



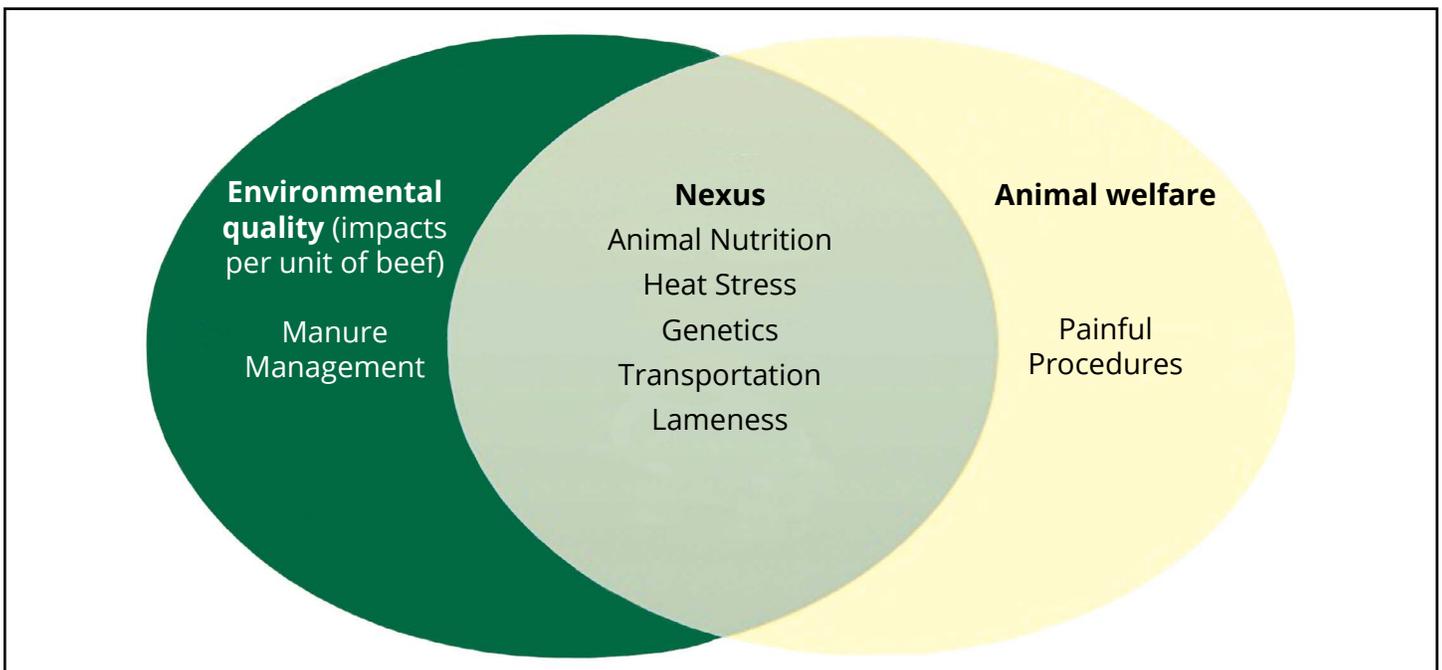
*Fact Sheet 11 in the Series: Tough Questions about Beef Sustainability*

## How does animal health and welfare impact sustainability?

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While beef sustainability is often equated to environmental impact, it also encompasses economic viability and societal acceptance.<sup>1</sup> The dramatic increase in global population has resulted in the intensification (increased output per unit of input) of agriculture to meet growing food demand. Intensification in the beef industry has received scrutiny because some believe increased productivity comes at the expense of animal health and welfare.<sup>2</sup> In reality, ensuring that cattle have the highest standards of health and welfare is beneficial to both individual beef producers and the environmental, social, and economic sustainability of the entire beef industry.

Just like people experience stress, cattle can experience stressful events throughout their life cycle. If stressful events cause cattle to have decreased growth rates, feed conversion efficiency, reproductive rates, or lead to an increased susceptibility to illness, then all three components of beef sustainability (environmental, social, and economic) can be negatively impacted. The inter-relationship between animal welfare and sustainability is particularly well illustrated by the nexus between environmental quality and animal welfare (**Figure 1**). For example, cattle can be selected that have genetic traits that allow them to have improved disease resistance, and be more adaptable to their environment. In turn,



**Figure 1.** The nexus between environmental impact per unit of beef produced and cattle welfare. Items listed in the nexus are issues that can be “win-wins” (e.g., if the heat stress cattle experience can be mitigated, their productivity improves, thereby decreasing environmental impacts per unit of beef).\*

\*Adapted from Place and Mitloehner, 2014<sup>3</sup>

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those traits could improve the lifetime efficiency of cattle to convert feed into body weight gain, as cattle that are ill tend to have lower feed conversion efficiencies. Improving lifetime feed efficiency lowers environmental impact and natural resources required per unit of beef, and lowers the cost of production for beef producers. As the preceding example demonstrates, the health and welfare of cattle is inextricably linked to beef sustainability, beyond just social acceptance and responsibility to the animals under a farmer or rancher's care.

Another example of the impact of cattle health and welfare on beef sustainability is transportation. The cow-calf phase of beef production is widely distributed across the United States and encompasses about 728,000 farms that have an average herd size of 40 cows.<sup>4</sup> However, cattle finishing typically takes place in feedlots that are concentrated in certain geographic locations (e.g., the High Plains); therefore, some cattle must be transported long distances during their lifetimes. Transportation can be a stressful situation for cattle due to handling, noise, stocking density, journey duration, and various other factors.<sup>3,5</sup> The stress of transportation can result in decreased immune function, decreased feed intake, and increased illness and mortality.<sup>3</sup> One management technique to help cattle cope with these stressors is called preconditioning, meaning they undergo a vaccination, nutrition, and management program for 30-60 days after weaning and before transportation to the feedlot.<sup>5</sup> Aside from preconditioning, creating a low-stress environment prior to, during, and upon arrival is essential to managing cattle stress. To accomplish this, cattle are handled and managed properly by trained personnel.<sup>3</sup>

The stress level of the animal upon arrival at a harvesting facility drastically affects the quality of the meat obtained from the animal. Meat from highly stressed cattle tends to be dark and tough, whereas cattle that are less stressed produce a much more desirable and tender product.<sup>6</sup> Reducing stress associated with transportation results in healthier animals, higher-quality beef products, and decreased food waste, all of which reduces the environmental impact per unit of beef.<sup>3</sup>

Lameness, or the abnormal gait or stance of an animal that can cause difficulty in its movement, is another animal health and welfare issue that can affect environmental impacts per unit of beef. Peer-reviewed research on lameness and the mobility of beef cattle is lacking in comparison to other species, such as dairy cattle, broiler chickens, and swine. This is likely due to an overall lower

incidence of lameness for beef cattle in comparison to those aforementioned species. However, research in those other species consistently shows negative effects on the productivity of animals as a result of lameness, such as decreased growth rates and poorer reproductive performance.<sup>3</sup> Consequently, it is appropriate to conclude that lame beef cattle will also have impaired productivity, such as decreased growth rates due to an unwillingness to visit a feed bunk as frequently as cattle that are not lame. As with previous examples, decreased productivity of an individual animal can cause the increased use of natural resources to produce a unit of beef and, therefore, higher environmental impacts per unit of beef. For both the welfare of their animals and the environment, beef producers practice management techniques to limit the incidence of lameness, such as decreasing the frequency of animal handling, ensuring pens are free of excess moisture and selecting structurally correct breeding animals.

Some stressors that cattle experience, such as weather extremes, are unavoidable. Thermal stressors affect cattle health, productivity, growth, and reproductive performance even long after the weather event occurs.<sup>3,5</sup> Mitigating the effects of weather extremes is not always feasible, particularly because cattle spend the majority of their lives outdoors. However, some management interventions can improve both animal comfort and productivity, which has a positive impact on the environment. Providing shade or sprinklers in the summertime and shelters or wind breaks in the wintertime can reduce thermal stresses. Reducing thermal stressors improves feed-to-gain ratios, reproductive success, and final carcass weight, thereby simultaneously improving animal welfare and lowering environmental impacts per unit of beef.<sup>3,5</sup>

While eliminating all stressful events from beef production is unrealistic in the same way that we do not live our lives completely without stress, management techniques and genetic selection can be used to reduce cattle stress, resulting in simultaneous improvements of animal health and welfare. Animal health and welfare go hand-in-hand with reducing environmental impact and maintaining economic viability.

**Bottom Line: Animal health and welfare are vital to beef sustainability. Healthy and comfortable animals have higher production efficiencies and less impact on the environment. Beef producers positively impact all three components of sustainability (environmental, social, and economic) through their commitment to animal health and welfare.**

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