Agriculture, Agribusiness, and Renewable and Natural Resource Program Review

B. Delworth Gardner

Brigham Young University, gardnerdel@yahoo.com

Follow this and additional works at: https://scholarsarchive.byu.edu/facpub

Part of the Agricultural and Resource Economics Commons

BYU ScholarsArchive Citation

https://scholarsarchive.byu.edu/facpub/3034

This Peer-Reviewed Article is brought to you for free and open access by BYU ScholarsArchive. It has been accepted for inclusion in Faculty Publications by an authorized administrator of BYU ScholarsArchive. For more information, please contact ellen_amatangelo@byu.edu.
# AGRICULTURE, AGRIBUSINESS, AND RENEWABLE AND NATURAL RESOURCES PROGRAM REVIEW

## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of Recommendations.</td>
<td>iv</td>
</tr>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>History of the Institute of Food and Agricultural Sciences</td>
<td>3</td>
</tr>
<tr>
<td>Issues Faced by Agriculture and Natural Resources</td>
<td>3</td>
</tr>
<tr>
<td>The Uniqueness of Florida Agriculture/Natural Resources</td>
<td>5</td>
</tr>
<tr>
<td>Organizational and Administrative Structure.</td>
<td>6</td>
</tr>
<tr>
<td>Issues Facing Land Grant Colleges of Agriculture</td>
<td>9</td>
</tr>
<tr>
<td>Clientele Expectations of IFAS</td>
<td>10</td>
</tr>
<tr>
<td>Review of Programs at Florida A &amp; M University</td>
<td></td>
</tr>
<tr>
<td>Overview</td>
<td>11</td>
</tr>
<tr>
<td>Summary of Recommendations</td>
<td>12</td>
</tr>
<tr>
<td>Discussion and Recommendations</td>
<td></td>
</tr>
<tr>
<td>Support for the Land Grant Mission</td>
<td>13</td>
</tr>
<tr>
<td>Program Planning</td>
<td>15</td>
</tr>
<tr>
<td>Program Goals: Clarity and Articulation</td>
<td>17</td>
</tr>
<tr>
<td>Facilities and Equipment</td>
<td>18</td>
</tr>
<tr>
<td>Faculty Quality and Quantity</td>
<td>19</td>
</tr>
<tr>
<td>Faculty Salaries and Incentives</td>
<td>21</td>
</tr>
<tr>
<td>Faculty Morale</td>
<td>22</td>
</tr>
<tr>
<td>Curriculum Relevance and Redevelopment</td>
<td>23</td>
</tr>
<tr>
<td>Student Enrollment</td>
<td>24</td>
</tr>
<tr>
<td>Organizational Structure</td>
<td>25</td>
</tr>
<tr>
<td>Review of Programs at University of Florida</td>
<td></td>
</tr>
<tr>
<td>Mission and Goals of IFAS</td>
<td>27</td>
</tr>
<tr>
<td>Educational Programs</td>
<td></td>
</tr>
<tr>
<td>Overview</td>
<td>29</td>
</tr>
<tr>
<td>Assessment of Program Quality.</td>
<td>31</td>
</tr>
<tr>
<td>Factors Pertaining to Program Quality</td>
<td>40</td>
</tr>
<tr>
<td>A Vision to the Future</td>
<td>41</td>
</tr>
<tr>
<td>TABLE OF CONTENTS (Continued)</td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td></td>
</tr>
<tr>
<td>Research</td>
<td></td>
</tr>
<tr>
<td>Quality of the Research Faculty .................................. 42</td>
<td></td>
</tr>
<tr>
<td>Quality of the Research Students-Postdoctoral and Graduate Students .................................. 43</td>
<td></td>
</tr>
<tr>
<td>Breadth of Research and Responsiveness to State Needs .............. 44</td>
<td></td>
</tr>
<tr>
<td>The Roles of Basic Research in IFAS ................................ 45</td>
<td></td>
</tr>
<tr>
<td>Extension</td>
<td></td>
</tr>
<tr>
<td>Overall Quality ............. 45</td>
<td></td>
</tr>
<tr>
<td>Integration of Extension ....................... 46</td>
<td></td>
</tr>
<tr>
<td>Joint Appointments and Budget Flexibility .................. 47</td>
<td></td>
</tr>
<tr>
<td>Geographic Dispersal of Personnel and Facilities ............. 48</td>
<td></td>
</tr>
<tr>
<td>IFAS Areas of Emphasis (The Future) .......................... 52</td>
<td></td>
</tr>
<tr>
<td>Research Priorities</td>
<td></td>
</tr>
<tr>
<td>Biotechnology/Biocontrol ........................................ 54</td>
<td></td>
</tr>
<tr>
<td>Marketing and Trade ........... 56</td>
<td></td>
</tr>
<tr>
<td>Water and Environmental Quality .................................. 57</td>
<td></td>
</tr>
<tr>
<td>Opportunities for Improvement</td>
<td></td>
</tr>
<tr>
<td>Budget ......................................................... 58</td>
<td></td>
</tr>
<tr>
<td>Finance and Accounting .......... 58</td>
<td></td>
</tr>
<tr>
<td>Personnel ................................. 58</td>
<td></td>
</tr>
<tr>
<td>Revolving Accounts .................. 59</td>
<td></td>
</tr>
<tr>
<td>Space ........................................... 59</td>
<td></td>
</tr>
<tr>
<td>Equipment ............................... 60</td>
<td></td>
</tr>
<tr>
<td>Social Issues Research/Extension ................................ 61</td>
<td></td>
</tr>
<tr>
<td>Level of Support per Scientist ................................ 61</td>
<td></td>
</tr>
<tr>
<td>International Programs .................. 61</td>
<td></td>
</tr>
<tr>
<td>Technical Education ..................... 62</td>
<td></td>
</tr>
<tr>
<td>Overall Assessment of Quality of IFAS ................................ 62</td>
<td></td>
</tr>
<tr>
<td>Composition of Review Team ..................................... 63</td>
<td></td>
</tr>
<tr>
<td>Orientation Schedule and Participants .......................... 68</td>
<td></td>
</tr>
<tr>
<td>Florida A &amp; M University Review Schedule and Participants .......... 69</td>
<td></td>
</tr>
<tr>
<td>University of Florida Review Schedule and Participants .......... 71</td>
<td></td>
</tr>
</tbody>
</table>
TABLE OF CONTENTS (Continued)

Appendices

A -- History of Institute of Food and Agricultural Sciences ... 81
B -- The Uniqueness of Florida Agriculture/Natural Resources ... 87
C -- IFAS Organizational and Administrative Structure

<table>
<thead>
<tr>
<th>Relationship to State Legislature</th>
<th>101</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Administrative Structure of IFAS</td>
<td>103</td>
</tr>
<tr>
<td>Relationship with Specific Units in University of Florida</td>
<td>109</td>
</tr>
<tr>
<td>Relationship with Other State Universities</td>
<td>113</td>
</tr>
<tr>
<td>Relationship with State Agencies</td>
<td>118</td>
</tr>
<tr>
<td>Relationship with Federal Agencies</td>
<td>121</td>
</tr>
<tr>
<td>Relationship with Counties</td>
<td>126</td>
</tr>
<tr>
<td>Relationship to Community Colleges</td>
<td>127</td>
</tr>
</tbody>
</table>
LIST OF RECOMMENDATIONS

For Florida A & M University

Summary ................................................. 12

Recommendation #1: .................................. 15

The land-grant segment of FAMU's mission, as it specifically pertains to cooperative extension, resident instruction, cooperative research and international programs, should be reassessed, reviewed and rejuvenated in light of the important role the University has played and will continue to play in the State's higher education system. The redefined mission should take into account changes in the agricultural sector as well as changes in the job market now faced by agricultural graduates of the 80's. Moreover, a hard look should be taken well into the future to determine in what ways the land-grant programs at FAMU can be of maximum service at the State, national, and international levels during the 21st century.

Recommendation #2: .................................. 16

The University, in concert with the Board of Regents, should develop a comprehensive long-range plan for agricultural programs. To the extent possible, there should be detailed sub-plan components for research, teaching, extension and international programs. The plan and the process should encompass, yet not be limited to, the following features:
(a) Joint management and implementation of the four land-grant components.
(b) Joint faculty appointments including how they will be achieved and what the benefits will be, especially for student enrollment and curricular offerings.
(c) Clear delineation of clientele whose needs will be met by the landgrant program(s), singularly and collectively.
(d) Evidence of objective assessment of existing faculty, equipment, facilities, budget and other resources and detailed projection of future requirements in each catagory to arrive at program goals.
(e) Clear delineation of mission, goals, objectives and planning assumptions agreed upon within the University and by the governing board.
(f) Well thought through ideas about the potential for interweaving externally funded centers and institutes into the operational and managerial fabric of the Division of Agriculture and the University.
(g) Growth potential and how growth in enrollment and program initiatives will be achieved and managed.
Recommendations #3: Program goals should be revised and developed within and among the four land-grant components with a clearer sense of direction from the Board of Regents and from within the institution. Priorities should be set and pursued.

Recommendation #4: The planned renovation of Perry-Paige Hall should move forward. Federal outlays for improving conditions in research and extension should be carefully guided. However, it is cautioned that FAMU take a careful look at how improvement in non-teaching facilities can be made to impact on teaching programs. It should be kept in mind that the academic program(s) and faculty should be the driving core of all agriculture initiatives within the University. Most important with facilities and equipment, is the need to step back and take a comprehensive look at how already planned or initiated construction and/or renovation will emerge in such a way to meet needs of those future programs or initiatives in agriculture which may emerge from the recommended comprehensive and long-range planning process.

Recommendation #5: The distribution of faculty assignments should be reassessed and efforts made to involve more faculty in teaching activities, especially when new teaching programs have been put in place. Students should be taught by faculty who are engaged in cutting-edge research and who are in touch with the community outside the University. In short, FAMU should remove barriers that prevent joint assignments for faculty. Any expansion of faculty numbers, whether for research, teaching or extension, should give consideration to attracting not only Ph.D.-level personnel, but also aggressive future-oriented individuals.

Recommendation #6: Salaries for productive FAMU agriculture faculty should be brought into parity with comparable groups of faculty at other institutions in the State University System. FAMU should devise mechanisms for appropriately rewarding those faculty members who attract grant dollars to the University and State. Also, an effective awards program should be developed so as to recognize and reward outstanding performance over a wide array of categories.
Recommendation #7: The administrators of the College of Engineering Science, Technology, and Agriculture (CESTA) and of the University should move swiftly in examining those factors that are, in fact, the root cause of low faculty morale. A plan of action should be developed so that responses that are within internal grasp and control of the University can be effectuated early on. Expressions of intent on the part of the governing Board regarding future growth, support or non-support of agricultural programs at FAMU should be made a matter of public knowledge.

Recommendation #8: The University should continue its assessment of the quality, relevance and support for the resident instruction (teaching) in agriculture. It may well be that a single B.S. degree in agricultural science with options for concentration in selected sub-disciplines is the way to go. Any plan for program modifications should be undergirded by a realistic and hard nosed assessment of demand for agricultural program graduates. Moreover, a thorough assessment and plan should be laid for marketing the new or modified curriculum that would be provided.

Recommendation #9: FAMU must seriously investigate the sources of past low enrollment in connection with curriculum assessment and overhaul. Further, the faculty and administrators of CESTA must develop or update their understanding of the supply/demand situation for agricultural graduates, and organize an effective marketing strategy. Focus on enrollment (student training) should be at the core of any consideration given to developing new institutes.

Recommendation #10: The University and the Board of Regents should give serious consideration to the need for improving the administrative structure as it pertains to agriculture and the several programs therein.
For University of Florida

UF Recommendations #1: ................................. 32
Enhancement of faculty teaching improvement programs at the Institute, School and Department levels, with appropriate incentives to cause the faculty to participate in them.

UF Recommendation #2: ................................. 32
Recommitment of the total faculty of the discipline to excellence in the undergraduate and graduate teaching programs.

UF Recommendation #3: ................................. 36
There is a clear opportunity for attracting a greater number of exceptionally well qualified undergraduate students to meet Florida's future critical manpower needs through a well planned, statewide, competitive scholarship and recruitment program.

UF Recommendation #4: ................................. 37
The graduate student stipend/tuition issue should be critically examined and adjusted favorably to assure and enhance the continued enrollment of highly qualified and committed graduate students, because competitors will be doing so.

UF Recommendation #5: ................................. 37
Avoid the loss of out-of-state tuition waivers for graduate assistants if they cannot be given Florida residency after one year.

UF Recommendation #6: ................................. 37
Mathematics requirements for the B.S. degree should be strengthened.

UF Recommendation #7: ................................. 37
Upper division/graduate course(s) in plant biochemistry should be strengthened. The assistance of the College of Liberal Arts and Sciences would be helpful in this regard.

UF Recommendation #8: ................................. 37
A foreign language requirement for the B.S. degree should be considered in recognition that agriculture in the United States and in Florida is international in essentially all of its aspects.
UF Recommendation #9: Courses of study in the basic botanical and plant sciences, including plant genetics, should be reviewed with the goal of developing a core curriculum on the cutting edge of these sciences preparatory to advanced study in these fields. This opportunity for strength does not in any way imply criticism of courses presently offered in either the botanical or plant sciences. To the contrary, its purpose is to cause the design, implementation and strengthening of those core (required) studies in the botanical sciences essential to the achievement of excellence in the agricultural and biological sciences.

UF Recommendation #10: Teaching resources allocated to these fields should be significantly increased because the quality of instruction in Microbiology and Cell Biology has increased significantly over the past several years, and because the instruction offered in these fields is of critical importance to education in biotechnology and related areas.

UF Recommendation #11: All curricula should be reviewed with the goal of strengthening students' marketing and business skills. It is suggested that this review be undertaken with cooperation of appropriate faculty from the College of Business Administration.

UF Recommendation #12: IFAS's long range planning places high priority on the development of an area of research strength in biological control/biotechnology. The consultants are in strong agreement with this priority and believe that it offers an unusual opportunity, one uniquely open to Florida because its "socio-econo-agro-ecosystem" provides a "living laboratory," for the development of interdisciplinary instruction in plant protection at both the undergraduate and graduate levels (See, for example, Tammen and Wood, "Education for the Practitioner" in Plant Disease: An Advanced Treatise Vol. I. Academic Press, 1977). Such courses of study, not offered elsewhere in the United States, would serve not only Florida, but also the region, nation and the Caribbean basin.

UF Recommendation #13: Continue to strengthen programs of graduate study and research with the goal of achieving excellence in those sciences of key importance to Florida in its national and international setting.
UF Recommendation #14: Develop research strength in biological control and biotechnology. See discussion under UF Recommendation #12.

UF Recommendation #15: The education of students in agriculture, food science and natural resources to meet future needs will require significant improvement in the equipment necessary for teaching and graduate research in the laboratory, greenhouse and field.

UF Recommendation #16: The faculty and administration together should develop a set of incentives for faculty development. Individual departments should aggressively advance their own choices of world-class scientists, based on academic priorities, for eminent scholar appointments.

UF Recommendation #17: Make graduate students stipends competitive. Recruit graduate students and postdoctoral students aggressively. Treat the postdocs as the professionals they are.

UF Recommendation #18: Basic research in all areas is impossible. Therefore, the commitment to areas must be selective and intense. Selection in some cases may be in response to client demand. In general IFAS faculty itself must lead the way and make the selective choices.

UF Recommendation #19: It is suggested that UF study the extension centers to determine whether consolidation would be appropriate.

UF Recommendation #20: A plan should be developed by the program participants to define and assure the interdisciplinary nature of the program.
For the Board of Regents

BOR Recommendation #1. .......................................................... 52

Obviously, each of the activities identified by IFAS as an area of emphasis is very important. When one takes into account the current strengths of the faculty, the unique needs of the State, and the expressed desire to compete nationally, it is our opinion that an exceptionally strong case can be built for focusing agriculture on:

1. Biological Control of Pests
2. Biotechnology (an Office of Technology Assessment report suggests that commercialization of biotechnology will likely occur in Animal Science, Food Science, Plant Science, Environmental Science as well as Bioprocess Engineering. Therefore, major benefit could accrue to Florida through an emphasis on Biotechnology).
3. Marketing and Trade
4. Water and Environmental Quality

To achieve excellence, faculty focus and reallocation of resources to these areas will be required. With the existing faculty quality in Florida, the objective is clearly attainable. In so doing, Florida will become recognized as "world class" in biology/agriculture and will reap handsome economic rewards from its resulting more competitive agriculture for many years to come. In addition, because these programs are cutting-edge and high-technology, significant industrial development will be attracted to Florida. Not to provide the additional resources will significantly delay progress toward excellence, create major negative pressures from the agricultural industry because of unmet needs, and will significantly decrease the competitiveness of Florida agriculture in the highly competitive world market.

BOR Recommendations #2: .......................................................... 55

Funds and related support for the optimum development of the present faculty and facilities, recognition of the important role of postdoctoral students, and aggressive recruitment of a few of the very best research and teaching faculty available are a necessity to achieve excellence.

BOR Recommendation #3: .......................................................... 55

The current research lab space formula for biological sciences which provides 450 sq. ft./scientist should be increased for these programs to 750 sq. ft. to accommodate postdocs and graduate students.
BOR Recommendation #4: Implementing the proposal to improve management effectiveness in the State University System of Florida as stated in A Path to Excellence in Public Higher Education in Florida is essential if world-class academic excellence is to be achieved.

BOR Recommendation #5: The Fixed Capital Outlay Budget Request should be granted without delay. Programatically, these items are essential and therefore easily justified. In fact, academic excellence in these core thrust areas will not occur without them.

BOR Recommendation #6: Special BOR policies should be developed to upgrade older facilities (laboratories).

BOR Recommendation #7: Special BOR attention should be given to scientific and information management equipment as a part of the "Quest for Excellence." Additional planning should occur at the campus level to improve efficiencies, i.e., common use of specialized equipment.

BOR Recommendation #8: Consideration should be given to providing increased State support for the IFAS International Programs.
The State University System of Florida has established a "Quest for Excellence" in its Master Plan. It is a bold plan of action that will "unleash the University System from those time-bound constraints which would allow only gradual change." It is also clear that the State University System of Florida plans to compete successfully with the very best academic universities. In its mission statement the University of Florida, as a land-grant institution, administers the Institute of Food and Agricultural Sciences (IFAS), a special unit providing statewide food and agricultural teaching, research, and extension services. It is the opinion of the consultants that IFAS and FAMU can and should provide key leadership in the "Quest for Excellence" as represented by successes in land-grant institutions in a few other key states (California, Wisconsin, Illinois, Minnesota and New York).

The mission of IFAS and FAMU is to help Florida realize its maximum potential for agricultural development and to contribute to the solution of social, economic, environmental, natural resources, and cultural problems of concern to the people of Florida. It is the opinion of the consultants that IFAS and FAMU should move aggressively to carry out their mission. Moreover, in many ways the "Quest for Excellence" and the IFAS mission are complementary.
Florida A&M University is also a land-grant institution and maintains "an abiding commitment to agricultural programs that serve Florida citizens over a large part of the State with an emphasis on the needs of the rural poor and the small farmer." Research and extension programs at FAMU are coordinated with IFAS and were included in the review. Academic programs in agriculture at FAMU were also evaluated.

In this report, the consultants share their observations and suggestions related to two major points, i.e., academic excellence and solving the agricultural/natural resource problems of Florida.

In the "Quest for Excellence" Master Plan, Frank Press, President of the National Academy of Science is quoted:

"I believe the remaining two decades will see a revolution based on high technology. I think the leadership will emerge from those countries which have the strongest science and technology base, which are able and willing to make major capital investments, and which have a level of education of the public and the work force worthy of the new technologies that will emerge. The economic viability of the United States in the next two decades will depend on how well we perform in all these areas."

Therefore, aggressive action by IFAS and FAMU is called for if Florida is to be a full participant in the national revolution. Each $40 million investment in IFAS and FAMU is likely to increase Florida's economic activity over $400 million. (Calculations made with equations developed by resource economists at Yale University and the University of Minnesota.)
HISTORY OF THE INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES

Several significant federal and state laws established and gave direction to land-grant universities (University of Florida and Florida A&M University among them). Thus, the College of Agriculture at the University of Florida and Division of Agriculture at Florida A&M University, the Agricultural Experiment Station, the Cooperative Extension Service, the School of Forest Resources and Conservation, and International Agricultural Programs emerged over a period of more than 100 years to carry out federal and state mandates. A more detailed history is included as Appendix A. A complete understanding of these significant historical events is important for those shaping the future of agriculture and natural resource teaching, research and extension.

ISSUES FACED BY AGRICULTURE AND NATURAL RESOURCES

Agriculture in the United States and in the world is in major transition. Although some suggest that we have been in transition from the beginning, many believe that the current changes represent an acceleration and that they are likely to have far-reaching implications for both the agricultural and natural resource base, for the people who are involved in the production and management of food, and for those involved in the management and uses of natural resources. Experts generally agree that the following issues will have major impact on U.S. agriculture and therefore must be aggressively addressed if our agricultural and natural resources industries are to remain dynamic and viable.
1. **Technology.** Major technological advances are on the horizon. Advances in biology have especially far-reaching implications. In addition, developments in electronics and closely-related areas, for example, information management, will provide major opportunities for improved efficiencies in agriculture. In order to control costs and remain economically competitive, a continuing flow of technological advances must be available to those involved in agriculture and natural resources.

2. **Restructuring of agriculture.** Significantly fewer individuals/firms will supply the bulk of agricultural products. Those that survive will most likely know a good deal more about economics, management, and marketing than was previously required.

3. **Global dimension.** The events of the last two decades have placed U.S. agriculture squarely in a world market. Continued growth will require not only successful penetration of international markets, but successful competition with imports for our domestic markets as well.

4. **Social dimension.** As a result of numerous technological advances, the restructuring that is occurring in agriculture and the implications of dealing in the international marketplace, there will be numerous social implications for the people involved in the system.

   Decision makers, in Florida in particular, should note that plants are our most significant primary producers. In this country at this time we urgently need greater efficiency in primary production (cost control), innovative change in production techniques to meet competition in the marketplace, improved quality of the primary product, an increase in the potential for greater primary production, and a decreased dependency on production practices that may be hazardous to human health and the environment.
With respect to our secondary producers (animals, bacteria and fungi) again in many instances supply exceeds demand. What is needed is more efficiency in production (cost control), better quality products, and production procedures that do not threaten human health and the environment.

Improvements in distribution and new uses should be sought. Additional study and research are needed, especially in the areas of human nutrition and the political, social, and economic aspects of food and fiber production.

THE UNIQUENESS OF FLORIDA AGRICULTURE/NATURAL RESOURCES

Geographically Florida agriculture is quite isolated. Other states have greater opportunity to collaborate in research and extension because they share some common problems. For example, new developments in corn or soybeans in the midwest have application in several states. In contrast, most of the technologies for commodities produced in Florida must be developed in Florida. Therefore, a relatively large research and extension program is essential to its economic well being.

Florida's resources are unique and diverse. Most are renewable but they are not indestructible. Continued and intensified use of them requires an understanding of the delicate ecological balance required. Thus, research, basic and applied, must precede and accompany intensified use if the uniqueness and diversity are to be productively maintained. These simple facts are now self-evident, already recognized by IFAS and underly much of the IFAS mission. More detailed information about the uniqueness and complexity of Florida agriculture is provided in Appendix B.
ORGANIZATIONAL AND ADMINISTRATIVE STRUCTURE

According to the rules of the Department of Education and the Division of Universities, IFAS is administered under the Board of Regents and the University of Florida.

The College of Agriculture and the School of Forest Resources and Conservation are the degree-granting units of IFAS. Faculty are expected to provide quality education (instruction) and to engage in creative/scholarly research, not unlike faculty in other colleges or schools at the University of Florida. At Florida A&M University the Division of Agriculture is the degree-granting unit and faculty are expected to perform in the same manner.

Faculty with appointments in the Agricultural Experiment Station are expected to engage in research that will contribute to the solution of problems pertaining to Florida agriculture and/or natural resources. To accomplish this objective, some research must be conducted where the problems exist. Therefore, the Agricultural Experiment Station operates 23 research centers located throughout the state. Research faculty are located at 21 research centers. An extensive research support mechanism is required.

Faculty with appointments in Cooperative Extension are expected to develop and conduct quality educational programs including adaptive research for the people involved in food and agriculture and natural resources. Thus, the entire State becomes the campus for the University of Florida (IFAS) and Florida A&M University and offices/faculty are located in each county.

During the mid-70s Congress mandated that certain universities (including the University of Florida and Florida A&M University) become involved in contributing to solutions to agricultural problems in other countries. This legislation is particularly significant to Florida since most of the plants
and animals produced in the State are common to other countries rather than other states. Thus, IFAS and FAMU faculty involvement in international research has a high payoff. For example, if pests are studied and understood in neighboring countries, those pests can more likely be controlled should they be inadvertently introduced into Florida.

IFAS programs are coordinated with those at Florida A&M University through the Center for Cooperative Agricultural Programs located at FAMU.

Within the University of Florida, IFAS funds relevant and supportive external programs outside the Institute in Botany, the Herbarium, Main and Hume Libraries, the College of Veterinary Medicine, Law, Engineering, Business, Medicine, Center for Latin American Studies and the Center for African Studies.

IFAS has joint programs with Florida Atlantic University and Florida International University in Ornamental Horticulture and Turfgrasses.

A joint program in Environmental Toxicology is in place with the University of Florida, Florida State University and the University of South Florida cooperating.

IFAS cooperates with the University of Central Florida and the University of South Florida in Aquatic Weeds Research.

In Home Economics, programs are shared with Florida State University, the University of West Florida and Florida International University.

IFAS coordinates several programs with State Agencies including:

- Department of Citrus
- Department of Agriculture and Consumer Services
- Department of Environmental Regulation
- Water Management Districts
IFAS also coordinates its programs with a number of federal agencies, including:

1. Cooperative State Research Service (CSRS). Through CSRS, IFAS is a part of the national network of federal and state agricultural research agencies. In this manner Florida contributes to the national agricultural research agenda. CSRS also requires and assists in a regular review of program quality and content.

2. (Federal) Cooperative Extension Service (ES-USDA). The staff assists Florida with educational programs that are on the national agenda and approves programs for the expenditure of federal funds and facilitates coordination.

3. Agency for International Development (AID). Through AID, funding is derived for international programs. Through joint memoranda and the Joint Career Corps, extensive interaction occurs.

4. Agriculture Research Service (ARS). Numerous ARS research scientists are located in Florida to address national agricultural problems. These scientists add significantly to the scientific resource base for research and education in Florida.

IFAS also cooperates with each county in the State. County extension education programs are supported extensively by county governments. In fact, 40 percent of the IFAS Cooperative Extension budget is provided by county commissioners. This level of support is above the national average.

IFAS interacts with the Community College System. Approximately 50 percent of the IFAS students come through the Community College System. The
consultants applaud this healthy interaction and recommend that it be encouraged to continue.

For more detailed information about IFAS organizational and administrative structure see Appendix C.

ISSUES FACING LAND GRANT COLLEGES OF AGRICULTURE

In keeping with their mission, land-grant universities are expected to provide key leadership through quality teaching, research, and extension programs that will enable the citizenry to respond successfully to those broad and complex issues that confront it. To provide an adequate and relevant program, the individual College of Agriculture must have:

(a) quality faculty,
(b) quality program leadership,
(c) adequate facilities and equipment,
(d) adequate library support,
(e) adequate support personnel,
(f) a statewide organization of research, teaching, and extension that is appropriately interactive,
(g) faculty linkages with other scientists in the university, and
(h) a demonstrated capability to react successfully to emergency situations.
CLIENTELE EXPECTATIONS OF IFAS

Florida agriculture is indeed high risk and is characterized by intense economic pressures for new technologies. Some clientele, but not all, understand the need for a fundamental research program upon which unforeseen problems can be solved. Clearly, during the current economic downturn in some sectors of agriculture, all clientele want immediate direction in cost control. Further, there is the expectation that IFAS should give higher priority to product processing research and to product development and marketing.
OVERVIEW

This report was developed based on information gathered during the orientation session and site visit to review agricultural programs at Florida A&M University and from background documentation supplied prior to and during the review. Because of the time involved, the consultant cautions the reader of this report that the observations provided to undergird recommendations are but a series of snapshot impressions as to conditions that exist at the University and within the State. However, it can be reasoned that prior experience with land grant programs and emersion in management and oversight responsibilities for such programs provide the consultant with a base of knowledge and understanding that would at least provide ample focus to the snapshot impressions (observations) gained during the visit.

The report is direct, though perhaps not as brief as would have been desired. Both the directness and lack of brevity are felt necessary to address complex issues at FAMU that do exist in spite of the relatively small size of the program. The report is structured to provide background observations and accompanying recommendations limited to only ten (10) factors. They are: 1) support for the land grant mission; 2) program planning; 3) program goals: clarity and articulation; 4) facilities and equipment; 5) faculty/quality and quantity; 6) faculty salaries and incentives; 7) faculty morale; 8) curriculum relevance and redevelopment; 9) student enrollment; and 10) organizational structure.
Recommendations are provided in each section to guide the University in addressing situations in each of the ten areas. Because the recommendations are somewhat lengthy in the text, a separate summary version of the recommendations is provided in the following section of the document.

SUMMARY OF RECOMMENDATIONS

1. The land grant mission of Florida A&M University should be reviewed, revitalized and reaffirmed.

2. The University should develop a comprehensive long-range plan for the collective agricultural programs which takes into account available resources, changing or expanding clientele and collaborative strengths of land grant program components (Research, Teaching, Extension and International Programs).

3. Agriculture program goals should be re-evaluated in light of emerging mission and clientele situations. Relevant priorities should be set through a process which involves faculty, administrators and significant input from outside the University.

4. Facilities and equipment should be improved. Activity in this area should be initiated with a mind set toward parity and fairness as well as toward positioning the program for relevant service during the 21st century.

5. Faculty recruitment, retraining and in-service development should receive high priority. Competitiveness and ability of faculty to attract students, resources and prestige to the University should be in the forefront of all considerations.
6. Faculty salaries for productive faculty should be made more competitive and equalized with levels offered at other agricultural universities within the system.

7. The University should fully investigate the faculty morale problem within the Division of Agriculture and initiate immediate corrective actions and/or activities.

8. The curriculum should be reviewed and should undergo intensive overhaul. It should be made more relevant to present day circumstances and organized to become more responsive to emerging demands for graduates, research output and public service within the State. Curriculum modification should also acknowledge FAMU's emerging role in the international arena.

9. Recruitment, program development and increasing the attractiveness of agriculture should be the components of initiatives for increasing student numbers and quality. While FAMU should remain responsible for providing educational opportunities for Blacks and minorities, its availability and service to a racially diverse student population should be enhanced.

10. The organizational structure for managing and directing agricultural programs should be evaluated.

DISCUSSION AND RECOMMENDATIONS

1. Support for the Land Grant Mission

The University (FAMU) is a residential, multilevel comprehensive land grant university that offers a wide variety of instructional, research and service programs at the undergraduate, professional and graduate levels.
Although FAMU was established as a public institution to provide higher education for Blacks in Florida, it has become one of the two most racially and ethnically diverse members of the State University System. While the racial diversity on campus precipitates changes in faculty perception on expected diversity of clientele to be served, the faculty is not sure that the external political/higher education community shares the perception. Put simply, the governing board seems to be only slowly embracing the notion of a changing mission and clientele for FAMU in agriculture and related sciences.

The land grant segment of FAMU's mission encompasses resident instruction, cooperative research, cooperative extension and international programs. While FAMU's "traditional" mission focused on teaching, the advent of growth in research, extension and international program initiatives has been realized nearly exclusively through external (federal) funding. It has been through the external funding that agriculture has achieved viability in the face of limited State support. At the same time, FAMU's personnel in agriculture registers frustration over the lack of aggressive State support (financial or vocal) for their agricultural programs at a time when potential for growth is real. Indicators of growth potential are: 1) national studies show an alarming undersupply of agricultural graduates; 2) agricultural research facilities are undergoing revitalization through federal funds; 3) some linkage potential with industry seems to exist; 4) the Cooperative Extension program is showing increasing signs of implementation of special projects; 5) facilities for the Cooperative Extension program have recently been authorized by the federal government for FAMU and its sister institutions; 6) the international program shows signs of increasingly strong potential to attract funding and critically important policy activities at the FAMU campus; 7) special federal funding for enhancing the teaching program in agriculture signals affirmation as to the
importance of the program; 8) the highly integrated staff suggests that the basis for attracting a racially diversified student body is in place; and 9) sentiment suggests a readiness among faculty and administrators to try a "modern," new or more relevant approach to resident instruction in agriculture.

Recommendation #1: The land-grant segment of FAMU's mission, as it specifically pertains to cooperative extension, resident instruction, cooperative research and international programs, should be reassessed, reviewed and rejuvenated in light of the important role the University has played and will continue to play in the State's higher education system. The redefined mission should take into account changes in the agricultural sector as well as changes in the job market now faced by agricultural graduates of the 80's. Moreover, a hard look should be taken well into the future to determine in what ways the land-grant programs at FAMU can be of maximum service at the State, national, and international levels during the 21st century.

2. Program Planning

The availability of several planning documents would suggest that the Division of Agriculture does not suffer from lack of ability in planning and analysis. Rather, it can be said that the agriculture faculty recognizes the importance of planning and has attempted to do so in the face of some unsupported assumptions that would undergird program success or failure. Because of ambiguity of support for resident instruction, a future direction for agriculture as reflected in a plan that interlaces strengths of research, extension and international programs with that of instruction has failed to materialize. Planning documents that have emerged recently seem to be of single (separate) program focus.
If agriculture is truly to be viable, there must be strong intermeshing of program components. There must also be stronger support for resident instruction, albeit for some modernized version of what now exists. There should be a removal of ambiguity at all levels regarding what role FAMU agriculture will play in the State's higher education arena, in Florida's communities and in the business community (in-state and internationally). Finally, there should be realistic and comprehensive planning, based on jointly embraced assumptions, expectations and resource commitment from within the University and from the higher education system.

**Recommendation #2:** The University, in concert with the Board of Regents, should develop a comprehensive long-range plan for agricultural programs. To the extent possible, there should be detailed sub-plan components for research, teaching, extension and international programs. The plan and the process should encompass, yet not be limited to, the following features:

(a) Joint management and implementation of the four land-grant components.
(b) Joint faculty appointments including how they will be achieved and what the benefits will be, especially for student enrollment and curricular offerings.
(c) Clear delineation of clientele whose needs will be met by the land-grant program(s), singularly and collectively.
(d) Evidence of objective assessment of existing faculty, equipment, facilities, budget and other resources and detailed projection of future requirements in each category to arrive at program goals.
(e) Clear delineation of mission, goals, objectives and planning assumptions agreed upon within the University and by the governing board.
(f) Well thought through ideas about the potential for interweaving externally funded centers and institutes into the operational and managerial fabric of the Division of Agriculture and the University.

(g) Growth potential and how growth in enrollment and program initiatives will be achieved and managed.

3. **Program Goals: Clarity and Articulation**

The goals of each land-grant program were spelled out in several of the documents provided for the review team. To a large extent they are not at variance (nor should they be) with goals of the typical land-grant university. What emerges as an issue for the reviewer in connection with program goals, during the short period of review, can best be summarized as follows:

(a) There did not seem to be a strong degree of goal internalization on the part of the faculty,

(b) There was not a clear sense that all faculty shared a common understanding of goals and related priorities,

(c) It was not evident that parallel goals for the four land-grant program components had been thought through collectively so that interlocking management and implementation could be achieved,

(d) There was not a clear sense that goals and priorities which are presently pursued have evolved against a background assumption that FAMU's programs fully operate in the "mainstream" of Florida's agricultural community, and

(e) There was strong feeling that past actions by the Board of Regents to reduce programs had been levied disproportionately (and unfairly) against agriculture at FAMU.
In spite of the environment of frustration and uneasiness over perceived commitment to agricultural programs at FAMU (by the State), there was a strong and healthy optimism about the future.

Recommendations #3: Program goals should be revised and developed within and among the four land-grant components with a clearer sense of direction from the Board of Regents and from within the institution. Priorities should be set and pursued.

4. Facilities and Equipment

The condition of facilities for research, instruction and extension though clean and orderly maintained suggest an exceptionally long period of underfunding. Poor lighting, inadequate ventilation and poor space distribution were obvious even upon casual observation. It is noted that facilities at FAMU are not on parity with conditions found at other 1890 land-grant institutions (most have benefited from injections of federal and state funding). When generally compared with facilities found at other institutions in the State of Florida and specifically with facilities and equipment provided for IFAS, it can be reasonably assured that FAMU's conditions would be judged grossly below parity.

Plans were provided to the team which show expected outlays for renovating Perry-Paige Hall. Specific details on how teaching, research and other assignable and non-assignable space would be renovated and enhanced were included. The tour of facilities provided evidence that federal dollars for agricultural research facilities and equipment are already beginning to change the conditions of benign neglect. The University Research Forum showed evidence of new structures, but yet has a distance to go before adequate
conditions can be realized. It was learned from the Administrator of 1890 Extension that federal funds of $50 million had recently been authorized for FAMU and 16 other 1890 universities. The combined impact of federal funding and state dollars for renovation should move FAMU to a position of moderately improved facilities and equipment.

Recommendation #4: The planned renovation of Perry-Paige Hall should move forward. Federal outlays for improving conditions in research and extension should be carefully guided. However, it is cautioned that FAMU take a careful look at how improvement in non-teaching facilities can be made to impact on teaching programs. It should be kept in mind that the academic program(s) and faculty should be the driving core of all agriculture initiatives within the University. Most important with facilities and equipment, is the need to step back and take a comprehensive look at how already planned or initiated construction and/or renovation will emerge in such a way to meet needs of those future programs or initiatives in agriculture which may emerge from the recommended comprehensive and long-range planning process.

5. Faculty/Quality and Quantity

Faculty quality is an elusive concept as it may be measured differently depending on the character of the University. Indicators typically used are levels of education (proportion with terminal degrees), research productivity (publications and grant dollars attracted) and teaching-program-related outcomes. Apart from innate quality of faculty, the quality environment can be impacted by work assignment (distribution), teaching levels, salary, tenure and promotion arrangements and overall support for instruction in terms of physical facilities, equipment and working conditions.
As a whole, the quality of FAMU's agricultural faculty was found to be quite good. Given the relative size of the program, the number (28 head count) was about adequate, but the distribution among disciplines and among program components (extension, research, teaching) was a bit off the mark.

Sixty-four percent of the faculty held the Ph.D. degree from some of the top universities in the U.S. Several are graduates from the University of Florida. Thirty-six percent held the M.S. degree. Although no hard figures were provided, observation showed the faculty to be highly diverse along racial and ethnic lines with more than 50 percent of the research faculty being non-U.S.-Black and/or international.

The distribution of faculty training among academic disciplines reflects the relative strengths of FAMU's agricultural programs. According to data available, 46 percent held degrees in plant and soils sciences, 14 percent were classified as animal scientists, 28 percent were in education, and 11 percent are in the social sciences. These are broad categorizations.

A comparison of faculty assignment by land-grant program area shows that 35 percent held teaching responsibilities to some degree and only three out of 28 held full-time teaching positions. Sixty-four percent of the faculty held research responsibilities, while only 21 percent held joint teaching/research positions. In extension, 22 percent held exclusive extension assignments, while less than one percent held joint extension/teaching assignments.

Overall, FAMU's agricultural faculty was found to be highly educated, well informed and motivated, and shared a mixed optimism about the future.

Recommendation #5: The distribution of faculty assignments should be reassessed and efforts made to involve more faculty in teaching activities, especially when new teaching programs have been put in place. Students should
be taught by faculty who are engaged in cutting-edge research and who are in touch with the community outside the University. In short, FAMU should remove barriers that prevent joint assignments for faculty. Any expansion of faculty numbers, whether for research, teaching or extension, should give consideration to attracting not only Ph.D.-level personnel, but also aggressive future-oriented individuals.

6. Faculty Salaries and Incentives

Based on information provided during interview sessions, it was determined that average salaries paid to FAMU's agriculture faculty ($35,000/nine months) lag behind those of IFAS ($45,000/nine months) by about ten thousand dollars. It was not determined exactly how FAMU salary levels compare with other universities in the State University System although they were said to be lower. Apart from salary, other factors discussed in connection with incentives were reward for grantsmanship and faculty development opportunities provided through sabbaticals and in-service development experiences. In each case, the resounding concern was "the absence of incentives of these types." Generally, there was also concern for lack of reward for performance above the "call of duty." The consultant was not able to substantiate or refute these claims. Moreover, both faculty and administrators suggested that lack of sufficient incentives continues to cause difficulties.

Recommendation #6: Salaries for productive FAMU agriculture faculty should be brought into parity with comparable groups of faculty at other institutions in the State University System. FAMU should devise mechanisms for appropriately rewarding those faculty members who attract grant dollars to the University and State. Also, an effective awards program should be developed
so as to recognize and reward outstanding performance over a wide array of categories.

7. Faculty Morale

The consultants found widespread faculty and administrative support for the new FAMU President, Dr. F.S. Humphries. However, in plain terms, faculty morale was found to be "low." Factors impacting morale were noted to be diverse and pervasive within and external to the University. Although several highly outspoken faculty in plant science expressed frustration with leadership of the College of Engineering Science, Technology and Agriculture (CESTA) and within the Division of Agriculture, probing questions evoked a broader set of causes of frustration. Some were: 1) resource allocation and reallocation away from traditionally supported programs of research, 2) shifting priorities in extension and research programs, 3) limitation of resources and support for resident instruction, 4) low salaries, 5) lack of incentives to stimulate higher levels of performance, 6) lack of joint appointments for faculty, 7) lack of sufficient critical mass in FTE teaching faculty, 8) inability to get certain classes at the desired time, etc. Many of the factors are to be found within any university at any given time, but they should not be lightly discounted.

The most striking and broad-based source of frustration that impacts morale and positive expectations for the future was the feeling that support had been withdrawn from agricultural programs at FAMU. As was explained by some faculty members, there is a feeling that actions under the direction of an earlier constituted Board of Regents had been taken directly to dismantle agriculture. Home economics education had been removed and emphasized at
another Regents' institution, in the name of avoiding duplication. Other offerings in plant/soil sciences and animal sciences (those with greater enrollments) had also been removed at earlier times in the name of desegregation. In short, there was a general feeling that a move was afoot to allow remaining programs in agriculture to reach a gradual demise due to attrition and benign neglect.

Recommendation #7: The administrators of the College of Engineering Science, Technology, and Agriculture (CESTA) and of the University should move swiftly in examining those factors that are, in fact, the root cause of low faculty morale. A plan of action should be developed so that responses that are within internal grasp and control of the University can be effectuated early on. Expressions of intent on the part of the governing Board regarding future growth, support or non-support of agricultural programs at FAMU should be made a matter of public knowledge.

8. Curriculum Relevance and Redevelopment

The curriculum is noted to be relatively diverse and perhaps too broad, given the low level of enrollment and small number of FTE faculty assigned to teaching. Available documents show a total of six Bachelor of Science degrees being offered and also the Master of Science and Master of Education degree being offered in Agricultural Education. A two-year program in Pre-Veterinary Science is offered. The relatively broad based offering, vis-a-vis low enrollment, gives rise to difficulty in creating a "critical mass" in the instruction program.

While there is a problem in this area, there is evidence to suggest that the faculty and administrators have given consideration to ways to turn the
situation around. Planning sessions, including a retreat, have been held, from which have emerged documents to guide the way to improved conditions. Four such unapproved (or unofficial) documents are worth noting. They are: 1) a proposal to establish an Agricultural Institute for Small Farming and Urban Environmental Studies; 2) a proposal for the Viticulture Science Program at Florida A&M University; 3) a proposal to establish a Center for International Policy and Research; and 4) a development plan for a Center for Urban and Freshwater Entomology at FAMU. Also of note is the cooperative research 5-year plan which addresses future linkages with resident instruction and other land-grant programs.

Recommendation #8: The University should continue its assessment of the quality, relevance and support for the resident instruction (teaching) in agriculture. It may well be that a single B.S. degree in agricultural science with options for concentration in selected sub-disciplines is the way to go. Any plan for program modifications should be undergirded by a realistic and hard nosed assessment of demand for agricultural program graduates. Moreover, a thorough assessment and plan should be laid for marketing the new or modified curriculum that would be provided.

9. Student Enrollment

Total enrollment in agriculture at FAMU has mirrored the trend that has prevailed in the state and across the U.S. over the past six years. With an average enrollment of sixty-four (64) students over the period, the Division of Agriculture experienced a peak of 95 students in 1980 and a low of 52 students in 1983. Enrollment stood at 55 students in 1984. While national and statewide trends (and impacting factors) in agricultural enrollment explain (generally) the low level, it is expected that other factors come into
play at FAMU. It is suspected that such factors as quality of facilities, the level of financial support for instruction, and overall attractiveness of the curriculum have come into play at FAMU. It is also noted that FAMU has experienced relatively limited scholarships for recruiting students.

The low enrollment level (supply) that now exists at the University is particularly alarming when one accepts national study conclusions that demand for agriculture graduates will increasingly outstrip supply in the very near future. Moreover, when the impact of recent low enrollments is coupled with the increased average age of professional agriculturists nationally (near retirement), it is quite possible that a chronic supply/demand imbalance will soon emerge. The obvious implication is that colleges of agriculture have a tremendous teaching, recruiting and selling job ahead. FAMU must share in the responsibility of averting the impending supply/demand imbalance and should position itself to respond effectively.

Recommendation #9: FAMU must seriously investigate the sources of past low enrollment in connection with curriculum assessment and overhaul. Further, the faculty and administrators of CESTA must develop or update their understanding of the supply/demand situation for agricultural graduates, and organize an effective marketing strategy. Focus on enrollment (student training) should be at the core of any consideration given to developing new institutes.

10. Organizational Structure

Under the present official organization structure, the Division shows four directors (in the areas of instruction, research, viticulture and extension) reporting to the Head of the Division of Agriculture. The Division Head in turn reports through an Assistant Dean to the Dean of the College of
Engineering Science, Technology and Agriculture. Beyond that, the Dean reports to the Vice President of Academic Affairs and he to the President. Clearly this structure places land-grant programs in a position too far removed from the active hub of upper administration within the university. Land grant programs are increasingly organized so as to be actively represented within the central University upper administration framework by a Vice President for Agriculture. Such a structure recognizes the vitality, scope and complexity of land grant endeavors and allows for the appropriate executive/managerial environment. The structure that now exists at FAMU may well be a source of problems and frustrations that prevail in agriculture.

The review process did uncover evidence that the University recognizes this problem and has proposed a structure which should bring managerial improvement. A document entitled "A Proposal to Establish an Agricultural Institute for Small Farming and Urban Environments Studies" carries on page eight a position for Vice President for Agriculture and International Programs. It also references other possible administrative structuring within the agricultural arena.

Recommendation #10: The University and the Board of Regents should give serious consideration to the need for improving the administrative structure as it pertains to agriculture and the several programs therein.
MISSION AND GOALS OF IFAS

The primary mission of IFAS (stated earlier) will be carried out with the attainment of the following goals:

1. Enhancing teaching programs to insure a continuing supply of astute managers, innovators, and scientists for the Florida food, agricultural, and natural resource communities.

2. Enhancing competitive production and market position of the Florida food, agricultural and natural resource industries through the development, application, and management of appropriate technology.

3. Contributing to the enhancement of the quality of life in urban Florida where IFAS has expertise.

4. Assessing and enhancing renewable and natural resources. The locations of IFAS units are shown on the map on the following page.

Florida is an increasingly urban, aging, and rapidly growing state. As a result, new and larger demands are being placed on the Land-Grant Universities and IFAS in particular. In addition, the diversity of crops and animals in Florida agriculture is large compared to most other states mostly resulting primarily from the State's location, climate, soils, and resource base. The increasing population and its patterns of work and recreational activities are impinging on the resource base in significant ways. These structural characteristics of the State have had two primary consequences for IFAS's sphere of
RESEARCH AND EDUCATION CENTERS

1. Belle Glade (cattle, forage crops, sugarcane, vegetables)
2. Bradenton (cut flowers, vegetables)
3. Homestead (ornamentals, subtropical fruits, vegetables)
4. Lake Alfred (citrus)
5. Quincy (cattle, field crops, fruit crops, tobacco, vegetables)
6. Sanford (field crops, ornamentals, vegetables)

AGRICULTURAL RESEARCH AND EDUCATION CENTERS

1. Apopka (foliage plants, ornamentals)
2. Brooksville (Brooksville Beef Cattle Research Station, USDA)
3. Dover (strawberries, vegetables)
4. Ft. Lauderdale (animal diseases, aquatic weed control, ornamentals, turfgrass)
5. Ft. Pierce (citrus, vegetables, forage and pasture crops)
6. Hastings (cabbage, potatoes)
7. Immokalee (forage and pasture crops, vegetables)
8. Jay (cattle, field crops, fruits, nuts)
9. Lakeland (National Weather Service)
10. Leesburg (grapes, watermelons)
11. Live Oak (field crops, fruits, swine, tobacco)
12. Marianna (field crops, swine)
13. Monticello (fruits, nuts)
14. Ocala (horses)
15. Ona (cattle, forage crops)
16. Tallahassee
17. Vero Beach
activities: 1) An institutional structure has emerged that is very complex and geographically dispersed (see map, next page), and 2) The clientele groups served by the Institute are numerous and highly diverse in their interests. The result is a large expansion in the demand for programs and services by IFAS.

Despite modest increases in state and federal support, and a successful effort by IFAS to expand its extramural resources, its ability to meet these demands is still inadequate. Our impression is that the Institute's resources are spread thinly over the competing demands and therefore the quality of service is lower than it might be if there were greater concentration and focus of activities. But given the Land Grant philosophy of service to the people of the State, how can this focus of activities be achieved? Only by strict adherence to criteria that clearly define the domain of work and scope of activities.

This posture of greater focus will have its costs (especially political costs), since the organization will appear to be nonresponsive to some perceived needs. But we think the problem may be sufficiently serious that we would urge IFAS to consider some changes in this direction.

EDUCATIONAL PROGRAMS

I. OVERVIEW

As the 1862 Land-Grant institution for the State of Florida, the University of Florida, through its Institute for Food and Agricultural Sciences has mandated responsibility for higher education in the agricultural and food
sciences, and in the area of renewable and natural resources. Such education began in 1884 and has grown in strength and scope over the past 100 years, particularly over the past 40 years, until at the present time its educational programs, both undergraduate and graduate, are recognized as some of the finest in the United States.

The purpose of this review is to broadly assess the quality of these programs. The emerging needs of the State of Florida, with its national and international linkages, require a vision of the future as suggested by the Board of Regents' "Quest for Excellence." This vision put into action will assure that well-educated and prepared people will be available to move the State forward to the benefit of all.

The timing of the review could not be more appropriate because Florida would appear to be at a critical point in her history. Opportunity for Florida agriculture has never been greater. The accomplishments of IFAS in teaching in partnership with the State of Florida and indeed, the agricultural and food industry of the State, have been of such a magnitude that an industry valued at greater than 15 billion dollars per year (value added) has developed in a land area where natural resources are limited. Continued growth of this critically important segment of the economy, with wise use of its natural resources will require talented, motivated, exceptionally well educated people. Decisions must be made now as to how and where to strengthen the undergraduate and graduate educational programs of IFAS and the University of Florida to make certain that the talent not only matches the vision, but that it is available when it is needed.
II. ASSESSMENT OF PROGRAM QUALITY

In order to assess the quality of the teaching programs offered by the Institute, the consultants raised appropriate questions with the several "audiences" available within and without the University and within IFAS itself. These included industry representatives, state officials, representatives of the central administration of the University, including the President, Deans of various colleges, and administrators within IFAS, including department chairmen, IFAS faculty and students. Work load data pertaining to the activities of the teaching faculty were also examined.

An assessment of various components of significance to the quality of the educational programs of the Institute follows. It should be noted that in so far as they could, the consultants also attempted to assess the quality of instruction of relevant courses offered outside of IFAS. Comment will be made on these assessments as well.

A. Quality of the Teaching Faculty

Some 280 faculty members of IFAS (100 FTE) are engaged in teaching and advising some 882 undergraduates and 692 graduate students. All of the individuals interviewed, without exception, stated that the quality of the teaching faculty is good. Many faculty have received national, regional and institutional teaching awards.

The consultants attempted to determine the need for faculty to update and improve their teaching knowledge and skills. Although IFAS has a program for faculty improvement which includes a "sabbatical" leave opportunity, it seems apparent that greater attention, including appropriate incentives, should be given to programs that will encourage the teaching faculty to remain on the cutting edge of their disciplines.
The teaching programs offered by the several academic disciplines of IFAS could also be improved by the involvement of the total faculty of each discipline irrespective of their assigned responsibilities to teaching, research and/or extension.

Opportunities for the Future.

**UF Recommendation #1:**
Enhancement of faculty teaching improvement programs at the Institute, School and Department levels, with appropriate incentives to cause the faculty to participate in them.

**UF Recommendation #2:**
Recommitment of the total faculty of the discipline to excellence in the undergraduate and graduate teaching programs.

B. Quality of the Student Body

1. **Undergraduate.** The quality of the undergraduate students in the College of Agriculture and the School of Forest Resources and Conservation appears to be good, ranging up to excellent. In the Fall of 1985, entering University Freshmen had an average GPA of 3.4 and an average SAT of 1090. Over fifty percent of the students entering the College do so having attended a Community College in the State and eighty percent of these have the AA Degree. When questioned about the quality of their preparation for upper division study and about their ability to perform competitively at this level, the Department Chairs and the faculty alike indicated that both student preparation and performance were satisfactory.
Undergraduate enrollments have declined from a peak of 1232 students in 1977 to 882 in 1985 following a national trend in agricultural colleges. The demand for graduates of the College with the B.S. degree, however, remains high, with an average job/student ratio of 2.6. What is true for Florida is also true nationally: a recently published manpower study (USDA) indicates a shortage of graduates in most areas of agriculture for the next decade. This clearly indicates that career opportunities in the food, agricultural and natural resources areas are excellent and that a College program to cause prospective students to elect studies in these areas, may be advisable.

Significant increases in black student enrollment have been achieved by aggressive recruitment and retention activities (See Table 1). These activities include:

a. Employment of a full-time minority recruiting and retention person,

b. Participation in recruitment at all levels by faculty and administration,

c. Visitation programs to high schools, junior colleges and 1890 schools (for graduate students),

d. An undergraduate grant from IFAS is offered to any black student qualified for admission and in need and is continued for as long as satisfactory progress is made toward a degree in agriculture,
e. Graduate assistantships are available from the Vice President for Agricultural Affairs for qualified black students if a regular assistantship isn't available from the Department, and

f. Special counseling and academic support is provided to assist in retaining and, most importantly, graduating black students in the College of Agriculture. Not only has the number of black students increased but also the quality. The top Bachelor of Science graduate from the College of Agriculture last semester was a black scholarship student with a 3.96 grade point average (A = 4.0) in Food Science and Human Nutrition. Another black student in the same program with a grade point average of 3.90 will be graduating this Spring. We believe this presents solid evidence of progress and that the efforts of IFAS are to be commended. However, we also believe that the effort as outlined in items a-f above should be pursued with the same vigor in the coming years as they have in the recent past.

g. Placement -- Although positions available to all of the students of IFAS outnumber the students graduating, students are apparently experiencing difficulty in contacting prospective employers and vice-versa. For this reason, the College may wish to initiate a low cost, but effective student placement service supported in part by industry.
Table 1

BLACK STUDENT ENROLLMENT*
INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES
1981-1986

<table>
<thead>
<tr>
<th></th>
<th>Undergraduate Students</th>
<th>Graduate Students</th>
<th>Total Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Spring Semester)</td>
<td>(Spring Semester)</td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td>10</td>
<td>8</td>
<td>18</td>
</tr>
<tr>
<td>1982</td>
<td>18</td>
<td>10</td>
<td>28</td>
</tr>
<tr>
<td>1983</td>
<td>21</td>
<td>10</td>
<td>31</td>
</tr>
<tr>
<td>1984</td>
<td>28</td>
<td>15</td>
<td>43</td>
</tr>
<tr>
<td>1985</td>
<td>40</td>
<td>11</td>
<td>51</td>
</tr>
<tr>
<td>1986</td>
<td>50</td>
<td>13</td>
<td>63</td>
</tr>
</tbody>
</table>

*Foreign students not included.
2. **Graduate.** It is clear that students undertaking graduate study in the various disciplines offered by IFAS are well qualified for such study.

Enrollments over the past ten years have ranged from 490 in 1975 to 692 in 1985. Graduate enrollments appear to have reached a "steady-state" over the past few years. There appears to be opportunity for growth in several disciplines, however. Again, because job opportunities appear to exceed the number of students graduating, faculty in the various disciplines may wish to strengthen recruitment efforts. However, a more important factor may be the relatively low graduate assistant stipends presently offered and the prospect that there will be significant restrictions on permitting out-of-state students to be classified as Florida residents. These two factors probably place IFAS at a distinct disadvantage in the competition for highly qualified graduate students. This must be avoided.

**Opportunities for the Future**

**UF Recommendation #3:**

There is a clear opportunity for attracting a greater number of exceptionally well qualified undergraduate students to meet Florida's future critical manpower needs through a well planned, statewide, competitive scholarship and recruitment program.
UF Recommendation #4:
The graduate student stipend/tuition issue should be critically examined and adjusted favorably to assure and enhance the continued enrollment of highly qualified and committed graduate students, because competitors will be doing so.

UF Recommendation #5:
Avoid the loss of out-of-state tuition waivers for graduate assistants if they cannot be given Florida residency after one year.

C Undergraduate Programs of Study

The Institute, through the College of Agriculture and the School of Forest Resources and Conservation in cooperation with other Colleges, offers an array of courses and curricula which in broad scope are relevant and adequate to meet Florida's present needs. However, to strengthen these courses and curricula it is suggested that:

UF Recommendation #6:
Mathematics requirements for the B.S. degree should be strengthened.

UF Recommendation #7:
Upper division/graduate course(s) in plant biochemistry should be strengthened. The assistance of the College of Liberal Arts and Sciences would be helpful in this regard.

UF Recommendation #8:
A foreign language requirement for the B.S. degree should be considered in recognition that agriculture in the United States
and in Florida is international in essentially all of its aspects.

UF Recommendation #9:
Courses of study in the basic botanical and plant sciences, including plant genetics, should be reviewed with the goal of developing a core curriculum on the cutting edge of these sciences preparatory to advanced study in these fields. This opportunity for strength does not in any way imply criticism of courses presently offered in either the botanical or plant sciences. To the contrary, its purpose is to cause the design, implementation and strengthening of those core (required) studies in the botanical sciences essential to the achievement of excellence in the agricultural and biological sciences.

UF Recommendation #10:
Teaching resources allocated to these fields should be significantly increased because the quality of instruction in Microbiology and Cell Biology has increased significantly over the past several years, and because the instruction offered in these fields is of critical importance to education in biotechnology and related areas.

UF Recommendation #11:
All curricula should be reviewed with the goal of strengthening students' marketing and business skills. It is suggested that this review be undertaken with cooperation of appropriate faculty from the College of Business Administration.
UF Recommendation #12:

IFAS's long range planning places high priority on the development of an area of research strength in biological control/biotechnology. The consultants are in strong agreement with this priority and believe that it offers an unusual opportunity, one uniquely open to Florida because its "socio-eco-agro-ecosystem" provides a "living laboratory," for the development of interdisciplinary instruction in plant protection at both the undergraduate and graduate levels (See, for example, Tammen and Wood, "Education for the Practitioner" in Plant Disease: An Advanced Treatise Vol. I. Academic Press, 1977). Such courses of study, not offered elsewhere in the United States, would serve not only Florida, but also the region, nation and the Caribbean basin.

D. Graduate Study and Research.

The Institute graduate faculty and research in its College of Agriculture, the School of Forest Resources and Conservation, and the Graduate School, appears to be adequate and relevant. Although there may be differences in the qualities of the programs offered by the various disciplines, they appear in general to be good and some are excellent.
Opportunities for the Future.

UF Recommendation #13:
Continue to strengthen programs of graduate study and research with the goal of achieving excellence in those sciences of key importance to Florida in its national and international setting.

UF Recommendation #14:
Develop research strength in biological control and biotechnology. See discussion under UF Recommendation #12.

III. FACTORS PERTAINING TO PROGRAM QUALITY

A. Equipment. - It appears, in general, that equipment for teaching and for graduate study and research is inadequate. Some equipment is outmoded and/or, because of the lack of funds, has not been adequately maintained. The acquisition of new equipment, absolutely essential to educating students and to conducting research in the real world of "high tech" agriculture, has been deferred because of too few dollars in the budget line. These deficiencies have become acute in several programs and the quality of education in these fields has and will continue to erode until the deficiency is corrected.
Opportunities for the Future

UF Recommendation #15:
The education of students in agriculture, food science and natural resources to meet future needs will require significant improvement in the equipment necessary for teaching and graduate research in the laboratory, greenhouse and field.

IV. A VISION OF THE FUTURE

The University of Florida, through and with its Institute of Food and Agricultural Sciences has an opportunity to serve the State of Florida and its people in ways perhaps greater than ever in its proud history. Over the past thirty years sound educational programs, both undergraduate and graduate, have been established in agriculture, food and natural resources appropriate to the mission of the Institute and the needs of the State of Florida. These programs articulated with those in the Community Colleges, will range from good to excellent in quality to be sure. In terms of a vision for the future it is far more important to understand that these programs now form a solid base upon which true excellence can be built. The challenge, of course, is to marshal the resources at a time when resources are scarce. The opportunity is to build programs, broadly at the undergraduate level and selectively at the graduate level, comparable in quality to the finest in the United States. These people will give leadership to cause the agricultural, food and natural resource sectors of the State to prosper well into the 21st century, to the very real benefit of all the people in all of the communities: metropolitan, urban and rural.
I. QUALITY OF THE RESEARCH FACULTY

In most areas the quality and productivity of the research faculty is very good, and in some areas it is excellent. For example, one department is publishing journal articles at a rate of five per scientist per year. Salaries and start-up funds are sufficient to attract excellent faculty as evidenced by recent appointments. (It should be noted that these successes were achieved through significant reallocations of resources.) The eminent scholar program demonstrates that the University can attract the interest of the country's best scholars and that the faculty recognize this program as an opportunity to further develop their own interests.

There is concern about faculty development. Limitations in high-quality space, out-of-date equipment, difficulties in keeping and rewarding career service technicians, low net stipends for graduate students, and lack of direct incentives for faculty development are seen as impediments to the kind of development desired by the faculty. In general, the initiative in faculty development must come from the individual faculty member. This initiative then requires encouragement, nurture and reward from colleagues and all levels of the administration. Initiatives to be anticipated are requests and arrangements for sabbatical leaves, mini-leaves, retreading, repotting, special materials, and mid-career restarts.
Opportunities for the Future.

UF Recommendation #16:

The faculty and administration together should develop a set of incentives for faculty development. Individual departments should aggressively advance their own choices of world-class scientists, based on academic priorities, for eminent scholar appointments.

II. QUALITY OF THE RESEARCH STUDENTS--POSTDOCTORAL AND GRADUATE STUDENTS

The present graduate students are impressive; however, the pool of very good to excellent applicants is not large enough. The net stipend is insufficient to allow an offer from IFAS to be competitive with an equivalent educational opportunity in another state. With some notable exceptions there are too few postdoctoral students in the research laboratories of IFAS. In the best universities much of the innovative research is done by postdocs. The reason for this is obvious. They are already well-trained and are on the way to their first position. It is clear to them that it is to their advantage to be productive.

The placement of graduate students and postdoctoral scientists indicates that the quality of both is good. It would appear, with some gratifying exceptions, that they are not being placed in the very best institutions or companies, however. This reflects at the least the perception of the outside world of the quality of IFAS faculty and students. To the extent that training is accomplished on external grants and grant renewals there is a direct and quantitative evaluation by peers of the quality of both students and faculty.
UF Recommendation #17:

Make graduate students stipends competitive. Recruit graduate students and postdoctoral students aggressively. Treat the postdocs as the professionals they are.

III. BREADTH OF RESEARCH AND RESPONSIVENESS TO STATE NEEDS

The number and diversity of Floridian agricultural commodities is an exciting challenge for the research planners as well as for those that do the research. Equal attention, or even a prorated attention, to every commodity is impossible. The problem-solving approach is used. A researcher already conversant in the languages of biology (biochemistry, physiology, immunology, genetics and morphology) assembles and invents the tools needed to study the specifics of selected organisms in basic and fundamental ways. Where practical problems can be foreseen, e.g. freezing temperatures, basic research can be aimed at a solution, i.e. a frost-resistant plant. Where problems cannot be foreseen, e.g. when and where a foreign pest will be introduced, the best preparation is to have available various groups of fundamental scientists kept sharp by their own intellectual curiosity and by their desire to impress and instruct their peers with new observations and new understanding. These scientists, and those assigned to them, will constitute task forces to deal with both expected and unexpected agricultural emergencies.

IFAS scientists already recognize the international character of many of their missions. It should be recognized that the application of basic skills to protect Floridian plants from foreign pests in our own selfish interests generates information of immediate use to the international programs of IFAS.
IV. THE ROLES OF BASIC RESEARCH IN IFAS

Basic research serves several needs and desires. It provides the tools and techniques for solving problems. It satisfies the intellectual curiosity and desire of the researcher. A center for basic research is a highly visible recruiting device - the curious are attracted to a place where they can be curious. It is a center for instruction to undergraduates, graduates, postdoctorals and visiting scientists, and is therefore a center for the development of human resources. It helps in the recruitment of students for the B.S., M.S. and Ph.D. programs. It attracts outside funding and improves the ability of its members to attract outside funding.

UF Recommendation #18:

Basic research in all areas is impossible. Therefore, the commitment to areas must be selective and intense. Selection in some cases may be in response to client demand. In general IFAS faculty itself must lead the way and make the selective choices.

EXTENSION

I. OVERALL QUALITY

The Cooperative Extension program was broadly acclaimed by a limited sample of clientele external to the University, by University administrators outside IFAS and at the departmental level, and by University faculty and staff. There is good balance among production, marketing, consumer, environmental, and youth extension programs.
Florida extension is characterized by several features, some of them quite unique, that contribute significantly to the quality of performance: 1) integration of specialists in academic departments, 2) joint appointments with research and teaching, and budget flexibility, and 3) coverage of the State and responsiveness to clientele needs. Each of these characteristics shall be discussed below and strong and weak points will be highlighted and evaluated.

II. INTEGRATION OF EXTENSION

Personnel budgeted from extension funds operate from the campus at the University of Florida at Gainesville, from the campus of FAMU at Tallahassee, from the regional centers of IFAS, and from the counties of the State.

Compared with programs in most other states, extension personnel and functions in IFAS have been more thoroughly integrated into academic departments. Personnel evaluations for extension specialists are made first at the departmental level and then reviewed at higher levels, and department chairmen are the immediate supervisors of the activities of these specialists. We regard all of this as conducive to the maintenance of quality of extension programs. Faculty and students in academic departments provide intellectual stimulation needed if extension specialists are to remain intellectually alive, current in their disciplines, and thus effective in dealing with their various clientele.

On the whole, it appears that extension activities are being appropriately recognized in personnel evaluations conducted at the departmental level and above.
III. JOINT APPOINTMENTS AND BUDGET FLEXIBILITY

We are also impressed by the large number of joint appointments among extension and research and teaching categories of budgeted effort. When it is possible for scientists to extend their own findings to clientele, the quality of information dissemination improves and clientele confidence increases. Joint appointments, however, can produce several kinds of distortions that can be real problems. The misallocation of effort among joint categories is one such problem. We found little evidence, however, that extension activities are being neglected in Florida in favor of research. Because of pressures brought by clientele and the tradition of responsiveness to those pressures by IFAS, there appears to be a large number of faculty, especially in the regional centers, involved in extension activities, even though they are not budgeted to extension. In fact, compared to our experience in other states, there is little budgeted FTE to extension in the regional centers. Many extension faculty actually working out of the regional centers are budgeted in the departments at Gainesville. We regard flexibility to move personnel and operating budget among teaching, research and extension as an advantage so long as teaching and research are not neglected and adequate recognition for professional and University service is given for the extension activity.

It appears that at the present extension may at times be crowding out research. A few department chairmen were somewhat concerned about this issue. Administrators must be cognizant of this possibility and not allow current pressures for responses to minor short-run problems to displace long-term and more basic research that will provide the scien-
tific findings needed for effective problem solutions in the long-run. Still, the flexibility to move academic resources to those uses and people where they have the highest payoff is a major advantage, and we applaud this flexibility in the Florida system.

IV. GEOGRAPHIC DISPERSAL OF PERSONNEL AND FACILITIES

Florida is almost unique among the states in the fraction of faculty, particularly research faculty and staff, that is located in regional centers and counties of the State. This feature has several benefits, but presents some major challenges. We shall discuss these in turn.

It is apparent to us that the system is highly responsive to clientele needs. A large and increasing share of the operating budget comes from the counties and this support may become even more critical in a period of declining federal support that likely lies ahead. We understand that Florida ranks third among the states in obtaining county support for extension (40 percent of the resources currently comes from this source). This support probably would not be forthcoming were the county officials as representatives of the people not pleased with the programs. We were informed that when a problem arises, those affected are likely to go directly to the regional centers for help. This would not be their pattern if they were not receiving the help they feel they need. Nearly all county offices and regional centers have advisory boards that assist in planning programs and generating grant funds. This activity promotes much good will for the University. There is some evidence that the distribution of membership on these boards could be improved to include more prominent local people broadly representative of
the community, but on the whole, the boards appear to be making an important contribution to University-community relations.

Florida is an isolated state geographically. The regional centers, particularly in the Northern end of the state, appear to have close contact with professionals working on similar problems in other states, mostly in Georgia and Alabama. Both information and personnel can move expeditiously between states in response to need.

Many of the centers have faculty and staff representing several disciplines. This is extremely important, given that nearly all problems are multi-disciplinary. These small inter- and multi-disciplinary task forces working on a given problem are more likely to be effective in solving it than if critical disciplines were missing in the investigation.

The commitment of resources to the regional centers, particularly in some areas, appears to be especially significant in serving small limited-resource and minority farmers. A good mix exists between responding to requests that come to the counties and regional centers and seeking out those who are having problems and responding to their needs. The 4-H program appears to be doing a better job of reaching black than Hispanic youth, however.

We are not completely confident, however, that all is well. The challenges of having such a dispersed faculty and staff are formidable. The most critical issue in our view is maintaining contact with peers who speak the same scientific language and can provide intellectual exchange and stimulation. Close cooperation with clientele is not a substitute.
Scientific obsolescence can occur very quickly without almost daily contact with other professionals in the same and related fields. The scientific complexity of most real-world problems is of such dimensions that if the competency of the advisory function is missing, clientele will go elsewhere. In fact, there is considerable evidence in many states around the country that extension specialists are behind technicians working in the private sector who have greater incentives to keep current.

Having adequate library resources available is another critical problem for field personnel. And what about those centers which are not large enough to provide the necessary mix of disciplines?

We are satisfied that IFAS is making a substantial effort to minimize these problems. The State is ahead of most in providing electronic equipment and computers to both campus and regional centers that permit professional contact and information exchange. Bibliographic materials and library card catalogues appear to be widely available. Graduate students work on dissertations at many centers. Gainesville faculty sometimes teach there and some field faculty teach on campus. All of these responses are laudatory and in the right direction. But are they sufficient? We have some doubts.

At the very least, IFAS should undertake a comprehensive study to determine whether or not this problem of professional isolation is a serious one. Strong encouragement through incentives should be given to a faculty development program, especially for those in the more remote centers. It appears to us that sabbatical leaves are hardly utilized at all to upgrade skills and competence.
The level of recruitment is another important problem. Because of the costs of isolation, it may be difficult to recruit faculty at the Ph.D. level in the centers. But we are not convinced that staff recruited at the M.S. level is adequately trained to deal in a competent way with the existing problems. Surely the problems are not less difficult than those encountered by the on-campus faculty, so why should training and competence be less for field than for campus faculty?

Because of the complexity of the issues discussed in the foregoing paragraphs, we are not confident that specific recommendations are appropriate. But we would urge IFAS to look again at the problem and evaluate the following margins:

1. Is each center scientifically viable? Is there a critical mass of needed scientists to do a quality job?

2. Is the mix of disciplines optimal? If not, can disciplinary help be acquired from the main Gainesville campus?

3. Is the mix of teaching, research, and extension FTE optimal given the tasks to be accomplished?

4. Can faculty and staff competence be retained over the long run?

The implications of the above questions are obvious. If the answers are strongly negative, serious consideration should be given to closing the centers that are not viable and reallocating the resources to those that are.
UF Recommendation #19:

It is suggested that UF study the extension centers to determine whether consolidation would be appropriate.

IFAS AREAS OF EMPHASIS (THE FUTURE)

As a part of its ongoing planning activities, IFAS has identified the following Areas of Emphasis:

1. Environmental Toxicology
2. Culture and Protection of Plants and Animals
3. Plant and Animal Breeding and Genetics
4. Processing and Post Harvest Handling
5. Agricultural Mechanization and Robotics Technology
6. Biological Control of Major Pests
7. Market Problems
8. Enhancing Natural Resources
9. Improving Human Nutrition
10. Farming Systems

BOR Recommendation #1.

Obviously, each of the activities identified by IFAS as an area of emphasis is very important. When one takes into account the current strengths of the faculty, the unique needs of the State, and the expressed desire to compete nationally, it is our opinion that an exceptionally strong case can be built for focusing agriculture on:

1. Biological Control of Pests
2. Biotechnology (an Office of Technology Assessment report suggests that commercialization of biotechnology will likely occur in Animal Science, Food Science, Plant Science, Environmental Science as well as Bioprocess Engineering. Therefore, major benefit could accrue to Florida through an emphasis on Biotechnology).

3. Marketing and Trade

4. Water and Environmental Quality

To achieve excellence, faculty focus and reallocation of resources to these areas will be required. With the existing faculty quality in Florida, the objective is clearly attainable. In so doing, Florida will become recognized as "world class" in biology/agriculture and will reap handsome economic rewards from its resulting more competitive agriculture for many years to come. In addition, because these programs are cutting-edge and high-technology, significant industrial development will be attracted to Florida. Not to provide the additional resources will significantly delay progress toward excellence, create major negative pressures from the agricultural industry because of unmet needs, and will significantly decrease the competitiveness of Florida agriculture in the highly competitive world market.
I. BIOTECHNOLOGY/BIOCONTROL

IFAS has made a prescient commitment to the development of a Biotechnology/Biocontrol research group. What has been accomplished so far is impressive. In fact, it is the intensity of the commitment and the high quality of the accomplishments to date that make it clear that the fulfillment of this commitment will require additional resources. Additional faculty appointments are required to achieve critical mass. At least one of these appointments must be at the senior level—perhaps an eminent scholar. Additional space is required for existing and to-be-added faculty, and funds and space must be provided for postdoctoral students and visiting scientists.

In the past few years we have witnessed the development of a new set of tools that are interesting in their own right and also in their applicability to the study of almost all aspects of basic and applied biology. The ability to identify, isolate, modify, transfer, and control the expression of desired genes, the ability to tailor-make antibodies and the ability to generate or regenerate whole organisms from single cells constitute the principal tools of biotechnology and biocontrol that will add to and change current breeding practices. Where single genes or a small number of genes control a desired trait (e.g., disease-susceptibility, heat tolerance, cold tolerance, herbicide resistance, etc.), early successes can be expected. Those traits (e.g., yield) under the control of a large number of genes will, for now, continue to be "moved" by conventional breeding practices. Although
there are specialists in the design of these new tools their successful use requires the participation of the basic biologists who understand what the tools can do and who have some appreciation for the whole organism in its producer role.

The quality of a biotechnology/biocontrol group depends upon the freedom of the researcher to advance the state-of-the-art of tool-making, his ability to instruct others in the use of these tools, and his willingness to volunteer his help in the collaborative effort to use these tools to solve unforeseen problems.

It should be noted that the nutritional program in IFAS is robust. The research faculty has many interesting challenges. The diversity of food in Florida, the diversity of life styles of the population and the skew of population distribution toward the older segment generates a plethora of opportunities for inquiry into nutritional requirements and related issues of food quality and food processing.

Opportunities for the Future

BOR Recommendations #2:

Funds and related support for the optimum development of the present faculty and facilities, recognition of the important role of postdoctoral students, and aggressive recruitment of a few of the very best research and teaching faculty available are a necessity to achieve excellence.

BOR Recommendation #3:

The current research lab space formula for biological sciences which provides 450 sq. ft./scientist should be increased for
these programs to 750 sq. ft. to accommodate postdocs and graduate students.

UF Recommendation #20:

A plan should be developed by the program participants to define and assure the interdisciplinary nature of the program.

II. MARKETING AND TRADE

There can be little doubt that marketing of agricultural products will be of critical concern to Florida's future. The Department of Food and Resource Economics at the University of Florida has developed a national reputation in agricultural marketing and is well-placed to grow even stronger in the years ahead. Significant marketing functions include the transport, storage, financing, and processing of agricultural commodities.

Florida must depend on food exports, to other regions of the US as well as internationally, if farm income is to keep pace with other sectors of the economy. To successfully export will require strength in at least two areas: 1) agricultural product development, and 2) cost and demand studies of Florida agriculture and its relevant markets.

The transport and storage of raw agricultural commodities are generally more costly than for processed products. The value-added that results from processing is also highly beneficial to the creation of employment and income. Thus, a vital need exists for developing new products that will utilize raw agricultural crops. Much of the work being done in Food Science will help in filling this need.
International markets are becoming increasingly competitive. Surpluses are an endemic problem for nearly all developed countries. Many are dumping these surpluses on world markets. If the United States and Florida are to successfully compete in these markets, economic intelligence must be available on comparative costs, price and income elasticities, barriers to trade, exchange rate movements, etc. Under flexible exchange rate regimes that now exist, international trading is much more risky than in previous years. It is increasingly important that growers and traders understand how to utilize futures and options markets and forward contracting in reducing risk and uncertainty.

III. WATER AND ENVIRONMENTAL QUALITY

It is widely conceded that population growth alone will put increasing stress on Florida's natural environment in the years ahead. Agricultural and urban wastes are largely water- and air-borne and degrade and despoil the fragile environment. The problems are already critical in many groundwater aquifers, rivers, lakes, and estuaries. The state's number one industry, tourism, is inextricably linked to the fauna and flora of the natural ecosystem as is the lifestyle of most native Floridians. There is no escaping from the urgent need to understand these ecosystems better and how to protect them. IFAS has a special responsibility to explore the critical linkages between agriculture and the natural environment.

Expanding irrigation and increasing urban uses of water will inevitably bring these users into conflict in their struggles for largely fixed water supplies. Attention needs to be given to finding ways of
improving water-use efficiency in both sectors. In addition, recent legislation requiring five-year permits to use water has introduced major impediments to investment in economic activities that utilize water. Ways need to be explored that would provide greater security of tenure and yet protect the natural environment. The creation of permanent water rights that could be traded in water markets is only one example of institutional arrangements that should be explored. This should prove to be an exciting multidisciplinary exercise as economic, social, political and legal aspects are investigated.

OPPORTUNITIES FOR IMPROVEMENT (General)

I. **BUDGET.** The restrictions on transfer of funds among budget categories, salary rate controls and requirements related to year-end balances result in major inefficiencies and disincentives at the unit and scientist level. Related problems are magnified in that research and extension centers are dispersed throughout the state.

II. **FINANCE AND ACCOUNTING.** Significant inefficiencies and disincentives result at the scientist level as a result of purchasing and payment procedures.

III. **PERSONNEL.** Unusually large disruptions of research programs occur as a result of personnel management (career service) policies.
IV. REVOLVING ACCOUNTS. State regulations require that the proceeds from the sale of certain agricultural commodities be returned to the State for allocation. A very positive incentive could be created for faculty if proceeds remained in local revolving accounts. The result would be a significant reduction in the cost of teaching and research.

BOR Recommendation #4:

Implementing the proposal to improve management effectiveness in the State University System of Florida as stated in A Path to Excellence in Public Higher Education in Florida is essential if world-class academic excellence is to be achieved.

V. SPACE.

A. Fixed Capital Outlay. In its Fixed Capital Outlay Budget Request for 1986-87, IFAS requested:

Priority 1. Bio-Control/Bio-technology Facilities
   (Entomology-Nematology and Microbiology-Cell Sciences)
Priority 2. Agricultural Engineering Facilities
Priority 3. McCarty Hall renovation
Priority 4. Rolfs Hall renovation

These items were included in the University of Florida request as Priorities 4/8, 13, 18 and 16, respectively.
BOR Recommendation #5.

The Fixed Capital Outlay Budget Request should be granted without delay. Programatically, these items are essential and therefore easily justified. In fact, academic excellence in these core thrust areas will not occur without them.

B. Renovation of existing laboratories. As one might predict in a system with several new campuses, renovation in several laboratories has been delayed much more than normal. As a result, program quality is being negatively impacted.

BOR Recommendation #6:

Special BOR policies should be developed to upgrade older facilities (laboratories).

VI. EQUIPMENT.

The cost of purchasing and maintaining state of the art equipment in agricultural research, teaching and extension is quite large. It is also obvious that the same is true for many other parts of the University.

BOR Recommendation #7:

Special BOR attention should be given to scientific and information management equipment as a part of the "Quest for Excellence." Additional planning should occur at the campus level to improve efficiencies, i.e., common use of specialized equipment.
SOCIAL ISSUES RESEARCH/EXTENSION

Based on the information available to us, it is our opinion that not enough attention is being given to social issues, particularly in research.

LEVEL OF SUPPORT PER SCIENTIST

To achieve excellence or to solve problems in Florida agriculture, the level of support per scientist must be increased. It is our opinion that when additional operating funds are obtained, they should be made available to scientists on a competitive basis.

INTERNATIONAL PROGRAMS

The IFAS International Programs are judged to be high quality and relevant. Continued excellence should be encouraged.

BOR Recommendation #8.

Consideration should be given to providing increased State support for the IFAS International Programs.
Florida agriculture is heavily dependent on specialty crops and related high technology production and processing. Therefore, it would be valuable to conduct a feasibility study to determine whether or not IFAS/FAMU should develop a two-year degree program in agriculturally-related technologies. Successful examples are in place at the University of Minnesota, Michigan State University, North Carolina State University, and Ohio State University.

OVERALL ASSESSMENT OF QUALITY - IFAS

It is the opinion of the review team that the current quality of the faculty and programs is good to very good with an opportunity for excellence in a limited number of areas.
COMPOSITION OF REVIEW TEAM

Lead Consultant

MAX LENNON was Vice President for Agricultural Administration and Executive Dean for Agriculture, Home Economics and Natural Resources, The Ohio State University, Columbus, Ohio, at the time of this review. His previous appointments include Dean, College of Agriculture, University of Missouri where he also served as Director, Agriculture and Experiment Station and Chairperson, Department of Animal Husbandry. At Texas Tech University he served as Professor and Chairman, Department of Animal Science, Assistant and Associate Dean and Director of Research College of Agricultural Sciences. For the Central Soya Company, he directed swine feed research.

Dr. Lennon received his education in North Carolina where he received the B.S. and Ph.D. in Animal Science at North Carolina State University. On March 1, 1986, Dr. Lennon assumed the Office of President of Clemson University. His professional activities include serving a broad spectrum of agriculture at local, state and national levels. Most of his research and publications are in the area of swine nutrition.

UF Consultants

JOSEPH VARNER has served as Professor of Biology, Washington University, St. Louis, Missouri, since 1973. He has served as Professor also at Michigan State University and Ohio State University and has been awarded several research fellowships and scholarships including American Cancer Society Scholar, Senior Postdoctoral Fellow, N.S.F., University of Washington, Senior Postdoctoral Fellow, N.S.F., University of Cambridge and others. Dr. Varner
was elected to the National Academy of Sciences in 1984 and has served as Consultant to The Monsanto Company since 1967. He has served as Visiting Professor in five U.S. Universities and in the University of Chile and has served on numerous professional committees, advisory boards, and panels. Dr. Varner has served as editor of *Plant Physiology* and currently holds membership in several scientific and biological associations. He is currently serving as President of the Society for Developmental Biology. Dr. Varner's research and publications have been primarily in basic Biochemistry much of which was applicable to agricultural production of corn, peas and tomatoes. He was educated at Ohio State University having received the B.S. and M.S. in Chemistry and the Ph.D. in Biochemistry there. He received an honorary doctorate from L'Universite De Nancy in 1977. A long list of Dr. Varner's former graduate and postdoctoral students currently occupy prestigious positions as scientists and professors such as L. N. Lewis, Professor and Dean, Agricultural Experiment Station, University of California, Berkeley; R. Bernlohr, Professor and Chairman, Biochemistry, Penn State University; R.C.-C. Huang, Professor, Johns-Hopkins University; B. O. Juliano, Chairman, Chemistry, International Rice Research Institute, The Philippines; M. J. Chrispeels, Professor, University of California, San Diego; R. L. Jones, Professor, University of California, Berkeley.

B. DELWORTH GARDNER is Professor of Agricultural Economics, University of California, Davis, where he has served in that capacity since 1976. Formerly he served on the faculties at Utah State University, Colorado State University and Brigham Young University. Dr. Gardner has served on more than ten review panels to evaluate graduate and research programs in various state universities. He has served as consultant in South America, Asia, Middle East and
Europe as well as the United States. He currently serves as Consultant to California Department of Water Resources and on advisory committees to Forest Policy and Management Program; Resources for the Future, Washington, D.C.; Center for Political Economy, Bozeman, Montana; Wildlands Resources Center, University of California, Berkeley; and previously served in several similar capacities. Dr. Gardner received his undergraduate and Master's degrees in Agricultural Economics from the University of Wyoming and his Ph.D. in Economics from the University of Chicago. His research responsibilities have included projects on Value of Water in Alternative Uses, On-Farm Use of Irrigation Water, and other projects on the economics of water, rural development, rural settlement patterns, agricultural land values, and rice straw disposal. Dr. Gardner's publications have dealt with the economics of state and national policies and practices on grazing public and private ranges, water management, recreation, crop production, oil shale, and population distribution.

JAMES F. TAMMEN is President of Oglevee Associates, Inc., Connellsville, Pennsylvania, where he is responsible for research and development, market development, and corporate operations in an organization dealing with pathogen-free producing systems of horticultural crops. Formerly, Dr. Tammen held positions as Professor of Plant Pathology at both the University of Minnesota and Pennsylvania State University. He also served as Head of the Department of Plant Pathology at Pennsylvania State University and as Dean of the College of Agriculture at the University of Minnesota. Dr. Tammen was educated in California having received the B.S. in Plant Sciences from the University of California at Davis and Berkeley and the Ph.D. in Plant Patholo-
gy from the University of California at Berkeley. His research and publications have dealt primarily with pathogen-free production of vegetatively propagated plants; root diseases of plants; epidemiology of plant diseases; etiology, epidemiology and control of the diseases of floricultural plants. Dr. Tammen has been active in several professional organizations and served as President of the American Phytopathological Society, member of the governing board of the International Society for Plant Pathology, Chairman for the Intersociety Consortium for Plant Protection, and member of the Organizing Committee and Chairman of the Program Committee for the Ninth International Congress of Plant Protection.

FAMU Consultant

HANDY WILLIAMSON, JR. is Deputy Director for Research and University Relations, Bureau of Science and Technology, Agency for International Development (A.I.D.), Washington, D.C., and is on leave from Tennessee State University, Nashville, Tennessee, where he holds the position of Associate Professor and Director of the Cooperative Agricultural Research Program. Dr. Williamson has been an international and domestic consultant on many projects and review teams which involved travel throughout Africa, the Caribbean, the Far East, as well as the U.S. He was formerly Associate Director of the Center for Rural Development and Assistant Professor of Agricultural Economics at Tuskegee Institute, Alabama.

Several state, regional and national committees, boards and task forces have benefited from Dr. Williamson's contributions such as the Board for Food and International Agricultural Development (BIFAD), the Association of State
University Directors of International Agricultural Programs (ASUDIAP), U.S. Joint Council on Food and Agricultural Sciences, Southern Regional Agricultural Research Committee, National Association of State Universities and Land-Grant Colleges and the Tennessee Valley Authority. Dr. Williamson's research and publications include economic and rural development studies affecting land use, resource management, manpower training, research and extension development, and efficiency of small and large farms in diverse geographical settings such as Sub-saharan Africa, Alabama, Tennessee, Jamaica, Botswana, Swaziland, the Philipines, the Ivory Coast and Angola. Dr. Williamson received the B.S. in Vocational Agriculture at Alcorn State University, Lorman, Mississippi; the M.S. in Agricultural Education at Tennessee State University; the M.S. in Agricultural Economics from University of Missouri-Columbia; and the Ph.D. in Agricultural Economics from University of Missouri-Columbia.
Orientation Schedule and Participants

January 20, 1986
Chancellor's Conference Room
Collins Building
Tallahassee, Florida

8:45 - 9:15  Introduction to State University System of Florida
             Roy E. McTarnaghan, Vice Chancellor for
             Academic Programs

9:15 - 9:30  Procedure for Systemwide Program Review
             Angela Lupo-Anderson, Director, Program Review

9:30 - 9:45  Schedule for Review
             Taylor Cullar, Program Review Assistant

9:45 - 10:45 Discussion of Issues to be Addressed by Review Team
             Clarence Ammerman, Faculty Program Consultant
             Mac Lennon, Lead Consultant

11:00 - 12:00 Role of Universities in Meeting Needs of Agriculture
               Frank Bouis, Chairman, Governor's Task Force on
               the Future of Agriculture in Florida

1:00 - 1:45  Role of Universities in Meeting Needs of Agriculture
             Doyle Connor, Commissioner, Department of Agriculture

2:00 - 2:45  Role of Universities in Meeting Needs of Natural
             Resources
             Don E. Duden, Assistant Executive Director,
             Department of Natural Resources

2:45 - 3:30  Discussion of Issues continued
             Max Lennon, Lead Consultant

3:30 - 4:00  State University System Budget Procedures
             Ron Stubbs, Associate Director, Office of Budgets
FLORIDA A & M UNIVERSITY
SITE VISIT SCHEDULE
AND PARTICIPANTS
ROOM 101, PERRY-PAIGE BUILDING
January 21, 1986

Meeting with University Administrators 8:45 - 10:00 a.m.

Frederick Humphries, President
Richard Hogg, Vice President Academic Affairs
Charles C. Kidd, Dean, College of Engineering Science, Technology and Agriculture
Lee E. Evans, Assistant Dean, College of Engineering Science, Technology and Agriculture

Meeting with Directors 10:00 - 11:00 a.m.

Nathaniel Saylor, Former Director Agriculture Science
Lawrence Carter, Coordinator, Cooperative Extension
Sunil K. Pancholy, Director, Research
Peter Hartmann, Director, International Programs

Meeting with Students and Faculty 11:00 - 12:00 noon

Ten students from various areas of agriculture
Claude McGowan, Extension, Animal Science Specialist
Sam Hand, Instruction, Landscape Design
William Peters, Instruction, Entomology
Ann Gordon, Research, Entomology
Manuel Pescador, Research, Entomology
Ralph Flowers, Research, Entomology
Y. P. Hsieh, Research, Soil Science
Grace McWhorter, Instruction, Ornamental Horticulture
C. B. Owens, Instruction, Agronomy
Lee E. Anderson, Instruction, Animal Science
Rosalie Myers Instruction, Entomology
Olusalvia Lamikanra, Research, Viticulture
Verian Lamikanra, Instruction, Food Science and Assistant to Dean

Meeting with Alumni and FAMU Employees 1:00 - 1:30 p.m.

Alumni

Rosalie Myers, FAMU, Entomology
Joe Shingles, Vocational Agriculture
Theodore James, FHA
Betty Brodwell, FHA
Damon Miller, FAMU Extension, President Agriculture Alumni
Darrell Johnson, SCS
L. E. Anderson, FAMU Animal Science, Vice President Agricultural Alumni
Employees

Janet Peters, Entomology
Michael Hubbard, Entomology
Grace McWhorter, Ornamental Horticulture
C. C. Coulitas, Soils
Crews, Visiting professor from FHA
C. W. O'Brien, Entomology

Meeting with Faculty from Other Schools and Colleges 1:30 - 2:00 p.m.

Lynette Padmore, Biology
C. B. Subramanyam, Biology
Henry Lewis, Pharmacy
Verian Lamikanra, Assistant to Dean, CESTA-Curriculum Development

Review of Facilities 2:00 - 3:00 p.m.

Lee E. Evans, Assistant Dean
Sunil Pancholy, Director Research

Meeting with Administrators

Frederick Humphries, President
Richard Hogg, Vice President Academic Affairs
Charles C. Kidd, Dean, Engineering Science, Technology and Agriculture
University of Florida
Site Visit Schedule
and Participants

University of Florida, Campus, Gainesville--January 22-26, 1986

ORIENTATION MEETING 8:00-8:10 AM, January 22nd, MCC 1031
K.R. Tefertiller, Vice President for Agricultural Affairs

IFAS OVERVIEW 8:15-9:45 AM, January 22nd, MCC 1031
K.R. Tefertiller, Vice President for Agricultural Affairs
Vernon Perry, Acting Dean for Research
John Woeste, Dean for Extension
G.L. Zachariah, Dean for Resident Instruction

MEETINGS WITH SELECTED UNIVERSITY ADMINISTRATORS
10:00-10:30 AM, January 22nd, TIGERT 226
Marshall M. Criser, President

10:30-11:00 AM, January 22nd, TIGERT 235
Robert A. Bryan, Provost and Vice President for Academic Affairs

11:00-11:30 AM, January 22nd, GRINTER 223
Donald R. Price, Vice President for Research

11:30-12:00 AM, January 22nd, GRINTER 280
Madelyn Lockhart, Dean of the Graduate School and Dean for International Studies

LUNCH 12:15-1:15 PM, January 22nd, President's Dining Room, JWRU (Review Consultants Work/Discussion Session)

IFAS PROGRAMS 1:30-2:00 PM, January 22nd, MCC 1031
K.R. Tefertiller, Vice President for Agricultural Affairs

PLANT AND ANIMAL PRODUCTION 2:00-2:30 PM, January 22nd,
Leader: Neal Thompson, Professor (Food Science and Human Nutrition) and Assistant Dean for Research; Pesticide Residue Analysis.

Discussants: Charles Dean, Professor and Chairman, Department of Agronomy; Plant Breeding and Genetics.
Walt Kender, Professor (Fruit Crops) and Center Director, Citrus REC; Research Administration/Horticulture.
Dan Cantliffe, Professor and Chairman, Department of Vegetable Crops; Seed Physiology.
Will Waters, Professor (Horticulture) and Center
Director, Gulf Coast REC; Horticulture/Plant Nutrition.
Jim App, Professor (Agricultural and Extension Education) and Assistant Dean for Extension; Extension Administration.
Roger West, Professor and Chairman, Department of Animal Science; Meat Science.
Wayne H. Smith, Professor (Forestry) and Director, Center for Bio-Mass Energy Systems; Forest Soils Science.
Neal Becker, Professor, Department of Preventive Medicine (CVM); Swine Diseases.

FOOD QUALITY AND NUTRITION 2:30-3:00 PM, January 22nd
Leader: Frank Busta, Professor and Chairman, Department of Food Science and Human Nutrition; Food Microbiology.
Discussants: Bob Cousins, Boston Family Professor of Human Nutrition; Biochemistry and Human Nutrition.
Steve Otwell, Associate Professor; Seafood Technology.
Doris Tichenor, Professor and Director, Department of Home Economics; Meat Science/Home Economics Administration.
Jim Cato, Professor (Food and Resource Economics) and Director, Florida Sea Grant College Program; Marine Economics.

NATURAL RESOURCES 3:00-3:30 PM, January 22nd,
Leader: Arnett Mace, Professor and Director, School of Forest Resources and Conservation; Forest Hydrology.
Discussants: Jerry Shiremen, Professor and Chairman, Department of Fisheries and Aquaculture (SFRC); Fisheries Science.
Jim Davidson, Professor (Soil Science) and Assistant Dean for Research; Soil Physics.
Jim Cato, Professor (Food and Resource Economics) and Director, Florida Sea Grant College Program; Marine Economics.
Wayne H. Smith, Professor (Forestry) and Director, Center for Bio-Mass Systems; Forest Soils Science.

ENVIRONMENTAL TOXICOLOGY 3:45-4:15 PM, January 22nd,
Leader: Dan Shankland, Professor and Chairman, Department of Entomology and Nematology; Insect Toxicology and Physiology.
Discussants: Brian McNeal, Professor and Chairman, Department of Soil Science; Inorganic Soil Chemistry.
Willis Wheeler, Professor (Food Science and Human Nutrition) and Director, Pesticide Research Laboratory; Pesticide Chemistry.
Joe Delfino, Professor (College of Engineering); Environmental Engineering.
Dale Habeck, Professor; Entomology.
Jim Davidson, Professor (Soil Science) and Assistant Dean for Research; Soil Physics.
BIOLOGICAL CONTROL OF PESTS 4:15-4:45 PM, January 22nd,
Leader: Vernon Perry, Professor (Entomology and Nematology) and
Acting Dean for Research; Nematology.
Discussants: Orion Boucias, Assistant Professor; Insect Pathology.
Clay McCoy, Professor, Citrus REC; Entomology.
Fred Bennett, Graduate Research Professor; Biological Control.
R. Charudattan, Professor; Biological Control of Aquatic Weeds and Pathogens.
Bob Peart, Graduate Research Professor; Systems Stimulation.

INTERNATIONAL PROGRAMS 4:45-5:15 PM, January 22nd,
Leader: Hugh Popenoe, Professor (Soil Science) and Director of IFAS International Programs and Center for Tropical Agriculture; Tropical Soils/International Programs Administration.
Discussants: R. Hunt Davis, Professor (History) and Director, Center for African Studies; History of South Africa/African Education/African Agriculture.
Terry McCoy, Professor (Latin American Studies, Sociology, and Political Science) and Director, Center for Latin American Studies; Latin American Politics and Public Policy.
Charles Eno, Professor (Soil Science) and Assistant Director, IFAS International Programs; Soil Science.
Chris Andrew, Professor (Food and Resource Economics) and Associate Director, IFAS International Programs; International Trade and Development/Marketing.

FARMING SYSTEMS PROGRAMS 8:00-8:30 AM, January 23rd,
Leader: Chris Andrew, Professor (Food and Resource Economics) and Associate Director, IFAS International Programs; International Trade and Development/Marketing.
Discussants: Pete Hildebrand, Professor; Agricultural Economics/Farming Systems.
Jim App, Professor (Agricultural and Extension Education) and Assistant Dean for Extension; Agricultural Extension Administration.
Neal Thompson, Professor (Food Science and Human Nutrition) and Assistant Dean for Research; Pesticide Residue Analysis.
Jimmy Rich, Associate Professor, AREC-Live Oak; Nematology.

MARKETING PROGRAMS 8:30-9:00 AM, January 23rd,
Leader: Leo Polopolus, Professor; Agricultural Economics.
Discussants: Jim Seale, Assistant Professor; International Agricultural Trade and Finance.
Bob Degner, Associate Professor; Agricultural Market Research.
John Vansicle, Associate Professor; Marketing Economics.

BIO-TECHNOLOGY 9:05-10:00 AM, January 23rd,
Leader: John Gander, Professor and Chairman, Department of Microbiology and Cell Science; Biochemistry/Biotechnology.
Discussants: Fuller Bazer, Professor; Animal Physiology.
Curt Hannah, Professor; Plant Genetics/Biotechnology.
Indra Vasil, Graduate Research Professor; Plant Biotechnology.
Chuck Niblett, Professor and Chairman, Department of Plant Pathology; Plant Virology/Biotechnology.
Michael Burridge, Professor and Chairman, Department of Infectious Diseases (CVM); Epidemiology.

FISCAL MANAGEMENT ISSUES 10:15-11:00 AM, January 23rd,
Leader: Charles Conover, Professor (Ornamental Horticulture) and Center Director, AREC-Apopka; Ornamental Horticulture.
Discussants: Vernon McKee, Director, IFAS Planning and Business Affairs; Resource Economics.
Ed Heffelfinger, Associate Director, IFAS Planning and Business Affairs; Fiscal Management.
Hugh Popenoe, Professor (Soil Science) and Director, IFAS International Programs and Center for Tropical Agriculture; Tropical Soils.
Neal Thompson, Professor (Food Science and Human Nutrition) and Assistant Dean for Research; Pesticide Residue Analysis.
Bob Kramer, Director, IFAS Sponsored Programs and Development; University Administration/Grants Administration/Development.
Brian McNeal, Professor and Chairman, Department of Soil Science; Inorganic Soil Chemistry.

PERSONNEL MANAGEMENT ISSUES 11:00-11:45 AM, January 23rd,
Leader: Roger Natzke, Professor and Chairman, Department of Dairy Science; Dairy Cattle Management/Mastitis Control.
Discussants: Jim Brasher, Professor (Agricultural and Extension Education) and Assistant Dean for Extension; Extension Administration/4-H and Other Youth Programs.
Fuller Bazer, Professor; Animal Physiology.
Walt Kender, Professor (Horticulture) and Center Director, Citrus REC; Research Administration/Horticulture.
Jim Davidson; Professor (Soil Science) and Assistant Dean for Research; Soil Physics.
Ray Andrew, Associate Professor (4-H) and Director, IFAS Personnel Affairs; Extension Administration/4-H/Personnel Administration.
Dan Shankland, Professor and Chairman, Department of Entomology and Nematology.

LUNCH WITH SELECTED UNIVERSITY ADMINISTRATORS 12:00 Noon-1:15 PM, January 23rd, President’s Dining Room, JWRU
Gerald Schaffer, Associate Vice President for Administrative Affairs
Art Sandeen, Vice President for Student Affairs
Wayne H. Chen, Dean, College of Engineering
Robert F. Lanzillotti, Dean, College of Business Administration
Jeffrey E. Lewis, Associate Dean, College of Law
Charles F. Sidman, Dean, College of Liberal Arts and Sciences
STUDENTS MEETING (Undergraduate and Graduate) 1:30-2:45 PM, January 23rd, MCC 1031

UNDERGRADUATES
Brian Cardin, Mechanized Agriculture, Vice President of the Student Agricultural Council, Outstanding Junior in the College of Agriculture, 1984-1985
Nicola Dronoff, Animal Science, President of Alpha Zeta Honor Fraternity
Cynthia Dunham, Plant Pathology
Ellen McMullan, Food Science and Human Nutrition, Member, Student Agricultural Council
Molly Meade, Animal Science, Treasurer, Student Agricultural Council
Oscar Schaps, Food and Resource Economics, President of the Food and Resource Economics Club, Citizen of El Salvador, resident in U.S.

GRADUATES
Enrique Garcia, Food and Resource Economics, Non-thesis M.S. student from Ecuador, B.S., UF, December, 1984
Sherri Noxel, Agriculture and Extension Education, President of the Student Agricultural Council, Resident-alien from Canada, M.S. student, B.S., UF, May, 1985
Dale Seale, Vegetable Crops, M.S. student, B.S. Cornell, May, 1982
Steven Taylor, Agronomy, Ph.D. student, B.S. Kentucky, May, 1981, M.S., UF, December, 1984
Thomas Zoebisch, Entomology, Ph.D. student from Mexico

REVIEW TEAM WORK SESSION 2:45-5:00 PM, January 23rd, MCC 1031

NORTH FLORIDA RESEARCH AND EDUCATION CENTER DIRECTORS AND EXTENSION DISTRICT DIRECTORS 8:00-8:45 AM, January 24th
Don Herzog, Professor (Entomology and Nematology) and Center Director, North Florida REC: Entomology/Pest Management.
Dale Hensel, Professor (Soil Science) and Center Director, AREC-Hastings Soil Fertility.
Tony Peacock, Professor (Agronomy) and Center Director, AREC-Jay; Plant Breeding.
Wayne P. Smith, Assistant Professor and District Extension Director; Extension Administration/4-H.
Steve Ryan, Assistant Professor and District Extension Director; Extension Administration/Extension Entomology.

CENTRAL FLORIDA RESEARCH AND EDUCATION CENTER DIRECTORS AND EXTENSION DISTRICT DIRECTORS 8:45-9:30 AM, January 24th
Will Waters, Professor (Horticulture) and Center Director, Gulf Coast REC; Horticulture/Plant Nutrition.
Walt Kender, Professor (Horticulture) and Center Director, Citrus REC; Research Administration/Horticulture.
Charley Conover, Professor (Ornamental Horticulture) and Center Director, AREC-Apopka; Ornamental Horticulture.
Finley Pate, Professor (Animal Science) and Center Director, AREC-Jay; Beef Cattle Nutrition.
Gary Elmstrom, Professor (Vegetable Crops) and Center Director; AREC-Leesburg; Horticulture.
Pete Warnock, Associate Professor and District Extension Director; Extension Administration/Extension Education.
Maurice Cole, Associate Professor and District Extension Administration/Dairy Science.

CENTER FOR COOPERATIVE AGRICULTURE PROGRAMS (UF/FAMU) 9:30-9:45 AM, January 24th
Bob Bradford, Professor (Agriculture) and Center Director; Soil Chemistry.

ANIMAL SCIENCES DEPARTMENTS 10:00-10:40 AM, January 24th
Roger West, Professor and Chairman, Animal Science Department; Meat Science.
Henry Wilson, Professor and Acting Chairman, Poultry Science Department; Poultry Physiology.
Roger Natzke, Professor and Chairman, Dairy Science Department; Dairy Cattle Management/Mastitis Control.

PLANT SCIENCES DEPARTMENTS 10:40-11:20 AM, January 24th
Charles Dean, Professor and Chairman, Agronomy Department; Plant Breeding and Genetics.
Bill Wiltbank, Professor and Acting Chairman, Fruit Crops Department; Environmental Physiology.
Dan Cantliffe, Professor and Chairman, Vegetable Crops Department; Seed Physiology.
Tom Sheehan, Professor and Acting Chairman, Ornamental Horticulture Department; Floricultural Physiology.

NATURAL RESOURCES DEPARTMENTS 11:20-12:00 Noon, January 24th
Loukas Arvanitis, Professor and Acting Chairman, Forestry Department (SFRC); Mensuration Biometrics.
Ron Labisky, Professor and Acting Chairman, Wildlife and Range Management Department; Wildlife Population Ecology.
Jerry Shireman, Professor and Chairman, Fisheries and Aquaculture Department (SFRC); Fisheries Science.
Brian McNeal, Professor and Chairman, Soil Science Department; Inorganic Soil Chemistry.

LUNCH WITH IFAS FACULTY ADVISORY COMMITTEE 12:15-1:30 PM, January 24th, President's Dining Room, JWRU
Dr. Lynn B. Bailey, Associate Professor, Human Nutrition
Dr. Kenneth J. Boote, Professor, Plant Physiology
Mr. Thomas H. Braddock, County Extension Director IV, Duval, Livestock
Mr. Reginald L. Brown, County Extension Director III, Collier, Vegetables
Dr. Carroll R. Douglas, Professor, Extension, Poultry
Dr. Elaine T. Klatt, County Extension Director II, Broward, Home Economics
Mrs. Ameda J. Overman, Professor of Nematology, Ornamental Vegetables
Dr. James O. Strandberg, Professor of Plant Pathology, Vegetable Crops
Dr. Fuller W. Bazer, Chairman, Professor of Physiology, Reproductive Physiology
Dr. Frederick S. Davies, Associate Professor, Horticulture
Dr. Thomas A. Kucharek, Professor of Plant Pathology, Extension and Research

DISCIPLINE GROUP (A) DEPARTMENTS 1:45-2:25 PM, January 24th
Dan Shankland, Professor and Chairman, Entomology and Nematology Department; Insect Toxicology and Physiology.
Chuck Niblett, Professor and Chairman, Plant Pathology Department; Plant Virology/Biotechnology.
John Gander, Professor and Chairman, Microbiology and Cell Science Department; Biochemistry/Biotechnology.

DISCIPLINE GROUP (B) DEPARTMENTS 2:25-3:05 PM, January 24th
Gerry Isaacs, Professor and Chairman, Agricultural Engineering Department; Crops and Grain Handling/Solar Energy.
John Reynolds, Professor and Acting Chairman, Food and Resource Economics Department; Natural Resource Economics.
Frank Busta, Professor and Chairman, Food Science and Human Nutrition Department; Food Microbiology.

DISCIPLINE GROUP (C) DEPARTMENTS 3:05-3:45 PM, January 24th
Carl Beeman, Professor and Chairman, Agricultural and Extension Education Department; Vocational Agriculture/Teacher Education.
JoAnn Pierce, Associate Professor and Acting Chairperson, 4-H and Other Youth Programs Department; Youth and Adult Education.
Susanne Fisher, Professor, Assistant Dean and Chairperson, 4-H and Other Youth Programs Department; Youth and Adult Education.

IFAS DEANS 4:00-5:00 PM, January 24th, ROLFS 109
John Woeste, Dean for Extension
G.L. Zachariah, Dean for Resident Instruction
Vernon Perry, Acting Dean for Research

REVIEW TEAM WORK SESSION 8:00 AM-9:30 PM, January 25th, MCC 1031
8:00 AM-3:00 PM, January 26th, MCC 1031

RESEARCH AND EDUCATION CENTER, FT. LAUDERDALE January 27th
INTRODUCTORY REMARKS 8:00-8:10 AM
Jim Davidson, Professor (Soil Science) and Assistant Dean for Research; Soil Physics.
Jim App, Professor (Agricultural and Extension Education) and Assistant Dean for Extension; Extension Administration.

THE SETTING 8:10-8:20 AM
Steve Ryan, Assistant Professor and District Extension Director; Extension Administration/Extension Entomology.

PROGRAM THRUST AREAS
1. **WATER 8:20-8:50 AM**

   **Leader:** Van Waddill, Professor (Entomology and Nematology) and Center Director, Everglades REC; Integrated Pest Management in Vegetable Crops.

   **Discussants:** George Snyder, Professor, Everglades REC; Soil Science. Barry Baldwin, Professor (Agricultural Engineering Dept.); Agricultural Pollution Control. Roy Carriker, Associate Professor (Food and Resource Economics Dept.); Natural Resource Economics. Clayton Hutcheson, County Extension Director, Palm Beach County; Citrus/Water/Land Use. George Fitzpatrick, Associate Professor, Ft. Lauderdale REC; Horticultural Water Use.

2. **ORNAMENTAL HORTICULTURE 8:50-9:20 AM**

   **Leader:** Bill Ennis, Professor (Agromony) and Former Center Director, Ft. Lauderdale REC; Crop Protection.

   **Discussants:** Henry Donselman, Associate Professor, Ft. Lauderdale REC; Tropical Ornamental Horticulture. Stephen Verkade, Assistant Professor, Ft. Lauderdale Ornamental Horticulture/Instruction. David Bruce, County Extension Director, Dade County; Community Development/Human Resource Development. George Snyder, Professor, Everglades REC; Soil Science.

3. **SUB-TROPICAL FRUITS AND VEGETABLES 9:20-9:50 AM**

   **Leader:** Dick Baranowski, Professor (Entomology and Nematology) and Center Director, Tropical REC; Biological Control/Tropical Fruit Pests.

   **Discussants:** Mary Lamberts, Extension Agent, Dade County; Tropical and Specialty Vegetables. Carl Campbell, Professor, Tropical REC; Tropical Fruit Production. Vick Guzman, Professor, Everglades REC; Vegetable Crops. Richard Tyson, Extension Agent I, Dade County; Vegetables/Agricultural Programs. Kirk Larson, Extension Agent, Dade County; Tropical Fruits/Citrus.

4. **MEDICAL ENTOMOLOGY 9:50-10:10 AM**

   Dick Baker, Professor (Entomology and Nematology) and Director, Florida Medical Entomology Laboratory, Vero Beach; Mosquito Biology and Control.

5. **SOUTHEAST FLORIDA RESEARCH AND EDUCATION CENTER DIRECTORS AND DISTRICT EXTENSION DIRECTORS 10:20-11:05 AM**

   Dick Baranowski, Professor (Entomology and Nematology) and Center Director, Tropical REC; Biological Control/Tropical Fruit Pests.

   Dave Sutton, Professor (Agronomy) and Acting Center Director, Ft.
Lauderdale REC; Biological Control of Aquatic Weeds. 
Van Waddill, Professor (Entomology and Nematology) and Center Director, Everglades REC; Integrated Pest Management in Vegetable Crops. 
Dick Baker, Professor (Entomology and Nematology) and Director, Florida Medical Entomology Laboratory, Vero Beach; Mosquito Biology and Control. 
Steve Ryan, Assistant Professor and District Extension Director; Extension Administration/Extension Entomology. 
Dick Wooten, Associate Professor and District Extension Director; Extension Administration/Horticulture.

6. SOUTHEAST FLORIDA COUNTY EXTENSION DIRECTORS 11:15-12:00 Noon (Broward Extension Office)
David Bruce, County Extension Director, Dade County; Community Development/Human Resource Development. 
Elaine Klatt, County Extension Director, Broward County; Community Development. 
Clayton Hutcheson, County Extension Director, Palm Beach County; Citrus/Water/Land Use.

LUNCH 12:00 Noon-1:15 PM

REVIEW TEAM WORK SESSION 1:15-3:00 PM

DEPARTURE FOR GAINESVILLE 3:00 PM
REVIEW EXIT INTERVIEWS, UNIVERSITY OF FLORIDA (CAMPUS, GAINESVILLE)
January 28, 1986

IFAS CENTRAL ADMINISTRATION  8:15-9:15 AM, MCC 1031
  K.R. Tefertiller, Vice President for Agricultural Affairs
  A.F. Cribbett, Executive Assistant for Agricultural Affairs
  V.G. Perry, Acting Dean, Research
  J.T. Woeste, Dean for Extension
  G.L. Zachariah, Dean for Resident Instruction
  V.C. McKee, Director, Planning and Business Affairs
  H.E. Drummond, Assistant Dean, Resident Instruction
  J.L. Fry, Assistant Dean, Resident Instruction
  N.P. Thompson, Assistant Dean, Research
  J.J. Brasher, Associate Dean, Extension
  S.G. Fisher, Assistant Dean, 4-H and Other Youth Programs
  D.A. Tichenor, Assistant Dean, Home Economics
  M.L. Clarke, Assistant Dean, Marine Advisory Program
  J.C. Joyce, Director, Center for Aquatic Weeds
  M.E. Morris, Director, IFAS Governmental Relations
  D.W. Poucher, Director, IFAS Information
  H.L. Popenoe, Director, International Programs
  C.O. Andrew, Associate Director, International Programs
  R.C. Kramer, Director, IFAS Sponsored Programs
  J.F. Gerber, Director, Agricultural Grants
  J.C. Cato, Director, Florida Sea Grant College Program
  D.L. Shankland, Director of Toxicology
  T.E. Freeman, Acting Assistant Dean, Research

K.R. Tefertiller, Vice President for Agricultural Affairs
  9:15-10:00 AM, MCC 1031

Gene Hemp, Associate Vice President for Academic Affairs
  10:00-10:45 AM, MCC 1031

SUMMARY SESSION  11:00 AM, University Centre Hotel, Board of Regents
  Staff
      Roy E. McTarnaghan, Vice Chancellor for Academic Programs
      Angela Lupo-Anderson, Director, Program Review
      Clarence Ammerman, Faculty Program Consultant
      R. Taylor Cullar, Program Review Assistant
      Ronald D. Stubbs, Associate Director, Office of Budgets
      Sonia L. Collins, Budget Analyst

80
APPENDIX A*

HISTORY
OF
INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES

* Prepared by the IFAS Coordinating Committee for the Board of Regents
Review of the Food and Agriculture and Renewable Resources Programs.

The Institute of Food and Agricultural Sciences (IFAS), administered by
and through the University of Florida, is the statewide system of agricultural
research and education for Florida. The programs of IFAS extend into every
county and community of the State. However, the development of these programs
has not been of recent origin; rather, IFAS has been the outgrowth of both
Federal and State legislation as well as administrative action taken by
Federal, State, and local authorities during a period of more than 100 years.

On July 2, 1862, President Abraham Lincoln signed into law what is
generally referred to as the Land-Grant Act. The new piece of legislation
introduced by U. S. Representative Justin Smith Morrill of Vermont granted to
each state 30,000 acres of public land for each Senator and Representative
under apportionment based on the 1860 census. Proceeds from the sale of these
lands were to be invested in a perpetual endowment fund which would provide
support for colleges of agriculture and mechanical arts in each of the states.
In 1890, Congress, through the second Morrill Act, appropriated up to $25,000
per state for a ten-year period to further finance the Land-Grant colleges.
The Nelson Amendment of 1908 provided further funding for these colleges. The establishment of Florida Agricultural College at Lake City in 1884 under the Morrill Act marked the beginning of what ultimately became the College of Agriculture of the University of Florida.

Through approval of the Hatch Act of 1887, Congress provided for the establishment of an agricultural experiment station at each of the Land-Grant colleges. Several later acts, including the Adams (1906), the Purnell (1925), and the Bankhead-Jones (1935) Acts, provided for expanded appropriations to the state agricultural experiment stations. By Congressional action in 1955, all state agricultural experiment stations' activities under the Hatch Act are administered by the U. S. Secretary of Agriculture, through the Cooperative State Research Service (CSRS), United States Department of Agriculture (USDA).

The Florida Agricultural Experiment Station was established in 1888 as a part of the Florida Agricultural College at Lake City. In 1905, passage of the Buckman Act (Chapter 5384, Laws of Florida) formally established the University of Florida as the combined State University and Land-Grant College, which the Board of Control and the State Board of Education voted to locate in Gainesville. The Buckman Act specifically provided for a "department" of agriculture in the University. Both Federal and Florida State law, therefore, prescribe that the Florida Agricultural Experiment Station shall be a unit of the Land-Grant College.

In 1914, the third functional arm of the Land-Grant College concept was provided with passage of the Smith-Lever Act. This Act established the Cooperative Extension Service and specified that it would be associated with Land-Grant Colleges throughout the Nation. Furthermore, provisions of the Act stipulated that Federal funds must be matched from local sources. Over a
period of years, these funds have been supplied by both state and county
governments, providing a three-way partnership unique in educational annals.

Legislation assenting to the Smith-Lever Act was passed by the Florida
Legislature in 1915 (Chapter 241.18, Laws of Florida). This legislation
authorized the Board of Control to receive and administer the Federal funds
for establishing and supporting cooperative extension in Florida. A Memoran­
dum of Understanding between the United States Department of Agriculture and
the University of Florida has become the legally binding document as pre­
scribed in the basic legislation. The Memorandum is renewed from time to time
as deemed necessary to update procedures and reemphasize the role and respon­
sibility. The document currently in force was executed in January, 1955.
Several Acts subsequent to the Smith-Lever Act, including the Capper-Ketcham
Act (1928), the Bankhead-Jones Act (1935), the Norris-Doxey Act (1937), Act of
1939, the Department of Agriculture Organic Act (1944), the Bankhead-Flannagan
Act (1945) and the Renewable Resources Extension Act (1978) all expanded the
appropriations for and/or the role and scope of cooperative extension programs
in agriculture and home economics. In 1955, the amendment to the Smith-Lever
Act included the provisions of acts passed subsequent to the original
Smith-Lever Act and provided for appropriations on a continuing basis. In
addition, the Agricultural Marketing Act (1946) provided funds for extension
work aimed at solving problems within the total food and fiber marketing
system.

From 1925 to 1937, a Department of Forestry operated as a part of the
College of Agriculture. In 1937, the Florida Legislature, through Senate Bill
15, enabled the School of Forestry, in addition to performing a teaching
function, to operate its own research program. In 1957, forestry research was
incorporated into the Florida Agricultural Experiment Station system. Federal
assistance to help support research on forestry and forestry-related problems is provided on a continuing basis through the McIntire-Stennis Act enacted in 1962. In 1968, the Extension Forestry Section became a formal part of the School of Forestry's organization. In 1971, the School's designation was changed to the School of Forest Resources and Conservation.

Through the years, the functions of the College of Agriculture, the Agricultural Experiment Station and the Cooperative Extension Service in Florida were carried out as three somewhat separate and autonomous administrative and budgetary units. The School of Forestry, however, received budgetary support during this period from both the College of Agriculture and the Agricultural Experiment Station. To effect total coordination of all of the agricultural programs of the University and to eliminate duplication of administration, the Florida Board of Control in April, 1964 approved the creation of the Institute of Food and Agricultural Sciences (IFAS). This action authorized the organization of the four major agricultural units of the University -- College of Agriculture, School of Forestry, Agricultural Experiment Station, and Cooperative Extension Service -- as well as the University's Conservation Reserve near Welaka and the International Agricultural Programs -- into a single budgetary and administrative unit.

One of the primary goals in developing IFAS was to bring about a unified effort and closer coordination of the three closely related functions of resident instruction, research, and extension. Therefore, emphasis has been placed on organizing the total program of IFAS on a functional rather than on a unit basis. In this way, prominence is given to one organization rather than three or four. To provide for the most effective coordination of the total program of IFAS, one administrator has been assigned the responsibility
of coordinating statewide efforts in resident instruction, research, and extension.

Although IFAS is now organized on a functional basis, within the academic structure of the University, the College of Agriculture continues to serve as the basic degree granting unit for the University's agriculture and forestry programs. Likewise, the Florida Cooperative Extension Service continues to be the entity through which the University cooperates with Federal and local governments in the administration of agricultural, home economics and natural resources extension programs. Similarly, the Florida Agricultural Experiment Station continues to be the organization through which the University cooperates with the Federal government in conducting research on problems related to agriculture. Therefore, reference will continue to be made to these units. However, basic to the IFAS organizational concept is a philosophy of one organization rather than three or more. Today IFAS is a major budgetary unit of the State University System of Florida and the University of Florida.

The teaching, research and extension programs of IFAS are enhanced as a result of the University of Florida being one of only three or four institutions of higher education in the Nation in which all disciplines and professional schools are located on one campus. Because of the cooperative interdiscipline efforts between IFAS and other units on campus, IFAS, through its statewide mission and programs, is better able to serve the needs of the state in food and agriculture and renewable and natural resources.
**APPENDIX B**

**THE UNIQUENESS OF FLORIDA AGRICULTURE/NATURAL RESOURCES**

*Prepared by the IAFS Coordinating committee for the Board of Regents Review of the Food and Agriculture and Renewable Resources Programs.*

**Climate and Natural Resources**—Agriculture is heavily influenced by the quantity and quality of its natural resources. Florida's climate, soils, water, forests, wildlife and fisheries, and unique ecosystems are important to the State's agriculture. These resources also contribute to the State's attractiveness and for uses that compete with agriculture. Population projections indicate that these competing pressures will increase in the remainder of the 1980s and in the 1990s.

Florida's climate is primarily responsible for many of the unique characteristics of Florida's agriculture. The extreme southern part of the State enjoys a semi-tropical to tropical climate. Rainfall averages approximately 52 inches per year throughout the State, but is seasonal along the peninsula portion of the State. The vagaries of Florida's weather can also be extremely devastating to the agricultural sector. The wrath of both freezes and hurricanes have destroyed millions of dollars worth of agricultural crops, fishery and forestry production in recent years. Also, low seasonal rainfall during the winter and spring months frequently cause major groundwater drawdowns in
agriculture areas of the State, especially in those areas where water is used for cold protection of plants.

Florida's resources include prime (Soil Conservation Service Classification Systems) agricultural soils which are generally distributed in a band across the northern portion of the state approximately on a line north of interstate Highway 10. The balance of Florida's soils are classed as unique (Soil Conservation Service Classification System) with an intended favorable connotation. Florida's soils in the peninsular part of the state are either fertile or infertile. The "muck" soils, the largest area of which is located north of the Everglades, are very high in natural fertility provided minor nutrients are applied. These soils generally are used for high value crops such as vegetables and sugar cane. The remaining soils are of a sandy nature requiring large inputs of fertilizer and water to support intensive forms of agriculture. Also, because of Florida's warm-moist climatic conditions, problems associated with insects and plant and animal diseases are common. Florida agriculture uses more agricultural pesticides per cultivated acre than other states. Because of this, major research and extension programs exist in integrated pest management (IPM) and biological control of pests. In the past, Florida's agriculture has been characterized by a heavy dependency on energy based inputs.

Large acreages of Florida's farmland are being converted to urban uses although the exact amount of farm land lost each year is difficult to determine. Other losses occur from subsidence (oxidation) of the organic soils and erosion of some prime croplands. Mining, especially of phosphate, and borrow pits for building and road construction also impact land availability. However, despite efforts to preserve land for agricultural use, competing forces continue to bid land away from agriculture. Agricultural returns are
simply not adequate to make agriculture a viable competitor for land which has urban development opportunities.

The surface waters of Florida comprise about sixteen percent of the total area of the State. These lakes and rivers are especially attractive for recreational and commercial uses. In some cases, these waters also are use consumptively by various groups. However, groundwater is the source for 85 percent of the State's public water supplies and is the source for about one-half of the water used for irrigation of agricultural crops. Water withdrawals are replaced by infiltrating rainwater and runoff in recharge areas which are being identified and protected. Competition for water is a growing concern. Water conservation alone will not solve the problems anticipated in the future. Water for irrigation purposes will become increasingly expensive and water planning efforts may be forced to meet urban water needs prior to those for agriculture. Water quality is also an issue of growing concern and one which will receive increased attention in the future.

Forests occupy over 44 percent of the land area of Florida providing economic, social, and environmental benefits to Floridians as well as over 40 million tourists annually. These fast growing intensively managed forests are largely held in private ownership with large industrial land-owners holding approximately 60 percent. In addition to their significant economic contribution, these forests provide water recharge areas, wildlife habitats, forage for cattle, recreational areas, and authentic beauty. Increasing pressure to manage these lands for economic and public benefits is occurring.

The State contains a variety of unique ecosystems. These contribute to a rich diversity of plant and animal species that are important, not only to Florida residents, but to the entire nation. For example, Florida's wild vertebrate species include 52 amphibians, 98 reptiles, 450 birds and 89
mammals. Twenty-six of these species are endangered. There is a similar array of plant species. Both regulatory strategies and direct purchase of landscapes are approaches for their protection and are the procedures currently being used and will most likely continue to be used in the future. Some of the interest and activity in protecting unique ecosystems will impact existing agricultural operations.

This wealth of natural resources offers opportunities, responsibilities and problems for Florida farmers. The very diversity and uniqueness of the ecosystem places a responsibility on agricultural producers to seek management systems that will be both economically productive and compatible with environmental quality standards and urban interfaces. Otherwise, increased regulation of agricultural activities is assured. However, the greatest threat to the resources and to the farming community comes from the influx of population from outside the state, both as tourists and as new residents. The attractiveness of Florida's resources brings in new people, increases the competition for the available resources, and makes it more difficult to preserve the quality of the environment.

Demographics—Generally accepted predictions of population growth in the United States indicate gradual but continued small increases. During the decade of the 1970's, the U.S. population increased about 1.0 percent per year. In the 1980's and 1990's, demographers are predicting average annual population increases for the U.S. of about 0.7 percent. U.S. population is therefore expected to increase from 226 million in 1980 to about 243 million in 1990 and 260 million in 2000. Florida's population is expected to increase at a rate of two to three times that of the nation as a whole., from 9.7 million in 1980 to 12.6 million in 1990 and 15.0 million people by the year
2000, at which time Florida is predicted to be the fourth most populous state. Also, by 1990 it is estimated that 57 percent of the population will reside in eight counties with 78 percent of the population located in coastal counties.

Important population characteristic changes are also anticipated. The proportion of the U.S. population less that 25 years of age will decline while older age groups will become proportionately larger. These age structure shifts will be particularly dramatic in Florida. For example, during 1980-1990 there will be a 64 percent increase in persons age 75 and older and a 34 percent increase in persons 65-74 years of age. Average household size is expected to continue its downward trend. The proportion of working age women in the labor force is expected to continue increasing. Rural versus urban living preferences will continue resulting in all areas of Florida experiencing rapid population growth in the 1980's and 1990's. Unfavorable crime publicity in south Florida may continue to encourage growth in central and northern areas of the state.

Continued rapid population growth, increasing tourism, and an increasing public sensitivity to the quality of life will intensify demands and competition for Florida's finite and vital natural resources. These changes coupled with an urbanized state and legislature will continue to impact the use, operations, and management of agricultural and forested lands. Significant pressures on water supply, land and land prices, increased environmental regulation for water quality, wetlands, land use, pesticides, fisheries, and nongame wildlife are expected. Few states will experience these trends as intensely as Florida during the next decade.

Major Production Regions--There are two distinguishing characteristics of Florida agriculture--diversity and uniqueness. Both of these place a heavy
burden on the research and extension activities of IFAS. While it is always
dangerous to generalize, the state can be divided into several production
regions.

Panhandle. Tillable land in the Panhandle is used for row crops--
primarily corn, peanuts, and soybeans--with yields comparable to other
parts of the southern coastal plains. Much of the Panhandle is not
suitable for production agriculture but is used for intensive forest
production.

North Central Florida. The band from Gainesville to Orlando is a
transition zone with several pockets of speciality crops and forest
production. Around Ocala there is an intensive concentration of horse
farms that have produced Kentucky Derby winners and the like. To the
north and northwest of Orlando is the Zellwood muck land that is used
almost exclusively for vegetable production. Also, north of Orlando is
major ornamental production area. The foliage industry in this region
has experienced a large growth during the past three decades.

South Central Florida. The region from Orlando south to the
Everglades is mainly used for cattle production. In a state that is
known for its various intensive agricultural crops, it may be surprising
that such a large proportion of the state is used for this purpose.
There are several important sub-regions in south central Florida:

The Ridge. A topographic map of Florida reveals what appears to be
a spinal column running in a north-south direction along the peninsula.
This region of rolling sandy hills is known as the Ridge and is one of the important citrus regions in the state.

**Indian River.** Along the east coast of central Florida is another important citrus belt. Substantial acreages of vegetables can also be found along the east coast. Also, a large landscape ornamental industry exists in this area.

**Everglades.** The muck soils immediately north of the Everglades are used primarily for vegetables, sugarcane, and sod production. The muck is an exhaustable resource which is being slowly oxidized at the rate of one inch per year.

**South West.** The soils in this region are well suited to winter vegetables and citrus. Citrus acreage has increased substantially since the 1983 and 1985 freezes. This agricultural area is expanding rapidly.

**South Florida.** The area from Miami south produces a number of exotic or tropical crops such as mangos, limes and specialty and winter vegetables. An increasing acreage in this region is being devoted to the production of specialty fruits and vegetables for new ethnic groups that have become residents in Florida over the past two decades. The soils in this region are rocky (limestone) and poor in fertility.

The diversity of agriculture in Florida along with the growing urban population make it difficult for IFAS to meet the demands placed on its research and extension faculty. This diversity and growth will continue
during the coming decade making it even more difficult for IFAS to meet its responsibilities in the future. This problem must be addressed through either additional resources or a reduction in services.

Economic Importance of Agriculture--Agriculture in Florida is a major producer of food, ornamental horticulture, forestry, marine, tropical fish, and related products and a significant contributor to the economy of the state as well as the nation. In addition to the direct production of agricultural products, Florida agriculture generates jobs and income in a variety of related packing, processing, transportation, input supply, and wholesale and retail industries. Also, Florida agriculture plays a role in supporting other industries in the state. For example, the sale of turf, ornamentals and other landscaping materials to the construction industry. Florida consumers are also supplied with a variety of fresh fruits, vegetables, milk, and poultry products.

The gross value of farm receipts in Florida is approaching $5 billion annually. This makes agriculture Florida's second largest industry after tourism. In 1981, Florida ranked 12th among all states in terms of cash receipts. It is significant to note that these data do not include the marine component of Florida's food and agricultural industry and the commercial turf industry (golf courses, parks, etc) nor do the data fully account for the value of commercial forest products produced in the state. Beyond total cash receipts, Florida is a major producer of several agricultural products. Among the 50 states Florida ranks:

1st in grapefruit
1st in oranges
1st in sugarcane
1st in honey
2nd in greenhouse and nursery products
2nd in tomatoes
3rd in lettuce
6th in all crops
6th in peanuts
6th in commercial marine landings
8th in tobacco
9th in eggs
13th in dairy products

In 1980, Florida agriculture produced 42 commodities with farm sales in excess of $5 million, 38 with sales in excess of $10 million, 14 with sales in excess of $50 million and eight with sales in excess of $100 million. The level of diversity in crop production in Florida is more apparent when compared with neighboring Alabama and Georgia where only 21 commodities in each state exceeded $5 million in 1980 cash receipts. The top ten commodities order of sales value are oranges, cattle and calves, dairy products, grapefruit, sugarcane, tomatoes, foliage, eggs, broilers and soybeans.

Cash receipts and value of sales, however, only begin to measure the role of the food and agricultural industry in Florida. As noted earlier, agriculture is a basic industry in the Florida economy and attempts to assess the total contribution of agriculture. However, to assess the contribution of agriculture to the State's economy one must account for related farm supply, packing, processing and transporting activities. Economists estimate that the $4.0 billion of farm receipts in 1980 in Florida generated additional
processing and marketing activity within the state in excess of $11.0 billion. Thus, agricultural production and processing activities are believed to generate in excess of $15 billion annual sales activity in Florida. The leading contributor is the citrus industry with gross sales in excess of $6 billion annually. Other commodity groups generating more than $1.0 billion are the lumber and paper group, food processing, sugar, vegetables, ornamentals, and livestock products.

Thus, Florida agriculture is a significant contributor to the economy of the State. Agriculture also has been a growth industry in the State. Cash receipts have grown almost steadily since 1950 and show little tendency to fluctuate wildly during recessionary periods.

The development of Florida agriculture to its current level, however, did not occur by chance or because of any unique historical advantages. In fact, Florida agriculture developed in spite of enormous problems of soil fertility, pests and diseases. Overcoming these problems reflects on the ingenuity of Florida farmers and supporting research and technology. Continued growth in the future is likely to be at least as big a challenge as has growth in the past.

International Competition--Foreign producers of agricultural commodities may impact Florida producers in two ways: 1) By competing for domestic U.S. markets now being served by Florida producers; and 2) By competing for export markets which are now being (or which could be) served by Florida producers.

Increasingly, agricultural producers in foreign countries are able to compete effectively with domestic producers both in Florida and in other states of the nation. There are many factors which favor the ability of foreign producers to gain a competitive edge--improved and readily accessible
U.S. technology, lower production costs, less rigid environmental protection measures, lower standards for product quality, and export subsidies by foreign governments. Compounding the situation is the U.S. policy of free trade.

These circumstances emphasize the fact that the principle hope of domestic agricultural producers lies in their ability to continue to improve their production efficiency and marketing so that they can effectively compete with foreign producers. This emphasizes the need to maintain strong programs of agricultural research and extension aimed at generating and using the improved technology necessary to achieve and maintain the highest levels of production and marketing efficiency.

International influence on plant and animal diseases plays an important role in Florida agriculture. Products, pests and predators move in international channels. Given the similarity of environment and commodities, the State has no alternative but to become increasingly involved with countries of similar conditions in pest control, management, and eradication programs. Biotechnology will not eliminate this need. Adaptive "problem solving" research is essential following a systems approach that entails international cooperation.

Many of the current destructive insect pests of basic grains and annual row crops are suspected to have originated from Caribbean Basin locales. Knowledge gained by IFAS faculty in foreign countries has resulted in permanent biological control of many citrus insect pests and has provided the basis for structuring present citrus canker control measures.

In conclusion, the growth rate of Florida agriculture in the next decade can best be described as uncertain. The uncertainty arises due to the fact that agricultural producers are price takers in regard to commodities sold, will remain confronted with increased costs for production inputs, are subject
to variable weather conditions, and can be affected by either controls (e.g., export embargos) or regulations enacted by federal state and local governments. While all the aforementioned problems confront agriculture nationally, Florida agriculture is confronted with additional uncertainties. These additional factors include population growth rates considerably above the national average, the emergence of foreign competitors in commodity markets, potential competition for limited water resources between agricultural producers and urban residents, and a limited land base suitable for agricultural production. There is little doubt during the next decade that the absolute value of cash receipts from farm marketings will increase. However, with the State's rapid population growth and emphasis by the State on economic development (e.g., specifically nonagricultural development) to employ these residents, the relative value of agricultural cash receipts in the total State economy may decline.

The magnitude, growth and importance of Florida's diversified agriculture is not automatic. If economic development within the State is geared toward nonagricultural industries, the relative importance of agriculture to Florida's economy will decline. In order for Florida agriculture to remain competitive in both domestic and world markets, it will require a conscientious effort by state policy makers to maintain the current comparative advantage of Florida agricultural producers. This may be most easily accomplished by eliminating or not enacting regulations or administrative rules detrimental to agriculture, encouraging technological advances that increase farm productivity, providing for orderly growth that does not "crowd out" agriculture, and equitably allocating the state's limited land and water resources. Further, the technological base must be adequate to counter the continuing invasions of
pests and diseases and to maintain the compatibility of Florida agriculture with its growing urban population and fragile natural resources base.

With careful planning and consideration by state policy makers agriculture can continue to play an important role in Florida's economy. Historical evidence indicates that Florida agricultural producers have adapted successfully to changing technological, market, and resource constraints when given the opportunity to compete on an equal basis. However, the producers' ability to adapt to these changes is largely dependent upon federal and state economic policy. Federal and state economic policies that encourage technological advances, maintain producers comparative advantage, and allocate resources equitably will contribute to the viability and importance of agriculture to Florida's economy.
APPENDIX C*

IFAS ORGANIZATIONAL
AND
ADMINISTRATIVE STRUCTURE

* Prepared by the IAFS Coordinating Committee for the Board of Regents
Review of the Food and Agriculture and Renewable Resources Programs.

Relationship to State Legislature

IFAS is administered under the Board of Regents and the University of Florida according to the Rules of the Department of Education, Division of Universities, University of Florida, Section 6CI-1.01(5) These rules state:
The Institute of Food and Agricultural Sciences (IFAS) is administered by the Vice President for Agricultural Affairs, as a separate budgetary unit within the University of Florida, receiving its appropriated funds from the Florida Legislature through the Board of Regents and the President. Its three functions are resident instruction, research, and extension, each function having a Dean who has general supervisory responsibilities with respect to that function. The Dean for Resident Instruction is responsible to the President, through the Vice President for Agricultural Affairs and,
in academic matters relative to resident instruction and academic personnel, through both the Vice President for Agricultural Affairs and the Vice President for Academic Affairs. Resident instruction is executed through the College of Agriculture, the School of Forest Resources and Conservation, and the College of Veterinary Medicine, the latter of which is jointly administered with the Health Center. Generally, in the College of Veterinary Medicine, the professional veterinary medicine degree is coordinated through the Health Center; the graduate degree programs and related research in Veterinary Medicine are jointly coordinated through the College of Agriculture, and the Agricultural Experiment Station in IFAS and through the Health Center; and the research and extension programs involving food and agricultural related animals including horses and aquaculture, are respectively coordinated through the Agricultural Experiment Station and the Cooperative Extension Service, IFAS. IFAS research is executed through a network of seven regional research and education centers, fourteen agricultural research and education centers, one statewide equine center and one statewide laboratory. These units are located throughout the State of Florida as a part of the Agricultural Experiment Station. IFAS Extension is executed through the Florida Cooperative Extension Service, a program of non-resident educational programs in all 67 counties of Florida in cooperation with various Boards of County Commissioners and the United States Department of Agriculture. Programmatic support of the County Extension program is provided by Extension faculty in IFAS departments, multi-disciplinary centers and pro-
grams, and agricultural research and/or education centers. The Vice President for Agricultural Affairs serves as Director of the Florida Agricultural Experiment Station and The Director of the Florida Cooperative Extension Service.

The Florida Sea Grant program, created in 1966 by Public law 89-688, is a bi-institutional (Florida State University and University of Florida) effort that was initiated in Florida in 1972. Administratively, the Florida Sea Grant functions as a center within the State University System of Florida. The Center has a system-wide responsibility; however, the director of the Sea Grant program is located at the University of Florida and reports to the Vice President for Academic Affairs and consults with the Vice President for Agricultural Affairs (IFAS) at the University of Florida. Oversight of research and education (extension) is maintained in the directors office, whereas day-to-day management of extension is supported through a grant to the Florida Cooperative Extension Service.

Internal Administrative Structure of IFAS

The Vice President for Agricultural Affairs, chief administrative officer of the Institute of Food and Agricultural Sciences (Director of Florida Agricultural Experiment Station and Florida Cooperative Extension Service), is responsible to the President of the University of Florida. A dean is assigned the responsibility of coordinating the total statewide effort in each of the functional areas of resident instruction, research, and extension. These three administrators are designated as Dean for Resident Instruction (Dean,
College of Agriculture), Dean for Research (Associate Director, Florida Agricultural Experiment Station), and Dean for Extension (Associate Director, Florida Cooperative Extension Service).

Although the Institute of Food and Agricultural Sciences is organized on a functional basis within the academic structure of the University of Florida, the College of Agriculture is the degree granting unit for the University's agriculture and forestry programs. The School of Forest Resources and Conservation is the unit through which the University of Florida conducts its degree programs in forestry and related fields; the Florida Cooperative Extension Service is the administrative entity through which the University of Florida cooperates with the federal and local governments in the administration of both the agriculture, home economics, natural resources, 4-H, community resource development, and marine advisory programs statewide; and the Florida Agricultural Experiment Station is the administrative entity through which the University of Florida cooperates with the federal government in operation of the agricultural research program.

The colleges, schools, and departments of the Institute of Food and Agricultural Sciences include:

College of Veterinary Medicine contains the departments of Comparative and Experimental Pathology, Comparative Ophthalmology, Medical Sciences, Physiological Sciences, Infectious Diseases, Preventive Medicine, Veterinary Radiology, Reproduction, Special Clinical Sciences, and Surgical Sciences.

School of Forest Resources and Conservation contains the Departments of Forestry, Fisheries and Aquaculture, and Wildlife and Range Science; Departments include Agricultural and Extension Education, Agricultural
Engineering, Agronomy, Animal Science, Dairy Science, Editorial, Entomology and Nematology, Food Science and Human Nutrition, Food and Resource Economics, 4-H and Other Youth Programs, Fruit Crops, Home Economics, Microbiology and Cell Science, Ornamental Horticulture, Plant Pathology, Poultry Science, Soil Science, and Vegetable Crops. Each college dean, school director, or department chairman administers and coordinates the statewide program of resident instruction, research, and/or extension in his/her particular unit's commodity or discipline program area.

The Institute of Food and Agricultural Sciences contains the following interdisciplinary and/or multidisciplinary centers and programs:

- The Center for Tropical Agriculture, a part of the Office of International Programs is headed by a director who coordinates research and education programs concerned with tropical international agriculture of interest to Florida.

- The Center for Biomass Energy Systems is headed by a director who provides statewide coordination of research and education programs concerned with the development and application of biomass as an alternate fuel source.

- The Center for Natural Resources is headed by a director who provides statewide coordination for research and education programs concerned with solving environmental and natural resources problems related to agriculture throughout Florida.
The Sea Grant Extension Program is headed by a coordinator who provides statewide coordination for extension programs concerned with marine resources and products.

The Center for Cooperative Agricultural Programs is headed by a director who is located at Florida A&M University and provides statewide coordination of agricultural research and extension cooperative program efforts between the Institute of Food and Agricultural Sciences and Florida A&M University.

The Center for Aquatic Plant Research is headed by a director who provides statewide coordination for research and education programs concerned with solving aquatic weed problems.

The Center for Environmental Toxicology is headed by a director who develops programs in research, instruction, and extension to meet the immediate and long-term needs of Florida and its citizenry, and serves as a resource for state regulatory agencies concerned with protection of the environment and human and animal health.

The Regional Research and Education Centers, the Agricultural Research and Education Centers, the Horse Research and Education Center and a statewide Medical Entomology Laboratory are located in major agricultural, horse and/or forestry production areas of the state. Each center is headed by a director who is generally concerned with agricultural, horse and/or forestry problems of the area of the state in which it is located.
The statewide Medical Entomology laboratory is headed by a director who is concerned with mosquito control research.

The Office of International Programs is headed by a director who is responsible for administration, coordination, and development of all international activities of the Institute of Food and Agricultural Sciences.

The Office of Planning and Business Affairs is headed by a director who provides administrative, business, management, and budgetary support for all units of the Institute of Food and Agricultural Sciences and performs a liaison and coordinating function with the University of Florida Office of Administrative Affairs.

The Office of Sponsored Programs and Development -- SHARE (Special Help for Agricultural Research and Education) is headed by a director who coordinates the agricultural development program efforts for the Institute of Food and Agricultural Sciences' Sponsored Programs. The director is concerned with the administration, coordination, and development of the SHARE program which is aimed at enlisting private support for programs of the Institute of Food and Agricultural Sciences.

The Office of IFAS Sponsored Programs and Development Grants is headed by a director who provides administrative support for all units of the Institute of Food and Agricultural Sciences in the enlistment of grants, contracts and agreement enlistments.
The Office of Personnel Affairs is headed by a director who provides administrative support for all units of the Institute of Food and Agricultural Sciences in the area of personnel recruiting, interviewing, appointments, orientation, training, evaluation, tenure, promotion, termination, and affirmative action and performs a liaison and coordinating function with the Personnel Relations Division and the Office of Academic Affairs, University of Florida.

The Office of Conferences and Institutes is headed by a director who provides support services for IFAS special events and coordinates services for workshops, conferences, short courses, and institutes sponsored by IFAS units and cooperators.

The Office of Facilities Operations is headed by a director who is concerned with the construction, renovation, repair and maintenance of all Institute of Food and Agricultural Sciences buildings, facilities, and equipment located on the campus of the University of Florida and throughout the State. The director is also responsible for providing recommendations to the Vice President for Agricultural Affairs on land use, space, facilities, fixed equipment, safety, security, land transactions, easements, rights-of-way, and other such matters as they affect the Institute of Food and Agricultural Sciences.
A Cooperative Extension office is operated in each of the 67 counties of Florida. Under the direction of a county extension director, each office extends the programs of the Institute of Food and Agricultural Sciences to local people. These include programs in agriculture, home economics, 4-H, and community resource development. Sea Grant Extension programs are also provided in the coastal counties of the State.

Relationship With Specific Units in University of Florida

The following are units in which IFAS provides funding for personnel and/or support. These are not the only units on the campus with which IFAS faculty are cooperating (e.g., Environmental Engineering Department, Florida State Museum, Zoology, Law, Biochemistry, etc.), but they are units that receive an annual allocation to cooperate in IFAS projects. Other cooperative efforts are supported primarily through extramural funds.

Botany Department—Although Administered primarily by the College of Liberal Arts and Science (CLAS), the Botany Department maintains close ties with IFAS in teaching, research, and extension. Many of the fundamental courses taught in the Department of Botany are required courses for many of the graduate and undergraduate students in IFAS. These include basic courses in biochemistry, morphology, anatomy, systematics, and ecology. The department provides comprehensive coverage of all plant and fungal groups.

The Botany faculty also maintains an active role in IFAS research programs. Major projects include biomass potential of aquatic macrophytes, cellular and molecular genetics for crop production, cell culture in
napiergrass improvement, chromatin structure and gene expression in maize, and
ecology and systematics of mycorrhizae in Florida. To support this research IFAS provides four career service positions, three postdoctorates, and one research scientist.

**Herbarium**--The Herbarium is administered primarily by the College of Liberal Arts and Sciences and is a part of the Florida State Museum. The Herbarium is responsible for plant identifications, as well as scientific research in basic plant taxonomy.

The Herbarium identifies all plant materials submitted by faculty members in IFAS, other faculty on campus and in the state, and the general public. The Plant Identification Service identifies an average of 3,500 plant specimens each year. It also provides information on toxic and poisonous plants, medicinal uses of plants, as well as scientific information.

The Herbarium handles all loans and exchanges of plant material for IFAS faculty and graduate students in the Departments of Ornamental Horticulture, Agronomy, Forestry, etc.

**Main and Hume Library**--The primary responsibility of the Main and Hume Library is to support the resident instruction, research, and extension programs in the Institute of Food and Agricultural Sciences. Additionally, they service other University of Florida faculty, students, staff, citizens of Florida, and the scholarly community at large as they are able. They provide intellectual and physical access to all forms of retrievable knowledge and participate in cooperative efforts on campus and in local, state, and national information programs for the intellectual benefit of their users.
A new Central Science Library (CSL) will open during the summer of 1986 at which time Hume Library will transfer its holdings to CSL and under the supervision of the Associate Director for Public Services in the Main Library, Director of the University of Florida Libraries, and Dean for Resident Instruction in IFAS. The annual budgetary IFAS allocation to Hume Library will be transferred to the Central Library effective July 1, 1986.

Statistics Department--The Department of Statistics is administered primarily by The College of Liberal Arts and Sciences, but is a service and research unit that interacts with all areas of IFAS research and extension. This unit is primarily responsible for helping with the design of research studies, analyzing research data, interpreting results of data analyses and providing expertise in statistical computing to expedite data analysis. Over the years, this unit has developed the skills required to solve problems associated with agricultural research. These include skills in designing field trials, sampling both people and the environment, modeling biological systems, modeling certain aspects of food production, and developing data management and analysis software systems.

College of Veterinary Medicine--The College of Veterinary Medicine (CVM) is a unique academic unit at the University of Florida. Through the Vice President for Health Affairs (HSC), the Dean for Veterinary Medicine has programmatic and budgetary responsibilities on all matters relating to the professional degree (DVM) program, the Veterinary Medical Teaching Hospital, and the health/biomedical-related research program. Support from the Vice President for Agricultural Affairs (IFAS) includes resources for large animal
disease research, undergraduate (baccaluareate) instruction and veterinary extension. Although these programmatic missions are distinct, HSC and IFAS resources are usually combined in the College and department for maximum effectiveness and optimum results.

Administrative responsibilities of the CVM Office of the Dean are divided into academic affairs, research and graduate studies, student services, instruction, public services, and clinical services. The Assistant Deans for research and graduate studies and instruction-extension have IFAS-related program responsibilities. The 25 IFAS-CVM faculty are assigned programmatically to the Department of Infectious Diseases, Preventive Medicine, Medical Sciences, Special Clinical Sciences, Physiological Sciences, and Comparative and Experimental Pathology. Their academic expertise and interest include microbiology, public health, epidemiology, parasitology, pathology, aquatic medicine, physiology, toxicology, clinical large animal medicine and herd health, and veterinary extension.

The College's large animal disease research efforts are concentrated in beef and dairy cattle, swine, poultry, and horses. The College also provides herd health services for IFAS food animals and horses.

Both CVM-HSC faculty participate and provide courses for IFAS graduate students in physiology, parasitology and toxicology and undergraduate students in anatomy-physiology, animal health, and preventive medicine.

The College's Extension Program, supported by IFAS, includes three FTE faculty with missions related to beef cattle, dairy cattle, horses, 4H, and swine. Other Veterinary service program areas are covered by CVM-HSC faculty.

The State University System (SUS) Veterinary Medicine Program will be reviewed later this fiscal year; thus, no portion of the program will be
considered during the food and agriculture program review. Because the
College of Veterinary Medicine is administered through HSC and IFAS, the
review will be conducted jointly with research, teaching and extension pro-
grams supported and administered through IFAS being reviewed at that time.

**Relationship With Other State Universities**

The following are universities within the State University System (SUS) with which IFAS has formal working relationships.

**Florida A&M University**—The Center for Cooperative Agricultural Programs (CCAP) was established by an agreement between Florida A&M University (FAMU) and the University of Florida (UF) effective January 20, 1982. Since that time, an effort has been made to focus the activities of the center such that it's mission and purpose would be achieved.

The mission of CCAP is to facilitate cooperation, coordination, and Joint planning of research and extension programs between Florida A&M University and IFAS-University of Florida with emphasis on research and extension of value to small farmers. Research and extension programs and projects related to swine production, horticulture, vegetable production, and marketing are emphasized.

The purpose of research and extension coordinated by CCAP, regardless of whether it is related to small farm or general Florida agriculture, is to improve existing or develop new technology that will reduce production costs of farmers; to develop and demonstrate soil and crop management practices for cost efficient production of vegetables; to develop and demonstrate management practices for cost efficient production of animals; to evaluate and demonstrate production of specialty crops; to evaluate alternative marketing
systems; and to improve the quality of life of people residing in rural areas of Florida.

Through CCAP, the roles and responsibilities of the Florida A&M Extension program specialists and field staff may be integrated into the existing organizational structure of the Florida Cooperative Extension Service. The following linkages encourage a unified and coordinated statewide Extension Program and a more efficient use of limited financial resources of both institutions:

1. 1890 and 1862 extension professionals and paraprofessionals located in target counties function as a team in program planning, implementation, and evaluation of county extension programs. County Advisory Committees composed of local citizens serve a significant role in developing complementary extension programs.

2. The Administrator of the Cooperative Extension Program at Florida A&M University provides leadership in program planning responsibilities of 1890 professionals at the county level through coordination with 1862 District Extension Directors. The administrator also coordinates with 1862 District Extension Directors in-service training programs conducted out-of-county where additional financial resources are requested.

3. 1890 and 1862 Extension program specialists are programmatically and organizationally linked by subject-matter areas to enhance coordination, program development, and staff development training to support county, district, and State Extension programs.
4. Resource personnel at Florida A&M University, University of Florida, and other state and federal agencies are utilized as necessary to provide support and advisement in planning and implementing Extension programs.

5. The 1890 specialists participate in state staff conferences, orientations, and other in-service programs conducted by program specialists from either institution. The 1890 Specialists serve on committees when beneficial to both institutions.

6. The 1862 specialists and support staff participate in conferences, on committees, and in-service training programs conducted by the Cooperative Extension Program at Florida A&M University.

7. The Administrator of the 1890 Cooperative Extension Program serves on the administrative/supervisory staff of the Florida Cooperative Extension Service and participates in policy formulation and evaluation to insure that a coordinated and complementary Extension Program is achieved in Florida.

Florida Atlantic University and Florida International University--The Ornamental Horticulture and Turf Education Program for Southeast Florida is designed to provide the educational needs of students with degree objectives and nondegree oriented commercial growers and others in the ornamental horticulture and turf industry. The program is centered at the Ft. Lauderdale Research and Education Center with two faculty members located at that Center. Faculty members in biological sciences at both Florida Atlantic University and
Florida International University participated in developing the implementation plan.

The resident instruction program utilizes facilities and services available at Florida Atlantic University, Florida International University and Broward Community College. A classroom building is operated jointly by the three institutions on the Broward Community College campus which is adjacent to the Ft. Lauderdale Research and Education Center. This building is used for lectures and laboratory classes appropriate for the facility. Florida International University has three courses which are part of the program. These are in Plant Physiology, Plant Pathology, and Entomology. In addition, appropriate elective courses may be taken from either Florida Atlantic University or Florida International University. The Ornamental Horticulture courses and a Soils course are UF courses taught at the Center utilizing IFAS and jointly operated facilities. The extension education program utilizes the Research and Education Center facilities, various county extension facilities, and others as needed to carry out the program.

Florida State University and the University of South Florida—Florida Law, Chapter 84-338, Sections 72-75 is a legislative mandate to Florida State University, the University of South Florida and the University of Florida to coordinate and increase their research to forestall further deterioration of the environment and fresh water supply of Florida by chemicals, and to address problems already created by chemical pollution of the environment. This law established the Toxicological Research Coordinating Committee (composed of representatives from the environmental toxicology centers of the three respective universities) to ensure coordination of effort and an orderly compilation
of data relevant to chemical contamination of the environment and research being conducted on that problem.

The programs at the three universities provide a basis for the correction of existing problems and the prevention of future problems of environmental contamination by toxic chemicals in Florida. They will serve as sources of authoritative information on those matters for state regulatory agencies, the state legislature, the Pesticide Review Council and the citizens of Florida. Furthermore, they will provide training and education for scientists to work in this important field of environmental science.

University of Central Florida and University of South Florida--In order for the IFAS Center for Aquatic Weeds to fulfill its Legislative mandate to coordinate aquatic plant research within the State of Florida it must:

1. Participate on the interagency Florida Aquatic Plant Advisory Council with representatives from the other members of the State University System (SUS) and other concerned agencies. The Center Director holds a permanent seat on the Council along with representatives of the other SUS universities which serve on a two year rotating basis. To date, both the Universities of Central Florida and South Florida have served on the Council;

2. Sponsor an annual aquatic plant research review meeting. Prior to 1984, the meeting was held in conjunction with the Florida Aquatic Plant Management Society meeting, however the meeting is now held at each of the interested universities on a rotating basis, and

3. Participate in cooperative research projects with other SUS scientists having similar interests. A cooperative research agreement between IFAS and the USDA Agricultural Research Service enabled an
electrophoretic taxonomic survey of aquatic plant species to be conducted in Tampa in cooperation with University of South Florida aquatic plant scientists.

Florida State University--The home economics program in Florida's State University System (SUS) was reviewed during 1984. Based upon this review, several actions are now in progress toward implementation.

Florida State University is charged with examining off-campus graduate education needs for the immediate future in cooperation with the Home Economics Department in IFAS at the University of Florida, the University of West Florida, and the Florida International University. At the present time, the only comprehensive doctoral program in home economics is located at Florida State University. The Home Economics Department in IFAS is building towards a Masters degree program.

The College of Home Economics at Florida State University and the Department of Home Economics in IFAS at the University of Florida are exploring areas in which they can cooperate in order to strengthen home economics related services, research, and teaching in Florida. Specifically the unit administrators at each university are looking for cooperative research and teaching opportunities which will help meet the needs for graduate education of home economics county extension faculty and secondary school teachers.

Relationship with State Agencies

Florida Department of Citrus (DOC)--DOC generates funds through producer fees on citrus fruit moving through the market. DOC is governed by a
commission of appointed growers, handlers and processors. A small portion of the budget is allocated to DOC staff for market and packing and processing research. Special allocations have been made to IFAS for mechanical harvesting, but they are currently not active. Almost all of the research on handling and processing is conducted by DOC staff located at the Citrus Research and Education Center at Lake Alfred. The staff (15) hold adjunct appointments in IFAS and work with IFAS faculty, often sharing facilities and equipment. A contract arrangement for facilities, utilities, and operational expenses exists between IFAS and DOC. DOC staff have the responsibility to respond to immediate short term citrus industry handling and processing needs.

Marketing research has been closely coordinated with the IFAS Department of Food and Resource Economics (FRED), DOC staff (3) are housed in FRED, and work closely with IFAS faculty on projects which directly support DOC.

Other State Agencies--IFAS maintains cooperative working relationships with many State of Florida Agencies. The primary agencies are the Florida Department of Agriculture and Consumer Services (FDACS), The Department of Environmental Regulation (DER), Water Management Districts, The Florida Game and Freshwater Fish Commission (FGFWFC), and the Department of Natural Resources (DNR).

FDACS cooperates with IFAS on a broad front and administers pass through funds from state, federal and grower groups. In addition, special agreements exist on agricultural marketing and pest control. Department staff may hold adjunct appointments in IFAS where appropriate. The Division of Plant Industry (DPI), primarily a regulatory agency, has a major facility contiguous to the campus with a quarantine facility which is available to IFAS faculty for projects of mutual interest. A major insect collection also is housed and
staffed by DPI. IFAS faculty use this facility for research and graduate student instruction. The facility also houses a nematode collection. Major plant disease problems also are handled by this agency. DPI and IFAS work cooperative, for example, on the control and eradication of plant diseases and pests, such as citrus canker.

The FDACS has worked with IFAS and the USDA in a major cooperative program to accelerate the soil survey of Florida. This program is nearing completion and represents a major cooperative effort with funding provided through DACS to IFAS to provide major scientific and laboratory support.

DER and IFAS have specific agreements to address major environmental contamination and specific pesticide contamination problems. DER provides funding for the Environmental Toxicology Center as well as funding for special analytical and research services. Program areas include surface non-point source pollution problems, drainage and irrigation effects on organic soils, recycling of sewage effluent and sludge in agricultural and forest systems, and impacts of agricultural pest management on groundwater quality.

The Florida Water Management Districts, have worked closely with IFAS faculty in establishing water requirements for plant growth and cold protection. Many of these projects have been funded by Water Management Districts (total of five) depending on interest and need. An excellent working relationship exists between IFAS and the Water Management Districts.

FGFWFC works with the IFAS School of Forest Resources and Conservation and the US Department of Interior on cooperative wildlife and fishery programs. These units provide significant faculty and financial support to projects of common interest. A non-game wildlife agreement is being developed. The Commission also cooperates with IFAS on specific projects through memorandums of agreement which include funding.
DNR has agreements with IFAS for the Aquatic Weed program. This is a major effort which entails cooperation with USDA/ARS, USAID and local agencies. IFAS provides research and extension support for faculty in Gainesville and at the Ft. Lauderdale Research and Education Center. Funding is provided through DNR trust funds derived from fuel taxes. Staff from DNR have been housed in the Aquatic Weed Center. Agreements with DNR for aquatic weed control focus on non-chemical procedures using fish, insects, disease, and water management.

Relationship With Federal Agencies

The following are federal agencies with whom IFAS has formed longtime working relationships.

Cooperative State Research Service (CSRS)--IFAS is the Florida participant in the national network of agencies and scientists that supply research information for the food and agricultural and forest industries of the United States. IFAS, like similar agencies of other states, receives federal formula funds to support research. IFAS ranks 28th in receipt of federal formula funds (Hatch) when compared with all Agricultural Experiment Stations and 14th when compared with its counterparts in the southern region. Scientists from IFAS and other states cooperate to conduct research on problems of regional and national concern. Information and data are exchanged on an almost daily basis. CSRS is the federal office responsible for allocating federal formula funds to IFAS and other states. It also supervises fund usage and must approve in advance all research projects supported with federal funds. CSRS helps states coordinate regional research projects so that common goals are met with minimum duplication. CSRS operates the Current Research Information
Service (CRIS) a computerized data base through which a scientist within the system can keep up to date on research in progress by anyone within the system. Also, CSRS represents the states in dealing with the USDA or other federal agencies concerning agricultural research. CSRS is a focal point in the coordination of agricultural research within the U.S. and in effect, serves to represent the interests of the states.

Cooperative Extension Service--In 1914, legislation was passed by the U.S. Congress which stated in part:

In order to aid in diffusing among the people of the United States useful and practical information on subjects relating to agriculture ... and home economics ... and to encourage the application of the same, there may be continued or inaugurated in connection with the college, agricultural extension work which shall be carried on in cooperation with the United States Department of Agriculture.

This legislation became known as the Smith-Lever Act and forms the basis for Cooperative Extension efforts. Following the passage of this legislation, the federal government developed a Memorandum of Understanding with each individual state outlining how each "partner" would support extension work. The University of Florida accepted the provisions of the Smith-Lever Act on May 25, 1915.

Federal funding for support of Extension programs was initially based on a formula which took into account the size of the rural/farm population. That formula has remained relatively unchanged over the years. As a consequence of Florida's small rural population relative to total population, Florida has
always ranked near the bottom of the states in terms of the amount of Smith-Lever formula funds it receives from the federal government.

In handling these funds, letters of credit are sent directly from the USDA to IFAS, but spending authority is directly controlled by the Florida Legislature. All federal formula funds are reappropriated by the Florida Legislature as an integral part of the IFAS state appropriation. Therefore, federal funds spent in support of Extension programs are actually an integral part of the State's annual appropriation to IFAS.

In addition, Florida Cooperative Extension Service (FCES) provides the federal partner with an annual plan of work that indicates in considerable detail the programs and projects it plans to undertake during the year. An annual report submitted each year indicates progress made toward reaching educational goals. Information contained in this report is frequently used by the USDA in support of its budget request to the Federal Congress.

The FCES has been the frequent recipient of federal audits in terms of Title VI (Extension Program Delivery) and Title VII (Employment Procedures). Reports of these audits indicate that with only minor exceptions, the FCES is in excellent compliance with Affirmative Action requirements and Equal Employment Opportunity (EEO) requirements.

Agency for International Development (AID)--Florida agriculture is international in all respects, so participation in international research and education directly benefits the State. Long-term associations between faculty and international students provide an extended research base to help agriculture in Florida as well as in the student's country. Improved agricultural production and development in middle and low income countries (from where many students come), augment the demand for Florida's agricultural products.
A broad-based international research orientation, be it based in biotechnology or other important fundamental research activities, demands adaptive research, sustained funding and careful germ plasm retention. Recognition that commodity research must be placed in a hierarchy of research and education programs including cropping systems (crop combinations), farming systems (socio-biological independencies) and agricultural systems (intra and inter sectorial influences) is emerging.

The Agency for International Development (AID) has several modes for university involvement and the IFAS Office of International Programs has activities under most of these. They include the following:

1. Contracts - The contract selection process for individual projects assures equitable treatment and understanding on the part of all parties.

2. Memorandum of Understanding (MOU) - A memorandum commits AID and individual universities to dependable, long term relationships. Joint MOU's formalize cooperative relationships between AID and combinations of 1890 and 1862 land grant institutions.

3. Joint Careers Corps - Provides for assignments of university faculty to AID missions, alternating with periods at their home campuses.

4. Technical Support to Mission - These programs provide university expertise for developing and evaluating country projects.

5. Joint Enterprise - This method of contracting provides for including smaller institutions in project implementation.

Although contractual relationships are established between universities and AID, it is important to understand the role of an intermediary body called The Board for International Food and Agricultural Development (BIFAD). BIFAD has been responsible for expanding the role of U.S. Agricultural Colleges and
Universities in helping countries solve critical food problems. BIFAD helps mobilize university resources in support of four priorities emphasized by the AID Administrator: 1) the private sector, 2) research and technology transfer, 3) policy reforms, and 4) institutional development.

Today, the principal emphasis of BIFAD is on institutional development projects. A major share of staff resources is devoted to identifying the most qualified individuals and University contractors to meet AID project needs. AID decides on the selection of contractors, and BIFAD helps increase, broaden, and improve the participation of U.S. universities.

The University of Florida is among the leading university contractors in the nation. The majority of the contracts is managed in IFAS by the Office of International Programs. The face value of contracts in fiscal 1984 was approximately $40 million, ranking the University of Florida 12th in the nation. The volume of business under these contracts for 1982-1984 is shown in Table 1. The volume of activity increased significantly in 1985.

The University, through the Center for Tropical Agriculture and the Office of International Programs, is one of five land grant institutions that has a Memorandum of Understanding with AID. It provides $300,000 annually to help faculty participate in foreign assistance programs. Essentially all of the overseas contracts in IFAS are classified as projects on institutional development or research and technology transfer or both. Policy reforms are usually associated with both endeavors.

United States Department of Agriculture (USDA)--USDA maintains agreements with IFAS for several agencies of the Department. The primary agency is the Agricultural Research Service (ARS) which has staff located in IFAS departments on campus (Agronomy, Agricultural Engineering, Plant Pathology), in one
of two ARS laboratories contiguous to the campus (Insect Affecting Man and Animal and Attractants Laboratory), and at off campus centers at Lake Alfred, Ft. Lauderdale and Belle Glade. ARS scientific staff are eligible for adjunct faculty appointments and may participate in academic programs. The largest ARS research program is in the Department of Entomology and Nematology. Support for these programs are provided through various types of cooperative agreements. These agreements have been mutually beneficial to programs in entomology, nematology, plant physiology, agricultural engineering, mechanical harvesting, aquatic weeds, plant and animal breeding, plant stress, agricultural meteorology, and biotechnology.

Relationship with Counties

The following are county offices and programs with which IFAS works with in carrying out its statewide extension and teaching functions.

County Government--As mentioned earlier, funding support for Extension programs come from three primary sources: from the federal government through the USDA, from state government through the Legislature and from county government through the Boards of County Commissioners. Hence the name, "Cooperative" Extension Service.

In Florida, county governments participate significantly in funding extension programs. On the average, they contribute 40% of all extension faculty salaries, provide all secretarial salaries, travel funds, telephone service, office supplies and equipment, utilities, and the physical facilities in which the county extension faculty and staff are housed.

The basic state legislation that spells out the county's participation is FS 240.505. In essence it gives the county the option to set its own level of
funding for extension and also gives the county the authority to accept or reject county extension faculty who are recommended for employment within the county. From this brief explanation, it may be correctly concluded that the Extension Service in any given county stands or falls on its ability to deliver meaningful and relevant educational programs to its citizens.

Another unusual characteristic of County extension is its heavy reliance upon county advisory committees. These committees provide input into program direction by reflecting to county extension faculty the needs and desires of local citizens. A survey completed in November of 1985 indicated that there are over 5,000 citizens serving on extension advisory committees throughout the State of Florida.

The excellent level of funding support exhibited by county governments is further illustrated by the fact that there are some 30 county faculty who are paid 100 percent by county funds.

Relationship to Community Colleges

The twenty-eight community colleges in the State Community College System are supported by a combination of state funds, student fees, and property taxes from special tax districts created within the county or counties served by the community colleges. Each community college offers general interest courses for non-degree students, vocational courses leading to a number of two-year degrees, and a college parallel program leading to an Associate of Arts degree (AA). All community college students who plan to pursue a Bachelor's program at the University of Florida should complete the parallel program. Under the articulation agreement between the University of Florida and community colleges, any student who has earned an AA at a Florida community college with a grade point average of at least 2.0 is eligible to apply for
admission to the University of Florida. Students who have completed the pre-professional course requirements in a community college are admissible to the College of Agriculture, University of Florida. Approximately one-half of all graduates from the College of Agriculture complete the first two years of study at a Florida community college.