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The Impact of Socioeconomic Factors on Selected Practices by Small Livestock Producers in Florida

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Abstract

Socioeconomic factors could affect the practices of small livestock producers who produce and sell locally or regionally. Yet, there is limited research on the issue in the Southeastern U.S., for example, Florida. Thus, this study assessed the impact of socioeconomic factors on practices of small livestock producers in Florida. The data were obtained from a sample of seventy producers from several counties in Florida, and were analyzed using descriptive statistics and logistic regression analysis. The results showed that a majority practiced rotational grazing; did not test soil regularly; had parasite problems; did not use veterinary services, and practiced record keeping. Further, the binary logistic regression analyses showed that selected socioeconomic factors had statistically significant effects on selected practices. For instance, gender had a statistically significant effect on soil testing; household income had a statistically significant effect on parasite problem; gender had a statistically significant effect on the use of veterinary services; and farming status, race/ethnicity, education, and household income had statistically significant effects on record keeping. The findings suggest that socioeconomic factors may be important in producers adopting practices.

Keywords: Socioeconomic Factors, Selected Practices, Farm Practices, Small Livestock Producers, Small Producers

1. Introduction

Livestock production is important because of its effect on farmers and communities, especially in its ability to create jobs for farmers. Thus, it positively impacts local economies and communities. Yet, the sector has its challenges, such as having the requisite resources to facilitate production; for example, having access to credit, keeping up with changing technology, having access to appropriate markets, and having adequate and appropriate knowledge of farming. These challenges could even be more pronounced for small producers. According to Johnson et al. (2010), the preceding challenges could be minimized if best management practices are adopted. The Colorado State University Extension Service (2009) argued that usually small farmers operate their farms with relatively more enterprises and with limited resources; thus, making it much more difficult for them to keep up with good management practices.

Food and Water Watch (2010) was of the opinion that the above challenges have made it impossible for small- and medium-sized livestock farms to meet consumer demands. As a result, smaller farms have been displaced by factory or industrialized farms, which are able to meet the demands of the marketplace. In addition, it argued that industrialized farming has created an opportunity for the decrease in product prices, utilization of land for production, and easy monitoring of livestock from dangerous wild animals. However, Nierenberg (2006) argued that while industrialized animal production has benefits, it had also contributed negatively to public health, the environment, animal welfare, and rural communities.

The concerns raised about industrialized farming have caused consumers to seek healthier and/or sustainable alternative food systems, such as locally or regionally produced foods. In the light of this, Zepeda and Deal (2009) stated that many consumers are of the opinion that locally produced foods are more environmentally- and climate-friendly alternatives to conventional foods. Peters et al. (2009) also emphasized that local food systems reduce food safety risks, because of the perception that; they: offer improved nutrition; increase the likelihood of consumers making healthier food choices; facilitate obesity prevention, and help reduce risk of other diet-related diseases. Consequently, there is a growing interest in local or regional food markets. The growing interest in locally or regionally produced foods makes it worthwhile for small and regional producers, especially livestock producers, to pursue these markets to increase their profitability and viability.

What is more, practices by local or regional small livestock producers may be related to socioeconomic

factors. Yet, there is limited research on socioeconomic factors and their effects on practices by small livestock producers in Southeastern states, such as Florida, where many small producers reside. Apart from two other studies conducted in the Southeast U.S. by Tackie, Bartlett, Adu-Gyamfi, Quarcoo, & Jahan (2016) on Alabama and Tackie et al. (2018) on Georgia, which deal with socioeconomic factors and their effects on practices that were identified by the authors, there are no other known studies to them specifically on this issue. Thus, the purpose of this study was to assess the impact of socioeconomic factors on selected practices of small livestock producers in Florida. The specific objectives were to (1) identify and describe socioeconomic factors, (2) describe and assess selected practices, and (3) estimate the extent to which socioeconomic factors affect specific practices. This study adopts the formats of the Tackie et al. (2016) and the Tackie et al. (2018) studies. The rest of the article covers the relevant literature, methodology, results and discussion, and conclusion.

2. Literature Review

2.1 Socioeconomic Factors

Producers' socioeconomic factors have been discussed in previous studies on production agriculture. For instance, Suppadit, Phumkokrak, & Poungsuk (2006) assessed the adoption of good agricultural practices for beef cattle farming in Thailand. They reported that 73% were part-time farmers; 80% were males; 37% were 56-65 years; 84% had elementary or lower education, and 33% had annual household incomes of baht 50,001-100,000 ($1,506-3,012).

Gaul, Hochmuth, Israel, & Treadwell (2009) evaluated the characteristics of small farm operators in Florida. They found that 95% were Whites; 58% were 45-64 years, and 45% had college degrees. About 44% indicated that more than fifty percent of their household income was from the farm, and 64-70% had farm sizes of 50 or less.

Tackie, Ngandu, Allen, Baharanyi, & Ojumu (2012) evaluated the characteristics and status of small and limited resource meat goat farmers in the Alabama Black Belt. They found that 53% of respondents were part-time farmers; 55% were 46-65 years; 80% were males; 70% were Blacks, and 53% had a high school diploma or an associate's degree.

Ogunkoya (2014) examined socioeconomic factors that affect livestock production in South Africa. The results showed that 77% were full-time farmers; 88% were males, and 89% were married. Exactly 50% were 38-57 years; 43% had high school education, and 82% earned an annual household income of Rands 60,000 ($4,507).

Tackie et al. (2016) assessed the impact of socioeconomic factors on selected practices by small livestock producers in Alabama. They reported that 69% were part-time farmers; 83% were males, and 81% were Blacks. Additionally, 51% were 45-64 years; 65% had at most a two-year/technical degree or some college education, and 51% had an annual household income of at most $40,000.

Tackie et al. (2018) also analyzed the impact of socioeconomic factors on selected practices by small livestock producers in Georgia. They found that 50% were part-time farmers; 55% were females; 58% were Whites. Approximately 38% were 45-64 years; 53% had at most a two-year/technical degree or some college education, and only 15% had an annual household income of at most $40,000.

2.2 Practices by Livestock Producers

Furthermore, practices used by producers have been discussed in past studies, and these played a role in production outcomes. For example, Vestal, Ward, Doyle, & Lalman (2006) analyzed beef cattle production and management practices and implications for educators. They reported that 49% of producers used a computerized method of record keeping; 19% used forage testing and based supplemented feed needs on animal requirements, and 70% provided hay feeding for at least 90 days. Moreover, 81% performed both single and multiple vaccinations before marketing the calves; 45% used growth-promoting implants, and 70% left bulls with cows for 60 to 90-day breeding periods.

Johnson et al. (2010) examined factors affecting adoption of recommended management practices in stocker cattle production. They reported that 36% of producers always implanted cattle; 60% had knowledge of setting proper stocking rates and had long-term business plans; 26% marketed their cattle in uniform lots, and 11% used cash contracts as a risk management tool in marketing calves. Also, they reported that: (1) income, farm size, and farming status (full-time status) had significant effects on adoption of stocking rates; (2) farm size, income, and age had significant effects on marketing, and (3) income, some college education, age, and full-time status had significant effects on implanting calves.

Debele, Guru, Hundessa, & Duguma (2013) assessed farmers' management practices and factors affecting goats' systems in Kombolocha District, Ethiopia. They reported that 74% of the farmers used

communal lands for grazing; 77% practiced vaccination in ordinary times, and 37% vaccinated animals during a disease outbreak. About 77% used veterinary services, and 52% dewormed their goats.

Boz (2014) analyzed the best management practices and innovations in beef cattle farming and their adoption in the Eastern Mediterranean Region of Turkey. The author found that 70% of producers considered the roughage to concentrate ratio of feed before feeding it to their cattle; 55% grew fodder crops; 94% used concentrated feed, and 54% used vitamins and minerals for animal feeding. Further, 95% used veterinary services regularly, and 93% "identified" and registered their animals.

Tackie et al. (2012) examined the characteristics and status of small and limited resource meat goat farmers in the Alabama Black Belt. They reported that 88% fed animals on pasture; yet, 73% fed hay, and 98% fed some form of grain/grain mix; implying that some part of the year, possibly in the winter when pasture quality and quantity is low, hay is fed. Additionally, 70% had parasite problems, and 98% indicated that they had access to veterinary services.

Tackie et al. (2016) ascertained the impact of socioeconomic factors on selected practices by small livestock producers in Alabama. The results showed that 68% of respondents practiced rotational grazing and 48% regularly practiced soil testing. Almost 59% had parasite problems; 77% used the services of a veterinarian, and 62% kept records. Moreover, the results showed that farming status had a statistically significant impact on rotational grazing. Education and household income had statistically significant impacts on the incidence of parasites. Age had a statistically significant impact on the use of the services of a veterinarian. Lastly, race/ethnicity and education had statistically significant impacts on keeping records.

Tackie et al. (2018) also evaluated the impact of socioeconomic factors on selected practices by small livestock producers in Georgia. Their findings revealed that 78% of producers practiced rotational grazing and 73% regularly practiced soil testing. Exactly 65% affirmed that they had parasite problems; 73% used the services of a veterinarian, and 75% kept records. The findings also revealed that gender and race/ethnicity had statistically significant impacts on use of the services of a veterinarian. With the manipulation of data, income had statistically significant impacts on testing soil regularly and keeping records.

3. Methodology

3.1 Data Collection

The study used a questionnaire, which comprised three parts, namely, production, processing, and demographic information. The questionnaire was submitted to the Institutional Review Board, Human Subjects Committee of the Institution for approval before being administered. It was administered to a convenience sample of small livestock producers. This method of sampling was used, because of a lack of a known sampling frame from which subjects could be drawn.

The data were collected by interviewing beef cattle and meat goat producers at several program sites in Florida, and the producers were from 18 Florida counties, mostly in the northern and middle part of the state: Alachua, Bay, Clay, Dixie, Duval, Gadsden, Gulf, Hamilton, Hernando, Hillsborough, Jackson, Jefferson, Leon, Madison, Marion, Polk, Taylor, and Wakulla. The data collection period was from the summer of 2013 to the summer of 2015. They were collected by Extension agents and other technical personnel from Florida A&M University, as well as a graduate student from Alabama. The sample size was 70, and it was considered adequate for the study. Not all the responses to questions on the questionnaire are reported in this study, because this is part of a lager study.

3.2 Data Analysis

The study used descriptive statistics and binary logistic regression analysis to analyze the data. The two main descriptive statistics used were frequencies and percentages. Regarding the logistic regression analysis, the general model is stated as follows:

$$Y_i = \ln (P_i/1\text{-}P_i) = \beta_0 + \beta_j X_{ij} + \varepsilon \quad (1)$$

Where:

$Y_i = \ln (P_i/1\text{-}P_i)$ = the natural log (or the log odds) of the probability that the i^{th} observation of the dependent variable belongs to a particular group to the probability that it does not belong to that particular group

β_0 = constant

β_i = coefficients

i = number of observations

j = number of independent variables

X_i = independent variables
ε = error term
Five models were developed for the selected five production practices, just as in the Tackie et al. (2016) study for Alabama and Tackie et al. (2018) study for Georgia. The estimation model for Model 1 is stated as:

$$\ln (P_{ROG}/1\text{-}P_{ROG}) = \beta_0 + \beta_1 STA + \beta_2 GEN + \beta_3 RAC + \beta_4 AGE + \beta_5 EDU + \beta_6 HHI + \varepsilon \quad (2)$$

Where:
$\ln (P_{ROG}/1\text{-}P_{ROG})$ = the natural log (or the log odds) of the probability that a producer practices rotational grazing to the probability that a producer does not practice rotational grazing
STA = Farming status
GEN = Gender
RAC = Race/ethnicity
AGE = Age
EDU = Education
HHI = Household income

Thus, the estimation model hypothesizes that the natural log of the probability that a producer practices rotational grazing to the probability that a producer does not practice rotational grazing is affected by farming status, gender, race/ethnicity, age, education, and household income. It was assumed that the expected signs of the independent variables were not known a priori.

Identical models were set up for practices 2 to 5:
Soil test (SOT)
Parasite problem (PAP)
Veterinary services (VES)
Record keeping (REC)

Specifically,
Model 2:

$$\ln (P_{SOT}/1\text{-}P_{SOT}) = \beta_0 + \beta_1 STA + \beta_2 GEN + \beta_3 RAC + \beta_4 AGE + \beta_5 EDU + \beta_6 HHI + \varepsilon \quad (3)$$

Where:
$\ln (P_{SOT}/1\text{-}P_{SOT})$ = the natural log (or the log odds) of the probability that a producer regularly conducts soil tests to the probability that a producer does not regularly conduct soil tests
Dependent variables = as previously described

Model 3:

$$\ln (P_{PAP}/1\text{-}P_{PAP}) = \beta_0 + \beta_1 STA + \beta_2 GEN + \beta_3 RAC + \beta_4 AGE + \beta_5 EDU + \beta_6 HHI + \varepsilon \quad (4)$$

Where:
$\ln (P_{PAP}/1\text{-}P_{PAP})$ = the natural log (or the log odds) of the probability that a producer has a parasite problem to the probability that a producer does not have a parasite problem
Dependent variables = as previously described

Model 4:

$$\ln (P_{VES}/1\text{-}P_{VES}) = \beta_0 + \beta_1 STA + \beta_2 GEN + \beta_3 RAC + \beta_4 AGE + \beta_5 EDU + \beta_6 HHI + \varepsilon \quad (5)$$

Where:
$\ln (P_{VES}/1\text{-}P_{VES})$ = the natural log (or the log odds) of the probability that a producer uses veterinary services to the probability that a producer does not use veterinary services
Dependent variables = as previously described

Model 5:

$$\ln (P_{REC}/1\text{-}P_{REC}) = \beta_0 + \beta_1 STA + \beta_2 GEN + \beta_3 RAC + \beta_4 AGE + \beta_5 EDU + \beta_6 HHI + \varepsilon \quad (6)$$

Where:
$\ln (P_{REC}/1\text{-}P_{REC})$ = the natural log (or the log odds) of the probability that a producer practices record keeping to the probability that a producer does not practice record keeping
Dependent variables = as previously described

The details of the independent variable names and descriptions used for the models are shown in the

Appendix, Tables 1-5. The logistic regression analysis was run for the various models using SPSS 12.0© (MapInfo Corporation, Troy, NY). The criteria used to assess the models were the model chi-squares, beta coefficients, *p* values, and odd ratios.

4. Results and Discussion

Table 1 shows the socioeconomic characteristics of the respondents. Sixty percent of the respondents were part-time farmers and 34% were full-time farmers; equal proportions (50% each) were males and females, and 47% were Whites. Additionally, 52% were 45-64 years old and 39% were 65 years or older. With regards to education and household income, 66% had at least a two-year/technical degree; whereas, 33% were high school graduates or had a lower educational level; 60% had an annual household income of $40,000 or below and 36% had an annual household income of over $40,000. The result of the farming status agrees with Tackie et al. (2016) for Alabama who also reported more part-time farmers than full-time farmers. In terms of age and education, the results are in agreement with Tackie et al. (2016) for Alabama and Tackie et al. (2018) for Georgia. They found more producers over the age of 44 years than below, and more producers with at most a two-year/technical degree or some college education than otherwise. Furthermore, the findings agree with Tackie et al. (2016) for Alabama where a higher number of respondents earned $40,000 or less annual household income than over $40,000. On the contrary, the results differ from Tackie et al. (2016) and Tackie et al. (2018) for Georgia in terms of gender and race/ethnicity, as well as for Tackie et al. (2018) for Georgia in terms of annual household income.

Table 2 depicts selected practices used by the producers. About 63% indicated they practiced rotational grazing; whereas 37% did not; 40% conducted soil tests regularly and 59% did not; 54% had parasite problems and 46% did not have such problems. Furthermore, 47% indicated that they used veterinary services as opposed to 50% who did not; 81% of the producers stated that they kept records, and 19% stated that they did not keep records. Three findings, rotational grazing, parasite problem, and record keeping, were identical to Tackie et al. (2016) for Alabama and Tackie et al. (2018) for Georgia. In both studies, there were more producers who performed the practice than those who did not. In the case of soil tests, the finding was in agreement with Tackie et al. (2016) for Alabama, where less than 50% of respondents practiced soil testing; however, it was not in agreement with Tackie et al. (2018) for Georgia where nearly 73% conducted soil tests regularly. Additionally, the finding for the use of veterinary services was inconsistent with those attained by Tackie et al. (2016) for Alabama and Tackie et al. (2018) for Georgia where more producers used veterinary services compared to the current study.

Table 1. Socioeconomic Characteristics (N = 70)

Variable	Frequency	Percent
Farming Status		
Full-time	24	34.3
Part-time	42	60.0
No Response	4	5.7
Gender		
Male	35	50.0
Female	35	50.0
Race/Ethnicity		
Black	29	41.4
White	33	47.1
Hispanic	1	1.4
Other	7	10.0
Age		
20-24 years	0	0.0
25-34 years	1	1.4
35-44 years	5	7.1
45-54 years	13	18.6
55-64 years	23	32.9
65 years or older	27	38.6
No Response	1	1.4
Educational Level		

High School Graduate or Below	23	32.9
Two-Year/Technical Degree	7	10.0
Some College	21	30.0
College Degree	16	22.9
Post-Graduate/Professional Degree	2	2.9
No Response	1	1.4
Annual Household Income		
$10,000 or less	5	7.1
$10,001-20,000	5	7.1
$20,001-30,000	18	25.7
$30,001-40,000	23	20.0
$40,001-50,000	14	2.9
$50,001-60,000	2	20.0
Over $60,000	14	12.9
No Response	3	4.3

Table 2. Selected Practices (N = 70)

Variable	Frequency	Percent
Rotational Grazing		
Yes	44	62.9
No	26	37.1
Soil Tests for Pasture Regularly		
Yes	28	40.0
No	41	58.6
No Response	1	1.4
Parasite Problem		
Yes	38	54.3
No	32	45.7
Veterinary Services		
Yes	33	47.1
No	35	50.0
Not Response	2	2.9
Record Keeping		
Yes	57	81.4
No	13	18.6

Table 3 presents the estimates of the effects of socioeconomic factors on selected practices. The model chi-square (which relates to the overall significance of the model) for the rotational grazing model was not statistically significant (p = 0.905). This implies a weak fit between the socioeconomic factors and whether or not a producer practiced rotational grazing. The Nagelkerke R^2 was 0.046; this means the socioeconomic variables explain 5% of the variation in whether or not respondents practiced rotational grazing. Not surprisingly, none of the coefficients of the socioeconomic factors was statistically significant. The results are contrary to those obtained by Tackie et al. (2016) for Alabama who found that farming status had a statistically significant effect on rotational grazing. However, they are consistent with Tackie et al. (2018) for Georgia. They reported that none of the socioeconomic factors had a statistically significant impact on rotational grazing.

Table 3. Estimates for Various Models on the Effects of Socioeconomic Factors on Selected Practices

	ROG			SOT		
Variable	β	*p*	OR	β	*p*	OR
STA	-0.411	0.484	0.663	-0.225	0.707	0.798
GEN	-0.185	0.749	0.831	-1.061*	0.079	0.346
RAC	-1.175	0.555	0.839	-0.342	0.299	0.711
AGE	-0.069	0.841	0.993	-0.038	0.911	0.963
EDU	-0.063	0.792	1.065	0.044	0.862	1.045
HHI	-0.155	0.379	0.856	-0.135	0.467	0.874
Constant	2.356	0.292	10.548	1.672	0.453	5.321
Chi-square		2.150 (p = 0.905)		5.963 (p = 0.427)		
Nagelkerke R^2		0.046		0.124		

Table 3 Continued.

	PAP			VES		
Variable	β	*p*	OR	β	*p*	OR
STA	-0.833	0.169	0.435	-0.367	0.555	0.693
GEN	-0.144	0.814	0.865	-1.575**	0.014	0.207
RAC	-0.459	0.183	0.632	-0.202	0.524	0.817
AGE	-0.391	0.262	0.676	0.372	0.298	1.450
EDU	0.141	0.576	1.152	-0.120	0.640	0.887
HHI	0.393**	0.050	1.481	-0.244	0.207	0.783
Constant	2.285	0.310	9.826	1.182	0.597	3.260
Chi-square		10.257 (p = 0.114)		10.649* (p = 0.100)		
Nagelkerke R^2		0.203		0.217		

The model chi-square for the soil test was not statistically significant (p = 0.427). This implies a weak fit between the socioeconomic factors and whether or not a producer conducted soil tests regularly. The Nagelkerke R^2 was 0.124; this means the socioeconomic variables together explain 12% of the variation in whether or not a producer conducted soil tests regularly. Despite the overall insignificance of the model, the coefficient of gender was statistically significant. Therefore, it was assumed that a factor was likely "impeding" a possible overall significance. Consequently, additional analyses were done by dropping factors one at a time; yet still, the overall model was not significant. For gender, it may be that female producers more than male producers are likely to conduct soil tests regularly, all things equal. These findings are in opposition to those by Tackie et al. (2016) for Alabama and Tackie et al. (2018) for Georgia who found that none of the socioeconomic factors had a statistically significant effect on soil testing.

Table 3 Continued.

Variable	REC β	*p*	OR
STA	-1.577*	0.097	0.207
GEN	1.446	0.215	4.247
RAC	0.973**	0.036	2.645
AGE	-0.678	0.223	0.507
EDU	0.663*	0.098	1.940
HHI	-0.645**	0.027	0.525
Constant	2.207	0.506	9.092
Chi-square	16.733*** (p = 0.010)		
Nagelkerke R^2	0.397		

***Significant at 1%; **Significant at 5%; *Significant at 10%; OR = Odds Ratio

The model chi-square for the parasite problem model was not statistically significant (p = 0.114). This also means a weak fit between the socioeconomic factors and whether or not a producer had parasite problems. The Nagelkerke R^2 was 0.203; this means the socioeconomic variables explain 20% of the variation in whether or not a producer had parasite problems. The preceding notwithstanding, household income was statistically significant. Thus, again, it was assumed that a factor was likely "impeding" a possible overall significance. Consequently, additional analyses were conducted by dropping factors one or two at a time. When gender was dropped, household income was still statistically significant (p = 0.050) with β = 0.390 and OR = 1.477; the model chi-square was 10.202 and statistically significant (p = 0.070), and the Nagelkerke R^2 was 0.202 (not shown in Table). When gender and education were dropped, household income was still statistically significant (p = 0.018) with β = 0.435 and OR = 1.545; the model chi-square was 9.909 and statistically significant (p = 0.042), and the Nagelkerke R^2 was 0.197 (not shown in Table). It may be plausible that income is critical for treating parasites, and that those with higher incomes are more able to treat parasites because of availability of resources, all things equal. The odds ratio of 1.481 for household income means that if income increases from one category to the next category, a producer is nearly 1.5 times more likely to have parasite problems; but this is counter to intuition since higher income persons have more resources should be better able to deal with parasites. The possible explanation is that this group of respondents may be finding it difficult to deal with parasites, as the problem of parasites is common in the Southeast, and difficult to treat. The producers may just be coping with it or other practices may be impinging on its control. However, farming status, gender, race/ethnicity, age, and education were not statistically significant. The results in are incongruent with those found by Tackie et al. (2016) for Alabama. They found that education and household income had statistically significant effects on parasite problem. Similarly, the results are in disagreement with Tackie et al. (2018) for Georgia. They found that none of the socioeconomic factors was significant.

The model chi-square for the veterinary services model was statistically significant (p = 0.100). This implies a fairly strong fit between the socioeconomic factors and whether or not a producer used veterinary services. The Nagelkerke R^2 was 0.217; this means the socioeconomic factors explain 22% of the variation in whether or not respondents used veterinary services. The coefficient of gender was statistically significant (p = 0.014). This means that gender contributed to whether or not a producer used veterinary services. Moreover, it may mean that female producers were more likely to use veterinary services. A plausible explanation for is that female producers may have the propensity to use the services of a veterinarian, because they might not want to chance treating the animals themselves, all things equal. The odds ratio of 0.207 for gender means that if gender changes from female to male, a producer is about 0.20 (a fifth) times less likely to use the services of a veterinarian. However, farming status, age, education, and household income were not statistically significant. The findings are contrary to the ones obtained by Tackie et al. (2016) for Alabama and Tackie et al. (2018) for Georgia. They, respectively, reported age had a statistically significant effect on veterinary services, and gender and race/ethnicity had statistically significant effects on veterinary services.

The model chi-square for the record keeping model was statistically significant (p = 0.010). This implies a strong fit between the socioeconomic factors and whether or not a producer practiced record keeping. The Nagelkerke R^2 was 0.397; this means the socioeconomic variables explain nearly 40% of the variation in

whether or not a producer practiced record keeping. The coefficients of farming status, race/ethnicity, education, and household income were statistically significant (respectively, $p = 0.097$, $p = 0.036$, $p = 0.098$, and $p = 0.027$). This means that farming status, race/ethnicity, education, and household income contributed to whether or not a producer practiced record keeping. For farming status, it may mean that part-time producers practiced record keeping less than full-time producers, because the former group had less time available to perform for additional tasks. For race/ethnicity, it may mean that White producers are more likely to practice record keeping compared to Black producers, because White producers normally have more resources than Black producers, all things equal. For education, it may mean that those with higher educational levels are more likely to practice record keeping than those with lower educational levels. The reason is that more likely than not highly educated producers will value or appreciate the value of records more than those with lower levels of education. For household income, it is generally true that those with higher income levels are more likely to practice record keeping compared to those with lower levels of income. The odds ratio of 0.525 for household income means that if income increases from one category to the next, a producer is nearly 0.5 (one-half) times more likely not to keep records; this is counterintuitive. A possible explanation for this anomaly may be that higher income producers were being impeded by some external factor or factors to prevent them from spending time on record keeping. However, gender and age were not statistically significant. These findings partially agree with Tackie et al. (2016) for Alabama who found that race/ethnicity and education had statistically significant effects on record keeping. On the contrary, they do not agree with Tackie et al. (2018) for Georgia who reported that none of the socioeconomic factors was statistically significant; but when gender was dropped for that study, household income was significant.

5. Conclusion

The study assessed the impact of socioeconomic factors on selected practices of small livestock producers in Florida. Specifically, it identified and described socioeconomic factors; described and assessed selected practices; and estimated the extent to which socioeconomic factors influenced selected practices. The data were collected using a questionnaire and were analyzed by descriptive statistics and logistic regression analysis. The results showed that there were more part-time farmers than full-time farmers (60 v. 34%); equal proportions of male and female farmers (50 v. 50%); more White farmers than Black farmers (47 v. 41%); more farmers 45 years or older than younger farmers (89 v. 8%); more farmers with at least a two-year/technical degree than lower educational levels (73 v. 26%), and more farmers with an annual household income of less than $40,000 compared to those with an annual household income of over $40,000 (60 v. 36%). A majority of the producers practiced rotational grazing (63%); did not test soil regularly (59%); had parasite problems (54%); did not use veterinary services (50%), and practiced record keeping (81%). The binary logistic regression analyses showed that selected socioeconomic factors had statistically significant effects on selected practices. For instance, gender had a statistically significant effect on soil testing. Household income had a statistically significant effect on parasite problems. Gender had a statistically significant effect on use of veterinary services. Farming status, race/ethnicity, education, and household income had statistically significant effects on record keeping.

The preceding gives an indication that practices by small livestock producers are important. However, it appears that the respondents do not highly consider regular soil testing, or use of veterinary services. It may be that they do not see the relative significance of these practices. Providing education or training may help in this direction. In addition, the fact that selected socioeconomic factors affect selected practices is an indication that socioeconomic factors matter in practices implemented by small producers. These factors must be considered in designing and implementing programs for small producers. The study has shown how socioeconomic factors affect practices by small livestock producers; specifically, small beef cattle and goat meat producers. Its main contribution is the indication that farming status, gender, race/ethnicity, education, and annual household income affect practices by small livestock producers, in particular, in the study area. Future studies are needed, and these may include replicating this study as is, or with a larger sample size, and/or covering a larger area.

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Appendix

Variable Definitions and Description of Data for the Various Models

Table 1. Variable Definitions and Description of Data for the Rotational Grazing Model (N = 62)

Variable	Description	Mean	Standard Deviation
Farming status	1 = full-time 2 = part-time	1.65	0.48
Gender	1 = male 0 = female	0.48	0.50
Race/ethnicity	1 = Black 2 = White	1.87	0.91
Age	1 = 20-24 2 = 25-34 3 = 35-44 4 = 45-54 5 = 55-64 6 = 65 or above	5.11	0.96
Education	1 = high school or less 2 = two-year/technical 3 = some college 4 = college degree 5 = post-graduate/professional	2.47	1.24
Household income	1 = $10,000 or less 2 = $10,001-20,000 3 = $20,001-30,000 4 = $30,001-40,000 5 = $40,001-50,000 6 = $50,001-60,000 7 = more than $60,000	4.22	1.86
Rotational grazing	1 = yes 0 = no	0.62	0.49

Table 2. Variable Definitions and Description of Data for the Soil Test Model (N = 62)

Variable	Description	Mean	Standard Deviation
Farming status	1 = full-time 2 = part-time	1.64	0.48
Gender	1 = male 0 = female	0.48	0.50
Race/ethnicity	1 = Black 2 = White	1.87	0.91
Age	1 = 20-24 2 = 25-34 3 = 35-44 4 = 45-54 5 = 55-64 6 = 65 or above	5.11	0.96
Education	1 = high school or less 2 = two-year/technical 3 = some college 4 = college degree 5 = post-graduate/professional	2.47	1.24
Household income	1 = $10,000 or less 2 = $10,001-20,000 3 = $20,001-30,000 4 = $30,001-40,000 5 = $40,001-50,000 6 = $50,001-60,000 7 = more than $60,000s	4.22	1.86
Soil test	1 = yes 0 = no	0.40	0.49

Table 3. Variable Definitions and Description of Data for the Parasite Problem Model (N = 62)

Variable	Description	Mean	Standard Deviation
Farming status	1 = full-time 2 = part-time	1.64	0.48
Gender	1 = male 0 = female	0.48	0.50
Race/ethnicity	1 = Black 2 = White	1.87	0.91
Age	1 = 20-24 2 = 25-34 3 = 35-44 4 = 45-54 5 = 55-64 6 = 65 or above	5.11	0.96
Education	1 = high school or less 2 = two-year/technical 3 = some college 4 = college degree 5 = post-graduate/professional	2.47	1.23
Household income	1 = $10,000 or less 2 = $10,001-20,000 3 = $20,001-30,000 4 = $30,001-40,000 5 = $40,001-50,000 6 = $50,001-60,000 7 = more than $60,000	4.22	1.86
Parasite Problem	1 = yes 0 = no	0.50	0.50

Table 4. Variable Definitions and Description of Data for the Veterinary Services Model (N = 60)

Variable	Description	Mean	Standard Deviation
Farming status	1 = full-time 2 = part-time	1.63	0.49
Gender	1 = male 0 = female	0.50	0.50
Race/ethnicity	1 = Black 2 = White	1.87	0.93
Age	1 = 20-24 2 = 25-34 3 = 35-44 4 = 45-54 5 = 55-64 6 = 65 or above	5.12	0.98
Education	1 = high school or less 2 = two-year/technical 3 = some college 4 = college degree 5 = post-graduate/professional	2.48	1.24
Household income	1 = $10,000 or less 2 = $10,001-20,000 3 = $20,001-30,000 4 = $30,001-40,000 5 = $40,001-50,000 6 = $50,001-60,000 7 = more than $60,000	4.15	1.84
Veterinary Services	1 = yes 0 = no	0.50	0.50

Table 5. Variable Definitions and Description of Data for the Record Keeping Model (N = 64)

Variable	Description	Mean	Standard Deviation
Farming status	1 = full-time 2 = part-time	1.64	0.48
Gender	1 = male 0 = female	0.48	0.50
Race/ethnicity	1 = Black 2 = White	1.87	0.89
Age	1 = 20-24 2 = 25-34 3 = 35-44 4 = 45-54 5 = 55-64 6 = 65 or above	5.12	0.95
Education	1 = high school or less 2 = two-year/technical 3 = some college 4 = college degree 5 = post-graduate/professional	2.45	1.23
Household income	1 = $10,000 or less 2 = $10,001-20,000 3 = $20,001-30,000 4 = $30,001-40,000 5 = $40,001-50,000 6 = $50,001-60,000 7 = more than $60,000	4.30	1.87
Record keeping	1 = yes 0 = no	0.84	0.37