University of Florida
May 2008

Opportunities and Challenges for University of Florida in Providing Sustainable Land Use Science and Policy Research to County Governments:

A Survey of UF/IFAS Extension Faculty

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Cover photo:

University of Florida Professor John Cisar's research on the impacts of landscape plants on nitrogen leaching into groundwater is an example of the type of science that can address questions regarding the sustainability of land use practices in Florida. Photo courtesy of UF/IFAS Communication Services. Used with permission.

Executive Summary

Survey Results

- Responses were received from 37 directors and faculty in 67 counties (representing 55% of Florida's counties).
- Extension agents have been already become involved in matters of local policy related to sustainable land use, and have used research from a variety of disciplines:
  - 49% of respondents have been involved in a "complex or controversial land use issue" in their county
  - 59% of respondents have been asked about issues related to policy
  - 62% felt that information they provided affected land use decisions
- A large majority (81%) agreed that extension could be more proactive in working with county government on land use issues.
- Fields such as policy, land use planning, sustainability, and legal research came across as the key fields in which extension could devote additional efforts.
- Other areas respondents identified as useful for expanding efforts to inform county policymakers included economics, sociology, meteorology/climatology, hydrology, architecture/civil engineering, GIS/geography, and transportation.
- Respondents felt it "very important" to communicate legal implications (51%) and "somewhat important" to communicate uncertainty (51%) and controversy (68%).
- Respondents do not always communicate specific details and provide citations of research to county government, but summaries of issues are useful.
- A notable percent of respondents stated that they are "not comfortable" conveying the legal implications of a land use decision (36%), locating an expert at UF (32%), interpreting science on complex land use issues (27%) or with the protocol by which county commissioners are supposed to contact UF/IFAS Extension (8%).

Recommendations and Action Items:

(1) Develop partnerships with colleges, centers, institutes, and faculty that address emerging research and extension needs in land use and sustainability.

Action Item: Budget for new partnership with non-IFAS faculty and build new partnerships that do not require funding.

Action Item: Renew support to IFAS/Levin College of Law collaboration in land use law and policy.

Action Item: Strengthen partnership with the UF Water Institute

(2) Formalize the role of the current Sustainability Working Group and charge it with developing an action plan; further develop relationships between extension faculty and on-campus working groups such as People and Land Use Strategies (PLUS).

Action Item: Develop logic model for Growth Management and Land Use Policy Focus Team.

Action Item: Task Sustainability Working Action Group with development of logic model for sustainability and identify a cross-cutting approach that would integrate the work of the team across all goal teams and focus areas.

(3) Support participatory approaches to work with county governments on emerging issues in land use and sustainability and develop a two-way dialog about research and extension needs.

(4) Ensure extension faculty protocols for dealing with county governments are made explicit and that training is provided to faculty so that they can feel comfortable and confident when controversial issues arise with county governments.

(5) Develop opportunities for non-IFAS faculty to serve as Statewide Specialists in land use and sustainability extension. Continue and expand the program of university-wide internships in land use sustainability and in county extension offices.

Action Item: Continue to support extension internship program in land use and sustainability.

(6) Continue to develop in-service training programs in land use and sustainability.

(7) Extend training to county governments on land use and sustainability issues in Florida.

Action Item: Get land use experts involved in county government leadership training and develop training for county government on land use and sustainability issues through Florida Association of Counties leadership training.

(8) Develop a database or contact list for extension agents, build ties between UF experts and county extension agents, and ensure agents are trained on how to contact experts.

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Background

Sustainable development, or the concept of "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations, 1987), is emerging as a driving force behind decision-making in the twenty-first century. Stakeholders such as municipal planners, government officials, farmers, landowners, and professionals are searching for guidance on how environmental issues and regulations impact their cities, businesses, and lives (Schneider & Smallidge, 2000). Industries, governments, and citizens are integrating concepts of sustainability into their decision-making in hopes of increasing efficiency and conserving resources for future generations.

Concepts of sustainable development are being integrated into community designs and city planning for processes such as waste, energy, water, biodiversity, and local source agriculture. Sustainability is also emerging as an organizing framework for state and local decision-making.With this increased interest in sustainability comes an increased need for information in the area of sustainability and land use.

Land grant institutions play a special role in informing and contributing to sustainability initiatives by cultivating cutting edge information through research in the newly developing areas of sustainability and land use. Land grant universities are in a unique position to spread this knowledge to the community through extension (USDA 2008). Cooperative Extension is an educational partnership between the United States Department of Agriculture (USDA) and land grant universities and colleges nationwide (Broussard & Bliss 2007; USDA 2008). Ever since its inception in the early 1900s, Cooperative Extension has played a crucial role in educating the community on best practices and new developments in research and technology in agriculture and other disciplines (Schneider & Smallidge, 2000).

At the University of Florida (UF), the Institute of Food and Agricultural Sciences (IFAS), College of Agricultural and Life Sciences (CALS) and the Florida Agricultural Research and Education Center house UF/IFAS Extension. UF/IFAS Extension encompasses thousands of faculty members, scientists, educators, administrative staff, and volunteers who all work towards providing scientific knowledge and expertise to the public through educational programs and assistance (UF/IFAS Extension 2008).

Because of its unique position as the link between cutting edge institutional research and the community, along with its institutional goals, established history of outreach, and years of experience communicating science to land use stakeholders, UF/IFAS Extension is well positioned to meet the challenges posed by sustainability issues. However, the complex, interdisciplinary nature of sustainability will require extension to adopt new approaches and address new questions. With the proper communication lines in place, land grant institutions can provide the best available science regarding sustainability and land use through extension education.

Rationale for the Study

The purpose of the survey was to learn more about the current interactions between county governments and extension agents at UF/IFAS in order to evaluate whether extension's role in providing scientific information about land use and sustainability was meeting the needs of Florida's counties. In order to draw from the valuable experiences and insights of the University of Florida's network of IFAS extension faculty and directors, a survey was sent to the extension county directors across the state. County directors were chosen because they are the initial point of contact for county governments seeking more information,

therefore it was assumed that they would the most knowledgeable about the types of land use and sustainability issues, concerns, and questions that arise in counties around Florida.

The main themes addressed in the survey included:

- **Interactions with County Government.** This theme was designed to evaluate whether there was significant frequency of interaction to justify further development into extension-county communication efforts.
- **Communicating Science about Land Use**, This theme explored the preferences and effectiveness related to various communication formats and approaches.
- **Impacts on Land Use Policy**. This theme was chosen to help determine whether extension's communication efforts with county governments had impacts in issues affecting counties in Florida.

The goal of the survey was to inform the following broad questions:

- To what extent does IFAS extension interact with county government to address issues of local governance?
- What types of communication are useful to county government?
- What types of information are useful to county government?
- What are the future challenges, from the perspective of IFAS extension agents?
- How can IFAS extension and the UF Levin School of Law integrate legal studies and policy into extension, in order to better serve the needs of local county governments?

Methods

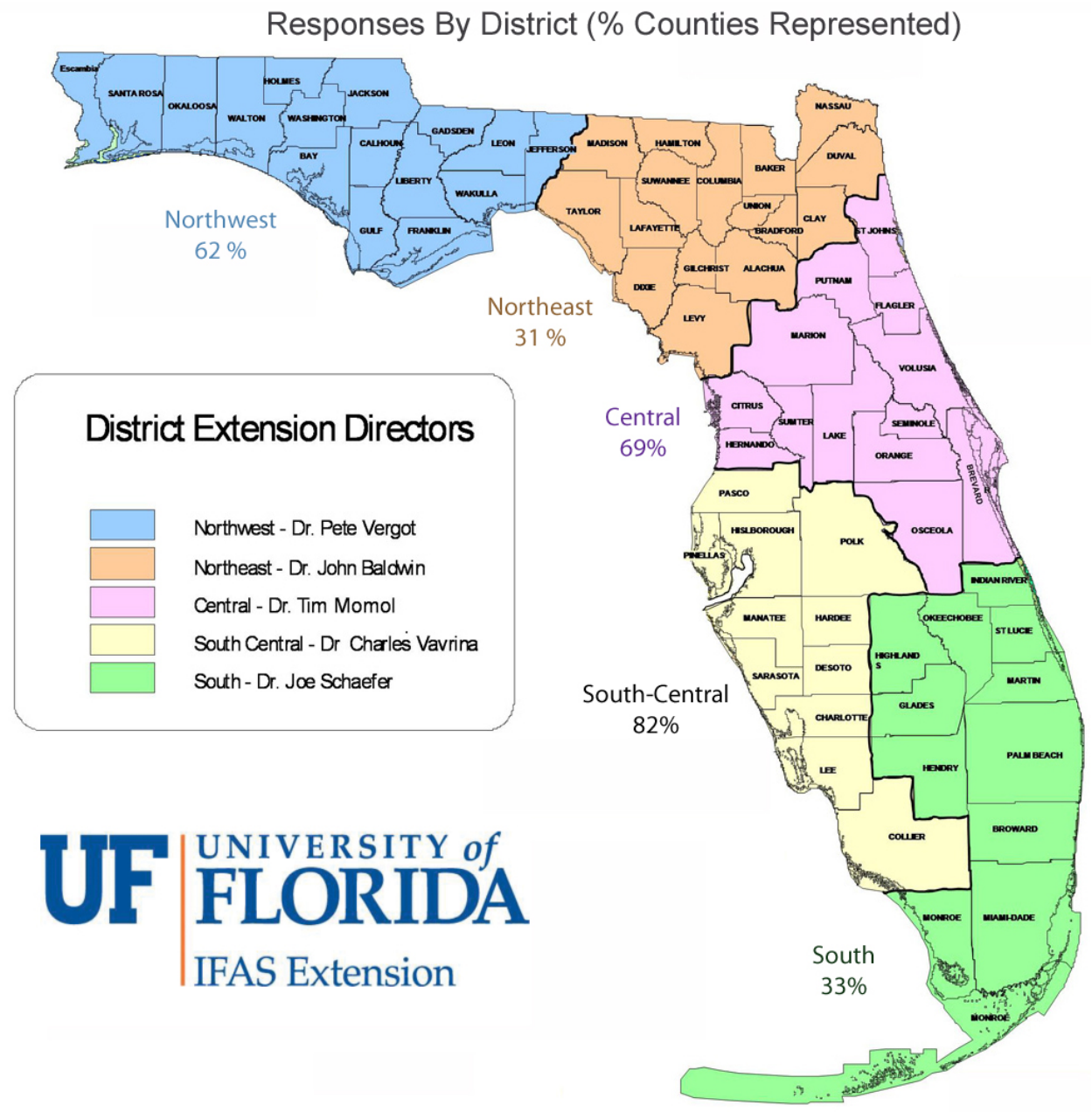
An initial questionnaire was sent to a small group of county directors and faculty, as a pilot study, to determine whether this group interacted at all with county governments, what types of interactions they had. Based on the results of the initial questionnaire, the survey was targeted towards county directors, but was designed to handle comments from other relevant, experienced UF/IFAS employees who could potentially provide feedback on the themes of the survey.

A survey consisting of 19 multiple choice and open-ended questions was administered online using Survey Monkey (www.surveymonkey.com), an online survey management site. An email containing a cover letter and a link to the online survey was sent to each of the five District Directors, with a request to email the survey on to county directors in their district. Two follow-up emails were sent after the initial response deadline in order to generate more responses.

Survey Results

Responses were received 27 county directors, 10 county faculty, and one district director representing a total of 37 of the 67 counties (55%). Some counties were represented by more than one respondent, while other respondents represented multiple counties.

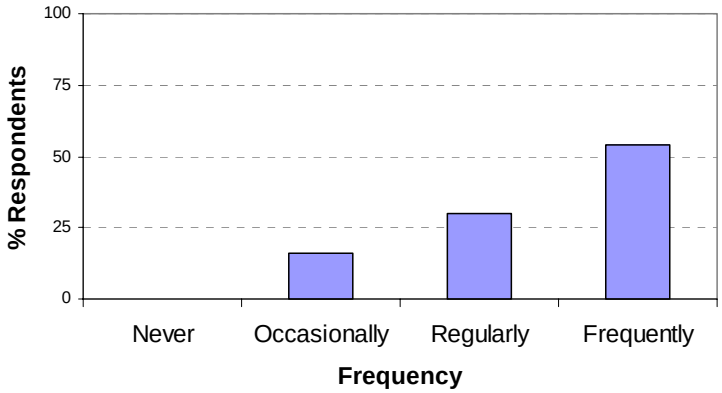
The representation of counties was broad and fairly even among the five extension districts, as shown in the figure below. The percentages shown represent the percent of counties represented by those who responded in the survey.



Interactions with County Government

One of the goals of the study was to learn more about the frequency of interaction between UF/IFAS extension offices and county policymakers. Respondents were asked an open-ended question about their frequency of interaction with county governments. Responses were coded into four categories: Never, Occasionally, Regularly, and Frequently. Respondents all had some degree of interaction with county governments (see the figure below). The frequency of interaction ranged from "*less than once a year*" to "*almost daily*." More than half of the respondents stated that they interacted with county government "*frequently*" or indicated interaction more than once a month. This suggests that in many of Florida's counties, extension is already playing an important role in providing information to county governments.

Frequency of Interaction with County Government



Category	Interpretation
Never	No interaction
Occasionally	Once yearly or less
Regularly	More than 2–3 times a year; Less than once a month
Frequently	More than once a month

A number of questions indicate that respondents have been already become involved in matters of local policy related to sustainable land use. When asked if they had been involved in a "complex or controversial land use issue" in their county, 49% responded "yes." 59% of respondents indicated that they have been asked about issues related to policy. When asked if they felt information or recommendations they have provided had affected land use decisions, 62% responded "yes."

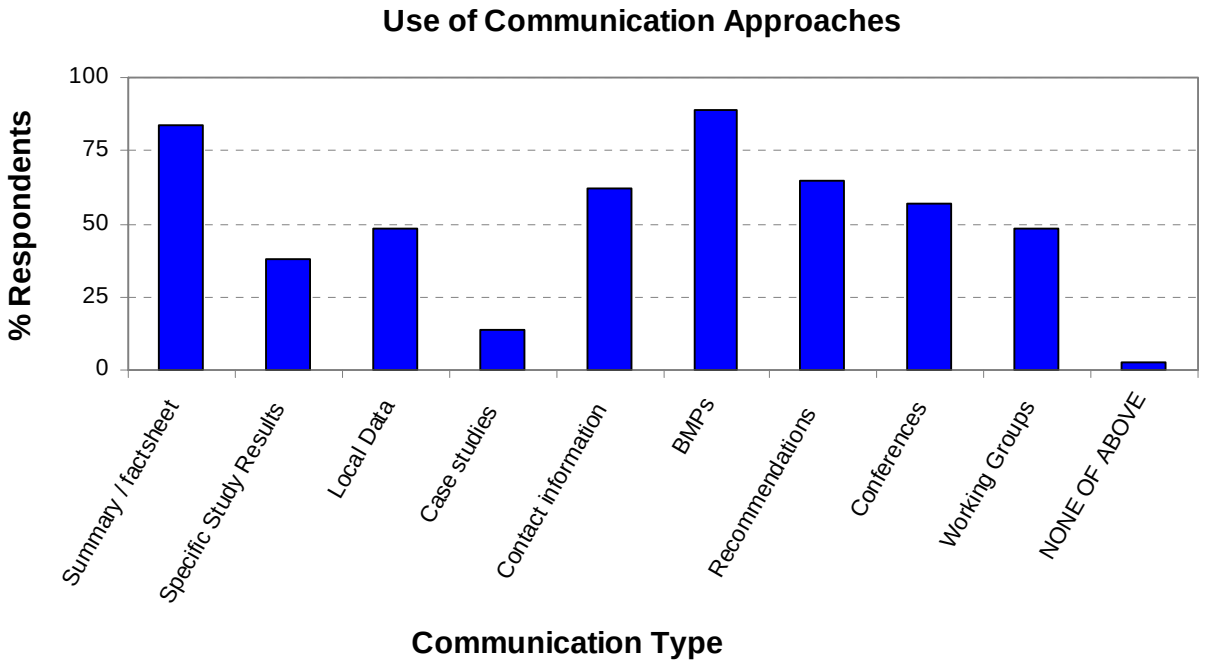
Survey responses seem to support the idea extension could expand into sustainable land use issues. A large majority of respondents (81%) agreed that extension could be more proactive in working with county government on complex land use issues.

When asked if they had attempted to formally evaluate the impacts that their work had on county government decisions, only 4 county directors responded "yes". This is likely to be due to the difficulty in developing an accurate assessment instrument. One respondent noted: "*Very difficult to do...would love to have an evaluation tool developed at the state level."*

The general impression was that information being provided had been used in county land use decisions (62%). As one county director pointed out: *"We continue to be asked for guidance and to participate in committees with other decision makers."*

Effectively Communicating Research

Extension representatives use a diversity of approaches to communicate with county government. The most common types of communication with county governments – used by over 75% of respondents – were summaries such as factsheets and best management practices. A variety of other approaches were used by about half of the respondents (see the figure below). These include both diffusion-style methods and participatory approaches such as providing contact information for experts, giving personal recommendations and presentations, attending conference, and participating in working groups.



Factsheets are a communication tool developed to gather relevant information about an issue into a user-friendly summary that a specific audience can understand and apply. At the University of Florida, professors and extension faculty can develop and publish factsheets through the Electronic Document Information System (EDIS), where they are accessible to audiences online at the Solutions For Your Life Website (http://solutionsforyourlife.ufl.edu/). This provides a concise overview of issues to interested parties, in a format that can be accessed on-demand. Summaries such as these were used by 84% of respondents. While they may not always be customized to the specific decision a county government is facing, they can increase awareness of an issue and guide a decision-maker on important points to consider. The results suggest that summaries of relevant facts on specific land use issues are valuable in supporting extension as it expands to deal with sustainability.

Best management practices (BMPs) are related to the general concept of "best practices." 89% of respondents indicated that they used this as a communication method with local county policy-makers. Best practices, as a general term, refers to any a set of guidelines developed for a technical domain, in order to promote effective processes. They have been applied to domains as diverse as information technology, engineering, product development, risk management, change control, defect tracking, evidence-based medicine, land use management, and watershed protection. BMP specifically refers to guidelines developed for

the latter domains – land use and watershed management – to advise agricultural producers on how to manage water, nutrients, and pesticides in a way that minimizes agriculture's impact on the state's natural resources. This suggests that conveying practical guidance to policy-makers may be a useful way to convey scientific information about sustainability and land use.

Other frequently used forms of communication include providing **contact information** (62%) for experts, giving **personal recommendations** (62%), participating in **conferences and presentations** (57%), and **working groups** (49%). This demonstrates the important role that extension agents play in transforming basic scientific research information into locally relevant evidence-based guidance for land use decisions. Interacting with county governments allows agents to interpret how basic research applies to specific situations and issues that arise. By acting as an initial contact point, they can direct counties to the best available expertise at the University of Florida. Their participation in conferences and working groups keeps them involved in dialogs about the latest governance issues and decisions that county governments are facing. Finally, they add value above and beyond the basic science by providing recommendations that are based on their overall experience and knowledge of the state of the science.

Providing **local monitoring data** was a widespread activity among respondents (49%). Local monitoring data can include lake watch programs, water quality monitoring, bird counts, plant diseases, and a variety of other cooperative efforts between scientists and local communities to collect regional data.

Less frequent methods of communication include **specific research study** results (38%) and **case studies** from the scientific literature (14%). It is likely that these are not formats which are readily translated into decision-making support for the issues and concerns of local county governments. Academic literature on science to policy communication suggests that the local, contingent nature of many complex land use decisions makes interpreting scientific research difficult and can sometimes lead to stakeholder disputes over how to interpret scientific research.

Respondents also mentioned that they held **bi-weekly meetings**, organized **summaries or workshops**, and **letters of information/recommendation** to other department heads and county commissioners. These interactive methods allow extension agents to provide the county with the latest scientific recommendations on particular issues that are being faced by that county. It is likely that the usefulness of these methods lies in their customizability.

Additional Methods of Communication: Respondent Comments
Bi-weekly meetings
Provide a summary, organize and hold workshops
Letters of information and/or recommendation to other department heads and county commissioners

Florida's Issues and Information Needs

Almost half of the respondents (49%) mentioned they had experience dealing with county governments on controversial, complex land use policy issues from a variety of disciplines. Issues they mentioned were condensed into categories and are shown in the table below.

# of Times Mentioned	Types of Issues	Specific Examples
7	Waste management issues	Fisheries waste, sludge, bio-solids, manure, municipal effluent spray fields
4	Water issues	Irrigation, permitting, consumptive uses, wetland buffers, defining flood hazards
4	Rural land stewardship	planning, and policy
3	Development & growth management	Smart growth, cluster development
3	Land clearing, tree ordinances	
3	Agriculture policy related definitions	Agricultural reserve issues, defining "farms" and "agricultural exemption"
3	Land Acquisition	Environmental lands, public recreation
2	Rezoning and comprehensive planning	
2	Fertilizer related issues	
2	Marine, waterfront, port issues	
2	Land use agreements	Community garden leases, Conservation easements
2	Mining Issues	Phosphate mining land reclamation, soil reclassification, mining on agricultural lands
1	Green building	
1	Streetscaping and landscaping regulations in public and private areas	
1	Equestrian grazing	
1	Inland port	

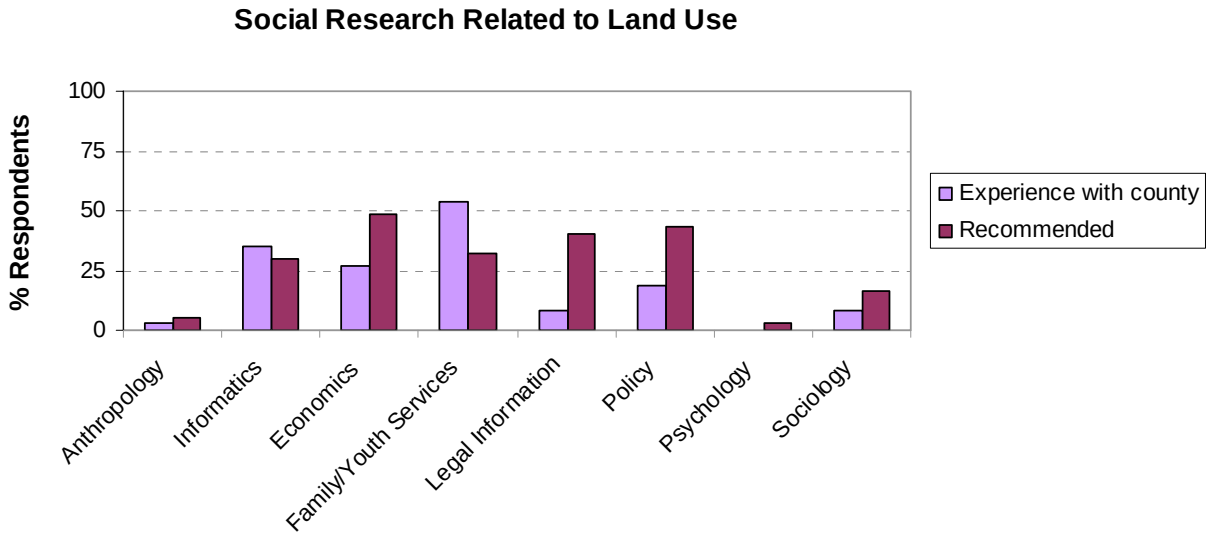
Waste management issues, water issues, and rural land stewardship issues are the most common complex land use and sustainability issues that respondents were involved with. Development and growth management issues, land clearing and tree ordinances, agricultural reserve issues, and being approached to assist with decisions regarding land acquisition were also mentioned repeatedly.

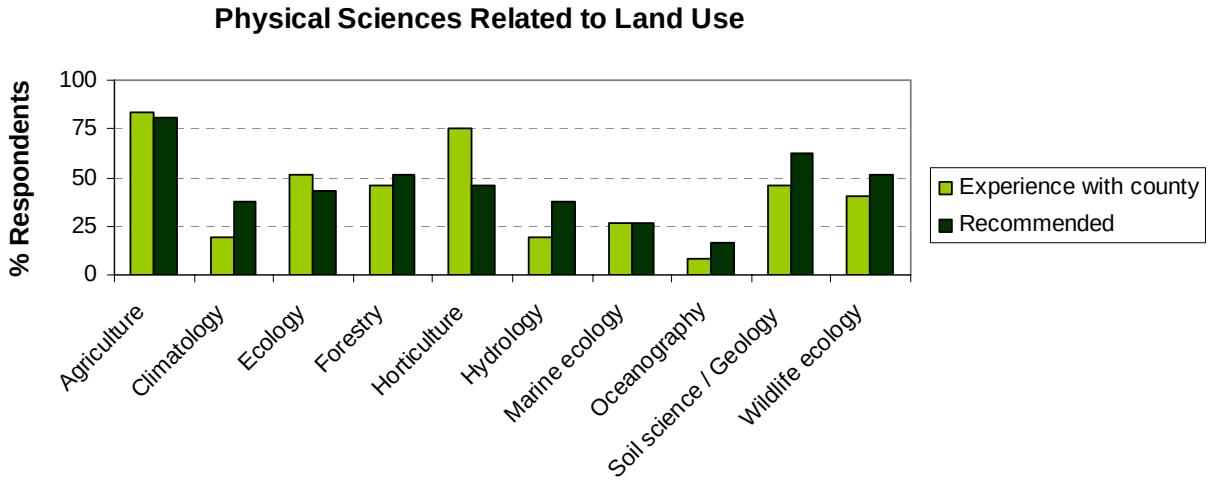
To understand more about research and academic information needs for land use and sustainability issues, respondents were asked what **types of information they had provided to the county** in the past as well as **which fields of expertise they felt could be most useful for county policy-makers to make well-informed decisions**. By comparing responses on these two questions, potential growth areas for extension were identified.

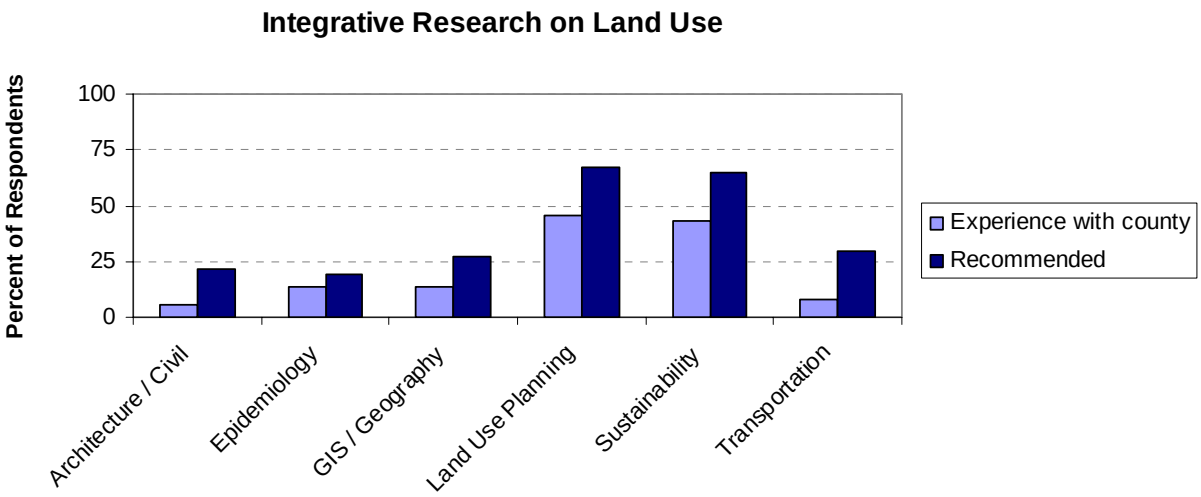
Extension agents are still most commonly involved in traditional areas such as Agriculture, Horticulture, and Family/Youth services (over 50% had drawn from these fields). Nearly half

of the respondents had used physical sciences that are tied to the sustainability of land uses or natural resources – including ecology, forestry, soil science/geology, and wildlife ecology.

Other fields showed a notable difference between the past experience with county governments and the agent's recommendation that it would be useful for making well-informed decisions at the county level. Despite having little experience utilizing legal research areas such as legal information and policy, over 40% of respondents thought they would be useful for county policy-makers. Integrative fields such as land use planning and sustainability already play an important role, and over 60% of respondents felt they would be important for well-informed land use decisions. Additional fields that respondents recommended at higher frequencies than their experience levels included economics, sociology, meteorology/climatology, hydrology, architecture/civil engineering, GIS/geography, and transportation.

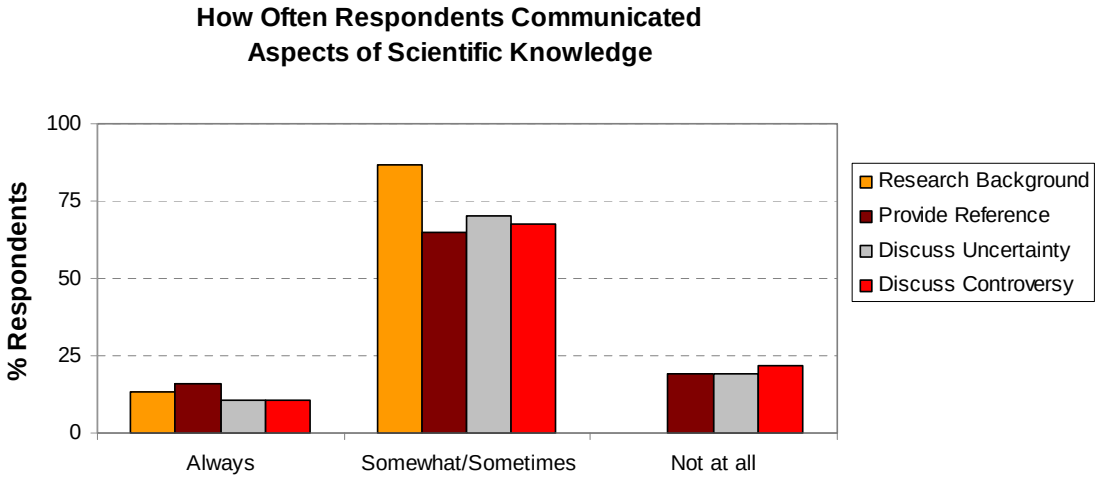






Challenges in Interpreting Research for County Governments

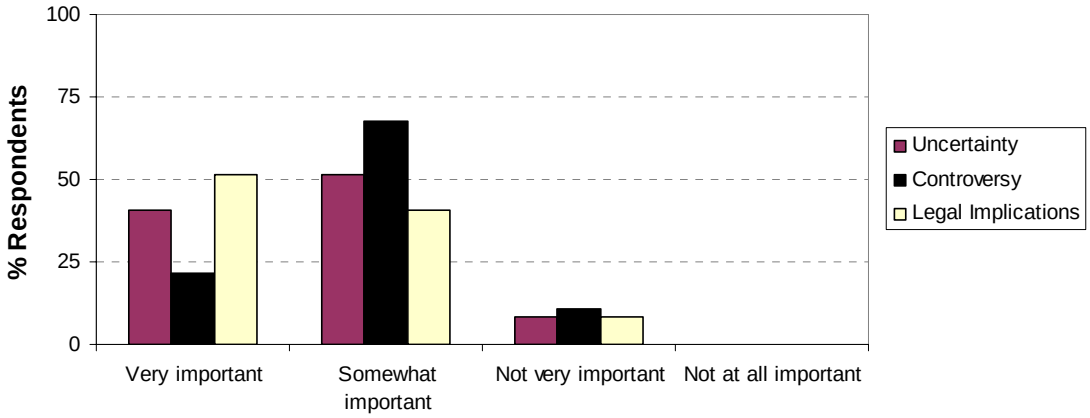
In order to learn more about how extension agents dealt with uncertainty, complexity, and controversy, they were asked questions about whether they communicated **background information about research**, **provided academic references**, **discussed uncertainties**, or **discussed controversies** related to scientific information.



The results indicate that, in general, there is a large grey area for when these aspects of science are communicated. It appears useful to give some research background, as no respondents chose “not at all” in this category and 87% chose “somewhat/sometimes”. Based on the responses, extension agents must use their judgment about how much background to give. As one respondent noted, “*Usually a one page summary of salient information is requested. Almost NEVER is in-depth information requested*.”

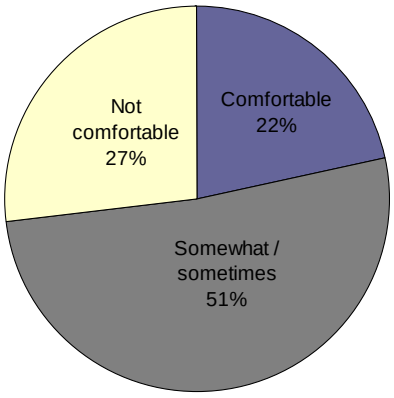
When asked how **important** they felt it was to communicate uncertainty, controversy, and legal implications, the most frequent response was "very important" for legal implications (51%) and "somewhat important" for uncertainty (51%) and controversy (68%).

Communicating Uncertainty, Controversy, and Legal Implications

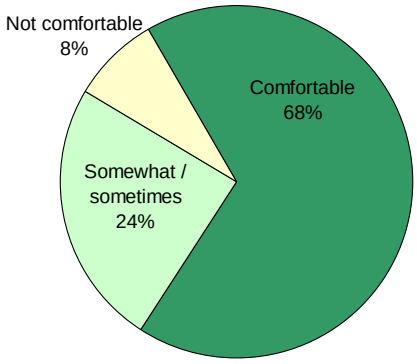


Respondents were asked about their comfort level with various aspects of communication in order to better understand where future training or clarification may be required to support their communication with county government.

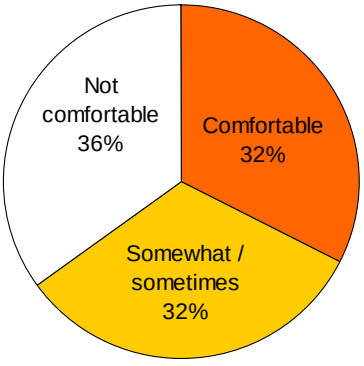
Interpreting Science on Complex Land Use Issues



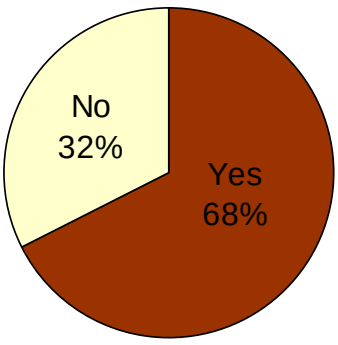
Protocol for Commissioner to Contact Extension



Questions about Legal Implications



Clear Understanding of How To Locate Expert at UF



The results indicate that there are varying degrees of comfort on interpreting complex scientific information about land use, with the majority indicating they were "somewhat/sometimes" comfortable. Most likely, this is related to how well the agent's particular area of specialization corresponds with the issue at hand.

The responses indicate some areas where UF/IFAS Extension may be able to provide further training for extension agents. Although there is an established method by which county commissioners are supposed to contact extension, only 68% of respondents were comfortable with the protocol. Almost a third of respondents (32%) were not clear on how to locate an expert in another field at the University.

Finally, only about a third of the respondents were comfortable with responding to questions about legal implications. The remaining 68% were only "somewhat or sometimes comfortable" or were not comfortable. This is an area where a partnership with the UF Levin School of Law may be able to build IFAS extension's capacity to deal with questions about the legal implications.

Land Use and Sustainability Issues

In order to learn more about issues for which future extension efforts would be most beneficial, respondents were asked to create a "top ten list" of the most unsustainable land use and resource management practices in Florida in need of an intervention. Not all respondents answered this question, and only 2 respondents provided an entire list of 10 unsustainable issues that would benefit from an intervention. However, many respondents suggested three or more issues. The top three responses offered were grouped into categories of related issues, and are listed in the table below. The complete lists that were provided by respondents are shown in Appendix II at the end of this report.

Most Frequent Unsustainable Land Use Issues Mentioned By Respondents

Tally†	Top rank issues	Tally†	Second rank issues	Tally†	Third rank issues
7	Development related issues	5	Poor planning (i.e. communities, resource use, rural development)	4	Protecting benefits of agricultural lands
5	Water/water use	5	Urban sprawl / subdivisions	2	Shopping centers/subdivisions
3	Urban sprawl/ Cities	2	Water	2	Non-point source pollution / septic tanks
1	Growth without concern for water	1	Conserving green space	1	Transportation
1	Transportation	1	Green initiatives	1	Not understanding impacts of growth
1	H2A Housing	1	Phosphate Mining	1	Aquifer depletion
1	Sludge as fertilizer	1	Fertilizer	1	Energy (fossil fuels)
-	-	1	Transportation	1	Wildlife management
-	-	1	Conflict among municipalities related to development/annexation	1	Animal density

†Tally represents the number of times respondents mentioned the issue at that specific level of ranking (first, second, or third).

An analysis of the frequency of certain key words and phrases also supports this interpretation. Three key themes of **poorly planned development**, **urban sprawl**, **water** emerged from the responses, so the frequency with which terms related to these themes appeared in the text entered by respondents was measured. The term "development" was used 9 times, "growth" was used 3 times, and variants of the word "plan" were used 8 times.

Terms related to the theme of urban sprawl appeared frequently – "urban" (6 times), "sprawl" (7 times), variants of "house" (3 times) residential (4 times), subdivisions (3 times) and even the specific term "shopping center" was listed twice. Water was mentioned 12 times, and "irrigation", "wetland", and "watershed" mentioned once each.

Three minor themes also seemed to appear: **non-point source pollution**, **transportation**, and **protection of benefits of agricultural lands**. Terms related to non-point source pollution that appeared repeatedly were water (12 times), fertilizer (3 times), pollution (2), runoff (2). Herbicide and buffers were each mentioned once. Transportation (2 times) and roads (2) formed a related theme. Finally, there were no common terms related to agricultural lands, but the conversion of agricultural lands, and the related loss of its local food production and aquifer recharge benefits were mentioned.

Recommendations for University of Florida Extension to Build Capacity in Land Use Sustainability Issues

In order to address Florida's current and future land use sustainability issues, extension will need to expand its capacity to new areas of science and policy research. The majority of respondents felt that extension could become more pro-active in issues of local land use or natural resource management policy (81 %). When asked about future land use and natural resource management issues that needed policy interventions, responses centered around waste management, development and planning-related issues, water issues, tree ordinances and landscaping issues, land acquisition issues, and the protection of agriculture and other green space.

From the experiences that respondents provided, it is clear that the science is not always easily translated into advice for county governments because of the many contingencies that must be considered. However, because extension is such a trusted, traditional source of scientific information on land use, it is natural for stakeholders to consult with them in disputes and for them to work with county governments on sustainability issues.

If extension is to expand its role to deal with sustainable land use issues, it will need to build extension agents' capacity to deal with land use issues, and provide support for them in this role. The current question for UF/IFAS Extension seems to be not whether to expand into sustainable land use issues, but rather how best to accomplish this expansion to build new capacities.

Dealing with the complexity and uncertainty of land use issues requires extension agents to strike a challenging balance between conveying research study results directly versus interpreting them into the particular context of a decision that a county government is facing. This process is sometimes complicated by the uncertainty in research results, the differing evidence in different studies, and the complexity of interpreting research from another region or context into the specific circumstances of a county in Florida. While training may help with this, there are several things that UF/IFAS can consider to build their capacity to deal with these complex issues. It is important that extension agents be well-trained and have clear roles in conveying scientific information to county governments, because controversial issues can sometimes lead to politically charged situations.

Determining how the results of research studies apply to county land use decisions can be difficult. It requires making sense of how research results from a controlled research environment apply to highly complex and contingent local conditions in a county. Sometimes, research in an area of land use may have high levels of uncertainty, or the interpretation of the state of the science may be controversial among experts.

Several practical recommendations for IFAS have been derived from the trends in responses and are presented below.

(1) Develop partnerships with colleges, centers, institutes, and faculty that address emerging research and extension needs in land use and sustainability.

Many of the land use and sustainability issues mentioned by respondents are of an interdisciplinary, complex nature. Issues such as waste management, water issues, rural and agricultural land stewardship, development, planning, and growth management are all complex issues involving a variety of disciplines. Some of the latest cutting edge research on these types of cross-cutting topics is occurring in colleges, centers, and institutes outside of IFAS and are being researched by non-IFAS faculty. By partnering with these units, UF/IFAS can enhance its capacity to compile, organize, and deliver relevant information on these topics to county governments.

(2) Formalize the role of the current Sustainability Working Group and charge it with developing an action plan; further develop relationships between extension faculty and on-campus working groups such as People and Land Use Strategies (PLUS).

Developing and expanding partnerships into new academic areas will require strategic planning to identify specific research and communication needs as well as specific strategies for researching and communicating information needs at a level more detailed than the broad areas addressed in this survey. The UF/IFAS Sustainability Working Group, which was originally created as a discussion forum for sustainability issues, would be an excellent group to task with developing these strategies. The group could specify priority issues in land use and sustainability topics and identify the relevant UF academic units with which to form partnerships in order to meet these needs.

(3) Support participatory approaches to work with county governments on emerging issues in land use and sustainability and develop a two-way dialog about research and extension needs.

Sustainability is not only about sustaining existing extension priorities, but also requires continued observation of real issues and topics in land use that emerge in Florida's counties. IFAS's capacity to design future research and extension activities to meet future needs would be strengthened by maintaining a constant two-way dialog and encouraging Florida's county governments to freely approach IFAS with their knowledge gaps and information needs. This can help IFAS maintain cutting edge research and extension by responding to new issues as they arise around the state.

(4) Ensure extension faculty protocols for dealing with county governments are made explicit and that training is provided to faculty so that they can feel comfortable and confident when controversial issues arise with county governments.

The survey results indicate fairly widespread levels of uncertainty and fairly low comfort levels among respondents in critical protocols required for interacting with county governments to convey complex information about land use and sustainability. Future training could help increase extension agent's comfort level in dealing with county governments on complex issues. This is particularly important considering that issues which arise in county governments may sometimes be controversial or politically charged issues.

(5) Develop opportunities for non-IFAS faculty to serve as Statewide Specialists in land use and sustainability extension. Continue and expand the program of university-wide internships in land use sustainability and in county extension offices.

Survey results suggest that UF/IFAS can bring valuable information to the state's counties by increasing their capacity to directly address topics of land use and sustainability. By creating Statewide Specialists and providing internship opportunities, UF/IFAS can build their capacity to communicate the latest academic research and understanding of these issues to Florida's counties.

(6) Continue to develop in-service training programs in land use and sustainability.

In-service training programs tailored to address current Florida land use and sustainability issues would increase extension agent's ability to recognize these newer issues and effectively communicate relevant research information to stakeholders. Discussions with extension agents on how to convey the right level of uncertainty and complexity in sustainability science to decision-makers would also help develop their ability to make these critical judgments in topics that frequently arise.

(7) Extend training to county governments on land use and sustainability issues in Florida.

Training programs tailored to address county government's information needs in land use and sustainability would increase their awareness of these issues, strengthen the working relationship between county governments and UF/IFAS extensions, and provide timely and relevant information. Also, EDIS factsheets that directly address current sustainable land use issues from the county's perspective are importing as supporting materials for any training strategy.

(8) Develop a database or contact list for extension agents, build ties between UF experts and county extension agents, and ensure agents are trained on how to contact experts.

One of the challenges of land use and sustainability issues is the fact that its complexity and interdisciplinary nature makes it challenging for any one person to be well-versed in all of its aspects and issues. Therefore, training extension agents on how to field responses outside their area of expertise is important to help increase effectiveness and channel knowledge from experts to county governments using extension as a liaison.

Future Dialogs

While the survey is a useful first step in identifying potential opportunities and challenges for UF/IFAS Extension to address land use sustainability issues, there are a number of future dialogs which must be continued in order to help clarify future pathways to success.

Based on the issues that agents have experienced, and disciplines they have recommended, it is clear that there is a need to increase UF/IFAS Extension's capacity in new areas of land use sustainability research. The Sustainability Working Group would be an excellent forum to further clarify specific land use sustainability issues for which compiling factsheets, fostering new research, and increasing agents' training would be useful.

Negotiating the balance between providing scientific background versus providing a simple recommendation is difficult in new, emerging issues where there are no precedents. Discussions among agents about the state of the science on sustainability issues and how to strike a balance between may help agents to be more aware of how to deal with providing research information on new and emerging sustainability issues. Providing agents with an

opportunity to discuss effective communication approaches, or training them on how they are expected to deal with them, will increase their capacity to interpret complex and interdisciplinary science in a transparent and accurate manner.

The dialog between county decision-makers and the university on sustainability issues should be bilateral and should help the university to guide research based on real-world issues as well as allowing county policy-makers to benefit from basic and applied research experts at the University of Florida are already aware of. Participatory approaches to communication, such as workshops, conferences, working groups, and even phone calls or emails may be one method of achieving this balance. Encouraging county governments and agents to provide feedback to UF/IFAS Extension is important in ensuring a good match between scientific knowledge in academia and the real-world sustainability issues.

Appendix I: List of Survey Questions

1. Which of Florida's counties are you responsible for?
   (If more than one, please list all that apply.)
2. How many years have you been in extension?
3. What are your areas of expertise as an extension agent?
4. What is your current position within IFAS?
5. How often have you interacted professionally with local policymakers (such as local elected officials, advisory boards, planners, and other county staff)?
6. Which of the following areas of expertise has county government asked you about: (SELECT ALL THAT APPLY)

   [Agriculture, Architecture/Civil engineering, Anthropology, Climatology/Meteorology, Data/Informatics, Ecology/Environmental Science, Economics, Epidemiology/Public Health, Forestry, Family and Youth Services, GIS/Geography, Horticulture/Gardening, Hydrology, Land Use Planning (eg, urban or regional), Legal Information, Policy, Psychology, Marine ecology/fisheries science, Oceanography/Coastal engineering, Soil Science/Geology, Sociology, Sustainability, Transportation, Wildlife Ecology, None of the Above]

7. Do you provide information to county government in any of the following types, forms, and forums: (CHECK ALL THAT APPLY)
   - A summary of the state of scientific knowledge on an issue (such as an EDIS factsheet may provide)
   - Specific research study results (eg, from a journal article)
   - Specific, local environmental monitoring data (eg, condition of soil, water, vegetation, or wildlife)
   - Case studies from the scientific literature
   - Contact information for other professionals, experts, or consulting companies
   - Best management practices
   - Personal recommendation based on expert knowledge
   - Conferences, presentations
   - Working Groups on Special Issues or Topics
   - None of the Above
   - Other
8. When communicating science, do you...(Check ONE option per row)
   a. ...provide background about the specific research that led to the current state of knowledge?
      [Always, Somewhat/Sometimes, Not at All]
   b. ...provide scholarly reference information or discuss sources of information?
      [Always, Somewhat/Sometimes, Not at All]
   c. ...discuss uncertainties about the current academic information?
      [Always, Somewhat/Sometimes, Not at All]
   d. ..discuss controversies among academics on the state of scientific facts?
      [Always, Somewhat/Sometimes, Not at All]
9. How comfortable are you...(Check ONE option per row)
   a. ...interpreting and conveying interdisciplinary scientific information about complex LAND USE decisions (eg, agricultural land conversion, fertilizers and runoff,

energy and climate change) to local policymakers (such as local elected officials, advisory boards, planners, and other relevant staff)?

b. ...with the protocol by which county commissioners are supposed to contact extension for information?

c. ..with how to respond (eg, who to contact or what information to defer to) when asked about legal implications of land use decisions?

10. Have you been professionally involved in any complex or controversial LAND USE issues in your county? IF so, please describe the nature of the issue or dispute.

11. Do you have a clear understanding on how to locate and contact an expert from UF to answer a question outside your area of expertise?

12. Have you ever felt that you were asked to provide policy advice or make recommendations on matters of policy?

13. How important do you feel it is to communicate...(CHECK ONLY ONE)

a. ……the level of uncertainty in academia on a scientific subject?
[Very important, Somewhat Important, Not Very Important, Not at All Important]

b. ……the level of controversy in academia on a scientific subject?
[Very important, Somewhat Important, Not Very Important, Not at All Important]

c. ……the legal implications of a scientific debate?
[Very important, Somewhat Important, Not Very Important, Not at All Important]

14. Do you feel scientific information or research you provided to local policymakers (such as local elected officials, advisory boards, planners, and other relevant staff) has ever influenced a LAND USE decision?

15. Have you ever formally evaluated the impact of information that was provided by your extension office to local policymakers (such as local elected officials, advisory boards, planners, and other relevant staff)?

16. Do you feel that extension can be more pro-active in informing local policymakers (such as local elected officials, advisory boards, planners, and other relevant staff) LAND USE decisions?

17. Based on your experience, which fields of expertise do you feel are useful for local policymakers (such as local elected officials, advisory boards, planners, and other staff) to make well-informed LAND USE decisions?

[Agriculture, Architecture/Civil engineering, Anthropology, Climatology/Meteorology, Data/Informatics, Ecology/Environmental Science, Economics, Epidemiology/Public Health, Forestry, Family and Youth Services, GIS/Geography, Horticulture/Gardening, Hydrology, Land Use Planning (eg, urban or regional), Legal Information, Policy, Psychology, Marine ecology/fisheries science, Oceanography/Coastal engineering, Soil Science/Geology, Sociology, Sustainability, Transportation, Wildlife Ecology, None of the Above]

18. In order of importance, and based on your experience or expertise, please list up to ten of the most unsustainable land use or resource management practices in Florida that could benefit from a state or local policy intervention. Be as specific as possible. 1 = most important 10= least important

19. Do you have any suggestions on support, tools, training, or information that IFAS or the Levin College of Law can provide to help you work with local policymakers on LAND USE decisions?

Appendix II: Lists of 10 Most Unsustainable Practices in Florida That Could Benefit From Intervention

	Issues, In Descending Order of Rank Importance (as determined by respondent)									
Respondent Code	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
AH	Roads and bridges	phosphate mining	shopping centers	water treatment facilities	housing projects	urban sprawl	wetland destruct-ion	herbicide application	lawn mainten ance/ fertilizer	water pollution
AD	urban sprawl	land use planning	sustaining agriculture	Environ-mental protection	habitat enhance-ment for wildlife	water issues	soil protect-ion	invasive plants	toxic plants	Venom-ous animals
AY	coastal residential development	interbasin water transfers	destruction of productive ag lands that serve as recharge area, buffers	destruction of wildlife habitat	nutrient and other contamin-ant rich stormwater runoff	failure to develop mass trans-portation	sprawl	rural sprawl based on 5-10-20 acre residential limits that encourage fragmentati on of land use		
AU	Water allocation/ usage	lack of technical support for rural counties dealing with development issues	septic tank use in coastal areas verses ground and surface water contamination	looking at watershed holistically as impacted by local city/county comp plans.	Looking at a broader view of environ-mental impacts related to any kind of develop-ment					
AM	poorly planned development	poorly planned communities	poorly planned transportation	lack of local food systems	lack of funding for hurricane hardness					
AL	construction site management, clear cutting, scraping, and fill	Conserving green space	protection/incent ives for preserving agriculture	water issues, quality, runoff, and conservation						
BL	Cities	Roads	New subdivisions	Mismanaged public lands						
BK	Water	Fertilizer	Animal Density							
AG	Urban sprawl	Conversion of	I am not sure I							

		ag land to subdivisions	really get what you are looking for here?							
AE	growth without concern for water resources	lack of dialog between comprehensive plan and resource planning	lack of knowledge of long term effects of growth							
AT	Unsustain-able development	Wasteful water practices	Excessive electrical use produced by fossil fuels							
AK	Irrigation	Green initiatives	Non-point source pollution							
AQ	putting houses on valuable ag land	not clustering development to contain urban sprawl	continuing to pump water from aquifer for residential use							
AB	automatic sprinklers for turf irrigation	urban sprawl	promote local produce and stop imported vegetables harvested by children (Mexico)							
BO	Water use	urban development	wildlife management							
BQ	Uncontrolled residential development	Lack of planning for growth								
AI	Shopping Center Development	Large unit (GT 50) subdivisions								
AN	H2A Housing	Finding ways to eliminate conflict between counties and municipalities with regard to development, especially annexation.								
AR	All solid sludge should be a Class AAA Fertilizer									

Appendix III: Suggestions on Support, Tools, Training, or Information that IFAS or Levin College of Law Could Provide

- Training…maybe even team training with a county official/expert this really isn't my area of expertise but I assume that I need to know the basics since I am in an administrative role.
- How does the health of an ecosystem and the 10,000 people it supports compete against the water needs of millions in another state (Atlanta, GA) who want to greatly limit the amount of water that can flow down river thus damaging the down stream ecosystem? How are we going to deal with freshwater allocation issues (Water Wars) in the future?
- BMP's on water use
- Be available either by phone, email, or face-face to help resolve problems that arrive on Land Use decisions and Agriculture implications.
- We need marketing pieces that let policy makers know we have expertise in this area.
- Yes, be more responsive to requested assistance from Extension Agents. I have made repeated requests to the Law School for waterfront assistance and to date have received none.
- Provide the planning workshop for decision makers.
- Help at the local level to get code changes that allow communities to become sustainable. Too many of our codes were written before communities knew about climate change and sustainability.
- Make information available through workshops or training for our officials, support for small counties who may not have the staff for extensive research and work in this area.

References

Broussard, S.R., & Bliss, J.C. (2007). Institutional commitment to sustainability: An evaluation of natural resource extension programs in universities in Alabama and Oregon. *International Journal of Sustainability in Higher Education*, 8(3), 272-84.

Schneider, R.L., & Smallidge, P.J. (2000). Assessing extension educator needs in New York to address natural resource issues for the new millennium. *Journal of Extension*, 38(3).

UF/IFAS Extension. (2008). *About extension*. Retrieved May 12, 2008, from http://solutionsforyourlife.ufl.edu/about/.

United Nations. (1987). *Report of the World Commission on Environment and Development* (General Assembly Resolution 42/187). Retrieved May 12, 2008, from http://www.un.org/documents/ga/res/42/ares42-187.htm.

United States Department of Agriculture, Cooperative State Research, Education, and Extension Service. (2008). *Extension*. Retrieved May 12, 2008, from http://www.csrees.usda.gov/qlinks/extension.html.