ISSN 1466-2523

Animal Health Research Reviews **15**(2); 189–192
doi:10.1017/S1466252314000310

Factors that influence producer decisions to implement management strategies

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Received 14 June 2014; Accepted 20 September 2014; First published online 7 November 2014

Abstract

Cow–calf enterprises in the USA are widely divergent in size, locale, resource availability, management skill, and market focus. Furthermore, variation exists in dependence on the cow–calf enterprise as a primary source of income, perception about the utility of a particular management practice or technology, and assessment of cost: benefit resulting from implementation impact decisions. Enterprises with larger cow inventories, greater dependence on income from the cattle enterprise, and that retain ownership further into the supply chain beyond the cow–calf operation are more likely to institute management protocols such as vaccination programs, defined calving seasons, and reproductive technologies. Successful cow–calf managers place the highest priority on herd nutrition, pasture and range management, herd health, financial management marketing, production management, and genetics. Management practices are more likely to be adopted when they align with a manager's perception of the utility, labor availability, favorable cost: benefit outcomes and profit motivation.

Keywords: cow–calf operations, management, producers, technology

Introduction

The beef production model in North America is complex, involving large numbers of independent producers operating in widely dispersed geographical locations with a variety of management practices suited to region, size of enterprise, business goals, resource constraints, and market opportunities. This paper will focus on those US producers who own cows and may retain ownership of some or all of their calves into the stocker and/or feedyard phase of beef production.

Producer demographics

Ownership of the US beef cow herd is nearly evenly split between herds with fewer than 100 head of breeding age females and those with inventories greater than 100 (Fig. 1). However, there is significant divergence in enterprise numbers within these categories with 90% of cow–calf enterprises having less than 100 cows (45% of the national inventory), whereas 10% of the herds have greater than 100 head (55% of the national inventory). Herds with greater than 500 head comprise less than 1% of the enterprises but hold nearly 17% of the inventory (USDA, 2013). As herd size increases, producer commitment of time to the enterprise increases as does reliance on the cow–calf enterprise as a primary income source (Table 1).

Cow–calf enterprises are widely distributed across all 50 states with the greatest concentration of production in the Northern and Southern Great Plains. The average herd size for the western region of the USA is 155 head, for the Northern and Southern Plains 105 and 75 head, respectively, whereas the North Central region has average herd sizes of 56 head and the Southeast average is 59 head (USDA, 2013).

The age of agricultural producers is not normally distributed given that 18% are younger than 45, 40% are between the ages of 45 and 59, and 42% are 60 years of age of older (19% are older than 70) (USDA, 2013).

Enterprise categories

Cow–calf enterprises are highly heterogeneous with differences arising from factors such as percent of income derived from cow–calf production, level of profit motivation, lifestyle factors, and resource limitations (time, labor, capital, and

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Table 1. Key demographic factors related to size of cow–calf enterprises. Adapted from NAHMS Cow–Calf Studies (USDA 2010, 2011)

	1–49 hd	50–99 hd	100–199 hd	200+ hd
Owner work time devoted to cow–calf enterprise (%)	29	47	55	68
Cow–calf enterprise is primary income source (%)	5	24	43	65
Communicate health program information to buyers (%)	28	43	57	74
Vaccinated any beef animal (%)	59	87	96	92
Vaccinated calves against respiratory disease (birth to sale) – one time (%)	14	22	26	24
Vaccinated calves against respiratory disease (birth to sale) – two or more (%)	13	41	46	58
No respiratory disease vaccination (birth to sale)	73	36	28	18

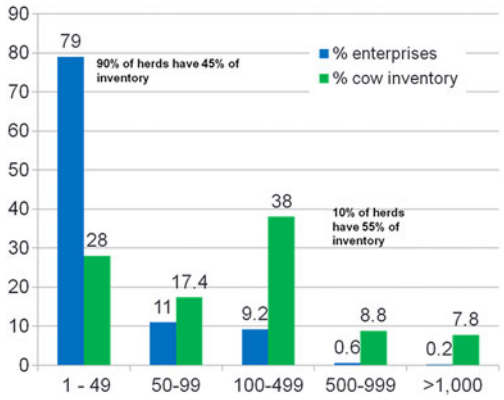

Fig. 1. Percent of enterprises and cow inventory accounted for by various sized cow–calf herds.

expertise). One approach to categorize cow–calf producers is as follows:

- Professional cattlemen – information driven, value creation and capture focus, innovation friendly;
- Professional cattlemen – tradition driven, commodity focus, change resistant;
- Professional farmer – cattle as a by-product of land ownership or as alternative marketing option for grain production (significant variation in level of passion for the cattle enterprise);
- Professional in other industry – cattle as a secondary source of income;
- Recreational cattle producer – lifestyle is primary focus – income from cattle not the critical factor due to other income streams;
- 'Cattle as cash' producer – margin operators, cattle marketing to meet specific needs of the family. (Field *et al.*, 2007)

These categories were formed from a qualitative approach and have not been quantified. However, they have been presented to numerous audiences and almost without exception have been received as an appropriate approach to defining the various categories of beef cow owners.

Externalities

Cattle producers across segments and categories face an increasingly chaotic business environment where volatility has become the norm due to economy, social movements, regulations, consumer preferences, and market forces. Lawrence and Minert (2011) examined the Porter Competitive Forces model applied to the beef industry and determined that barriers to entry, substitute product availability, and technology were the most likely factors to impact beef producers in the short run. These three forces coupled with regulatory actions focused on markets (country of origin labeling [COOL], trade agreements), environment (water and air quality, threatened, and endangered species), energy policy (ethanol, wind energy), and labor (immigration, wages) will exert substantial pressure on producers (Field, 2000, 2010; Field *et al.*, 2007; Lawrence and Minert, 2011).

The influence of any one of these forces has the potential to affect the decision of an individual enterprise manager, but taken in total, the combined impact of these forces creates a burden of accumulated aggravation that contributes to the search for low-risk strategies, rising frustration levels that may lead to producers exiting the industry as well as decisions by the next generation not to enter the beef business.

Producer priorities and behaviors

In a study conducted in 2006, leading cow–calf producers ($n = 130$) and industry specialists/advisors ($n = 87$) quantified their management priorities. The pooled results ranked herd nutrition, pasture and range management, herd health, financial management marketing, production management, and genetics as the top seven categories in order of priority from a listing of fifteen (Field, 2006). Clearly, successful producers viewed herd health as a critical step in assuring the sustainability of their enterprises. Furthermore, results from the study showed that maintaining herd health costs at below industry average levels was not a priority.

The NAHMS Beef survey conducted by USDA Veterinary Service in 2007–08 showed that herd size has a dramatic impact on whether or not veterinary consultation was utilized. Forty-three percent, 63, 76, and 82% of herds less than 50 head, 50–99 head, 100–199 head, and greater than 200 head, respectively, utilized veterinary service in the year previous to the study (USDA, 2009a). The primary use of veterinary consultation was to prevent or treat disease. However, as herd size increased, veterinary consultation broadened to incorporate nutritional management and production practices not related to disease. Furthermore, as herd size increased, the likelihood

https://doi.org/10.1017/S1466252314000310 Published online by Cambridge University Press

Table 2. Demographic and production practice implementation differences by cow–calf enterprises marketing calves following weaning, stocker backgrounding, or finishing. Data from McBride and Mathews (2011)

	Cow–calf – sell at weaning	Cow–calf – sell following stocker phase	Cow–calf – sell following finishing	Cow–calf – all
Demographics				
Cows (N)	64	93	86	79
Weaning Wt. (lb)	502	499	523	502
Weaning (%)	82.6	83.0	84.5	82.9
Calves sold at weaning (%)	100	21	28	59
Calves sold following backgrounding stocker (%)	0	79	15	36
Calves sold following finishing (%)	0	0	57	5
Farm income from cattle (%)	36	43	34	39
Production practices				
Defined calving season	54	66	79	61
Use A.I.	4	11	19	8
Calfhood growth implant	9	17	25	14
Rotational grazing	59	62	56	60
Individual cow records	40	50	56	46

Table 3. Demographic and production practice implementation differences in cow–calf enterprises across geographical regions of the USA. Data from McBride and Mathews (2011)

	North Central[a]	Southeast[b]	N. Plains[c]	S. Plains[d]	West[e]
Demographics					
Cows (N)	56	59	105	75	155
Weaning wt. (lb)	501	480	543	493	538
Weaning (%)	83.6	80.9	87.3	82.9	82.8
Calves sold at weaning (%)	44	70	41	69	53
Calves sold following backgrounding stocker (%)	45	28	49	29	39
Calves sold following finishing (%)	11	2	10	2	8
Farm income from cattle (%)	23	25	38	67	66
Production practices					
Defined calving season	82	45	92	42	85
Use A.I.	11	4	17	6	14
Calfhood growth implants	28	7	26	8	13
Rotational grazing	54	60	58	62	71
Individual cow records	52	35	59	45	52

[a]IA and MO.
[b]VA, TN, KY, AR, MS, GA, AL, FL.
[c]KS, NE, SD, ND.
[d]OK, TX.
[e]MT, WY, CO, NM, CA, OR.

that any vaccinations were administered increased (Table 1). Regional variation in vaccination protocols were also demonstrated in the NAHMS study with 91, 76, and 60% of central, western, and southeastern herds vaccinating at least one animal, respectively (USDA, 2009b).

Specific to respiratory disease, producers with larger herds were significantly more likely to administer vaccines against respiratory disease to calves either once or on multiple occasions (Table 1). Enterprises in the Southeastern USA were least likely to vaccinate against respiratory disease (73% – no vaccination) while enterprises centrally were most likely to utilize preventative protocols (67% – one or more vaccinations). In total, 69% of the US calves sold by cow–calf producers have received at least one vaccination against respiratory disease (USDA, 2010).

Technology

Technology adoption varies widely across beef cattle enterprises. Factors such as size of enterprise, marketing strategy, and regional location help to describe differences (Tables 2 and 3); however, variation in technology and best practice protocol adaptation varies considerably within these categories. Clearly, not all producers pursue the same goals or are motivated by the same influences. Furthermore, individual enterprises within and across geographic regions do not share the same resource constraints.

Ward *et al.* (2008) evaluated factors affecting production practice adoption rates by Oklahoma cow–calf producers and determined that labor reduction, dependence on the cow–calf enterprise for family income, age and educational level of

https://doi.org/10.1017/S1466252314000310 Published online by Cambridge University Press

producers, and herd size were the significant influencers. For example, as producer age increases, resistance to labor intensive protocols rises. Conversely, new practices and technologies (even if they require more time and labor) are typically more appealing to younger, better educated producers who depend on the cow–calf enterprise as a primary income source.

In practice, cow–calf producers evaluate new protocols or technologies from a partial budgeting perspective where either directly or intuitively the expected benefit is weighed against the cost of implementation. Furthermore, producers compare novel, innovative practices as to their anticipated utility. Thus both cost: benefit analysis as well as assessment of functionality and convenience of the proposed technology are brought to bear on the decision-making process. In light of this model, beneficial innovations may be rejected if they are viewed as too labor and time intensive or if they excessively disrupt established routines and logistics of the enterprise.

Cow–calf enterprise managers are diverse and make decisions based upon a variety of motivating factors. One size fits all strategies are unlikely to be effective. However, management protocols designed with sufficient flexibility to allow alignment with the goals, resources, human capacity, and labor availability of a particular enterprise are more likely to find acceptance.

References

Field TG (2000). Balancing the economic and social importance of ruminants with their environmental impact. In *XXI World Buiatrics Congress*, December 4–8, Punta del Este, Uruguay.

Field TG (2006). Priorities First – Identifying Management Priorities in the Commercial Cow-Calf Business. American Angus Association, St. Joseph, MO, pp. 1–28. Available online at: http://www.angus.org/pub/prioritiesfirstfinal.pdf (Last accessed June 14, 2014.)

Field TG (2010). Raising beef in a first world country: science, media and politics. In *Proceedings of the Beef Improvement Federation Annual Research Conference*, June 28–July 1, Columbia, MO, pp. 39–45. Available online at: http://www.bifconference.com/bif2010/documents/05_field_tom.pdf (Last accessed June 14, 2014.)

Field TG, Lemenager RP, Long B, Suttee H and Gardiner H (2007). The future of information dissemination to the beef cattle industry. In *Proceedings of the Western Section of the American Society of Animal Science*, June 20–22, Moscow, ID. 58:176–182.

Lawrence JD and Minert JR (2011). Fundamental forces affecting livestock producers. Choices Magazine. Vol. 26. Available online at: http://www.choicesmagazine.org/magazine/article.php?article=165 (Last accessed June 14, 2014.)

McBride WD and Mathews K (2011). The diverse structure and organization of U.S. beef cow-calf farms. EIB-73. U.S. Dept. of Agriculture, Econ. Res. Serv. Available online at: https://www.motherjones.com/files/eib73.pdf (Last accessed September 20, 2014.)

USDA (2009a). Beef 2007–08, Part II: Reference of beef cow-calf management practices in the United States, 2007–08. USDA:APHIS:VS, CEAH, Fort Collins, CO #N512.0209.

USDA (2009b). Beef 2007–08, Part IV: Reference of beef cow-calf management practices in the United States, 2007–08. USDA:APHIS:VS, CEAH, Fort Collins, CO #523.0210.

USDA (2010). Vaccination of calves for respiratory disease on U.S. beef cow-calf operations. USDA:APHIS:VS:CEAH, Fort Collins, CO #564.1209.

USDA (2011). Small-scale U.S. Cow-calf operations. USDA:APHIS:VS, CEAH, Fort Collins, CO #596.0411.

USDA (2013). Agricultural statistics annual. USDA National Agricultural Statistics Service. Available online at: http://www.nass.usda.gov/Publications/Ag_Statistics/2013/index.asp (Last accessed June 14, 2014.)

Ward CE, Vestal MK, Dye DG and Lalman DL (2008). Factors affecting adoption of cow-calf production practices in Oklahoma. *Journal of Agricultural and Applied Economics* **40**: 851–863.