

# **State Major Program Annual Impact Report February 2002**

**State Major Program Number: FL107**

**State Major Program Title:**

**Vegetable Production, Harvesting and Handling, and IPM Efficiencies in Florida**

**Calendar Year: 2001**

**Design Team Leader: Steven A. Sargent**

**Major Program Objectives:**

The mission of the Design Team for SMP FL 107 is to increase the knowledge base of the county extension faculty in commercial vegetable production and harvesting practices, and to assist them in the planning, implementation, and reporting of educational activities for the commercial vegetable industry in Florida.

This SMP facilitates, develops and coordinates programming in five target areas:

- 1) Nutrient and Water Management
- 2) Integrated Pest Management
- 3) Alternative Crops and Production Systems
- 4) Business Management and Marketing
- 5) Harvest and Handling

## **1. 2001 Design Team Meetings**

The official design team meeting was held on April 25, 2001, immediately following the In-service. Additional communications were conducted with team members at the FACTS Meeting (October 2) and throughout the year via email and telephone regarding specific areas.

# FL 107 Design Team Meeting

**Wednesday, April 25, 2001**

**8:00 AM to Noon**

**1304 Fifield Hall, Campus**

## Agenda

7:45 a.m. - Coffee

8:00 a.m. - FL 107: Action Groups, LIV ... where do we go from here?

8:30 a.m. - Action Group planning/action plans

- Cultural Practices (Ron Rice)
- IPM (Susan Webb)
- Communications (Betsy Lamb)
- Production Economics (Fritz Roka)

9:45 - Wrap up

10:00 a.m. - Break and Raffle 1

10:15 - Other discussion items:

- In-services for 2002
- North Florida REC, Suwannee Valley update (Bob Hochmuth)
- FACTS planning:
  - >Vegetable Session (Betsy Lamb)
  - >Learning Zone (Phyllis Gilreath; Mary Lamberts)
  - >Postharvest Horticulture Institute
- Florida Tomato Institute (Phyllis Gilreath)
- Publications:
  - >SP170 (Don Maynard)
  - >EDIS and other pubs.

- Other

11:15 Comments from Dr. Dusky

- >SMP overview
- >EDIS update
- >other
- >Q&A

11:30 Other Business and Raffle 2

12:00 noon - Have a safe trip home!!

There were 36 agents, specialists and administrators present at the meeting. Brief reports were made by each action group leader. The group chose Vegetable Marketing as the theme for the 2002 In-service program. Fritz Roka, Mark Wade, Al Wysocki, Suzanne Stapleton, and Richard Tyson volunteered to develop the program. There was also discussion on the need to develop a web site for FL 107

2. 2001 In-service Trainings Offered to County Faculty

a) April 23-25, 2001 **Beneficials and Biorationals for Vegetable Pest Management**

LOCATION: Gainesville. Faculty in charge: S. Webb, S. Sargent

b) February 13: **Strawberry In-service Training.**

LOCATION: GCREC-Dover. Faculty in charge: J. Duval, D. Legard.

c) Feb. 20-21: **Food Safety Training Program for the Southeast.**

LOCATION: CREC, Lake Alfred. One of four training workshops conducted for vegetable and citrus extension agents from Florida, Georgia, Tennessee and South Carolina. Faculty in charge: J. Brecht, S. Sargent and M. Ritenour.

d) June 7: **Vegetable Production Using Plasticulture.**

LOCATION: NFREC-Quincy. Faculty in charge: S. Olson.

(One other training was offered (Postharvest Horticulture Industry Tour) but no agents registered.)

3. **The publication section and grant section contains duplication.**

Not applicable.

4. **Summary of Impacts for Clientele and Success Story sections.**

### **Target Area 1: Nutrient and Water Management**

National Goals Addressed:

Goal 1--To achieve an agricultural production system that is highly competitive in the global economy.

Goal 4--To achieve greater harmony (balance) between agriculture (production activities) and (stewardship and protection of) the environment.

Goal 5-- To enhance economic opportunities and the quality of life among families and communities.

Key Themes Addressed:

Diversified/Alternative Agriculture; Innovative Farming Techniques; Plant Germplasm; Plant Health; Drought Prevention and Mitigation; Risk Management; Small Farm Viability; Natural Resources Management; Nutrient Management; Sustainable Agriculture; Soil Quality

### Problem Description:

The annual farm value of Florida-grown vegetables during the 1999-2000 crop year was approximately \$1.54 billion, harvested from 287,450 acres, making vegetable production a significant contributor to the state's economy. However, Florida vegetable growers face continued and new threats to their ability to remain competitive. The latest data show that, of the approximately 12,000 planted acres and not harvested, two contributing factors were: losses due to weather patterns, and losses due to inadequate production practices. Increased pressure for water due to drought and urban demand is affecting present irrigation practices, while use of nutrients on crops can impact water quality.

### Extension Programming Response:

FL 107 programs addressed this target area via educational sessions at two major events. The Florida Agriculture Conference and Trade Show (FACTS) in Lakeland had an estimated 120 vegetable growers and industry personnel, representing 18 counties, that participated in the hands-on Learning Zone. At least 60 participants completed one or more hands-on "Learning Zones" (Water Quality/Irrigation Management Zone and the Vegetable Nutrition Zone) at the 2001 FACTS Meeting in Lakeland to receive CEUs. Survey results indicated that 77% of respondents felt that educational content was of value and they would apply the information. Topics indicated to be of most value were Vegetable BMP's and the use of tensiometers and water sensors. Approximately 47% of participants indicated the water management/water quality zone was very useful, while 53% indicated it was somewhat useful. The vegetable nutrition/physiology zone was rated very useful by 85% of participants.

Over 200 participants attended the 2001 Tomato Institute in Naples. Three presentations focused on water/fertilizer issues. 91% of participants responding found the information useful and 62% were likely to implement the information in their operation this year.

County-level meetings and one-on-one contacts in this target area reached more than 300 individuals. Over 500 clientele received water use information via newsletter articles in the state.

The Extension Soil Testing Laboratory in Gainesville provided interpretation of about 12,000 soil, tissue and water samples received from Florida residents including commercial major, medium and small producers. soil test results and nutrient recommendations. The soil test information forms and related fact sheets are continuously updated and made available to the clients.

The first Florida Drip Irrigation School was offered on November 13, 2001 at the North Florida Research and Education Center - Suwannee Valley. The program was a success as 43 persons attended.

Variety trials and demonstration trials were conducted statewide in support of industry needs.

#### Changes Made by Target Audience:

In Manatee County, acreage using drip irrigation with tensiometers are used for water management has not increased from 5 years ago, but the number of vegetable crop acres now utilizing tensiometers has doubled from 2774 to 5030.

Prior to 1984, only about 500 acres out of nearly 30,000 acres of watermelons in northern Florida used plastic mulch. Work done in Jefferson County, NFREC-Quincy and NFREC-Suwannee Valley in Live Oak has helped lead to an increase in use of intensive production practices. Today, 50% of watermelons in northern Florida use plastic mulch, transplants, or a combination. Intensive production practices have allowed growers to become more profitable through earlier crops.

Work on frost protection of vegetables has increased the use of row cover technology from zero acres in 1984 to over 3000 acres today. Row cover protection of vegetables in Palm Beach County in 1989 amounted to almost 2000 acres and was the difference between total loss to freezing temperature and no crop loss. It is estimated that pepper crop value more than doubled that winter due to row cover technology.

In Miami-Dade County, 18 growers purchased tensiometers in 2001 and started using them for scheduling irrigation. 196 "new" acres of tropical fruit groves and vegetable fields were monitored. Since 1998 over 550 acres of tropical fruits and vegetables is monitored by tensiometers. These changes were the outcome of educational programming to introduce importance of scheduling irrigation to more growers. 82% participants indicated in the surveys, that tensiometers may be very helpful for their operations. Only 12% were familiar with this tool before attending extension educational programs. 63% stated that they are planning to introduce tensiometers in their practices.

At present nearly 50% of the vegetables produced in Southwest Florida use low volume irrigation. Conversion of an additional 5% of vegetable farms in southwest Florida from traditional seepage irrigation systems to more efficient drip irrigation systems would result in a potential water use reduction of 1.17 billion gallons of water per year by the industry in the five counties situated in this area.

#### Success Stories:

A new greenhouse hydroponic tomato operation in Sanford was having problems with the nutrition program. The agent used plant sap test meters to establish actual nitrogen and potassium levels in the tomato plants, stabilizing the growing conditions of the crop. Sap meters were loaned to the farmer for several months with weekly consultations by the agent. The farmer purchased their own meters for this year's crop

involving approximately 12,000 square feet of greenhouse production at a value of \$50,000.

Fifteen northern Florida growers who were educated in crop input reduction, and were able to do so, cut their costs by 20%, saving \$600 per acre in tomatoes (200 acres), \$300 per protected acre (15 acres) in peppers, and \$120 per acre in watermelons and cantaloupes (500 acres). Most of the cost reduction was in the judicious use of fertilizer and water, and selection of effective insecticides and application techniques. This amounted to \$120,000 for the two commercial tomato growers, \$45,000 for the five pepper growers, and \$60,000 for the eight watermelon/cantaloupe growers.

In a demonstration project encompassing 140 acres at farm near Live Oak in 2001, faculty demonstrated that potatoes could be grown with reduced N and reduced irrigation water. Comparable potato yields were obtained with 40 pounds less N and 10 % less water compared to the standard commercial programs.

## **Target Area 2: Integrated Pest Management**

### National Goals Addressed:

Goal 1--To achieve an agricultural production system that is highly competitive in the global economy.

Goal 4--To achieve greater harmony (balance) between agriculture (production activities) and (stewardship and protection of) the environment.

Goal 5-- To enhance economic opportunities and the quality of life among families and communities.

### Key Themes Addressed:

Diversified/Alternative Agriculture; Innovative Farming Techniques; Invasive Species; Risk Management; Small Farm Viability; Biological Control; Energy Conservation; Integrated Pest Management; Pesticide Application; Sustainable Agriculture; Water Quality; Natural Resources Management; Nutrient Management

### Problem Description:

The annual farm value of Florida-grown vegetables during the 1999-2000 crop year was approximately \$1.54 billion, harvested from 287,450 acres, making vegetable production a significant contributor to the state's economy. However, Florida vegetable growers face continued and new threats to their ability to remain competitive. The latest data show that approximately 12,000 planted acres were not harvested for several reasons: lack of a profitable market, losses due to pests or weather, or quality losses due to inadequate production practices. Increased competition from non-traditional

production areas has also cut into key markets for Florida-grown vegetables. In the past several years, several new insects and diseases have become major pests in Florida. Other diseases and insects continue to challenge vegetable producers in addition to the new pests. These factors, coupled with the loss of many pesticides due to the re-registration process, have caused greater losses of crops due to absence of adequate control measures. Production costs continue to rise because of increased applications of pesticides and other increased mechanical or labor-intensive practices. New pesticide regulations require increased paperwork and create application scheduling problems, harvest scheduling problems, etc., that has put an increased financial burden upon growers.

#### Extension Programming Response:

Mailing records (Hendry County only) indicate that 1040 growers and other individuals in the Florida industry are receiving information on a variety of pertinent IPM topics via the SW Florida Vegetable Newsletter (bimonthly) as well as receiving the South Florida Vegetable Pest and Disease Hotline (biweekly).

Diagnostics were made for vegetable plant diseases and insect pests in UF/IFAS labs located around the state. At Gulf Coast REC, Bradenton, 343 field samples (40% vegetables) were processed in 2001; 64% originated from growers, extension agents, industry personnel, and research scientists at GCREC or other RECs, 35% came from the plant pathology program at GCREC, and 1% originated from homeowners. At GCREC, Dover, up to 400 strawberry samples were brought to the clinic for diagnosis. The Florida Extension Plant Disease Clinic-SWFREC analyzed 426 samples of plant diseases and made control recommendations.

Significant statewide programmatic effort was made related to changes in methyl bromide regulatory issues, alternatives research programs, and management of nematode pests of methyl bromide-dependent crops in the state.

Web site resources developed: a) IPM web site with emphasis on biological control (<http://biocontrol.ifas.ufl.edu>); b) Plant Pathology extension publication site (<http://plantpath.ifas.ufl.edu/takextpub/Ext%20Pubs/ppp.htm>) is being used by county extension faculty to attain recommendations and a source of a hardcopy for mass printing for use in their respective counties. Commercial company representatives are using this information to learn what diseases are pertinent or related to products that they sell. Through November, 2001, this site had 2096 hits; c) Plant Doctor at NFREC-Quincy (<http://plantdoctor.ifas.ufl.edu>) was initiated in 2001 to better communicate and connect with counties and the target audience; d) The "Intergrated Pest Management of Strawberry Diseases in Annual Winter Strawberry Fruit Production in the Southeastern US " (<http://strawberry.ifas.ufl.edu/proguidedis.htm>).

The Florida Pest Management Information Program completed crop/pest management profiles for the following vegetable crops: eggplant, squash, cantaloupe and posted them on the USDA's Office of Pest Management Policy and PIAP Crop Profile web

page at (<http://ipmwww.ncsu.edu:8150/opmppiap/>). Crop profiles are 10-60 page documents that provide information on production practices, pests, pesticides used, and alternative practices for the crop in Florida. Crop profiles help persons in government agencies understand the pest problems, production practices, pest control methods used by Florida growers for the crop.

The FPMI program also provided an eight page monthly newsletter (Chemically Speaking) to nearly 3,000 hard copy subscribers (<http://pest.ifas.ufl.edu/news.htm>). The newsletter provided updates on pesticide registrations, pesticide regulations, Food Quality Protection Act implementation and many other related issues to growers, extension faculty, government agency and agricultural industry personnel.

Responses made to USDA Office of Pest Management Policy requests for review of EPA risk assessments for several organophosphate insecticides, ethion, dimethoate, diazinon, and disulfoton. Other pesticides included endosulfan and TBZ. Assessed the loss of benomyl for 8 crops and the resulting need for thiophanate-methyl.

An in-service training "Beneficial Insects and Biorational Pesticides in Vegetable Pest Management" consisting of oral presentations, field trips, and a hands-on laboratory session. 18 county agents and 18 extension specialists participated.

#### Changes Made by Target Audience:

Informal surveys of pesticide distributors in the Immokalee area indicate that the vegetable industry has reduced use of persistent broad spectrum pesticides by over 50% in the last five years. This trend will reduce the industry's impact on environmentally sensitive areas in southwest Florida. With pest control costs averaging between 20 - 30 % of the cost of production in most vegetable crops, a reduction of 5% per crop on 75% of farms practicing IPM would result in \$11 million dollars savings per year in SW Florida alone.

#### Success Stories:

Ultraviolet-reflective mulch was tested in tomato fields in the Quincy/south Georgia area by North Florida REC specialists to reduce populations of thrips that transmit tomato spotted-wilt virus (TSWV), the most serious tomato disease throughout the region. By 2000 season end, the metalized mulch field had an incidence of 11 % TSWV. An adjacent field produced on the standard black mulch had an incidence of TSWV of 45 %. This 75 % reduction in virus would translate to an increase in yield of about 600 25 lb boxes/a or about \$4000/a increase in value. The metalized mulch is more expensive, but the yield increase more than makes up for the increase cost of the mulch (<\$200/a). At this time UV reflective mulch has been adopted by 40 % of tomato growers in north Florida and south Georgia to manage TSWV and their vector thrips.

A biological control program tested by NFREC-Quincy using the minute pirate bug for thrips is rapidly being adopted on pepper grown throughout the north Florida, south

Georgia region. This adoption saves about \$100 per acre in pesticide costs and increases yields by 30-40%.

### **Target Area 3: Alternative Crops and Production Systems**

#### National Goals Addressed:

Goal 1--To achieve an agricultural production system that is highly competitive in the global economy.

Goal 4--To achieve greater harmony (balance) between agriculture (production activities) and (stewardship and protection of) the environment.

Goal 5-- To enhance economic opportunities and the quality of life among families and communities.

#### Key Themes Addressed:

Diversified/Alternative Agriculture; Innovative Farming Techniques; Invasive Species; Risk Management; Small Farm Viability; Biological Control; Energy Conservation; Integrated Pest Management; Sustainable Agriculture; Water Quality; Natural Resources Management; Nutrient Management; Community Development

#### Problem Description:

The annual farm value of Florida-grown vegetables during the 1999-2000 crop year was approximately \$1.54 billion, harvested from 287,450 acres, making vegetable production a significant contributor to the state's economy. However, Florida vegetable growers face continued and new threats to their ability to remain competitive. The latest data show that approximately 12,000 planted acres were not harvested for several reasons: lack of a profitable market, losses due to pests or weather, or quality losses due to inadequate production practices. Increased competition from non-traditional production areas has also cut into key markets for Florida-grown vegetables. In the past several years, several new insects and diseases have become major pests in Florida. These factors, coupled with the loss of many pesticides due to the re-registration process, have caused greater losses of crops due to absence of adequate control measures. Production costs continue to rise because of increased applications of pesticides and other increased mechanical or labor-intensive practices. It is estimated that 10% of vegetable acreage in southwest Florida will be converted from traditional crops (e.g., green harvested tomatoes) to alternative vegetable crops, such as potatoes, green beans, herbs, oriental and/or Hispanic vegetables. Development of viable alternative crops and techniques will help Florida large and small growers to remain competitive in the face of these threats.

### Extension Programming Response:

A survey of the acreage devoted to various crops determined that vegetable acreage in southwest Florida has increased from approximately 35,000 acres in 1995 to 45,100 acres in 2001. This reversal of trends is due to several factors, particularly the shift to a more diverse crop base which is less vulnerable to competitive forces from abroad. Notable increases are: snap bean acreage increased from 2,500 acres in 1997 to over 10,000 acres at present; specialty crops (e.g., ethnic vegetables) from 500 acres to over 3000 acres; and organic production from 50 acres to over 200 acres.

Three TV programs were produced in Alachua County promoting local vegetable production and availability.

In northeast Florida, educational and technical information was provided to 97 individuals on pest management, fertilization, irrigation management, variety selection and plastic mulch technology for vegetable producers of watermelon, cantaloupe, pepper, tomato, squash, southern peas, sweet corn and greens. Technical and educational assistance was also provided to 61 individuals seeking information on alternative enterprises ranging from commercial ornamental nursery production to field grown tree production to sod production, greenhouse vegetable production, organic vegetable production, herb production, wild flower seed production, deciduous fruit production to value added product enterprises of various types.

Alternative crop evaluations and demonstrations were a focus of year-round work at the North Florida REC-Suwannee Valley and on cooperating farms. Over 50 different crops were grown for evaluation and demonstration in greenhouses, under shade systems, and in field culture. Major emphasis was given to fresh herbs, muskmelons, specialty tomato, specialty peppers, eggplant, cut flowers, sweet onions, leafy green vegetables, oriental vegetables, miniature cucumber (Beit-Alpha and European types), strawberry, and plug transplant production.

Numerous field trials were conducted statewide to evaluate possible alternatives to methyl-bromide soil fumigant, including chemical alternatives and soilless culture in the open field. Crops included watermelon, pepper, tomato, cantaloupe, and strawberry. Much of this work was in cooperation with the statewide IR-4 program. A Methyl Bromide Alternatives Field Day at NFREC-SV was attended by 45 people including industry, researchers, county faculty, and growers.

### Changes Made by Target Audience:

In 2001, a Suwannee County greenhouse grower made a \$150,000 expansion to increase the crop mix to five fresh herbs. Support and trouble shooting visits by extension faculty were successful in solving problems such as: fertigation program and pH adjustment for rosemary, insect control and nutrient programs for basil, and variety trials for basil and chives. Postharvest and marketing programs have also included

assistance with pricing information, developing a food safety program, and handling and packaging issues.

Tropical sweetpotato (boniato) accounts for 6000 ac in south Miami-Dade County. 2-3 growers are continuing to evaluate Imidan as an additional tool for managing sweetpotato weevil. Some are considering treating on a more regular basis. Sweetpotato growers are aware of the morningglory leafminer as a potentially very serious pest and several have learned how to identify weeds which are in Convolvulaceae family and are potential alternate hosts for this insect. A working budget was developed for sweetpotato which can be refined to include information from more growers.

As a result of demonstration and educational efforts, at least 50% of the growers in west-central and southwest Florida have tried some form of methyl bromide alternative on their farms and are becoming more receptive to trying alternatives in response to the phase out of methyl bromide. This represents more than 16,000 acres of tomatoes and 3,000 acres of pepper with a farm gate value of approximately \$35 million. Additionally, most growers are now aware of at least one methyl bromide alternative for vegetable crops and are planning on increasing their on-farm trials with alternatives.

A large number of growers statewide have initiated off-season weed management techniques to reduce hard-to-control weeds such as nutsedges. As of January 1, 2001, a 50% methyl bromide reduction went into effect. One quarter of the state's watermelon producers initiated off-season weed management to control nutsedges for their spring 2001 crops.

Sunn hemp (*Crotalaria juncea* L.) was superior to eight cover crops tested at TREC. in terms of dry weight/acre, nitrogen retained/acre, weed control and increased yields in tomato. 30% of growers who attended field days expressed interest to try sunn hemp in their fields during the off-season.

#### Success Story:

Strawberry breeding line # 93-100 did not perform well in growers' field trials, however, it grew well in protected culture at NFREC-Suwannee Valley. In 2000 it was named 'Earlibrite' and more than 3 million plants were grown in fruiting fields in the Dover area as well as many plants being grown internationally. In 2001-2002 this variety will increase to 20% of the acreage with more than 1500 acres planted.

## **Target Area 4: Business Management and Marketing**

### National Goals Addressed:

Goal 1--To achieve an agricultural production system that is highly competitive in the global economy.

Goal 5-- To enhance economic opportunities and the quality of life among families and communities.

### Key Themes Addressed:

Diversified/Alternative Agriculture; Agricultural Financial Management; Risk Management; Small Farm Viability; Sustainable Agriculture; Community Development; Promoting Business Programs

### Problem Description:

The annual farm value of Florida-grown vegetables during the 1999-2000 crop year was approximately \$1.54 billion, harvested from 287,450 acres. As much as 80% of the 20 major vegetables produced are shipped to out-of-state and export markets. During the past 10 years Florida has also followed the national trend of increasing the number and quantity of value-added products. Fresh-cut (pre-cut) vegetables now account for as much as 10% of total production, targeting both institutional and retail levels. Thus, vegetable production contributes significantly to the state's economy. However, Florida vegetable growers face continued and new threats to their ability to remain competitive. The latest data show that approximately 12,000 planted acres were not harvested, in part due to lack of profitable markets. Increased competition from non-traditional production areas has also cut into key markets for Florida-grown vegetables. In the past several years, several new insects and diseases have become major pests in Florida. Other diseases and insects continue to challenge vegetable producers in addition to the new pests. These factors, coupled with the loss of many pesticides due to the re-registration process, have caused greater losses of crops due to absence of adequate control measures. Production costs continue to rise because of increased applications of pesticides and other increased mechanical or labor-intensive practices. New pesticide regulations require increased paperwork and create application scheduling problems, harvest scheduling problems, etc., that has put an increased financial burden upon growers. Substantial losses in the market channel also occur due to inappropriate packing and handling practices.

### Extension Programming Response:

Specialists at Southwest Florida REC and Indian River REC began to develop enterprise budgets for ethnic vegetable crops, which could serve as alternative crops to the historical base of tomato and bell pepper acreage. Additional work continues to

assess the economic benefits of plastic mulch for onion production in south Florida and the economic advantages of larger transplant cell sizes.

The Market Information System (<http://mis.ifas.ufl.edu/~market/>) is a market news web site that organizes data published by the USDA. This is one of the premier market news sites, receiving almost 650,000 hits in 2001.

The 1st International Agricultural Trade & Policy Conference was hosted in Gainesville for 3 days to bring together producers and policy makers and discuss the major trade and policy issues facing the Florida agriculture. It was attended by 160 members of the agricultural community and policy making groups.

#### Changes Made by Target Audience:

Preliminary results of the Farm Market Guide Impact Survey indicate that 30% of 120 participating farmers in the north Florida region have benefitted from this publication. In addition, several area farm have seen benefits from extension promotion of regional direct marketing. For example, a Hamilton County farmer expanded his agritourism U-pick operation to include a commercial CornMaze, providing greater diversification to the farm income. Improved agricultural marketing skills have been evident by area farmers.

70% of the participants in the Agricultural E-Marketing program reported that this program changed their opinion of internet marketing and 50% intend to develop a web page for their agricultural business as a result of this program. 52% of agritourism participants reported their intent to use information from the program in their business. Farmers in Madison, Suwannee, and Bradford counties showed improved marketing skill by forming new marketing partnerships that resulted in increased sales and returns.

#### Success Story:

An estimated 20 farms in north Florida expanded sales to restaurants or retail sales through local markets or agritourism. Five strawberry farmers reported increased profitability of their strawberry crop through participation in extension programs. These farmers received 300% increase in price for their berries by producing an earlier crop and selling to high-end markets in Jacksonville through a group effort.

## **Target Area 5: Harvest and Handling**

#### National Goals Addressed:

Goal 1--To achieve an agricultural production system that is highly competitive in the global economy.

Goal 2-- A safe and secure food and fiber system

Goal 5-- To enhance economic opportunities and the quality of life among families and communities.

Key Themes Addressed:

Diversified/Alternative Agriculture; Human Nutrition; Small Farm Viability; Sustainable Agriculture; Food Accessibility and Affordability; Food Handling; Food Quality; Food Recovery/Gleaning; Food Safety; Food Security; Foodborne Illness; Foodborne Pathogen Protection; Community Development;

Problem Description:

The annual farm value of Florida-grown vegetables during the 1999-2000 crop year was approximately \$1.54 billion, harvested from 287,450 acres. As much as 80% of the 20 major vegetables produced are shipped to out-of-state and export markets. During the past 10 years Florida has also followed the national trend of increasing the number and quantity of value-added products. Fresh-cut (pre-cut) vegetables now account for as much as 10% of total production, targeting both institutional and retail levels. Thus, vegetable production contributes significantly to the state's economy. However, Florida vegetable growers face continued and new threats to their ability to remain competitive. The latest data show that approximately 12,000 planted acres were not harvested, in part due to lack of profitable markets and quality losses resulting from inadequate production practices. Increased competition from non-traditional production areas has also cut into key markets for Florida-grown vegetables. Production costs continue to rise because of increased applications of pesticides and other increased mechanical or labor-intensive practices. New pesticide regulations require increased paperwork and create application scheduling problems, harvest scheduling problems, etc., that has put an increased financial burden upon growers. Substantial losses in the market channel also occur due to inappropriate packing and handling practices.

Extension Programming Response:

Three major extension programs were conducted in 2001 related to postharvest handling of vegetable crops.

Obtaining this multi-state grant (Southeastern U.S. Regional Training Grant in Food Safety) resulted a 2-day train-the-trainer program (45 county faculty from Florida, Georgia and South Carolina). Training materials are currently being developed for handlers of horticultural crops, and for training of county faculty, statewide faculty and industry.

2001 Florida Postharvest Horticulture Institute at FACTS. The theme of the 1.5-day program was "Sanitation and Food Safety: Keeping Produce and People Safe". (44 participants from industry, extension and research.)

Postharvest Industry Tour. Four-day field trip visiting operations from harvest through packing and distribution in central and southeast Florida. (18 participants from university and industry, with significant industry funding to reduce costs.)

Several presentations were made throughout the year by postharvest specialists at county-level meetings around the state, including more than 200 people at the Florida Tomato Institute.

On-site visits by postharvest specialists were made to major tomato packinghouses in 2001 representing about 80% of state production. Dump-tank water quality and packing house sanitation was measured; results and recommendations on needed improvements (if necessary) were made to managers. Samples were also taken at several tomato fields and packinghouses to test for presence of selected human pathogens.

The UF/IFAS Postharvest web site (<http://postharvest.ifas.ufl.edu/>) was improved during 2001, and a number of articles were written by specialists related to postharvest handling of vegetable crops.

#### Changes Made by Target Audience:

As a result of information presented at the Postharvest Horticulture Institute at FACTS, several packinghouse managers indicated that they would begin developing action plans for implementing food safety Best Management Practices for their operations. Three commercial vegetable agents attended the program with the goal of incorporating new information into their county programming.

County extension faculty working with commercial vegetable grower/shippers handled a greater number of postharvest questions posed by local industry personnel as a result of postharvest information and training provided to them in 2001.

Two major Florida tomato packers adopted new sanitation methods and equipment following on-site analyses that revealed inadequate sanitation systems with potential postharvest decay and food safety hazards.

The largest herb producer in South Florida was able to increase the postharvest quality of fresh herbs. On-site visits and a shipping test in collaboration with the farm manager resulted in implementation of several significant changes in the growing, harvesting, storing, packing and shipping of the herbs. By cooling the herbs faster after harvest, this farm was able to improve the quality of herbs by at least 10-15% and reduced significantly complaints from supermarkets.

Three farmers adopted rigid, clam-shell containers for improved postharvest handling of their crops, and one farmer modified a delivery truck to include a cooler for improved temperature management of the crop.

### Success Stories:

On-farm studies were made to hydrocool cantaloupes in Jackson County. The major melon grower in the region saved about \$20 in cooling costs per truckload by cooling the melons more efficiently after implementing cooling recommendations.

One north Florida greenhouse grower learned of optimum storage temperatures for Beit-Alpha cucumbers from postharvest tests conducted in 2001 at the Postharvest Horticulture Laboratory in Gainesville. The grower built an additional cooler to allow storage at the optimal temperature and exclude ethylene exposure from stored tomatoes. The grower also modified the shipping container and spoke to buyers to ensure proper temperature management of the cucumbers after delivery, resulting in significant reduction of postharvest losses at retail.