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Assessing the Educational Program Needs of Small and Limited Resource Meat Goat Producers

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ASSESSING THE EDUCATIONAL PROGRAM NEEDS OF
SMALL AND LIMITED RESOURCE MEAT GOAT PRODUCERS

Title of Thesis

ASSESSING THE EDUCATIONAL PROGRAM NEEDS OF
SMALL AND LIMITED RESOURCE MEAT GOAT PRODUCERS

by
Francisca A. Quarcoo

A Thesis Submitted to the Graduate Faculty
of Tuskegee University
in Partial Fulfillment of the Requirements
for the Degree of

MASTER OF SCIENCE IN AGRICULTURAL AND RESOURCE ECONOMICS

TUSKEGEE UNIVERSITY
Tuskegee, Alabama 36088
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To my mother, Stella Adzo Kuivi Agbmenu; to my children, Elorm Ivan Quarcoo and Aseye Rayna Quarcoo; and to my husband, Franklin Quarcoo

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ABSTRACT

ASSESSING THE EDUCATIONAL PROGRAM NEEDS OF SMALL AND LIMITED RESOURCE MEAT GOAT PRODUCERS

**by
Francisca A. Quarcoo**

The purpose of this study was to assess the preferred educational program needs of small meat goat producers. The specific objectives were to (1) determine if current educational programs by the Caprine Research and Education Unit and/or the Cooperative Extension Program, Tuskegee University, reflect the actual needs of meat goat producers, (2) measure adoption and impact of past educational efforts by the Caprine Research and Education Unit and/or the Cooperative Extension Program, (3) determine the desired presentation or delivery format for future programs, and (4) determine relationships between selected socio-economic variables and explained variables. The data were obtained from a purposive sample of 54 producers, and analyzed using frequencies, percentages, and chi-square tests.

This group of respondents had more males than females (62 percent versus 33 percent); equal proportions of Blacks and Whites (46 percent); more middle-aged producers (64 percent); more producers with at least a two-year college degree (72 percent); about equal proportions (49 percent) of those with \$40,000 or less annual household income and those with more than \$40,000 annual household income. There were many more part-time farmers with most making \$2,500 or less in annual sales. Nearly 95 percent indicated that they were at least somewhat familiar with the Caprine Research and Education Unit and/or Cooperative Extension Program programs in marketing, nutrition, reproductive management, and integrated parasite management. For the most part, 78 percent indicated that, the programs have contributed to their operations. In addition, at least 72 percent agreed that

research on nutrition management and nutrient analysis; efficacy of natural parasiticides; integrated parasite management; economic, marketing and risk management; productivity and profitability among meat goat and milk breeds; meat quality assurance programs; reproductive management and artificial insemination were important to them. An overwhelming majority (82 percent) agreed that they had adopted or used information or skills from past program activities. Moreover, at least 72 percent affirmed that their preferred educational delivery formats for future educational programs were field/goat day; on-farm demonstrations/farm visits; one-on-one assistance; meat goat newsletter; and fact sheets and publications.

The chi-square tests showed that age had a significant effect on adoption or use of information or skill from past activities. Regarding preferred education delivery presentation format for future educational programs, gender and age had significant effects on using meat goat newsletter; race/ethnicity had a significant effect on using on-farm demonstrations/farm visits as well as on using fact sheets and publications; and age had a significant effect on using web-based program materials as well as formal classroom setting. Overall, based on the research preferences for the producers and the educational delivery format preferences for future programs, we propose or suggest that these two should be given priority to enhance meat goat production. In addition, factors such as age, gender, and race/ethnicity should be considered in adoption of information or skill, and for preferred educational delivery formats for future educational programs.

CHAPTER I

INTRODUCTION

Background

Livestock educational programs are very important to producers because these programs equip them with the required knowledge to meet the demands of consumers. Tubene & Holder (2001) indicated that for producers to be successful and remain competitive, they usually participate in educational programs sponsored by Cooperative Extension if the programs are relevant and directly address their needs. According to Franz & Townson (2008), agricultural educators play an important role in reaching producers with requisite information to increase their profitability and quality of life. Franz, Piercy, Donaldson, Richard, & Westbrook (2010) were also of the view that agricultural education needs assessment gives producers the opportunity to directly share their learning preferences and influence the improvement of farm management education programming and delivery. Baharanyi & Zabawa (1996) listed four issues that should be addressed by educational programs targeted at producers: (1) availability of programs that target the specific needs of the producer; (2) accessibility to the targeted producers; (3) the extent to which farm programs were funded and delivered in an equitable manner given the population and needs of the producers; and (4) whether producers had the necessary social capital to allow them to access available programs and other related resources.

According to Brasier et al. (2009), the increasing diversity of producers in the U.S. has given rise to a new audience that Extension educators need to recognize. The authors stressed the importance of developing educational programs that reflect the special educational needs and opportunities presented by this diverse audience. Knowledge of how

Extension educators perceive producers, and factors that influence these perceptions are both very important in that they provide an insight into potential opportunities and barriers that Extension educators may encounter in their quest to meet the educational needs of diverse audiences. Eberle & Shroyer (2000) also stated that the success of Extension educational programs depends on the selection of proper methods and tools that allow for easy transfer of new techniques to enhance farming enterprises.

It is generally believed that, livestock education based on obsolete techniques usually does not lead to a successful livestock operation. According to Marshall (2012), technology is continuously changing, and therefore, it is necessary to keep abreast with this changing technology in order to remain competitive in livestock production. Livestock educators must, therefore, deliver requisite agricultural programs based on changing technology. Consequently, it is necessary to determine the degree to which producers use information delivered by educators through these programs to make sure the programs are being delivered effectively. Marshall also stated that small-scale producers should be surveyed and evaluated to discover their needs. He argued that this evaluation must take into consideration the fact that individual producers, depending on their operational structure, may need individualized assistance. Extension services could benefit from these assessments because they could ascertain if their resources are being fully utilized and, ultimately, if their delivery systems are effective.

Problem Statement

Meat goat production has become an alternative animal production system for small and limited resource producers. Coffey, Hale, & Wells (2004) as well as Bowman (2003) stressed that typically, goats are easier to manage and less costly to raise compared to many

other livestock species such as cattle and pigs, and are becoming increasingly important for several reasons. These include increased demand for goat meat; interest in environmentally sound forms of vegetation control; low-cost of feeding and care; high nutritional value of goat meat; and ease of incorporating meat goat production into other livestock activities. The USDA (2001) observed that compared to other red meats, goat meat provides a lot of nutritional value and greater health benefits. Goat meat is leaner and has less calories, saturated fat, and cholesterol than chicken, beef, pork and lamb. Consequently, the demand for goat, an alternative red meat with low-fat content, should continue to increase as the health benefits of goat meat becomes more widely known among the general population.

Coffey (2006) was of the view that raising goats for meat production, for instance, requires a wide variety of special skills and knowledge pertaining to goat production, management, and marketing. Also, Coffey emphasized that information on establishing a facility, nutrition, pasture management, breeding, herd health, reproduction management, record keeping, marketing, and business management are all major areas of education required to be successful in meat goat production. The author also indicated that, hoof trimming, administration of medications, and physical examination of animals for health problems are skills that are useful in goat production. Solaiman (2007), in addition, stated that proper knowledge of goat husbandry, budgeting, marketing techniques, and effective record keeping enhance the profitability of meat goat enterprises.

Gillespie, Basarir, & Schupp (2004) analyzed beef cattle producers' choice in cattle marketing. They stated that producers retained ownership of cattle through feedlot and received information on animals' performance. They found that educational programs that informed producers of the benefits and costs of alternative calf marketing programs would be

very useful if producers were aware of the programs. In addition, they found that producers with high interest in marketing were more likely to become better managers. These producers were also younger and full-time farmers.

Hall, Knight, Coble, Baquet, & Patrick (2003) assessed beef producers' risk management receptions and desire for further risk management education. They indicated that producers who were susceptible to risk were more likely to attend educational programs in three of these risk management areas; forward contracts, futures and options, financial management, and herd health. They also stated that 57 percent of producers were highly interested in herd health management education; 38 percent were interested in financial management education; and 25 percent were highly interested in forward contracts or futures and options education. Producers who were familiar with forward contracting, financial management, and herd health stated strong interest in obtaining further education in each of those areas. Producers who were knowledgeable in herd health management were 24 percent more likely to attend herd health management education; likewise, the producers who recently used futures and options were 22 percent more likely to attend additional training.

The latter two studies were conducted on other livestock, and additionally, there has been limited research on educational programs tailored to meet the needs of meat goat producers. Therefore, there is a need to conduct a study, such as the current study, to enhance meat goat production, and also, enhance the educational program needs of small meat goat producers. The insights that would be provided by this study would help tailor training programs to effectively meet the needs of producers through concerted and collaborative efforts involving research specialists and Extension educators.

Purpose and Objectives

The purpose of the study, therefore, was to assess the educational program needs of small and limited resource meat goat producers. The specific objectives were to (1) determine if current educational programs by the Caprine Research and Education Unit and/or the Cooperative Extension Program, Tuskegee University, reflect the actual needs of meat goat producers, (2) measure adoption and impact of past educational efforts by the Caprine Research and Education Unit and/or the Cooperative Extension Program, (3) determine the desired presentation or delivery format for future programs, and (4) determine relationships between selected socioeconomic variables and explained variables.

Organization of the Study

The rest of this thesis is organized in four chapters. Chapter II covers the literature review. Chapter III deals with the methodology. Chapter IV focuses on the results and discussion, and chapter V covers the summary and conclusion.

CHAPTER II

LITERATURE REVIEW

This chapter consists of four sections. The first section describes goat producers and/or farm characteristics. The second section discusses programming needs, with emphasis on production, economics, and marketing. The third section covers adoption of educational programs or practices by producers. The fourth section focuses on educational delivery program formats or methods.

Goat Producers and/or Farm Characteristics

Tackie (1989) assessed the management status of selected goat farmers in Alabama. He reported that more than half of the respondents were 40-64 years of age; 23 percent were 20-39 years of age; 71 percent were males; and all had at least 7th grade education. Forty-two percent had raised goats for at least 10 years; however, almost all had raised goats for more than three years. His research also showed that about 70 percent of the farmers worked part-time on their farms. In addition, approximately 40 percent of the producers did not plan to increase the size of their goat herds for the next five years, because of limited space; because they raised goats as a hobby; or because of the high cost of feed.

Percival (2002) evaluated the economic characteristics of the meat goat industry in the Southeastern U.S. He reported that half of the farmers were middle aged (41-60 years). His findings on education suggested that highly educated persons were going into goat production. About seven percent had high school diplomas, 26 percent had an associate's degree, and at least 43 percent had a bachelor's degree. The majority of the producers were males, and Whites formed the largest racial group. Approximately 38 percent of the farmers

were part-time producers and about 60 percent raised meat goats. A majority (58 percent) had herd sizes between 5 and 50 and only two percent had herd sizes of more than 500.

Tackie, Ngandu, Allen, Baharanyi, & Ojumu (2012) assessed the characteristics and status of small and limited resource meat goat farmers in the Alabama Black Belt. They reported that 55 percent of producers were 46-65 years of age; 80 percent were males; 70 percent were African Americans; and another 70 percent had at most an associate's degree. About 73 percent of the farmers had 50 acres or less of farmland; a majority (about 73 percent) had Boer-Spanish cross-breed goats, and 53 percent were part-time farmers.

Jackson (2007) conducted a survey of meat goat producers in Tennessee and surrounding areas. He reported that about 75 percent of meat goat producers were at least 46 years old with less than ten years of experience in raising goats. More than half (almost 54 percent) had an interest in increasing the sizes of their herds in the future and 36 percent preferred maintaining the same size of herd. The top breed of does raised by the producers were Boer or Boer crosses, Kiko or Kiko crosses, and Spanish/Brush or Spanish/Brush crosses. The two top breeds for bucks were Boer or Boer crosses and Kiko or Kiko crosses.

Anderson, Brownie, Luginbuhl, & Mobley (2004) assessed farm characteristics of meat goat producers. They reported that the average herd size kept by producers was 35. Approximately 67 percent raised goats for meat, while about 27 percent raised goats for meat and milk. The majority of operations were small and not the major source of income for the producers.

USDA, APHIS (2010) examined goat management practices in the U.S. It reported the average number of years a producer owned goats increased as herd size increased, ranging from 8 years for very small operations (with less than 10 heads) to 18 years for large

operations (with 100 or more heads). Fifty percent of small producers raised goats for meat; 58 percent of large producers raised goats for their livelihood, as their main source of income. Nearly 39 and 18 percent of producers, respectively, used the nutritionist and University/Extension agent as their most important source of goat health information. A majority (about 53 percent) kept non-computerized records, and 14 percent kept computerized records.

Gillespie, Nyaupane, McMillin, & Harrison (2013) assessed the characteristics of the meat goat industry. Their results showed that 78 percent of producers owned an average farmland of 200 acres; of this, an average of 58 acres was used for goat production. Forty percent of the producers' net farm income was from the goat production. The most common breed raised was the Boer goat (75 percent), followed by the Kiko goat (32 percent).

Programming Needs

Production

Nutrition. Proper nutrition for goats is necessary at all ages in order to maximize profit potential in kids, yearlings, or adult animals. Luginbuhl & Poore (1998) listed carbohydrates, fats, protein, minerals, vitamins, and water as the basic nutrients required by goats. Food generally consumed by meat goats are of plant origin known as forages. Forages have varying quantities of water and dry matter, which is made up of organic components (carbohydrates, proteins, fats, and vitamins) and inorganic components (minerals). Water is an important nutrient of high consumption and may be the most critical of all nutrients. Kawas, Mahgoub, & Lu (2012) reported the significance of water for meat goats. According to them, water intake depends on the body size, age and physical activity, health status, and

environmental factors of goats. Reduction of water can restrict feed intake and feed efficiency, and negatively affect growth, reproduction, and milk production.

Johnson, Doyle, & Long (2010) examined the effect of feeding system on meat goat growth performance as well as carcass traits and fatty acid profiles. They used two treatments for their study; Treatment 1, the control and Treatment 2. The control group diet comprised grazing forage and chopped hay with no grain mix, and Treatment 2 diet comprised grain mixed with forage. At the start of the experiment, the goats weighed 23 kg. Goats were fed to the target end weight of 36.4 kg. The researchers reported that the grain group, Treatment 2 had fewer days on feed and a greater average daily gain compared with the control group. Goats on grain were significantly heavier at harvest and had desirable carcass selection scores, tenderness, or fat-cover scores; however, dietary treatment did not impact dressing percent, tenderness, or fat-cover score.

Tackie (1989), in his assessment of the management status of selected goat farmers in Alabama, reported that 86 percent of respondents fed their herds with grain/grain mix; 81 percent fed hay, and 84 percent fed pasture. About five percent, however, fed their herds mostly surplus fruits. He also reported some of the nutritional problems experienced by farmers. These included insufficient pasture/hay/silage, insufficient vitamin and minerals intake, insufficient protein intake, insufficient grain intake, and shortage of resources to prepare balanced rations.

Schoenian (2013) explained that meat goats could be fed with supplements if there is enough forage but of poor quality, because protein, an important nutrient is typically the first limiting nutrient in poor quality forage. According to her, supplementing with protein has been proven to increase the immune response to parasites (worms). She stressed, though, that

the supplementation of the diet of meat goats may not be as economical as supplementation of the diets of other ruminants.

Health. Wolf (2005) evaluated the economics of farm decisions to prevent and control infectious livestock diseases. He emphasized that, for producers to be able to make decisions regarding disease management, they must understand the options that they have in relation to the disease in question. These options depend on the biology of the disease, prevention techniques, tests for infection and their costs, treatments available, market reactions, as well as industry and government programs and policies. The biology of a disease includes modes and rates of transmission, disease evolution, production losses associated with the disease, and mortality rate. He also explained that farmers and other individuals or groups that may be affected by adverse outcomes of diseases, benefit from mitigation through prevention or control.

According to Okpebholo & Kahan (2007), proper and effective management of internal parasites is extremely important for the survival of the goat industry. They were of the view that farmers must be able to detect the clinical signs of a major worm infestation, properly treat infected animals, and effectively reduce the exposure of goats to these parasites. Worms that infect small ruminants have developed resistance against most of the available and widely used anthelmintics. Although preventive measures such as low stocking rate, pasture rotation, and proper nutrition could reduce the level and the effects of infestation by parasites, prevention strategies that effectively reduce the need for anthelmintics and decrease parasitic infestations are needed.

Browning et al. (2006) evaluated three meat goat breeds for doe fitness and reproductive performance in the Southeastern U.S. They observed that frequent use of anthelmintic treatments at 4- and 6-week intervals in Boer-dominated herds is a common practice of meat goat producers. They stated that doe genotypes with resistance to parasitic infections would benefit producers raising animals on pastures contaminated with parasites.

Anderson et al. (2004) assessed sources of drug use knowledge for meat goat producers. They reported that producers get information on animal health from multiple sources. These sources include veterinarians, Extension personnel, magazines, other producers, the feed store, and the Internet. The authors further revealed that the majority of producers read labels before using dewormers; the most commonly used dewormer was Ivermectin. The producers also understood that they could not legally use any drug product that was not obtained legally and were aware of drug use regulations. The producers' main concern was the perceived cost of dealing with a veterinarian.

Terrill et al. (2009) assessed the use of *sericea lespedeza* hay, a non-chemical dewormer that can be used in goat diets. It is also a perennial, warm-season legume that can be used for grazing, as hay, or as a conservation plant. It is adapted to most areas in the Southern U.S., except low-lying wet areas, extremely dry or shallow soils, and alkaline soils. Terril et al. reported that inclusion of 50 and 75 percent *sericea lespedeza* hay minimized fecal egg count in goats. The optimal level of *sericea lespedeza* hay in the diet of goats for reducing both fecal egg count and adult worm numbers in the abomasum of goats was 75 percent; decreased egg production was also observed at the 50 percent level. Even though, feeding goat with *sericea lespedeza* at 50 percent of the diet would be beneficial in reducing pasture infection with gastrointestinal nematode larvae, an increased level of dried *sericea*

lespedeza is needed to kill adult worms. There is evidence that *sericea lespedeza* hay has potential as a natural supplement to replace chemical anthelmintics.

Moore et al. (2008) analyzed the effects of feeding *sericea lespedeza* hay on growth rate of goats naturally infected with gastrointestinal nematodes. Their analysis on adult nematodes showed that there was no significant effect of diet, infection status, or diet × infection status interaction on total adult nematodes. There was also no significant effect of diet or diet × infection status on total abomasal nematodes; however, there was a significant effect of infection status on the percentage of the total blood volume of growing goats.

Burke, Terrill, Kallu, Miller, & Mosjidis (2007) evaluated the use of copper oxide wire particles (COWP) to control gastrointestinal nematodes in goats. Administration of the medication was done from 0 to 21 days. There was an overstocking of weaned goats, which resulted in a high level of pasture contamination with infective larvae. In their analysis, nematode infection rapidly reestablished after an initial reduction in fecal egg count (FEC), and the seemingly high number of blood-feeding *H. contortus* L4 larvae led to anemia in 88 percent of goats within 28 days after administration of COWP. The results revealed that the use of COWP during cooler months may have caused a reduction in the FEC, and also, that COWP may be less effective in reducing gastrointestinal nematode infection in mature goats compared with growing animals.

Sahlu et al. (2009) examined anthelmintic resistance in ruminants, and observed that anthelmintic resistance in goats seems to be more prevalent than in other ruminants. Resistance can be counteracted by nutritional manipulation, genetic selection, and vaccination. Alternative approaches to controlling internal parasites include feeding or browsing forages with anthelmintic-suppressing properties, and avoiding contaminated

pastures by grazing management. Adding nematode-trapping fungi or COWP to the diet to kill adult worms in the abomasum, or introducing parasitic larvae on pasture are also strategies that can be used.

Reproduction. Amoah, Gelaye, Guthrie, & Rexroad (1996) examined breeding season and aspects of reproduction of female goats, and found that most of the goats began to breed after June or July and peaked from September to November when day lengths were shorter. However, as the day lengths increased after December, breeding of goats began to decline. Nonetheless, the Nubian and Pygmy breeds were found to have an extended breeding season ranging from eight to eleven months. They explained that this could be due to the lack of sensitivity of these two breeds to photoperiodic changes during the year.

Attwood (2007) evaluated the reproduction management of meat goats. The author found body weight was the major factor affecting reproductive performance of does at mating. Heavier does tended to produce more kids than lighter does. Does weighing between 36kg to 45kg produced about two times as many kids as does weighing less than 27kg, and 40 percent more kids than does weighing 27kg to 32kg. The author also found that does can mate at seven months and get 100% kidding; however, it is essential that such does are placed on excellent feeding and management regimen. The researcher suggested that does, at least, 19 months of age should be mated.

Browning, Kebe, & Byars (2004) assessed 30 Boer and 27 Kiko does as maternal lines for kid performance under humid, subtropical conditions. They reported that at kidding, 25 of the Boer and 23 of the Kiko does produced at least one live kid when exposed to Spanish bucks. Boer does at kidding were heavier than Kiko does. Litter size and litter

weight at birth did not differ between Boer and Kiko goats. The weights of kids at birth were also similar between Boer and Kiko goats; however, male kids at birth were significantly heavier than female kids.

Chemineau (1983) examined the effect on estrus and ovulation of exposing creole does three times per year to the buck. He explained that the “male effect” has normally been associated only with non-cyclic females. The results, however, showed that the introduction of bucks hastened estrus, especially on the first day. This suggested that the introduction of the buck may have influenced the cyclic pattern of spontaneously ovulating does. Some of the high estrous activity on the first day of introduction of the buck may be explained by the fact that some females in estrus the previous day may have been marked by the bucks. Therefore, it appeared that the presence of bucks may have induced early ovulation and estrus.

Economics

Tackie, Ngandu, & Allen (2009) evaluated meat goat enterprise budget for small farmers. The enterprise budget was based on an 85-doe herd enterprise. Expected returns were determined based on weight; light kids, 40-60lbs and heavy kids, 61-80lbs as well as culled does. The unit price for light kids was \$0.80/lb; and for heavy kids was \$1.00/lb; culled does were estimated at \$41.25/head. Total returns from sale of kids and culled does were estimated as \$7,626.25. Variable costs were \$2,221.35; returns above variable costs were \$5,404.90; fixed costs were \$5,320.00; total costs were \$7,541.35; and net returns were \$ 84.90. The breakeven price per head was \$52.37.

Percival (2002) analyzed the economic characteristics of the meat goat industry in Southeastern U.S. Nearly 19 percent of the producers indicated it cost them \$20 to raise a goat to a market-ready weight, and eight percent indicated that it cost them over \$35 to raise a goat to a market-ready weight. Also, 36 percent estimated less than \$500 as gross income per year, and eight percent estimated over \$5,000 as gross income per year.

Tackie et al. (2012) assessed the characteristics and status of small and limited resource meat goat farmers. About 78 percent of the producers had a total cost of \$5,000 or less. Seventy percent spent \$1,500 or less on feed; about 88 percent spent \$1,000 or less on labor; and 68 percent spent \$1,000 or less on fencing. They also reported that the gross receipts for approximately 68 percent of producers were \$5,000 or less. According to them, 35 percent made losses, and 30 percent broke-even. Only three percent made profits of \$2,001-\$2,500, and eight percent made more than \$2,500. About 43 percent of the farmers made a total investment of \$5,000 or less, and 73 percent made a total investment of \$10,000 or less.

Nelson & Liu (2005) analyzed household demand potential for goat meat in eleven Southern States. Results from their study showed that household income influences consumption behavior. According to them, households earning less than \$25,000 are more likely to consume goat meat. This indicates an inferior characterization or poor consumer perception of goat meat. Different consumption patterns were observed among the states. Compared with other states, households in Texas were more likely to consume goat meat; households in Florida were less likely to consume goat meat. The authors also found that, households that ranked meat price very high tended to consume goat meat on special occasions; households that ranked meat taste low tended to consume goat meat more

regularly than those which ranked it high, and members of households were less likely to eat goat meat if they had never consumed lamb. They also observed that older people consumed goat meat more regularly, while younger people consumed goat meat occasionally, and males were more likely to consume goat meat than females.

McMillin & Brock (2005) examined the production practices and processing for value-added goat meat. They found that age and sex of goat influenced meat properties and cost. Younger, leaner, and more heavily muscled goats cost more regardless of breed. Older goats generally lack meat tenderness and sensory properties and cost less. Intact male goats also tend to cost more than female or castrated goats. The researchers also stated that goat meat provides better textural and flavor properties that is beneficial in lower fat or processed meat products. They observed that the acceptance of goat meat and goat meat products greatly depends on the consumer's culture and desires, as well as price.

Stanton (2004) evaluated starting a meat goat enterprise. She observed that many producers start meat goat enterprises with little or no financial planning. She mentioned four financial areas to be considered before venturing into meat goat production. These are: (1) the approximate annual costs of rearing a doe and her kids; (2) average market value of slaughter goats; (3) the carrying capacity of land and facilities; and (4) the productivity that can be expected from the doe under farm conditions. She suggested that prospective meat goat producers should contact other producers, Cooperative Extension, or USDA agencies for financial, technical, and other assistance. She also suggested that prospective producers should establish a network with other producers and attend educational workshops.

Marketing

Tackie (1989) assessed the management status of selected goat farmers in Alabama. He reported that more than half (54 percent) of goat producers had easy access to the market. About 61 percent of customers who purchased goats regularly were neighbors. However, about 70 percent of the producers were not able to meet the demand of buyers. Nearly 56 percent of the producers showed willingness to participate in a meat goat marketing network with the objective of bringing producers and consumers together.

Percival (2002) analyzed the economic characteristics of the meat goat industry in Southeastern U.S. He found that live goat sold for \$60/head or \$1/lb live weight, and goat meat retailed at a little less than \$2/lb. Thirty-three percent of producers stated that age and sex of the goat influenced sales. Majority (70 percent) indicated they had no influence on price. He identified irregularity in supply of goat meat as a challenge, and ascribed it to the underdevelopment of the industry. He stated that until the producer is able to differentiate goat meat from other relatively homogeneous products by improving the quality, it will continue to fetch relatively low prices. He suggested the further standardization of the product in the areas of grading, cutting, packaging, and distribution.

Tackie et al. (2012) assessed the characteristics and status of small and limited meat goat farmers. They reported that 45 percent of producers sold 20 goats or less; 78 percent sold at the farm gate; 80 percent sold directly to individual consumers, and another 80 percent indicated that they had easy access to the market. Approximately 63 percent mentioned marketing as the type of education and technical assistance provided to them by various universities, such as Tuskegee University and Auburn University; community-based

organizations, such as the Federation of Southern Cooperatives; and private organizations, such as Heifer International.

Jackson (2007) examined marketing methods used in Tennessee and surrounding areas. Nine marketing categories were used for analysis; these were: “Live Auction,” “On Farm Sale for Breeding Stock,” “Direct to Consumer,” “Directly to a Livestock Dealer,” “Sales to Youth for a Livestock Project,” “Internet or Electronic Auction,” “Directly to a Niche Market,” “Other Marketing Methods,” and “Directly to a Meat Packer.” He found that the first outlet that most producers used was “Live Auction,” 49 percent; the second outlet was “On Farm Sale for Breeding Stock,” 19 percent. He explained that even though many goats were being sold, there were still markets that were underutilized. He further explained that although using livestock auction is convenient and requires only loading and shipping of animals, producers also face some disadvantages such as being price takers. He stressed that producers will require more planning and marketing skills if they want to sell directly to consumers.

Knudson (2006) also examined market opportunities for meat goat producers. He stated that traditional outlets such as auction markets are not expected to generate a steady access to market for goat producers. He argued that finding a processor is more likely to be the safest and most profitable outlet. Consequently, producers need to maximize the quality of their goats and deliver a constant supply of product when requested by the processor in order to achieve the highest price and ensure access to the market. USDA-APHIS (2012) indicated that, nevertheless, marketing livestock at an auction or sale barn requires little effort in finding a buyer. In addition, direct sales to consumers can be more profitable because there are limited transportation costs, no middlemen, and no sales commissions.

Okpebholo & Kahan (2007) emphasized that marketing is still a major challenge to the development of the meat goat industry. They explained that the market situation is unpredictable and unorganized with no established standards for marketing goat meat. Additionally, there is an insufficient number of government-approved processing plants for goats. The difficulty and expense involved in transporting animals to approved processing facilities limit the ability of producers to market meat goat products. Furthermore, the connection between producers and ethnic consumers needs to be strengthened because these groups mostly prefer fresh meat slaughtered on the farm. Okpebholo & Kahan also identified other major marketing challenges facing the meat goat industry, which include the need for approaches that are effective in convincing mainstream Americans to consume goat meat. The authors explained that, large and established grocery chains are skeptical about the inclusion of goat meat in their stock because of the uncertainty of reliable supplies.

Pinkerton (1995) analyzed meat goat marketing opportunities. He focused on different ethnic groups and their preferences for meat goat. He indicated that Hispanics prefer young kids, cabrito, weighing 15-25 lbs or young goats that yield a twenty five pound-carcass (approximately 50 lbs live weight); Muslims like a bit heavier carcass about 35 lbs (approximately 70 lbs live weight). Muslims also select a lean carcass and will discriminate against an overly fat carcass; and Caribbeans, especially Haitians and Jamaicans, prefer mature bucks. Pinkerton emphasized that meat goat producers should familiarize themselves with the customs, holidays, and preferences of their ethnic clientele.

Davy et al. (2010) evaluated the costs of marketing meat goats. They emphasized that information regarding goat markets is still developing and standard sales practices are uncertain. Based on three ranches that were studied during a 12-month cycle, they estimated

\$3,600 as marketing costs, which included advertising, promotion, and farmer's market expenses, etc. They advised that it is necessary for producers to explore the market and sales outlets to find what is best for their business, which include strategies to achieve profitability and financial sustainability.

Ekanem et al. (2013) assessed the factors affecting purchase decision for goat meat by consumers. Eighty-five percent of the participants indicated they considered price important when making the decision to purchase goat meat; 55 percent indicated they paid the right price for their goat meat. Eighty-four percent stated that they purchased goat meat because of taste; 75 percent purchased the meat because of the packaging, and 58 percent purchased the meat because of nutritional information. About 60 percent of the participants, however, indicated that they were willing to purchase more goat meat if additional information on nutritional value were available to them. The authors also reported that 77 percent preferred purchasing fresh goat meat, and 60 percent were willing to travel up to 20 miles to purchase goat meat.

Solaiman (2007) examined the meat goat industry in the U.S. She found that apart from special holidays such as Easter, the 4th of July, and certain Muslim holidays (e.g., Aideh Ghorban or Aideh Fatre) when there is a three- to four-fold increase in consumption of goat meat, consumption of goat meat is stable. The author stated that understanding these ethnic traditions and matching their demand with production requires marketing education and techniques. Moreover, appropriate harvesting and handling techniques such as Kosher and Halal should be considered for clients who are Jews or Muslims. Ibrahim, Liu, & Nelson (2008) conducted a pilot study of halal goat meat consumption, and found that over 80 percent of respondents ranked halal as the most important criteria for purchasing goat meat,

followed by meat quality. More than 80 percent of respondents indicated that “freshness” (never frozen) of goat meat was either very important or important to them.

Fox-Gamble (2011) evaluated marketing of and demand for meat goats. He found that most people who purchase goat meat were Hispanics, Muslims, and Caribbeans. Twenty percent of those who consumed goat meat were Hispanics compared to 12 percent of the general population that consumed goat meat. Of the non-goat meat consumers, 32 percent of Hispanics said they were willing to try it. More men also tended to consume goat meat than women. Peak consumer age range was 55-74 years old.

Nelson, Whitehead, Mobini, Brown, & Thomas (2004) assessed segmentation in meat goat markets based on effects of gender, race, and age. They reported that, Hispanic males rated the flavor of goat meat barbecue higher than all other race/gender groups. Black males rated the flavor of the goat meat barbecue significantly higher than white females. In descending order, Hispanic males, black males, and black females rated the flavor of goat meat higher than did the other race/gender groups. When goat meat was compared with beef alone, the Hispanic males’ mean rating for goat meat was higher than that of all other races and gender classifications.

Fraser (2004) analyzed the market for meat goats. Respondents were asked to taste a sample of goat meat and provide feedback. He reported that 41 percent of those who tasted the meat were willing to purchase it on holidays; and 31 percent said they would consume it monthly if it were readily available. Nearly four out of five people refused to try the samples because they were disgusted by the word “goat.” Despite this, the author reported that there is a promising market for highly seasoned goat meat products. In fact, he reported that, some respondents suggested that changing the name from “goat” to something more attractive like

“cabrito” or “chevon” may help overcome some of the negative preconceptions consumers have about goat meat.

Beutler (2010) examined meat goat surveys for three states. On issues pertaining to marketing education, 87 percent of meat goat producers expressed interest in attending training sessions; 36 percent were of the view that training sessions on this topic should be held bi-annually. More than half of producers were willing to travel at least 50 miles to attend educational programs on meat goat production. The content of the training, time, and location of training were factors which determined producers’ decision to travel. Eighty-one percent preferred face-to-face education than some other means, such as teleconferences. In addition, 42 percent were comfortable with a registration fee of \$20 per person to attend face-to-face educational events; 32 percent were comfortable with \$10 per person; 12 percent indicated that they would only attend educational programs that were free. At least 55 percent of respondents who did not operate meat goat enterprise indicated that a meat goat association or cooperative will influence their decision to raise meat goats.

Adoption of Educational Programs or Practices

Karki et al. (2012) analyzed the short-term impact of Tuskegee University Extension Livestock Education programs. Topics covered included integrated management of internal parasites in goats, silvopasture practice, year-round pasture production and management, and grazing and browsing. Based on pre-test and post-test results, they found improvement in knowledge of most participants after completing three of the sessions. Participants’ knowledge on integrated management of internal parasites increased by 44 percent; participants’ knowledge on silvopasture practice increased by 42 percent; and participants’

knowledge on year-round pasture production and management increased by 57 percent. In addition, 90 percent of those who attended the integrated management of internal parasite session; 79 percent of those who attended the silvopasture practice session; 58 percent of those who attended the year-round pasture production and management session, and 80 percent of those who attended the grazing and browsing session indicated that the sessions were useful to them. Also, 87 percent of participants who attended the integrated management of parasites session; 39 percent of those who attended the silvopasture practice session; 54 percent of those who attended the year-round pasture production and management session, and 68 percent of those who attended the grazing and browsing session indicated they were very likely to use the knowledge and skills acquired on their farms.

Callahan & Thomas (2002) evaluated information technology adoption in agricultural operations. They found that younger respondents were more likely to use computer-based resources than older respondents. There was a positive correlation between respondents' level of education and preference for computer or Internet as communication tools; as the level of education for the respondents increased, their preference for computers and Internet as communication tools also increased. They experienced the same relationship with respondents' gross annual income level; as the gross income for respondents increased, their preference for computers also increased. They proposed a framework to help with computer and Internet adoption in agricultural operations. They suggested that educators should determine the level of a particular farmer's computer and Internet utilization, and develop a plan that increases the likelihood of usage.

Khanal & Gillespie (2013) assessed the adoption and productivity of breeding technologies in dairy production. They reported that the decision for producers to adopt

technology can be effective if the benefit of adopting the new technology is higher than the benefit of the old technology. Producers who adopted artificial insemination technology were relatively younger, more educated and did not work off-farm, and planned to continue farming for at least 10 years. These producers recorded higher net returns over total costs; thus, reducing their costs.

Joseph (2013) evaluated current production practices and factors leading to the adoption of new production practices and technologies by beef cattle producers. She reported that, 30 percent of the producers adopted a new production practice or technology because it helped generate higher profits; 19 percent adopted the practice because it fitted with the goals of their operations and could be tried on a small scale, and 17 percent adopted the practice because it neither required extra time nor put extra strain on management. The main reasons producers did not adopt a new production practice or technology were because it was too expensive (20 percent); time consuming (17 percent); or did not fit with their operational goals (14 percent). About 81 percent of producers stated that, the most important factor that influenced their decision to adopt a new production practice or technology was because it was an innovation which contributed to profitability.

Nettles & Bukenya (2004) assessed producers' willingness to adopt Hazard Analysis and Critical Control Point (HACCP) principles in the goat meat industry. They reported that the probability that white producers would adopt HACCP principles was higher than black producers; male producers were also more likely to adopt these principles than female producers. Producers above 40 years were less likely to adopt HACCP principles, and those with college education were more likely to adopt HACCP principles. Producers who had experienced health or mortality problems in their operations were also more likely to adopt

HACCP principles than those who had not experienced such problems. Farm size and experience in goat production were insignificant factors influencing a producer's willingness to adopt HACCP principles. Whether producers' owned or rented the farm also did not have any effect on their willingness to adopt HACCP principles.

Johnson et al. (2008) assessed factors affecting the adoption of management practices in stocker cattle. They found that producers were more likely to adopt technologies with immediate economic benefits than technologies with long-term benefits; producers with higher level education were less likely to adopt management practices such as futures, options, and/or cash contracts in risk management than those with lower education levels; producers with some college education were less likely to adopt risk management tools than those without some college education; and producers above 50 years were less likely to adopt recommended practices without special motivations than those 50 years or less. The researchers also stressed that understanding producers and their characteristics should help Extension educators recognize producers that would benefit from educational programs. They advised that Extension educational programs should be designed to improve the profitability of producers' operation.

Educational Delivery Formats or Methods

Bates et al. (2012) assessed the educational needs of pork producers that will enhance the use of group sow housing. They reported that producers showed preference for Internet-based methods of information transfer and consistently wanted on-demand access to information that could be accessed from Internet bulletin boards. Producers also wanted some educational offerings through more traditional methods such as face-to-face group

meetings at a common location and one-on-one on-farm meetings. Participants, in addition, indicated that distance education methods such as Internet-based workshops, teleconference with power-point slides, and pre-recorded CDs/DVDs were acceptable methods for delivery of information and transfer of technology.

Trede & Whitaker (2000) evaluated the educational needs and perceptions of Iowa beginning farmers toward their education. They reported that preferred delivery systems by majority of respondents were on-site educational instruction, single mailings on specific topics, and consulting public institutions for unbiased agricultural information. Farmers indicated they will not attend meetings taught by fiber optics, satellite, or any state-wide communication systems. They will also not travel up to one hour to attend classes. With regards to sources of educational information in the future, farmers indicated they will turn to family members, university Extension personnel, agricultural consultants, farm organizations, and agribusiness and commercial firms.

Adhikari & Suvedi (2000) assessed the educational needs of Michigan livestock producers. They found that important sources of information used by producers were mostly from farm magazines, farm suppliers/dealers, families/friends and neighbors, specialized farm magazines, Extension publications, and agricultural newspapers. However, producers rarely used information sources such as, TV and radio news, TV and radio farm programs, and the Internet. They also found that some of the important subject matter areas that producers would like included in Extension programs were business management, general farm management, livestock management, sustainable agriculture and environmental management, chemical science, and the economics of farm operations.

Maddox, Mustian, & Jenkins (2013) analyzed the agricultural information preferences of North Carolina farmers. They reported that the top five preferred information delivery channels for producers were newsletters, magazine articles, bulletins/fact sheets, family and friends, and on-farm visits. The newsletters category had the highest rating with 60 percent, followed by magazine articles (46 percent), bulletins/fact sheets (45 percent), family and friends (42 percent), and on-farm visits (36 percent). The delivery channels were re-grouped into five major categories: personal, printed materials, groups/organizations, computer-based channels, and electronic channels. “Personal channel” was the most preferred delivery channel, by 55 percent of producers, when seeking information about new farm management practices and their adoption, or for making day-to-day decisions.

Renick (2012) analyzed relationships between adult learning styles and educational delivery method preferences. She stressed that Extension educators should focus on the demographic characteristics of age, education, and profession when developing program delivery methods that will effectively meet the needs of producers. However, she advised that educators should not focus on gender or the number of years in farming as these had little or no influence on delivery methods.

Boone, Boone, Cullen, & Woloshuk (2013) examined information transfer between beef producers and Extension agents. They found that the top three methods that producers preferred to learn about Extension programs were by mail, newsletters, and flyers. Their least preferred methods were through television, radio, and the Internet. Producers also indicated high preference for demonstrations, discussion, and individual consultation. However, Extension educators preferred methods such as newspapers, word-of-mouth, and mail.

Joerger, Bowen, Jaber, Werner, & Nelson (2012) evaluated the educational interests, needs, and instructional preferences of producers enrolled in Minnesota Farm Business Management Education Program. They reported that the top four topics of interest selected in livestock production management education were nutrition, facilities selection, feed selection, and health. Producers listed the following as the primary barriers to participation in education programs delivered by universities: being too busy to attend; time of day not being conducive with schedule; and distance to event. They suggested that education providers and partners leverage the expertise of their technical staff to develop programs using traditional and Internet-based technologies for teaching livestock production management practices.

CHAPTER III

METHODOLOGY

This chapter is organized into three main sections. The first section focuses on the description of the instrument used in the study. The second section explains the methods used for the data collection. The third section describes how the data were analyzed.

Instrument

A semi-structured questionnaire was developed for the study. It was divided into five parts consisting of the following: (1) current programming needs, (2) new issues or programming areas, (3) adoption and impact of past Caprine Research and Education Unit and/or Cooperative Extension efforts, (4) presentation formats for future programs, and (5) demographic information. Examples of questions in Part I were: “Are you familiar with the Tuskegee University Caprine Research and Education Unit and/or Cooperative Extension Program educational programs in meat goat marketing, nutrition management, reproductive management, or Integrated Parasite Management?” “Has any of the programs in the Caprine Research and Education Unit and/or Cooperative Extension Program resulted in any benefits to the Alabama [or your State’s] meat goat production system that you are aware of?” Examples of questions in Part II were: “What areas of research are most important to you, in order of priority?” Areas included, but not limited to, integrated parasite management, nutrition management and nutrient analysis, reproduction management, and economic, marketing and risk management.

Furthermore, examples of questions in Part III were: “Have you adopted or used any information or skill from past Caprine Research and Education Unit and/or Cooperative Extension Program activities?” “Has any information you received, or skill you learned from

past Caprine Research and Education Unit and/or Cooperative Extension Program activities saved or made you money, or made your operation easier to run?” Examples of questions in Part IV were: “What is your preferred educational delivery presentation format?” “How would you improve the Tuskegee University Caprine Research and Education Unit and/or Cooperative Extension Program educational programs?” Examples of questions in the Part V were: “Indicate your annual sales from your meat goat operation;” “Indicate your farming status;” and “Indicate your educational level.” The questionnaire was submitted to the Institutional Review Board (IRB) of Tuskegee University and was approved before being administered. A sample of the questionnaire is shown as Appendix A.

Data Collection

The data were collected using purposive sampling. Purposive sampling also referred to as judgmental, selective, or subjective sampling is a non-probability sampling technique. Patton (1990) stated that the objective of purposive sampling is to select information rich cases whose study will lighten the questions under study. McMillan (1996) explained that in purposive sampling, the purpose of the study and what the researcher knows about the population guides the process. The researcher generates a sample relative to some particular characteristics that he/she considers important. Based on what the researcher knows about the population, he/she makes a judgment of which cases should be selected to provide the best information to address the purpose of the research. He explained, for example, that in research on effective teaching it may be most informative to observe “expert” or “master” teachers rather than all teachers; and to study effective schools, it may be most informative to interview key personnel, such as the principal and teachers who have been in the school a number of years. Purposive sampling was used for this study because the researcher

considered the characteristics of the sample (meat goat producers) important to the topic as well as best fitting for the purpose of the research.

Mail survey was adopted to collect data using Dillman's (1978) Total Design Method (TDM). TDM has four steps, namely, Step 1: initial mailing, which involves mailing cover letters and questionnaires to sample members or subjects in week one; Step 2: a week later, a follow-up by sending reminder letters or postcards to the sample members or subjects; Step 3: three weeks later, a second follow-up by sending reminder cover letters and questionnaires to sample members or subjects; Step 4: seven weeks later, another follow-up by sending reminder cover letters and questionnaires to sample members or subjects.

The questionnaire was administered to two sets of groups, A and B, who attended workshops at Tuskegee University in 2012. Group A comprised 31 producers who attended the Goat Day in April, 2012 and those who attended the Silvopasture workshop in May, 2012; Group B comprised 23 producers who attended the Master Goat Producers Certification training in August, 2012. The total number in the sample was therefore 54. Using Dillman's TDM, for Group A the initial mailing was done Friday, August 31, 2012; the second mailing was done Friday, September 9, 2012; the third mailing was done Friday, September 21, 2012; and the fourth mailing was done Friday, October 19, 2012. For Group B, the initial mailing was done Monday, September 24, 2012; the second mailing was done Monday, October 1, 2012; the third mailing was done Monday, October 15, 2012; and the fourth mailing was done Monday, November 12, 2012. After the fourth mailing for Group B, one more mailing was done for both groups on Tuesday, November 20, 2012. The producers were primarily from Alabama, but four of them were from Georgia, Tennessee, Florida, and Arkansas.

Of the 31 questionnaires mailed for Group A, 27 were returned; however, 2 were unusable because they were incomplete. Of the 23 questionnaires mailed for group B, 16 were returned. The combined response rate for A and B was 80 percent (43/54), and the combined usable response rate for A and B was 79 percent (41/52).

Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS Version 12.0). Descriptive statistics such as frequencies and percentages as well as chi-square tests between selected socioeconomic variables and other (explained) variables were used to analyze the data. One important use of descriptive statistics is that it enables researchers to summarize a collection of data in a clear and understandable way (Lane, 2003). Statpak (1997) maintained that frequency analysis is the simplest of all statistical procedures and is ideal for data which has been coded into groups or categories. This coding can either be alpha or numeric-type data.

Statpak (1997) also stated that purpose of the chi-square tests is to determine whether the observed frequencies (counts) differ markedly from the expected frequencies. The chi-square test is part of a contingency table analysis in which observed cell frequencies are organized into a contingency table. The chi-square statistic is the total of the contributions from individual cells in the table. If outcome of an observed frequency in a cell is noticeably different from the expected frequency, then the contribution of that cell to the overall chi-square is large. However, if it is close to the expected frequency for that cell, then the contribution of that cell to the overall chi-square is low. Nonetheless, a large chi-square

statistic indicates that somewhere in the table, the observed frequencies vary significantly from the expected frequencies.

The chi-square test enables the researcher to find out whether two sets of variables are independent of (or not related to) each other. The null hypothesis (Ho) refers to a situation in which two variables are independent of each other, while the alternate hypothesis (Ha) refers to a situation in which two variables are not independent of (or related to) each other. Albers-Miller (1996) specified that finding the value for the chi-square (χ^2) is represented as:

$$\chi^2 = \sum \sum [(O_{ij} - E_{ij})^2] / E_{ij} \quad (1)$$

Where:

χ^2 = chi-square

Σ = summation

O =observed frequency

E =expected frequency

The observed frequency is the frequency obtained from the survey. The observed frequencies are compared with expected cell frequencies, created under the assumption of the null hypothesis. The expected frequency is calculated as:

$$E_{ij} = (n_i n_j) / n \quad (2)$$

where:

n_i and n_j are the marginal frequencies

i = the number of sample units in category i of the row variable

j = the number of sample units in category j of the column variable

The degree of freedom (df) is needed to test the significance.

$$df = (r-1)(c-1) \quad (3)$$

where:

r = number of rows

c = number of columns

Key (1997) explained that the critical value is taken from chi-square table given a specific significance level and the degrees of freedom. If the chi-square value is greater than or equal to the tabulated chi-square value, the value is significant and the null hypothesis is rejected.

Examples of the null hypothesis (H_0) and alternate hypothesis (H_a) for this research are presented as:

H_0 : Adoption and use of information or skill learned from past Caprine Research and Education Unit and/or Cooperative Extension Program activities is independent of (or not related to) selected socioeconomic variables.

H_a : Adoption and use of information or skill learned from past Caprine Research and Education Unit and/ or Cooperative Extension Program activities is not independent of (or related to) selected socioeconomic variables.

The selected socioeconomic variables were gender, race/ethnicity, age, education, and annual household oncome. Identical hypotheses were inferred for preferred educational delivery formats for future educational programs.

CHAPTER IV

RESULTS AND DISCUSSION

This chapter presents the results and discussion. It is organized in two main sections. The first section presents and discusses the frequency and percentage results. The second section focuses on the chi-square results. The results are generally presented according to the order of the questions on the questionnaire, except the demographic information which are presented first.

Frequency and Percentage Results

Demographic Information

Table 1 shows the demographic characteristics of the respondents. About 56 percent reported annual sales of \$2,500 or less; about 13 percent reported annual sales of \$2,501-\$5,000; another 13 percent reported annual sales of \$5,001-\$12,500, and eight percent reported annual sales of \$12,501-\$15,000; only about three percent reported annual sales of above \$20,000. Approximately 18 percent had herd size of 10 or less; another 18 percent had herd size of 11-20; 21 percent had herd size of 21-30; 10 percent had herd size of 31-40; eight percent had herd size of 41-50; and 18 percent had herd size of over 50. The mean herd size was 89 (not shown in table), but a majority (nearly 67 percent) had herd sizes below 40. About 33 percent were full-time farmers and 56 percent were part-time farmers. The annual sales were similar to those reported by Tackie et al. (2012) who found the gross receipts for majority of producers was \$5,000 or less. Regarding herd size, the results were different from to Anderson et al. (2004) who reported mean herd size of 35. Also, the farming status was consistent reported by Tackie (1989) and Tackie et al. (2012) who found that the majority

Table 1. Responses Reflecting Demographic Information

Variable	Frequency	Percent
Annual Sales		
\$2,500 or less	22	56.4
\$2,501-5,000	5	12.8
\$5,001-7,500	2	5.1
\$7,501-10,000	2	5.1
\$10,001-12,500	1	2.6
\$12,501-15,000	3	7.7
Above \$20,000	1	2.6
No Response	3	7.7
Herd Size		
10 or less	7	17.9
11-20	7	17.9
21-30	8	20.5
31-40	4	10.3
41-50	3	7.7
Over 50	7	17.9
No Response	3	7.7
Farming Status		
Full Time	13	33.3
Part Time	22	56.4
No Response	4	10.3
Gender		
Male	24	61.5
Female	13	33.3
No Response	2	5.1
Race/Ethnicity		
Black	18	46.2
White	18	46.2
Other	3	7.7

Table 1. *Continued*

Variable	Frequency	Percent
Age		
20-24 years	3	7.7
25-34 years	4	10.3
35-44 years	2	5.1
45-54 years	8	20.5
55-64 years	17	43.6
65 years and older	5	12.8
Educational Level		
High School/GED	11	28.2
Two-Year/Technical College Degree	4	10.3
Some College (Did not complete)	7	17.9
College Degree	17	43.6
Annual Household Income		
\$10,000 or less	5	12.8
\$10,001-20,000	6	15.4
\$20,001-30,000	5	12.8
\$30,001-40,000	3	7.7
\$40,001-50,000	4	10.3
\$50,001-60,000	7	17.9
More than \$60,000	3	20.5
No Response	6	2.6

of producers worked part-time; on the contrary, Percival (2002) found that the majority of producers were full-time farmers. The disparity could be a result of geographic differences; Percival's study (2002) covered meat goat producers in Southeastern U.S., whereas Tackie (1989) and Tackie et al. (2012) studies covered producers in Alabama where small meat goat producers are dominant.

Also, 62 percent of the respondents were males and 33 percent were females. Equal numbers of the respondents were Blacks and Whites (46 percent for each group). Regarding age, about eight percent were 20-24 years; 10 percent were 25-34 years; five percent were 35-44 years; 21 percent were 45-54 years; 44 percent were 55-64 years; and 13 percent were 65 years and older. Furthermore, approximately 28 percent had a high school diploma; 10 percent had a two-year/technical college degree; 18 percent had some college education; and 44 percent had a college degree. Thirteen percent had an annual household income of \$10,000 or less; 15 percent had an annual household income of \$10,001-\$20,000; 13 percent had an annual household income of \$20,001-\$30,000; eight percent had an annual household income of \$30,001-\$40,000; 10 percent had an annual household income of \$40,001-50,000; 18 percent had an annual household income of \$50,001-60,000; and 21 percent had an annual household income of more than \$60,000.

The results on gender were consistent with those reported by Tackie (1989), Percival (2002), and Tackie et al. (2012) who found that majority of the meat goat producers were males. Similarly, except Percival (2002) who found that majority of producers were Whites, the previous mentioned authors found that most of the producers were Blacks. Again, the disparity could be a result of geographic differences. The age and education of the participants were also consistent with that reported in previous studies. Tackie (1989), Percival (2002), Tackie et al. (2012), and Jackson (2007) found that majority of producers were middle aged (between 40 to 64 years). All the aforementioned authors, with the exception of Jackson, also found that the majority of producers had at least an associate's degree. This dispels the notion that highly educated people do not operate a livestock enterprise but supports the observation that more educated people are venturing into meat

goat production. On the whole, this group of respondents had more males than females; about equal proportion of Blacks and Whites; more middle aged producers; more producers with at least a two-year college degree; and about equal proportions of those with \$40,000 or below annual household income and those over \$40,000 annual household income.

Current Programming Needs

Table 2 reflects the responses regarding current programming needs. When asked if they were familiar with Tuskegee University Caprine Research and Education Unit and/or Cooperative Extension Program educational programs in meat goat marketing, nutrition management, reproductive management, or integrated parasite management, about five percent indicated that they were not familiar; 33 percent indicated that they were somewhat familiar; 36 percent indicated that they were familiar; and 26 percent indicated that they were very familiar. This finding shows that a large proportion of respondents were fairly familiar with the Tuskegee University Caprine Research and Education Unit and/or Cooperative Extension Program educational programs in the above-mentioned areas.

In addition, for those who answered somewhat familiar, familiar, and very familiar, when asked if the aforementioned programs have contributed to their operations, 78 percent responded “yes for the most part;” 19 percent responded “yes but less than expected;” and three percent responded “no, the programs’ promise remains largely unfulfilled.” This result indicates that producers were generally utilizing the programs. A previous study by Karki et al. (2012) showed that programs organized by the Tuskegee University Cooperative Extension Program were useful to producers. It found most producers who integrated management of internal parasite training session, silvopasture practice training session, year-round pasture production and management training session, and grazing and browsing

Table 2. Responses Reflecting Current Programming Needs

Variable	Frequency	Percent
Familiarity with Educational Programs		
Not Familiar	2	5.1
Somewhat Familiar	13	33.3
Familiar	14	35.9
Very Familiar	10	25.6
Have Programs Contributed to your Operations?		
Yes, For The Most Part	25	78.1
Yes, But Less Than I Expected	6	18.8
No, The Programs Promise Remain Unfulfilled	1	3.1
No Response	7	17.9
Has Any of the Programs Resulted in Any Benefits?		
Yes	25	73.5
No	9	26.5
No Response	5	12.8
List at Least One Program		
Marketing	6	21.4
Health	9	32.1
Reproductive Management	3	10.7
Conference and Training	7	25.0
Other	3	10.7

training session indicated that the programs were useful and producers were very likely to use the knowledge and skills acquired.

Also, when participants were asked if any of the aforementioned programs has resulted in any benefits to the Alabama or their state's meat goat production system that they were aware of, nearly 74 percent answered, "yes" and 27 percent answered, "no." Furthermore, participants were asked to list at least one of the programs that resulted in a benefit to the Alabama or their state's meat goat production system that they were aware of.

Of the total responses provided, 21 percent were on marketing; 32 percent were on health (parasite management, FEC, FAMACHA); about 11 percent were on reproductive management; 25 percent were on conferences and trainings (Master Goat Producer Certification and Goat Day); and about 11 percent were on other activities, such as fencing, Cooperative Extension Program general activities, and other technical and management assistance. This result suggests that the programs provided by the Tuskegee University Caprine Research and Education Unit and/or Cooperative Extension Program largely had a positive impact on the Alabama and surrounding states' meat goat production system.

New Issues or Programming Areas

Table 3 displays responses on new issues or programming areas. About 82 percent indicated that research on integrated parasite management was important to them; whereas about three percent indicated that this type of research was not important to them. Almost 87 percent indicated that research on efficacy of parasiticides was important to them; whereas three percent indicated that this type of research was not important to them. Nearly 90 percent indicated that research on nutrition management analysis was important to them; whereas three percent indicated that this type of research was not important to them. Furthermore, about 72 percent stated that research related to reproductive management and artificial insemination was important to them, and nearly eight percent stated such research was not important to them. Almost 77 percent stated that research related to productivity and profitability among meat and milk breeds was important to them; and nearly eight percent stated that such research was not important to them. Approximately, 46 percent stated that research related to traditional 4-H livestock programs was important to them; and 23 percent stated that such research was not important to them. Also, about 77 percent affirmed that

Table 3. Responses Reflecting New Issues or Programming Areas

Variable	Frequency	Percent
Integrated Parasite Management		
Yes	32	82.1
No	1	2.6
Unsure	1	2.6
No Response	5	12.8
Efficacy of Natural Parasiticides		
Yes	34	87.2
No	1	2.6
Unsure	2	5.1
No Response	2	5.1
Nutrition Management and Nutrient Analysis		
Yes	35	89.7
No	1	2.6
Unsure	2	5.1
No Response	1	2.6
Reproductive Management and Artificial Insemination		
Yes	28	71.8
No	3	7.7
Unsure	4	10.3
No Response	4	10.3
Productivity and Profitability among Meat and Milk Breeds		
Yes	30	76.9
No	3	7.7
Unsure	1	2.6
No Response	5	12.8
Traditional 4-H livestock programs		
Yes	18	46.2
No	9	23.1
Unsure	3	7.7
No Response	9	23.1

Table 3. *continued*

Meat Quality Assurance programs		
Yes	30	76.9
No	2	5.1
Unsure	1	2.6
No Response	6	15.4
Economic, Marketing, and Risk Management		
Yes	31	79.5
No	2	5.1
Unsure	2	5.1
No Response	4	10.3
Biotechnology		
Yes	20	51.3
No	6	15.4
Unsure	5	12.8
No Response	8	20.5

research on meat quality assurance programs was important to them; however, five percent indicated such research was not important to them. Approximately 80 percent affirmed that research on economic, marketing, and risk management was important to them; however, five percent indicated such research was not important to them. About 51 percent affirmed that research biotechnology was important to them; however, 15 percent indicated that such research was not important to them.

The hierarchical representation of new issues or programming areas important to producers were nutrition management and nutrient analysis; efficacy of natural parasiticides; integrated parasite management; economic, marketing, and risk management; productivity and profitability among meat and milk breeds; meat quality assurance programs; reproductive management and artificial insemination; biotechnology; and traditional 4-H livestock programs. Producers are likely to appreciate the contents of the program even better if Extension specialists take into consideration this information and tailor programs

accordingly. In addition, respondents were asked to indicate by ranking (1, 2, 3, etc.) the new issues or programming areas of most importance to them. The top three areas chosen were health; nutrition; and economic, marketing, and risk management. This is consistent with what was reported by Joerger et al. (2012) who found that health and nutrition management were among the top four topics of interest selected by livestock producers in livestock production management education.

Adoption and Impact of Past Caprine Research Unit and/or Cooperative Extension Efforts

Table 4 shows responses on adoption and impact of past Caprine Research and Education Unit and/or Cooperative Extension Program efforts. When asked if they had adopted or used any information or skill from past Caprine Research and Education Unit or Cooperative Extension Program activities, about 82 percent of the respondents answered “yes” and about eight percent answered “no.” Respondents who answered “yes” were asked to list the information or skill they had adopted. Out of the total responses given, about 61 percent were on health management (specifically, parasite management); 13 percent were on information and skill acquired from conferences and trainings (particularly, Master Goat Producer Certification); about nine percent were on information and skill acquired on nutrition and nutrient analysis; and 18 percent were on information and skill acquired on other areas, such as cross breeding Boer with Kiko goats, breed type, hoof trimming, and record keeping. Also, when asked if any of the information they received or skill they learned from past program activities saved or made them money, or made their operations easier to run, 56 percent of the respondents answered, “yes” and 18 percent answered, “no.”

Table 4. Responses Reflecting Adoption and Impact of Past Caprine Research and Education Unit and/or Cooperative Extension Program Efforts

Variable	Frequency	Percent
Adopted or Used any Information or Skill From Past Program Activities?		
Yes	32	82.1
No	3	7.7
Unsure	3	7.7
No Response	1	2.6
Program Adopted		
Health Management	14	60.9
Conferences and Trainings	3	13.0
Nutrition and Nutrient Analysis	2	8.7
Other	4	17.9
Information or Skill Learned Saved, or Made Money, or Made your Operation Easier to Run?		
Yes	22	56.4
No	7	17.9
Unsure	9	33.1
No Response	1	2.6
Specialist's Time and Resources Well Spent Providing you with Technical Assistance?		
Yes	27	69.2
No	2	5.1
Unsure	7	17.9
No Response	3	7.7
Educational Programs Enabled you or your Operation To Obtain Outside Funds (Grants or Loans)?		
Yes	5	12.8
No	32	82.1
No Response	2	5.1
How Often do you Participate In Activities or Use Materials?		
Not At All	1	2.6
Not Often	14	35.9
Often	17	43.6
Very Often	6	15.4
No Response	1	2.6

Moreover, when the respondents were asked if they believed the specialists' time and resources were well spent providing them with the technical assistance, 69 percent of the respondents answered, "yes" and five percent answered, "no." Respondents who indicated "yes" were further asked to explain their previous answers. They stated that they had received abundant information, knowledge, and skills on health, nutrition, and marketing as well as other information, such as where to purchase items or useful forthcoming conferences (not shown in table). When asked if the education programs have enabled them to obtain outside funding for their operations, only 13 percent of the respondents answered, "yes" and 82 percent answered, "no." Those who responded "yes" were asked to indicate the type of funding obtained. They all indicated that they obtained grants. The total amount reported was \$38,042.00; the mean was \$9,510.50 per respondent (not shown in table). Also, when asked how often they participated in activities or used materials by the Caprine Research and Education Unit and/or Cooperative Extension Program, three percent answered, "not at all;" 36 percent answered "not often;" 44 percent answered, "often;" and 15 percent answered "very often."

The results reflect a large number of producers who adopted or used information or skill from past Caprine Research and Education Unit and/or Cooperative Extension Program activities; especially in health management; and the programs actually made them money or their operations easier to run. These results support what was reported by Joseph (2013) who found producers' decision to adopt a new production practice or technology was because it was an innovation which helped generate higher profits. Also, most producers were pleased with the time and resources the specialists spent in providing them with technical assistance. Nevertheless, the educational programs did not enable a majority of respondents to obtain

grants or loans. This could be that they: (1) had never applied for external funds; (2) applied and were not approved; or (3) did not have information on how to obtain external funds.

Presentation Formats for Future Programs

Table 5 reflects responses on preferred educational delivery formats for future educational programs. About 72 percent of the respondents indicated that their preferred educational delivery format for future programs was through a meat goat newsletter; 82 percent indicated that their preferred educational delivery format for future programs was through on-farm demonstrations/farm visits; about 72 percent indicated that their preferred educational delivery format for future programs was through fact sheets and publications; 46 percent indicated that their preferred educational delivery format for future programs was through videotapes/DVDs; and 49 percent indicated that their preferred educational delivery format for future programs was through web-based program materials. Moreover, nearly 90 percent stated that their preferred educational delivery format for future programs was through field/goat day; 77 percent stated that their preferred educational delivery format for future programs was through one-on-one assistance; 59 percent stated that their preferred educational delivery format for future programs was through formal classroom setting; and 64 percent stated that their preferred delivery format for future programs was through software program/e-mail communication.

The results for the presentation formats for future educational programs shows that field/goat day, on-farm demonstrations/farm visits, one-on-one assistance, meat goat newsletter, fact sheets and publications, software program/e-mail communication, and to an extent formal classroom setting were the leading and preferred educational delivery format

Table 5. Responses Reflecting Preferred Educational Delivery Formats for Future Educational Programs

Variable	Frequency	Percent
Meat Goat Newsletter		
Yes	28	71.8
No	3	7.7
Unsure	5	12.8
No Response	3	7.7
On-Farm Demonstrations/Farm Visits		
Yes	32	82.1
No	0	0.0
Unsure	3	7.7
No Response	4	10.3
Fact Sheets and Publications		
Yes	28	71.8
No	1	2.6
Unsure	3	7.7
No Response	7	17.9
Video Tapes/DVD		
Yes	18	46.2
No	6	15.4
Unsure	5	12.8
No Response	10	25.6
Web-Based Program Materials		
Yes	19	48.7
No	7	17.9
Unsure	3	7.7
No Response	10	25.6
Field/Goat Day		
Yes	35	89.7
No	0	0.0
Unsure	1	2.6
No Response	3	7.7

Table 5. *Continued*

Variable	Frequency	Percent
One-on-One-Assistance		
Yes	30	76.9
No	3	7.7
Unsure	1	2.6
No Response	5	12.8
Formal Classroom Setting		
Yes	23	59.0
No	3	7.7
Unsure	4	10.3
No Response	9	23.1
Software Program/E-Mail Communication		
Yes	25	64.1
No	4	10.3
Unsure	2	5.1
No Response	8	20.5
Change Research/Extension Areas		
Yes	2	5.1
No	18	46.2
Unsure	13	33.3
No Response	6	15.4
Change Program Delivery Process		
Yes	7	17.9
No	15	38.5
Unsure	10	25.6
No Response	7	17.9
Do Nothing		
Yes	7	17.9
No	7	17.9
Unsure	12	30.8
No Response	13	33.3

for future programs. This indicates that the producers surveyed do prefer diverse educational presentation formats. These results are similar to Boone et al. (2013), Maddox et al. (2013), and Trede & Whitaker (2000) who found that the preferred information delivery channel for producers were newsletters, magazine articles, bulletins/fact sheets, and on-site educational instruction/demonstrations.

Participants were asked how they would improve Caprine Research Unit and/or Cooperative Extension Program educational programs. They had three options: (a) change research/Extension program areas; (b) change program delivery process; (c) do nothing. When participants were asked if they would change research/Extension program areas, five percent answered, “yes;” 46 percent answered, “no;” and 33 percent were not sure what they would do. Participants who answered “yes” were asked how they would change the program areas. The responses were: “every three months, an advertisement should be placed in the ‘farmer for sale section’ on Craig List in order for producers to know where the sales are;” “the specialists should find a way to reduce parasites in pasture;” “more programs should be on forages to keep feed costs down, and also where to purchase winter and summer forages and when to plant them.”

When participants were asked if they would change the program delivery process, 18 percent answered, “yes;” about 39 percent answered, “no;” and 26 percent were not sure what they would do. The participants who answered, “yes” were asked how they would change the process. Their responses were as follows: “county agents should assist farmers with less than 20 acres of farmland by providing them with flyers on programs;” “there should be better cooperation/ communication between program service providers;” “there should be more on-farm demonstrations, webinars, and more beginner classes;” and “there

should be more help available when needed.” Also, when participants were asked whether they would do nothing to improve educational programs, 18 percent answered, “yes;” another 18 percent answered, “no;” and 31 percent were not sure what they would do. Here again, the participants who answered “yes” were asked why they would not do anything, and they gave the following responses: “I believe that the Tuskegee University is doing an excellent job;” “because the format you have in place is fantastic;” “satisfied with what I am getting;” “I could not imagine a better way to do what they do, they should keep up the good work;” “the program seems to work” and “their results are on target.”

In general, only a relatively low proportion of producers were actually dissatisfied with the Caprine Research and Education Unit and/or Cooperative Extension Program educational programs and did not want to make any changes to the programs. However, a sizeable proportion of producers were not sure if they were satisfied with the programs and would want to make changes to them. This notwithstanding, since the majority producers indicated that their current educational program needs were nutrition management analysis; efficacy of parasiticides; integrated parasite management; economic, marketing, and risk management; productivity and profitability among meat and milk breeds; meat quality assurance programs; and reproductive management and artificial insemination, and furthermore that, their preferred educational delivery formats for future educational programs were field/goat day, on-farm demonstrations/farm visits, one-on-one assistance, meat goat newsletter, fact sheets and publications, software program/e-mail communication, and to an extent formal classroom setting were, it is important that researchers and Extension specialists focus on the producers’ program needs and their preferred educational delivery formats.

Chi-Square Test Results

Table 6 displays the results of the chi-square tests between adoption or use of information or skill from past Caprine Research and Education Unit and/or Cooperative Extension Program activities and selected socioeconomic variables. Of the socioeconomic variables tested, only age was significant at the five percent level. In this circumstance, the null hypothesis, stating that age is independent of adoption and use of information or skill learned from past Caprine Research and Education Unit and/or Cooperative Extension Program activities is rejected. This possibly implies that older producers tended to adopt or use information or skill learned from past Caprine Research and Education Unit and/or Cooperative Extension Program activities than younger producers. The reason for this may be that older respondents participating in these programs for a longer time have had a longer period to accept and adopt one or more of the practices. Race/ethnicity, age, education, and annual household income were not significant. The null hypothesis that these variables are independent of adoption or use of information or skill learned from past Caprine Research and Education Unit and/or Cooperative Extension Program activities are not rejected.

Table 6. Results of Chi-Square Tests between Adoption or Use of Information or Skill from Past Caprine Research and Education Unit and/or Cooperative Extension Program Activities and Selected Socioeconomic Variables

Variables	df	χ^2	ρ -value
Gender	5.1	3.748	0.154
Race/Ethnicity	4	1.341	0.854
Age	10	2.451**	0.025
Education	6	4.582	0.598
Household Income	12	10.947	0.533

**Significant at the five percent level

Table 7 shows the results of the chi-square tests between using meat goat newsletter as a preferred educational delivery presentation format for future educational programs and selected socioeconomic variables. Both gender and age were significant at the ten percent level. The null hypotheses that these variables are independent of using meat goat newsletter as a preferred educational delivery presentation format for future educational programs are rejected. This may mean that more male participants leaned toward using meat goat newsletter as a preferred educational delivery presentation format than females. Also, for age, the result could mean that older producers tended toward using meat goat newsletters as a preferred educational delivery presentation format than younger producers. The reason for this may be that male and older producers wanted something handy and quick to read rather than other methods or formats. Race/ethnicity, education, and annual household income were not significant. The null hypotheses that these variables are independent of using meat goat newsletter as a preferred educational delivery presentation format for future educational programs are not rejected.

Table 7. Results of Chi-Square Tests between Using Meat Goat Newsletter as a Preferred Educational Delivery Presentation Format for Future Educational Programs and Selected Socioeconomic Variables

Variables	df	χ^2	ρ -value
Gender	3	7.477*	0.058
Race/Ethnicity	6	5.361	0.498
Age	15	22.639*	0.092
Education	9	7.628	0.572
Household Income	18	15.397	0.635

*Significant at the ten percent level

Table 8 presents the results of the chi-square tests between using farm demonstrations/farm visits as a preferred educational delivery presentation format for future educational

programs and selected socioeconomic variables. Race/ethnicity was significant at the five percent level. The null hypothesis that race/ethnicity is independent of using farm demonstrations/farm visits as a preferred educational delivery presentation format for future educational programs is rejected. There is the likelihood that more Blacks than Whites gravitated toward farm demonstrations/farm visits as a preferred educational delivery presentation format for future educational programs. This may be due to the fact that many more Blacks are more recent meat goat producers relative to Whites, and therefore may prefer this format. Gender, age, education, and annual income were not significant. The null hypotheses that these variables are independent of using farm demonstrations/farm visits as a preferred educational delivery presentation format for future educational programs are not rejected.

Table 8. Results of Chi-Square Tests between Using Farm Demonstrations/Farm Visits as a Preferred Educational Delivery Presentation Format for Future Educational Programs and Selected Socioeconomic Variables

Variables	df	χ^2	ρ -value
Gender	2	1.532	0.465
Race/Ethnicity	4	9.953**	0.041
Age	10	9.477	0.490
Education	6	3.693	0.718
Household Income	12	14.912	0.246

**Significant at the five percent level

Table 9 presents the results of the chi-square tests between using fact sheets and publications as a preferred educational delivery presentation format for future educational programs and selected socioeconomic variables. Here again, race/ethnicity was significant at the five percent level. The null hypothesis that race/ethnicity is independent of using fact sheets and publications as a preferred educational delivery presentation format for future educational programs is rejected. Again, there is the likelihood that many more Blacks than Whites

gravitated toward using fact sheets and publications as a preferred educational delivery presentation for future educational programs. The reason may be because many more Blacks than Whites prefer something to hold in their hands to quickly refer to. Gender, age, education, and annual household income were not significant. The null hypotheses that these variables are independent of using fact sheets and publications as a preferred educational delivery presentation format for future educational programs are not rejected.

Table 9. Results of Chi-Square Tests between Using Fact Sheets and Publications as a Preferred Educational Delivery Presentation Format for Future Educational Programs and Selected Socioeconomic Variables

Variables	df	χ^2	ρ -value
Gender	3	2.251	0.522
Race/Ethnicity	6	13.361**	0.038
Age	15	8.687	0.893
Education	9	13.442	0.144
Household Income	18	16.593	0.551

**Significant at the five percent level

Table 10 presents the results of the chi-square tests between using videotapes/DVDs as a preferred educational delivery presentation format for future educational programs and selected socioeconomic variables. All the socioeconomic variables were not significant.

Table 10. Results of Chi-Square Tests between Using Video Tapes/DVDs as a Preferred Educational Delivery Presentation Format for Future Educational Programs and Selected Socioeconomic Variables

Variables	df	χ^2	ρ -value
Gender	3	0.796	0.850
Race/Ethnicity	6	10.204	0.116
Age	15	13.027	0.600
Education	9	8.160	0.518
Household Income	18	18.110	0.448

This means that the null hypotheses that these variables are independent of using videotapes/DVD as a preferred educational delivery presentation format for future educational programs are not rejected.

Table 11 shows the results of the chi-square tests between using web-based program materials as a preferred educational delivery presentation format for future educational programs and selected socioeconomic variables. Age was significant at the ten percent level. The null hypothesis that age is independent of using web-based program materials as a preferred educational delivery presentation format for future educational program is rejected. This may imply that older producers preferred using web-based program materials as the format for future educational program delivery. A possible presentation is that older producers are beginning to understand the relevance of web-based programs and are adapting to this method of program delivery to acquire the information that they need. Gender, race/ethnicity, education, and annual household income were not significant. The null hypotheses that these variables are independent of using web-based program materials as a preferred educational delivery presentation format for future educational programs are not rejected.

Table 11. Results of Chi-Square Tests between Using Web-Based Program Materials as a Preferred Educational Delivery Presentation Format for Future Educational Programs and Selected Socioeconomic Variables

Variables	df	χ^2	ρ -value
Gender	3	0.621	0.967
Race/Ethnicity	6	6.148	0.407
Age	15	23.474*	0.075
Education	9	10.741	0.294
Household Income	18	17.426	0.494

*Significant at the ten percent level

Table 12 shows the results of the chi-square tests between using field/goat day as a preferred educational delivery presentation format for future educational programs and selected socioeconomic variables. All selected socioeconomic variables were not significant. This means that the null hypotheses that these variables are independent of using field/goat day as a preferred educational delivery presentation format for future educational programs are not rejected.

Table 12. Results of Chi-Square Tests between Using Field/Goat Day as a Preferred Educational Delivery Presentation Format for Future Educational Programs and Selected Socioeconomic Variables

Variables	df	χ^2	ρ -value
Gender	2	1.145	0.564
Race/Ethnicity	6	3.506	0.743
Age	15	13.843	0.537
Education	9	10.520	0.310
Household Income	18	19.316	0.373

Table 13 displays the results of the chi-square tests between using formal classroom setting as a preferred educational delivery presentation format for future educational programs. Once again, age was significant at the ten percent level. The null hypothesis that age is independent of using formal classroom setting as a preferred educational delivery presentation format for future educational programs is rejected. This possibly means that older producers preferred using formal classroom setting as the format for future educational program delivery than younger producers. The reason for this may be that older producers usually tend to prefer traditional methods of learning, such as formal classroom setting, in order to be able to interact better with the specialists. On the contrary, gender, race/ethnicity, education, and annual household income were not significant. Therefore, the null hypotheses

that these variables are independent using formal classroom setting as a preferred educational delivery presentation format for future educational programs are not rejected.

Table 13. Results of Chi-Square Tests between Using Formal Classroom Setting as a Preferred Educational Delivery Presentation Format for Future Educational Programs and Selected Socioeconomic Variables

Variables	df	χ^2	ρ -value
Gender	2	0.219	0.975
Race/Ethnicity	6	6.671	0.352
Age	15	23.603*	0.072
Education	9	7.841	0.550
Household Income	18	16.338	0.569

*Significant at the ten percent level

Table 14 presents the results of the chi-square tests between using one-on-one assistance as a preferred educational delivery presentation format for future educational programs and selected socioeconomic variables. All selected socioeconomic variables were not significant. This means that the null hypotheses that these variables are independent of using one-on-one assistance as a preferred educational delivery presentation format for future educational programs are not rejected.

Table 14. Results of Chi-Square Tests between Producers Using One-On-One Assistance as a Preferred Educational Delivery Presentation Format for Future Educational Programs and Selected Socioeconomic Variables

Variables	df	χ^2	ρ -value
Gender	3	5.408	0.144
Race/Ethnicity	6	7.505	0.277
Age	15	18.945	0.216
Education	9	8.998	0.437
Household Income	18	14.621	0.688

Table 15 shows the results of the chi-square tests between using software programs/e-mail communication as a preferred educational delivery presentation format for future educational programs and selected socioeconomic variables. Once again, all the selected socioeconomic variables were not significant. This implies that the null hypotheses that these variables are independent of using software programs/e-mail communications as a preferred educational delivery presentation format for future programs are not rejected.

Table 15. Results of Chi-Square Tests between Using Software Programs/E-mail Communication as a Preferred Educational Delivery Presentation Format for Future Educational Programs and Selected Socioeconomic Variables

Variables	df	χ^2	p -value
Gender	3	2.237	0.525
Race/Ethnicity	6	6.044	0.418
Age	15	12.611	0.632
Education	9	9.650	0.380
Household Income	18	15.196	0.648

CHAPTER V

SUMMARY AND CONCLUSION

The purpose of this study was to assess the educational program needs of small and limited resource meat goat producers. The specific objectives were to (1) determine if current educational programs by the Caprine Research and Education Unit and/or the Cooperative Extension Program, Tuskegee University, reflect the actual needs of meat goat producers, (2) measure adoption and impact of past educational efforts by the Caprine Research and Education Unit and/or the Cooperative Extension Program, (3) determine the desired presentation or delivery format for future programs, and (4) determine relationships between selected socioeconomic variables and explained variables. Data for the study were collected using a questionnaire, through a mail survey of a purposive sample of 54 producers. The data were analyzed using descriptive statistics, specifically frequencies, percentages as well as chi-square tests.

The results showed that a majority (56 percent) of the respondents reported annual sales of \$2,500 or less; 18 percent each reported herd sizes of 10 or less and 11-20, and 21 percent had a herd size of 21-30; and 56 percent were part-time farmers. Also, about 62 percent of respondents were males; equal proportions (46 percent each) were Blacks and Whites; a majority (64 percent) was 45-64 years; nearly 72 percent had at least a two-year college degree. Additionally, there were about equal proportions (49 percent each) of those with annual household incomes of \$40,000 or less and those with annual household incomes of more than \$40,000. An overwhelming majority (nearly 95 percent) indicated, at least, being somewhat familiar with the Caprine Research and Education Unit and/or Cooperative Extension Program programs in marketing, nutrition, reproductive management, and

integrated parasite management. Similarly, 78 percent indicated that for the most part, the aforementioned programs have contributed to their operations. Nearly 74 percent stated that the programs have resulted in benefits to their State's meat goat production system. Furthermore, most of the producers (at least 72 percent) agreed that research on nutrition management and nutrient analysis; efficacy of natural parasiticides; integrated parasite management; economic, marketing, and risk management; productivity and profitability among meat goat and milk breeds; meat quality assurance programs; and reproductive management and artificial insemination was important to them.

About 82 percent agreed that they had adopted or used information or skill from past Caprine Research and Education Unit and/or Cooperative Extension Program activities; 56 percent agreed that the information or skill that they received from past Caprine Research Unit and/or Cooperative Extension Program activities saved or made them money, or made their operations easier to run. A relatively large majority of respondents (59 percent) indicated they often or very often participated in Caprine Research and Education Unit and/or Cooperative Extension Program activities or use their materials. Moreover, most (at least 72 percent) affirmed that their preferred educational delivery formats for future educational programs were field/goat day; on-farm demonstrations/farm visits; one-on-one assistance; meat goat newsletter; and fact sheets and publications.

The chi-square tests showed that age had a statistically significant relationship with adoption or use of information or skill from past Caprine Research and Education Unit and/or Cooperative Extension Program activities. Also, regarding preferred educational delivery presentation format for future educational programs, gender and age had significant effects on using meat goat newsletter; race/ethnicity had a significant effect on using on-farm

demonstrations/farm visits; race/ethnicity had a significant effect on using fact sheets and publications; age had a significant effect on using web-based programs materials; and again, age had a significant effect on using formal classroom setting.

Based on the results that a majority of producers surveyed thought research on nutrition management and nutrition analysis; efficacy of natural parasiticides; integrated parasite management; economic, marketing, and risk management; productivity and profitability among meat goat and milk breeds; meat quality assurance programs; and reproductive management and artificial insemination was important to them, the Caprine Research and Education Unit and/or the Cooperative Extension Program should continue research and Extension activities in these areas for many more small and limited resource meat goat producers to benefit. Also, since a large majority agreed that they had adopted or used information or skill from past Caprine Research and Education Unit and/or the Cooperative Extension Program activities, transferring new and appropriate technology by specialists and agents to small and limited resource producers should be put in “high gear” so as to reach more producers, or at least, maintain current ones.

Furthermore, it is obvious that the small and limited resource meat goat producers prefer field/goat day; on-farm demonstrations/farm visits; one-on-one assistance; meat goat newsletter; and fact sheets and publications for educational delivery formats for future programs more than any of the other formats. These should be emphasized in future educational programs. In addition, since age appear to be important in adoption or use of information or skill; gender and age appear to be important in using a newsletter as an educational delivery format; race/ethnicity appear to be important in using farm demonstrations/farm visits as well as fact sheets and publications as educational delivery

formats; and age appear to be important in using web-based program materials and formal classroom setting as educational delivery formats, these factors should be considered in any future educational delivery formats.

APPENDICES

APPENDIX A

Survey on Educational Program Needs of Meat Goat Producers

General Instruction/Directions

In order to assess meat goat producers' educational program needs, please answer the following questions. The answers you provide are confidential [Do not put name on the survey]. Only summaries of these answers will be reported for planning and recommendation purposes.

Part I: Current Programming Needs

1. Are you familiar with the Tuskegee University Caprine Research and Education Unit and/or Cooperative Extension Program educational programs in meat goat marketing, nutrition management, reproductive management, or Integrated Parasite Management?

[1] Not familiar [2] Somewhat Familiar [3] Familiar [4] Very familiar

2. If you answered 2, 3, or 4 to question 1, have these programs contributed to your operations?

[1] Yes, for the most part [2] Yes, but less than I expected [3] No, the programs' promise remains largely unfulfilled.

3. Has any of the programs (such as the ones listed in question 1) in the Caprine Research and Education Unit and/or Cooperative Extension Program resulted in any benefits to the Alabama [or your State's] meat goat production system that you are aware of?

[1] Yes [2] No

4. If yes, list at least one program (you may list a maximum of three): _____

Part II: New Issues or Programming Areas

5. What areas of research are most important to you, in order of priority (Number your choices using 1, 2, 3, etc. when choosing "yes")?

Research Area	Yes	No	Unsure
Integrated Parasite Management			
Efficacy of natural parasiticides, including tobacco, diatomaceous earth, pumpkin seeds, Sericea lespedeza, pine barks, and misc. herbs			
Nutrition management and nutrient analysis			
Reproductive management plus artificial insemination			

Analysis of productivity and profitability comparing meat breeds of goat and milk breeds			
Traditional 4-H livestock programs			
Meat Quality Assurance programs			
Economic, marketing, and risk management			
Biotechnology			

Part III: Adoption and Impact of Past Caprine Research and Education Unit and/or Cooperative Extension Efforts

6. Indicate your adoption and use of past meat goat production/Extension/educational information

Program (Workshop/Seminar/Publication)	Yes	No	Unsure
Have you adopted or used any information or skill from past Caprine Research and Education Unit and/or Cooperative Extension Program Activities?			
If yes, which one?			
Has any information you received or skill you learned from past Caprine Research and Education Unit and/or Cooperative Extension Program Activities saved or made you money, or made your operation easier to run?			
Do you believe the Caprine Research and Education Unit and/or Extension specialist's time and resources are well spent providing you with technical assistance?			
Explain your previous answer:			

7. Has the Tuskegee University Caprine Research and Education Unit and/or Cooperative Extension Program educational programs enabled you or your operation to obtain outside funds (grants or loans)?

[1] Yes [2] No

8. If yes to question 7, indicate whether you obtained a grant or loan, and how much?

[1] Grant (Amount: _____) [2] Loan: _____)

[3] Both: Grant (Amount: _____); Loan: _____)

Part V: Demographic Information

12. Indicate your annual sales from your meat goat operation

- [1] \$2,500 or less [2] \$2,501-5,000 [3] \$5,001-7,500 [4] \$7,501-10,000
 [5] \$10,001-12,500 [6] \$12,501-15,000 [7] \$15,001-17,500 [8] \$17,501-20,000
 [9] Above \$20,000

13. What is your herd size (that is, number of goats on your farm)?

- [1] 10 or less [2] 11-20 [3] 21-30 [4] 31-40 [5] 41-50 [6] Over 50

If over 50, specify number: _____

14. Indicate your farming status

- [1] Full time [2] Part Time

15. Indicate your gender

- [1] Male [2] Female

16. Indicate your race/ethnicity

- [1] Black [2] White [3] Hispanic [4] Other (specify) _____

17. Indicate your age range

- [1] 20-24 years [2] 25-34 years [3] 35-44 years [4] 45-54 years
 [5] 55-64 years [6] 65 years and above

18. Indicate your educational level

- [1] Elementary/Middle School [2] High School/GED [3] Two-year/Technical College Degree
 [4] Some College (did not complete) [5] College Degree

19. Indicate your annual household income

- [1] \$10,000 or below [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] Above \$60,000

20. Indicate your County/State of residence (for example, Macon County, AL)

21. Additional Comments: _____

Thank you for completing the survey

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