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**A SURVEY OF FARM MANAGEMENT AND REPRODUCTIVE  
MANAGEMENT STRATEGIES ON U.S. COMMERCIAL DAIRY FARMS**

by

Courtney Bir, Nicole Olynk Widmar, Christopher A. Wolf, and Nathan Thompson

Working Paper #17-1

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**Dept. of Agricultural Economics**

**Purdue University**

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# **A SURVEY OF FARM MANAGEMENT AND REPRODUCTIVE MANAGEMENT STRATEGIES ON U.S. COMMERCIAL DAIRY FARMS**

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## **Abstract**

Management strategies in the dairy industry, including those involved in dairy cattle reproductive management, continue to evolve as new technologies are introduced. In June of 2014, 2,980 surveys were sent to dairy farms in the United States. The survey was developed to obtain data regarding management and performance of currently operating dairy farms. Most of the operations were owned by a single operator, but the management team often incorporated other individuals such as other family members, nutritionist(s) or veterinarian(s). Although many operators still used paper records and did not include written contracts when dealing with suppliers, many used sophisticated reproductive management programs.

Keywords: dairy; management; reproduction

JEL Codes: Q10; Q12

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## **Introduction**

Management strategies, including those involved in dairy cattle reproductive management, continue to evolve as new technologies are introduced. Management decisions affect the profitability of the dairy herd through the ability to produce milk, meet milk premium goals, and efficiently replace cows in the herd. The objective of this paper is to summarize survey data regarding dairy herd management practices (including reproductive management) in order to facilitate economic insight.

## **Materials and Methods**

In June of 2014, 2,980 surveys were sent to dairy farms in the United States.<sup>1</sup> The survey was developed to obtain data regarding management and performance of currently operating dairy farms. On Monday June 29, 2014 the questionnaire/survey booklet, along with a postage paid envelope to facilitate responses, was mailed out to potential respondents. A reminder postcard was sent out Monday July 13, 2014. On Monday July 27, a second questionnaire booklet with another postage paid envelope was mailed to each of the farms. Respondents also had the option of taking the survey online, which was hosted using Qualtrics. Dairy farms were provided with the online option in all three communications sent to them via U.S. mail.

Of the 2,980 surveys mailed, 226 were returned as invalid addresses which reduced the total number of contacted potential respondents to 2,754. The total number of responses was 798 (response rate of 29%). Of the 798 total responses, 422 responded with a refusal to participate or provided information that they were not actively dairy farming. Thus, 376 respondents completed the survey, resulting in a completion rate of 14%.

The survey included general farm and operator characteristics including farm size, other enterprises, and management related questions. Additional questions regarding heifer contracts and the use of custom heifer raisers were asked to identify different management strategies for the replacement of cows in the herd. To examine different strategies used by producers to manage reproduction in the dairy herd, reproduction questions regarding the use of artificial insemination, sexed semen, semen suppliers and synchronization programs were included in the survey. Questions regarding the future of the farm such as expansion plans and plans to transfer to the next generation were included to better gauge potential changes to the industry in coming years.

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<sup>1</sup> The questionnaire was mailed to dairy farmers in seven states: Wisconsin, Minnesota, California, Vermont, Michigan, Indiana, and Florida.

## Results and Discussion

### General Farm Characteristics and Management Practices

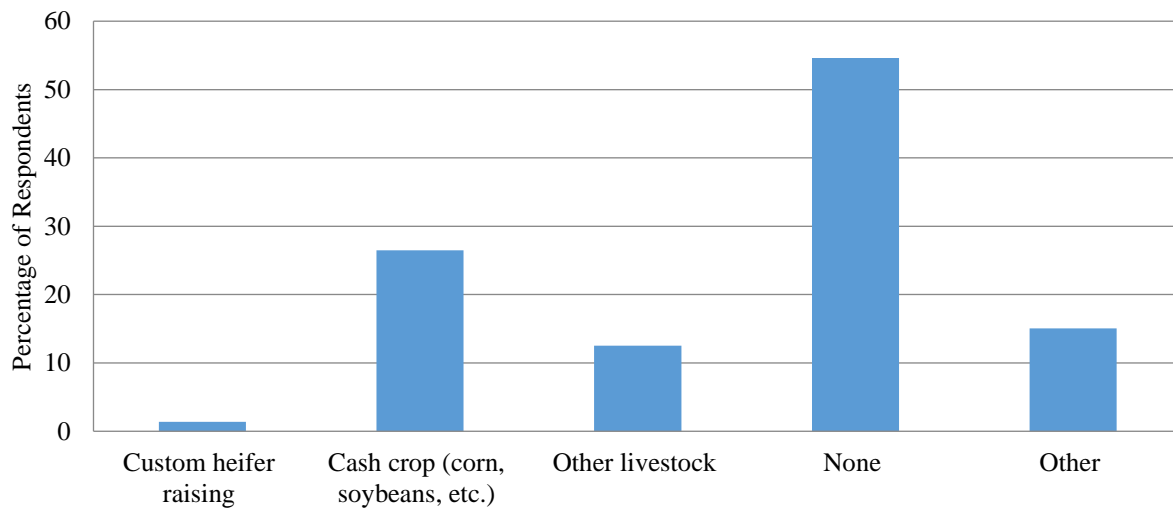
<b>Table 1. Farm Characteristics</b>	
<b>Question</b>	<b>Average Response (SD)</b>
<b>Cattle Totals</b>	
<b>Total Milk Cows (including first calf heifers and dry cows) n=371</b>	417 (1047)
<b>Total heifer calves and replacement heifers n=368</b>	363 (951)
<b>Bulls n=331</b>	13 (83)
<b>Dairy steers and bull calves n=315</b>	26 (126)
<b>Total acres operated (owned or rented) n=371</b>	
	576 (1069)
<b>Total POUNDS of milk sold by this farm in 2014 n=307</b>	
	12,809,773 (45,256,696)
<b>Anticipated herd size for 2020 (total cows, milking and dry) n=333</b>	
	466 (1211)

Farmer responses to general demographic and farm characteristics are reported in Table 1. A wide variety of milking cow herd sizes appear in this study. The number of total milk cows range from 8 to 9,675. Total heifer calves and replacement heifers per farm range from 0 to 9,150. The number of bulls per farm range from 0 to 1,000, which indicates some farms must strictly use artificial insemination for reproduction management. When evaluating only the operators that indicated owning at least one bull, the cow to bull ratio is approximately 82. Considering a commonly used ratio is 25 females to 1 bull (Fricke and Niles, 2003), it is obvious that even though there may be bulls on site, some operators use more than one reproductive management method. The number of dairy steers and bull calves on site ranged from 0 to 2,000. The average number of cows for the anticipated herd size in 2020 is 466, which is higher than the current average number of cows, 416. However, only 53% of operators indicated they were anticipating having larger herds in 2020.

To get an overview of other units (income generating farm enterprises) operators may be managing, respondents were asked to indicate if they had enterprises other than the milking

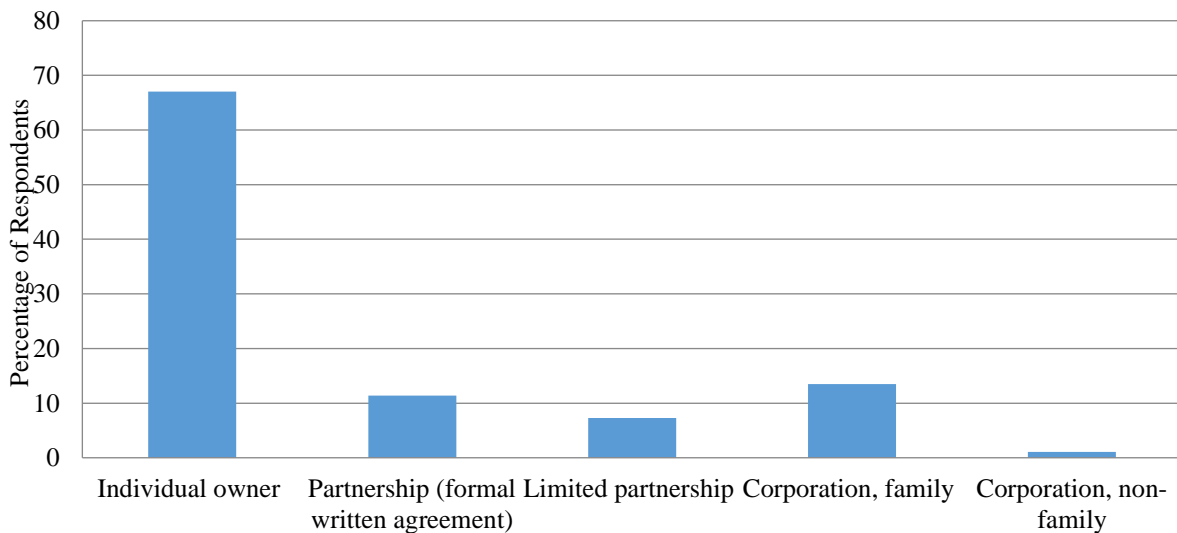
herd (outside the dairy operation focused on in the survey). More than half of the respondents indicated they did not have another enterprise (Figure 1). For those that did, the most common enterprises were cash crops such as corn, soybeans etc., followed by other livestock and “other.” Respondents were allowed to include text entries with the selection of “other,” and common responses were maple syrup, other on-farm production, and wood working.

Figure 1. Enterprises other than the Milking Herd n=359

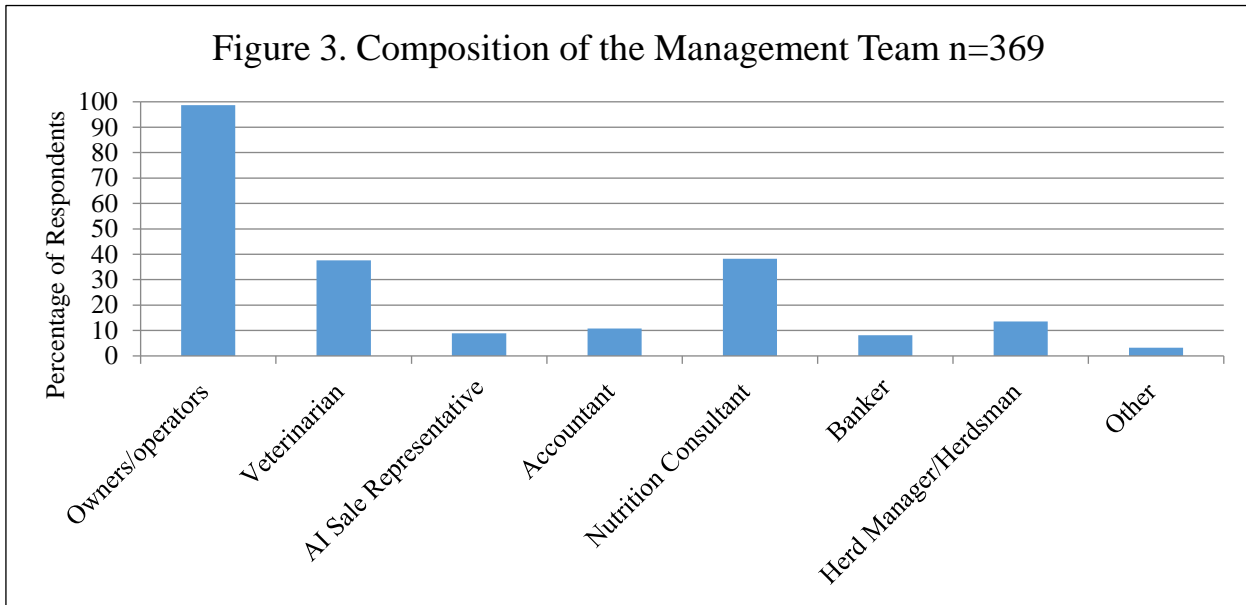


When asked about ownership arrangements the majority of operations surveyed had an individual owner (Figure 2). Non-family corporations made up the smallest percentage of farm ownership arrangements. Formally written partnerships, family corporations, and limited partnerships were 13% or less of the stated farm ownership arrangements.

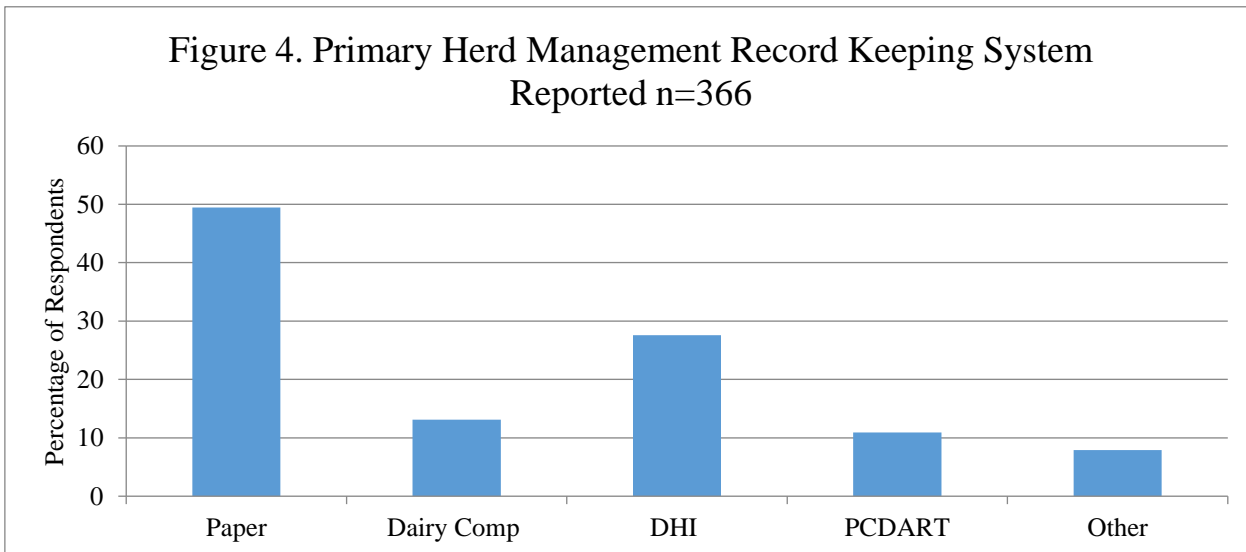
Figure 2. Farm Ownership Arrangements n=370



In addition to farm ownership arrangement, it was important to understand whom the farm management decision team consisted of (Figure 3). In 98% of the operations, the decision making team was comprised of at least the owner/operator. Veterinarians and nutrition consultants were the next two most often reported people to be included in the decision making team. The herd manager, accountant, banker, and AI (artificial insemination) sale representative were included in less than 13% of operation’s management decision-making teams. Respondents who selected “other” as a member of the management decision team frequently wrote in other close family members, such as children.

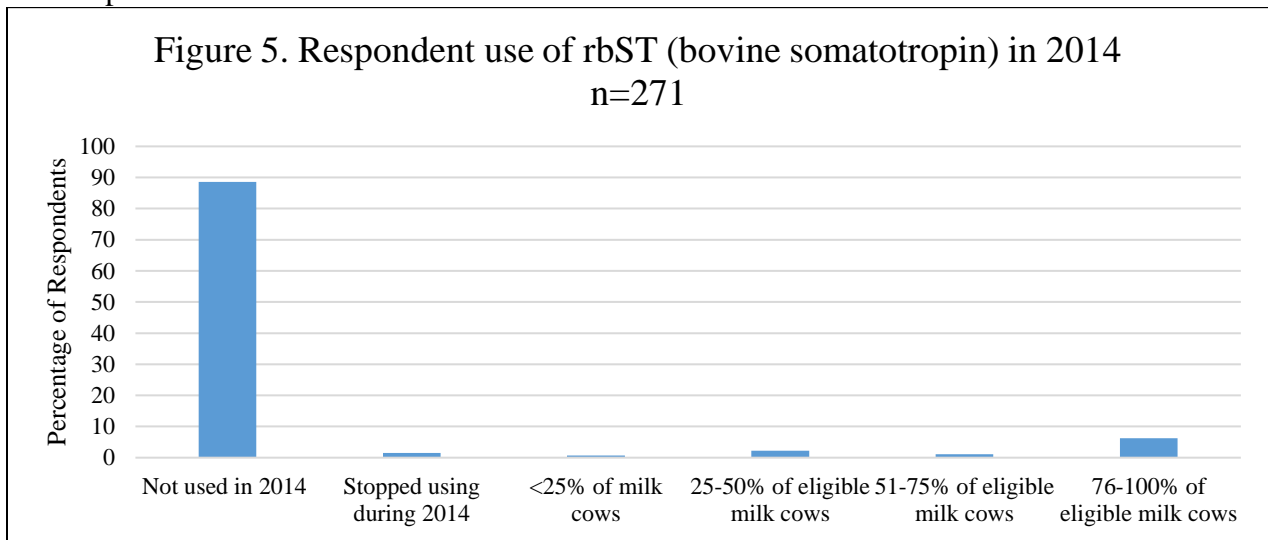


Farm record keeping options continue to expand as new record keeping programs are introduced in the industry. Nearly 50% of respondents indicated they used at least a paper herd management record keeping system in their operation (Figure 4). The next most frequently used herd management record keeping system was DHI (National Dairy Herd Information Association) with 27 percent. Dairy comp., PCDART, and “other” were selected by 13% or less of respondents as a primary herd management record keeping system.



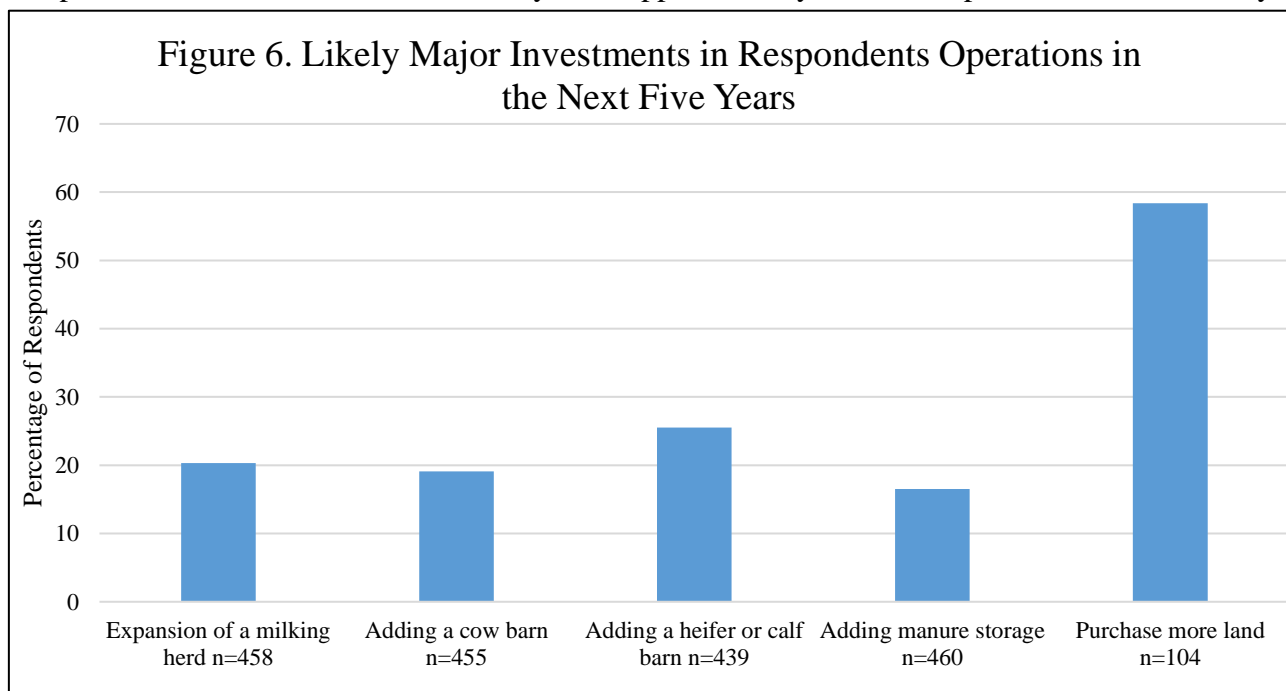
### rbST use in 2014

Figure 5 displays the percentage of respondents who used rbST in their dairy herd in 2014. The majority of respondents, 88%, did not use rbST in 2014. Given the large numbers of retailers, processors, and therefore cooperatives, which agreed (prior to 2014) to provide milk which can be labeled as “not from cows treated with rbST,” it is unsurprising that the vast majority of herds in the sample did not use rbST in their herd in 2014.



### Future Investments

Respondents were asked what major investments in their operations they were likely to make in the next five years (Figure 6). Fifty-eight percent of respondents selected that they were planning to purchase more land in the next five years. Approximately 20% of respondents indicated they

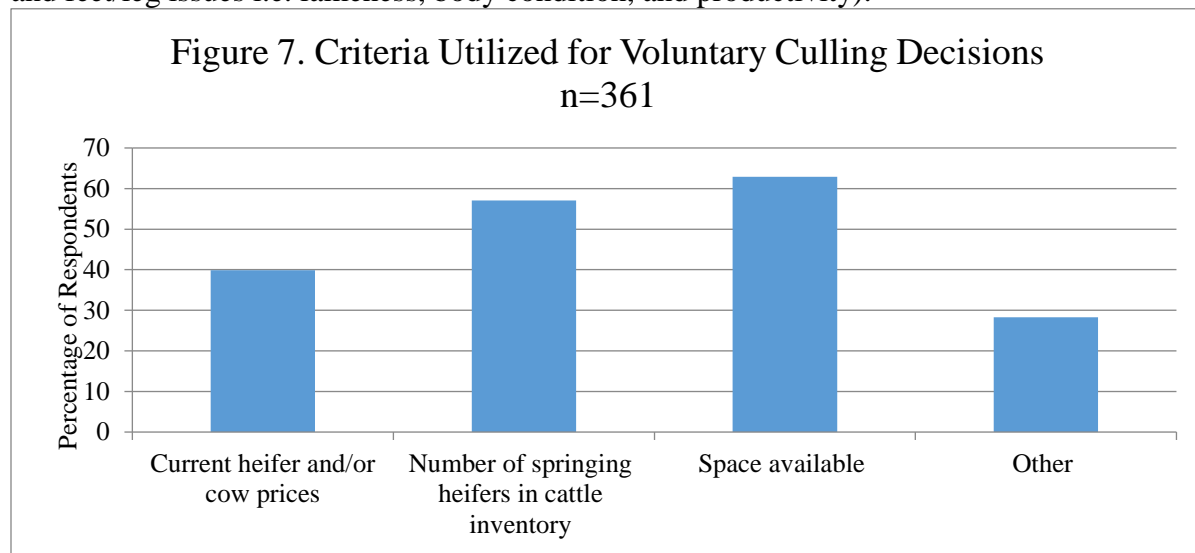




were going to expand the milking herd, or add a cow barn. In addition, 25% indicated they were going to add a heifer or calf barn. The lowest percentage of respondents indicated they were going to add more manure storage in the next five years.

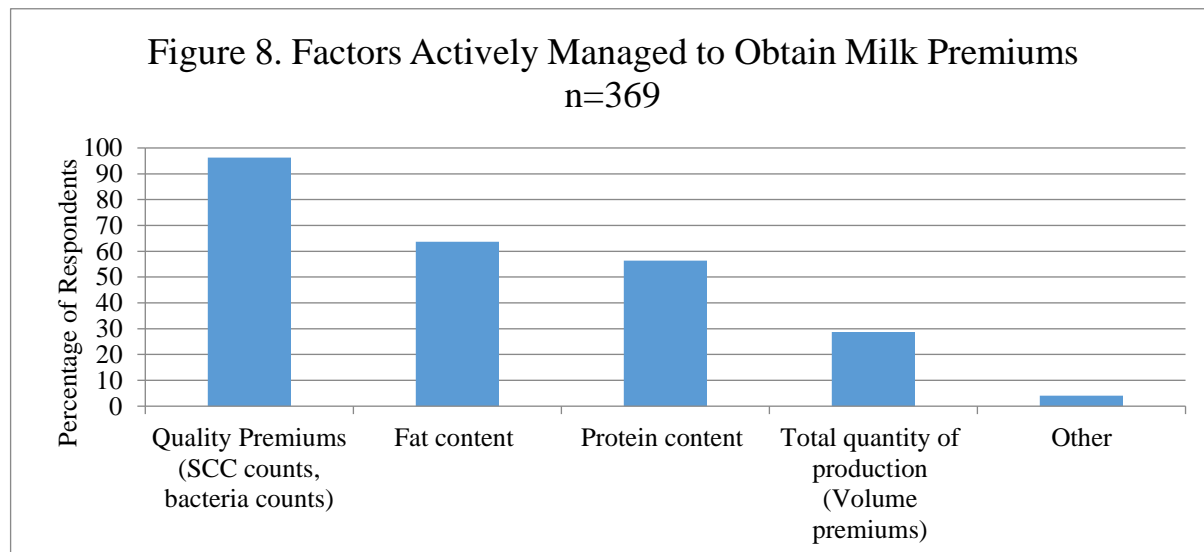
**Cull Rate and Culling Criteria**

The average cull rate for respondents in 2014 (n=316) was 24%. The most commonly selected criteria for voluntary culling decisions were number of springing heifers in the cattle inventory and space available, with 57 and 62 percent of respondents selecting those criteria respectively (Figure 7). Current heifer and/or cow prices was selected by approximately 40% of respondents and “other” was selected by 28% of respondents. Common write in answers for respondents who selected “other” were reproduction problems, health issues (including mastitis, somatic cell count, and feet/leg issues i.e. lameness, body condition, and productivity).



**Managing Milk Price Through Premiums**

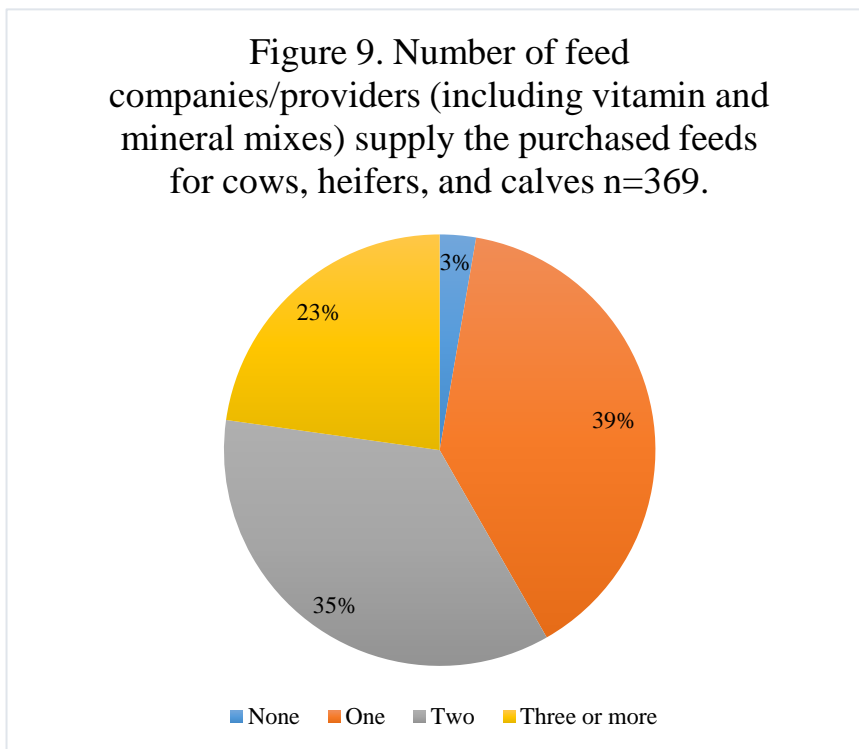
A large percentage, 96% of respondents (Figure 8), selected quality premiums (SCC (somatic cell counts), bacteria counts) as a factor they actively work to manage in order to obtain premiums in their milk check. The next most selected factors were fat content and protein content, with 63% and 56% respectively. Only 28% of respondents selected total quantity of production (volume



premiums) as a factor they actively work to manage to obtain premiums. Write-in responses for the “other” variable varied across producers. Some producers mentioned premiums for being rbST free or selling organic milk. Others indicated they felt quality cows and cow longevity outweighed the benefit of actively managing factors for premiums, or that few premiums were offered in their locale.

### Feed and Nutrition

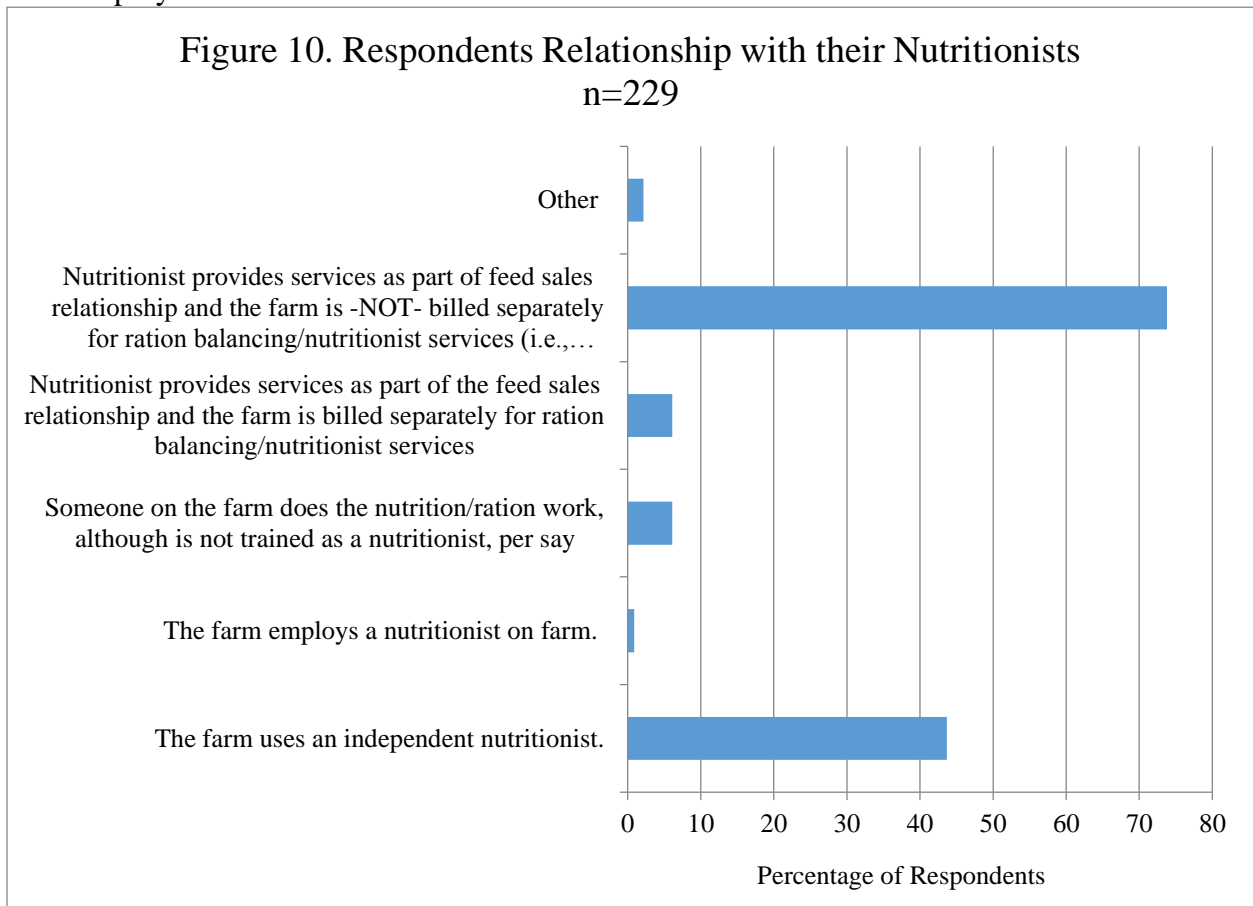
Although producers may only use one provider to purchase feed in order to receive bulk prices, it was important to determine under what circumstances producers may use more than one provider. When asked the number of feed companies/providers (including vitamin and mineral mixes) that supply the purchased feed for cows, heifers, and calves, only three percent of respondents selected they did not use purchased feeds (Figure 9). One or two suppliers was commonly selected (39 and 35 percent of respondents respectively) while 23% of respondents selected three or more suppliers.



Respondents who selected more than one supplier of feed were asked what statement applied to their farms purchasing scenario. Seventy-two percent of respondents (n=224) indicated they had different suppliers for products for cows and calves (i.e. milk replacer coming from different supplier than cow mineral mix). Multiple suppliers for cow feed products and multiple suppliers for calf feed products were selected by 45% and 20% of respondents respectively.

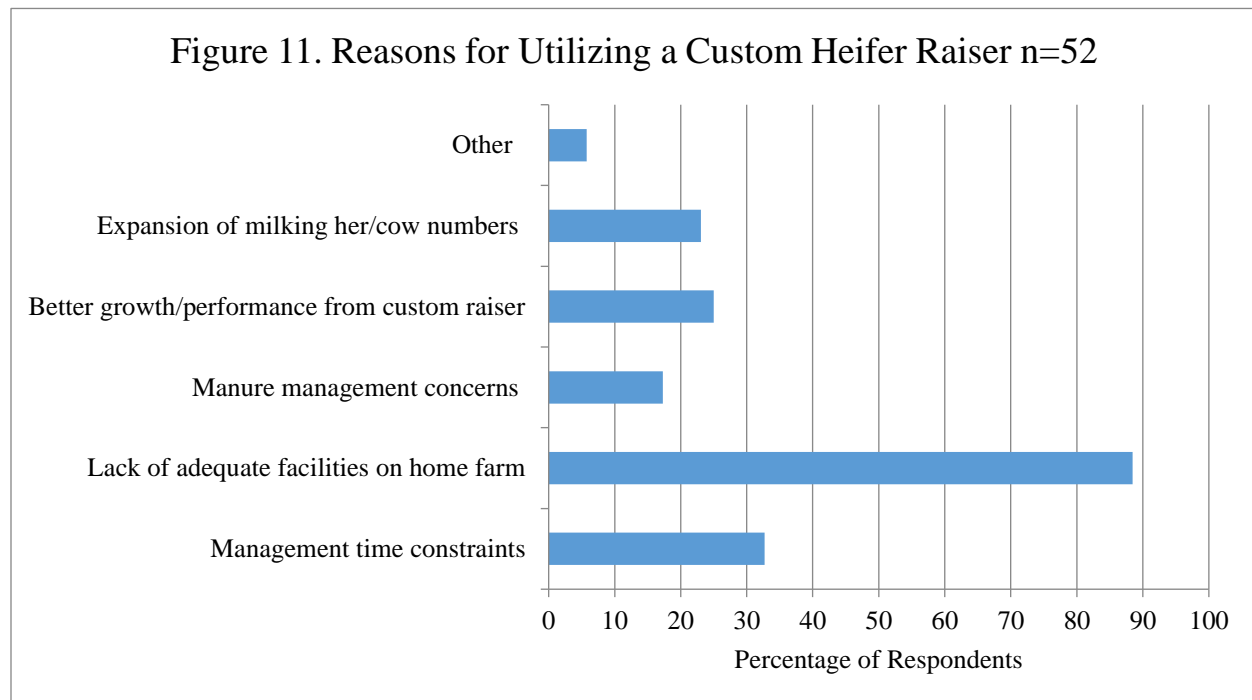
Nutrition is an important factor in operation profitability because it can determine both the cost of one of the largest inputs, feed, as well as the amount of the revenue-generating product, milk, produced. The majority of respondents, 76%, indicated their farm used the services of a nutritionist at the time of the survey (Figure 10). To better understand the role of the nutritionist in the operation, respondents were asked to indicate what statement (of those provided; see Figure 10) best described their relationship with their nutritionist. Seventy-three percent of respondents indicated the nutritionist provides services as part of feed sales relationship and the farm is not billed separately for ration balancing/nutritionist services. Less than half of the farms, 43%, indicated they used an independent nutritionist. Approximately 6% of respondents indicated a

nutritionist provided services as part of the feed sales relationship and the farm is billed separately for ration balancing/nutritionist services and someone on the farm does the nutrition/ration work, although is not trained as a nutritionist per say. Less than one percent of respondents indicated the farm employed an on-farm nutritionist.



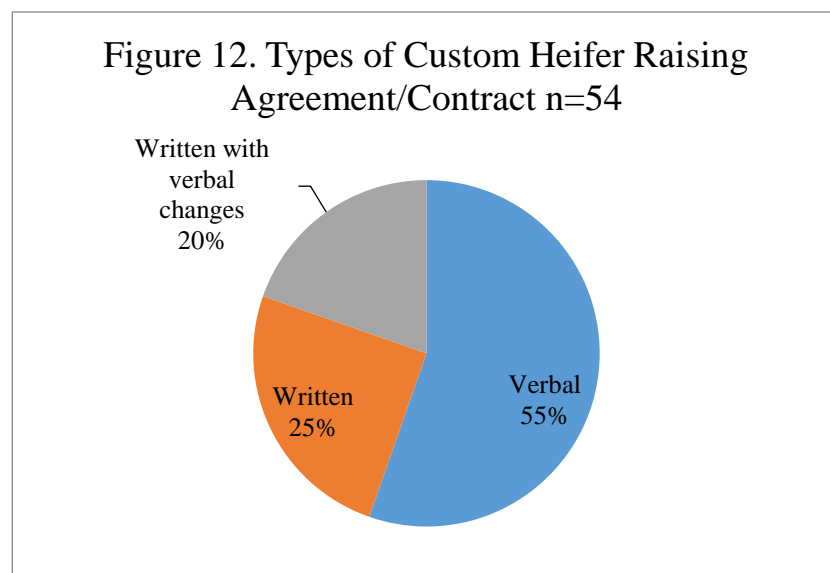
### Heifer management

Heifers may not directly produce revenue (by generating milk) on the operation, but they are necessary to the continuation of the herd. Operators may choose to manage this non-revenue generating enterprise of the operation differently depending on the specific circumstances of the farm. Only 15% of respondents (n=318) indicated they used an accelerated heifer growth program in 2014 at any stage of heifer growth. However, a large percentage of respondents (87%) indicated they used a custom heifer raiser in 2014, Figure 11. The majority of respondents, 88%, indicated



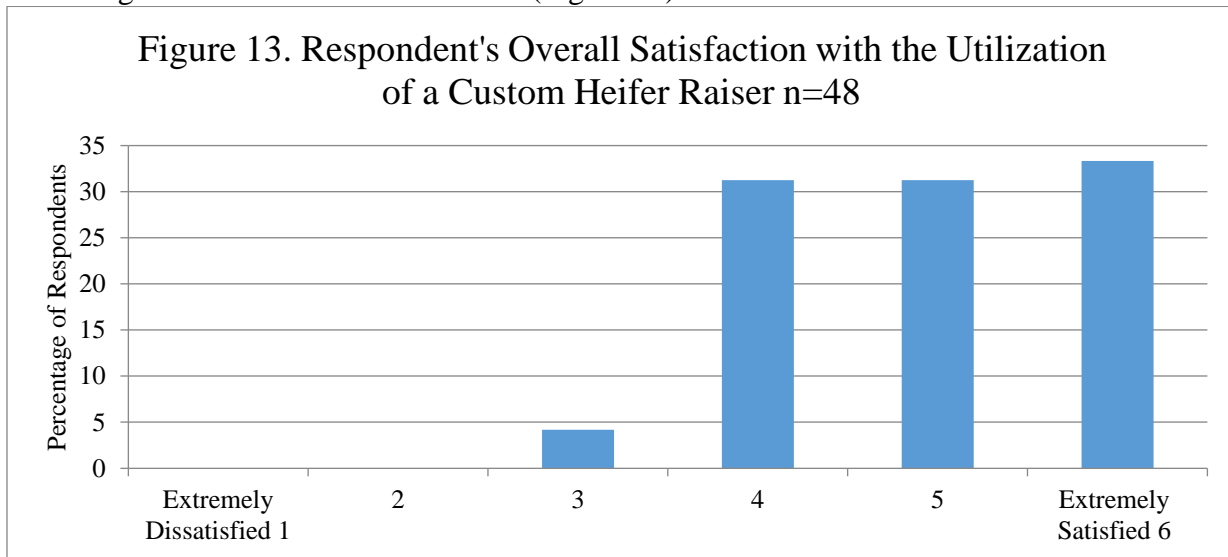
they used a custom heifer raiser because of a lack of adequate facilities on the home farm. Management time constraints, better growth/performance from custom raisers, expansion of milking herd/cow numbers, and manure management concerns were indicated as a reason by 32%, 23%, 25% and 17% of respondents, respectively.

Respondents who indicated they used a custom heifer raiser were asked what type of custom heifer raising agreement/contract they have (Figure 12). More than half of respondents indicated they had a verbal contract with the



custom heifer raiser. Written contracts, and written with verbal changes were selected by 25% and 20% of respondents respectively. The majority, 93%, of respondents (n=46) reported there were no bonus measures included in their custom heifer raising contracts. Only 2% of respondents indicated they used profit sharing as a bonus measure.

Respondents were asked to indicate on a scale from 1 (extremely dissatisfied) to 6 (extremely satisfied) their level of satisfaction with the utilization of a custom heifer raiser. Most respondents selected greater than a three on the scale (Figure 13).



To better understand the use of custom heifer growers, respondents who had previously raised calves/heifers in their operation and have switched to utilizing a custom heifer grower were asked if they noticed better performance and growth with the utilization of the custom raiser. Forty respondents indicated this question applied to their operation, and out of those 40 respondents, 45% indicated they have noticed better performance. Respondents that noticed better performance commonly stated they observed less death loss, faster growth, more consistent heifers, better health, the ability to breed at a younger age, and increased production in the first lactation.

**Reproduction Management**

Respondents were asked a series of questions to better understand their reproduction management practices. Reproductive management yields two payoffs for dairy producers by initiating milk production and also providing a calf. While producers are motivated to achieve good reproductive performance for various reasons, two common reasons are improved genetics and to initiate milk production. When asked to choose only one goal, 60% of respondents (n=280) selected improve herd genetics, when compared to 40% who selected generate pregnancies.

Table 2 summarizes some quantitative aspects of reproductive management.

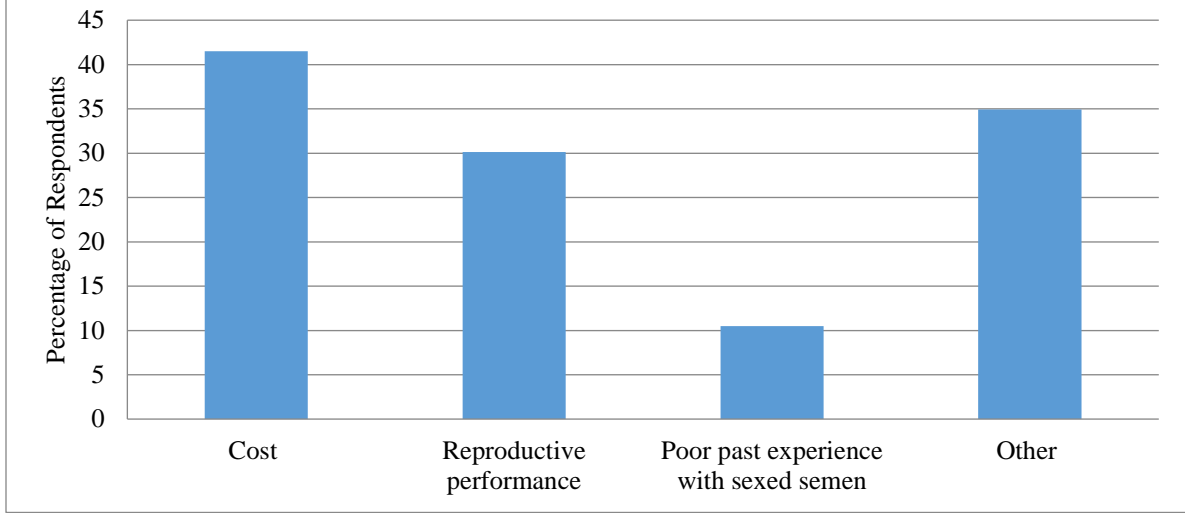
<b>Table 2. Reproductive Management</b>	
<b>Question</b>	<b>Respondent Average</b>
<b>Average age and weight of heifers at their first insemination/breeding</b>	
Age (in months) n=348	15
Weight (in pounds) n=298	823
<b>Average age and weight at first calving</b>	
Age (in months) n=348	24
Weight (in pounds) n=306	1199
Voluntary waiting period for lactating cows n=280	61
Calving interval (months) n=295	13
Average length of dry period (days)	56
Average number of days open (days) n=298	96
<b>Average Percentage of breeding using artificial insemination (AI)</b>	
Cows n=277	88%
Heifers n=266	77%
<b>Average price per straw of semen used on farm to breed cows and heifers n=376</b>	
Cows (\$/straw)	\$20.43
Heifers (\$/straw)	\$20.78
<b>% of Respondents</b>	
<b>Respondents who use artificial insemination</b>	
for breeding heifers n=362	73%
for breeding cows n=370	81%
<b>Use of sexed semen in your operation in 2014</b>	
for heifers n=306	35%
for cows n=308	16%
<b>Use of synchronization program on your farm in 2014 n=295</b>	
Yes, for heifers	28%
Yes, for cows	56%

Additionally, some respondents stated that they were concerned that there was already a milk surplus and expanding the herd by increasing the number of heifer calves would only compound the issue.

The average weight for heifers at their first insemination/breeding was 823 pounds and the average age was 15 months. On average, at first calving heifers weighed 1,199 pounds and were 24 months old. The majority of operators were using artificial insemination in their cows, 88%, as well as heifers, 77%. For both heifers and cows, operators spent approximately 20 dollars a straw for semen. Operators more frequently used sexed semen on heifers, 35%, than cows 16%.

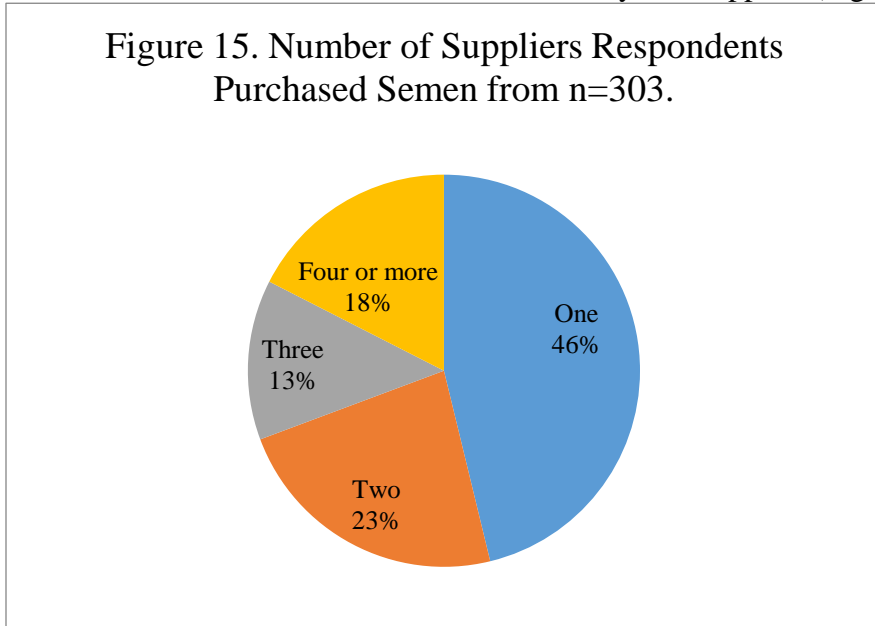
The majority of producers did not use sexed semen in their herd, and they were asked to indicate the primary reason the farm did not use sexed semen (Figure 14). Commonly selected options were cost, reproductive performance and “other.” The most common write in answer was that the farm had enough heifer calves born using natural semen and selling bull calves serves as a second source of income since the price of bull calves is currently high.

Figure 14. Respondents Primary Reasons the Farm did Not use Sexed Semen n=229



The majority of operators used artificial insemination for heifers and cows. Out of those producers who used artificial insemination, 46% used only one supplier (Figure 15). Twenty-three percent

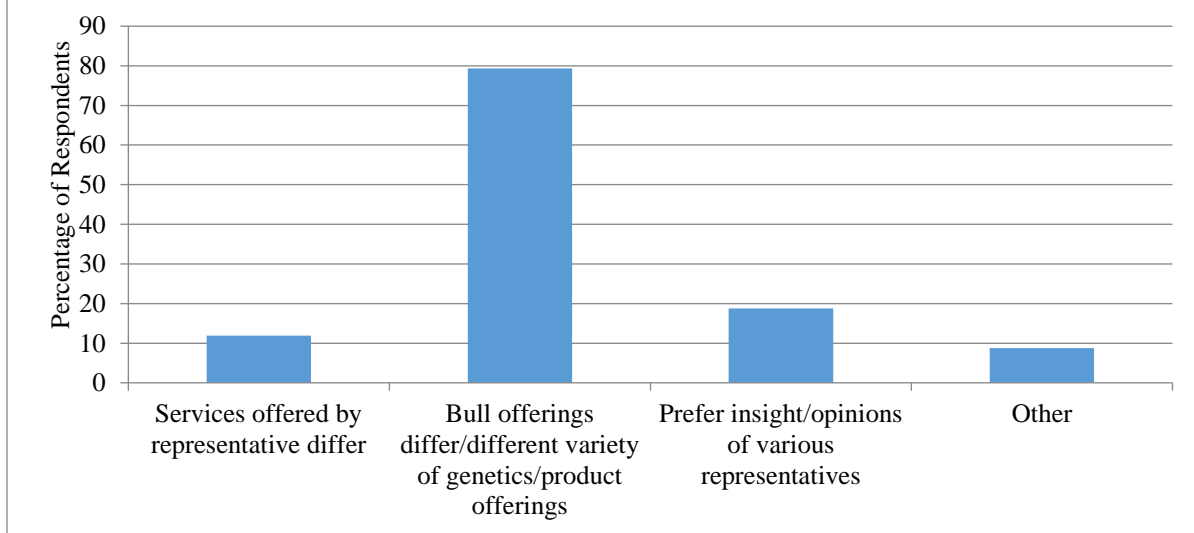
Figure 15. Number of Suppliers Respondents Purchased Semen from n=303.



of respondents purchased semen from two suppliers. A higher percentage of producers who purchased semen from more than two suppliers purchased semen from four or more suppliers, 18%, than only three suppliers, 13%.

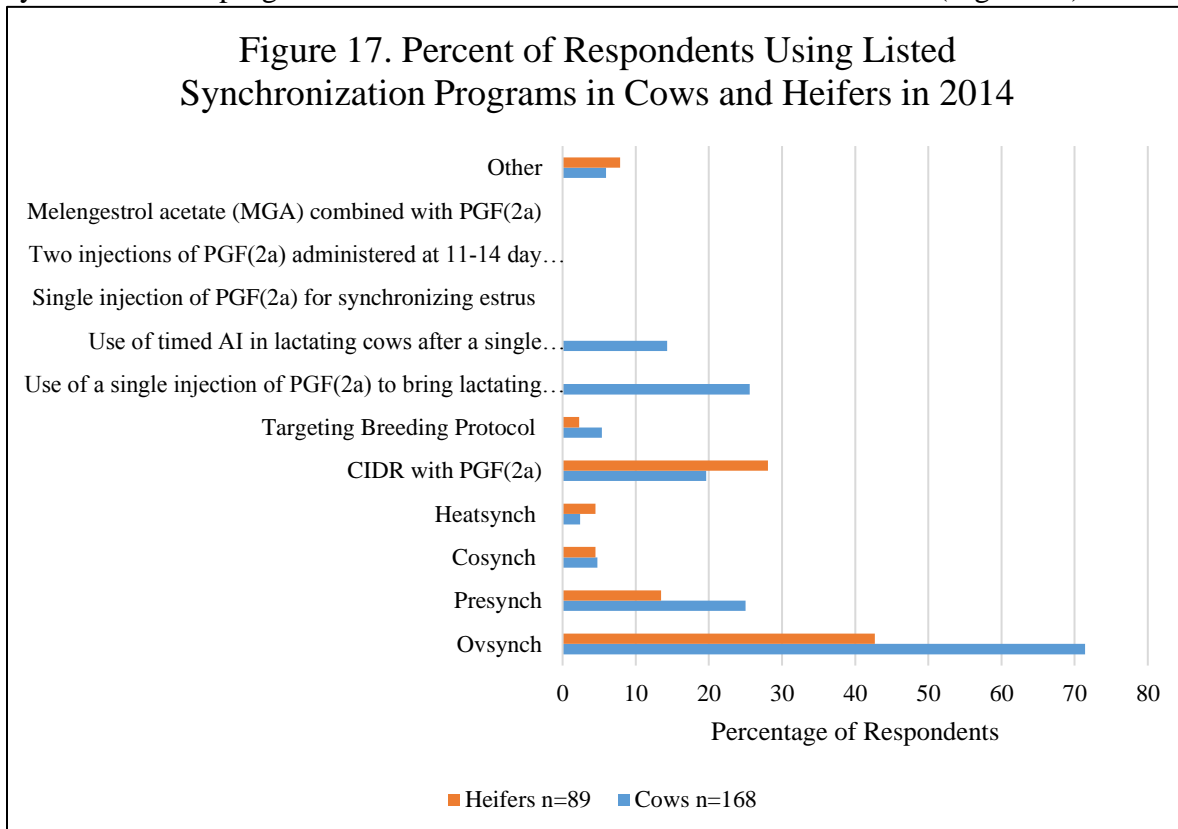
Producers who utilized more than one source of semen were asked why they used more than one source (Figure 16). The majority of respondents, 79% indicated bull offerings differ/different variety of genetics/product offerings. Eighteen percent of respondents indicated they prefer insight/opinions of various representatives, and 11% indicated the services offered by representatives differ. Other write in reasons given included wanting to use only the top bulls in the industry, having cows in two different locations, and having more than one breed of cow on site.

Figure 16. Why Respondents Utilized More than One Supplier of Semen n=160



Another important aspect of reproduction management is the use of synchronization programs for those operations utilizing AI. Operators more frequently used a synchronization program for cows 56%, than heifers 28% (Table 2). Additionally, respondents were asked what kind of synchronization program was most often used for both heifers and cows (Figure 17).

Figure 17. Percent of Respondents Using Listed Synchronization Programs in Cows and Heifers in 2014

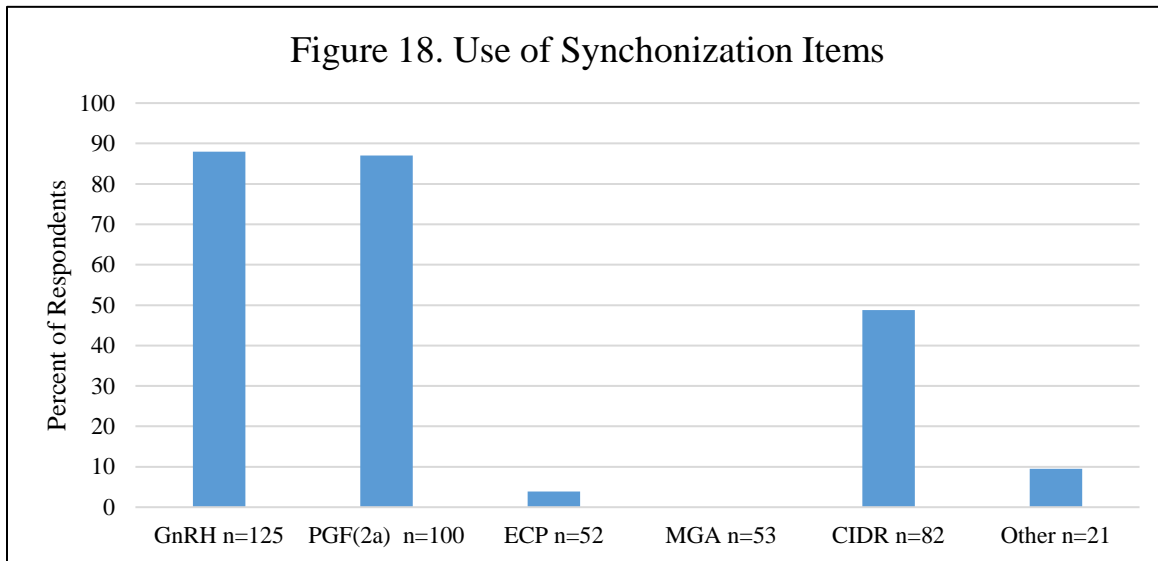


Ovsynch was used most frequently for both heifers and cows. Presynch for cows and the use of a single injection of PGF (2a) (Prostaglandin F2-Alpha) to bring lactating cows into estrus for AI

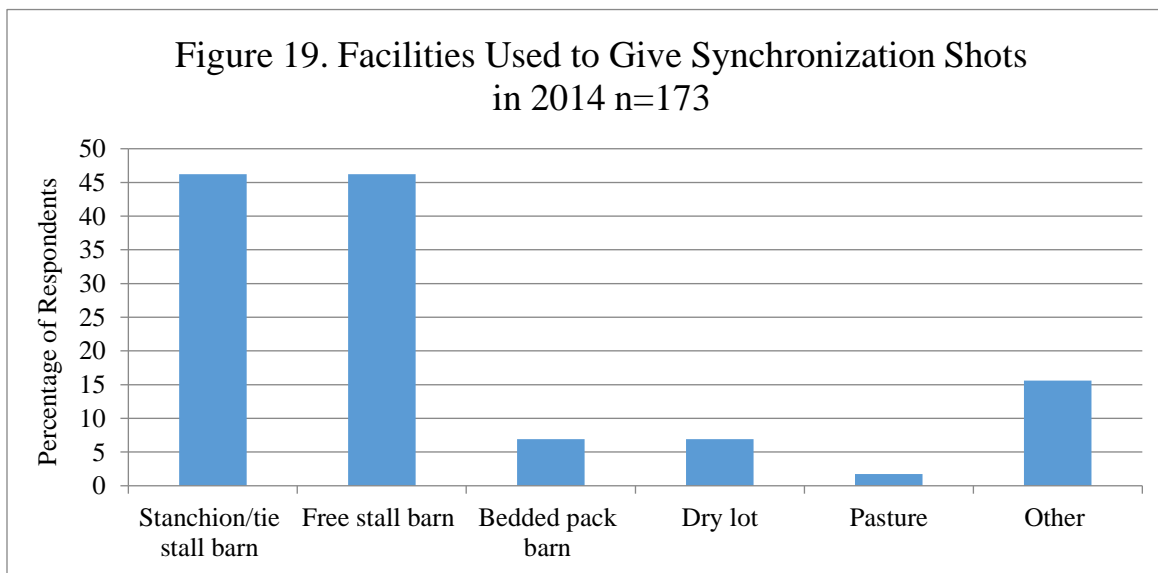


were both selected by approximately 25% of respondents. CIDR (controlled internal drug release) with PGF (2a) was selected more frequently in regards to heifers, 28%, than cows, 20%. Heatsynch was selected least frequently in respect to cows, and targeting breeding protocol was selected least frequently with respect to heifers.

Not surprisingly, given the percent of respondents using synchronization programs, the majority of respondents used GnRH, 88%, and PGF(2a), 87%, on their operation (Figure 18). GnRH was reported to cost producers on average \$5.85 per dose (n=76) and PGF(2a) was reported to cost producers \$2.83 per dose on average (n=73). A CIDR was used by 48% of respondents and was reported to cost on average \$9.64 per unit (n=32). ECP was used by only approximately 4% of respondents.



Respondents who used synchronization programs involving injections were also asked what



facilities were used for giving shots (Figure 19). The most commonly used facilities, 46% of

respondents, were stanchion/tie stall barns, and free stall barns. Approximately 7% of respondents used bedded pack barns and dry lots. Common write in responses were palpation rails, milking parlor and feeding headlock or simply headlock. On average, respondents reported that it took approximately 2 minutes to administer a shot to a cow (n=144) and approximately 3 minutes to administer a shot to a heifer (n=87). Given the often lesser equipped facilities devoted to heifer handling and management (versus those used for cows) and the inexperience of heifers with handling for management, the longer time required to administer shots to heifers is not surprising.

### **Conclusion**

A wide range of dairy operations in terms of size, farm characteristics and management styles participated in the survey. Many operations had enterprises outside of the milking dairy herd, but many of them were related or fit well with their dairy farming operation. Most of the operations were owned by a single operator, but the management team often incorporated other individuals such as other family members, nutritionist(s) or veterinarian(s). Although many operators still used paper records and did not include written contracts when dealing with suppliers, many used sophisticated reproductive management programs. Operations varied greatly in terms of farm management strategies, but most operations did not use rbST and seemed to have a positive outlook on the future based on their plans to purchase land.

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