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Abstract

This study uses multivariate statistical procedures to explore extension avenues used by goat producers in Missouri and Arkansas. Use of an avenue is influenced by a number of factors including nature of issue, time, and scale of operation. The results show that professional avenues, which are deeply rooted in tradition and history, are the main outreach avenues, but the

Internet is emerging as an important and increasingly utilized avenue by many goat producers. Demonstrational, family based, and specific client need based avenues are used less frequently.

Keywords: extension utilization, goat production, small-scale producers

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Introduction

Cooperative extension has had wide-ranging impacts on agricultural production in the United States and globally (Hoag, 2005). While a significant proportion of U.S. farms (71%) have annual gross sales of less than \$25,000, there is no evidence to suggest that these farms get more of extension's resources and support. A number of researchers (e.g., Jones and Garforth, 1998) have recognized the role of agricultural extension in delivering information and advice to the farming community.

Extensive literature exists on cooperative extension efforts on knowledge transference pertaining to large-scale producers of crop and livestock, particularly beef and dairy (Trauger et al., 2008). However, a sharp contrast emerges when technology transfer to small-scale producers, particularly small ruminant producers, is considered. Small-scale producers, particularly those producing sheep and goats, are a special clientele with unique needs compared to more established crop farmers (Muhammad, Isikhuemhen, Basarir, 2009). To date, programming from research stations to extension frontline personnel and ultimately to farmers has not addressed issues specific to small-scale farmers. Little attention has been paid to changing economic and technological developments that increase uncertainty and risk in small-scale operations.

This research focuses primarily on the utilization of outreach avenues for veterinary services, a source of management information and technology transfer for goat producers. Extension services use a number of techniques and methods to deliver programming, including individual or group visits, organized meetings, use of model farmers, demonstration plots, information and communication technologies, and farmer field days schools (Chase, Ely, and Hutjens, 2006). Extension and outreach are more amenable to established crop and livestock farmers, and it is generally assumed that the plurality of alternative service delivery options offers opportunity to reach various types of farmers with different needs in various settings, with the understanding that small-scale producers have special issues and concerns that sometimes render the modes of delivery out of reach. In an effort to provide greater opportunity for identifying effective mechanisms for ensuring that such farmers acquire the information they need to enhance their businesses, we attempt in this research to explore what adaptations, if any, to the current delivery mechanisms would enhance delivery efficiency and create user-friendly programming that is accessible to those—such as small-scale producers—endowed with fewer resources and greater time and labor constraints.

Goat production is one of the fastest growing agricultural production systems in the United States today (Okpebholo and Kahan, 2007). To sustain this growth and tap into the growing demand, farmer-friendly outreach efforts are necessary to bridge the information gap in production, processing, and marketing. In so doing, it is hoped farmers will quickly get solutions to issues that impede the smooth running of their enterprises. While there are well-established mechanisms for effective control of internal parasites, issues on marketing strategies for goat products, inadequate expert information, and capital availability continue to hinder the full potential of the goat industry.

The research question therefore is how effective and responsive are the outreach avenues with respect to this segment of producers. What factors influence outreach avenue use? The study's main objective is to identify extension/outreach avenues targeting small-scale producers and their efficacy in enhancing goat production. Specifically, we (i) identify and estimate the relative importance of the factors underlying use of outreach avenues; (ii) develop a profile of each outreach avenue; and (iii) explore the relationship between producers' socioeconomic characteristics and use of different outreach avenues.

The study uses survey data from Missouri and Arkansas collected in 2013. The information generated by this study is useful not only to farmers but also to policymakers to improve effectiveness of the relationship between outreach providers and farmers. It may also contribute to the development of efficient and effective outreach strategies for the goat industry in particular and other small ruminants in general. A unique contribution of this study is a better understanding of what underlies successful outreach/extension efforts for small ruminant producers.

Methods

The survey instrument was developed by researchers at Missouri State University with collaborating investigators from Lincoln University and Arkansas State at Monticello. Before implementation, the survey instrument benefited from expert evaluation (from veterinarians, university professors, extension personnel, and experienced goat producers). The survey elicited information on personal demographics, farm characteristics, farm management protocols, product marketing, and information sources.

The target population was dairy and meat goat producers in Missouri and Arkansas. Producer addresses and emails were obtained from national registry organizations and university extension services mailing lists. Duplication between species and resources was removed to prevent sending more than one survey to any one operation. A total of 1,087 producers made up the final email list. Most producers were sent the survey in November 2013 via a Survey Monkey online questionnaire, and printed copies were prepared and mailed by Missouri State University to 37 producers with limited Internet access. Printed copies were mailed with a cover letter and postage paid return envelope enclosed. A reminder email was sent to non-respondents two weeks later. The survey required approximately twenty minutes of respondents' time. Approximately 73% of the email list consisted of Missouri producers and 27% were Arkansas producers. Fifteen surveys were returned by producers who no longer owned goats, three surveys were returned by

producers outside of the target area, and 98 surveys were deemed undeliverable by Survey Monkey. Of the web-based and mailed surveys, 206 were viable and are used in analysis, for a response rate of 21.2%.

The study analysis is based on responses to 21 questions relating to extension/outreach avenues. Respondents were asked to rate on a Likert scale of 1 (never) to 4 (often) how often they received veterinary services, how often they used sources of information for production management or animal husbandry, and how often they used particular sources when seeking out new technologies on goat production. A score of 2 indicated an indifferent or neutral response. Each respondent answered a set of questions relating to the three areas:

1. *“How often do you receive the following services from your veterinarian? (e.g., care for sick animals, veterinary supplies, etc.)*
2. *How often do you use the following sources to get information about your goat health and production management? (e.g., university extension system, family, friends, Internet, etc.)*
3. *How often do you consult the following sources to learn about new goat practices? (e.g., university extension system, family, friends, Internet, etc.)*

Principal components factor analysis (PCA) was used to reduce the 21 questions exploring outreach avenues with respect to producer’s use of veterinary services, information sources for current animal health and production management, and information sources for new goat production technologies to a smaller set of factors. A standard latent root equal to 1 and a Scree test were used to establish how many factors to retain, followed by a confirmatory analysis to ensure internal reliability of the factors. Finally, a two-stage cluster analysis was employed to identify clusters of outreach avenues serving the particular aspect of a goat production enterprise.

ANOVA tests were applied to examine inter-cluster heterogeneity. The selection of the analytical methods is based on the variable measures, all of which were ordinal; however, in the presence of continuous and ordinal measures, alternative methods are called for. All the 21 variables used in the analysis were ordinal measures, and factor analysis was the logical analytical method to identify underlying factors that explain the pattern of correlations within a set of observed variables. The factor analysis was followed by clustering, the strength of which strength lies in its ability to discover hidden patterns.

Results and Implications

Results indicate that outreach avenues used for services, sources of information on production management, and sources of information on new technology among goat producers falls into six categories, including traditional approaches relying on land grant university cooperative extension and using the Internet to transfer and share information. Goat farmers use specialized or need-based approaches when they are dealing with health and reproductive issues. As in beef, dairy, and crop farming, goat famers obtain information from other famers (friends and family). Additionally, they use demonstration-based approaches through farm visits and on-farm

demonstrations on certain aspects of goat production. Though the frequency was below average, goat farmers used management approaches on issues relating to kid disbudding, tattooing, recordkeeping and nutrition education. The results of cluster analysis suggest that different groups of goat producers place varying importance on different outreach delivery mechanisms. Some expressed strong sentiments about using the Internet as their tool for getting information, resolving animal health issues, or obtaining information about new technologies on goat production. Others were more attuned to using traditional approaches, while some preferred to resolve their farming issues with the services of a veterinarian. Significant results rejecting the null hypothesis were those relating to enterprise type, education, income, and farming experience. On the other hand, there was failure to reject the null in relating the cluster/famer groupings on basis of age, gender, and state.

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