Value of Managing Beef Cattle Genetics

Lisa Rees

University of Missouri

Department of Agricultural and Applied Economics

Contact Information:

803 E. Green Meadows, Apt. 102

Columbia, MO 65201

Profile- Lisa Rees

I am currently pursuing a Ph.D. in agricultural economics at the University of Missouri. My dissertation is under the direction of Dr. Joe Parcell entitled, "Three Beef Essays- Value Characteristics through Technology Adoption." I expect to complete all work for the Ph.D. by December of 2010. My interest in agriculture economics arose from my background of being raised on a cow-calf and row crop operation in southwest Missouri.

The first essay is a conceptual paper that analyzes how different types of capitals (production, social, human, natural) can influence a producer to adopt reproductive technology. The second essay determines the level of profit needed to adopt technology relative to a producer's risk preference. The third essay identifies the value of certain animal characteristics and how these values may change over time, which could give producers better information on what characteristics to breed for using technology.

The first essay examines the influence of production risk and capital on technology adoption. The study investigates the measures the impact of various factors that influence technology adoption in the beef industry. It investigates, specifically, the effects of natural, human, social (trust) and production capital have on producers' technology adoption. Also, the study explores the affect of production risk on individuals' decisions to adopt reproductive technology. The results of this study will allow extension and policy advocates a better understanding on the factors, and their importance, that influence technology adoption in the beef industry.

The second topic is hedonic model fragility in quality bred heifer characteristics. The study extends the hedonic model framework to quality differentiated bred heifers, in order to analyze hedonic model parameter stability. This research allows for a better understanding of which type of attributes are most prone to parameter instability over time. Producers that receive more accurate information on heifer value characteristics will be able to make more informed decisions.

The third topic is stochastic dominance analysis of reproductive technology adoption of cow-calf producers. The main objective of this study is to identify which producers, according to risk level, would adopt artificial insemination. The study can inform policy-makers by understanding what effects individuals' risk preferences have on their management decisions. Individuals in extension can also distribute the information to producers who can use it to make better management decisions.

These topics are interlinked because the adoption of technology in the beef industry will create value in the supply chain. This analysis will look into the factors influencing producers to adopt technology, along with the net profits needed for individuals according to their risk preferences. In addition, this study will specifically look at the potential value characteristics that the technology can create for the market. I believe this research can provide advancement in beef reproductive technology adoption literature, as well as provide the potential for an extension program.

Mentor Information

Dr. Joe Parcell

143a Mumford Hall

Columbia, MO 65211

Dr. Parcell is my advisor for my research. He directed me to contact individuals in extension in order to gain a better understanding of an extension proposal. In addition, he has reviewed my extension proposal and given me feedback.

Value of Managing Beef Cattle Genetics

Situation

The beef industry makes up significant portion of the Missouri agricultural economy. Cattle and calves sales rank third in commodity sales from Missouri—roughly 1.2 billion dollars in receipts (ERS, 2008). Missouri ranks third among states in beef cow inventory-- estimated to have two million cows. However, three-fourths of Missouri cow-calf producers raise between 1-49 head; this structure makes it more difficult for a majority of Missouri producers to capitalize on economies of scale or value added enterprises—due to risk adversity and inadequate information.

Recent changes in the beef industry have presented Missouri cow-calf producers an opportunity to improve profitability. Cattle buyers are demanding more uniform and consistent cattle, typically in large quantities, and consumers are demanding higher quality beef. Both changes in demand allow Missouri producers-- of any size-- an opportunity to capitalize and profit from the changes. Missouri cow-calf producers can improve profitability by providing cattle buyers with consistent and high quality animals through adoption of artificial insemination and estrous synchronization.

Artificial insemination would allow Missouri cow-calf producers an improved ability to manage reproduction. Improved reproductive management could reduce reproduction loss, from females failing to become pregnant during the breeding season, and improve sire selections for value-added characteristics. It is important that producers know the value of characteristics so that they can improve their sire selection. This will allow them to breed for desired genetic traits that bring premiums. Artificial insemination allows producers to become more profitable by breeding for characteristics in their animals that meets changes in demands and receive premiums. Additionally, the usage of other technologies, such as estrous synchronization, has the ability to increase profits for Missouri cow-calf producers. Estrus synchronization allows producers to more efficiently administer artificial insemination, as well as creates a more narrow calving span.

Efficiencies will result from both technologies, thus value can be captured, because feedlot buyers can improve their performance when they have animals of similar genetics and age. Both technologies, if adopted widely, can have the ability to produce consistent high quality animals for Missouri cow-calf producers. Through technology adoption, Missouri producers of any size can produce higher quality animals that demand a premium for their superior characteristics.

In order for producers to decide whether to adopt artificial insemination, they may calculate cost and return estimates to determine profitability in their operations. This extension program will share research knowledge on the profitability of artificial insemination. In

addition, this extension program will provide producers with information on certain value characteristics of beef cattle that can give producers the ability to improve their sire selection.

Information to share

There will be two types of information included in this extension program, which stems from my dissertation research. First, information on the profit level needed for adoption of artificial insemination. Second, information will be included that identifies the value of certain animal characteristics, including animals conceived through estrous synchronization, and how the value may change over time. These two areas of my research, profitability of artificial insemination and improving sire selection through knowing characteristic values, will make up the foundation of this program- Value of Managing Beef Cattle Genetics.

Target Audience

The target audience for the profitability of artificial insemination adoption will be Missouri cow-calf producers; specifically, cow-calf producers in the northern half of the state--due to the structure of their operations (Horner et al., 2009). Northern Missouri cow-calf producers are typically higher cost investors who use more management in their operations (Horner et al., 2009). Beef technology adoption does take some investment, as well as management, and northern Missouri producers have operations that have the necessary components for adoption. In contrast, southern Missouri producers typically have lower capital investments along with low management input (Horner et al., 2009).

To further narrow the target audience, the focus will be directed to younger producers--who in my preliminary dissertation research suggests are more likely to adopt artificial insemination. The audience targeted for the information on sire selections will be the same audience as information on profitability of artificial insemination, but also include current artificial insemination users of Missouri. In addition, Certified Angus Beef will be part of the targeted audience for sire selection information due to their interest in technology's ability to help grow the supply of Certified Angus Beef in order to meet the projected rise in demand for their high quality product.

Goals of program and program evaluation

<u>AI Profitability Information</u>

1) Short Term- Get information out to producers about AI profitability *[Evaluation: Record how many pamphlets are distributed, Record number of hits on Show-Me-Select website & Record number of participants at presentations]*

2) Intermediate Term- Producers use information to decide whether AI would be profitable for their operation *[Evaluation: Talk with Vets, AI industry representative, Extension agents, Beef*

breed associations about issue & Follow up with a survey question addressing this with presentation participants]

3) Long Term- Increase adoption of technology usage *[Evaluation: Talk with vets, AI industry representative, Extension agents, Beef breed associations about issue & Follow up with a survey question addressing this with presentation participants]*

Sire Selection Information

1) Short Term- Get out information on sire selection to producers

2) Intermediate Term- Producers use information in their decision making process

3) Long Term- Producers that use information, increase their profits

The evaluation process for sire selection information will be the same as described for the information on AI profitability. This is because the information of both will be distributed together. The evaluation procedures described for the AI profitability information will be applied in the same manner to the sire selection information.

Distribution of Information- "Value of Managing Beef Cattle Genetics"

1) Create pamphlet with research results of AI profitability and sire selection- distribute to Missouri regional extension offices, AI industry representatives, Missouri veterinarians, Breed Associations *[These groups have been indentified due to their connection to producers through extension, sales or service.]*

2) Develop a press release on research results of AI profitability and sire selection- distribute to newspapers across state and to agriculture magazine/newspapers

3) Conduct presentations on research results of AI profitability and sire selection at various events and locations *(powerpoint presentation and pamphlets for participant take-home & record contact information for participants*)

- Young Farmers and Ranchers Missouri Farm Bureau Conference

-Young Missouri Cattlemen's Leadership Conference

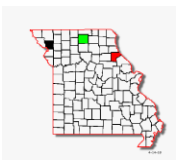
-Certified Angus Beef

-In service training for regional extension livestock and agribusiness specialists

-Regional Extension Presentation in the Northwest region (Andrew County), North Central (Sullivan County) and Northeast (Ralls County)

Key- County Colors

Black= Andrew County Green=Sullivan County Red= Ralls County



4) Create a link to pamphlet through the Show-Me-Select Replacement Heifers Program website under the tab "economic analysis and summary information" *[The Show-Me-Select Replacement Heifers Program is being used by many progressive producers who use artificial insemination.]*

Project Logic Model

INPUTS (What We Invest)	**OUTPUTS Activities (What We Do)**	**OUTPUT Audience (Whom We Reach)**	**OUTCOME Short-Term (Learning)**	**OUTCOME Intermediate-Term (Action)**	**OUTCOME Long-Term (Conditions)**
Perform research on profitability of technology adoption of artificial insemination- AI Profitability Perform research on identifying value of animal characteristics and how they may vary over time- Sire Selection	Create pamphlet with research results Develop a press release on research results Conduct presentations on research results at various events and locations In service training for Regional Extension Create a link to pamphlet information through the Show-Me-Select Heifers Program website	Missouri cattle producers (northern and younger cattle producers) Missouri Regional Extension AI industry reps. Certified Angus Beef Missouri Veterinarians Beef Breed Associations Missouri newspapers Ag. mags./newspapers MO Farm Bureau-Young Farmers and Ranchers Conference MO Young Cattlemen's Leadership Conference	<u>AI Profitability</u> Get information out to producers <u>Sire Selection</u> Get information out to producers	<u>AI Profitability</u> Producer use information to decide whether AI would be profitable for operation <u>Sire Selection</u> Producers use information in sire selection decisions	<u>AI Profitability</u> Increase adoption of AI <u>Sire Selection</u> Producers that use information increase their profits

<u>Resources</u>

Economic Research Service (ERS). "Missouri State Fact Sheet- Top Commodities, Exports, and Counties- Top 5 agriculture commodies," [2008] USDA, Washington, D.C. Accessible at http://www.ers.usda.gov/statefacts/mo.htm.

Horner, J., Milhollin, R., Sexton, J., Payne, C., Pierce, V., Weaber, B., et al. (2009). *The Missouri Beef Audit- An Analysis of Missouri's Competitive Position in the Beef Industry*: University of Missouri Extension.

Map of Missouri Image- created at http://monarch.tamu.edu/~maps2/map_mo.htm.

National Agricultural Statistics Service (NASS). "Missouri Statistics- Cattle Operations-Numbers & Cattle Operations- Percent of Inventory for Cows that Calved Beef," [2007] USDA, Washington, D.C. Accessible at http://www.nass.usda.gov/Statistics_by_State/Missouri/index.asp.