

SOWING THE SEEDS OF A NEW HORTICULTURE SCIENCES TEACHING PROGRAM

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Abstract. In 1997, the Treasure Coast Legislative Delegation obtained \$868,000 in recurring funding to establish a University of Florida (UF) Undergraduate Teaching Program in agriculture at the Indian River Research and Education Center (IRREC) in Fort Pierce. Funding was allocated for eight new faculty members with 70% teaching appointments supporting departments of Environmental Horticulture, Horticultural Sciences, and Food and Resource Economics. An additional \$3.7 million was obtained for a new 19,000 ft² building to house the teaching program during the 1998 legislative session. Florida's burgeoning \$1.46 billion environmental horticulture, \$1.57 billion vegetable, and \$1.38 billion citrus industries, and the concomitant need for qualified agricultural science graduates will support the rapid growth of the new teaching program. Local industry feedback indicates a strong need for students having Bachelor of Science Degrees in the agricultural sciences. Upper-division courses are taught in the evening allowing 'place-bound' (full-time employment, family obliga-

tions, etc.) students to obtain a 4-year-degree locally. Lower division courses and some upper division courses are provided through a partnership with Indian River Community College and Florida Atlantic University. Students, attending UF at the IRREC, benefit from having highly qualified professors, top quality education facilities, the latest multi-media equipment, and close proximity to the largest agricultural production region in Florida. Local producers and industry leaders have a great deal of pride about the program and often serve as guest lecturers furthering student immersion in the day-to-day operation of agriculture. The germination of the new teaching program will be discussed with emphasis on recruitment techniques, teaching philosophies, innovative teaching techniques and the importance of distance education.

Introduction

Horticulture comprises an enormous part of the United States agricultural industry with nursery and greenhouse crops representing the sixth largest agricultural commodity group in the nation (Hodges and Haydu, 1999). The US wholesale value of floriculture crops was an estimated 3.93 billion supported by 14,308 floriculture growers (USDA, 1998). Growers in the southeast region of zones 8-10 comprise about 21% of the nation's floriculture producers and Florida is now ranked second in the nation for floriculture production with \$654 million in wholesale value. This industry value is second only to Florida's vegetable industry and surpasses the value of Florida's citrus industry (USDA, 1998). Regional distribution of sales and employment data shows the lower east coast region (includes Fort Pierce) of Florida having the highest total floriculture sales and the second highest employment rate (Hodges and Haydu, 1999).

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The increases in ornamental horticulture production correlate with rising population numbers (Stamps, 1999) resulting in increased demand for agricultural education in regions throughout Florida. Sustained horticulture industry growth will increase demand for trained, educated employees. To meet the growing education needs of Florida, The University of Florida has established off site campuses that bring educational opportunities to the people. In 1997, collaborative efforts of our state legislators, local and state educators, business groups and other community leaders were successful in helping establish the UF's College of Agriculture and Life Sciences (CALS) third off campus degree program in Fort Pierce (Fig. 1) which included \$868,000 in annual recurring funds and a 3.7 million dollar teaching facility (Fig. 2). The development of off site campuses by CALS throughout Florida allows the expansion of enrollment outside the main campus and provides place-bound students the opportunity to earn a baccalaureate degree in several different disciplines (Cheek, 1999). Branch campus programs offer upper division courses and rely on local community colleges and other state universities to provide lower division, general education courses and the occasional upper division course. The Indian River Research and Education Center (IRREC), in partnership with Indian River Community College (IRCC) and Florida Atlantic University, works to provide a solid curriculum for students and facilitate their placement in the job market following graduation. Local industries have shown enormous interest and support by investing time, expertise, and financial resources into the teaching program.

The following paragraphs review information and experiences pertaining to the growth and development of the new teaching program at the IRREC. Some aspects covered are unique to the IRREC teaching program, but others can be applied to the expansion of CALS teaching programs statewide.

Potential Student Demographics

Population Growth. When starting a new teaching program population demographics of the area should be thoroughly

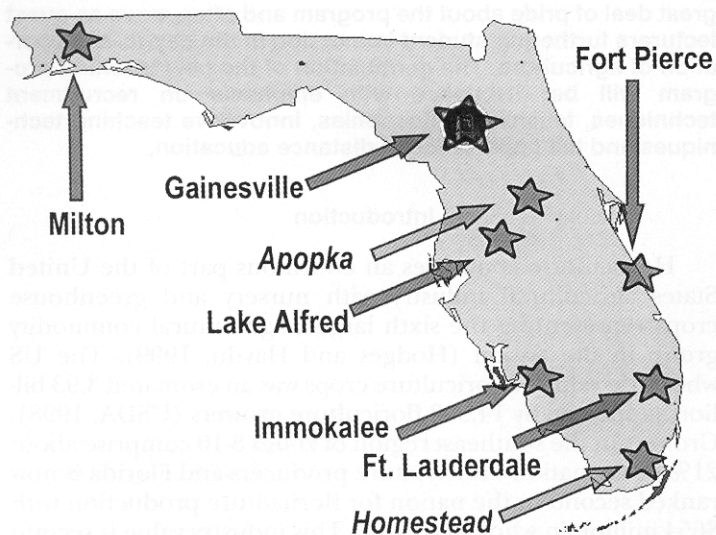


Figure 1. Geographic location of University of Florida College of Agriculture and Life Sciences undergraduate teaching programs. Only the Fort Lauderdale, Milton, and Fort Pierce campuses currently offer Bachelor of Science degrees. Immokalee teaches several lower division undergraduate courses. Lake Alfred offers one upper division undergraduate course (in addition to numerous graduate courses). Homestead, Apopka, and Immokalee are expected to have degree seeking programs in the future.

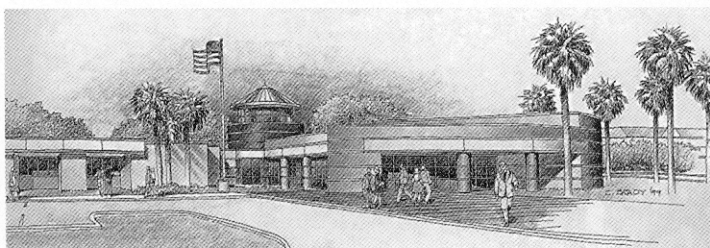


Figure 2. Architects three-dimensional drawing of the new teaching Building. Final design may vary slightly from drawing. Provided by Hunton Brady Pryor Maso Architects, Orlando, FL.

investigated. The U.S. Census Bureau makes such data readily available. The new teaching program at the IRREC is in the midst of a region undergoing rapid population growth. St. Lucie County has experienced a 19.3% increase in population since 1990 (Table 1). Our general recruiting region, which includes Indian River, Okeechobee, Martin, and St. Lucie counties, has shown an overall 14.7% increase in population. IRREC 4-county recruitment region growth rate is nearly equivalent to the overall 15% population growth rate of Florida and greater than the South Atlantic Region and United States population growth rates of 12.3 and 8.7% respectively. Thus, the region has a population growth rate to support the growth and development of an off campus teaching program.

Age Distribution. Currently, 26% of the population in the IRREC teaching program 4-county recruitment region is 65 or older (Table 2). Since 1990 the percentage of the population that is 65 and over in our major student recruitment area has increased by 2.2% and the number of people from age 0-4 and 5-17 has decreased 0.5% and 1.4% respectively (Table 2). As of 1995, Florida had more citizens classified as elderly than any other state in the nation and with 19% of residents 65 or over exceeded the national percentage by over 6 percentage points (Campbell, 1996). Florida's citizens have a median age of 38.3, a full 3 years higher than the rest of the nation (Table 1). Although the entire U.S. population is expected to age over the next quarter century, Florida's population of elderly, estimated to be 26% by 2025, will be 7.5% percentage points higher than the nation's maintaining Florida's rank as the state with the oldest population in the nation. In addition, by 2025, only 21% of Florida's population will be under age 20—the smallest fraction of any state's population except West Virginia (Campbell, 1996).

This information on age distribution will be incorporated into IRREC teaching program recruitment efforts and curriculum design to provide education services tailored to meet the unique needs of the local population. The data also suggests an increased focus on recruitment of younger students as their numbers relative to the general local population decline. Based on population forecasts, increased competition from other Florida universities for traditional age students is a strong possibility.

Ethnic Distribution. Population ethnic distribution should be another important component of teaching program development and recruitment efforts. In Indian River, St. Lucie, Okeechobee, and Palm Beach counties there are estimated to be at least 40,300 people of Hispanic, Haitian, and Guatemalan origin working in agriculture (Florida Dept. Education, 1999). A greater proportion of Florida's population is of African American or Hispanic origin than the rest of the nation (Table 3). In 1998, the population of the state of Florida was

Table 1. Population Change Data Relevant to Recruiting for the Indian River Research and Education Center^a

Geographic region	1990		1998 ^b			2025 ^{c,x}	
	Population (millions)	Median age (years)	Population (millions)	Change from 1990 (%)	Median age (years)	Population (millions)	Change from 1998 (%)
United States	248.77	32.8	270.30	8.7	35.2	335.1	24.0
South Atlantic ^w	43.57	33.5	48.94	12.3	36.0	62.7	28.1
Florida	12.94	36.2	14.92	15.3	38.3	20.7	38.7
Indian River area ^a	0.37	—	0.43	14.7	—	—	—
St. Lucie County	0.15	—	0.18	19.3	—	—	—

^aData made available by the U.S. Census Bureau which is part of the U.S. Department of Commerce.

^bThis is an estimated population. See <http://www.census.gov/population/www/method.html> for additional information on how representatives of the U.S. Census Bureau arrived at these numbers.

^c(Cambell, 1996). Internet: <http://www.census.gov/populations/www/projections/ppl47.html>.

^wSouth Atlantic includes the populations of Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, and West Virginia.

^aIncludes the populations of St. Lucie, Indian River, Martin, and Okeechobee counties in Florida Internet: <http://www.census.gov/population/estimates/county/ca/cafl98.txt> and <http://www.census.gov/population/estimates/county/ca/caflmars.txt>.

15.4% African American and 14.1% Hispanic. Based on U.S. Census Bureau predictions the increase in minority populations relative to the overall population will only continue. The Hispanic and African American population size of Florida rank it in the top 5 states for these two minorities (Campbell, 1996). IRREC classroom observations make it clear that faculty must improve student recruitment to encourage local minorities to participate in the program. UF's CALS has successfully doubled the enrollment of minorities in the last decade (Cheek et al., 1999). Teaching faculty and staff at the IRREC must work hard to increase the minority enrollments at a rate that is proportional to the rate of increase attained at the college level.

Recruitment Techniques

The biggest potential faculty pitfall in this process is the lack of recruitment and advertising expertise. Too often, personnel shortages result in scientists and educators being relied on to carry out job functions best left to professional advertising firms, marketing specialists, and recruitment officers. Pioneering members of the IRREC teaching faculty would have benefited from the demographic information discussed in the previous section.

There are many potential opportunities for active student recruitment at the state, regional, and local level (Table 4). All of these activities have potential to raise public awareness and bring new students to the program. The initial strategy was to participate in as many functions as possible, but time constraints only allowed attendance at events with the highest

visibility and potential to attract students. Passive recruitment techniques can be as effective as active recruitment activities in many cases. For example, IRREC teaching faculty transport student recruitment materials to various professional meetings. Whether it is at an extension gathering, community activity, or research planning session, faculty request to be on the agenda just to mention that teaching program informational materials are available. Another simple, but effective tactic is to clearly identify oneself with the teaching program during formal introductions. Instead of "Dr. John Doe, Assistant Professor, UF" faculty introduce themselves as "John Doe, Assistant Professor and Undergraduate Coordinator with UF's new teaching program at the Indian River Research and Education Center at Fort Pierce. This straightforward approach has led to many informal discussions concerning the new teaching program. For example, one of the authors volunteers for the Indian River Lagoon Envirothon which has other participants from UF's Florida Medical Entomology Laboratory, South Florida Water Management District, St. Johns River Water Management District, and several Florida Department of Environmental Protection outposts. With a brief introduction, professionals from the 4-county recruitment region were made aware of the new teaching program.

IRREC faculty were fortunate to have substantial recruitment funds, by University standards, to design and implement an advertising campaign introducing the new teaching program. Initially, two private firms were interviewed to handle recruitment and advertising, but ultimately IFAS Educational Media and Services (EMS) was utilized to design the overall campaign and advertising media so that the recruit-

Table 2. Age distribution of St. Lucie, Indian River, Martin, and Okeechobee Counties.^a

Age (years)	1990		1998		1990-1998
	Population	% of Total	Population	% of Total	% Change
0-4	23676	6.4	25215	5.9	-0.5
5-17	54818	14.8	68874	16.2	1.4
18-24	27476	7.4	26380	6.2	-1.2
25-44	99044	26.7	102924	24.2	-2.5
45-64	77892	21.0	91840	21.6	0.6
65+	88000	23.7	110198	25.9	2.2
Total	370906	100.0	425431	100.0	0.0

^aData obtained from Internet: <http://www.census.gov/population/estimates/county/ca/cafl98.txt> and <http://www.census.gov/population/estimates/county/ca/caflmars.txt>.

Table 3. Population distribution by race.²

Race	1990				1998			
	United States		Florida		United States		Florida	
	Population (millions)	% of Total	Population (millions)	% of Total	Population (millions)	% of Total	Population (millions)	% of Total
African American	30.5	12.3	1.8	14.0	34.4	12.7	2.3	15.4
Hispanic	20.4	8.2	1.5	11.6	27.6	10.2	2.1	14.1
Native American	2.1	0.8	.04	0.3	2.4	0.9	.06	0.4
White	188.3	75.7	9.5	73.6	195.4	72.3	10.2	68.5
Asian ³	7.5	3.0	0.1	0.8	10.5	3.9	0.2	1.3
Total	248.8	100.0	12.9	100.3	270.3	100.0	14.9	99.7

²Data from Internet: <http://www.census.gov/population/estimates/state/srh/srh98.txt> and <http://www.census.gov/population/estimates/state/srh/srh98mars.txt>; please see these sources for complete details.

³Includes Pacific Islanders.

ment budget could be used entirely for ad placement. This large in-kind donation of services by EMS enabled the IRREC to access professionally 'in-house' designed materials and doubled the amount of ad placement that could be purchased. The help of EMS in making the ad campaign a success was invaluable. A total of \$25,270 was spent on advertising (Fig. 3). The majority of funds (59%) were used for newspaper ads followed by radio airtime (24%) and cable TV spots on *The Weather Channel* (8%). Approximately \$2,300 was spent on special mail outs and flyers announcing student recruitment events and new courses. Every off campus teaching program should not only be allowed a start-up advertising budget to increase public awareness and establish a local academic identity, but should also receive recurring maintenance funds for annual advertising. Off-campus sites are at a advertising disadvantage since many Florida residents visualize UF as inextricably associated with the city of Gainesville.

Student Recruitment Results

The harvest of our recruitment efforts (including paid advertising) is shown in Fig. 4. The majority of potential student contacts came from the four counties where recruitment and advertising efforts were concentrated. One notable exception is Highlands county. An individual Instructor in the Agricultural Technology and Citrus program at South Florida Com-

munity College embraced our program from the beginning and is responsible largely for these numbers. Palm Beach Community College also has a strong horticultural sciences program and has recommended students to contact our center. Identifying enthusiastic individuals associated with horticultural education and the community colleges should be a priority when developing any off-campus upper-division teaching program. The large number of potential students contacting the IRREC from St. Lucie County is likely due to the physical proximity to the center (4 miles away), IRCC's administrative support of our teaching program, and an excellent, proactive agricultural science department chair. Many of the contacts from other counties and states have likely been the result of a teaching program Internet web presence (www.irrec.ifas.ufl.edu) maintained by a member of the teaching faculty.

The number of potential student contacts is much greater than the number of students enrolled in the teaching program (Fig. 5). This is expected in a new program. Much of our time is spent advising students who won't enter our program for several years. High school students, 1st and 2nd year community college students, and upper-division students are counseled on curriculum choices to help increase their competitiveness for entry into one of IRREC's two B.S. programs.

IRREC's enrollment has grown from 31 students in the first semester of the program (fall 1998) to the current enrollment of 61 students (Fig. 5). There was only one course of-

Table 4. Sample of Undergraduate Student Recruitment Activities.²

Geographic region	Student recruitment opportunity
State	Florida Agricultural Convention and Trade Show (FACTS) Tail Gator FFA State Convention
Regional	Meeting with Community College Advisors Citrus Expo Florida Nurseryman and Growers Association Annual Meeting
Local	Heathcote Botanical Gardens Festival St. Lucie Chamber of Commerce Meetings County School Board Meetings County High School Visits Tours of the Indian River Research and Education Center

²A subset of student recruitment activities completed by teaching faculty at the Indian River Research and Education Center from spring semester 1998 through fall semester 1999.

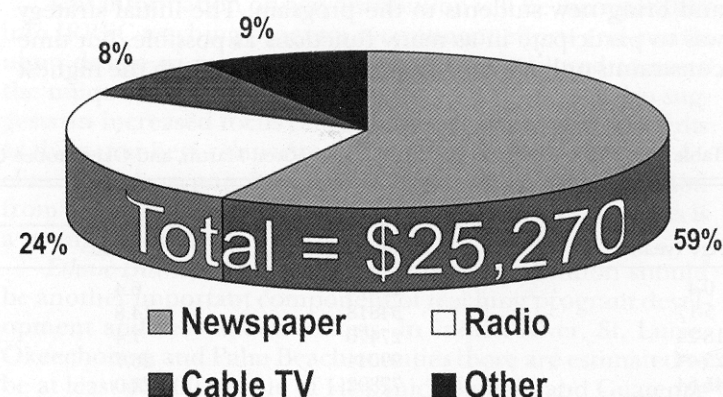


Figure 3. Teaching program advertising expenses from the spring semester of 1998 through fall semester of 1999. The 'other' category included special mailings, fliers, and brochures advertising course schedules, new courses, and student recruitment events.

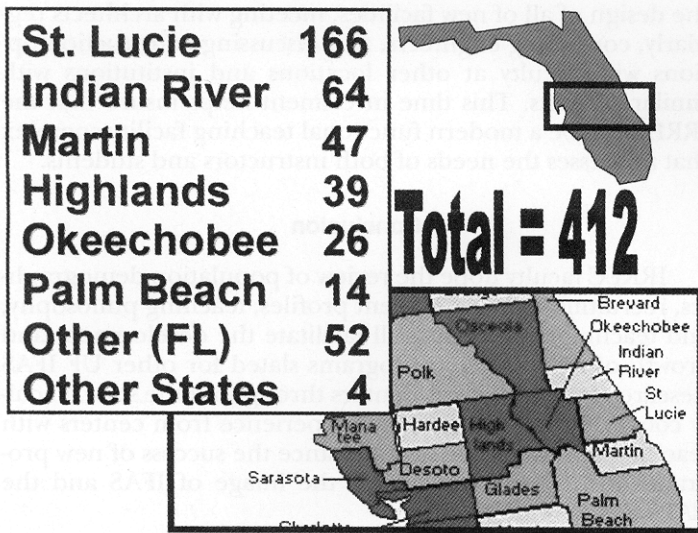


Figure 4. Geographical origin of contacts interested in the teaching program from spring semester 1998 through fall semester 1999. Numbers include potential students who contacted teaching representatives of the new teaching program via phone, fax, mail, e-mail, or in person.

ferred during summer semester 1999. Only 13% of the current students are officially degree-seeking undergraduates in the Horticultural Sciences or Food and Resource Economics curriculum. The remaining portion of the student body is composed of non-degree seeking and auditing students. Overall, the student body is approximately 44% female and 56% male and 35 years of age. However the range of student ages is great. In the spring 1999 offering of *Tropical and Sub-tropical Fruit* (FRC 3252) the youngest student is 20 and the eldest 80. Increasing the proportion of degree seeking students in addition to increasing the overall number of students enrolled is a primary goal of the teaching program. However, the large agricultural industry in our area will support a large number of students enrolling for professional development and advancement. A high course dropout rate among non-degree seeking students has also been observed. Many students find the time input and rigor of college courses to be incompatible with career and family obligations.

With limited student numbers, every student enrolled at IRREC is a valuable resource guaranteed individual treatment and the best possible instruction. The Fort Pierce campus was created to provide equal but not duplicate teaching programs in horticulture and agricultural business as compared to the Gainesville campus. Faculty have capitalized on the strengths of the off-campus location of the new teaching program. Located on 800 acres, IRREC is central to a major agricultural production region. Land is readily available for use in ornamental, citrus, and vegetable teaching collections. Within minutes of the center, students can travel to inspect local grower operations and participate in hands-on learning experiences. With the wealth of agricultural activity in the area, faculty encourage student and industry interaction by including course field-trips to local greenhouses, production fields, and gardens. Guest lectures by local experts are also utilized to expand student understanding of south Florida's horticultural industry.

The faculty at the IRREC are truly dedicated to the success of the new program. Currently, all courses are scheduled in the evening to accommodate nontraditional students who have daytime work hours. Each new student recruit becomes an integral part of the teaching program and faculty are committed to insuring individual student success.

Innovative Teaching Techniques

Small classroom sizes with low student: teacher ratios have facilitated the utilization of innovative teaching techniques. For example, last semester a newly developed course, *South Florida Flora and Ecosystems* (ORH 4932) debuted in the curriculum. This introductory, upper-division, agroecology course had two specific objectives. First, it was designed to introduce students to a wide array of plant species and ecosystems found in South Florida. Additionally, course exercises were constructed to increase student critical thinking skills via weekly creative writing exercises on controversial agricultural and environmental topics. Lectures given by instructors were directly reinforced with field experiences orchestrated by local ecology experts. Students learned to identify scrub habitat in the Savannah's, how pine Flatwoods are managed using fire, and the importance of dune vegetation and estuary ecosystems. Students also participated in two Saturday field trips touring the McArthur Agroecology Research center, Hole in the Doughnut Wetland Restoration Project (Everglades), and the Tropical Fruit and Spice Park (South Florida Rocklands). Geographic location and manageable class sizes in the new teaching program make the offering of *South Florida Flora and Ecosystems* and similar courses another unique advantage of the new teaching program.

The internet and World Wide Web have dramatically increased the availability of horticulture information to industry and consumers. Teaching faculty have also utilized this technology for several courses. In the *South Florida Flora and Ecosystems Course*, a web page was designed and continuously updated throughout the class enabling digital images of plant material and field experiences to be available to IRREC students and other interested people throughout the world (Tignor, 1999a). In the *Tropical and Subtropical Fruits* (FRC 3252) course, a web site provides students with lecture notes, fruit images, and Internet hyperlinks for additional information

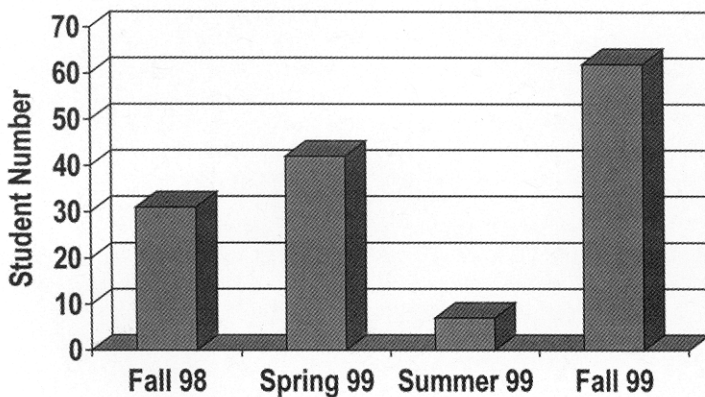


Figure 5. Student enrollment numbers for spring semester 1998 through fall semester 1999. There was only one course offered in the summer of 1999. Numbers taken from the total number of student numbers and do not include students who dropped courses during a given semester. Totals include, degree-seeking, non-degree seeking, and auditing students.

(Tignor, 1999b). Students are encouraged to use the Internet to submit homework and interact with professors and each other outside the classroom. This is particularly important at off site campuses, since many of our students travel long distances to attend.

Because off site campuses have limited faculty numbers, interactive teleconferencing is another innovative teaching technique used to deliver courses in other areas of expertise to students throughout the state. Interactive teleconferencing utilizes compressed audio-video streaming to generate a course from one site and transmit it to multiple locations, providing real-time communication among distant classrooms. A resident UF faculty member facilitates courses with laboratory components at distant sites. Environmental horticulture courses currently being prepared for distance education are *Horticultural Physiology* (HOS 4304), *Environmental Plant Identification and Use* (ORH 3513C), *Annual and Perennial Gardening* (ORH 4804C), and *Interior Landscape Practices* (ORH 4874C).

Physical Growth and Expansion of Teaching Resources

The IRREC has existed under various names since 1947. From those humble beginnings of an 80-acre farm and home owned by St. Lucie County, the Center has grown to encompass approximately 800 acres of research and demonstration plots, over 15,000 ft² of office and laboratory space, and an array of greenhouse facilities (Staff, 1997). Recently, with the addition of the Teaching Program, physical expansion of the Center is entering an exponential growth phase to accommodate students, faculty, and staff. Current construction projects include: a new 3.8 million dollar 19,000 ft² teaching facility (Fig. 1), a 4000 ft² greenhouse-shadehouse complex, and a two acre ornamental and citrus germplasm collection. An exceptional design feature of the new teaching building is the integration of multi-media equipment throughout classrooms and laboratories to supplement traditional teaching resources. Teaching faculty have been heavily involved with

the design of all of new facilities, meeting with architects regularly, consulting engineers, and discussing construction options with faculty at other locations and institutions with similar projects. This time investment helps insure that the IRREC will be a modern functional teaching facility complex that addresses the needs of both instructors and students.

Conclusion

IRREC faculty hope the review of population demographics, recruitment issues, student profiles, teaching philosophy, and teaching techniques will facilitate the development and growth of new teaching programs slated for other UF IFAS Research and Education Centers throughout the state. Faculty cooperation, expertise, and experience from centers with teaching programs can only enhance the success of new programs and further strengthen the image of IFAS and the CALS as statewide entities.

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