

Measuring Florida Extension Faculty's Agricultural Paradigmatic Preferences

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Abstract

The demand for sustainable agriculture has increased, and many institutions, including the University of Florida, have adopted agricultural sustainability as a major goal. Extension has been identified as a critical information source, important in disseminating sustainable agricultural growing techniques. However, research has demonstrated that an institution's goals may not be represented by the actions and beliefs of its staff members (Eveland, 1986; Minarovic & Mueller, 2000). While Extension faculty have been identified as change agents in the shift to a more sustainable agriculture, the literature contained little regarding Florida Extension agents' attitudes towards this topic. The study and its findings were framed by Mitzel's model of teaching and learning, and we sought to describe Florida Extension agents through an exploration of the presage variables associated with their teaching. This study utilized an updated Alternative and Conventional Agricultural Paradigm (ACAP) scale instrument to quantitatively measure Florida Extension agents' agricultural paradigms. The sample included 188 randomly selected Extension faculty working across all disciplines. Within a potential score range of 24 – 120, and higher values indicating stronger alignment with sustainable agriculture, the Sustainability Score mean for Florida Extension agents was 80.64. The study identified three paradigmatic groups: Conventionals, Moderates, and Sustainables. We documented elements of Florida Extension professionals' presage variables and determined that there is no disconnect between University of Florida Extension faculty and their organization's goals related to sustainable agriculture.

Keywords: Extension education; Mitzel's model; agricultural paradigm; individual preferences

Sustainable agriculture has been offered as a solution to minimizing the effects of some conventional agricultural practices (USDA, 1999). Many definitions of the paradigm exist; however, most descriptions include components of natural resource preservation, and economic, social, and environmental balance (USDA, 1999). For the purpose of this research, we defined

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sustainable agriculture as “an agriculture that can evolve indefinitely toward greater human utility, greater efficiency of resource use, and a balance with the environment that is favorable both to humans and to most other species” (Harwood, 1990, p. 4). Simply, sustainable agriculture protects the environment, conserves resources, and supports the community while generating a profit for the producer. A clear difference between sustainable, alternative, and organic agriculture has not been identified; for the purpose of this study, the terms were considered transposable (Agunga & Igodan, 2007).

Extension agents are “persistently called upon to develop richer understandings of their ever-changing clientele” (Goodwin & Gouldthorpe, 2013, p. 73). One such change includes the increasing demand for sustainable agriculture in national policy, in communities (Gonzalez, 2011) and in university objectives (Doerfert, 2011), including the University of Florida (University of Florida, 2008). An example of the demand for sustainable agriculture in national policy is the most recent Farm Bill (H. Res. 2419, 2008), which offered incentives for converting land to support sustainable grazing or crop production methods and made funding a priority for those who seek loans to convert land into organic and alternative production systems. This indicates the significance and permanence of this agricultural paradigm. Gonzalez identified an “emerging consensus among policy-makers at the international level that promoting sustainable agriculture is necessary to address the environmental and food security challenges of the 21st century” (2011, p. 516). The University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) Extension Statewide Goals and Focus Areas for 2008-2012 identified “Agricultural and Natural Resource Industry Profitability and the Sustainable Use of Environmental Resources” as a primary goal for small farms, agronomic row crops, sugarcane, rice, animal sciences, and fruit and vegetable crops.

The 2011-2015 National Research Agenda for the American Association for Agricultural Education recognizes that “a sufficient supply of well-prepared agricultural scientists and professionals is needed to drive sustainable growth” (Doerfert, 2011, p. 9) and address 21st century challenges. One such challenge is in promoting sustainable agriculture, and Extension professionals are in a position to do so (Boone, Hersman, Boone, & Gartin, 2007). Extension agents, such as those employed by University of Florida, have been identified as critical information sources, important to the success of producers who wish to pursue sustainable or alternative agricultural growing techniques.

Recent research suggests a growing demand (Lillard & Lindner, 2012) and a substantial opportunity for Extension to become more involved in sustainable agriculture. Agunga and Igodan (2007) explored sustainable agriculture growers’ perceptions, and found that the producers greatly needed Extension. Their study revealed that producers viewed Extension as lacking in knowledge about sustainable agriculture, and used Extension agents only as secondary information sources (Agunga & Igodan, 2007). Goodwin and Gouldthorpe (2013) identified a substantial need for Extension to better serve producers. Further emphasizing the importance of Extension and education, the 2011-2015 National Research Agenda for the American Association for Agricultural Education asserts that “(a)n informed citizenry, including policy decisions at all levels, will create win-win solutions that ensure the long-term sustainability of agriculture, natural resources, and quality of life in communities around the world” (Doerfert, 2011, p. 8).

While there is a demand for Extension to support sustainable agriculture, Extension professionals will not promote sustainable agriculture if they do not recognize the value in this agricultural paradigm (Agunga, 1995). Researchers have identified relationships between production preferences and specific attitudes (Allen & Bernhardt, 1995; Beus & Dunlap, 1994); therefore, it is useful to look at Extension agents’ attitudes towards any topic they may be expected to teach. Subject matter does not exist in a vacuum but is deeply connected to those who teach and learn it. Development of “teaching methods that make values and attitudes visible in agricultural education and consider human values as both subjects and agents in relation to ... agriculture” (Botelho, 1999, p. 208) is highly important.

Administration cannot assume that agents are in agreement with or supportive of their organization's goals (Minarovic & Mueller, 2000), and it is highly important to measure and understand the individual preferences within an institution (Eveland, 1986). Abaidoo and Dickinson (2002) noted that the adoption of sustainable agriculture reflects not only changes in production practices, but also represents a shift in paradigmatic preferences, environmental beliefs, attitudes, and values. Galt, Clark, and Parr (2012) found that our evolving food system indicated a need for changing paradigms in addition to behaviors. A paradigm can be described as "an example that serves as a pattern" and "the conceptual framework that permits the explanation and investigation of phenomena" (Paradigm, 1997, p. 989). For this study, we defined an agricultural paradigm as an individual's preferred model of agricultural practices and we recognized that an Extension agent's preferred agricultural preference would fall at some point between a strongly conventional and a strongly sustainable paradigm.

Extension administration and educators may be interested in better understanding the organization's paradigms and how these preferences play into the Extension classroom. This research is important because individual perceptions play an important role within the function of a larger organization, and it is known that individuals do not necessarily support the goals and objectives held by their organization (Eveland, 1986; Minarovic & Mueller, 2000). An understanding of the attitudes and values held by the persons who make up an organization are critical to understanding the entity's true stance towards their outwardly stated goals. Simply, an understanding of individual preferences towards organizational goals holds substantial value when determining if staff members are likely to work to achieve them or if there is a potential disconnect between the university and its Extension agents. Using this information, administration can better understand their staff, Extension faculty can better understand themselves, and individuals' agricultural paradigms and training needs can be anticipated.

Theoretical Framework

This study was framed by Mitzel's model of the teaching and learning experience as described by Dunkin and Biddle (1974). Mitzel's model describes teaching and learning as being comprised of four distinct variables, and we used this framework as a lens through which to view the relationship between Extension agents' agricultural preferences and the outcome of their educational programming (Dunkin & Biddle, 1974). Mitzel's model explains that the outcomes of a teaching and learning experience, or *product* variables, are influenced by *context*, *process*, and *presage* variables (Dunkin & Biddle, 1974). Context variables refer to student characteristics and environmental factors; process variables are described as the specific activities that occur during the act of teaching and learning (Dunkin & Biddle, 1974). Presage variables are characteristics of educators that "may be examined to determine their influence on the teaching process" (Parr, Edwards, & Leising, 2006, p. 83). Presage variables encompass teacher properties, or "measurable personality characteristics" (Dunkin & Biddle, 1974, p. 40) that are inseparable from the teaching situation, and include educators' attitudes, preferences, and motivations (Dunkin & Biddle, 1974; Parr, Edwards, & Leising, 2006). Presage variables describing an Extension agent would thus include their agricultural paradigms and link these to their teaching activities and outcomes. This study applied Mitzel's model to agricultural Extension programming (Figure 1) and focused on the presage variables (Extension agents' agricultural preferences) as a means to understand the process variable (topics taught).

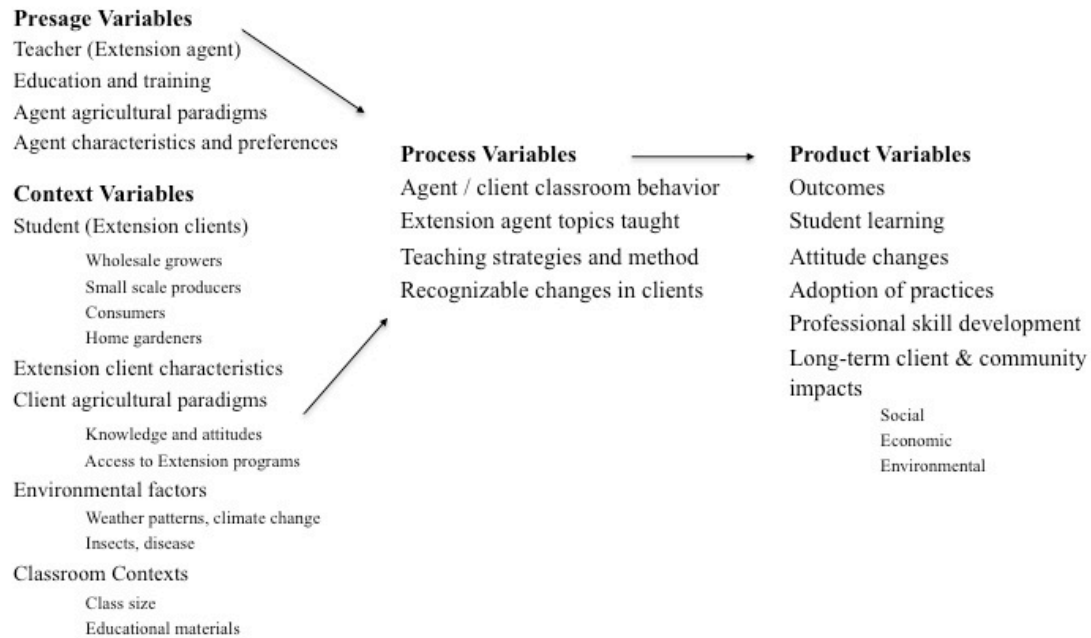


Figure 1. A graphic representation of Mitzel's model of the teaching and learning experience as applied to agricultural Extension programming. Adapted from "A model for the study of classroom teaching" by M.J. Dunkin and B.J. Biddle, 1974, *The Study of Teaching*, p. 38.

Purpose and Objectives

The purpose of this study was to describe University of Florida Extension faculty's characteristics and agricultural paradigms through the lens of Mitzel's model. Further, we explored paradigmatic preferences to determine whether a disconnect existed between the organization and its Extension professionals' perceptions towards agriculture. The objectives that guided this study included the following:

1. Describe University of Florida Extension faculty's demographic and background characteristics.
2. Document University of Florida Extension faculty's agricultural paradigms.

Methods

We based our study on the original work of Beus and Dunlap (1991), who developed the Alternative-Conventional Agricultural Paradigm (ACAP) scale to measure paradigmatic views towards agriculture. They found that the scale statistically discriminated between sustainable and conventional perspectives. However, we found the original ACAP scale was in need of further refinement associated with language and individual statements. The original paired Likert-type scale instrument contained twenty-four "bi-polar items that portray the respective positions of the two paradigms as anchor points on a multi-point scale" (Beus & Dunlap, 1991, p. 438). Several researchers found the instrument to be valuable. Jackson-Smith and Buttel found the scale to be "appropriate and useful in studies of the agricultural intelligentsia (agricultural scientists, farm policymakers, organizational leaders...)" (2003, p. 513). Others, including Rasmussen and Kaltoft, have agreed that this instrument "is a suitable method for quantitative assessment of attitudes to agriculture" (2003, p. 2).

We further developed and piloted a revised version of Beus and Dunlap's original ACAP instrument (1991) by using a panel of experts to improve and validate the instrument. We then evaluated the reliability of the new tool in a pilot study of known paradigmatic groups (Sanagorski, Murphrey, Lawver, Baker, & Lindner, 2013). Subsequently, the electronic survey instrument was administered to a random sample of 188 Extension faculty members in all disciplines statewide to identify and document the paradigmatic preferences of University of Florida Extension educators.

Instrument Development

Each set of statements was separated by five points, or possible responses, which allowed respondents to identify their position between the two viewpoints. One-half of the statements were randomly reversed to reduce response set bias.

Dr. Curtis Beus granted us with permission to further develop this tool (personal communication, July 25, 2011). We evaluated the instrument and identified numerous double-barreled statements as well as outdated language (Sanagorski et al., 2013). Double-barreled statements are defined as survey items that cover more than one issue; they introduce ambiguity and should be avoided in surveys (Iarossi, 2006). For example, we identified the original "High energy use makes U.S. agriculture vulnerable and should be greatly reduced" (Beus & Dunlap, 1991, p. 439) as a double-barreled statement and revised it, which resulted in "Dependence on high inputs of energy makes U.S. agriculture vulnerable" (Sanagorski, 2012, p. 115). We utilized a panel of subject and research experts to review the resulting instrument for quality, clarity, and content validity. The panel was composed of four faculty members specializing in Extension education from two different land-grant universities. One panelist was included because of noteworthy contribution to survey error reduction and research evaluation methodology; one of the panelists is a known expert on sustainable agricultural production methods; two of the panelists were selected because they are known experts in program evaluation in this field (Sanagorski et al., 2013). We enhanced, updated and improved the tool accordingly, and incorporated all of the panel's recommendations into the pilot version of the instrument. The majority of changes provided by the panel related to improving upon the language used (Sanagorski et al., 2013). For example, the panel decided that our population might not relate to the term farmers and advised that we replace them with growers or landowners in the new instrument. Further, we added items to the instrument to collect descriptive data of the sample, including gender, age, department, education attained, land-grant versus non-land-grant education, and farm versus non-farm background (Sanagorski et al., 2013). Qualtrics (Qualtrics, 2009) survey software was used to convert the tool into an electronic survey instrument.

We conducted the pilot test of the updated ACAP scale instrument during the months of May and June of 2012 (Sanagorski, 2012), and structured the pilot test on the recommendations of Johanson and Brooks (2010), seeking 24 - 30 total respondents with 12 - 15 originating from each known group. We selected pilot test participants and assigned them to either the conventional or sustainable group based on the panel members' identification of their preferred paradigmatic traits and practices. There were 12 respondents selected for the known conventional group and 16 selected for the known alternative group. Pilot study participants resided in the southeastern United States and were not informed of the grouping (Sanagorski et al., 2013).

Reliability of the updated scale was measured at .94 using Cronbach's alpha coefficient (Sanagorski et al., 2013). Cronbach's alpha is considered to be an excellent measure of reliability when using scales for research (Santos, 1999) and when measuring tests that are not "scored right versus wrong" (Fraenkel & Wallen, 2008, p. 158). According to Fraenkel and Wallen (2008), a reliability coefficient greater than 0.70 is acceptable for use. We concluded that the coefficient of .94 on a scale from 0.00-1.00, with 1.00 being the greatest level of reliability, should be considered suitable (Sanagorski et al., 2013). Item-total statistics indicated that the removal of

any of the individual items would not result in a substantially higher Cronbach's alpha value, and therefore, no items were removed or modified (Radhakrishna, 2007).

Sanagorski et al. (2013) conducted an independent *t*-test for equality of means between the two groups and concluded that their Sustainability Score means were not equal ($t = 4.091, p < .001$); the sustainable known group's Sustainability Score was statistically higher, or more sustainably-oriented, than that of the conventional known group. The Cohen's *d* measure of effect size for this analysis was 1.60, between known groups on Sustainability Score, which we interpreted as an indication of a large magnitude of relationship (Sanagorski et al., 2013) based on Cohen's recommendations (1988). Effect size measures the strength of relationship and is independent of sample size. Based on the significance of the difference between known-group means and the large effect size resulting from this independent *t*-test, we concluded that the updated ACAP scale does effectively discriminate between known groups (Sanagorski et al., 2013). They determined that this finding paired with the reliability of the updated instrument supported the determination that this tool could be used to collect data on populations of Extension agents and other educators.

The updated ACAP scale, which is summarized in Table 1, was found to be reliable and able to discriminate between paradigmatic groups, which enabled us to proceed with the use of the instrument (Sanagorski et al., 2013).

Table 1

Summarized Scale Items and Item Statistics on Updated Alternative and Conventional Agricultural Paradigm (ACAP) Scale in a Pilot Study to Determine Reliability and Validity of an Instrument.

Item Number	Summarized Scale Item	Corrected Item-Total Correlation	Cronbach's Alpha If Item Deleted
1	Meeting food needs with fewer farmers is positive versus negative	.646	.936
2	Cropland should be managed for profits versus long-term capacity	.565	.937
3	Dependence on high inputs of energy makes agriculture secure versus vulnerable	.659	.936
4	The primary goal of profitability versus long-term condition of land	.547	.937
5	The amount of agricultural land owned should not versus should be limited	.386	.939
6	Science & policy should develop more technologies versus recognize production limits	.454	.939
7	Success depends on modern technology versus experience & local knowledge	.792	.933
8	Agricultural success will not versus will be affected by decline of small communities	.668	.935
9	Less diverse, larger operations versus diverse, smaller operations meet agricultural needs best	.888	.932
10	Farm traditions and culture are outdated versus essential to modern agriculture	.537	.937
11	Farming is a business versus a way of life	.590	.937
12	Growers should primarily use synthetic versus natural fertilizers and methods	.573	.937
13	Less versus more people should participate in food production	.570	.937
14	Modern agriculture is a cause of minor versus major environmental problems	.836	.932
15	Landowners should farm as much as they can profitably versus personally	.763	.934
16	Agricultural operations should specialize in few crops versus variety of crops	.491	.938
17	Soil and water should be used as needed versus conserved	.617	.936
18	Growers should purchase versus produce most of their goods and service	.362	.939
19	The key to agricultural success lies in overcoming nature versus harmonizing with nature	.656	.935
20	Producers should specialize in either versus both crops or livestock	.469	.938
21	Production of food should take place at local versus national levels	.661	.935
22	The successful grower has an above average standard of living versus enjoys growing crops	.528	.937
23	Technology should replace versus enhance agricultural labor	.380	.939
24	The availability of food is evidence that agriculture is successful versus environmental consequences are evidence that it is not successful	.865	.932
Cronbach's Alpha			.939

Note. There were a total of 24 statements. Reproduced from “Measuring agricultural paradigmatic preferences: The redevelopment of an instrument to determine individual and collective preferences – a pilot study,” by L. A. Sanagorski, T. P. Murphrey, D. E. Lawver, M. Baker, and J. R. Lindner, 2013, *Journal of Extension*, 51(5).

Survey of Extension Faculty Members

We selected a random sample of 188 from the population of 305 Extension faculty members based on the recommendations of Krejcie and Morgan (1970). The study included Extension faculty from all disciplines to reflect the reality that agriculture incorporates all areas and that Extension faculty were collaborating on cross-disciplinary programs in this area. We chose a web survey design because we were targeting a very specific population that had access to the Internet and the technological capabilities needed to complete the instrument (Dillman, Smyth, & Christian, 2009). We used Qualtrics (Qualtrics, 2009) to distribute the updated ACAP scale instrument electronically and invited Extension faculty members to participate in the study through electronic mail delivered to their University of Florida email address. We followed Dillman, Smyth, and Christian's (2009) recommendations for using multiple contacts, with modifications, to construct four communications: one original survey, a thank you message, and two replacement surveys. Based on Dillman, Smyth, and Christian's (2009) guidelines for web survey implementation, we personalized all contacts to respondents, utilized multiple contacts, timed our messages with the population in mind, and provided clear instructions for accessing the survey. Those who completed a survey did not receive replacement surveys while those who did not received a thank you message (Dillman, Smyth, & Christian, 2009). A random drawing offering two gift cards was presented as an incentive to participate. Respondents were asked to input demographic and background information, and to self identify with one of three paradigmatic groups: a) strong supporters of conventional agriculture; b) supporters of both conventional and sustainable agriculture; and c) strong supporters of sustainable agriculture. The study remained open for a total of 36 days.

Following data collection, we transformed the previously reversed items and coded the data so that each response equated to a numerical value between one and five. Strongly conventional responses were coded with the value of one and strongly sustainable responses were coded with the value of five on each of the twenty-four items. Moderately conventional and sustainable responses were coded with two and four, accordingly, and neutral or undecided responses received the value of three. We created a new variable from the sum of each individual's 24 responses on the instrument and termed it the Sustainability Score. The possible value of Sustainability Score ranged from 24, which was the most conventional potential score, to 120, which was the most sustainable potential score. We imported the data into SPSS for analysis.

Following the 36-day survey period, 69 Extension agents had completed the instrument, resulting in a 36.7% response rate. After attaining less than 100% response, we controlled for non-response error by using "days to respond" as an independent regression variable (Lindner, Murphy, & Briers, 2001; Lindner & Wingenbach, 2002). This is "an extrapolation method in which nonrespondents are considered to be a linear extension of the latest respondents, and a trend may be detected across respondents based on relative earliness or lateness to respond" (Lindner et al., 2001, p. 52). We chose this method over the other available recommendations due to the fact that conducting this survey via phone would have been quite burdensome for non-respondents, making the comparison with non-respondents method impractical. We created a continuous variable for "days to respond" and used this variable in a regression equation where our Sustainability Score was regressed on the "days to respond" variable (Lindner et al., 2001). Our regression model did not generate statistically significant results ($R^2 = .005$, $p = 0.251$), and therefore we concluded that nonrespondents were not different from respondents and findings could be generalized to the population.

Findings

We explored elements of Extension agents' presage variables, or characteristics of educators that are inseparable from the teacher, which influence the teaching process. In following the objectives of our study, we examined both demographic and background characteristics as well as faculty agricultural paradigms.

Objective 1: Describe University of Florida Extension faculty's demographic and background characteristics

The mean age of respondents was 44.93 ($SD = 12.86$). All respondents had earned a minimum of a Bachelors degree while the majority of respondents (66.2%, $n = 45$) held Master's degrees. A few (13.2%, $n = 9$) had achieved Doctoral degrees. Males comprised 38.5% ($n = 25$) while females comprised 61.5% ($n = 40$). Most (86.6%, $n = 58$) of the respondents indicated they had attended a land-grant university. A small percentage (14.9%, $n = 10$) currently owned agricultural land, and nearly one-third (29.9%, $n = 20$) had been raised on a farm.

The sample was composed of Extension faculty from all disciplines: 28.0% ($n = 19$) worked primarily in Agriculture; 32.4% ($n = 22$) worked primarily in Horticulture; 16.2% ($n = 11$) worked primarily in Family and Consumer Science; 16.2% ($n = 11$) worked primarily in 4-H, and 7.4% worked in other disciplines, namely Sea Grant ($n = 2$) and Natural Resources ($n = 2$). Respondents were located in each of the Florida Extension Districts: 34.3% ($n = 23$) in the South; 23.9% ($n = 16$) in the Northeast; 13.4% ($n = 9$) in the Northwest; 14.9% ($n = 10$) in the South Central; and 13.4% ($n = 9$) in the Central District.

Objective 2: Document University of Florida Extension faculty's agricultural paradigms

Extension faculty were asked to self-identify as a) strong supporters of conventional agriculture; b) supporters of both conventional and sustainable agriculture; and c) strong supporters of sustainable agriculture. We labeled these three self-identified paradigmatic groups as Conventionals, Moderates, and Sustainables. Moderates were those who supported both conventional and sustainable agricultural paradigms; Conventionals were those who supported conventional agriculture; Sustainables were those who strongly supported sustainable agricultural paradigms. Very few (4.4%) of the Florida Extension Faculty identified as belonging to the Conventionals group. The majority (65.2%) identified themselves as Moderates, with approximately one-third (30.4%) identifying themselves as Sustainables. The Sustainability Score mean for the Conventionals group was 59.33. The Sustainability Score mean for the Moderates group was 78.91. The Sustainability Score mean for the Sustainables group was 87.38. Based on the small number of faculty identifying themselves as Conventionals ($n = 3$), we determined that robust statistical comparisons could not be conducted with this group; therefore, we did not include them in further comparisons with Moderates and Sustainables.

The Sustainability Score mean for Florida Extension faculty was 80.64 ($SD = 12.74$), which is slightly above the median value of 72 between the most sustainable (120) and most conventional (24) potential scores. The range of Sustainability Score means for all respondents was 40 to 114.

An independent t -test for equality of means was used to compare Sustainability Score means between Moderates and Sustainables. A statistically significant difference was identified in the scores between the Moderates ($M = 78.91$, $SD = 9.76$) and Sustainables ($M = 87.38$, $SD = 13.21$); $t(64) = 2.93$, $p = 0.005$. These results indicated that respondents' self-identified paradigmatic group matches their Sustainability Score, and that Florida Extension faculty members were able to accurately gauge their personal agricultural paradigm. The effect size of

this difference, as measured by Cohen's *d*, was .73, which was interpreted as a medium effect (Cohen, 1988).

Conclusions

We found that Florida Extension faculty were demographically diverse and fairly evenly distributed. Most held Master's degrees, which was expected, as most Extension agents are required to earn this degree within their first several years of employment with the University of Florida. Geographically, responses were fairly well distributed around the state. The responses from those working in agriculture and horticulture far outnumbered the other disciplines, which we attributed to the likely interest held by individuals working in fields most closely associated with our study.

We undertook this study to explore elements of individual Extension educators' presage variables. We found the updated ACAP scale instrument (Sanagorski et al., 2012) to be reliable, relevant, and able to effectively measure an individual's agricultural preference. We identified three agricultural paradigms held by Florida Extension faculty and named these groups Conventionals, Moderates, and Sustainables. The nature of educators' individual characteristics, or presage variables in Mitzel's teaching and learning model, suggests that these elements are inseparable from the Extension classroom (Dunkin & Biddle, 1974).

When asked to report alignment with a specific paradigm, Extension faculty clustered into statistically different groups with a medium effect size, indicating that there is validity in self-identification with an agricultural paradigm. The Florida Extension faculty's Sustainability Score mean emerged slightly above the median between the most conventional and alternative potential scores, and most respondents indicated that they consider themselves either Sustainables or Moderates. Very few identified themselves as Conventionals. The Moderates and the Sustainables were skewed towards the sustainable paradigmatic preferences. Although Moderates identified themselves as supporters of both paradigms, the data suggests that they are more strongly supportive of the sustainable paradigm. As a whole, University of Florida Extension faculty aligned more closely towards sustainable preference than the conventional end of the spectrum, which we interpreted as a positive view of sustainable agriculture. Based upon this finding, we concluded that faculty at the University of Florida are accepting of a sustainable agricultural paradigm, and are thus incorporating elements of this paradigm into their Extension classroom.

At a time when education was exclusive, the land-grant university system was established to serve all members of American communities and to deliver quality, research-based information regardless of individuals' location, finances, or any other characteristic (Sanderson, 1988). A current goal of UF/IFAS is sustainability of environmental resources (2008). One objective of this study was to measure individual paradigmatic preferences, based on the reality that individual values do not necessarily reflect the objectives set by their organization (Minarovic & Mueller, 2000). This is the first study we know of in which University of Florida Extension Faculty's agricultural paradigmatic preferences were quantitatively measured; our findings suggest synergy between this organization's objectives and its faculty's personal paradigms based on an identification of individual paradigms. We gleaned valuable insight on University of Florida Extension faculty's agricultural preferences from this study, which allowed us to generate a primary documentation of this information.

This study applied Mitzel's model to agricultural Extension programming (Figure 1) and focused on the presage variable (Extension agents' agricultural preferences) as a means to understand the process variable (topics taught). We found this model to be useful in examining the Extension teaching and learning environment. As viewed through the lens of the guiding framework, this study illustrated some characteristics that can influence the teaching process of Florida's Extension educators, or presage variables in Mitzel's model (Dunkin & Biddle, 1974;

Parr, Edwards, & Leising, 2006). Presage variables such as agricultural paradigms are personality traits that educators bring into their teaching (Dunkin & Biddle, 1974), and are linked to topics taught, Extension activities, and outcomes. We discovered that the majority of University of Florida Extension faculty strongly align with Moderate and Sustainable paradigms; thus, we believe that they will bring fundamentals of sustainable agriculture into their teaching environments.

Implications and Recommendations

Recent research has shown that Extension agents are not always the primary or best sources of information for producers (Agunga & Igodan, 2007; Goodwin & Gouldthorpe, 2013), and we sought to identify the role of agricultural preferences as a player in this phenomena. Through the exploration and documentation of paradigmatic preferences held by University of Florida Extension faculty, this study addressed an important information gap and documented elements of University of Florida Extension agents' presage variables, a key component of their teaching outcomes (Dunkin & Biddle, 1974). Baseline data about this population has now been recorded. This research contributed to knowledge regarding possible elements that could hinder effective education to Extension clients (Doerfert, 2011). Based on the findings of this study, we assert that there is no disconnect between the university and its Extension agents as they view goals towards agricultural sustainability. As interpreted through the frame of Mitzel's model, Extension faculty are supportive of the goals of their organization towards sustainability, and will therefore include elements of this paradigm in their teaching.

Despite the use of an incentive offered to participants and multiple replacement surveys, a poor response rate was achieved. The response rate of 37%, while characteristic of electronic survey-based studies, is considered to be quite low. We caution the reader that the small sample size may have prevented the identification of certain relationships between variables. This study was further limited to University of Florida Extension faculty who were employed during June and July of 2012, and to those who chose to respond. Although this instrument was randomly distributed to individuals working in all disciplines, the majority of respondents belonged to agriculture and horticulture fields. We believe this may be due to the fact that agricultural paradigms are most interesting to those working in these closely related areas, which explains the few responses from faculty in other disciplines. We suggest that in future studies, special attention should be given to appealing to the other disciplines. The instrument could be distributed specifically through the different program area leaders to inspire participation among these disciplines.

Several studies have identified many barriers to the adoption of sustainable agriculture (Agunga & Igodan, 2007; Hanson, Kauffman, & Schauer, 1995; Rodriguez, Molnar, Fazio, Sydnor, & Lowe, 2009) and in-service training needs (Agunga, 1995) in this area. This study suggests that Extension attitudes and agricultural preferences are not barriers to their teaching about sustainable agriculture. However, we suggest that qualitative research should be conducted with the University of Florida Extension faculty to explore educational needs and additional perceived barriers to teaching and adopting sustainable agricultural paradigms. The education of Extension faculty has been identified as crucial in diffusing sustainable agricultural practices (Boone et al., 2007; Jayaratne, Martin, & DeWitt, 2001), and we agree that topics in this area should be included in professional training curriculum and resource development.

This research was based on the foundation that the function of an organization is based on individual preferences. While the University of Florida outwardly supported sustainable agriculture, it was not known whether the Extension faculty subscribed to its goals and objectives. We believe that University of Florida Extension administration can be confident in knowing that the majority of their Extension faculty are considered either Sustainables or Moderates, and thus, subscribing of its organizational goals. Now that paradigmatic preferences are documented, an

exploration of the connection between attitudes towards agricultural sustainability and individual characteristics can be conducted. Specifically, the identification of factors that increase one's tendency towards a more sustainable paradigm would be useful to University of Florida administration in planning continuing educational programs. Extension faculty should be provided with training and educational tools related to sustainable agricultural practices to support their teachings on this topic. We suggest that Extension faculty are moving forward from their role as secondary sources of information about sustainable agriculture (Agunga & Igodan, 2007) to primary facilitators of this paradigm.

Further research should be conducted to build upon the findings of this study. We recommend that replications be conducted to measure and compare other land-grant university Extension faculty's paradigms. Resulting data may indicate whether there is a national trend towards a specific paradigm or if attitudes vary between regions or universities. A comparison between agricultural professionals in other organizations and other countries, using the updated ACAP scale, would also be beneficial to understanding perspectives and preferences on various scales.

Every position in Extension is connected to agriculture, and therefore professionals in all subject areas were included in this study. A tendency towards sustainable agriculture was identified in Extension agents in all subject areas, which points to potential opportunities for multidisciplinary teams to work together on projects that support and enhance sustainable agriculture. Based on this conclusion, we recommend that Extension programs should integrate professionals from all disciplines to strengthen initiatives related to sustainable agriculture.

We found the updated ACAP scale valuable in exploring presage variables and recommend that future research may answer the question as to whether this tool can be used to explore Extension clients' agricultural paradigms, or context variables. It is not known whether this instrument would be effective and useful with the end users of Extension services, such as producers and consumers. If this instrument was found to be useful in measuring where Extension clients are paradigmatically, it could be used as a tool to match individuals with similar paradigms or to create interdisciplinary working groups with differing perspectives. This is an area of great opportunity for future research. If this instrument proves to be useful in measuring where an Extension audience falls on the paradigmatic scale, it can be a valuable tool used to segment the audience, direct educational programming, curriculum development, and improve communicated messages to increase the effectiveness of programming.

We suggest that the updated ACAP scale may be a useful tool for other land-grant universities and related organizations in understanding the agricultural paradigmatic preferences that shape their institution. We suggest that the identification of the Sustainables, Moderates, and Conventionals paradigmatic groups as well as an adoption of this terminology may be helpful to this organization as well as others in understanding their staff members.

We believe that Sustainability Scores should be documented on a large geographic scale, providing a clear picture of agricultural paradigms and the national Extension system as a whole. While Mitzel's model has historically been used to apply to traditional classroom teaching, we found it to be highly relevant and valuable in framing Extension education. Extension professionals are tasked with deciding how to communicate with clients in order to achieve behavioral changes. Mitzel's model is an ideal framework with which to explore the personal dynamics of an Extension teaching and learning situation, and it can be used in conjunction with traditional program planning elements, such as logic models. Program planners can use Mitzel's model to explore characteristics of Extension educators and their clients. We suggest that this model be introduced to Extension professionals during continuing educational training programs. Mitzel's model is an ideal accessory to Extension logic models, and it targets a level of individual understanding that would be instrumental in understanding the audience and the teacher in Extension programming.

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