



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

# THE IMPACT OF MARKETING CHANNELS USED BY U.S. MEAT GOAT PRODUCERS ON FARM PROFITABILITY

Jeffrey Gillespie, Narayan Nyaupane, Kenneth McMillin, and Wes Harrison

Selected Paper prepared for presentation at the Southern Agricultural Economics Association (SAEA) Annual Meeting , Dallas, TX, February 1-4, 2014

Copyright 2014 by Jeffrey Gillespie, Narayan Nyaupane, Kenneth McMillin, and Wes Harrison. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided this copyright notice appears on all such copies.

# **THE IMPACT OF MARKETING CHANNELS USED BY U.S. MEAT GOAT PRODUCERS ON FARM PROFITABILITY**

**Jeffrey Gillespie, Narayan Nyaupane, Kenneth McMillin, and Wes Harrison**

*This study investigates factors influencing the use of marketing channels in U.S. meat goat production. Producer demographics, production system, socioeconomic, and regional variables impacted marketing channel selection. Larger-scale producers selling goat meat or selling larger percentages of goats as slaughter or as meat were more profitable.*

*Key words: marketing channels, meat goat, probit, profitability*

## **INTRODUCTION**

Effective product marketing is one of the most important aspects of business enterprises. To successfully market products, it is important for a producer to have answers to three questions (1) what, (2) where, and (3) when (Jones and Raper 2012). Sound understanding of market dynamics helps not only in making immediate marketing decisions but also provides insights in designing future production strategies. Although the rate of growth of the US meat goat industry has decreased in the last few years, it has been one of the most rapidly growing agricultural industries over the past few decades, largely because of increased demand from the immigrant population. In spite of its production growth, areas of production and consumption are widely separated across the nation. Most of the U.S. meat goats are produced in Texas and the Southeast whereas the major goat consuming population resides on the West and East coasts of the U.S. (Pinkerton et al. 1991). Furthermore, the type of goat meat demanded widely varies based on the origin of the immigrant population and their associated religious cultures. A number of studies have discussed U.S. meat goat marketing dynamics and price seasonality (Pinkerton et al. 1991; Frasar 2004; Larson and Thompson 2005; Jones et al. 2012; and Jones and Raper 2012). Some of the initial meat goat marketing studies (Degner and Lin 1993; Glimp 1995) discussed the issues behind the

meat goat production systems and consumer tastes and preferences on meat goat marketing. Other studies have discussed goat marketing in different countries (Aduku et al. 1991; Pandit and Dhaka 2005). We found no previous studies dealing with the what, where, and when questions of marketing, which are prerequisites for a sustainable and competitive U.S. meat goat industry.

By using data collected from a nationwide mail-survey, this study provides comprehensive information on the types of meat goats produced in the U.S., when producers market them, and where they market them. This study further investigates the factors affecting the profitability of U.S. meat goat farms. The specific objectives of this study are to determine: (1) how meat goats are marketed in U.S. and factors affecting producer selection of marketing channels, and (2) the factors affecting profitability of the meat goat enterprise, i.e., which of those marketing channels led to greater farm profit. Seven major marketing channels were analyzed in this study: (a) live auctions, (b) dealers, brokers, or meat packers, (c) wholesale and retail businesses, (d) selling of goat meat, (e) direct sale to consumers, (f) market pooling, and (g) cooperatives.

### ***U.S. Meat Goat Industry and Ethnic Demand***

The U.S. population has increased significantly over the last 60 years (152.3 million in 1950 to 308.7 million in 2010) and a primary contributor has been immigration (Shrestha and Heisler 2011). The foreign-born population residing in U.S. in 2005 was 12% of the total; the percentage is projected to be 19% by 2050 (Passel and Cohn 2008). Hispanics and the Asian population were 14% and 5% of the total in 2005, respectively, expected to rise to 29% and 9%, respectively, in 2050. Having a significant increase in immigrants especially from goat meat consuming nations, the US demand for meat goats has increased in recent years, and this should continue to increase as long as there is an accelerated growth in the immigrant population. Although there has been considerably increased domestic meat goat production over the last few decades, the U.S. continues to fulfill its demand by importing frozen meat from Australia and New Zealand. Meat goat imports of 1,749 metric tons in 1991 increased to 15,752 metric tons in 2011, approximately equivalent to 1,052,340 live goats (Stanton 2012). Since most ethnic

consumers prefer fresh meat over frozen, there is significant potential for growth and development of domestic meat goat production (Knudson 2006).

In a typical meat goat supply chain, first, meat goats are marketed to the nearby live auction markets. Second, dealers purchase them and sell them either to meat packers, wholesale businesses, or via the regional auctions. Third, meat packers (who also have slaughterhouses) sell meat cuts or carcasses to retailers and wholesale businesses arrange for further processing of animals (Stanton 2006). This typical scenario is not universally the case for all farms and locations. In addition to the availability of markets, the advantages/disadvantages associated with alternative markets are also considered to have significant impacts on producer selection decisions.

### ***Factors Influencing Producer Selection of Marketing Channels***

In this study, we describe the producer selection decision using the following equation:

1. *Selection of Marketing Channel(s) = f (Demographic Variables, Farming Characteristics, Production Systems, Economic Indicators, Regional Variables)*

Since the selection of a marketing channel can be described as a discrete choice (1 if selected; 0 if not selected), the probability distribution of their selection can be estimated by using the probit (normal distribution) function (Judge et al. 1988). In accordance with Greene (2008), the probability of a producer selecting a given marketing channel can be described as:

$$2. \text{Prob}(Y=1|x) = \int_{-\infty}^{x'\beta} \phi(t)dt = \Phi(x'\beta)$$

The function  $\Phi(\cdot)$  is defined as the normal distribution function,  $Y=1$  denotes that the marketing channel has been selected, and  $x$  is a vector of explanatory variables hypothesized to influence the selection decision.

Marginal effects for continuous and dummy variables are respectively estimated as follows (Greene, 2008):

$$3. \frac{\partial E[y|x]}{\partial x} = \phi(x'\beta)\beta$$

where  $\phi(\cdot)$  is the standard normal density, and

$$4. \quad \text{Prob}[Y = 1 | \bar{x}_d, d = 1] - \text{Prob}[Y = 1 | \bar{x}_d, d = 0]$$

where  $\bar{x}_d$ , denotes the means of all the other variables in the model. Separate probit models were run for each of the market outlets.

### ***Independent Variables Used in the Probit Models***

*Num\_meatgoats* is the average total number of meat goats raised on the farm, serving as a proxy for farm size. *Sale\_slaugh%* is the percentage of goat sales for slaughter or as meat. *Age* is a continuous variable representing the producers age in 15 year intervals, starting at 30 years. *Bachelor* is a dummy variable indicating whether a producer holds at least a college bachelor's degree. *Offfarmjob* is a dummy variable representing the producer held an off-farm job. *Risk averse* is a dummy variable indicating that the producer tends to avoid risk when possible in investment decisions. *Farm\_income* is a continuous variable indicating the percentage of annual net farm income derived from goat operation.

Four basic production systems may be used on U.S. meat goat farms. In pastured but not rotated, *PAS\_notrot%*, goats are pastured without using a management intensive rotational grazing system. In pastured and rotated, *PAS\_rot%*, pastures are cross-fenced into "paddocks" so that the animals can be easily monitored in terms of grazing, feed supply, health, safety and many more. Animals are rotated in this system. In a dry lot, *Drylot%*, goats are kept in a dry lot where there is no growing forage. Goats are fed with purchased feed and/or hay. Extensive-range or pasture/woods, *Extensive%*, was used as the base. In the extensive system, goats are not handled much. They are kept on large tracts of pasture or rangeland, mostly "fending for themselves." Goats forage for food and care for young with minimal assistance (Coffey 2006).

Regional variables, *Southeast* (AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, and WV), *Northeast* (CT, DE, MA, MD, ME, NH, NJ, NY, PA, RI, and VT), *Midwest* (KS, IA, IL, IN, MI, MN, MO, ND, NE, OH, SD, and WI), and *West* (AK, AZ, CA, CO, HI, ID, MT, NM, NV, OR, UT, WA, and WY) were used to capture the geographical differences around the nation. Land quality, market availability, price, and many other key factors differ across the regions; therefore producer selection of

marketing channels is also expected to differ across the country. *Texas/Oklahoma* (TX, and OK) was considered as base.

### ***Profitability Measures***

There are two major approaches used in estimating farm profitability: the whole-farm approach (Kopke et al. 2008, Young et al. 2011), and the enterprise approach (McBride et al. 2004, Gillespie et al. 2009); sometimes both are used (Tauer and Knoblach 1997, Gillespie et al. 2010). Using the whole-farm approach, profit is estimated for the entire farm whereas in the enterprise approach it is estimated only for the particular enterprise of interest. Profit can be further estimated in terms of per unit of land, per unit of output, or per unit of breeding animals. Since land quality and output prices differ widely across the country, thereby requiring estimation adjustments, we chose to estimate profit per breeding doe. Similar to Tauer and Mishra (2006) with dairy, we found significant correlation between the total number of breeding animals (does) and their production (number of goats) with a correlation coefficient of 0.88. Advantages of using per unit breeding-animal-based analysis is that it is one major consistent measure of estimation and can be predetermined unlike other farm products that are stochastic in nature and are correlated to the error terms (Tauer and Mishra 2006).

*Estimating Cost of Production:* Costs associated only with meat goat production were measured directly and those associated to the entire farm were adjusted according to the share of meat goat revenue relative to total revenue. Direct total cost of meat goat production includes: operating costs (purchases of meat goats; purchased feed; bedding and litter expenses; medical supplies, veterinary and custom services; fuels, oils and lubricants; electricity; maintenance and repair for the upkeep of all farm buildings, land improvements, and all other farm/ranch improvements; depreciation of farm assets used for breeding goats; cash wages paid to hired farm and ranch labor plus payroll taxes and benefits; cash value of feed, farm commodities, fuel, housing, meals, other food, utilities, vehicles for personal use, and other non-cash payment for farm work) and marketing and storage expenses.

Other operating expenses shared for the entire farm include: seeds, sets, plants, seed cleaning and treatments, transplants, trees, and nursery stock; nutrients, fertilizer, lime, and soil conditioners; bio-

controls and agricultural chemicals for crops, livestock, poultry, and general farm use; all other utilities and water for irrigation; water purchased for irrigation or otherwise, internet access etc.; farm supplies, marketing containers, hand tools, and farm shop power equipment; repairs, parts, and accessories for motor vehicles, machinery, and farm equipment; insurance for the farm business; interest and fees paid on debts for the operation; property taxes paid on farm real estate (land and buildings), livestock, machinery, and other farm production items; renting or leasing of tractors, farm vehicles, equipment, or storage structures; farm vehicle and licensing fees; custom work, performed by machines and labor hired as a unit; and professional or farm management services such as record-keeping, accounting, tax and business planning, farm product advice, conservation practices, etc. These were allocated to the goat enterprise according to the percentage of total farm revenues from meat goats.

*Estimating returns:* Total meat goat related revenue was estimated by summing the total sales of goats for meat, breeding stock, and goat meat. Other farm revenue was generated by the sale of field crops, hay and silage, fruits and vegetables, animals and animal products other than meat goats and their related products. After adjusting the costs associated to the entire farm, net enterprise profit was estimated by subtracting meat goat related total costs from those of total meat goat related revenue. Net enterprise profit was divided by the total number does bred in 2011.

### ***Factors Affecting Farm Profitability***

Enterprise profit per breeding doe was modeled as the following OLS equation:

$$5. \quad \textit{Profit} = f(\textit{Marketing Channels}, \textit{Number of Meat Goats}, \textit{Types of Animals Sold}, \textit{Producer Demographics}, \textit{Production Systems Used}, \textit{and Regional Variables})$$

Independent variables used in this equation include the marketing channels analyzed in the first-stage probit runs; therefore endogeneity was suspected. Testing for endogeneity was conducted for each of the marketing channels by using 4 different instruments, *gs2\_smallacre*, *mp4\_targmarket*, *poic1\_foreign*, and *marketinfo*, respectively, for sales to dealers, selling of meat, direct to consumer, and auction market. *Gs2\_smallacre* is a continuous variable representing the extent of producers' agreement that 'they can raise goats on a relatively small acreage' as a reason of selecting goat enterprise as opposed



to other agricultural enterprises. *Mp4\_targmarket* is a dummy variable indicating that producers target their goat production to specific ethnic holiday markets. *Poic1\_foreign* shows the extent to which producers agree or disagree that the surplus supply of foreign goat meat product has significant negative impacts on goat producers in their areas. *Marketinfo* shows the total number of primary information sources producers use to know the market prices of goats. The alternative sources include: extension service; media - TV, radio, or magazines; other farmers; the internet; farm organizations; and others. The first-stage probit models were run with the core variables and the respective instrument mentioned above for each marketing channel. Then the residuals from each of those models were included in the second-stage Ordinary Least Square regression on farm profitability. The significance of the residuals in OLS regression would serve as an indicator of endogeneity. No endogeneity problem was found.

## **DATA**

A mail survey was sent to 1,600 U.S. meat goat producers during Summer and early Fall, 2012, using Dillman's Tailored Design Method (2007). Producer names were collected online. Phrases like "meat goat producers in Louisiana," "meat goat association, LA," or "meat goat farms, Louisiana" were entered for each state and 4-5 Google pages were thoroughly visited if there were any web-links available for the meat goat producers. Most of the producers were found as members of meat goat associations, or they were listed in [www.eatwild.com](http://www.eatwild.com). Some of the addresses were also collected by individually visiting the respective websites of the farms. The first round of mailing included a cover letter, a ten page questionnaire, a complementary pen, and a postage-paid return envelope. After one week, the first postcard reminder was sent to non-respondents. This was followed by a new cover letter, a survey, and a return envelope to non-respondents two weeks later. One week later, a final reminder (second postcard) was sent. All of the follow-ups were made only to the non-respondents as of the date. After removing 190 producers who did not produce meat goats during 2011 and 52 undeliverable from the total population, an adjusted response rate of 43% was received with the 584 completed responses.

To determine the marketing channels producers used, the following question was asked: “Which of the following marketing channels do you use to sell goats? (Check all that apply),” with possible choices: (a) Dealers, brokers, or meat packers, (b) Wholesale and retail businesses, (c) I sell goat meat, (d) Live auctions, (e) Market pooling, (f) Direct sale to consumers, and (g) Cooperatives. The above question was followed by: “If you answered that you sell goat meat [(c)], through what outlets do you market the meat?,” with possible choices: (a) Farmers markets, (b) Direct to consumers, (c) Grocery stores, (d) Restaurants, and (e) Other. To meet the second objective, a question was asked as follows: “Do you target your goat production for specific ethnic holiday markets?,” with possible choices of “Yes” and “No.” Producers responding “Yes” to the above question were directed to a follow-up question as follows: “For which of the following holiday seasons do you generally focus sales? (Circle all that apply),” with the following possible choices: (a) Easter, (b) Ramadan, (c) Id al Adha, (d) Hispanic holidays, (e) Christmas and/or New Year, (f) Dashain, (g) Caribbean holidays, and (h) Other. Most of these ethnic holidays have their own characteristic demands of specific types of meat goats. To study the consistency between the use of ethnic holiday markets and an annual goat sale, information on different types of meat goats sold were collected by the following question: “Please list the total number of goats you sold in each of the following categories during 2011.” Possible choices were: “(a) Suckling kids, (b) Weaned kids ( $\leq 30$  lbs), (c) Wethers ( $>30$  lbs), (d) Bucks (31- 120 lbs), (e) Bucks ( $>120$  lbs), (f) Does (31-100 lbs), (g) Does ( $>100$  lbs), and (h) Other.”

At the end of the survey, producers were asked if they were willing to participate in a follow-up survey related to production costs and returns. A total of 433 producers responded “yes.” The follow-ups were sent and 127 completed responses were received.

## RESULTS

Table 1 shows the percentage use of different marketing channels by US meat goat producers. Two marketing channels found to be the most commonly used were *direct to consumer* (79%) and *live auction* (65%), whereas others were used by relatively smaller portions of the population. Fifteen percent

of the producers used *dealers, brokers, or meat packers*, 11% *sold goat meat*, 5% used *market pooling*, 3% used *wholesale and retail businesses*, and 3% used *cooperatives*. Since very few farms used 3 marketing channels (*Wholesale and retail businesses, market pooling, and cooperatives*), only the 4 more frequently used marketing channels (*direct sale to consumer, live auction, dealers, brokers, or meat packers, and I sell goat meat*) were used in the profitability runs.

**Table 1: Percentage use of marketing channels**

Marketing Channels	Percent using
Direct sale to consumer	79
Live auction	65
Dealer, brokers, or meat packers	15
I sell goat meat	11
Market pooling	5
Wholesale and retail businesses	3
Cooperatives	3

***Summary Statistics of the Variables Used in This Study***

Table 2 describes the summary statistics of the independent variables used in the probit runs for producer selection of marketing channels. On average, there were 61 meat goats per farm. The average age of survey respondents was 52 years and 45% of the respondents had at least a bachelor’s degree. Sixty-one percent of the respondents held an off farm job, and 45% considered themselves as risk averse. The average annual net farm income derived from goat operation was found to be 40%. Forty-five percent of the goats sold in 2011 were slaughter goats. Geographically, most of the respondents were in the *Southeast* (36%) and *Midwest* (37%); and significantly smaller share of population were in the *Northeast* (7%), *West* (9%), and *Texas/Oklahoma* (11%).

***Factors Affecting Producer Selection of Meat Goat Marketing Channels***

Larger-scale farmers were more likely to market animals via dealers and wholesale markets. Producers selling higher percentages of slaughter animals were more likely to market via dealers, live auctions, and cooperatives, were more likely to sell goat meat, and were less likely to sell direct to

consumers. *Age* of the producer was negatively associated with the use of live auction markets. Producers holding a *bachelor's* degree were more likely to market via dealers and less likely to market via live auction markets. Producers holding an *off farm job* were less likely to sell goat meat, but were more likely to market via cooperatives. Producers receiving a higher percentage of net farm income from the goat enterprise (*Farminc\_goat*) were more likely to sell via wholesale and retail markets. As compared to the producers having extensive-range production systems, those using pastured but not rotated systems (*PAS\_NotRot%*) were more likely to use auction markets and were less likely to market via wholesale outlets and cooperatives whereas those with pastured with rotation systems (*PAS\_Rot%*) had narrowly positive marginal effects on auction markets.

**Table 2: Means of independent variables used in the probit runs**

Variables	Description	Mean
<i>Num_meatgoat</i>	Total number of meat goats in the farm	60.84
<i>Sale_Slaugh%</i>	Percentage of goat sold for slaughter or as meat	44.61
<i>Age</i>	Producer age (years): (a) $\leq 30$ , (b) 31-45, (c) 46-60, (d) 61-75, (e) $\geq 76$	2.95
<i>Bachelor</i>	<i>Dummy</i> = Whether producer holds at least a bachelor's degree: (a) Less than high school, (b) high school diploma/GED, (c) some college/technical college, (d) bachelor's degree, (e) advanced degree (M.S., Ph.D., J.D., M.D., etc.)	0.45
<i>Offfarmjob</i>	<i>Dummy</i> = Whether a producer holds an off farm job	0.61
<i>Riskaverse</i>	<i>Dummy</i> = Producer self-characterization relative to other investors: (I tend to avoid risk when possible in my investment decision.)	0.45
<i>Farminc_goat</i>	Percentage annual net farm income derived from goat operation: (a) 0-19% (b) 20-39% (c) 40-59% (d) 60-79% (e) 80-100%	2.52
<i>Extensive%</i>	Percentage of meat goats raised under this system	10.53
<i>PAS_NotRot%</i>	Percentage of meat goats raised under this system	28.59
<i>PAS_Rot%</i>	Percentage of meat goats raised under this system	47.84
<i>Drylot%</i>	Percentage of meat goats raised under this system	13.03
<i>Southeast</i>	Producers belong to the states: AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, and WV	0.36
<i>Northeast</i>	Producers belong to the states: CT, DE, MA, MD, ME, NH, NJ, NY, PA, RI, and VT	0.07
<i>Midwest</i>	Producers belong to the states: KS, IA, IL, IN, MI, MN, MO, ND, NE, OH, SD, and WI	0.37
<i>West</i>	Producers belong to the states: AK, AZ, CA, CO, HI, ID, MT, NM, NV, OR, UT, WA, and WY	0.09
<i>Texas/Oklahoma</i>	Producers belong to the states: TX, and OK	0.11

**Table 3: Probit runs on producer selection of marketing channels**

	Dealers		I Sell Meat		I Sell Directly to Consumers		Auction	
	Coeff. (Robust S.D.)	Marg. Eff. (Std. Err.)	Coeff. (Robust S.D.)	Marg. Eff. (Std. Err.)	Coeff. (Robust S.D.)	Marg. Eff. (Std. Err.)	Coeff. (Robust S.D.)	Marg. Eff. (Std. Err.)
<i>Num_meatgoats</i>	0.0030*** (0.0011)	0.0007*** (0.0002)	0.0002 (0.0012)	0.0000 (0.0002)	-0.0006 (0.0011)	-0.0002 (0.0003)	0.0010 (0.0010)	0.0003 (0.0004)
<i>Sale_slaugh%</i>	0.0091*** (0.0020)	0.0020*** (0.0004)	0.0046** (0.0023)	0.0007** (0.0003)	-0.0098*** (0.0020)	-0.0026*** (0.0005)	0.0052*** (0.0017)	0.0018*** (0.0006)
<i>Age</i>	0.0167 (0.0821)	0.0036 (0.0179)	-0.1258 (0.0980)	-0.0185 (0.0147)	-0.0076 (0.0812)	-0.0020 (0.0211)	-0.1683** (0.0722)	-0.0583** (0.0247)
<i>Bachelor</i>	0.2357* (0.1429)	0.0513* (0.0312)	0.2209 (0.1675)	0.0325 (0.0244)	0.1936 (0.1356)	0.0504 (0.0351)	-0.3414*** (0.1196)	-0.1183*** (0.0405)
<i>Offfarmjob</i>	0.1926 (0.1579)	0.0419 (0.0342)	-0.5261*** (0.1726)	-0.0775*** (0.0258)	0.0155 (0.1433)	0.0040 (0.0373)	-0.0448 (0.1310)	-0.0155 (0.0454)
<i>Farminc_goat</i>	0.0232 (0.0432)	0.0051 (0.0094)	0.0065 (0.0511)	0.0010 (0.0075)	0.0114 (0.0409)	0.0030 (0.0106)	0.0137 (0.0354)	0.0048 (0.0123)
<i>PAS_Notrot%</i>	0.0009 (0.0030)	0.0002 (0.0007)	-0.0010 (0.0035)	-0.0001 (0.0005)	0.0002 (0.0026)	0.0001 (0.0007)	0.0054** (0.0024)	0.0019** (0.0008)
<i>PAS_Rot%</i>	0.0015 (0.0029)	0.0003 (0.0006)	0.0048 (0.0032)	0.0007 (0.0005)	0.0010 (0.0025)	0.0003 (0.0007)	0.0036 (0.0022)	0.0012* (0.0008)
<i>Drylot%</i>	0.0058 (0.0036)	0.0013 (0.0008)	-0.0022 (0.0045)	-0.0003 (0.0007)	0.0025 (0.0034)	0.0006 (0.0009)	0.0025 (0.0030)	0.0009 (0.0010)
<i>Southeast</i>	1.0584** (0.4590)	0.2305** (0.0983)	0.7075* (0.4135)	0.1042* (0.0626)	0.0639 (0.2553)	0.0166 (0.0665)	-0.2188 (0.2064)	-0.0758 (0.0713)
<i>Northeast</i>	1.0003* (0.5240)	0.2178** (0.1126)	2.3072*** (0.4446)	0.3398*** (0.0689)	0.0904 (0.3449)	0.0235 (0.0897)	-0.5691* (0.2951)	-0.1972** (0.1012)
<i>Midwest</i>	1.2054*** (0.4582)	0.2625*** (0.0977)	1.0100** (0.4074)	0.1488** (0.0624)	-0.2086 (0.2520)	-0.0543 (0.0653)	-0.0923 (0.2092)	-0.0320 (0.0725)
<i>West</i>	0.8047 (0.4893)	0.1752* (0.1052)	1.4131*** (0.4374)	0.2081*** (0.0675)	0.2988 (0.3184)	0.0777 (0.0830)	-0.5153* (0.2636)	-0.1786** (0.0904)
Constant	-3.1980*** (0.6081)		-2.2145*** (0.6383)		1.2102*** (0.4542)		0.6150 (0.3988)	
Observations	512		512		512		512	
Pseudo $R^2$	0.1078		0.2071		0.0801		0.0566	

Note: \*\*\*, \*\*, and \* indicate variables significant at  $P < 0.01$ ,  $P < 0.05$ , and  $P < 0.10$  levels respectively.

**Table 3: Probit runs for producer selection of marketing channels, continued**

	Wholesale		Cooperatives		Market Pooling	
	Coeff. (Robust S.D.)	Marg. Eff. (Std. Err.)	Coeff. (Robust S.D.)	Marg. Eff. (Std. Err.)	Coeff. (Robust S.D.)	Marg. Eff. (Std. Err.)
<i>Num_Meatgoats</i>	0.0021* (0.0012)	0.0001 (0.0001)	0.0003 (0.0013)	1.4E-05 (7.3E-05)	-0.0017 (0.0014)	-0.0002 (0.0001)
<i>Sale_slaugh%</i>	-0.0023 (0.0028)	-0.0001 (0.0002)	0.0070** (0.0033)	0.0004* (0.0002)	0.0034 (0.0025)	0.0003 (0.0002)
<i>Age</i>	0.0016 (0.1326)	0.0001 (0.0074)	0.2340 (0.1432)	0.0132 (0.0090)	0.1637 (0.1049)	0.0152 (0.0100)
<i>Bachelor</i>	0.4776* (0.2761)	0.0265* (0.0151)	0.1324 (0.2394)	0.0075 (0.0135)	-0.1295 (0.2046)	-0.0120 (0.0189)
<i>Offfarmjob</i>	-0.1061 (0.2709)	-0.0059 (0.0150)	0.6911** (0.2974)	0.0389** (0.0192)	-0.2769 (0.1990)	-0.0257 (0.0186)
<i>Farminc_goat</i>	0.1814** (0.0752)	0.0101** (0.0043)	-0.0065 (0.0750)	-0.0004 (0.0042)	0.0084 (0.0589)	0.0008 (0.0055)
<i>PAS_Notrot%</i>	-0.0099** (0.0045)	-0.0005** (0.0003)	-0.0089* (0.0046)	-0.0005* (0.0003)	-0.0047 (0.0037)	-0.0004 (0.0003)
<i>PAS_Rot%</i>	-0.0065 (0.0040)	-0.0004 (0.0002)	-0.0032 (0.0039)	-0.0002 (0.0002)	-0.0031 (0.0034)	-0.0003 (0.0003)
<i>Drylot%</i>	-0.0090 (0.0057)	-0.0005 (0.0003)	-0.0020 (0.0055)	-0.0001 (0.0003)	-0.0019 (0.0054)	-0.0002 (0.0005)
<i>Southeast</i>	4.7682*** (0.6273)	0.2647*** (0.0722)	0.2717 (0.4385)	0.0153 (0.0249)	4.9702*** (0.5410)	0.4608*** (0.0916)
<i>Northeast</i>	6.2586*** (0.6268)	0.3475*** (0.0844)				
<i>Midwest</i>	5.1734*** (0.6140)	0.2872*** (0.0757)	0.4213 (0.4262)	0.0237 (0.0247)	5.3066*** (0.5729)	0.4920*** (0.0965)
<i>West</i>	4.9330*** (0.6884)	0.2739*** (0.0736)	1.0920** (0.4456)	0.0615** (0.0279)	4.8314*** (0.5651)	0.4479*** (0.0903)
Constant	-7.1633 (0.0000)		-3.5851*** (0.6535)		-6.7608 (0.0000)	
Observations	512		511		512	
Pseudo $R^2$	0.2444		0.1628		0.0981	

Note: \*\*\*, \*\*, and \* indicate variables significant at  $P < 0.01$ ,  $P < 0.05$ , and  $P < 0.10$  levels respectively.

Results for the regional variables show that, as compared to the producers in *TX* and *OK*, producers in the other regions (*Southeast*, *Northeast*, *Midwest*, and *West*) were more likely to market via dealers, brokers, or meat packers; and wholesale and retail businesses; and were more likely to sell goat meat. Producers residing in the *Northeast* and the *West* were less likely to sell via live auction markets. Producers in the *Southeast*, *Midwest*, and *West* were found to be more likely to use market pooling. Producers in the *West* were also found to be more likely to form cooperatives in marketing their meat goats. *Northeast* was dropped from the regression for the market pooling and cooperatives. Overall, this result shows that the producer selection of marketing channels varied significantly based on region, which could be primarily because of the availability of the markets, population density and its diversity, and differential cost of production/marketing.

Table 4 shows the results of the OLS run on factors affecting the profitability of the meat goat enterprise. As mentioned earlier, only the four most commonly used marketing channels were used in this analysis. The only marketing outlet that was more likely to be profitable was '*I sell goat meat*'. Size of the farm (*Num\_meatgoats*) and percentage sale of slaughter goats (*Sale\_slaugh%*) were also positively associated with enterprise profit.

**Table 4: Profitability run; marketing channels and other variables**

Variables	Coefficient	Robust S.E.
Dealers	37.29	210.44
I sell meat	340.97*	174.57
Consumer	-191.24	209.66
Auction	192.28	212.64
Num_meatgoats	4.44*	2.30
Sale_slaugh%	5.07*	2.82
Age	19.94	87.16
Bachelor	143.55	203.20
Off farm job	420.80	285.12
Risk averse	191.42	189.68
Farmincome_goat	39.19	47.21
PAS_NotRot%	-0.75	3.18
PAS_Rot%	-0.28	3.90
Drylot%	-7.10	6.10
Southeast	196.34	265.66
Northeast	172.85	325.50
Midwest	-325.64	384.90
West	28.90	390.54
Constant	- 1527.97**	676.49
Observations		94
R <sup>2</sup>		0.2022

## DISCUSSION AND CONCLUSIONS

Using nationwide survey data, this study examines three major aspects of meat goat marketing in the United States, the factors affecting producer use of marketing channels, and the factors affecting profitability of a meat goat enterprise. Results showed that *direct sale to consumer* and *live auction* were the two most commonly used marketing channels in the industry. Very few producers, 11% and 15%, were found to sell goat meat and use dealers, brokers, or meat packers, respectively, whereas other marketing channels were used by less than 5% each. Farm size, type of animals sold, producer demographics, production systems, and regional variables were found to be significant determinants in producer selection of marketing channels.



Producers tended to select marketing channels that required minimal animal handling and limited producer responsibilities. Marketing channels such as *dealers, brokers, or meat packers*; and *wholesale and retail businesses* require either to pay commission or to perform systematic arrangements of slaughter, processing and transporting to the consumers. On the other hand, *live auctions* are easier, have guaranteed timely payment and provide a competitive price if more buyers are competing. Selling *direct to consumers* reduces transportation costs. Note that producers selling larger numbers of slaughter goats were less likely to *directly sell to consumers* but to sell via *live auction*, which is understandable in that dealing with consumers for individual animals would be cumbersome as the volume of sale increases. One of the limitations of directly selling to consumers is that one needs to be skillful to deal with customers and have bargaining power, unless the price is fixed beforehand. Producers selling breeding stock and show goats generally advertise their price online and it would be probably convenient for them to use this outlet. On the other hand, regional variables showed producers in the *Northeast* and *West* were less likely to use live auction markets as compared to those in *Texas/Oklahoma*.

*Selling goat meat* requires significant time spent on searching and maintaining business relationships with clients, maintaining inspection standards, and having reliable sources of regular meat supply. Although on-farm selling of goat meat is relatively easier in the sense that you do not have to meet slaughter inspection standards as the ownership of the animal is transferred to the consumers before slaughter, producers still have to spend considerable time if they chose this route. Therefore, it was evident that producers holding an off farm job were less likely to sell goat meat. Although producers were inclined towards the marketing channels requiring less marketing effort, the more profitable route found from this study was rather time demanding - *selling goat meat*.

## REFERENCES

- Aduku, A.O., A.A. Aganga, I.D.I. Yaakugh, and D.O.A. Philip. 1991. "The Marketing of Goats in Northern Nigeria." *Small Ruminant Research* 6(1): 175-178.
- Coffey L. 2006. "General Overview of Goat Production." *Meat Goat Production Handbook*.

- Degner, R.L., and C.T.J. Lin. 1993. Marketing Goat Meat: An Evaluation of Consumer Perceptions and Preferences. University of Florida, Food Resource Economics Department, Florida Agricultural Market Research Center.
- Dillman, D.A. 2007. *Mail and Internet Surveys: The Tailored Design Method*. John Wiley & Sons. New York.
- Frasor, R. 2004. The Market for Goat Meat in Central Alabama.  
<http://www.ams.usda.gov/AMSV1.0/getfile?dDocName=STELPRD3319274>
- Gillespie, J.M., R. Nehring, C. Hallahan, C. Sandretto, and L. Tauer. 2010. "Adoption of Recombinant Bovine Somatotropin and Farm Profitability: Does Farm Size Matter?" *AgBioForum* 13(3): 251-262.
- Gillespie, J.M., R. Nehring, C. Hallahan, and C. Sandretto. 2009. Pasture-based Dairy Systems: Who Are the Producers and Are Their Operations More Profitable than Conventional Dairies?" *Journal of Agricultural and Resource Economics* 34(3): 412-427.
- Glimp, H.A. 1995. Meat Goat Production and Marketing. *Journal of Animal Science* 73(1): 291-295.
- Greene, W.H. 2008. *Econometric Analysis*. Sixth Edition. Pearson Prentice Hall. Upper Saddle River, New Jersey 07458.
- Jones J.J., and K.C. Raper. 2012. Meat Goat Marketing and Price Seasonality. Oklahoma Cooperative Extension Service. AGEC-622. Division of Agricultural Sciences and Natural Resources. Oklahoma State University.  
<http://pods.dasnr.okstate.edu/docushare/dsweb/Get/Document-7530/AGEC-622pod.pdf>
- Jodie P. and M. McCarter. 2012. Marketing of Meat Goats. Agriculture and Natural Resources. University of Arkansas, Division of Agriculture, Research and Extension. FSA-3094.  
<http://ar.marketmaker.uiuc.edu/uploads/da0c52ec76dbd91858d6f9e35adf9897.pdf>
- Judge, G.G., R.C. Hill, W.E. Griffiths, H. Lutkephol, and T. Lee. 1988. *Introduction to the Theory and Practice of Econometrics*, Second Edition. John Wiley and Sons, New York.
- Knudson, W.A. 2006. Market Opportunities for Meat Goats. Michigan State University Product Center for Agriculture and Natural Resources.
- Kopke, E., J. Young, and R. Kingwell. 2008. The Relative Profitability and Environmental Impacts of Different Sheep Systems in a Mediterranean Environment. *Agricultural Systems* 96(1): 85-94.
- Larson A. and E. Thompson. 2005. Niche and Ethnic Markets for Goat Meat in Illinois. Initiatives for the Development of Entrepreneurs in Agriculture (IDEA), University of Illinois Extension.  
<http://www.marketmaker.uiuc.edu/uploads/dc0ce7248ccaee7b1b2e172d2f11dff9.pdf>
- McBride, W.D., S. Short, and H. El-Osta. 2004. The Adoption and Impact of Bovine Somatotropin on US Dairy Farms. *Applied Economic Perspectives and Policy* 26(4): 472-488.
- Pandit, A., and Dhaka, J. P. 2005. Efficiency of Male Goat Markets in the Central Alluvial Plains of West Bengal. *Agricultural Economics Research Review* 18(2): 197-209.

- Passel J.S. and D. Cohn. 2008. "U.S. Populations Projections: 2005-2050." Pew Research Center, Social and Demographic Trends. [www.pewresearch.org](http://www.pewresearch.org)
- Pinkerton, F., D. Scarfe, and B.W. Pinkerton. 1991. Meat Goat Production and Marketing. E.(Kika) de la Garza Institute for Goat Research. [http://www.luresext.edu/goats/library/fact\\_sheets/m01.htm](http://www.luresext.edu/goats/library/fact_sheets/m01.htm)
- Stanton, T. 2012. An Overview of the Meat Goat Market 2012. <http://sheepgoatmarketing.info/education/meatgoatmarket.php>
- Stanton, T. 2006. Marketing Slaughter Goats and Goat Meat. Meat Goat Production Hand Book. American Institute for Goat Research. E(Kika) de la Garza. Langston University.
- Shrestha, L.B., and E.J. Heisler. 2011. The Changing Demographic Profile of the United States. Congressional Research Service Report for Congress (March). <http://www.fas.org/sgp/crs/misc/RL32701.pdf>
- Tauer, L.W. and W.A. Knoblauch. 1997. The empirical impact of bovine somatotropin on New York dairy farms. *Journal of Dairy Science*, 80(6), 1092-1097.
- Tauer, L.W., and A.K. Mishra. 2006. Can the Small Dairy Farm Remain Competitive in US Agriculture? *Food Policy* 31(5): 458-468.
- Young, J.M., A.N. Thompson, M. Curnow, and C.M. Oldham. 2011. Whole-farm Profit and the Optimum Maternal Liveweight Profile of Merino Ewe Flocks Lambing in Winter and Spring are Influenced by the Effects of Ewe Nutrition on the Progeny's Survival and Lifetime Wool Production. *Animal Production Science* 51(9): 821-833.