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DO SOCIOECONOMIC FACTORS MATTER IN ACREAGE OWNED AND ACREAGE FARMED BY SMALL LIVESTOCK PRODUCERS IN FLORIDA?

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Abstract

There is a likelihood that socioeconomic factors may impact acreage owned and acreage farmed by small producers; however, limited research have been done on this subject in the Southeastern states, such as in Florida. Consequently, this research assessed the impact of socioeconomic factors on acreage owned and acreage farmed by small livestock producers in Florida. The data were collected from a convenience sample of producers, and they were analyzed using descriptive statistics and ordinal logistic regression analysis. The results showed that most had farming and livestock farming experience of 20 years or less. Furthermore, two-thirds (67%) owned 30 acres of land or less, and a majority (69%) farmed over 30 acres. The ordinal logistic regression analyses revealed that, of the socioeconomic factors, only farming status had statistically significant effects on acreage owned and acreage farmed. The findings imply that socioeconomic factors, particularly, farming status, may be important in farm size in the study area. Perhaps, they should be considered in programs to assist small producers.

Keywords: Socioeconomic Factors, Acreage Owned, Acreage Farmed, Small Livestock Producers, Small Producers

INTRODUCTION

The issue of farm size has generated a lot of discussion, including its definition. For example, MacDonald, Korb, & Hoppe (2013) defined farm size as the acreage operated by the farm, including any that it rents, less any that is rented to other farms. The Smallholders in Transition Team (2017) also defined farm size as "the land operated by the household, intended as the land owned plus the agricultural land rented/borrowed/sharecropped in minus the agricultural land rented/lent/sharecropped out. Also, the land left fallow is considered operated land" (p. 4). However, Whitt (2020, p. 1) examined farm size from the perspective of gross cash farm income (GCFI), and based it on four main size categories; but, Category 1 and Category 3, respectively, had five and two subcategories. These were as follows: (1) Small family farms (GCFI less than $350,000): (a) low-sales farms (GCFI less than $150,000); (b) moderate-sales farms (GCFI between $150,000-349,999); (c) retirement farms, that is, small farms whose main operators indicate that they are retired; yet, continue to farm on a limited scale; (d) off-farm occupation; that is, small farms whose main operators indicate a full-time occupation apart from farming; (e) farming-occupation farms; that is, small farms whose main operators indicate farming as their main occupation; (2) mid-size family farms (GCFI between $350,000 and 999,999); (3) large-scale family farms (GCFI of $1,000,000 or higher): (a) large farms; that is, farms with GCFI between $1,000,000 and 4,999,999; (b) very large farms ; that is, farms with GCFI of

$5,000,000 or higher; and (4) nonfamily farms; that is, farms where the main operator and persons related to him or her do not have majority ownership of the farm.

According to the USDA NASS (2019a), the number of producers in 2017 was 3.4 million, up 7% from 2012. As in 2012, there were more male producers than female producers in 2017 (2.17 million vs. 1.23 million); the proportions were 64% males to 36% females. The proportion of producers with main occupation as farming was 42%; however, the proportion of those who had main occupation other than farming was 58%. There were 45,508 Black producers and 3.2 million White producers; the proportions were, respectively, 1.3% and 95.4%. The average age of producers was 57.5 years. Additionally, land devoted to farming has been decreasing and farm size has been increasing. According to US Farm Data (n.d.), the acreage devoted to crops and grazing land declined from 911 and 910 million acres from 2016 to 2017. Also, the USDA NASS (2019b) reported that the number of farms in the U.S. decreased from 2.11 million in 2012 to 2.04 million in 2017; however, only the smallest farms (less than 10 acres) and the largest farms (2,000 and higher) increased in number. The average farm size also increased from 434 acres in 2012 to 441 in 2017. Furthermore, Maixner & Wyant (2019) emphasized that from the 1930s to present, the average farm size has increased vis-à-vis the number of farms, which has decreased. The USDA NASS (2019c) found that 76% of farms made sales of less than $50,000; 58% made sales of less than $10,000, and 39% made sales of less than $2,500 in 2017. This implies that small producers still form an important fabric of the U.S. Agricultural landscape.

Relatedly, the FAO (2015) argued that there is no unique definition of a small producer. It posited that usually, farm size is used to classify producers. Therefore, it indicated that “households with less than a threshold land size may be characterized” as small producers (p. 3). Usually, this threshold is less than 2 hectares (5 acres). In this paper, we also view size from the perspective of acreage acquired or land size. In fact, land size is linked to the type of producer whether small or large. Normally, small producers have small acreages or farm sizes. Farm size itself may be affected by socioeconomic factors. However, there are not many studies that have been conducted on the effects of socioeconomic factors of small producers on farm size. A category of producers for whom this issue may be important is small livestock producers in the Southeast in general, and Florida in particular. On the basis of the aforementioned narrative, there is a need to determine the effects of socioeconomic factors on farm size for small livestock producers in this area. Consequently, the purpose of the study was to analyze the impact of socioeconomic factors on acreage owned and acreage farmed by small livestock producers in Florida. The objectives were to (1) identify and describe socioeconomic and other factors, and (2) estimate the extent to which socioeconomic factors affect acreage owned and

acreage farmed. To the best of our knowledge, only two studies, Tackie, Bartlett, & Nunoo (2019) and Tackie, Bartlett, Adu-Gyamfi, Perry, & Nunoo (2020) have analyzed the effects of socioeconomic factors on farm size of small livestock producers, and this study is modeled after those two studies.

LITERATURE REVIEW

Various researchers have studied farm size in regards to diverse factors. However, very few have researched the topic from the perspective of the effect of socioeconomic factors on farm size; specifically, acreage owned and acreage farmed. Thus, some of these selected studies are described in order of normal chronology. For instance, Carter (1984) examined the inverse relationship between farm size and productivity in India. The data were analyzed by descriptive statistics and regression analysis. He defined a small farm as one that had less than 10 acres (4.04 hectares) and a large farm as greater than 10 acres. He reported that the average size of a small farm was 3.02 hectares (7.46 acres) and the average size of a large farm was 8.46 hectares (20.90 acres). He also reported that per capita hectare production for small farms were higher than for large farms. The regression results showed that there was a strong inverse association between farm size and productivity. This effect is buttressed by the fact that as farm size doubled, per hectare production decreased nearly 40%; even when the difference between small and large farms were controlled for or taken into account, per hectare production still decreased by 20% as farm size doubled. According to the author, this suggests a closer look at small farms as a conduit for development.

Further, Hoque (1988) analyzed farm size and economic-allocative efficiency in Bangladesh Agriculture. They used ordinary least squares regression analysis, where grown output/gross cropped area was the dependent variable, and irrigation ratio, labor per acre, biological-chemical input per acre, traditional input per acre, and ownership proxy were independent variables. Also, they ascertained the relative economic and allocative efficiency vis-à-vis farm size. There were six farm sizes, namely, 1-3 acres; 3-7 acres; 7-12 acres; 12-18 acres; 12-18 acres, and 18 acres and above. The findings showed that labor, biological-chemical input, ownership, and traditional input had positive and significant effects on output. Smaller farms had higher relative economic efficiency compared to larger farms (i.e., greater than 12 acres). On the contrary, when it came to allocative efficiency, larger farms were more efficient than smaller farms. Both smaller and larger farms were inefficient in terms of labor and in terms of biological-chemical input. Further analysis between farm sizes and allocative efficiency and economic efficiency showed that farm size and allocative efficiency for biological-chemical input were significant and positively related for all farm size ranges, and farm size and

allocative efficiency for labor input were significant and positively related for farm size ranges up to 18 acres. Moreover, for overall efficiency, farm size and economic efficiency were significant and positively related for farm size ranges up to 7 acres, but were significant and negatively related for farm size ranges beyond 7 acres up to 18 acres, and not significant for farm sizes above 18 acres. Based on the preceding, the author posited that the most efficient farm size was between 7-12 acres with the ideal or optimum farm size as 10 acres.

Also, Papadas & Dahl (1991) assessed technical efficiency and farm size. They collected data, output and input, from 31 states in the U.S., and used Data Envelopment Analysis. For farm size they used twelve different sizes based on sales as the following: (1) less than $2,500; (2) $2,500-4,999; (3) $5,000-9,999; (4) $10,000-19,999; (5) $20,000-24,999; (6) $25,000-39,999; (7) $40,000-49,999; (8) $50,000-99,999; (9) $100,000-249,999; (10) $250,000-499,999; (11) $500,000-999,999; and (12) $1,000,000 or higher. The results revealed that farms with sales equal to or more than $100,000 (i.e., sizes 9-12) were efficient; farms with sales from $10,000 to $99,999 were inefficient (i.e., sizes 4-8). In this case, the inefficiency becomes more pronounced as one moved closer to smaller sizes. However, the inefficiency ceased at size 4, and efficiency returned for farms with sales of less than $10,000 (i.e., sizes 1-3). In other words, efficiency was present at the extremes of the classes. The authors explained that a plausible reason for efficiency for the smaller sizes, could be due to characteristics or nature of labor. Their position was smaller size farms rely on family labor and the cost of family labor is usually not recorded, even if it exists.

Additionally, Adesina & Djato (1996) evaluated farm size, relative efficiency, and agrarian policy in Cote D'Ivoire relative to rice farms. They obtained data through a survey of farmers. They defined a large farm size as at least 5 hectares (12.35 acres); however, for sensitivity analysis' sake they tested also for a large farm definition, 10 hectares (24.70 acres). They analyzed their data by regression analysis, where profit was the dependent variable and labor usage, wage rate, price of fertilizer, capital input, land input, large farm dummy, small farm dummy, district dummy, use of improved varieties, education, access to extension, access to credit were the independent variables. The authors found that there were no differences in relative economic efficiency of small and large farms, even when the threshold of small farm size was changed from 5 to 10 hectares. In other words, size did not matter in terms of total efficiency.

Furthermore, Gilligan (1998) examined differences in efficiency of farm size in Honduras. They collected input and output data through a survey of farmers in coffee growing areas by employing Data Envelopment Analysis and Tobit regression analysis. Farm sizes ranged from small: below 3.5 hectares; medium 3.5-10.5 hectares, and large: more than 10.5 hectares. The

author found that farm size was inversely related to an aggregate measure of scale and technical efficiency. Consequently, the author controlled for decreasing returns to scale and larger farms were more technically efficient. However, upon further analysis, the overall result showed that economic efficiency favored smaller farms more than larger farms; thus, making sense to tilt toward reducing farm sizes through land reforms.

Moreover, Binam, Sylla, Diarra, & Nambi (2003) analyzed factors affecting technical efficiency among coffee farmers in Cote D'Ivoire. They collected data from a random sample of farmers and also analyzed data by Data Envelopment Analysis. The results showed that, based on constant returns to scale, farms' average technical efficiency was 36%; based on variable returns to scale, farms average technical efficiency was 47%. The average scale efficiency (i.e., based on optimal size) was 77%. They also conducted analysis of potential determinants of technical efficiency via the Tobit model, with efficiency as the dependent variable and a vector of socioeconomic and cultural variables as independent variables (age, land tenure, education, family size, farm practices, farm contact, residence, access to credit, member of association, and distance from house to farm). Age and residence had positive and significant effects on efficiency; and family size and member of association had negative and significant effects on efficiency. The authors were of the view that these factors should be targeted for policy and action.

Consequently, Tackie et al. (2019) assessed acreage owned and acreage farmed in relation to socioeconomic factors in Alabama. They obtained their data using a questionnaire, and analyzed the data by descriptive statistics and ordinal logistic regression analysis. The authors reported that there were more part-time than full-time producers; more male producers than female producers, and more Black producers than White producers. Also, there were more respondents at least 45 years than younger respondents; more respondents with some college education or lower than those with higher education, and more producers with $40,000 annual household income or lower than those with higher annual household income. The findings, moreover, showed that a majority (58%) had more than 30 years farming experience; owned more than 50 acres of land (61%), and farmed more than 50 acres of land (69%). Correspondingly, 50% owned over 60 acres and 58% farmed over 60 acres. More land was farmed than owned. What is more, they found that age and education had positive and statistically significant effects on acreage owned and acreage farmed.

Finally, Tackie et al. (2020) evaluated acreage owned and acreage farmed vis-à-vis socioeconomic factors in Georgia. Here also, the authors obtained data using a questionnaire, and assessed the data using descriptive statistics and ordinal logistic regression analysis. They found that there were slightly more full-time than part-time producers; more female producers

than male producers, and more White producers than Black producers. Again, there were more respondents at least 45 years than younger respondents, and more respondents with some college education or lower than those with higher education. However, more producers earned over $40,000 as annual household income than those who earned $40,000 or less as annual household income. The results, also, revealed that a majority (83%) had 30 years or less farming experience; owned more than 50 acres of land (53%), and farmed more than 50 acres of land (65%). Proportions for over 60 acres owned and over 60 acres farmed were, respectively, 48 and 55%. In this case also, more land was farmed than owned. Furthermore, they found that farming status had a negative and statistically significant effect on acreage owned; however, education and household income had positive and statistically significant effects on acreage owned. Farming status had a negative and statistically significant effect on acreage farmed; on the contrary, household income had a positive and statistically significant effect on and acreage farmed.

The above literature could be grouped into two categories. First, farm size and efficiency (Carter, 1884; Hoque, 1988; Papadas & Dahl, 1991; Adesina & Djato, 1996; Gilligan, 1998; Binam et al., 2003). Second, socioeconomic factors, related factors, and farm size (Tackie et al., 2019; Tackie et al., 2020). It is obvious that the latter two studies are more related to the current research than the other studies. Consequently, revealing the limited research on the subject matter; thus, buttressing the motivation of the study.

METHODOLOGY

The study used a questionnaire, which comprised six parts, namely, farm information, production, processing, economics, marketing, and demographic information. The questionnaire underwent several revisions before it was submitted to the Institutional Review Board of the Institution of the authors for approval. Subsequently, the approved questionnaire was administered to the subjects. The subjects comprised a convenience sample of small livestock producers. This type of sampling was used, because of the lack of a known sampling frame from which intended subjects could be drawn.

The data were collected by interviewing small beef cattle and meat goat producers at several program sites in Florida. The producers were from 18 counties in Florida, mainly the northern and middle parts of the state, specifically, Alachua, Bay, Clay, Dixie, Duval, Gadsden, Gulf, Hamilton, Hernando, Hillsborough, Jackson, Jefferson, Leon, Madison, Marion, Polk, Taylor, and Wakulla. The interviews were conducted from the summer of 2013 to the summer of 2016. Those involved in the exercise were Extension agents and other technical personnel from Florida A&M University, as well as a graduate student from Alabama. The initial sample size

was 70, and it was considered adequate for the study. Not all the data collected were used in the study due to the fact that this is study is part of a lager study on small livestock producers' activities in three Southeastern states.

The analysis was conducted using descriptive statistics and ordinal logistic regression analysis. The study, further, used modified logistic regression model adapted from Banterle & Cavaliere (2009), and which was also used in Tackie et al. (2019, pp. 5-6) and in Tackie et al. (2020, p. 46), as stated below:

$$C_j(X_i) = \ln [P(Y>j|X_i)/P(Y\leq j|X_i)] = \beta_1 X_{i1} + \ldots + \beta_{ik} X_{ik} - \tau_j + 1 \quad (1)$$

Where, $C_j(X_i)$ is the cumulative odds of being at or below category j of an ordinal variable with K categories, $1 \leq j \leq K-1$; i is the number of participants/producers considered; j is the score for a category (of Y); k is the number of independent variables; Y is the dependent variable; X_{ij} represents the independent variables; β_i represents the coefficients, and τ represents the cut points between categories of the dependent variable.

The initial sample size was 70; this notwithstanding, for the ordinal logistic regression analysis, the number of observations used was 61, as a result of dropping observations with "no responses" to some questions. This is tenable as far as the number of observations exceed the number of independent variables (Gujarati & Porter, 2009). Acreage farmed was assumed to be related to acreage owned, because normally producers farm on acreages that they own. One could therefore make the argument that acreage farmed represents "actual farm size." Yet, both indicators are associated with farm size. Considering the aforementioned explanations, two models were developed and used. The estimation model for model 1 is:

$$\ln (P\text{ACO}>j/P\text{ACO}\leq j) = \beta_1 \text{FST} + \beta_2 \text{GEN} + \beta_3 \text{RAE} + \beta_4 \text{AGE} + \beta_5 \text{EDU} + \beta_6 \text{HHI} - \tau + 1 \quad (2)$$

where, $\ln (P\text{ACO}>j/P\text{ACO}\leq j)$ is cumulative odds of being at or below an acreage owned (ACO) category; FST is farming status; GEN is gender; RAE is Race/ethnicity; AGE is Age; EDU is Education, and HHI is Household income.

Thus, estimation model 1 hypothesizes that acreage owned is impacted by farming status, gender, race/ethnicity, age, education, and household income. The overall null hypothesis is that all of the regression coefficients are equal to zero or the independent variables together do not affect acreage owned. The hypothesized signs were as follows: farming status (+/-); gender (+/-); race/ethnicity (+/-); age (+); education (+), and household income (+). These imply that full-time producers will own more acreage; male producers will own more acreage; White producers will own more acreage; older producers will own more acreage; more educated producers will own more acreage; higher household income producers will own more acreage. The details of the variable names and descriptions used for model 1 are shown in Appendix Table 1.

An identical model, model 2, was set up for acreage farmed as:

$$\ln (P\text{ACF}>j/P\text{ACF}\leq j) = \beta_1\text{FST} + \beta_2\text{GEN} + \beta_3\text{RAE} + \beta_4\text{AGE} + \beta_5\text{EDU} + \beta_6\text{HHI} - \tau + 1 \quad (3)$$

Where, ln (*P*ACF>j/*P*ACF≤j) is cumulative odds of being at or below an acreage farmed (ACF) category; FST is Farming status; GEN is Gender; RAE is Race/ethnicity; AGE is Age; EDU is Education, and HHI is Household income.

Therefore, estimation model 2 hypothesizes that acreage farmed is affected by farming status, gender, race/ethnicity, age, education, and household income. Here, as well, the overall null hypothesis is that all of the regression coefficients are equal to zero or the independent variables together do not affect acreage farmed. As before, the hypothesized signs were as follows: farming status (+/-); gender (+/-); race/ethnicity (+/-); age (+); education (+), and household income (+). Identical explanations for the expected signs hold for acreage farmed as for acreage owned. The details of the variable names and descriptions used for model 2 are also reported in Appendix Table 1. The ordinal logistic regression analysis was run for the models, using SPSS 12.0© (MapInfo Corporation, Troy, NY). The criteria used to examine both models were the model chi-square, beta coefficients, and *p* values.

RESULTS AND DISCUSSION

Tables 1 and 2 show the descriptive results; however, Tables 3 and 4 depict the regression results. The descriptive results are provided because they provide a general context for the study. Table 1 presents the socioeconomic characteristics of the respondents. A majority of the respondents was part-time (60%); there were equal proportions of males and females (50% each), and slightly more Whites (47%) compared to Blacks (41%). There were more respondents at least 45 years (90%) compared to those below 45 years (9%); relatedly, 52% were 55 years or older. Additionally, 73% had some college education or lower, and 18% had at least a college degree. Moreover, 40% had an annual household income of $40,000 or less, and 43% had an annual household income of more than $40,000 but less than $60,000; 13% reported over $60,000 annual household income. Selected results, farming status, age, and education, agree with Tackie et al. (2019) for Alabama who reported that there were more part-time producers than full-time producers; more producers in the 45 years or higher age ranges than other age ranges, and more producers with at most some college education than a higher level of education. However, some of the results of this study are in disagreement with some of the findings of the Tackie et al. (2019) study, where there were more male than female producers; more Black than White producers, and more producers with an annual household income of $40,000 or less than over $40,000. Moreover, the results are in agreement with Tackie et al. (2020) for Georgia, who also found more White producers than Black producers;

more producers 45 years or older than other age ranges; more producers with at most some college education than other levels of education, and more producers with annual household income of over $40,000 than $40,000 or less. On the contrary, the findings are in conflict with Tackie et al. (2020) for Georgia, where there were more full-time producers than part-time producers, and more female producers than male producers. One comment about age is that consistently in all three studies, the proportion of older producers were higher than younger producers, which lines up well with national trends (e.g., USDA NASS, 2019a), where the average age of a producer was 58 years. Furthermore, in this study, the proportion of part-time producers vis-à-vis full-time producers lines up with the national statistics of 58% part-time and 42% full-time producers (USDA NASS, 2019a).

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

Table 1. Continued

Variable	Frequency	Percent
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 shows farm characteristics of the producers. About 64% had livestock operations only, and 36% had mixed enterprises of both livestock and crop production; 56% had farming experience of 15 years or less; 40% had farming experience 16-30 years, and 4% had farming experience of more than 30 years. Livestock farming experience seemed to follow about an identical trend; 50% had livestock farming experience of 15 years or less; 46% had livestock farming experience of 16-30 years, and 3% had livestock farming experience of more than 30 years. In short, 96% had farming experience of 30 years or less, and 4% had farming experience of more than 30 years. Similarly, 99% had livestock farming experience of 30 years or less, and 3% had livestock farming experience of more than 30 years. When based on a 20-year cut off point, 74% had farming experience of 20 years or less, and 26% had farming experience of more than 20 years. In the same vein, 71% had livestock farming experience of 20 years or less, and 27% had livestock farming experience of more than 20 years. It is obvious that those with farming experience 30 years or less, or 20 years or less were more than those with farming experience of more than 30 years, or more than 20 years. The trend for the proportion of producers with

livestock farming experience of more than 20 years was identical to the proportion of producers with farming experience of more than 20 years; this trend also holds for the proportion of producers with livestock farming experience of 20 years or less, or farming experience 20 years or less. However, this trend is contrary to Tackie et al. (2019) study for Alabama and Tackie et al. (2020) study for Georgia. In these studies, there were more producers with both farming and livestock farming experience of more than 20 years than 20 years or less. It is highly probable that, as in the Tackie et al. (2019) and Tackie et al. (2020) studies, several of the producers may have started earlier with crop enterprises and later on, switched to or added livestock enterprises, or could have started both crop and livestock enterprises simultaneously.

Table 2. Farm Characteristics (N = 70)

Variable	Frequency	Percent
Enterprises		
Row Crops	0	2.5
Livestock	45	64.3
Fruits and Vegetables	0	0.0
Multiple	25	35.7
Other	0	0.0
No Response	0	0.0
Farming Experience		
1-5 years	10	14.3
6-10 years	8	11.4
11-15 years	21	30.0
16-20 years	13	18.6
21-25 years	7	10.0
26-30 years	8	11.4
More than 30 years	3	4.3
No Response	0	0.0
Livestock Farming Experience		
1-5 years	14	20.0
6-10 years	8	11.4
11-15 years	13	18.6

Table 2. Continued

Variable	Frequency	Percent
16-20 years	15	21.4
21-25 years	7	10.0
26-30 years	10	14.3
More than 30 years	2	2.9
No Response	1	1.4
Animal Type		
Beef Cattle	13	18.6
Meat Goats	57	81.4
Both	00	0.0
No Response	1	0.0
Beef Cattle Herd Size		
10 or less	3	4.3
11-20	3	4.3
21-30	3	4.3
31-40	1	1.4
41-50	1	1.4
51-60	1	1.4
61-70	1	1.4
More than 70	0	0.0
No Response	0	0.0
No Applicable	57	81.4
Meat Goat Herd Size		
10 or less	19	27.1
11-15	10	14.3
15-20	7	10.0
21-25	4	5.7
26-30	4	5.7
31-35	3	4.3
36-40	5	7.1
More than 40	5	7.1
No Response	1	1.4
Not Applicable	12	17.1

Table 2. Continued

Variable	Frequency	Percent
Total Acreage Owned		
10 acres or less	10	14.3
11-20 acres	16	22.9
21-30 acres	21	30.0
31-40 acres	4	5.7
41-50 acres	4	5.7
51-60 acres	4	5.7
More than 60 acres	10	14.3
No Response	1	1.4
Total Acreage Farmed		
10 acres or less	4	5.7
11-20 acres	5	7.1
21-30 acres	13	18.6
31-40 acres	19	27.1
41-50 acres	5	7.1
51-60 acres	9	12.9
More than 60 acres	15	21.4
No Response	0	0.0

Furthermore, 19% had beef cattle, specifically, Angus and mixed breeds (not shown in table), and 81% had meat goats, specifically, Boer and Kiko mixed breeds (also not shown in table). The aforementioned breeds are relatively common in the Southeastern U.S. Additionally, the producers had small herd sizes; 13% had a beef cattle herd size of 30 heads or less and 6% had a beef cattle herd size of more than 30 heads. Correspondingly, 63% had a meat goat herd size of 30 heads or less and 19% had a meat goat herd size of more than 30 heads. This condition of small herd sizes also apply to Tackie et al. (2019) for Alabama and Tackie et al. (2020) for Georgia; only that in the latter cases, there appear to be more beef cattle than meat goats.

Considering acreage owned, 67% owned 30 acres or less, 17% owned 31-60 acres, and 18% owned over 60 acres. However, 31% farmed 30 acres or less; another 47% farmed 31-60 acres, and 21% farmed over 60 acres of land. More producers were on the lower ends (30

acres or less) of acreage owned (67%) than higher ends, and more producers were on the higher ends (more than 30 acres) of acreage farmed (69%) than on the lower ends. Acreage owned and acreage farmed showed different trends. However, acreage farmed exceeded acreage owned, especially in the 31-60 acre-category and the greater than 60-acre category. This may mean that some of the producers were getting access to additional acreage by renting or leasing land for part of their operations. From the perspective of acreage owned, based on 30 acres or less, and greater than 30 acres, these findings disagree with Tackie et al. (2019) study for Alabama and Tackie et al. (2020) study for Georgia. In the said studies, producers owned less acreage in the 30 acres or less categories and owned more acreage in the more than 30 acres categories. However, from the perspective of acreage farmed, the findings are consistent with the 30 acres or less, and greater than 30 acres categories for the Tackie et al. (2019) study for Alabama and the Tackie et al. (2020) study for Georgia. In these studies (and including the Florida study), producers farmed more acreage in the greater than 30 acres categories than the 30 acres or less categories.

Table 3 shows the estimates for model 1, socioeconomic factors and their effects on acreage owned. It shows overall, the model was not statistically significant ($p = 0.373$), i.e., all of the socioeconomic factors jointly do not explain the variation in acreage owned (ACO), the dependent variable. This is contrary to Tackie et al. (2019) and Tackie et al. (2020), respectively, for Alabama and Georgia. The situation here may be inherent in the data. However, farming status had a statistically significant and negative effect on acreage owned, $p = 0.058$. The coefficient for farming status means that if the farming status of a producer were to change from full-time to part-time, the expected ordered log odds decreases by 0.969 moving from one category to the next higher category of acreage owned, all things equal. Identical explanations apply to the other variables in model 1. In brief, farming status, contributes immensely to acreage owned. The more there are part-time farmers, the less the acreage owned.

The findings are not a surprise, insofar as farming status is concerned. For farming status, it is expected that if there are more part-time producers, all things equal, they would more likely own less land. This is because, generally, part-time producers have a primary occupation elsewhere, which normally takes more of their time, and therefore, might not want to own more acreage. The result on farming status agrees with that for Georgia (Tackie et al., 2020). Gender, race/ethnicity, age, education, and annual household income were statistically insignificant. This notwithstanding, gender, race/ethnicity, age, and annual household income had the expected signs; however, education had the unexpected sign. For the former, this means that male producers were more likely to own more acreage than female producers;

Table 3. Estimates for Socioeconomic Factors and their Effects on Acreage Owned

Variable	β	*P*
Farming status	-0.969*	0.058
Gender	0.056	0.910
Race/ethnicity	-0.245	0.352
Age	0.202	0.481
Education	-0.097	0.643
Household Income	0.051	0.735
Chi-square	6.470 (*P* = 0.373)	

*Significant at 10%

Black producers were less likely to own more acreage than White producers; older producers were more likely to own more acreage than younger producers, and producers with higher incomes were more like to own more acreage than those with lower annual household incomes. Correspondingly, for the latter, education, it means that those with higher education were less like to own more acreage than those with lower education. The negative relationship between acreage owned and education was unexpected. It is possible that those with higher education were leasing than owning the land.

Table 4 reflects the estimates for model 2, socioeconomic factors and their effects on acreage farmed. It also shows overall, the model was not statistically significant (p = 0.207), i.e., all of the socioeconomic factors jointly do not explain the variation in acreage farmed (ACF), the dependent variable. Again, this finding is contrary to Tackie et al. (2019) and Tackie et al. (2020), respectively, for Alabama and Georgia. Just as in the acreage owned case, the situation here may be inherent in the data. Despite this, again, farming status had a statistically significant and negative effect on acreage farmed, p = 0.021. The coefficient for farming status means that if the farming status of a producer were to change from full-time to part-time, the expected ordered log odds decreases by 1.200 moving from one category to the next higher category of acreage farmed, all things equal. Identical explanations apply to the other variables in model 2. In sum, again, farming status, contributes immensely to acreage farmed. The more there are part-time farmers, the less the acreage farmed.

Table 4. Estimates for Socioeconomic Factors and their Influence on Acreage Farmed

Variable	β	*P*
Farming Status	-1.200**	0.021
Gender	-0.488	0.333
Race/ethnicity	-1.116	0.657
Age	0.302	0.293
Education	-0.074	0.722
Household Income	0.013	0.929
Chi-square	8.444	(*P* = 0.207)

**Significant at 5%

In this case also, the findings are not a surprise. In a similar vein, the argument made for acreage owned, can be made for acreage farmed. That means for farming status, it is expected that the more there are part-time producers, all things equal, the less the acreage that they would farm. The explanation, as previously, is that part-time producers have limited time to attend to on-farm activities relative to full-time producers. Also, in regards to farming status, the results are in agreement with Tackie et al. (2020) for Georgia. Yet again, gender, race/ethnicity, age, education, and annual household income were statistically insignificant. Despite this, gender, race/ethnicity, age, and annual household income had the expected signs; but, education had the unexpected sign. As before, for the former, this means that female producers were less likely to farm more acreage than male producers; Black producers were less likely to farm more acreage than White producers; older producers were more likely to farm more acreage than younger producers, and producers with higher incomes were more likely to farm more acreage than those with lower annual household incomes. For the latter, education, it implies that those with higher education were less likely to farm more acreage than those with lower education. The negative relationship between acreage farmed and education was unexpected. It is possible that those with higher education farmed less acreage because they had other obligations elsewhere.

CONCLUSION

This study assessed the effect of socioeconomic factors on acreage owned and acreage farmed. Primarily, it identified and described socioeconomic and other factors, and estimated the extent to which socioeconomic factors influenced acreage owned and acreage farmed. The data were collected by the use of a questionnaire, and analyzed using descriptive statistics and ordinal logistic regression analysis. The findings showed that, a majority of the respondents was part-time producers; there were equal proportions of males and females, and slightly more Whites compared to Blacks. There were more middle-aged or older producers relative to younger producers. Furthermore, more producers had some college education or lower compared to those who had higher educational levels, and a majority had an annual household income of more than $40,000. Additionally, a great majority had farming experience or livestock faming experience of 30 years or less. Even when reduced to 20 years threshold, a majority still had farming experience or livestock farming experience of 20 years or less. Also, a majority had small livestock herd sizes, and had acreage owned of 30 acres or less (67%), and farmed more than 30 acres (69%).

The ordinal logistic regression analyses revealed that only farming status had statistically significant effects on acreage owned and acreage farmed. Although other factors, gender, race/ethnicity, age, and annual household income did not have significant effects they had the expected signs, with regards to acreage owned and acreage farmed. However, education did not have the expected sign with regards to acreage owned and acreage farmed. The findings suggest that farming status is important to farm size, at least, in the study area. It is possible that other factors may influence farm size; however, these were not obvious in the study. A notable contribution of the study is that farming status matters in acreage owned and acreage farmed by small livestock producers in the study area. Thus, program or assistance providers may want to consider farming status in the design and delivery of programs. Probably, assistance to part-time producers should be different from those for full-time producers. Additionally, policies such as promoting “small-space” agricultural techniques to assist part-time producers to get the most out of their farms/farm sizes may be required. In view of this, assistance providers could advise producers to use appropriate breeds of livestock and appropriate herd sizes that would yield the requisite output for their operations to be worthwhile. This study has added to existing knowledge in the subject area, in relation to Tackie et al. (2019) and Tackie et al. (2020). Future studies may be required to firm the results of the study. The study may have a couple of limitations. First, the sample may not be as large as one would have wanted. However, this is the problem one encounters when studying issues related to small producers. Second, it is possible that the producers may not have been forthcoming with

some of their responses. These limitations notwithstanding, the findings give insights into socioeconomic factors of small livestock producers and their relatedness to acreage owned and acreage farmed.

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APPENDIX

Table 1. Variable Definitions and Descriptions of Data for the Models (N = 61)

Variable	Description	Mean	Standard Deviation
Farming status	1 = full-time	1.64	0.48
	2 = part-time		
Gender	1 = male	0.48	0.50
	0 = female		
Race/ethnicity	1 = Black	1.89	0.92
	2 = White		
Age	1 = 20-24	5.10	0.96
	2 = 25-34		
	3 = 35-44		
	4 = 45-54		
	5 = 55-64		
	6 = 65 or above		
Education	1 = high school or less	2.44	1.23
	2 = two-year/technical		
	3 = some college		
	4 = college degree		
	5 = post-graduate/professional		
Household income	1 = $10,000 or less	4.20	1.86
	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		
Acreage owned	1 = 10 or less acres	3.56	2.00
	2 = 11-20 acres		
	3 = 21-30 acres		

	4 = 31-40 acres		
	5 = 41-50 acres		
	6 = 51-60 acres		
	7 = More than 60 acres		
Acreage farmed	1 = 10 or less acres	4.57	1.76
	2 = 11-20 acres		
	3 = 21-30 acres		
	4 = 31-40 acres		
	5 = 41-50 acres		
	6 = 51-60 acres		
	7 = More than 60 acres		