Fact Sheet: Tough Questions about Beef Sustainability

Project Title: Why is Sustainability So Difficult to Define?

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Sustainability is a term that is frequently used in a variety of industries, including beef production. The term has appealing attributes and there are likely few people who would not advocate for more sustainable production practices in many industries. But what is sustainability? If you ask 10 people, you are apt to receive 10 different answers. The definition of sustainability generally encompasses three different aspects of production: Environment, Social, and Economic. When all stakeholders in the beef value chain, from producers to retailers and consumers, agree that we want to raise beef in the most sustainable manner possible, why is it difficult to agree on what that production system looks like? The answer to that question is underpinned in the definition of "wicked" problems.

Sustainability is a "wicked problem."

Wicked problems are termed such because they often have ambiguous solutions and intended goals which may be unattainable. To simplify, wicked problems are "complex, ill-defined, messy and unsolvable."[2] Let's put this definition to the test using four criteria (Box 1) to exemplify how sustainability is "wicked."

The definition of a wicked problem was summarized by H.C. Peterson[1] to include four criteria:

1. No definitive definition of the problem exists
2. The solution to the problem is not binary- it can only be described as better or worse rather than solved or not solved
3. Varying priorities of stakeholders result in dramatically different perspectives on the problem
4. The relationships that underlie the problem are complex, systemic, and either unknown or very uncertain

Box 1. Criteria of a wicked problem.

First, no definitive definition exists. Due to the difficulties inherent in defining sustainability, many working definitions contain three different attributes: economic viability, environmental stewardship, and social responsibility. However, a challenge arises if we move toward adding more specifics to the definition, as the opportunities to debate the priority of each of these facets of sustainability, the weighting that should be placed on each, and how to establish specific metrics and measure the

outcomes could be boundless. With this level of complexity and ambiguity, a specific "one-size-fits-all" definition of sustainability becomes untenable.

Secondly, the solution is not binary. Because there is no standard, measurable definition of sustainability that perfectly sums up all possible sustainability priorities, sustainability can never be reached in the classic sense. A system can become more or less sustainable as it moves closer or further from the priorities, but it is not a "sustainable or not" classification. Just as in the adage, "It's the journey, not the destination," systems can alter their practices to be more in line with the ideals of sustainability, but there is no definitive threshold where one could say a system is sustainable.

Third, varying frames of reference skew stakeholder perception of the issue. Sustainability will be defined or weighted more heavily towards those aspects that are most important to that group or person's goals and priorities. As with any complex issue, failing to take into account the perspectives of other stakeholders leaves no "common ground." In order to show progress towards attaining a goal such as sustainability, groups must define, discuss, redefine, and compromise with other stakeholders to establish reasonable, achievable priorities that work for everyone. Of course, the larger and more diverse the group of stakeholders, the more perspectives and priorities that must be balanced. Sustainability in the beef industry is an excellent example because of the large variety of stakeholders and priorities, including cow/calf producers, stocker operators, feedlots, packers, retailers, foodservice operators, consumers, landowners, and nongovernmental organizations.

Lastly, the system is complex and interdependent, often with unknown outcomes. By definition, almost all biological systems will fit into this category. Beef production occurs in nearly every geographic region within the United States, each with different environmental conditions. The impacts of a production system or conservation practice in one area may be completely different in another. In addition, there are stark differences between regions in regard to the abundance of natural resources and the practices necessary for conservation of these resources. As with any ecosystem or biological process, changes in a process or practice may have a "ripple effect" into the larger system as a whole. Because of this, production decisions must be made with careful consideration to consequences, intended and unintended, in the larger system. As a result, "better and worse" cannot always be easily defined, or measured, because of its ambiguity. To illustrate these points with some practical examples, let's compare and contrast differences in the three pillars of sustainability (environment, economic, social) of two different beef production systems: grain-finished and grass-finished. (Figure 1). Cattle finished in either system will spend the first part of their lives (the first 8-16 months) consuming primarily forage, or whole plants such as grass and hay; however, the finishing or last part of their lives will vary in the following ways:

1. In a grain-finished beef system cattle are finished in a feedlot for 4 to 6 months eating a diet that is typically 70% or greater grain-based.

2. In a grass-finished beef system cattle are finished on grass for a period of 6 to 10 months, with little to no grain supplementation to their diets.

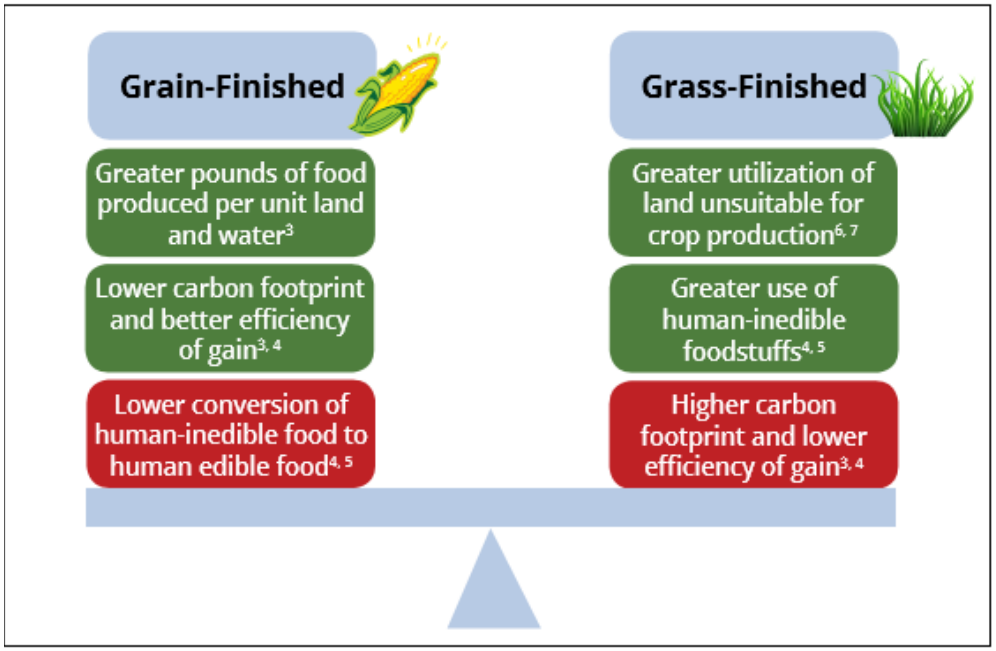

Figure 1. Contrasting some sustainability metrics for grain-finished vs grass-finished beef.

Which is more sustainable? Suppose that the grass-finished system above encompassed two different systems: a system comprised of planted bermudagrass forage only, or a system comprised of native rangeland only. Each of these forage types will likely have differences in stocking density, diversity of grasses and forbs, and fertilizer use.[8, 9, 10, 11] Keeping in mind the fact that these metrics may be different for different forages or in different parts of the country, which is more sustainable? If the grazing is incorporated in a rotational cropping system to take advantage of crop residue or to graze cover crops, would that be more sustainable? What if any of these producers were forced to sell their cattle due to lack of profit or reduction of necessary natural resources — was it sustainable? If consumers were opposed to one of these production systems due to their perception of animal welfare, would that system still be sustainable? Each individual person will have their own priorities and perceptions that may color their initial answer. However, if we consider the complexity of these systems and the trade-offs in various metrics related to sustainability, no one system is an obviously more sustainable choice — all of these systems can be sustainable. No one system is definitively "correct", because each has its own positive and negative attributes and each can become more sustainable by focusing on continual progress towards improvements for each of the three pillars of sustainability.

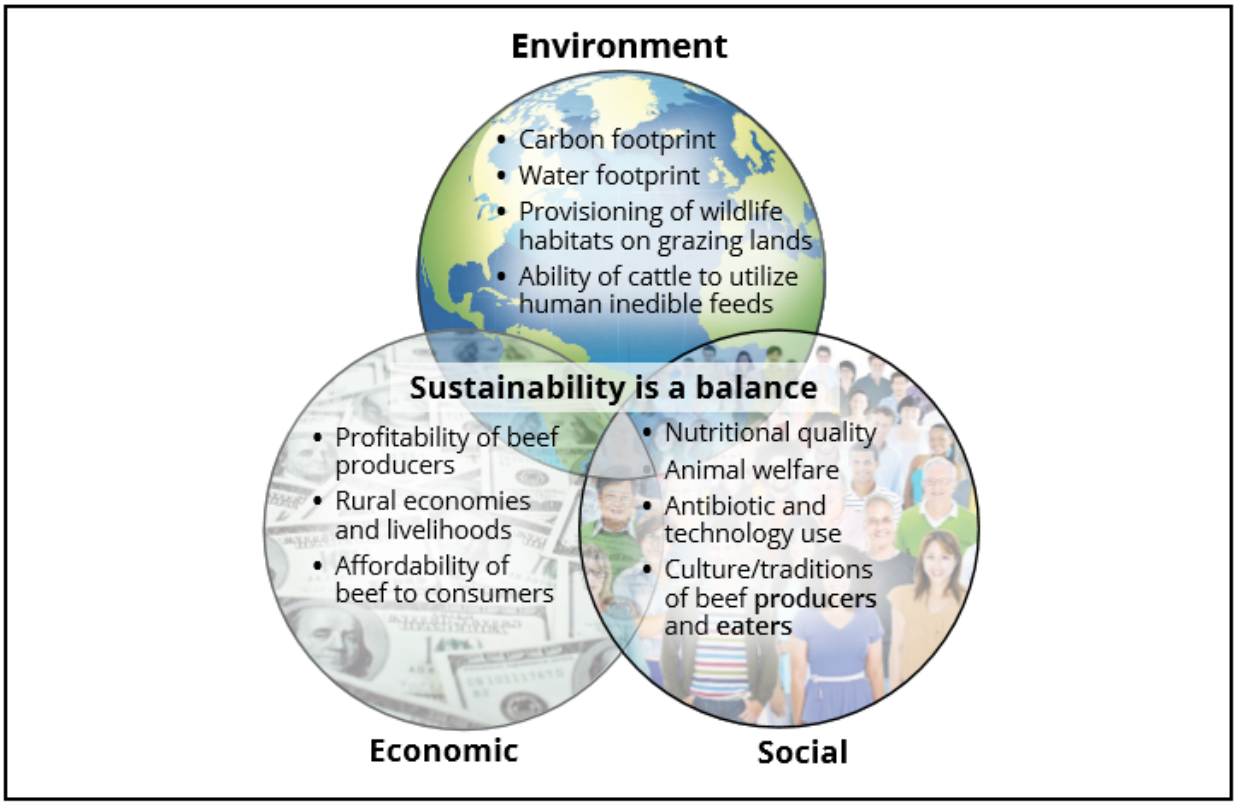

Figure 2. Examples of some of the issues that fall under the economic, environmental, and social aspects of beef sustainability.

Bottom line: Beef cattle production systems encompass a wide variety of management systems and environments. While one system may be very successful under one form of management and in one region of the country, that same management system may be unsuccessful in another. When considering various production systems with the three pillars of sustainability, it becomes clear why defining beef sustainability is such a wicked problem. However, even in the absence of a single universal definition and attainable sustainability goal, each beef production system can move forward and continuously improve its economic, environmental, and social sustainability.

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