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Abstract

Farm management is a series of complex processes incorporating a variety of dynamic factors, including biological production systems, resource allocation and management, and the management of increasingly complex financial and economic systems. Farm managers are constantly required to prioritize and allocate management effort and attention amongst these factors and evaluate tradeoffs. This analysis elicited from commercial producers the relative ranking of five critical farm management focus areas, namely, managing production; managing land, equipment, and facilities; controlling costs; managing output prices; and managing people. Out of a total of 2,247 commercial farms in this study, the largest mean shares of importance were placed on controlling costs (28.6%) and managing production (27.3%). Producers, on average, emphasized the management areas of controlling costs and managing production, relative to managing land, equipment, and facilities; managing people; and managing output prices, for farm success. Correlations between the farm management focus areas studied were estimated from producer-specific share of importance estimates resulting from a random parameters logit model; the strongest correlation observed was the negative relationship between managing production and controlling costs. Implications for self-identified success factors, or critical areas of management focus, of commercial farms are far reaching, potentially influencing sales, marketing, and decision support for these operations, as well as driving research and programmatic focus to provide relevant information to these producers moving forward.

Keywords: farm management, on-farm decision making, producer preferences

JEL Codes: Q10, Q12, Q13

Introduction

Arguably, the scarcest resource for any manager, whether in agricultural pursuits or otherwise, is time. Thus, managers are faced with the constant need to prioritize among tasks and make tradeoffs. This begs the question: amongst commercial farm managers, are certain management factors consistently chosen above others as being key to their success? Furthermore, are farm managers homogeneous in their prioritization of management focus areas or do managers differ depending on their demographics or farm type? For example, which management areas of focus are being prioritized as most important by farm managers with more experience or producing crops versus livestock products?

Farm management, and business management in general, is often divided into the two major categories of strategic and tactical management. Strategic management involves planning the overall long-term course of the business while tactical management focuses on the short-term actions that keep the firm moving along the chosen course in anticipation of reaching stated goals (Kay, et al., 2008). Often the strategy a farm employs will be based, at least in part, upon expectations for market prices of outputs produced, as well as production levels, which together inform expectations of farm revenue. Furthermore, how a farm chooses to manage variable and fixed expenses will be related to the overall goals of the business. In addition to revenue and expense expectations for the operation, other factors such as the capabilities and skill sets of management and labor personnel will impact the success of the farm business in reaching its intended goals.

Farm management focus areas or areas which are key to the success of the farm business (key success factors) investigated in this analysis are rooted in the fundamental drivers of farm profitability, expected revenues and expenses, as shown in Figure 1. The key focus areas related to revenue generation investigated were "managing production" and "managing output prices." Focus areas related to expenses and costs included "managing land, equipment, and facilities" as well as "controlling costs." "Managing people" was the fifth key success factor investigated; managing people, in terms of the human capital available on farms, is expected to impact profitability by influencing both revenue and expense generation processes. Furthermore, the capacity of farm labor and management will impact all aspects of farm management; the skill sets, strengths, and weaknesses of the management team will impact the overall path of the business while the capabilities of the on-farm labor and management team will determine the tractability of any strategic or tactical plan.

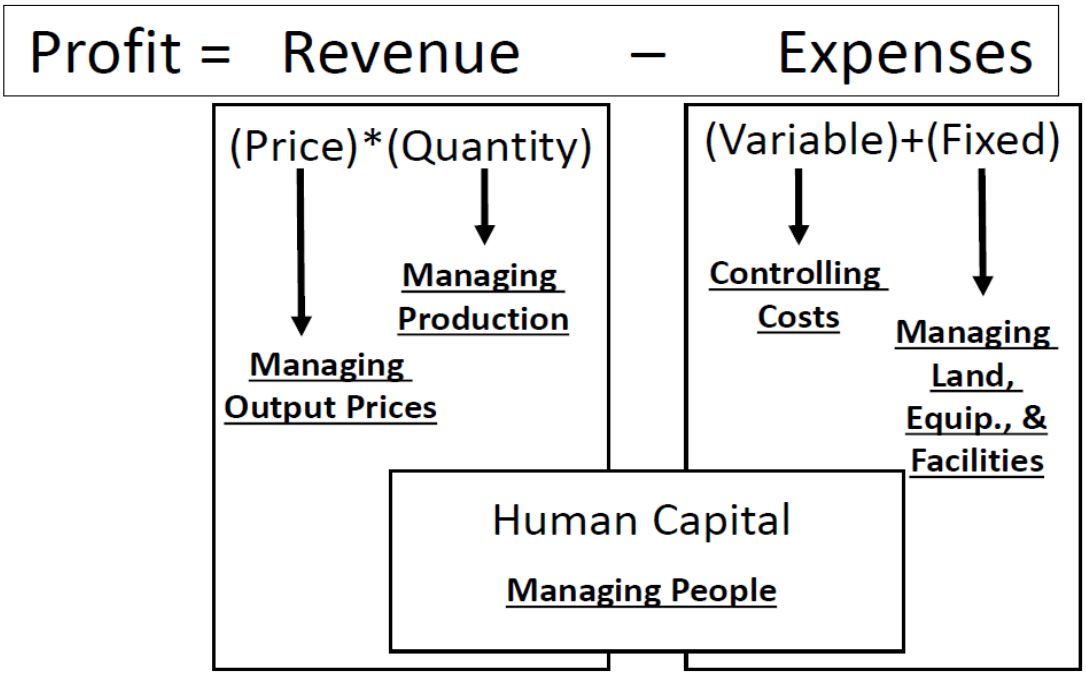

Figure 1. Motivation for selection of five key farm management focus areas employed in study.

Prioritizing management activities is an integral part of farm business management, however the necessity of making tradeoffs amongst scarce or fixed resources extends far beyond the farm gate. Methods traditionally used in consumer-focused research have been adapted to help understand the decisions of farm managers and agricultural producers with respect to prioritizing attributes and making tradeoffs. Studying the heterogeneous preferences of farm managers can be helpful in understanding preferences for special projects, attributes of production systems, and/or on-farm technologies. In particular, willingness to change (WTC), which incorporates the concepts of willingness to pay (WTP) and willingness to accept (WTA) for process changes by agricultural producers/managers (Schulz and Tonsor, 2010; Ortega, et al. 2014) is a recent area of interest in the literature. The removal of an on-farm production technology, specifically rbST, was studied by Olynk, Wolf, and Tonsor (2012) by using choice experiments to estimate changes in producer welfare under various production technology option sets. Roucan-Kane et al. (2013) used choice experiments to study agribusiness executives and their preferences for project attributes when selecting amongst innovation projects.

Across multiple areas of agricultural production, ranging from on-farm production to agribusiness management, choice methods have been utilized to determine the willingness to supply of various products and attributes by agricultural producers and agribusinesses. Erdem, Rigby, and Wossink (2012) examined two groups of stakeholders', specifically farmers and consumers, to elicit their perceptions of the share of overall responsibility at each stage of the food supply chain in ensuring that the meat consumers cook and eat at home is safe using best-worst scaling. Erdem, Rigby, and Wossink (2012) found that farmers believe consumers have a greater degree of responsibility than consumers believed they had for themselves.

The goal of this analysis is to determine how managers of commercial farms in the U.S. prioritize amongst the five investigated farm management focus areas or key factors for farm success. This analysis evaluates the relative importance, and ranking, of these factors through the use of best-worst scaling in a unique data set consisting of farm managers from across the U.S. on farms of various types. The relationships between the key success factors and managers' demographics and farm-specific characteristics are investigated in order to understand the importance of each of the key success factors on the varying types of commercial farming operations in the U.S. The main objectives of this paper are to determine the relative importance of each of the five key focus areas of farm management relative to each other and analyze the relationship between these key success factors and producer and enterprise characteristics.

Methods and Data

Pair wise rankings was used to derive the relative importance that U.S. farm managers place on the five management focus areas studied in this analysis, specifically managing production; managing output prices; managing land, equipment, and facilities; controlling costs; and managing people. In order to conduct this analysis, a large-scale survey of U.S. commercial farm producers was conducted.

Survey Instrument and Sample Demographics

The data used in this analysis was obtained from the 2013 Large Commercial Producer Survey, conducted at Purdue University[1]. The survey asked questions to determine buying behaviors, loyalty to brands and dealers, demographic information, and key operational success factors of commercial farmers/producers. Large commercial producers are targeted in this survey, and are defined as those with more than $100,000 in gross farm sales. A total of 2,247 respondents participated in the 2013 survey (via phone, mail, and internet) and completed the pair wise question designed for this analysis[2].

A total of 2,247 respondents completed the survey and choice question used in this analysis, resulting in a total of 21,218 total individual choices. Demographics and summary statistics describing the survey respondent and the type of operation they manage are presented in Table 1. The majority (83%) of respondents were male and the largest percentages of respondents were between 40 and 69 years of age. Similarly, 86% of respondents were reportedly the "primary farm decision maker," while 10% indicated they were the spouse of the primary decision maker. A total of 62% of respondents were from the Midwest region, while 17% were farming in each the South and West, and 4% in the Northeast.

[1] The survey tool, in its entirety, can be obtained at https://www.agecon.purdue.edu/cab/research_articles/2013_LCP_survey.pdf.

[2] Infogroup of Papillion, NE was utilized to conduct the survey via phone, mail, and internet. Infogroup is a leading provider of innovative business data and marketing solutions; its proprietary database was used to target and contact survey respondents who were identified to be large commercial agricultural producers across the United States.

Table 1. Respondent demographics

Demographic Variable	Percent (%) of Respondents
Male	83
Age	
18-24	0
25-39	5
40-54	27
55-69	46
70+	22
Education	
Attended H.S.	3
H.S. Graduate	31
Graduate of two-year college	18
Some four-year college	11
B.S.	29
M.S.	5
Advanced Grad Work	3
Role of Respondent	
Primary farm decision maker	86
Spouse of primary farm decision maker	10
Other family employee	3
Other non-family employee	1
% of respondents with farm income between	
Less than $100,000	15
$100,000-$499,999	34
$500,000-$999,999	18
$1,000,000-$2,499,999	19
$2,500,000-$4,999,999	8
$5,000,000 and over	6
Region	
Northeast	4
South	17
Midwest	62
West	17

In addition to general farm demographics, the specific type of enterprises operated were of interest. Table 2 displays the percent of total respondents who reported operating dairy, hog, beef, corn/soybean, wheat, cotton, and fruit, nut, or vegetable enterprises. In general, the mean size of the enterprises from the survey is much larger than the average across the U.S. This is because the survey sampling process targeted larger farms (stratified across enterprise type), especially those with more than $100,000 in gross farm sales.

Table 2. Farm Enterprise summary statistics

Variable	**Percent (%) of Farms Reporting this Enterprise**	**Mean Enterprise Size [1] (Standard Deviation)**
Enterprises Represented		
Dairy Enterprise	13	560 cows (1,030)
Hog Enterprise	3	26,065 hogs (63,612)
Beef Enterprise	8	1,679 cows (2,775)
Corn/Soy Bean Enterprise	41	1,481 acres (1,511)
Wheat Enterprise	9	2,240 acres (2,082)
Cotton Enterprises	3	1,219 acres (1,844)
Fruit, Nut, and Vegetable Enterprises	11	932 acres (2,162)

[1]Only those farms reporting the enterprise units (acreage or head) are included.

Ranking Questions and Econometric Analysis

The ranking questions developed for this survey were designed to elicit information from U.S. farmers regarding their prioritization of management efforts amongst five predetermined key areas of focus. Our approach follows the best-worst scaling method which has been increasing in popularity in business, marketing, and agricultural economics research with applications to food values (Lusk and Briggeman, 2009), health care issues (Flynn et al., 2007), ethical beliefs (Auger, Devinney, and Louviere, 2007), and even measuring people's overall life values (Lee, Soutar, and Louviere, 2007). Best-worst scaling requires the survey respondent, in this case commercial farmers, to indicate from a set of choices which item is best (most important) and which is worst (least important). Producers were asked to make several repeated choices and the management focus areas shown in each choice set were varied. Responses to the questions can be used to indicate each item's position on a continuum of importance. While the majority of applications of best worst-scaling are found in consumer-focused research, Wolf and Tonsor (2013) recently utilized the methodology to assess preferences for agricultural policies. Wolf and Tonsor (2013) analyze dairy farmer preferences for policies from amongst seven possible options; in their design producers were asked to select amongst three policy options in a total of seven scenarios.

Due to the forced tradeoff by survey respondents (farmers) amongst success factors, best-worst scaling was found to be particularly well suited for this analysis. Best-worst scaling is rooted in random utility theory, a well-studied and tested theory of human decision making generalized by McFadden (1974). Other methods of measurement of importance, such as rating based method where a respondent may be asked to rank importance on a Likert scale, do not force tradeoffs and allow respondents to indicate that all factors are indeed important. In this case, all success factors are deemed important implicitly by their inclusion in the experiment whereas best-worst scaling forces ranking amongst these values. Beyond forced ranking, the potential for different people to use a given scale differently (i.e., a ranking of 5 for one person would be equal to 4 for another person) is another shortcoming of rating-based methods (Lusk and Briggeman, 2009). Best-worst scaling avoids this pitfall by forcing a simple choice amongst a predetermined list of factors.

Best-worst scenarios can vary in the total number of attributes (or values) that a survey respondent is asked to select amongst (Aizaki, Nakatani, and Sato, 2014). This analysis employed a simplified best-worst scaling design that provided respondents with pair wise comparisons between key management focus areas. Given the pair-wise nature of the experimental design used, farmers selected only the most important factor (best), leaving the least important factor to be implied (the one not selected). This simplification was employed to enable data collection via written survey as well as via phone. This task was repeated ten times per farmer; the question presented in the survey is presented in Figure 2. Given the structure of the series of paired success factors, each factor could have been selected by an individual respondent a minimum of zero times and a maximum of four times. Farmers' responses to these questions were used to measure each attribute's position on a continuum of importance (Lusk and Briggeman, 2009).

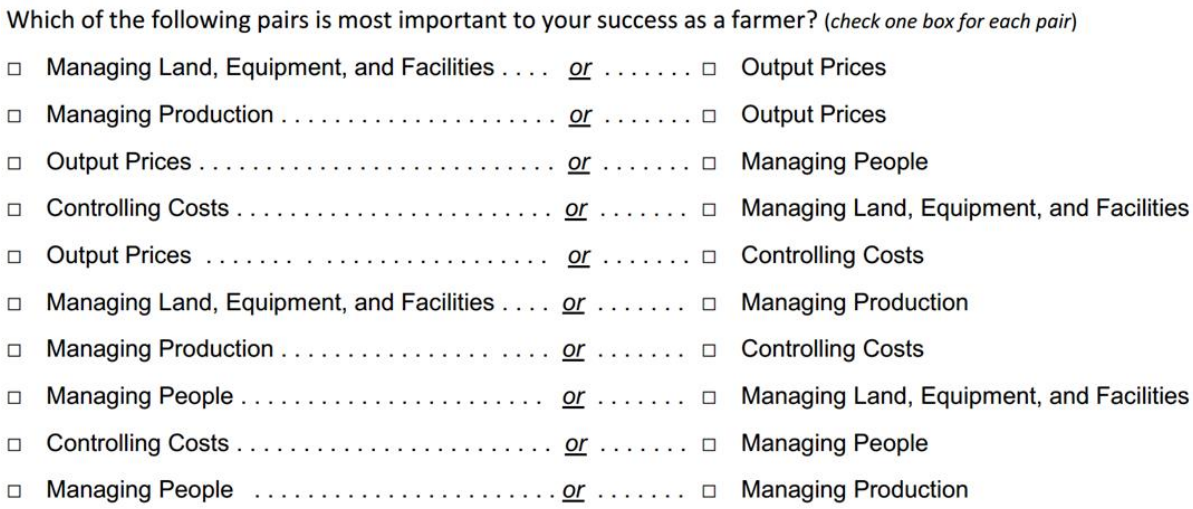

Figure 2. Ranking question as presented to farm managers

The choice task presented to producers in the survey included a total of 5 management focus areas. Assigning λ_j to represent the location of the management focus area *J* on the scale of importance, the latent unobservable level (*I*) of importance for producer *i* is,

$$I_{ij} = \lambda_i + \varepsilon_{ij} \qquad (1)$$

where ε_{ij} is a random error term. The probability that the farmer selects item *j* and item *k* as the best and worst, respectively, is the probability that the difference in I_{ij} and $I_{ik}$is greater than all other *J**(*J*-1)-1 possible differences in the choice set. Following Lusk and Briggeman (2009), if the error term is an independently and identically distributed type I extreme value, the probability takes the multinomial logit (MNL) form of,

$$\text{Prob (j = best } \cap \text{ k = worst)} = \frac{e^{\lambda_j - \lambda_k}}{\sum_{l=1}^{J}\sum_{m=1}^{J} e^{\lambda_l - \lambda_m - J}} \qquad (2)$$

The parameter λ_j can then be estimated with maximum likelihood estimation and represents the importance of value-attribute *j* relative to the attribute ranked least important (identified ex-post), normalized to zero, to avoid the "dummy variable trap" (Lusk and Briggeman, 2009). The random parameters logit (RPL), also known as a mixed logit model, was estimated to explore preference heterogeneity amongst farmer respondents for the management focus areas studied. Estimations were performed in NLOGIT 5.0. To obtain results consistent with standardized ratio scaling techniques, the share of importance (*S*) for each management focus area, equal to the forecasted probability of being chosen as most important (best), can be calculated as

$$S_j = \frac{e^{\lambda_j}}{\sum_{k=1}^{J} e^{\lambda_k}} \ . \qquad (3)$$

The share of preference for all value attributes must sum to one across all five management focus areas investigated in this analysis. Following Wolf and Tonsor (2013), equation (3) calculates the importance of farm management focus area *j* on a ratio scale; thus, if one management focus area has a share that is three times as large as the share on another area, it can be interpreted as being three times as preferred to the latter.

In addition to mean share of preference for the entire sample, individual-specific shares were estimated (through the estimation of individual-specific coefficients from the RPL model), enabling the analysis of correlations between an individual's share of preference for the five key management focus areas and key farm demographics, enterprise types, or farmer-specific demographics, such as age, education, and gender.

Results and Discussion

In order to be successful in farm management or agribusiness management today, a number of critically important areas of focus must be carefully managed. Traditionally, in the production of a commodity product, the focus has been on controlling assets (specifically land, equipment, and production facilities) and driving down costs. Additionally, focus on productivity and production efficiency has been heavily concentrated on as farmers have sought to increase outputs generated (i.e. bushels per acre) or produce more revenue from the same production processes (i.e. marketing co-products or increasing the focus on marketing outputs to obtain higher prices). Agribusinesses, and input suppliers in particular, have responded by marketing increasingly effective and efficient products, such as seeds, chemicals, or livestock feeds. As farms have grown in size, increased the mechanization of processes, and are learning to operate in fast-changing regulatory environments (sometimes with market-initiated policy changes) farm managers, in many cases, have found themselves managing professionals inside and outside their operations at much higher rates than in the past. The management focus area of managing human capital on farms is often discussed, but seldom studied in conjunction with other critical areas of focus for farm managers. This analysis investigated managing human capital alongside the other traditional areas of focus for

farm management to facilitate ranking of this, among other factors, and investigation of respondent or farm characteristics associated with those rankings.

Because the estimated utility parameters from the MNL and RPL models have no meaningful interpretations on their own, derived shares of preferences for each of the factors were calculated and are presented in Table 3. Analyzing the MNL and imposing the assumption that all farmer respondents have homogenous preferences, the preference shares ranged from the most important focus area of controlling costs (26.2%) to the least important focus area of managing people (11.2%). While statistically significant standard deviation estimates were found across all of the management focus areas studied in the RPL model, the ordering of importance did not change, but the resulting share estimates did. Results from the multinomial logit (MNL) and RPL analysis (Table 3) show that producers, on average, emphasize the management areas of controlling costs and managing production, relative to managing land, equipment, and facilities; managing people; and managing output prices, for farm success.

Table 3. Multinomial logit (MNL) and random parameters logit (RPL) coefficients and calculated preference shares

Value	**Econometric Estimates**			**Shares of Preferences**	
	MNL	**RPL**		**MNL**	**RPL**
		Coefficient	**Standard Deviation**		
Production	0.832*	1.049*	0.486*	0.258	0.273
	(0.017)	(0.025)	(0.029)		
Land, Equipment, and Facilities	0.625*	0.771*	0.474*	0.210	0.207
	(0.016)	(0.223)	(0.028)		
Controlling Costs	0.846*	1.095*	0.673*	0.262	0.286
	(0.017)	(0.028)	(0.030)		
Output Prices	0.335*	0.369*	0.651*	0.157	0.138
	(0.016)	(0.023)	(0.028)		
Managing People	0.000	0.000		0.112	0.096

Note: Individuals were shown 10 choices each, although not all respondents completed all 10 choices. Thus, the total number of respondents included in the econometric estimates was 2,247 but a total of 21,218 choices were made, rather than the 22,470 that were presented.

From the producer specific estimates of the RPL model, correlations between the five key farm management focus areas were estimated (Appendix 1). All of the correlations were significant at the 95% confidence level; the strongest correlation observed was the negative relationship between managing production and controlling costs (-0.607). The strong, negative correlation between managing production and controlling costs is especially interesting given they were earlier identified as the factors with the largest preference shares. While these two factors have the two highest mean preference shares in the sample, the negative correlation between them may be indicative of the emergence of two schools of thought: producers who credit the success of their farm business to primary emphasis on managing production versus controlling costs. Certainly in

the management realm there are businesses who seek success through careful cost control; arguably this has been a predominant mindset in production agriculture and in the production of traditional commodity crops. Managing production, on the other hand, is also a popular, but competing in many respects, strategy. Increasing production often comes at the expense of cost control; in other words, a manager must often 'spend money to make money' or more precisely in this example, 'spend more to grow more'. Other strong correlations observed were between controlling costs and managing land, equipment, and facilities (-0.441) and controlling costs and managing people (-0.478). The size of preference shares for managing output prices was negatively correlated with the size of the preference shares for all other focus areas.

Respondent Demographics and Farm Characteristics

For the sample as a whole the shares of importance of the five management areas of focus revealed an order of importance in terms of contributing to farm success from most to least of controlling costs; managing production; managing land, equipment, and facilities; managing output prices; and managing people. However, potential relationships between various manager demographics and farm characteristics were investigated to determine if significant relationships between observable characteristics and preference shares were present. It is expected that different farm types and managers with varying demographics prioritize management areas uniquely. Understanding the relationship between a farm characteristic, such as commodity produced, and the size of the preference shares devoted to the management focus areas is key for tailoring programming and support services for different farm audiences.

Correlations between the size of the preference shares for the management focus areas and farm characteristics were calculated. Appendix 2 reports the Pearson correlation and Spearman rank correlation for the management focus areas and the scale of livestock enterprises. A greater number of significant correlations were observed with the Spearman Rank Correlation method. Overall, the size of the livestock enterprise was significant and positively correlated with the size of the share of importance for managing people. Additionally, the relationship between the size of the preference share for controlling costs was negatively correlated with the size of the cattle enterprise; thus, as the scale of the cattle enterprise increased, relatively less importance was placed on controlling costs. (All correlations between controlling costs and the size of the livestock enterprises –all hog, dairy, and cattle categories- were negative or not statistically different from zero.) Given the necessity of large livestock operations to manage increasingly large employee numbers and devote increasing attention to human resource acquisition and management, this finding is not surprising. As farm sizes increase, labor requirements increase; additionally, a growing share of the agricultural workforce is employed by larger farms, thereby increasing the need for skilled management personnel (Bitsch and Olynk, 2007). Thus, the increased share of importance on managing people by larger livestock operations is a demonstration of this trend which has been recognized in agriculture for some time. This analysis is unique in the aspect that in order to obtain a larger preference share devoted to managing people, it must come at the expense of other management focus areas. Therefore, this positive and significant correlation between the size of livestock operations and size of the preference share for managing people is particularly meaningful as it demonstrates a self-reported tradeoff being made by managers. Simply stated, in larger livestock operations, increased attention is reportedly being paid to employee management rather than focusing on more traditional aspects of input management.

The Pearson and Spearman correlations for the size of the preference shares of the management focus areas and the size of various crop enterprises, reported as total acreage devoted to the enterprise, are reported in Appendix 3. The results for corn and soybean acreage were very similar to each other, as might be expected given crop rotations in much of the U.S. would lead to corn and soybean enterprises existing in the same farming operation. Significant and positive correlations between the total acres devoted to the enterprise and the size of the preference shares were observed for managing production and managing people, while a significant and negative correlation was observed with controlling costs.

For wheat and barley acreage, only one significant (positive) correlation was observed between the enterprise size and preference share for managing production. Cotton acreage had no significant correlations with the size of the preference share for any of the management focus areas studied. The finding of few significant correlations among the factors and acres of wheat and cotton is interesting. This lack of significance, in terms of correlations, would suggest no statistical difference in the management strategies for producers with more acres in these enterprises, compared to producers with fewer acres. While management strategies for most livestock and crop enterprises are different for larger producers, this is not the case for cotton and wheat producers in this sample of commercial producers.

The Pearson method found significance between potato acreage and the size of the preference share for managing land, equipment, and facilities, but the Spearman method found significant correlations between potato enterprise acreage and the size of the preference share for managing production (positive); managing output prices (negative); and managing people (positive). Both Spearman and Pearson methods found positive and significant correlation between tomato acreage and the size of the preference share for managing production; managing output prices; and managing people, and a negative correlation with controlling costs. For 'other fruit and vegetable acreage', the only significant correlation observed was a negative correlation between total acreage and the size of the preference share for managing people. The category of 'other fruits and vegetables' was the only enterprise for which the size of the enterprise was negatively correlated with the size of the preference share for managing people. It is hypothesized the reason for this unexpected negative correlation is a consequence of the survey design; the category 'other fruits and vegetables' included a wide range of crops which may be heterogeneous in their requirements in terms of management skills, assets, and labor intensity. As a result, acreage may not have been the ideal unit of comparison for this category. For instance, 1,000 acres of almonds would have vastly different revenue, management, and production implications in comparison to the same acreage of kidney beans.

In addition to farm-specific characteristics, such as commodity produced, relationships between producer demographics and relative importance of management focus areas were calculated (Appendix 4). A positive and significant correlation between education level and the size of the preference share for managing production; managing output prices; and managing people was found. Additionally, a negative and significant correlation between education level and the size of the preference share for controlling costs was calculated. The Spearman method also found a negative, significant correlation between education level and the size of the preference share for managing land, equipment, and facilities. Results from the Person correlation analysis showed that being male was correlated with having a smaller size of preference share for managing people;

no other significant relationships between gender and the importance of various management focus areas were found.

Positive and significant correlations between producer age and the size of the preference share for managing land, equipment, and facilities and managing output prices were observed for both correlation measures. A negative and significant correlation was also observed between respondent age and the size of the preference share for managing production. In general, older producers are conceivably less concerned about expanding their operation and more likely to be focused on transitioning assets or exiting the operation. It is not surprising to find these producers who may be more likely to be looking towards exiting are less concerned about production (output) of a crop or commodity but more concerned about managing their fixed assets (managing land, equipment, and facilities), where large portions of wealth are typically accumulated and stored.

When considering gross farm sales, this analysis suggests that having higher gross revenues is correlated with having a larger preference share for managing production and managing people and with having a lower preference share for managing land, equipment, and facilities and controlling costs. Overall, this linkage between sizes of preference shares and size of operation is similar to the results observed with enterprise correlations in tables 5 and 6 (although with a different unit of measurement for size of operation, dollars as opposed to number of animals or acres operated).

Conclusions and Implications

Understanding tradeoffs among areas of focus for farm managers has implications for farm managers themselves, as well as the agribusiness industries that serve farm businesses as input suppliers or buyers of products. While each of the five management functions, or key focus areas, have been studied and discussed in detail in past work, the ability to rank these areas of importance and force tradeoffs amongst them is novel in farm management. In particular, the forced tradeoffs inherent in this question framework mimic real life in the fact that additional management effort in one area necessarily requires reduced focus in another area, ceteris paribus. While a producer's success is likely a combination of each of these factors, it is important for producers to consider the factors that create success for their operation and compare these factors, or benchmark, to other producers with similar characteristics. Recognizing the values producers identified as being important to their success allows agribusinesses to more effectively capture efficiencies in product and/or service delivery. Market segmentation and sales approaches can be specifically tailored according to producers' values. For example, for input suppliers and agribusinesses dealing directly with farmers, tailoring offerings to highlight managing people in conversations with larger operations and cost control with smaller producers might be advantageous. While this analysis, focused on identifying preference shares and correlations, cannot show causation, in practice, producers can consider these relationships in light of the goals for their farm businesses.

Additional work in this area should carefully consider the challenges faced in this analysis. First, the scope of producer success was limited to the five factors evaluated. It is possible that factors outside of this research's scope may be significant for certain farm types. In particular, it is conceivable that the factors that should be considered for certain farm sectors, such as cropping operations, may differ from other farm sectors (i.e., livestock or fruit farms). Additionally, in this

analysis the measure of success was left open-ended for the respondents to interpret. It is possible that respondents had different measures of success for their different operations such as profitability or even passing a family tradition to the next generation. Finally, insufficient data was collected for geographic comparison; future work may consider possible regional differences impacting farmers' preferences for focus areas.

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Appendix 1. Correlations among shares of preferences of producer management focus areas

Pearson Correlations

Value	Managing Land, Equipment, Facilities		Managing Production		Controlling Cost		Output Prices		Managing People	
LEF			-0.046	**	-0.441	***	-0.271	***	0.308	***
Production	-0.046	**			-0.607	***	-0.233	***	0.268	***
Controlling Costs	-0.441	***	-0.607	***			-0.308	***	-0.478	***
Output Prices	-0.271	***	-0.233	***	-0.308	***			-0.106	***
Managing People	0.308	***	0.268	***	-0.478	***	-0.106	***		

Note: Statistical significance at the 10%, 5%, and 1% level is represented by *,**, and ***, respectively.

Appendix 2. Correlations between shares of preferences for management focus areas and livestock enterprise head

Pearson Correlations Value	Managing Land, Equipment, Facilities		Managing Production		Output Prices		Controlling Costs		Managing People	
Dairy Cows	-0.031		0.058		.009		-0.090		0.311	***
Finished Hogs	-0.066		0.162	**	-.037		-0.078		0.087	
Feeder Pigs	-0.071		0.095		-.070		-0.015		0.147	**
Finished Cattle	0.088	*	0.062		-.054		-0.089	*	0.118	**
Feeder/Stock Cattle	0.055		-0.040		.082	*	-0.078	*	0.141	***
Custom Cattle Fed	0.103		0.076		-.032		-0.121	*	0.105	*
Custom Heifers Fed	-0.005		0.080		-.064		-0.058		0.196	***
Spearman Rank Correlation										
Dairy Cows	0.013		0.100	**	-.162	***	-0.075		0.339	***
Finished Hogs	-0.018		0.104	*	.003		-0.076		0.102	*
Feeder Pigs	-0.126	*	0.196	***	-.021		-0.097		0.168	**
Finished Cattle	0.067		0.007		.019		-0.061		0.052	
Feeder/Stock Cattle	0.201	***	0.084		-.135	**	-0.149	**	0.148	**
Custom Cattle Fed	0.249	***	0.007		-.065		-0.113	*	0.118	*
Custom Heifers Fed	0.002		0.152	***	-.041		-0.104	***	0.104	***

Note: Statistical significance at the 10%, 5%, and 1% level is represented by *,**, and ***, respectively.

Appendix 3. Correlations between shares of preferences for mangaement focus areas and crop enterprise acre

Pearson Correlations										
Value	Managing Land, Equipment, Facilities		Managing Production		Output Prices		Controlling Costs		Managing People	
Corn	-0.029		0.130	***	-0.027		-0.082	***	0.151	***
Soybeans	-0.019		0.141	***	0.006		-0.113	***	0.129	***
Wheat, Barley, Other Small Grains	-0.036		0.040		-0.008		0.002		-0.037	
Cotton	-0.029		0.008		-0.064		0.049		0.032	
Potatoes	-0.094	*	0.002		0.026		0.032		0.047	
Tomatoes	-0.028		0.054	**	0.067	***	-0.084	***	0.101	***
Other fruits and vegetables	-0.003		-0.012		0.008		0.013		-0.048	**
Spearman Rank Correlation										
Corn	0.002		0.152	***	-0.041		-0.104	***	0.104	***
Soybeans	-0.006		0.133	***	0.010		-0.109	***	0.083	***
Wheat, Barley, Other Small Grains	-0.019		0.062	*	-0.001		-0.052		0.027	
Cotton	-0.068		-0.014		-0.063		0.042		0.030	
Potatoes	0.049		0.112	**	-0.134	***	-0.062		0.155	***
Tomatoes	-0.042	*	0.053	**	0.044	**	-0.087	***	0.088	***
Other fruits and vegetables	-0.003		-0.008		0.023		0.008		-0.030	

Note: Statistical significance at the 10%, 5%, and 1% level is represented by *,**, and ***, respectively.

Appendix 4 Correlations between shares of preferences for management focus areas and producer demographics

Pearson Correlations										
Value	Managing Land, Equipment, Facilities		Managing Production		Output Prices		Controlling Costs		Managing People	
Education	-0.028		0.054	**	0.067	***	-0.084	***	0.101	***
Gender	-0.003		-0.012		0.008		0.013		-0.048	**
Age	0.067	***	-0.118	***	0.045	**	0.027		-0.050	**
Gross Farm Sales	-0.051	**	0.152	***	-0.004		-0.125	***	0.275	***
Spearman Rank Correlation										
Education	-0.042	*	0.053	**	0.044	**	-0.087	***	0.088	***
Gender	-0.003		-0.008		0.023		0.008		-0.030	
Age	0.071	***	-0.106	***	0.072	***	0.030		-0.014	
Gross Farm Sales	-0.056	**	0.170	***	-0.038	**	-0.125	***	-0.188	***

Note: Statistical significance at the 10%, 5%, and 1% level is represented by *,**, and ***, respectively.