THE CENTER FOR
FOOD INTEGRITY℠

OPTIMIZING SUSTAINABILITY PROJECT

EVALUATING SUSTAINABILITY TRADEOFFS

FoodIntegrity.org

THE CENTER FOR
FOOD INTEGRITY

OUR MISSION

Helping Today's Food System
Earn Consumer Trust.

INTRODUCTION

Sustainability was originally synonymous with being "green." Improving and protecting the environment was the initial driver for both consumers and business. Today, consumers view sustainability more holistically, incorporating interconnected sets of issues tied to being a responsible consumer and responsible citizen. While sustainability still maintains a strong association with environmental attributes, today's definition can also include health and wellness, animal welfare, treatment of workers, food waste, packaging, impact on local and indigenous communities, and a range of additional issues that impact people, animals and the planet.

A variety of interest groups and other organizations are harnessing the increased interest in the evolving definition of sustainability to capture opportunity or promote a specific agenda. In a recent review, CFI identified more than 250 separate attributes of sustainability and corporate social responsibility. As a result, a new and growing challenge is the focus on a single ingredient, process or practice without accounting for the potential impact on the entire food system. For example, pressure to change the genetics of broiler chickens or eliminate technology used in dairy or pork production may have perceived benefits to animal well-being, but could also have significant negative impacts on water use, land use, greenhouse gas production, increased demand for fossil fuel and affordability of quality protein when more resources are required to deliver the same quantity of chicken, pork and dairy products.

The challenge for many food system stakeholders is recognizing the interrelated nature of food production systems and the lack of a framework for understanding, evaluating and communicating the impacts and tradeoffs of individual decisions on the entire food system. **As the arbiters of a sustainable food system, how do global food brands balance the demands of some consumers and advocacy groups with their commitments to improve the sustainability of the entire system?**

The decision making framework in this document is intended to give food system stakeholders a tool and process to evaluate the growing list of sustainability priorities to determine the impact of potential decisions. With this information companies can make better informed decisions that are aligned with their values, the values of their stakeholders and their business objectives.

Evaluating Choices and Consequences

IN A SUSTAINABLE, SOCIALLY RESPONSIBLE FOOD SYSTEM

STEP ONE

IDENTIFY ANY UNCOMPROMISABLE PRINCIPLES OR ASPECTS OF SUSTAINABILITY ARE NON-NEGOTIABLE BASED ON YOUR VALUES AND PRIORITIES

STEP TWO

GATHER LIFE-CYCLE ASSESSMENT AND SUSTAINABILITY DATA ON THE SPECIFIC PRACTICES OR POLICIES BEING CONSIDERED

STEP THREE

SUMMARIZE THE DATA INTO A CHART TO ALLOW EASY VISUALIZATION OF THE IMPACTS BEING EVALUATED

STEP FOUR

EVALUATE THE RESULTING TRADEOFFS

- ARE THE TRADEOFFS ACCEPTABLE? CAN THEY BE MINIMIZED OR MITIGATED IN SOME WAY?
  - IF **YES**, ADOPT THE PRACTICE OR POLICY
  - IF **NO**, DECLINE OR DEFER ADOPTION UNTIL NEGATIVE IMPACTS CAN BE ADDRESSED OR OFFSET

There are consequences and tradeoffs associated with many decisions related to sustainability and corporate social responsibility. Having a balanced evaluation of multiple attributes of sustainability will allow your company to determine which are most consistent with your values and business objectives and to effectively communicate your strategic decision to stakeholders. Research from the Center for Food Integrity shows

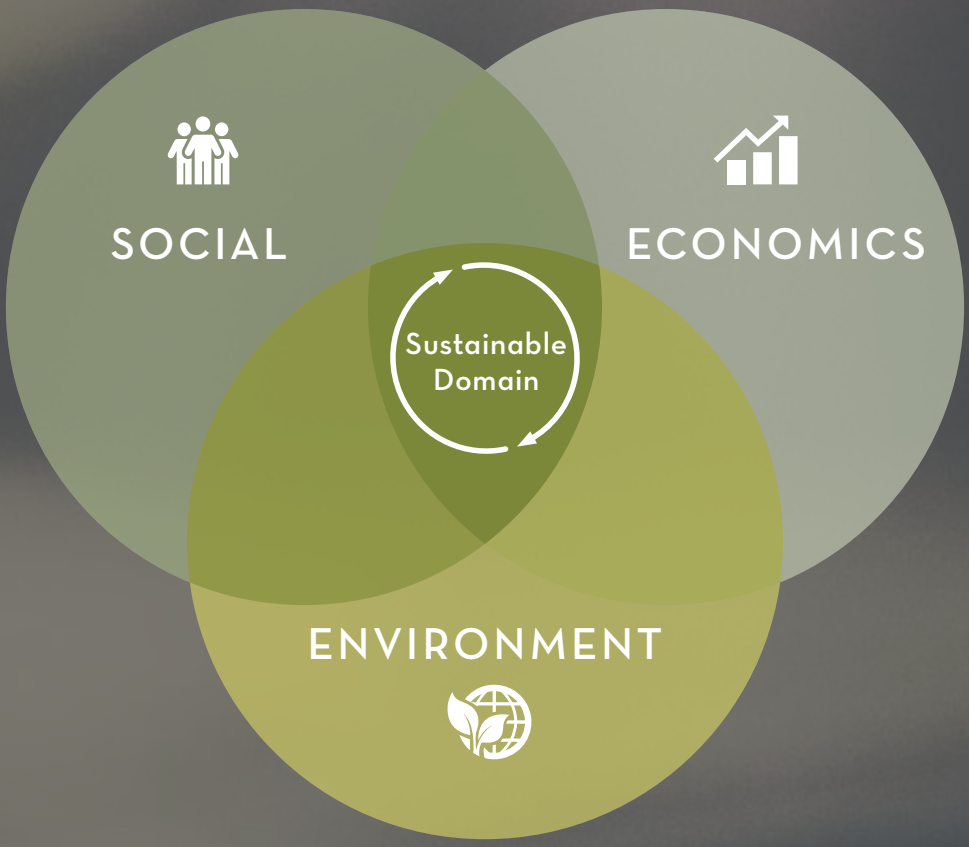
that being able to explain how and why you make decisions is an important factor in building trust and reducing potential stakeholder outrage.

Any given agricultural or food production practice has an impact on one or more of the three large dimensions of sustainability: Environment, Economic and Social. It is important to consider the impact of a practice or policy on specific attributes across and within each dimension.

You cannot change one variable in a food production system without impacting other variables in the system. Recognizing that there are tradeoffs inherent within and across attributes and dimensions helps your organization optimize your sustainability strategy.

DIMENSIONS

OF SUSTAINABILITY



STEP ONE

Identify Any Uncompromisable Principles

Any consideration of tradeoffs must begin with identifying areas of uncompromising principles and acknowledging that decisions that would negatively affect these aspects are off-the-table. Food safety, worker safety, and endangered species habitat are a few examples of attributes that may be considered non-negotiable. These attributes should be clearly defined upfront to secure internal alignment on what won't be compromised for another attribute of sustainability under any circumstances.

The challenge in evaluating tradeoffs is that the analysis is nearly always incomplete due to the complexity of food production systems. It is difficult and not generally cost- or resource-effective to identify and quantify all potential impacts, and definitive research or data may not be available. For these reasons, the goal in evaluating tradeoffs primarily is to provide strategic direction using qualitative and quantitative data. In many cases you may be asked to assign a value to a specific sustainability attribute based on data and your priorities and current policy without complete information. While this process will not provide an "apples to apples" quantitative comparison, it does provide a framework that allows you to transparently evaluate sustainability tradeoffs.

STEP TWO

Gather Life-Cycle Assessment and Sustainability Data

Begin by gathering objective, research- or experience-based data on the practices or policies to be evaluated. Information on potential impacts can be found from various groups identified in the Resources section at the end of this document. A commodity or trade association may have analyzed a specific practice, or if the subject is of broad interest, may agree to conduct one as a service to its members. Universities, trade associations, government agencies and for-and non-profit organizations are all potential sources for information or can suggest other resources to aid in your analysis.

Keep in mind the credibility of the source and information. The gold standard for research is publication in a peer-reviewed journal. This means the research has passed the rigor of review by other experts in the field and meets the standards for publication by the research journal's editors. Research of this caliber takes time and resources to conduct and may be very narrowly focused but can be considered very credible when available. An analysis or literature review of existing research on a topic can also be very informative when done objectively and comprehensively. "Cherry picking" which studies are included to favor a particular point-of-view can be a temptation when conducting this type of research so be alert for this type of bias when evaluating such studies, or when approached with study results from an organization advocating for a specific position. Your own internal experts' knowledge and experience, in conjunction with or in lieu of outside research, may provide the most accurate and relevant information on how a decision may impact your company. Their in-depth understanding of your systems and processes can identify possible unintended consequences of changes that aren't apparent to those outside the organization.

Once you have gathered the available information you can begin weighing the inevitable tradeoffs. Recognize that there is often tension between economic and environmental

or social dimensions, particularly if technological solutions have not yet been developed for an issue. A practice that is better for the environment may be more expensive, at least initially, and may negatively impact the economic attribute of profitability or social attribute of food affordability. Strategies to address this issue may include establishing return-on-investment criteria (prioritize break-even or positive ROI projects) or committing to invest in improved processes or in research to develop more cost-effective solutions.

Efficiency is generally considered an economic consideration but in reality can have environmental and social benefits. A good example is land use. Green Revolution pioneer Norman Borlaug advocated increasing crop yields as a means to curb deforestation. Farming intensification is economically positive in most cases, using less land, water and energy to produce a certain yield. However, every system has a tipping point where additional gains are no longer practical (the Pareto principle) so the goal should be to optimize rather than strictly maximizing efficiency.

STEP THREE

Summarize the Data

As you evaluate the implications of various practices, one method for summarizing the information is a simple chart with arrows or other symbols to represent the impacts of various attributes on sustainability dimension. We will use arrows - up, down and sideways – to indicate a positive, negative or neutral impact in that area.

As shown in the examples that follow, you begin the process by creating a chart for the policy or practice under consideration that includes columns for each sustainability dimension (Environment, Economic and Social) and then list the attributes or indicators which are a priority for your organization under each dimension. Using available information, determine whether the practice will have a positive, negative or neutral impact on each attribute area.

The following chart includes high-level examples of this type of summary. We've provide a template to create charts for practices specific to your organization. You may choose to include more aspects under each dimension for a more comprehensive evaluation. Be careful to avoid "analysis paralysis," that is, getting bogged down in quantifying every aspect or not making a decision because there isn't sufficient data. Remember that this is intended to be directional vs. definitive, and will reflect the values and priorities of your organization as well as available knowledge and technology at this point in time.

EVALUATING TRADEOFFS EXAMPLE

EXAMPLES	PRACTICE/POLICY	ENVIRONMENTAL ATTRIBUTES	IMPACT	ECONOMIC ATTRIBUTES	IMPACT	SOCIAL ATTRIBUTES	IMPACT
Egg Production	Cage-free eggs [1]	GHG emissions Air quality	↓ ↓	Egg production Food Affordability Cost of production	↓ ↓ ↓	Food Safety ✕ Worker Safety ✕ Hen mortality Natural behaviors	↓ ↓ ↓ ↑
Corn Production	No till/conservation tillage [2]	Soil health Water quality	↑ ↑	Equipment costs Yield Food affordability	↔ ↑ ↔	Nutritional content Labor	↔ ↑
Milk Production	rBST-free milk [3]	GHG emissions Land use Water use Carbon footprint	↓ ↓ ↓ ↓	Food affordability Milk yield Farmer profit	↔ ↔ ↔	Nutritional content Human Health ✕ Animal Health ✕	↔ ↔ ↔
Broiler Production	Slower growing birds [4]	Water use Manure production Land use	↓ ↓ ↓	Food affordability Feed costs	↓ ↓	Animal Welfare ✕	↔

↑ POSITIVE IMPACT
↓ NEGATIVE IMPACT
↔ NO/NEUTRAL IMPACT
✕ NON-NEGOTIABLE

SOURCES

(1) Coalition for Sustainable Egg Production

(2) USDA Agriculture Research Service, University of California, Davis

(3) Innovation Center for U.S. Dairy

(4) National Chicken Council

EVALUATING TRADEOFFS TEMPLATE

PRACTICE/POLICY	ENVIRONMENTAL ATTRIBUTES	IMPACT	ECONOMIC ATTRIBUTES	IMPACT	SOCIAL ATTRIBUTES	IMPACT
↑ POSITIVE IMPACT ↓ NEGATIVE IMPACT ↔ NO/NEUTRAL IMPACT ✕ NON-NEGOTIABLE	SOURCES					

STEP FOUR

Evaluate the resulting tradeoffs

Are the tradeoffs acceptable? Can they be minimized or mitigated in some way?

- If **YES**, consider adopting the practice or policy now or re-considering when the tradeoffs can be mitigated
- If **NO**, decline or defer adoption until negative impacts can be addressed or offset

Once complete, this process can be used to explain the rationale behind your sustainability commitments, to illustrate the potential impacts of changes you may be asked to make, and to support decisions to change or continue certain practices or policies.

For more information on using this information when responding to a request for a sustainability commitment in a specific area, please see the accompanying Responding to Requests for Commitment module.

Evaluating Tradeoffs Case Studies

BOVINE SOMATOTROPIN USE IN DAIRY COWS

Bovine somatotropin (BST) is a hormone produced by a cow that tells its body to produce milk. Recombinant Bovine Somatotropin (rBST) is a synthetic hormone that is biologically equivalent to BST, meaning the cow's body treats and processes it the same as BST. Milk from cows given rBST has the same amount of nutrients and calories and the same level of hormones while cows receiving rBST produce about one more gallon of milk daily. Concerns about potential or perceived effects on human and animal health have lead some groups to call for companies to source only milk from cows not administered rBST. FDA has determined that rBST was proven safe for humans who consume the milk and meat from animals treated with it, and also that rBST did not cause adverse effects on the health and well-being of the treated cows.

But what are the tradeoffs in deciding to reject use of rBST? Due to less milk produced per cow, producing the same amount of milk without rBST results in a larger carbon footprint, more water used, more land required and increased greenhouse gas emissions, which are in conflict with the most common environmental sustainability goals. It also results in less affordable milk, cheese and yogurt products as well as lower income for dairy farmers, which is in opposition to many social sustainability objectives.

So how do you balance the perceived public health concerns or absence label marketing claims with negative impacts on environmental and social sustainability goals? Improving animal welfare, including of animals receiving rBST, as a sustainability priority can address this concern. Communicating the shared values of safe, nutritious food and factual information supporting the safety of rBST will acknowledge concerns while supporting placing a higher priority on the sustainability benefits of its use.

CAGE-FREE EGGS

Let's look at another example tied to housing laying hens. In conventional systems, hens are housed in barns in multi-level rows of cages. In cage-free systems, hens can move within sections of a barn with perches, nesting boxes and floors covered with a natural material.

A multi-year study showed the hens in cage-free systems were able to better express natural behaviors such as pecking and scratching, had better leg strength and improved feather condition, attributes highly valued by some stakeholders. The same study showed the cage-free system had higher mortality and increased cannibalism/aggression (more than twice as many hens died prematurely), increased greenhouse gas emissions (double the ammonia emissions), poorer air quality for workers (particulate matter levels sometimes 8-to-10 times higher) and higher consumer egg prices (cost of production 36% higher).

SLOWER GROWING CHICKENS (BROILERS)

"Slower growing," as defined by the Global Animal Partnership, is equal to or less than 50 grams of weight gained per chicken per day averaged over the growth cycle, compared to current industry average for all birds of approximately 61 grams per day. This means that in order to reach the same market weight, the birds would need to stay on the farm significantly longer. A study by the National Chicken Council detailed the environmental, economic and sustainability implications of raising slower growing chickens, revealing a sharp increase in chicken prices and the use of environmental resources – including water, air, fuel and land.

If only one-third of broiler chicken producers switched to a slower growing breed, nearly 1.5 billion more birds would be needed annually to produce the same amount of meat currently produced – requiring a tremendous increase in water, land and fuel consumption:

- Additional feed needed: Enough to fill 670,000 additional tractor trailers on the road per year, using millions more gallons of fuel annually.
- Additional land needed: The additional land needed to grow the feed (corn and soybeans) would be 7.6 million acres/year, or roughly the size of the state of Maryland.
- Additional manure output: Slower growing chickens will also stay on the farm longer, producing 28.5 billion additional pounds of manure annually. That's enough litter to create a pile on a football field that is 27 times higher than a typical NFL stadium.
- Additional water needed: 1 billion additional gallons of water per year for the chickens to drink (excluding additional irrigation water that would be required to grow the additional feed).

If the industry did not produce the additional 1.5 billion birds to meet current demand, the supply of chicken would significantly reduce to 27.5 billion less chicken meals per year. The additional cost of even 1/3 of the industry switching to slower growing birds would be $9 billion, which could have a notable financial impact on the cost of chicken for foodservice companies, retailers, restaurants and ultimately – consumers. This would increase food instability for those who can least afford to absorb increases in food prices.

More research is needed to better understand if raising chickens slower than they are today would advance progress on health and welfare. Research will help identify if there are additional, unforeseen consequences of raising birds longer.

Resources

SUSTAINABILITY ORGANIZATIONS & PROGRAMS

- **American National Standard for Sustainable Agriculture**
  http://www.leonardoacademy.org/services/standards/agstandard.html
- **B Corporation** https://www.bcorporation.net/
- **Conservation Technology Information Center**
  http://www.ctic.purdue.edu/CTIC%20HOME/ABOUT%20CTIC/
- **Environmental Defense Fund Sustainable Supply Chains**
  http://business.edf.org/projects/featured/sustainable-supply-chains/
- **Field to Market** https://fieldtomarket.org/
- **Global Reporting Institute** https://www.globalreporting.org/Pages/default.aspx
- **Global Environmental Management Initiative** http://gemi.org/
- **International Seafood Sustainability Foundation** http://iss-foundation.org/
- **National Dairy FARM Program** http://www.nationaldairyfarm.com/
- **Sustainable Agriculture Initiative** http://www.saiplatform.org/
- **Sustainability Accounting Standards Board** https://www.sasb.org/
- **Sustainable Seafood Coalition** http://www.sustainableseafoodcoalition.org/
- **U.S. Environmental Protection Agency** https://www.epa.gov/sustainability/sustainability-resource-finder
- **U.S. Roundtable for Sustainable Beef** https://www.usrsb.org/
- **University of Arkansas Center for Agricultural and Rural Sustainability** http://cars.uark.edu/
- **University of California, Davis Agricultural Sustainability Institute** http://asi.ucdavis.edu/
- **USDA Economic Research Service** https://www.ers.usda.gov/
- **USDA National Institute of Food and Agriculture** https://nifa.usda.gov/
- **USDA Natural Resources Conservation Service** https://www.nrcs.usda.gov/wps/portal/nrcs/site/national/home/

COMMODITY/TRADE ASSOCIATIONS

An online directory of agriculture commodity organizations and trade associations can be found at

https://www.agmrc.org/directories-state-resources/related-directories/national-commodity-and-agricultural-organization-sites

If you need additional resources, please contact CFI. We're happy to connect you to organizations that have data to help inform your decision-making process.

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Contact The Center for Food Integrity for more information
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