



Management characteristics of beef cattle production in the western United States

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ABSTRACT

A comprehensive life cycle assessment of the beef value chain in the United States is being conducted to provide benchmarks and identify opportunities for improvement. Region-specific data are being collected to accurately characterize cattle production practices. This study reports production information obtained via surveys and on-site visits from 2 of 7 regions: the Northwest (Idaho, Montana, Oregon, Washington, and Wyoming) and the Southwest (Arizona, California, Colorado, Nevada, New Mexico, and Utah). Responses from ranches (defined as primarily grazing operations) included herd sizes ranging up to 28,500 cows and in total represented 3% of beef cows maintained in both regions according to inventories of the National Agricultural Statistics Service. Feedlot responses included operations ranging in capacities from 30 to 150,000 cattle and in total represented 33 and 19% of cattle finished in the Northwest and Southwest, respectively. Management information collected also included stocking rates; feed production and use; housing facilities; BW; diets; and machinery, energy, and labor use. Few differences in management were found between the 2 regions due primarily to the relatively dry conditions prevailing across much of the western United States. Stocking rates were relatively low in both regions, and more feed crops were grown on operations in the Northwest. In the Southwest, there was a trend toward smaller ranches (<100 cows) and more Holstein cattle were finished due to the large numbers of cull calves available from the dairy industry. Information gathered provides insights into management characteristics needed for modeling and evaluating production systems and conducting a comprehensive life cycle assessment.

Key words: cattle management, feedlot, ranch, beef cattle survey, grazing land

INTRODUCTION

The United States beef industry defines sustainability as meeting the growing demand for beef by balancing environmental responsibility, economic opportunity, and social diligence. To quantify the sustainability of beef in the United States, a national assessment was launched in 2010. The goal is to quantify sustainability through a nationwide cradle-to-grave life cycle assessment (LCA). The LCA is being conducted to establish benchmarks in various measures of sustainability and to identify opportunities for improvement but is not intended to promote particular management practices or regional preferences. Diverse management practices have developed around the climate, soils and other resources, and culture of various regions of the country. Due to the diverse nature of management systems across the nation, production practices must be studied within and across regions.

The country has been divided into 7 cattle-producing regions according to climate, differences in regional management systems, and geographical location. These are the Northeast, Southeast, Midwest, Northern Plains, Southern Plains, Northwest, and Southwest regions. The data gathered are used to form representative operations within each region to develop farm-gate partial LCA reporting carbon emissions, energy use, water use, and reactive N footprints. After all regions are completed, regional production data will be combined with information gathered from packing, marketing, and consumer segments of the beef value chain to complete a cradle-to-grave LCA.

Production and management data have been gathered (Asem-Hiablíe et al., 2015, 2016) and farm-gate assessments have been completed (Rotz et al., 2015) for the Southern and Northern Plains and Midwest regions. The objective of the current study was to survey and report beef cattle management and production practices for 2 more regions: the Northwest (Washington, Oregon, Idaho, Montana, and Wyoming) and the Southwest (Arizona, California, Colorado, Nevada, New Mexico, and Utah). Management practices for these regions were compared with other regions to identify unique region-specific characteristics and gather information needed to develop a robust national assessment.

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MATERIALS AND METHODS

Surveys and Visits

In all states of the western regions, voluntary ranch and feedlot surveys (Supplementary Information SI 1a and 1b; <https://doi.org/10.15232/pas.2017-01618>) were developed in consultation with state beef council and state cattlemen's associations to take account of region-specific management practices. Similar to the previous regional surveys (Asem-Hiablíe et al., 2015, 2016), internet addresses of the surveys were disseminated in letters to the producers from either the state beef council or cattlemen's association. Additionally, the web addresses of the surveys were distributed through periodicals and websites maintained by the beef council or cattlemen's associations. Hence, it was impossible to obtain the total number of survey recipients. On-site visits were also made to operations recommended by state representatives based on the operations' representativeness of the diversity within each state and availability of records to share. Confidential production data from individual producers were collated for each state.

Operation types as previously defined (Asem-Hiablíe et al., 2016) for the purposes of this national study are as follows: ranches are any operation that predominately includes cattle on pasture or rangeland and includes cow-calf-to-finish operations where calves are weaned, raised, and finished on the same operation. Feedlots are operations where cattle are predominantly fed in confinement (open lot or barn) either for backgrounding on a high-forage diet or finishing on a high-concentrate diet. Background and stocker cattle both refer to the intermediate stage of development between weaning of the calf and finishing of the animal on a high-concentrate diet. Backgrounders are referred to as cattle predominately fed in confinement, whereas stockers are predominately on grazing land. Overlaps occur where stockers may be fed a diet of harvested feed, particularly during winter. Feeder cattle are raised on ranches or feedlots and fed a high-concentrate diet to provide a finished carcass. Terminology for different operations sometimes varied among regions, but for consistency, these terms are used.

Ranches consisted of cow-calf only, cow-calf and stocker or backgrounding, cow-calf-to-finish, and stocker-to-finish operations. Total ranch responses from survey and visits were 371: Northwest (144) and Southwest (227). Alaska was included in the Northwest survey, but no responses were received. Due to the very low number of cattle in this state, they were not included in our analysis. Hawaii was surveyed along with the mainland Southwest. Due to its unique ecosystem and the different management practices used in this state, a different survey tool was used, which was part of a more extensive survey of their cattle industry. Data collected will be reported separately. Ranch visits numbered 16 in the Northwest and 19 in the Southwest. One to five operations were visited per state depending on the size and diversity of the industry in the state. According to the 2014 survey of the National Agricultural

Statistics Service (NASS, 2015), beef cows totaled 3.37 million in the Northwest and 2.47 million in the Southwest. Based on these reported populations, the number of cows represented in our surveys and visits was approximately 3.2% of the beef cow inventory in the Northwest and 2.7% in the Southwest.

Information on equipment, fuel, and electricity use was obtained through the ranch visits. Ranches visited in the Northwest consisted of 11 cow-calf operations (120 to 1,400 brood cows), 4 cow-calf and stocker operations (85 to 28,500 brood cows and 20 to 4,500 stockers), and a cow-calf-to-finish operation (about 300 brood cows, 25 stockers, and 250 feeder cattle). In the Southwest, 11 of the operations visited were cow-calf-only operations ranging in size from 53 to 6,000 brood cows. Also visited were a cow-calf and stocker operation (about 120 brood cows and 550 stockers), 6 cow-calf-to-finish operations (250 to 800 cows and 150 to 6,600 feeder cattle), and a stocker-only ranch with about 1,500 cattle.

Feedlot responses totaled 27 with 12 from the Northwest and 15 from the Southwest. This included visits to 6 facilities finishing 300 to 187,000 cattle/yr. The 2012 census (NASS, 2015) reported annual sales of cattle on feed of 1.33 million for the Northwest and 3.23 million for the Southwest. Although the number of operations surveyed was small, they represented a large portion of the cattle finished in each region (33% in the Northwest and 19% of those finished in the Southwest).

For summarizations and comparisons of operations, some data were expressed on a per-animal basis. For cow-calf-only operations, the average number of cows maintained throughout the year was used. While stockers or feeder cattle were included in the count when present on the ranch, bulls and replacement heifers were considered proportional to the number of cows and were not counted. Thus, on a cow-calf-to-finish operation, the sum of cows, stockers, and feeder cattle made up the number of animals counted. On feedlots, the number of cattle backgrounded or finished annually were counted.

Ranch and feedlot visits provided additional detailed information such as equipment and energy use. The average annual fuel use was estimated as the sum of reported gasoline and diesel use in diesel equivalent expressed per animal (1 L of gasoline \approx 0.877 L of diesel). As with previous regions, reported values of energy use varied widely among operations, and obtaining accurate estimates was sometimes difficult for ranches and smaller operations. Because of combined home and cattle production use, producers had difficulty estimating the portion used for cattle production. Due to these challenges, the numbers reported provide general guidance on typical or average energy use, and the wide-ranging values show the uncertainty in quantifying energy use.

Statistics

Descriptive statistics of cattle production data were computed at the regional levels and summaries of man-

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