agricultural practices and extension of this information and technology through traditional (e.g., workshops, seminars) and nontraditional (e.g., web-based media) avenues.
2. Enhancement and expansion of the programs in natural resources management and agricultural sustainability.

### Crop health, development, and quality

1. Expansion of integrated pest management (IPM) research, development, and extension programs.
2. Coordination of UF-TREC programs with local, regional, national, and international institutions and governmental agencies to improve IPM effectiveness.
3. Improve extension of information and results of IPM research to clientele through traditional (e.g., workshops, seminars) and nontraditional (e.g., web-based media) means.

### Economic analysis and intelligence

1. Economic analysis of existing and potential agricultural enterprises for south Florida.
2. Development of the economics extension program to address economic sustainability and new opportunities.
3. Identification of economic opportunities for local and regional producers and an extension program to inform producers.
4. Development and extension of agricultural economic information to local/regional producers.

### Technological advancement

1. Continue and expand research and development programs in tissue culture and biotechnology.
2. Continue and expand research and development programs in soil moisture and nutrient monitoring and management.
3. Seek and extend technology that is economically viable and improves the economic competitiveness of the local horticultural industry.

### Regional, national, and international impact

1. Sustain and enhance existing expertise and programs in subtropical and tropical fruit culture so that this program maintains its strong national and international reputation.
2. Enhance and expand expertise and programs in vegetable and ornamental crops and natural resources.

### **Goals and Initiatives**

#### Sustain and enhance UF-TREC as a center of excellence in research and information in tropical agriculture and natural resources in the tropics

1. UF-TREC will maintain and enhance current research, extension, and teaching programs in tropical and subtropical fruit and ornamental crops.
2. UF-TREC will increase the number of core disciplines in sustainable vegetable production, natural resources, and cross-commodity research and extension:
  - a. Vegetable Crops Horticulturist (research/extension split; sustainable agriculture, work closely with natural resources faculty);
  - b. Natural Resource (agro-ecologist, ecologist, or wildlife ecologist to be determined);
  - c. Cross-Commodity Postharvest Physiologist (to work on fruits, vegetables and ornamentals);
  - d. Ornamentals Horticulturist (work closely with natural resources faculty, BMPs).
3. UF-TREC will enhance the teaching program by:
  - a. Offering more classes through our partner, Fairchild Tropical Botanical Garden.
  - b. Developing short courses and summer courses for local, state, national, and international clientele in coordination with the CTA.
  - c. Building on the strength of the Ft. Lauderdale teaching program by seeking ways to compliment and coordinate the UF teaching programs in southeast Florida.
  - d. Investigate the possibility of offering courses through Florida International University and Miami Dade College.
  - e. Increased endowment funds for graduate students.
4. UF-TREC will enhance the Center for Tropical Agriculture (CTA).
  - a. Hire an assistant director to help coordinate CTA programs, seek institutional grants, and seek complex grants (e.g., USAID, World Bank), and network with potential collaborators and funding agencies.
  - b. Offer academic and professional training courses through the CTA. Those professionals who complete the course may receive a certificate.

5. Increase public relations activity.

#### Focus on team approaches to agricultural issues and research

##### Research and Extension

1. Identify basic and long-term research to enhance our understanding of the biology of the crops in south Florida.
2. More emphasis on sustainable agricultural practices to enhance agricultural and natural ecosystem compatibility.
3. Conduct detailed economic analyses of various commodities, potential commodities, and potential agricultural technologies.
4. Improve and enhance the multi-disciplinary research and extension approach at UF-TREC. This will be accomplished through a process whereby faculty identify the current status of knowledge on a particular crop or plant, what areas are in critical need of more information, and a coordinated effort among the faculty to address the identified critical areas.

#### Continue research and extension programs that enhance environmental stewardship

1. Expand and enhance the natural resource research programs at UF-TREC.
2. Establish a natural resource extension program at UF-TREC.
3. Enhance the multi-disciplinary approach among faculty to address sustainable agricultural practices and issues.

#### Improve the communication of research to our clientele

1. Enhance the extension programs at UF-TREC through the establishment of a multi-media staff position. This person will work closely with extension specialists, research faculty, and the UF-TREC staff to develop multi-media based extension programs.

#### Improve undergraduate, graduate, and professional level training and teaching programs

1. Seek and establish funding for more graduate students and UF-TREC assistantships.
2. Seek increased funding for visiting scientists.
3. Develop short courses and summer-term courses in specific subject areas (e.g., biotechnology, agricultural economics) and crops (e.g., orchid botany and production, avocado botany and production, etc.).
4. Develop of Internet based course offerings.
5. Assign the Teaching Coordinator the task of coordinating/organizing these course offerings along with the CTA.

#### Increase long-term funding

1. Establish perpetual fellowships and internships.
2. Seek long-term funding for graduate students.
3. Seek grants for specific programs and centers of excellence.

Improve the infrastructure of UF-TREC

Infrastructure needs for UF-TREC will be addressed by the South Florida State Initiative, a consortium of four south Florida research and education centers.

1. Improve housing for visiting scientists, graduate students, and interns.
2. Establish additional laboratory and office space.
3. Enhance and maintain or modify orchards at UF-TREC.
4. Enhance the ornamental palm and cycad collections at UF-TREC.

Periodically review progress toward goals of the strategic plan

1. Annually review the UF-TREC strategic plan.
2. Revise and update the plan as the situation changes.

**Specific personnel and resource needs**

New faculty positions

1. Vegetable Crops Horticulturist (research/extension split; sustainable agriculture, work closely with natural resources faculty).
2. Natural Resources (agro-ecologist, ecologist, or wildlife ecologist to be determined).
3. Cross-Commodity Postharvest Physiologist (to work on fruits, vegetables and ornamentals).
4. Ornamental Plant Horticulturist (work closely with natural resources faculty).

Maintain or modify existing faculty positions (due to anticipated retirement)

1. Full-time Center Director.
2. Full-time Director of CTA.
3. Plant tissue culture and biotechnology (cross commodity to replace fruit crops position).
4. Developmental plant physiologist (cross commodity to replace fruit crops position).
5. Entomologist (cross commodity to replace fruit crops position).

Staff positions

1. Associate director of CTA to facilitate development of center funding and programs.
2. 4 Biologists to support the 4 new faculty positions.

**Infrastructure needs (estimated \$10.7 million)**

1. New laboratory facilities to replace worn buildings for about one half the programs.
2. Dormitory facilities for visiting scientists, graduate students, and post docs.
3. New greenhouse and head-house facilities to replace worn buildings.

**Table 1. List of current faculty members and their departmental affiliation.**

Dr. Van Waddill, Senior Center Director and Prof.	Entomology and Nematology
Jonathan H. Crane, Prof.	Horticultural Sciences
Thomas L. Davenport, Assoc. Prof.	Horticultural Sciences

Michael J. Davis, Prof.	Plant Pathology
Edward A. Evans, Asst. Prof. and Assoc. Dir., Center for Tropical Agriculture	Food and Resource Economics
Waldemar Klassen, Prof. and Dir., Center for Tropical Agriculture	Entomology and Nematology
Yuncong C. Li, Assoc. Prof.	Soil and Water Science
Richard E. Litz, Prof.	Horticultural Sciences
Catharine M. Mannion, Asst. Prof.	Entomology and Nematology
Jorge E. Peña, Prof.	Entomology and Nematology
Randy C. Ploetz, Prof.	Plant Pathology
Bruce Schaffer, Assoc. Center Dir. and Prof.	Horticultural Sciences
Dakshina Seal, Assist. Scientist	Entomology and Nematology
Wagner A. Vendrame, Asst. Prof.	Environmental Horticulture
Kati L. White, Asst. Prof.	Agricultural and Biological Engineering