MEAT, POULTRY & DAIRY
Research Brief

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MEAT, POULTRY & DAIRY

Research Brief

SASB’s Industry Brief provides evidence for the disclosure topics in the Meat, Poultry & Dairy industry. The brief opens with a summary of the industry, including relevant legislative and regulatory trends and sustainability risks and opportunities. Following this, evidence for each disclosure topic (in the categories of Environment, Social Capital, Human Capital, Business Model and Innovation, and Leadership and Governance) is presented. SASB’s Industry Brief can be used to understand the data underlying SASB Sustainability Accounting Standards. For accounting metrics and disclosure guidance, please see SASB’s Sustainability Accounting Standards. For information about the legal basis for SASB and SASB’s standards development process, please see the Conceptual Framework.

SASB identifies the minimum set of disclosure topics likely to constitute material information for companies within a given industry. However, the final determination of materiality is the onus of the company.

Related Documents

- Meat, Poultry & Dairy Sustainability Accounting Standards
- Industry Working Group Participants
- SASB Conceptual Framework

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INTRODUCTION

The Meat, Poultry & Dairy industry has seen remarkable benefits of scale over the past century. However, the industry’s operations currently require significant amounts of energy and water consumption and land usage, which can generate externalities such as greenhouse gas emissions (GHG) and ecological impacts. To tackle these major 21st-century sustainability issues, the industry must straddle two major objectives: to scale to supply meat, poultry, and dairy cheaply to a growing global market and to maintain the license to operate in communities globally through sustainable operations. The first of these needs has resulted in, among other things, the increasing prevalence of large concentrated animal feeding operations (CAFOs), which have scale benefits that allow companies to provide their customers with large volumes of cheaper products. However, these operations also face community pushback in some areas as well as consumer concerns over the potentially inhumane treatment of animals.

This industry is facing tighter governmental regulations, especially around public health issues like antibiotic use, and companies will increasingly have to adapt their practices to comply with new restrictions, as well as to meet shifting consumer preferences, to maintain or gain market share in the coming decades.

Management (or mismanagement) of material sustainability issues, therefore, has the potential to affect company valuation through impacts on profits, assets, liabilities, and cost of capital.

Investors would obtain a more holistic and comparable view of performance with meat, poultry, and dairy companies reporting metrics on the material sustainability risks and opportunities that could affect value in the near and long term in their regulatory filings. This would include both positive and negative externalities, and the nonfinancial forms of capital that the industry relies on for value creation.

Specifically, performance on the following sustainability issues will drive competitiveness in the Meat, Poultry & Dairy industry:

- Managing GHG emissions from animals and animal waste;
- Improving energy usage in production, and diversifying sources of energy;
- Improving water efficiency to reduce water-related risks, especially in locations of water scarcity;

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• Preserving ecological resources and biodiversity by limiting the contamination and degradation of land and water resources;
• Ensuring the safety and quality of products to protect human and animal health;
• Ensuring worker health and safety and maintaining a strong safety culture;
• Responding to consumers’ increasing avoidance of animal products that have been treated with antibiotics;
• Ensuring that animal raising and production is conducted humanely;
• Ensuring a continued supply of livestock sourced in an environmentally sustainable way; and
• Managing the sourcing of feed, considering long-term climate change patterns.

INDUSTRY SUMMARY

The Meat, Poultry & Dairy industry produces raw and processed animal products, including meats, eggs, and dairy products, for human and animal consumption. Key activities include animal raising, slaughtering, processing, and packaging. Global industry sales were approximately $538 billion in 2014. Dairy and egg product sales were $268.5 billion, representing 50 percent of the total industry revenue, followed by meat products, with $187 billion in revenue, representing 35 percent. The U.S. is the largest producer of poultry and beef and the third-largest producer of pork and pork products. Other large exporters of meat products include Canada, Australia, Brazil, and New Zealand.

The industry sells products primarily to the processed foods industry and to retail distributors. Specifically, key end-markets include frozen foods companies, restaurants, livestock and pet feed, and grocery retailers. Demand for most animal products is relatively noncyclical, as many products are staple foods. Nonetheless, in 2009, during the height of the 2007–2009 recession, revenues fell by approximately 7 percent among meat, beef, and poultry processing companies. In economic downturns, consumers tend to shift to lower-quality products instead of reducing consumption. Long-term global consumer trends indicate increasing expenditures on higher-value foods such as meat and dairy products across income levels.

The price of inputs, including animals, animal feed, labor, electricity, fuel, and oils, is a key value driver. Animals and animal feed are the primary costs. Between 2006 and 2011, animal feed made up 50, 15, and 45 percent of the cost of producing milk, cows, and hogs, respectively. Much of the feed is crop-based; cattle consume almost half of all corn grown in the U.S. Volatility in feed prices has caused a strain on margins for some companies in the industry, particularly when changes in feed costs cannot be passed on to the end consumer. The median net profit margin for the industry was 3.77 percent in fiscal year (FY) 2014. Profitability in the industry is strongly correlated with farm size.

The industry’s greatest barrier to entry is regulation, the majority of which stems from food safety and environmental standards of the U.S. Department of Agriculture (USDA) and the U.S. Environmental Protection Agency (EPA). Barriers to entry for small farms are lower than those for industrial-scale farms, which require...
substantial capital expenditures for animals, machinery, and land.\textsuperscript{13}

The industry is competitive but maturing, with ongoing consolidation.\textsuperscript{14} For example, in June 2013, Chinese pork firm Shuanghui purchased Smithfield Foods, the world’s largest pork producer.\textsuperscript{15} In June 2014, Tyson Foods acquired Hillshire Brands for $8.55 billion, exceeding the final bid by competitor Pinnacle Foods.\textsuperscript{16}

The industry has experienced a shift toward CAFOs; the rise of industrialized farming techniques and technology, including CAFOs, has greatly enhanced industry productivity.\textsuperscript{17} The proportion of production from small, family-owned farms is relatively low today, as economies of scale continue to propel the shift to CAFOs. The United Nations Food and Agriculture Organization (FAO) estimates that CAFOs account for 72 percent of poultry production, 43 percent of egg production, and 55 percent of pork production globally.\textsuperscript{18} Most meat and dairy products are produced in single-species farms. Key innovations include advances in breeding techniques, animal pharmaceuticals, specialized feed, and mechanization.\textsuperscript{19} This shift toward larger, more efficient operations is expected to continue, and it highlights the tension between cost reduction and some of the industry’s most pressing sustainability issues.\textsuperscript{20}

Large industry operators typically rely on contract or independent farmers to supply the majority of their animals, rather than the companies’ owning farms and raising the animals themselves. However, this can vary depending on the company and the type of animal being processed. For example, Smithfield Foods, a large pork producer, is vertically integrated and sources more than 50 percent of its pigs from its own operations.\textsuperscript{21} Chicken producers, on the other hand, source the majority of their animals from independent farmers.\textsuperscript{22} Under some of these agreements, large companies provide independent or contract farmers with the animals to raise and supply them with animal feed. They are then purchased back for processing upon maturation. Large companies have varying degrees of control over the operations of these farmers.\textsuperscript{23} This industry dynamic therefore leads to varying levels of control over a company’s sustainability performance, since the majority of issues arise at the farm level.

The industry’s largest companies, including Tyson Foods, BRF S.A., and Hormel Foods, have international operations. U.S. exports have risen as a result of domestic surplus, with the major export markets being Mexico, Japan, Canada, and China. In the U.S., production is

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**Note on Industry Structure**

SASB recognizes that participants in this industry have different levels of vertical integration and control over supplier operations dependent both on livestock type and managerial preference. This brief addresses issues assuming that companies in the industry have some direct animal raising and production operations, as well as supply chains over whose operations they may have varying degrees of control. For example, poultry processors typically purchase the majority of chickens from third party contractors and are less vertically integrated than some pork producers, which own and operate farms that represent a large share of their supply. As with all SASB’s disclosure topics, the final determination of materiality is the onus of the company.
concentrated in California, the Midwest, and the South.24

A core driver of industry growth is the rising demand for meat proteins in emerging markets, which is leading the major industry players to expand operations overseas. Exports are expected to represent an increasing share of U.S. company revenues.25 Generally, as the global middle class expands, the demand for food and food products is expected to grow, driving increasing production.26 Furthermore, consumer trends toward healthier eating habits are expected to expand the higher-margin sales of organic and lean-cut products.27

A dynamic regulatory environment, consumer preferences, and climate change create key challenges as well as opportunities for meat, poultry, and dairy companies and are becoming important drivers in the long-term evolution of the industry.

Analysts examining this industry typically look at company revenue breakdowns and earnings before interest and taxes (EBIT) margins in each product category (e.g., chicken or beef), taking into account projections for future consumer trends in each of these areas. The international nature of many of these companies also makes them susceptible to risk from currency fluctuations.28

LEGISLATIVE AND REGULATORY TRENDS IN THE MEAT, POULTRY & DAIRY INDUSTRY

Regulations in the U.S. and abroad represent the formal boundaries of companies’ operations, and are often designed to address the social and environmental externalities that businesses can create. Beyond formal regulation, industry practices and self-regulatory efforts act as quasi-regulation and also form part of the social contract between business and society. In this section, SASB provides a brief summary of key regulations and legislative efforts related to this industry, focusing on social and environmental factors. SASB also describes self-regulatory efforts on the part of the industry, which could serve to preempt further regulation.21

The USDA oversees many aspects of U.S. agriculture, including animal health, quality assurance, livestock insurance, biotechnology, product inspection, distribution, and export regulations, while the Food, Agriculture, Conservation, and Trade Act (commonly known as the Farm Bill) is the primary agricultural policy tool of the U.S. government.29 The Farm Bill, which must be renewed every five years, also addresses key environmental and social issues.30 The 1990 Farm Bill defined “sustainable agriculture” as a system that will satisfy food and fiber needs, enhance environmental quality and the agricultural natural resource base, make the most efficient use of nonrenewable resources, sustain the economic viability of farm operations, and enhance the quality of life for farmers and society.31

Meat, poultry, and dairy producers are subject to extensive regulatory oversight on product safety. In the U.S., the Federal Food, Drug, and Cosmetic Act regulates pesticide use in or on foods and animal feed. Pesticide use is closely linked to food safety, and consumers are increasingly becoming aware of potential health risks.32 The USDA’s Animal and Plant Health Inspection Service (APHIS) monitors imported livestock as a precaution against the importation of animal diseases such as foot-and-mouth

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21 This section does not purport to contain a comprehensive review of all regulations related to this industry but is intended to highlight some ways in which regulatory trends are impacting the industry.
disease. APHIS has the authority to kill animals that present a threat to human health or the U.S. livestock inventory. To help prevent food-borne illnesses such as salmonella, the USDA’s Food Safety and Inspection Service inspects animals, meats, and slaughter facilities. 33 The U.S. Food and Drug Administration (FDA) also enforces the Food Safety Modernization Act, which gives it the authority to issue mandatory food recalls. 34 The FDA’s Public Health Services Act requires, among other things, the pasteurization of milk. 35 Companies in the industry that operate globally may have to navigate stricter regulation in foreign countries than in the U.S. Antibiotic use for nontherapeutic purposes is facing increased scrutiny within the industry. Many countries have banned the use or selling of animal products raised with antibiotics. The E.U. banned the use of antibiotics in 2006. 36 The FDA has also announced plans to reduce low-dose antibiotics for weight-gaining purposes for cows, chickens, and swine. 37 In June 2015, the FDA issued a new directive that veterinarians must prescribe animals antibiotics starting in December 2016 for any purpose; antibiotics have been available over the counter, and this regulation highlights the increasingly strict governmental control over their use. 38 In an effort to self-regulate, companies have begun making voluntary pledges to reduce the use of antibiotics in animal production.

With the exception of CAFOs, which require federal waste permits, environmental regulations are implemented largely at the state and local level based on federal guidance. 39 The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or Superfund) and the Emergency Planning and Community Right-to-Know Act (EPCRA) regulate management of animal waste and relevant emissions. Animal production facilities, especially CAFOs, can generate considerable quantities of chemical pollutants, including ammonia and hydrogen sulfide. Currently, only those CAFOs housing more than an EPA-specified number of animals, which varies by species, are required to report releases under CERCLA and EPCRA. 40

Animal production can also have sizable impacts on water resources, largely through animal waste releases, sediment, pathogens, and the use of pesticides. 41 The Clean Water Act (CWA) and Clean Air Act (CAA) regulate emissions from these operations. Animal production generates significant GHG emissions, especially methane, as well as emissions regulated under the National Ambient Air Quality Standards, including particulate matter, or dust. 42 Furthermore, the EPA’s Mandatory Greenhouse Gases Reporting Program (GHGRP), finalized on September 22, 2009, requires major suppliers and those that emit more than 25,000 tons of GHGs annually to monitor and report emissions. This rule applies to some manure management facilities, depending on their size. 43

The industry could also fall under state or local emissions protocols because of its high emissions values. For example, although California’s historic GHG regulatory framework, Assembly Bill 32 (A.B. 32), currently excludes agricultural sources of emissions, California’s Air Resources Board estimates that by 2020, agriculture, including livestock production, will contribute a significant portion to California’s GHG-reduction target. 44

The industry is required to adhere to specific employee health and safety standards. In the U.S., these standards are enforced by the Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor. 45
SUSTAINABILITY-RELATED RISKS AND OPPORTUNITIES

Industry drivers and recent regulations suggest that traditional value drivers will continue to impact financial performance. However, intangible assets such as social, human, and environmental capitals, company leadership and governance, and the company’s ability to innovate to address these issues are likely to increasingly contribute to financial and business value.

Broad industry trends and characteristics are driving the importance of sustainability performance in the Meat, Poultry & Dairy industry:

- **Consumption of natural resources:** Meat and poultry companies utilize natural capital inputs, including land, crop-based animal feed, and water. Rising food demand worldwide is increasing the industry’s resource requirements, while regulation and climate change could lead to higher costs or unstable supplies of those resources.

- **Environmental externalities:** Animal farming and animal products processing generate significant environmental externalities, including GHG emissions and air, land, and water pollution, that can harm human health and ecological systems. In turn, these externalities generate regulatory and operating risks.

- **Social externalities:** The industry is dependent on consumer confidence in the quality and safety of its products. Contaminated or otherwise compromised meat, poultry, and dairy products can be harmful to human health and may lead to lost sales, product recalls, and damaged brand reputation.

- **Evolving consumer sustainability preferences:** Consumers are increasingly concerned with the industry’s use of antibiotics, hormones, CAFOs, and genetically modified feed, which can impact the demand, growth, license to operate, and long-term profitability of industry players that are not able to capitalize on these trends.

As described above, the legislative and regulatory environment surrounding the Meat, Poultry & Dairy industry emphasizes the importance of sustainability management and performance. Specifically, recent trends suggest a regulatory emphasis on consumer protection, which will serve to align the interests of society with those of investors.

The following section provides a brief description of each sustainability issue that is likely to have material implications for companies in the Meat, Poultry & Dairy industry. This includes an explanation of how the issue could impact valuation and evidence of actual financial impact. Further information on the nature of the value impact, based on SASB’s research and analysis, is provided in Appendixes IIA and IIB.

Appendix IIA also provides a summary of the evidence of investor interest in the issues. This is based on a systematic analysis of companies’ 10-K and 20-F filings, shareholder resolutions, and other public documents, which highlights the frequency with which each topic is discussed in these documents. The evidence of interest is also based on the results of consultation with experts participating in an industry working group (IWG).
convened by SASB. The IWG results represent the perspective of a balanced group of stakeholders, including corporations, investors or market participants, and public interest intermediaries.

The industry-specific sustainability disclosure topics and metrics identified in this brief are the result of a yearlong standards development process, which takes into account the aforementioned evidence of interest, the evidence of financial impact discussed in detail in this brief, inputs from a 90-day public comment period, and additional inputs from conversations with industry or issue experts.

A summary of the recommended disclosure framework and accounting metrics appears in Appendix III. The complete SASB standards for the industry, including technical protocols, can be downloaded from www.sasb.org. Finally, Appendix IV provides an analysis of the quality of current disclosure on these issues in SEC filings by the leading companies in the industry.

ENVIRONMENT

The environmental dimension of sustainability includes corporate impacts on the environment. This could be through the use of natural resources as inputs to the factors of production (e.g., water, minerals, ecosystems, and biodiversity) or environmental externalities and harmful releases in the environment, such as air and water pollution, waste disposal, and GHG emissions.

Animal rearing and processing utilize natural capital inputs including water, land, and crop-based animal feed, and can contribute to pollution and habitat degradation, primarily through GHG emissions, energy use, chemical use, grazing practices, soil erosion, and land, water, and air contamination. The industry directly contributes to anthropogenic climate change by generating GHGs, mostly from methane associated with enteric fermentation (as part of the normal digestive process of animals) and animal waste. Additional emissions are released from direct energy-generation sources. These emissions present a risk, as GHG regulations are likely to become increasingly stringent worldwide.

Furthermore, water is an essential component in animal raising and processing. This poses an operating risk, as global water demand and water stress continue to rise. In addition, animal farming and processing are land-intensive and generate considerable waste, which may result in ecological damage, including water, soil, and air contamination, habitat destruction, and biodiversity loss. These factors, which are of special concern in ecologically sensitive regions, may lead to increased regulation and affect productivity and profitability.46

Greenhouse Gas Emissions

The Meat, Poultry & Dairy industry generates a significant amount of direct GHG emissions from both animal and energy-generation sources. These emissions contribute to climate change; therefore, companies in this industry face regulatory risks from climate change mitigation policies. The majority of the industry’s emissions stem directly from the animals themselves through the release of methane during enteric fermentation and during manure management. The direct emissions from livestock production represent a significant portion of total GHG emissions released among all sources, both in the U.S. and globally. These emissions sources are currently not widely regulated, which presents uncertainties as to the future of GHG regulations for this industry.
Companies in this industry also use large quantities of fossil fuels to meet energy requirements, generating additional direct GHG emissions. Given its contribution to climate-change inducing GHGs, the industry could be significantly impacted by future emissions regulation, through additional operating or compliance costs. By implementing new technologies to capture animal emissions and focusing on energy efficiency, companies can mitigate regulatory risk and volatile energy costs while also limiting their GHG emissions. Company performance in this area can be analyzed in a cost-beneficial way through the following direct or indirect performance metrics (see Appendix III for metrics with their full detail):

- Gross global Scope 1 emissions; and
- Description of long-term and short-term strategy or plan to manage Scope 1 emissions, emission-reduction targets, and an analysis of performance against those targets.

**Evidence**

Direct emissions from livestock production, including enteric fermentation, manure management, and processing and transporting animal products, represent 7.1 gigatonnes of carbon dioxide-equivalent (CO₂e) emissions, or approximately 14.5 percent of global man-made GHG emissions. In 2012, emissions from animal production, including enteric fermentation and animal waste, represented approximately 34.6 percent of U.S. agricultural GHG emissions. GHG emissions from animal sources are more difficult to measure. Although the industry’s GHG footprint receives relatively little attention from regulators and the public, the industry faces uncertainties about the nature and extent of future GHG regulations. Policy options for mitigating emissions from enteric fermentation may include EPA GHG reporting requirements, incentives for management practices, and cap-and-trade schemes to place a price on carbon.

Given the high global-warming potential of emissions from manure and enteric fermentation, these sources of GHG emissions may become increasingly monitored and regulated. Methane and nitrous oxide—the primary GHGs generated from the Meat, Poultry & Dairy industry—are, respectively, 25 times and 310 times more potent GHGs than carbon dioxide. Between 1990 and 2006, U.S. methane emissions from hog manure rose by 35 percent and those from dairy cow manure by 49 percent, a result of the increased use of CAFOs and manure lagoons.

Emissions reporting requirements are one facet of regulatory risk. Some CAFO manure management and animal processing facilities with methane or nitrous oxide emissions above EPA thresholds may be required to report their emissions under the GHGRP. In 2009, the EPA estimated that 107 CAFO facilities would have to report under the GHGRP. However, congressional legislation has not yet allocated funding for GHGRP reporting of agricultural sources; therefore, these facilities are not yet required to do so. Emissions from animals themselves are not covered under the GHGRP.

The EPA’s 2010 corporate average fuel-economy standards triggered two requirements under the CAA that may apply to agricultural sources. The first is a rule under Title V of the CAA that requires stationary sources generating emissions over a set threshold of regulated substances to obtain permits; fugitive emissions are exempt. The second requires new or modified facilities to install best-available control technologies to reduce emissions. The EPA has not identified any agricultural facilities that must adhere to these requirements under current emissions thresholds.
However, future revisions to the standards could apply to certain facilities above a threshold for emissions within the Meat, Poultry & Dairy industry.\textsuperscript{55}

As mentioned in the Legislative and Regulatory Trends section, the industry could also fall under state or local emissions protocols because of its high emissions values. California’s historic A.B. 32 GHG regulatory framework currently excludes agricultural sources of emissions. However, California’s Air Resources Board estimates that by 2020, agriculture, including livestock production, could contribute as much as 10 percent, or 17 million metric tons of CO\textsubscript{2}e, toward California’s GHG reduction target.\textsuperscript{56} As emissions reduction initiatives become more stringent over time, regulations may grow to include large emitters, such as some agricultural sources, that are not subject to the current requirements.

There are opportunities for the industry to simultaneously offset GHG emissions and earn revenue from carbon-offset credits. Facilities producing animal waste can sequester GHG emissions by using anaerobic digesters or covered-manure-pit technology. Successful anaerobic manure digesters are installed at many farms in the U.S., generating renewable energy credits that can then be sold to local utilities.\textsuperscript{57} In one case study, the capital expenditure was $550,000 to $650,000, and the potential energy-sales potential was more than $130,600 a year.\textsuperscript{58} The EPA estimates that there are 239 operational anaerobic digester systems at commercial livestock farms in the U.S.\textsuperscript{59}

Another important source of direct GHG emissions comes from the industry’s cogeneration of energy to operate processing plants. For example, the combustion of natural gas used for generating steam in fryers and ovens and for heating water represented 24 percent of Tyson Foods’ total GHG emissions in 2012.\textsuperscript{60} Efficiencies in energy usage can help reduce the cost associated with purchasing new equipment.

Corporate financial disclosures address the potential financial impacts of GHG regulation. Hillshire Brands, a major meat and poultry producer, reported in its fiscal year (FY) 2014 Form 10-K that “increased government regulations to limit carbon dioxide and other greenhouse gas emissions as a result of concern over climate change may result in increased compliance costs, capital expenditures and other financial obligations.”\textsuperscript{61}

**Value Impact**

GHG emissions primarily present a regulatory risk, manifesting in increased operating costs, capital expenditures, and impacts on operational efficiency and profitability. As the majority of emissions in this industry are difficult to control, future emissions regulation may require companies to purchase emissions-offset credits, resulting in lower profits. Regulations may also require the best available technologies to lower emissions, requiring capital expenditures.

Conversely, the potential to capture emissions from point sources such as CAFOs presents a revenue opportunity, as captured methane emissions and carbon-offset credits can be monetized or used to offset energy purchases. These developments could positively impact company profitability.

While regulatory development in this area is inherently slow, and its outcome is difficult to predict, the probability and magnitude of the impact of GHG emissions on the industry are likely to increase in the near to medium term, as
the trend toward increased mitigation of GHGs continues.

Scope 1 emissions data provides investors the ability to compare potential regulatory exposure between companies in this industry. Companies that have robust, quantitative, proactive plans will be better positioned to mitigate the impact of future costs. Investors may value discussion of investments in research, engagement in partnerships, and participation in voluntary programs as an indication that the company is forward-looking in terms of risk mitigation.

Energy Management

Meat, poultry, and dairy companies are reliant on energy as a primary input for value creation in production and processing facilities. Fossil fuel and electrical energy consumption can contribute to environmental impacts, including climate change and pollution. The industry’s energy-intense production has direct regulatory implications due to Scope 1 GHG emissions from on-site fossil fuel use. The financial risks from the direct use of fossil fuels are discussed earlier under the topic of Greenhouse Gas Emissions.

Furthermore, impacts from purchased electricity consumption, including emissions from utilities (usually accounted for as the Scope 2 emissions of a company purchasing electricity), have the potential to affect the results of meat, poultry, and dairy companies’ operations indirectly through impacts on costs, rather than as regulatory risks. Sustainability factors—such as increasing GHG emissions regulation, incentives for energy efficiency and renewable energy, and risks associated with nuclear energy and its increasingly limited license to operate—are leading to increases and volatility in the price of conventional electricity sources while making alternative sources cost-competitive.

Energy management is therefore essential for a competitive advantage in this industry, as purchased fuels and electricity account for a significant proportion of total production costs. The trade-off between on-site versus grid-sourced electricity and the use of alternative energy can have implications on both the cost and reliability of the energy supply, as well as the extent of Scope 1 versus Scope 2 emissions, influencing the degree of regulatory risk. Therefore, it is becoming increasingly important for companies to manage their overall energy efficiency, their reliance on different types of energy and the associated risks, and their access to alternative energy sources. Company performance in this area can be analyzed in a cost-beneficial way through the following direct or indirect performance metrics (see Appendix III for metrics with their full detail):

- Total energy consumed, percentage grid electricity, percentage renewable.

Evidence

The Meat, Poultry & Dairy industry requires a large amount of energy for its processing facilities. The industry as a whole uses 38,913,138,000 kilowatt-hours annually, which represents 4.7 percent of the total purchased electricity across all manufacturing facilities in the U.S. Consequently, energy represents a large portion of costs for companies in this industry. According to the U.S. Census Bureau’s Annual Survey of Manufacturers, purchased electricity for representative industries included in this brief was 1.15 percent of the total cost of materials. For the poultry processing segment of the industry (North American Industry Classification System 311615), fuel and electricity represent 1.53 and 2.47 percent of the total cost of materials. By this measure, a rough calculation shows that for Tyson Foods, a large poultry processing company with a cost of goods sold of
$37.58 billion in 2014, its cost of energy would represent approximately $1.5 billion annually, highlighting the importance of energy cost to a company’s operations.63

Companies recognize the risk of rising input costs and their inability to pass on these costs to consumers. For example, Tyson Foods stated in its FY2014 Form 10-K, “[w]e use natural gas, diesel fuel, and electricity in the manufacturing and distribution of our products. Legislation or regulation affecting these inputs could materially affect our profitability … Volatility in our commodity and raw material costs directly impact our gross margin and profitability. The company’s objective is to offset commodity price increases with pricing actions over time. However, we may not be able to increase our product prices enough to sufficiently offset increased raw material costs due to consumer price sensitivity or the pricing postures of our competitors. In addition, if we increase prices to offset higher costs, we could experience lower demand for our products and sales volumes.”64

Companies also recognize the cost-reduction benefits of energy efficiency in their operations. At Dean Foods, a large dairy company, energy costs represents 6 percent of its operating budget. The company has set a $300 million cost-reduction target and sees “energy efficiency as a key component in achieving [this] cost reduction target.” 65

The benefits of energy efficiency are particularly important in the face of rising electricity prices. In the U.S., the average retail price of electricity for the industrial end-use sector has gone from 4.7 cents per kilowatt-hour in 2001 to 7.5 cents per kilowatt-hour in 2014.66 The long-term projections of the U.S. Energy Information Administration (EIA) show that nominal electricity prices paid by the end-use sector will increase by 2.3 percent annually between 2012 and 2040.67

Companies can manage energy costs and reduce their exposure to rising energy costs in a number of ways, including energy-efficiency initiatives, cogenerating their own energy (although this can create regulatory risks from Scope 1 emissions if fossil fuel sources are used), and sourcing renewable energy. An energy audit conducted on a Canadian meat processing plant with annual energy expenditures of $4 million found that the plant had opportunities to reduce energy consumption by 15 percent, which would save $400,000 a year. Additionally, the audit determined that through implementing an on-site cogeneration power plant using natural gas, the plant could save $1.4 million a year with a payback period of 4.6 years.68 Other companies have begun to institute renewable projects to diversify their sources of energy and reduce their GHG emissions. Smithfield Foods has committed to building a $100 million anaerobic digestion plant that will convert some of the company’s manure waste from its pork production into biogas used for energy.69

Companies view their energy initiatives as a competitive advantage. Dean Foods said, “[t]hese [energy] efforts will provide us a strategic advantage over our competitors, because we are acting on opportunities to reduce our footprint more quickly. For instance, we have set more aggressive environmental sustainability goals than others in our industry. Therefore, we are confident that we will lower costs and energy consumption more swiftly than competitors.”70

Value Impact

Energy consumption can have ongoing impacts on operating costs due to volatile energy prices and rising energy consumption associated with
increasing meat and dairy production. In the face of rising electricity costs, companies that develop more energy efficient methods of production can gain a competitive advantage by offsetting rising costs and protecting margins. Through energy efficiency and the use of alternative energy sources, companies can benefit from significant cost reductions and reduce operational risks arising from fluctuations in fossil fuel prices.

Another source of operational risk is the reliability of future energy supplies, which can influence decisions about generating power on-site and diversifying energy sources versus purchasing electricity from the grid. Exposure to grid outages and volatile energy prices can increase a company’s vulnerability to these market and operational risks, increasing its risk profile and raising its cost of capital. The probability and magnitude of this vulnerability is likely to increase due to grid reliability issues, GHG emissions regulations, and other sustainability factors that could lead to increasing energy costs in the medium- to long-term.

The total amount of energy used can give analysts an indication of a company’s relative energy efficiency. The use of independent energy sources (non-grid) also indicates a degree of control and a company’s ability to provide continuous energy for its facilities. The percentage of energy derived from renewables indicates a company’s energy cost vulnerable to potential climate change regulations, its exposure to energy cost increases, and its energy independence.

Water Withdrawal

Water is an essential factor of production in the Meat, Poultry & Dairy industry, as it is required to hydrate animals. In addition to providing drinking water for animals, water is required to clean production units, wash animals, and cool facilities, animals, and products, as well as for waste disposal. The availability of adequate water supplies presents a growing operating challenge.

While water has historically been an abundant commodity in many parts of the world, it is increasingly becoming a scarce resource because of population growth, increasing per-capita consumption, poor water management, and climate change. According to some estimates, by 2025, important river basins in the U.S., Mexico, Western Europe, China, India, and Africa will face severe water problems, as demand overtakes renewable supplies. Many important river basins can already be considered “stressed.” The growing demand for water will likely increase competition between agricultural and other key water users. Water scarcity can result in higher supply costs and risks of shortages for companies reliant on stable water supplies, including meat, poultry, and dairy producers.

In this industry, operations reliant on surface waters for animal hydration, pasture, and processing facilities are particularly vulnerable to increases in water stress. This issue does not cover supplier’s water management and risks. This is discussed in the Environmental & Social Impacts of Animal Supply Chains issue. Company water efficiency and water-related risks can be analyzed in a cost-beneficial way through the following direct or indirect performance metrics (see Appendix III for metrics with their full detail):

- Total freshwater withdrawn and total water consumed, percentage of each in regions with High or Extremely High Baseline Water Stress; and
• Discussion of risks associated with water withdrawal and description of strategies and practices to mitigate those risks.

Evidence

Water risks exist during animal farming and animal-product processing. Rising water stress worldwide underscores the importance of water efficiency and securing adequate, stable supplies.

Although livestock production represents less than 1 percent of global freshwater consumption, water consumption by companies in the industry may be more significant at a local or regional level, particularly in dry areas or regions of rising water stress. For example, drinking water for livestock represents 23 percent of total freshwater consumption in Botswana, an arid country.

Water stress has already impacted some of the industry’s more productive regions, including California, which represents 7.1 percent of the livestock and livestock product revenue in the U.S. Persistent drought in the state has severely depleted surface water supplies. As a result, California ranchers have begun to reduce their herds, both through slaughter and by sending animals east to U.S. regions with greater water availability. As of April 2014, Reuters estimated that as many as 100,000 head of cattle had been transported east because of the drought, or approximately 2 percent of the state’s beef and dairy cows. Researchers at the University of California, Davis, estimate that the drought will reduce livestock and dairy revenues by $203 million in 2014 alone, as a result of reduced pasture availability and higher hay and silage costs.

Meat products are generally more water-intensive than plant-based foods are. Producing one kilocalorie from meat requires as much as ten times more water than producing one kilocalorie from grains, fruits, or vegetables. This includes water used to produce crop-based animal feed, which represents more than half water the industry uses worldwide. In industrialized animal production, animals are given water in troughs, as they do not have access to water-rich grasses or natural water sources, and water represents between only 5 and 12 percent of feed weight by percentage. However, by one estimate, the production of one pound of beef requires 18.6 gallons of water, pork 52.8 gallons, and poultry 2.4 gallons for drinking and processing alone. On an individual-company basis, water intensity varies according to the type of animal raised and the scale of farming operations.

Tyson Foods reported using 25.3 billion gallons of water in its global operations in FY2013. The company used much of this water for washing its products, a procedure required by government regulation to ensure product safety. Water efficiency is particularly significant, as there are not always substitutes for water in certain of the industry’s processes. Tyson reports a 14.7 percent reduction in water used per pound of product between 2004 and 2013. In part, this is the result of the company’s Environmental, Health, and Safety Management System Standards, which require facilities using more than one million gallons of water per week to implement a Water Conservation Plan with a water reduction goal and corresponding timeframe. Additionally, the company is undertaking a water scarcity and usage assessment of its production facilities in collaboration with the University of Arkansas.

Value Impact

Significant water use can affect operational efficiency and create operating risks. Increasing
global water scarcity may reduce the availability of surface waters for animal consumption, requiring the reduction or translocation of herds, or the importation of water, which can increase operating costs. A stable water supply is also necessary for animal product processing. Water prices may rise due to increasing demand and lower regional supply, impacting operating margins. Furthermore, limited access to water could directly affect a company’s ability to operate its processing facilities, which can impact revenues. The risk of operational impacts from water shortages could negatively affect a company’s credit profile and cost of capital.

Water costs are gradually expected to rise in several regions across the globe. As regulations become more stringent over time, and water resources become increasingly stressed due to climate change and other pressures, the probability and magnitude of future financial impacts due to water withdrawals are likely to increase.

Total water withdrawn in water stressed regions shows a company’s exposure to potential future cost increases as well as a company’s risk exposure in operations that require a steady supply of water.

**Land Use & Ecological Impacts**

Meat, poultry, and dairy operations can have significant ecological impacts, including biodiversity loss from land use and contamination by animal waste. The primary channels of impact are water, air, and soil contamination. The primary concern from CAFOs and animal-product processing facilities is the generation of large and concentrated amounts of waste and pollutants into the environment. Non-CAFO animal farming, which requires large tracts of pastureland, can lead to a physical degradation of land resources. Additionally, the world’s sheer volume of livestock contributes to a large number of environmental externalities that will influence the industry’s long-term competitive landscape.

Specifically, ecological impacts also arise from the chemicals, nutrients, pathogens, biological matter, and heavy metals found in animal manure and process waste. These substances enter the environment through air emissions, runoff, and waste discharges from pastureland, animal housing facilities, manure storage facilities, and processing plants. Animal waste may also contain antibiotics and animal hormones, which are used to improve animal health and increase weight. However, these substances can leach into local soil and water. Hormones have been found in surface waters near CAFOs and are linked to changes in the reproductive habits of aquatic species, including a substantial decrease in female fish fertility.

Land use and ecological impacts present regulatory risks in the form of fines, litigation, and difficulties in obtaining permits for facility expansions or waste discharge. Specifically, companies could face regulatory or reputational barriers to expanding operations in ecologically sensitive areas because of more stringent regulations, including permitting to protect ecosystems and endangered species. Treating effluent water and waste from facilities involves significant costs. Water contamination may also indirectly impact the industry by affecting the availability of usable purchased or naturally sourced water.

While this issue covers environmental impacts of direct operations, these impacts and associated risks also exist within a company’s supply chain and are discussed below in the issue.
Environmental & Social Impacts of Animal Supply Chains. Company performance in this area can be analyzed in a cost-beneficial way through the following direct or indirect performance metrics (see Appendix III for metrics with their full detail):

- Number of incidents of non-compliance with water-quality permits, standards, and regulations;
- Discussion of risks associated with water discharges and description of strategies and practices to mitigate those risks;
- Amount of animal litter and manure generated, percentage managed according to a nutrient management plan;
- Percentage of pasture and grazing land managed to National Resources Conservation Service (NRCS) Conservation Plan criteria; and
- Animal protein production from CAFOs.

Evidence

Ecological impacts can occur at all stages of meat, poultry, and dairy production and vary depending on the nature and scope of operations. Animal waste and impacts on physical land are the primary drivers of ecological damage and biodiversity loss from this industry. Currently, livestock account for approximately 20 percent of terrestrial animal biomass, placing a great strain on natural resources and landscapes necessary to feed and accommodate them. Furthermore, nearly 70 percent of pastureland in arid regions worldwide is considered degraded because of livestock-induced erosion, compaction, and overgrazing. Overgrazing and overstocking can contribute to habitat loss for both plants and animals via erosion, desertification, encouraging the invasion of alien plant species, destroying vegetation, and increasing watershed sedimentation.

Non-concentrated animal production requires vast tracts of land for pasture and contributes to physical land degradation as well as environmental pollution. In the U.S., an estimated 238,000 farms and ranches generate an estimated 500 million tons of manure annually. These are considered nonpoint pollution sources that can be reduced through proper storage and by managing runoff with proper waste-management systems. Furthermore, in 2008, approximately 15,300 CAFOs in the U.S. were large enough to require CERCLA or National Pollutant Discharge Elimination permits, which include requirements for managing manure waste from CAFOs.

Animal waste runoff from croplands (where it is applied as fertilizer) and CAFOs can lead to nutrient loading (eutrophication) in rivers, lakes, and oceans. This produces algal blooms that can release toxins and cause severe hypoxic water conditions, which can injure or kill aquatic life. The primary nutrients contained in animal wastes are nitrates and phosphorus. A well-known example of eutrophication is the large “dead zone” in the Gulf of Mexico, created in part by agricultural runoff from the American Midwest that enters the gulf via the Mississippi River.

Meat, poultry, and dairy producers have come under public and regulatory scrutiny for their contribution to nutrient pollution. In 2007, Pilgrim’s Pride entered into a memorandum of understanding with the Commonwealth of Virginia to use a feed supplement that lowers phosphorus content in poultry litter by up to 30 percent.

Manure quantities vary with the number and type of animals on a farm and, by some estimates, may range between 2,800 tons and 1.6 million tons per year. As discussed, animal waste can contain nutrients that impact...
ecological systems. In addition, it may contain substances that harm water quality. According to the EPA’s 2000 National Water Quality Inventory report, 29 U.S. states identified animal feeding operations as factors in water-quality impairment.\(^9\)

Within the industry, large accidental releases of waste have occurred periodically, resulting in significant ecological damage and regulatory fines. For example, a 2011 spill of 200,000 gallons of waste from a hog facility’s waste lagoon in Illinois contaminated a nearby river, killing more than 110,000 fish over a stretch of 19 miles of the river. The Illinois EPA later fined the facility operator, a privately held company, resulting in more than $81,000 in fines and recouped remediation expenses.\(^9\) While individual fines appear insignificant, such spills and violations occur frequently. In a 2014 report, the Illinois EPA found that the state’s many livestock facilities contribute to pollution across the state. More than 670 miles of Illinois streams and more than 25,000 lakes have been contaminated by animal feeding operations, making them among the top 10 contributors to environmental pollution of rivers and lakes in the state. The Illinois EPA also found that approximately 60 percent of livestock facilities in the state reported at least one spill or regulatory infringement in 2011.\(^9\)

Beyond regulatory fines and constraints, continuing violations of environmental regulations could result in the suspension of lucrative government contracts. Tyson Foods, after repeated environmental violations, was under investigation by the EPA for an ammonia spill that killed 100,000 fish in a Missouri river. Under the terms of the criminal investigation, the company could potentially lose all or a portion of the $500 million in contracts it receives from the government, highlighting the risks of chronic mismanagement of environmental issues.\(^9\)

Waste that contaminates surface or groundwater is of particular concern, as it can influence aquatic ecosystems and local water supplies and travel great distances. Meat, poultry, and dairy production facilities generate regulated wastewater that must be treated before discharge or recycling. For example, Tyson Foods reports operating 34 full-treatment and 43 pre-treatment wastewater facilities. Between 2010 and 2012, the company reduced its wastewater permit exceedances by 48 and its notices of violations of water quality standards by 86 percent.\(^9\) In 2013, the company paid out a total of $3.9 million in environmental fines and penalties.\(^9\)

Improper wastewater discharges can result in regulatory action. In 1997, the EPA fined Smithfield Foods and two of its subsidiaries $12.6 million for violations of the CWA. At the time, it was the largest CWA fine in history. The company allegedly discharged wastewater from its hog slaughtering and processing operations into the Pagan River in Virginia, resulting in more than 5,000 water discharge permit violations over the course of five years. The water contained high levels of phosphorous, ammonia, cyanide, oil, grease, and fecal coliform as a result of the company’s failure to install adequate treatment equipment.\(^9\)

Companies discuss potential financial liabilities from wastewater disposal in their SEC disclosures. For example, National Beef reported wastewater-treatment-cost risks in its FY2013 Form 10-K. The company utilizes municipal wastewater treatment facilities as well as its own treatment plants. The company stated that, as water-quality discharge requirements become increasingly strict, it “could be asked to
contribute toward the costs of such upgrades or to pay increased water or sewer charges … National Beef may also be required to undertake upgrades and make capital improvements to its own wastewater pretreatment facilities, the cost of which could be significant."  

Impacts on company value from ecological damage can also occur through constraints on expansion of operations. In 2002, in response to community health concerns regarding local swine production facilities, officials in Cerro Gordo County, Iowa, placed a one-year moratorium on the construction or expansion of animal-production, -feeding, and -housing facilities. The moratorium was repealed in 2005 after provisions for fines for violations of environmental and human health codes were established. Health officials believe that the moratorium prevented expansion in hog-production operations in the county even after the moratorium was lifted. 

Animal waste generated by CAFOs presents the industry’s greatest public health risk because of possible contamination of not only water resources but the air as well. While not as great in magnitude as the solid wastes generated at CAFO facilities, regulated air emissions also contribute to environmental pollution and regulatory risk. The largest commercial egg producer in Ohio, Buckeye Egg Farm, agreed to spend more than $1.4 million to install air-emission-pollution controls to reduce particulate matter (dust) and ammonia emissions from its egg-laying facilities. The company also paid $880,598 to settle allegations that it failed to obtain the necessary air permits and emissions samples. Particulate matter emissions can cause bronchitis and other systemic effects, including decreased lung function and cardiac arrest. Studies in North Carolina and elsewhere found that children living near factory farms have increased asthma rates.

**Value Impact**

The industry’s ecological impacts are diverse. Degradation of land resources such as pastureland or water can harm local or regional ecosystems. This harm can ultimately lower animal productivity, affecting the volume of salable products. Companies with poor environmental management records can have difficulty obtaining waste emission permits, or be required to pay fines for waste or air emissions exceedances. This can reduce revenue potential. As regulations potentially become more stringent, it can increase the cost of compliance, raising capital expenditures needed. The probability and magnitude of this issue is likely to increase in the medium- to long-term as regulation may aim to mitigate the environmental impacts of CAFO operations.

The more litter and animal manure produced, the greater the risk of exposure to non-compliance issues (e.g., due to increased likelihood of lagoon failure/seepage). Having a higher percentage of land managed to conservation standards is likely to indicate a company’s ability to successfully manage the long-term risks associated with degradation of pasture and grazing land. Understanding the amount of production from CAFOs could be useful to analysts as CAFOs can generate significant environmental and social externalities, leading to the potential risk of a company losing its social license to operate.

**SOCIAL CAPITAL**

Social capital relates to the perceived role of business in society, or the expectation of a business’s contribution to society in return for its
license to operate. It addresses the management of relationships with key outside stakeholders, such as customers, local communities, the public, and the government.

As the Meat, Poultry & Dairy industry produces foods for human and animal consumption, food safety and quality is of paramount importance. Strict regulations govern the production of animal products in most markets, and consumer demand is highly dependent on perceptions of food safety. Reporting on the management of issues related to food quality and safety will enable investors to assess whether companies are positioned to deal with evolving regulations as well as public and customer concerns about public health and, ultimately, protect shareholder value.

Food Safety

Meat, poultry, and dairy products are sold directly to consumers as raw food (e.g., milk or eggs) or processed foods. Maintaining product quality and safety is crucial, as contamination by pathogens, chemicals, or spoilage presents serious human and animal health risks. Companies can be impacted through product recalls, damaged brand reputation, and increased regulatory scrutiny. These factors can lower revenues directly through lost sales, and indirectly via consumer aversion to at-risk products and other shifts in consumers’ perceptions of food safety. Furthermore, regulation can lead to higher costs or lost revenues through trade restrictions.

While contamination or food safety issues can arise throughout multiple levels of a company’s value chain, it is often the final branded company that faces the most reputational harm. Companies can better address safety concerns when they arise and mitigate future risks by improving food safety policies and the visibility of their supply chains. The absence of supply chain visibility can result in a waste of resources to mitigate the issue. Company performance in this area can be analyzed in a cost-beneficial way through the following direct or indirect performance metrics (see Appendix III for metrics with their full detail):

- Number of recalls issued, total weight of products recalled;
- Global Food Safety Initiative (GFSI) audit conformance: (1) major non-conformance rate and associated corrective action rate and (2) minor non-conformance rate and associated corrective action rate;
- Percentage of supplier facilities that meet the GFSI requirements; and
- Discussion of markets that ban imports of a registrant’s products.

Evidence

In the U.S., the FDA maintains oversight over food production to ensure proper procedures are followed and to prevent the distribution of unsafe food. Additionally, the FDA oversees product recalls and procedures to remove and correct safety issues when they occur. On January 4, 2011, President Obama signed into law the Food Safety Modernization Act, which allows for FDA oversight of food safety issues in the areas of prevention, inspection and compliance, recall response, and traceability. Importantly, the law expanded the FDA’s ability to issue mandatory recalls of food that it has a reasonable suspicion has been adulterated.

Dean Foods, in its FY2014 Form 10-K discloses risks related to food safety laws, “[i]increased regulatory scrutiny could interrupt distribution of our products, as could be the case in the United States as the FDA enacts regulation pursuant to
the Food Safety Modernization Act of 2011, or force changes in our production processes and our products. Further, if we are found to be in violation of applicable laws and regulations in these areas, we could be subject to civil remedies, including fines, injunctions or recalls, as well as potential criminal sanctions, any of which could have a material adverse effect on our business." In addition, Hillshire Brands stated that, because of the recently enacted Food Safety Modernization Act, the company made capital expenditures to upgrade its facilities to comply with anticipated regulatory requirements.

Dean Foods also discusses the material reputational risks from food contamination, product recalls, and consumer preferences in its FY2013 Form 10-K, stating, “[t]he negative publicity surrounding such assertions regarding our products or processes could materially and adversely affect our reputation and brand image.” It is apparent from this disclosure that companies must consistently maintain high food safety standards.

Food safety concerns present a direct regulatory, business, and reputational risk for companies, which may increase over time. According to Hillshire Brands, “Food safety practices and procedures in the meat processing industry recently have been subject to more intense scrutiny and oversight and future outbreaks of diseases among cattle, poultry, or pigs could lead to further governmental regulation.” Negative food safety events can directly harm a company in multiple ways, resulting in business disruptions and lost profits, added costs from recalls, liability risks, and reputational damage.

Recalls can be significantly detrimental to individual companies. In 2008, the Westland/Hallmark Meat Company of California voluntarily recalled 143 million pounds of beef, the largest beef recall in U.S. history. The cause was fears over BSE, as some of the company’s cows had been filmed being unable to walk, a symptom of the disease; however, the USDA deemed that the health risks were slight. The initial costs of the recall exceeded $116 million for the company, which pushed it into bankruptcy. This highlights the extreme financial outcomes that can arise from food safety and quality issues.

A shift in consumer demand arising from food safety concerns can damage an entire industry in addition to having company-specific impacts. For example, after an August 2010 recall of more than 500 million eggs by a U.S. producer after a salmonella outbreak, negative media attention caused consumer demand to fall. The ensuing drop in demand cost the industry at least $100 million in lost sales in September 2010 alone. A Federal judge later sentenced the owner of the Iowa-based egg producer to three months in prison and assessed a $100,000 fine for misdemeanor charges related to violations that led to the recall.

In February 2014, at the request of the Food Safety and Inspection Service, Rancho Feeding Corporation of California recalled 8.7 million pounds of beef from “diseased and unsound” animals that had not been properly inspected by the USDA. This was a Class I USDA recall, which “is a health hazard situation where there is a reasonable probability that the use of the product will cause serious, adverse health consequences or death.” The USDA’s Office of the Inspector General has launched a criminal investigation into the company, which has voluntarily shut down operations.

Food safety issues may arise during the production or processing phase. Companies must
follow strict regulatory guidelines to ensure safety. However, inadvertent contamination has and will continue to occur periodically. It can result in costly recalls or bans on sales of products in different markets and tarnish the public’s perception of the meat industry. One well-known example is that of bovine spongiform encephalopathy (BSE), or mad cow disease. Following the discovery of BSE in cattle in Washington State in December 2003, 53 countries banned imports of all U.S. beef. A study by researchers at the Kansas State Department of Agriculture and Kansas State University found that the bans led to U.S. beef industry revenue losses of between $3.2 and $4.7 billion in 2004. The U.S. beef industry's exports plunged by 82 percent from 2003 levels. Company disclosures also allude to the effects of disease outbreaks. Hillshire Brands states in its FY2013 Form 10-K, “[t]he outbreak of disease could adversely affect our supply of raw materials, increase the cost of production and reduce operating margins. Additionally, the outbreak of disease may hinder our ability to market and sell products.” This highlights the potential for reducing external risks by having insight into a company’s supply chain.

As food safety issues can arise throughout a company’s value chain, companies that implement traceability systems in operations may be better able to mitigate negative outcomes when food safety incidents occur. For example, Canada has established a traceability system for cattle, which helped save thousands of cattle during a mad cow disease scare. The system was able to determine which farms the cattle came from and which animals had come in contact with infected animals, helping to avoid the traditional approach of killing off an entire herd. Implementing visibility into the sourcing of ingredients for companies has multiple benefits beyond those discussed above, including protecting a company’s reputation, improving a company’s agility in mitigating risks from suppliers, and improving consumer confidence.

**Value Impact**

Potential problems with food safety and quality present revenue and extraordinary expense risks. Product recalls or cases of food contamination can harm brand reputation, lowering revenues as consumers scale back spending on certain products or brands. These problems could also damage future revenue growth. More rigorous regulations may require capital expenditures, such as facility upgrades or research and development (R&D) investments, to meet stringent safety standards. Frequent food safety cases may result in contingent liabilities and higher cost of capital, while acute, high-impact food safety events could result in insolvency. Improvements in supply chain visibility can help to increase a company’s agility by targeting issues more quickly, and helping to reduce wasted resources and unnecessary efforts to mitigate issues.

The ability to minimize recalls is an indication of the quality of governance over food safety concerns. High GFSI standards non-conformance rates and low corrective action rates could indicate risks to food safety, which could lead to recalls, lost contracts, and remediation costs. Disclosure around suppliers’ food safety programs can help to highlight food safety risks within a company’s supply chain that can influence final products. A list of markets banning the import of a registrant’s products could indicate that a company is not meeting global expectations about quality and food safety.

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HUMAN CAPITAL

Human capital addresses the management of a company’s human resources (employees and individual contractors) as a key asset to delivering long-term value. It includes factors that affect the productivity of employees, such as employee engagement, diversity, incentives, and compensation, as well as the attraction and retention of employees in highly competitive or constrained markets for specific talent, skills, or education. It also addresses the management of labor relations in industries that rely on economies of scale and compete on the price of products and services. Lastly, it includes the management of the health and safety of employees and the ability to create a safety culture within companies that operate in dangerous working environments.

Animal rearing and processing is perilous, and exposes workers to dangerous machinery, chemicals, emissions, and waste, as well as transportation hazards. A strong company safety culture is critical to proactively guard against accidents, to protect employee health and safety, and to create a culture of safety for employees at all levels of the organization, which can directly influence the financial results of its operations.

Workforce Health & Safety

The Meat, Poultry & Dairy industry has relatively high injury rates compared with those in other industries. Industry safety data also indicate persistently high accident and fatality rates. Common hazards include falls, transportation accidents, heat, asphyxiation, exposure to hazardous chemicals, and machinery injuries.

Exposure to hazardous air emissions, including particulate matter dust in CAFO operations, may increase the risk of chronic illnesses, while workers can fall ill from pathogens when handling meat or animal waste. Furthermore, the use of antibiotics in animal production may contribute to the emergence of antibiotic-resistant pathogens in the workplace, possibly resulting in acute or chronic worker illnesses.

Worker injuries or fatalities can lead to negative publicity, low worker morale, and increased health care and injury compensation costs. Additionally, in the U.S., OSHA has the authority to levy fines against companies for noncompliance with worker health and safety standards, as well as preventable accidents, and can require remedial action such as employee training. Company health and safety performance can be analyzed in a cost-beneficial way through the following direct or indirect performance metrics (see Appendix III for metrics with their full detail):

- (1) Total recordable injury rate (TRIR) and (2) fatality rate; and
- Description of practices to monitor for and mitigate chronic and acute health conditions.

Evidence

The various subsegments of this industry have different injury rates. According to 2013 data from the U.S. Bureau of Labor Statistics (BLS), dairy product manufacturing (NAICS 3115) had an injury rate of 5.7 per hundred employees, animal slaughtering and processing (NAICS 3116) had a rate of 5.7, cattle ranching and farming (NAICS 1121) had a rate of 6.1, hog and pig farming (NAICS 1122) had a rate of 6.8, and poultry and egg production (NAICS 1123) had a rate of 5.1. All of these averages are at least 45 percent higher than the average across all industries of 3.5. The higher NAICS level industry, animal production (NAICS 311), had an illness and injury incidence rate of 6.2 per 100,000 full-time-equivalent U.S. workers in
2012, the highest of all U.S. industries. The
industry experienced 150 fatalities in 2012, 21.7
percent of the total fatalities for the BLS Natural
Resources and Mining sector. Violations of
health and safety standards may result in
regulatory fines, with repeated infractions
resulting in increased fines. For example, in
2007, OSHA cited Tyson Foods for repeated
violations of health and safety codes as a result
of the agency’s Site-Specific Targeting Program,
which inspects facilities in industries with
histories of high injury and illness rates, including
the Meat, Poultry & Dairy industry. OSHA
proposed fines of around $340,000 for repeated
violations of safety and health standards. For
this reason, companies like Tyson often highlight
their safety performance in sustainability reports.
Tyson reported that it had a 5.9 percent
reduction in its Days Away, Restricted, and
Transfer Rate between 2009 and 2013, meaning
that its workers were likely able to be more
productive.

Fieldworkers, farmers, and plant workers may
also be exposed to harmful chemicals, waste,
pathogens, and particulate emissions, which may
cause chronic illness and lead to lawsuits. For
example, Tyson Foods paid roughly $4 million in
a regulatory penalty and had to establish a risk
management program after violating safety
regulations between 2006 and 2010. During that
time, workers were exposed to high levels of
ammonia at multiple facilities, which resulted in
dozens of injuries and at least one death and left
one worker with chemical burns on more than
25 percent of his body. It was found that the
company failed to comply with safety procedures
and appropriately train employees on how to
manage spills. The company has since developed
an audit system to ensure that its plants are in
compliance with ammonia regulations. Similarly, in 2013, OSHA fined Pilgrim’s Pride
$170,000 by for exposing workers to unsafe
levels of ammonia. In its FY2014 Form 10-K,
Pilgrim’s Pride disclosed, “[w]e have from time to
time had incidents at our plants involving worker
health and safety. These have included ammonia
releases due to mechanical failures in chiller
systems … We have taken preventive measures
in response.”

Chronic illness among workers may also result in
increased health care-related expenses for
companies and decreased worker productivity.
Studies have found that particulate matter
emissions from CAFO operations increase
workers’ risk of developing respiratory ailments,
including chronic bronchitis, obstructive airways
disease, and interstitial lung disease. Other
emissions, including ammonia, can result in
fatigue, eye and lung irritation, headaches,
nausea, and chest tightness. Hydrogen sulfide,
considered by the National Institute for
Occupational Safety and Health (NIOSH) to be “a
leading cause of sudden death in the
workplace,” is generated in CAFO manure
storage pits. NIOSH has documented cases of
worker fatalities due to exposure to hydrogen
sulfide in manure pits.

In addition, because of the use of antibiotics in
animal production, workers may be exposed to
antibiotic-resistant pathogens. A study of
airborne concentrations of resistant bacteria at
CAFOs found levels of bacteria high enough to
present a human health risk in and near CAFO
facilities. Further, more than 70 studies have
shown negative health outcomes in workers at
hog CAFOs, 25 percent of whom experienced
forms of respiratory illness. Other studies found
worsened respiratory health among workers at
caged poultry facilities, and that six or more
years of working in poultry facilities placed
workers at risk for chronic health problems.
These impacts may partly be a result of lax air
toxin exposure regulations, as many CAFO
operations do not have occupational exposure limits.\textsuperscript{125}

**Value Impact**

Violations of health and safety standards could result in monetary and regulatory penalties, which can lead to extraordinary expenses and contingent liabilities. Companies could also have to increase their operating expenditures for corrective actions, which would have an impact on company profitability. These violations could also increase company health care costs and decrease worker productivity.

Employee lawsuits from exposure related to both regulated and unregulated but known hazardous substances could lead to similar impacts. Chronic worker injuries and fatalities may reduce overall worker productivity, which could present ongoing operational risks that reduce company output.

Comparing TRIR, fatality rate, near miss frequency rate, and company policies regarding practices related to acute and chronic employee health concerns allows for peer-to-peer comparison of companies’ safety performance. This comparison can show a company’s relative exposure to litigation and regulatory risks related to workplace safety.

**BUSINESS MODEL AND INNOVATION**

This dimension of sustainability is concerned with the impact of environmental and social factors on innovation and business models. It addresses the integration of environmental and social factors in the value-creation process of companies, including resource efficiency and other innovation in the production process. It also includes product innovation and efficiency and responsibility in the design, use phase, and disposal of products. It includes management of environmental and social impacts on tangible and financial assets—either a company’s own or those it manages as the fiduciary for others.

The Meat, Poultry & Dairy industry is subject to a high degree of regulatory and social scrutiny. Trends surrounding the use antibiotics in animal production and animal welfare and treatment during production are of increasing concern to consumers. Key factors include the use of human antibiotics in feed and the animals themselves, the use of vaccines, and the humane treatment of animals. These factors, if improperly managed, can affect brand reputation and revenue.

**Antibiotic Use in Animal Production**

The use of antibiotics to boost the growth of livestock and improve the output of animal production is becoming an increasing concern among consumers and is leading to regulatory scrutiny over animal production. Humans can become exposed to resistant strains of bacteria from the use of some antibiotics through a number of sources that are linked back to animal production. For example, these bacteria can be spread to humans through consumption of contaminated meat, through farmworkers and meat handlers, and through animal waste leaching into soil and water.\textsuperscript{126} Some industry groups, such as the National Chicken Council, contest that much antibiotic resistance is the result of the over prescription of antibiotics to humans. However, it is working with its members to phase out antibiotics that are considered critical for human health purposes.\textsuperscript{127}

While the use of antibiotics in animal feed or water supplies can improve the output of animal production, meat, poultry, and dairy companies
must balance the positive benefits with the potential negative long-term health and safety impacts on consumers. There is little debate that antibiotics can be used on sick animals for medical reasons. The problem lies in isolating the sick animals in often-crowded production facilities. It is worth noting that there is an inherent link between antibiotic use and the Animal Care & Welfare issue, discussed below. The subtherapeutic use of antibiotics allows for the closer animal quarters associated with CAFOs.

Growing consumer and regulatory pressure are challenging the business model of the industry and are likely to shift competitive dynamics going forward. This issue is facing increasing regulatory scrutiny in the U.S. and has started to be addressed in the E.U. since 2006. Oftentimes, companies in the industry supply contractors with animal feed containing antibiotics, which provides them with direct control over this issue. In other cases where companies get supplies from third-parties, they can select and specify suppliers that do not use antibiotics in animal raising. Company performance in this area can be analyzed in a cost-beneficial way through the following direct or indirect performance metrics (see Appendix III for metrics with their full detail):

- Percentage of animal production that receives (1) medically important antibiotics and (2) nontherapeutic antibiotics.

Evidence

Pharmaceuticals, including antibiotics, are commonly added to animal feed to increase animal growth. Antibiotics were introduced at low levels into animal production in the 1950s, when it was found that they contributed to the improved growth and production of animals. Today, it is estimated that 70 percent of all antibiotics used in the U.S. are given to farm animals, much of them for nontherapeutic purposes.\(^{128}\) This practice helps compensate for many of the unsanitary conditions associated with CAFO’s.\(^ {129}\) Studies suggest that the prevalence of antibiotics in animal production contributes to the rise of antibiotic-resistant strains of pathogenic bacteria in animal products. This presents a human health risk as bacteria have become resistant to human antibiotics, making disease treatment much more difficult when a person becomes infected. Based on 1998 estimates, antibiotic-resistant bacteria increased health care costs by $5 billion a year.\(^ {130}\)

Consumers are becoming increasingly concerned about the use of antibiotics in animal production and the possible human health consequences. A 2012 Consumer Reports survey found that 72 percent of Americans are extremely or very concerned with the presence of antibiotics in animal feed.\(^ {131}\) According to research firm IRI, sales of antibiotic-free chicken rose by 25 percent during 2014, representing 11 percent of all chicken sales.\(^ {132}\) Tyson acknowledged this in a 2015 investor call, when it noted that “the consumer is changing … they want less antibiotics.”\(^ {133}\) This highlights the dynamic of balancing increasing customer demand for antibiotic-free products with operational efficiency.

Policymakers are responding to these concerns. The E.U. banned the use of antibiotics as farm animal growth promoters in 2006.\(^ {134}\) In December 2013, the FDA announced a plan to phase out the use of widespread low-dose antibiotics for weight-gaining purposes during the production of cows, chickens, and swine.\(^ {135}\) In June 2015, the FDA issued a new directive that veterinarians must prescribe animals antibiotics starting in December 2016 for any purpose, allowing much stricter governmental
control over the use of these medicines; previously, antibiotics were available over the counter. However, these laws don’t necessarily mean the end of this public health issue, as there is concern among some stakeholders that there will be loopholes in the definitions of medically acceptable uses.

It is unclear exactly how this will play out, although a study by the World Health Organization found that the antibiotic ban by the Danish—who led the charge in the E.U. around this issue—slightly increased production, significantly lowered antibiotic resistance, and had a negligibly small impact on the livestock and poultry-heavy Danish economy (a 0.3 percent GDP reduction overall). While direct causal effects are difficult to measure, the study noted, among other things, that after the ban, average pig birth rates had risen, which is a key indicator of animal health. These production benefits will not be evenly distributed, and companies with robust protocols and hygienic practices will have the most to gain for these regulatory changes. Danish companies that continued to be successful after the ban improved their practices by, for example, cleaning animals’ spaces more frequently and providing better ventilation.

Regulatory concerns over antibiotic use can also affect company revenues through impacts on government purchases. In partnership with more than 150 other stakeholder organizations, President Obama signed a presidential memorandum in 2015 asking all federal departments and agencies to have protocols put in place that prefer sourcing meat products that adhere to “responsible”—meaning, not subtherapeutic—uses of antibiotics. These efforts attempt to catalyze widespread private-sector involvement, which, if successful, would increase the potential market share for companies that can efficiently deliver meat raised in this way.

The use of antibiotics in animal production may also present challenges with selling products internationally, as many countries have begun to ban or limit the imports of animal products produced with antibiotics. Russia has banned imports of U.S. beef and pork over concerns about the use of ractopamine, an antibiotic used to increase animal leanness and weight. The drug was approved for swine in the U.S. in 1999.

Health and safety concerns have begun to influence demand from key customers of the Meat, Poultry & Dairy industry. Buyers, including McDonald’s, have eliminated meats treated with antibiotics from their supply chain. Walmart has asked its meat suppliers to reduce the use of antibiotics and to provide annual reports on their progress.

The response from large chicken producers to customer concern over the continued use of nontherapeutic levels of antibiotics has been mixed. Tyson Foods plans to stop using antibiotics in its chickens by 2017, and the company has already reduced antibiotic use in broiler chickens by more than 80 percent between 2011 and 2015. Tyson Foods also committed to only using antibiotics as a last resort when animals are sick. This also allows it access to new markets, especially important as, between January 2014 and January 2015, sales of antibiotic-free chicken increased by 25 percent. At the same time, Sanderson Farms, the third-largest poultry producer, has been reluctant to reduce the use of antibiotics in chicken production, as its CEO believes it will result in higher rates of bird mortality, leading to significant costs.
Value Impact

For meat, poultry, and dairy producers, the use of antibiotics in animal production presents reputational and regulatory risks, both of which can affect long-term profitability through impacts on demand and market share. As demand for antibiotic-free products and overall demand for meat, poultry, and dairy products increases, producers are pressured to balance both the positive and negative effects of non-therapeutic antibiotic use to meet demand.

Companies that can effectively balance these tradeoffs have a competitive advantage, leading to an improved reputation and higher rates of customer retention, which increase sales. The probability and magnitude of this issue are likely to grow as customers continue to worry about the use of antibiotics in their food, and countries are beginning to establish regulation on antibiotics use in animal production.

Disclosure around the percentage of animals receiving sub-therapeutic doses of antibiotics highlights a company’s exposure to regulation limiting this practice.

Animal Care & Welfare

Issues concerning animal treatment and the methods by which animals are raised are increasingly under public and regulatory scrutiny. In recent years, consumers have shifted demand away from specific production methods such as the use of gestation crates, and other small caged enclosures that threaten animal health and welfare.

In the U.S., farm animals are largely excluded from federal and state animal welfare laws, including the Animal Welfare Act. Thus, many of the industry’s actions to improve animal welfare have come after consumer and advocacy group action. Since this issue can arise throughout a company’s value chain and harm a company’s reputation, many companies have begun to address it both within their own direct operations and in those of their third-party suppliers, which is discussed in greater detail in the issue Environmental & Social Impacts of Animal Supply Chains, below.

Animal care and welfare present both revenue and regulatory risks. Increasing consumer concern over the inhumane treatment of animals raised for food production is driving the industry to adopt new welfare and treatment standards. Modern animal production facilities are highly efficient, yet often contain adverse conditions for animals that can lead to customer backlash. Additionally, animals are fed and housed in close proximity to one another and in the same facility, increasing the risk of animal diseases and perpetuating other health effects that can threaten animal well-being and producer output. Company performance in this area can be analyzed in a cost-beneficial way through the following direct or indirect performance metrics (see Appendix III for metrics with their full detail):

- Percentage of pork produced without the use of gestation crates;
- Percentage of cage-free shell egg sales; and
- Percentage of production certified to a third-party animal welfare standard.

Evidence

The inhumane treatment of animals can result in significant reputational risks for the industry, possibly affecting demand. Undercover investigations and videos have shown that animals are often mistreated and have resulted in negative publicity for branded food companies and a loss of customers. For example, McDonald’s dropped its egg supplier, Sparboe...
Farms, after a video was released showing inhumane treatment of animals and unsanitary conditions that led to food safety concerns.147

In their SEC filings, companies recognize the growing pressure from outside organizations over the treatment of animals and the potential material harm it may cause to operations. Cal-Maine Foods, a large producer of eggs, stated in its FY2014 Form 10-K, “[p]ressure from animal rights groups regarding the treatment of animals may subject us to additional costs to conform our practices to comply with developing standards or subject us to marketing costs to defend challenges to our current practices and protect our image with our customers.”148

Companies recognize consumer concerns over the treatment of animals and offer products that meet these demands. For example Cal-Maine Foods offers specialty products for consumers who are sensitive to animal welfare issues. The company stated in its FY2014 Form 10-K, “[f]or fiscal 2014, specialty eggs accounted for 24.4% of our shell egg dollar sales and 17.2% of our shell egg dozens sold, as compared to 23.7% of shell egg dollar sales and 16.4% of shell egg dozens sold in fiscal 2013.”149 The company additionally stated that these products are higher margin and have prices that are less cyclical, as consumers are willing to pay more for the increased benefit of these products.150

Large business customers of the Meat, Poultry & Dairy industry are beginning to require strict animal treatment guidelines from their protein suppliers. Wal-Mart, the largest food retailer, has established guidelines to limit the use of pig gestation crates and other restrictive space methods for raising animals, as well as to reduce painful procedures such as de-horning or castration without painkillers. Experts believe these guidelines will have a widespread effect on the meat industry and become a blueprint for other retailers.151

Tyson Foods’ animal well-being program FarmCheck establishes strict procedures to follow for improving animal treatment and welfare. Under the program, the company undertakes on-farm third-party audits, has established an advisory panel of animal well-being experts, and ensures that staff members are aware of proper procedures and report any mistreatment violations.152

Animal welfare has become a concern for investors, as negative publicity can affect companies’ reputation. In 2013, the Humane Society of the United States and Green Century Capital Management jointly filed a shareholder resolution with Tyson Foods requesting that the company disclose financial and operational risks stemming from the use of gestation crates in hog production. The shareholders were concerned that Tyson’s use of the crates threatened the company’s reputation and market share, as consumers increasingly demand higher welfare standards.153

Legislation has already begun to challenge the treatment of animals in some states. In California, voters passed Proposition 2, which requires that eggs sold in the state come from chickens that have enough room to fully spread their wings and move around. The new law requires farmers to almost double the space per chicken, which requires costly upgrades or reduced flock sizes.154

**Value Impact**

Animal welfare and care issues can generate negative publicity, driving consumer demand away from certain products and increasing costs to correct issues and mitigate negative reputational damage. These issues directly lower
revenue, and in turn, profitability. Repeated negative publicity could cause a company to lose market share. Additionally, increasingly stringent animal care and welfare regulations could require changes to animal raising methods, which could raise operating costs or require capital and R&D expenditures. On the other hand, companies using the most sustainable farming techniques will likely experience a stronger demand for their products, which may strengthen their pricing power in the short- to medium-term.

Increased concerns from customers, investors, and regulators over the treatment of animals, along with the proliferation of social media, are likely to increase the probability and magnitude of this issue for the industry in the future.

Disclosure around metrics related to animal care and welfare can be used by analysts to understand the percentage of a company’s products that meet growing customer and regulatory expectations.

LEADERSHIP AND GOVERNANCE

As applied to sustainability, governance involves the management of issues that are inherent to the business model or common practice in the industry and are in potential conflict with the interest of broader stakeholder groups (government, community, customers, and employees). They therefore create a potential liability, or worse, a limitation or removal of license to operate. This includes regulatory compliance, lobbying, and political contributions. It also includes risk management, safety management, supply chain and resource management, conflict of interest, anti-competitive behavior, and corruption and bribery.

This industry’s supply chain is extensive. It includes animal farmers and crop farmers, who provide animals and feed ingredients. Suppliers operate internationally and face many of the same environmental and social issues mentioned in this brief. Furthermore, climate change is expected to unfavorably affect some of the industry’s factors of production, such as the cost of animal feed, as well as threaten animal production in specific regions. Maintaining oversight of potential risks associated with environmental and social risks in the supply chain can mitigate sourcing risks and help protect long-term business value.

Environmental & Social Impacts of Animal Supply Chains

Many companies supplement their own raising of animals with those from outside farmers or other corporations that have rearing operations, and thus many of the previously discussed environmental and social impacts exists within the industry’s supply chain. Negative environmental and social impacts will therefore likely affect animal products companies both through their supply chains as well as in their direct operations, as discussed previously in this brief. Specifically, companies can be exposed to sourcing and reputational risk as a result of negative impacts in their suppliers’ operations. Some of these impacts include deforestation, land use and waste management, water withdrawals, and animal treatment. Other issue within supplier operations include food safety and antibiotics use, the financial and performance implications of which are discussed under those respective disclosure topics.

Additionally, climate change risks present a long-term challenge for the Meat, Poultry & Dairy industry. The global presence of top companies in this industry heightens the probability of
diverse physical impacts of climate change within supply chains. Warmer average global temperatures are expected to contribute to a wide variety of climatic outcomes, including variations in precipitation patterns, temperature extremes, and more frequent severe storms. These can cause changes in crucial factors of production for animal raising and processing, including grasslands and water. Impacts on the quality of grassland pasture could negatively impact the productivity of pasture-fed animals. Furthermore, climate change is expected to increase the number and range of animal diseases and pests, while temperatures beyond the normal ranges for animals can affect their health.

Managing environmental risks within a company’s supply chain is critical to securing a steady source of animals at reasonable costs, while managing social risks can prevent reputational damage and impacts on demand from the inhumane treatment of animals. Company performance in this area can therefore be analyzed in a cost-beneficial way through the following direct or indirect performance metrics (see Appendix III for metrics with their full detail):

- Percentage of livestock from suppliers implementing NRCS Conservation Plans or the equivalent;
- Percentage of contract producers in regions with High or Extremely High Baseline Water Stress;
- Percentage of supplier and contract production facilities verified to meet animal welfare standards; and
- Discussion of strategy to manage opportunities and risks to livestock supply presented by climate change.

Evidence

The Meat, Poultry & Dairy industry creates many environmental externalities through its large use of land. Grazing lands make up 26 percent of Earth’s terrestrial surface, with cattle grazing contributing to a large portion of deforestation. For example, nearly 70 percent of the Amazon region’s forest has been converted to animal pasture, while crops for animal feed occupy much of the remainder. Globally, biodiversity is threatened by an expected increase in pastureland. Twenty-three of Conservation International’s 35 “global hotspots for biodiversity” and 306 of the Worldwide Fund for Nature’s 825 terrestrial eco-regions under threat are directly affected by livestock production. Deforestation contributes to biodiversity loss through habitat fragmentation, more opportunities for propagation of invasive plant species, and increased prevalence of destructive fires. Much of the deforestation associated with grazing land is attributable to the raising of cattle for beef production.

Beef companies generally do not own their own animals, so the risks from deforestation generally occur in a company’s supply chain. For example, Brazilian-based JBS S.A., the largest meat processor in the world, has been accused of failing to source its beef in accordance with its ethical standards. The company was criticized for failing to follow its own sourcing pledges by obtaining animals from at least five farms that were found by the Brazilian government to be illegally contributing to deforestation of the Amazon rain forest. Detrimental impacts from deforestation present challenges for the future of the industry and can lead to reputational risks for large companies that are seen as contributing to deforestation. According to a CDP report, 46 percent of cattle products companies recognized the reputational risks from deforestation as material.
Large companies have begun facing pressure from customers, non-governmental organizations, and regulators and have signed pledges to monitor their suppliers and end their contributions to deforestation. In 2009, large Brazilian meat producers JBS, Minerva, Marfrig, and Bertin committed to not buying cattle from newly deforested land in the Amazon. JBS began monitoring more than 60,000 cattle suppliers and conducting independent audits to ensure that they follow the environmental and social standards set by the company. As this issue can present large, headline-garnering reputational risks for customers of companies in the Meat, Poultry & Dairy industry, in addition to the companies themselves, many large industry customers such as McDonald’s and Walmart have begun demanding that their beef suppliers monitor and reduce their contributions to deforestation.

Climate change and the associated shifting weather patterns present risks for livestock health that threaten supplies in exposed regions. Cattle and hog farmers are likely more exposed to these issues than chicken farmers as cattle and hogs may not be sheltered. Livestock respond rapidly to temperature changes. Hot and cold extremes can cause animal fatalities, while sustained temperatures outside an animal’s accustomed range can cause it to expend energy and change feeding habits to maintain constant body temperature, negatively affecting health, and, in turn, reducing productivity and reproduction. Heat waves in the central U.S. in the 1990s caused concentrated cattle operations to lose more than 100 heads of cattle, while severe winters led to the loss of more than 1,000 heads in some feedlots. In 1992 and 1997, severe snowstorms lead to the deaths of more than 30,000 cattle in the southern plains of the U.S. Higher temperatures caused by climate change are the primary cause of the increased prevalence of mycotoxins in animal feed, a toxic fungal byproduct that can cause disease and death.

Climate change is likely to exacerbate variability in global weather patterns, which can have direct impacts on livestock production and performance. Long-term research by the California Air Resources Board has found that by 2050, the average Sierra Nevada snowpack, which supplies much of the state’s water, may decline by as much as 40 percent. This could both affect the availability of surface water for animal consumption and reduce the health of natural pasture grasses. In summer 2012, during the most severe U.S. drought in decades, approximately half of all livestock production was in areas of severe to extreme drought, while an additional 18 percent was in areas of moderate drought.

California cattle ranchers have faced difficulty in the midst of the recent drought, as grass has become stunted and creeks have run dry. These conditions have forced many farmers to move their herds to other states less affected by the adverse conditions. Over a four-month period in 2014, it was estimated that more than 100,000 cattle had been shipped out of the state. The National Beef Packing Co.’s California plant was forced to shut down because of the limited supply of cattle in the region. Previously, the facility had accounted for roughly 2 percent of the entire U.S. slaughter capacity. This exodus of cattle highlights the dramatic effects that shifting weather patterns can have on regional livestock production, with a potential for significant disruptions to operations of meat, poultry, and dairy companies.

Companies recognize climate risk in their operations and supply chains. BRF S.A., a large Brazilian beef producer, stated in its FY2014
Form 20-F, “[w]e consider the potential effects of climate change when evaluating and managing our operations and supply chain, recognizing the vulnerability of natural resources and agricultural inputs that are essential for our activities.” The company further highlighted the risk to animal productivity and raw material sourcing from the supply chain by stating, “[t]he main risks we have identified relate to the alterations in temperature (average and extreme) and changes in rainfall (average and extreme, such as drought, flooding and storms), both of which could affect agricultural productivity, the quality and availability of pasture areas, animal wellbeing and the availability of energy. These changes could have a direct impact on our costs, raising the price of agricultural commodities as a result of long periods of drought or excessive rainfall, [and] increasing operating costs to ensure animal wellbeing.”

Meat, poultry, and dairy companies may benefit from ensuring that their suppliers follow best practices for reducing the environmental and social impacts of raising animals and managing climate issues. BRF S.A. stated its supplier criteria in its FY2013 20-F, highlighting key sustainability issues, “[t]he evaluation process often involves the simultaneous consideration of several important supplier performance attributes that include ... the supplier’s social and environmental policies and performance.” Tyson Foods also aims to select its supply partners through criteria including environmental protection and resource conservation, product safety and quality, animal welfare, labor and human rights, employee health and safety, and business ethics. Similarly, Hillshire Brands is currently evaluating all its suppliers on key environmental metrics, including emissions, water use, and waste management. Supplier performance on these issues, such as water withdrawal, can have a direct influence on a company’s costs if its suppliers are negatively affected by these issues.

In 2014, a shareholder resolution filed with Dean Foods by Mercy Investment Services requested that the company require its dairy suppliers to regularly report water use (including in feed production), manure management, energy use, and GHG emissions. Dean Foods purchases more than $5 billion worth of unprocessed milk annually from more than 10,000 dairy farmers. The resolution received only 4.7 percent of votes, but illustrates shareholder concern with environmental impacts in the supply chain. In the meantime, the company is in the process of developing animal welfare standards and lifecycle assessments for environmental impacts in its dairy supply chain.

BRF S.A. has implemented initiatives to adapt to climate change and remain competitive by introducing “technological innovations in the animal-raising installations to improve the environment and acclimatization and safeguard the animal’s wellbeing.”

Additionally, meat, poultry, and dairy companies that source a large part of their products from third-party suppliers can be directly exposed to reputational risks from the poor treatment of animals. Tyson Foods upgraded its supplier policies and dropped one of its suppliers of its pork products after undercover videos were released showing evidence of animal cruelty at the pork supplier. As consumers are becoming increasingly concerned with how animals are raised, Tyson Foods’ established its FarmCheck program to monitor supplier performance on animal welfare standards. The company regularly audits supplier facilities to reduce the risks and ensure the proper treatment of animals outside of its direct control.
**Value Impact**

Climate change may disrupt animal production through increased variations in precipitation and temperature, causing animal losses and heightened the prevalence of animal diseases. Climate change presents a long-term, chronic risk to the industry’s ability to maintain animal inventories, stable supplies of animals, or animal products for processing. Inventory reduction can directly lower future revenues while impacts on suppliers can raise purchasing costs, lowering margins and profitability.

Meat and poultry producers that are able to successfully adapt to climate change challenges in their animal supply chains are more likely to achieve competitive advantage and strengthen their risk profiles, resulting in a positive long-term impact on their costs of capital. The probability and magnitude of the risks associated with this issue will increase as environmental issues associated with climate change are likely to grow in the long term. Additionally, understanding supplier performance on environmental and social issues could provide insight into operational challenges that may harm a company’s supply of animals, which could increase costs and resources needed to switch suppliers as well as present reputational risks.

Disclosure around a company’s percentage of livestock from suppliers implementing NRCS conservation plans (or the equivalent) can highlight suppliers’ performance on environmental standards. A higher percentage of contract producers in water-stressed regions could indicate supply and price risks in the future if the area faces increasing water shortage.

Having a high percentage of suppliers’ facilities verified to meet animal welfare standards is likely to reduce the magnitude of material impacts from instances of non-compliance. High levels of non-compliance could force a company to terminate supply contracts and/or cause a loss of customer contracts. Discussion around climate change strategy can help indicate the level of risk of production shortages and stoppages in the future.

**Environmental Risks in Animal Feed Supply Chains**

The animal feed supply chain for meat, dairy, and poultry producers is exposed to environmental issues that can affect the industry’s ability to source animal feed efficiently and economically, which can threaten companies’ long-term ability to operate. Climate change and increasing water scarcity can affect the production of animal feed, with a possible significant impact on feed availability and pricing that reduces company profitability. Animal feed represents a significant proportion of animal raising costs.

Companies can mitigate these risks by monitoring their feed supply chains for long-term impacts associated with climate change, source from suppliers managing these risks well, and attempt to hedge short-term price fluctuations. Company performance in this area can therefore be analyzed in a cost-beneficial way through the following direct or indirect performance metrics (see Appendix III for metrics with their full detail):

- Percentage of feed sourced from regions with High or Extremely High Baseline Water Stress; and

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* Companies in the Meat, Poultry & Dairy industry generally do not grow or produce their own animal feed. The animal feed segment is included in SASB’s Agricultural Products industry.
Discussion of strategy to manage opportunities and risks to feed sourcing presented by climate change.

Evidence

Climate change is expected to have an impact on the crops that supply the industry’s feed. The supply of feed is largely corn-based; in the U.S., 87 percent of corn is grown in areas of high or extremely high water stress, highlighting the challenges and potential supply disruptions for the industry. Drought in California has severely stressed the region’s feed supply, driving up prices and forcing many cattle ranchers to move herds to less affected regions, as discussed previously. Prices for alfalfa hay, which is grown in California, rose by 40 percent between January and July 2014.

The supply chain presents an operating risk for meat, poultry, and dairy companies, primarily due to feed purchases. Feed comprises between 20 and 50 percent of the production cost of beef cattle, hogs, and dairy cows. Companies are thus highly exposed to changes in availability and pricing of animal feed. For example, Tyson Foods in its FY2013 Form 10-K stated, “[c]orn, soybean meal and other feed ingredients are major production costs for vertically-integrated poultry processors such as us, representing roughly 71% of our cost of growing a live chicken in fiscal 2013. As a result, fluctuations in prices for these feed ingredients, which include competing demand for corn and soybean meal for use in the manufacture of renewable energy, can adversely affect our earnings.” Additionally, the company recognizes the potential effects weather patterns can have on available supplies.

Hillshire Brands discussed the effects of climate change on animal feed supply in its FY2013 Form 10-K, stating, “[c]limate change could affect our ability to procure needed commodities at costs and in quantities we currently experience and may require us to make additional unplanned capital expenditures.” Additionally, WhiteWave Foods recognized this risk in its FY2014 Form 10-K, stating, “[a] substantial portion of our raw materials are agricultural products, which are vulnerable to adverse weather conditions and natural disasters, such as severe rains, floods, droughts, frost, earthquakes, and pestilence. Adverse weather conditions and natural disasters also can lower dairy and crop yields and reduce supplies of these ingredients or increase their prices.”

Spikes in feed prices have caused reduced profitability for many companies and even played a role in the bankruptcy filing of Pilgrim’s Pride. High feed prices, low chicken prices, and high levels of debt led to large financial losses for the company, forcing it to file for bankruptcy in December 2008.

Companies can take adaptive steps to help mitigate the negative effects of climate change exposure. For example, BRF S.A. stated in its FY2014 Form 20-F, “[a]mong the initiatives we have taken to reduce our exposure to climate change and to maintain our competitiveness in terms of costs is the monitoring of stocks in grains purchases and the constant monitoring of the weather in agricultural regions to guide buying decisions, as well as anticipating price movements in the commodity markets.”

Some companies attempt to hedge commodity risk exposure, but they recognize it may not be a long-term solution to rising commodity prices. WhiteWave Foods stated in its FY2014 Form 10-K, “[o]ver the past several years, we have experienced increased costs as a result of weather conditions and other events outside of our and our suppliers’ control and this may
continue given recent weather conditions. In addition, we use derivatives to hedge price risk associated with forecasted purchases of certain raw materials; however, our hedged price could exceed the spot price on the date we actually take receipt of the commodity, resulting in an unfavorable impact on both gross margin and net earnings.\textsuperscript{191}

Improved disclosure around monitoring and adaptive strategies to rising commodity costs may provide investors with a better view of the operational and market risks associated with climate change in a company’s animal feed and ingredient supply chain.

**Value Impact**

Meat and poultry companies rely on stable supplies of agricultural inputs. Climate change is also expected to increase the costs of producing animal feed, contributing directly to feed price volatility, and raising purchasing costs. Recurring supply chain disruptions and higher price volatility could harm a company’s credit profile over time, having an impact on a company’s cost of capital. The acceleration of climate change is likely to increase the probability and magnitude of this issue on the industry.

Disclosure around a company’s animal feed supply chain exposure to water shortages and climate change can indicate potential risks for feed supply cost increases or disruptions.
This list includes five companies representative of the Meat, Poultry & Dairy industry and its activities. This includes only companies for which the Meat, Poultry & Dairy industry is the primary industry, companies that are U.S.-listed but are not primarily traded over the counter, and for which at least 20 percent of revenue is generated by activities in this industry, according to the latest information available on Bloomberg Professional Services. Retrieved on May 26, 2015.

<table>
<thead>
<tr>
<th>COMPANY NAME (TICKER SYMBOL)</th>
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<tr>
<td>Tyson Foods, Inc. (TSN)</td>
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<td>Dean Foods (DF)</td>
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<td>Pilgrim’s Pride Corporation (PPC)</td>
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<td>Smithfield Foods, Inc. (SFD)</td>
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<td>Hormel Foods Corporation (HRL)</td>
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APPENDIX IIA
EVIDENCE FOR SUSTAINABILITY DISCLOSURE TOPICS

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<tr>
<th>Sustainability Disclosure Topics</th>
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<th>FORWARD-LOOKING IMPACT</th>
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<td>Workforce Health &amp; Safety</td>
<td>44</td>
<td>96</td>
<td>6</td>
</tr>
<tr>
<td>Antibiotic Use in Animal Production</td>
<td>54</td>
<td>85 ²</td>
<td>4</td>
</tr>
<tr>
<td>Animal Care &amp; Welfare</td>
<td>54</td>
<td>85 ²</td>
<td>4</td>
</tr>
<tr>
<td>Environmental &amp; Social Impacts of Animal Supply Chains</td>
<td>67*</td>
<td>98 ²</td>
<td>7</td>
</tr>
<tr>
<td>Environmental Risks in Animal Feed Supply Chains</td>
<td>67*</td>
<td>98 ²</td>
<td>7</td>
</tr>
</tbody>
</table>

¹During the IWG phase, the issue “Animal Care & Welfare” included a discussion of what now are two separate disclosure topics: “Antibiotic Use in Animal Production” and “Animal Care & Welfare.”

²During the IWG phase, elements of the “Environmental & Social Impacts of Animal Supply Chains” and the “Environmental Risks in Animal Feed Supply Chains” disclosure topics were discussed in two different IWG issues (i.e., “Climate Change Adaptation” and “Supply Chain Management”). IWG scores presented in this table are an average of both.

HM: Heat Map, a score out of 100 indicating the relative importance of the topic among SASB’s initial list of 43 generic sustainability issues. Asterisks indicate “top issues.” The score is based on the frequency of relevant keywords in documents (i.e., 10-Ks, 20-Fs, shareholder resolutions, legal news, news articles, and corporate sustainability reports) that are available on the Bloomberg terminal for the industry’s publicly listed companies. Issues for which keyword frequency is in the top quartile are “top issues.”

IWGs: SASB Industry Working Groups.

%: The percentage of IWG participants who found the disclosure topic likely to constitute material information for companies in the industry. (-) denotes that the issue was added after the IWG was convened.

Priority: Average ranking of the issue in terms of importance. 1 denotes the most important issue. (-) denotes that the issue was added after the IWG was convened.

EI: Evidence of Interest, a subjective assessment based on quantitative and qualitative findings.

EFI: Evidence of Financial Impact, a subjective assessment based on quantitative and qualitative findings.

FLI: Forward-Looking Impact, a subjective assessment of the presence of a material forward-looking impact.
## APPENDIX IIB

### EVIDENCE OF FINANCIAL IMPACT FOR SUSTAINABILITY DISCLOSURE TOPICS

<table>
<thead>
<tr>
<th>Evidence of Financial Impact</th>
<th>Revenue</th>
<th>Operating Expenses</th>
<th>Non-operating Expenses</th>
<th>ASSETS &amp; LIABILITIES</th>
<th>RISK PROFILE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Revenues</td>
<td>Operating Expenses</td>
<td>Non-operating Expenses</td>
<td>Assets</td>
<td>Liabilities</td>
</tr>
<tr>
<td>Market Share</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>New Markets</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Pricing Power</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Cost of Goods</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>CapEx</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Extra-ordinary Expenses</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Tangible Assets</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Intangible Assets</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Contingent Liabilities &amp; Provisions</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Pension &amp; Other Liabilities</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

- **MEDIUM IMPACT**
- **HIGH IMPACT**
## APPENDIX III

### SUSTAINABILITY ACCOUNTING METRICS | MEAT, POULTRY & DAIRY

<table>
<thead>
<tr>
<th>TOPIC</th>
<th>ACCOUNTING METRIC</th>
<th>CATEGORY</th>
<th>UNIT OF MEASURE</th>
<th>CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greenhouse Gas Emissions</td>
<td>Gross global Scope 1 emissions</td>
<td>Quantitative</td>
<td>Metric tons (t), CO₂-e</td>
<td>CN0102-01</td>
</tr>
<tr>
<td></td>
<td>Description of long-term and short-term strategy or plan to manage Scope 1 emissions, emission-reduction targets, and an analysis of performance against those targets</td>
<td>Discussion &amp; Analysis</td>
<td>n/a</td>
<td>CN0102-02</td>
</tr>
<tr>
<td>Energy Management</td>
<td>Total energy consumed, percentage grid electricity, percentage renewable</td>
<td>Quantitative</td>
<td>Gigajoules (GJ), Percentage (%)</td>
<td>CN0102-03</td>
</tr>
<tr>
<td>Water Withdrawal</td>
<td>(1) Total water withdrawn and (2) total water consumed, percentage of each in regions with High or Extremely High Baseline Water Stress</td>
<td>Quantitative</td>
<td>Cubic meters (m³), Percentage (%)</td>
<td>CN0102-04</td>
</tr>
<tr>
<td></td>
<td>Discussion of risks associated with water withdrawal and description of strategies and practices to mitigate those risks</td>
<td>Discussion and Analysis</td>
<td>n/a</td>
<td>CN0102-05</td>
</tr>
<tr>
<td>Land Use &amp; Ecological Impacts</td>
<td>Number of incidents of non-compliance with water-quality permits, standards, and regulations</td>
<td>Quantitative</td>
<td>Number</td>
<td>CN0102-06</td>
</tr>
<tr>
<td></td>
<td>Discussion of risks associated with water discharges and description of strategies and practices to mitigate those risks</td>
<td>Discussion &amp; Analysis</td>
<td>n/a</td>
<td>CN0102-07</td>
</tr>
<tr>
<td></td>
<td>Amount of animal litter and manure generated, percentage managed according to a nutrient management plan</td>
<td>Quantitative</td>
<td>Metric tons (t), Percentage (%)</td>
<td>CN0102-08</td>
</tr>
<tr>
<td></td>
<td>Percentage of pasture and grazing land managed to NRCS Conservation Plan criteria</td>
<td>Quantitative</td>
<td>Percentage by hectares (%)</td>
<td>CN0102-09</td>
</tr>
<tr>
<td></td>
<td>Animal protein production from concentrated animal feeding operations (CAFO)</td>
<td>Quantitative</td>
<td>Metric tons (t)</td>
<td>CN0102-10</td>
</tr>
<tr>
<td>Food Safety</td>
<td>Number of recalls issued, total weight of products recalled*</td>
<td>Quantitative</td>
<td>Number, Metric tons (t)</td>
<td>CN0102-11</td>
</tr>
<tr>
<td></td>
<td>Global Food Safety Initiative (GFSI) audit conformance: (1) major non-conformance rate and associated corrective action rate and (2) minor non-conformance rate and associated corrective action rate</td>
<td>Quantitative</td>
<td>Rate, Percentage (%)</td>
<td>CN0102-12</td>
</tr>
<tr>
<td></td>
<td>Percentage of supplier facilities that meet the Global Food Safety Initiative (GFSI) requirements</td>
<td>Quantitative</td>
<td>Percentage (%)</td>
<td>CN0102-13</td>
</tr>
<tr>
<td></td>
<td>Discussion of markets that ban imports of the registrant’s products</td>
<td>Discussion &amp; Analysis</td>
<td>n/a</td>
<td>CN0102-14</td>
</tr>
</tbody>
</table>

* Note to **CN0102-11**—Disclosure shall include a description of notable recalls, such as those that affected a significant amount of product or those related to serious illness or fatality.
<table>
<thead>
<tr>
<th>TOPIC</th>
<th>ACCOUNTING METRIC</th>
<th>CATEGORY</th>
<th>UNIT OF MEASURE</th>
<th>CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workforce Health &amp; Safety</td>
<td>(1) Total recordable injury rate (TRIR) and (2) fatality rate</td>
<td>Quantitative Rate</td>
<td>Rate</td>
<td>CN0102-15</td>
</tr>
<tr>
<td></td>
<td>Description of practices to monitor for and mitigate chronic and acute health conditions</td>
<td>Discussion &amp; Analysis</td>
<td>n/a</td>
<td>CN0102-16</td>
</tr>
<tr>
<td>Antibiotic Use in Animal Production</td>
<td>Percentage of animal production that receives (1) medically important antibiotics and (2) nontherapeutic antibiotics</td>
<td>Quantitative</td>
<td>Percentage by weight (%)</td>
<td>CN0102-17</td>
</tr>
<tr>
<td></td>
<td>Percentage of pork produced without the use of gestation crates</td>
<td>Quantitative</td>
<td>Percentage by weight (%)</td>
<td>CN0102-18</td>
</tr>
<tr>
<td></td>
<td>Percentage of cage-free shell egg sales</td>
<td>Quantitative</td>
<td>Percentage (%)</td>
<td>CN0102-19</td>
</tr>
<tr>
<td></td>
<td>Percentage of production certified to a third-party animal welfare standard</td>
<td>Quantitative</td>
<td>Percentage by weight (%)</td>
<td>CN0102-20</td>
</tr>
<tr>
<td>Environmental &amp; Social Impacts of Animal Supply Chains</td>
<td>Percentage of livestock from suppliers implementing NRCS Conservation Plans or the equivalent</td>
<td>Quantitative</td>
<td>Percentage by weight (%)</td>
<td>CN0102-21</td>
</tr>
<tr>
<td></td>
<td>Percentage of contract producers in regions with High or Extremely High Baseline Water Stress</td>
<td>Quantitative</td>
<td>Percentage by contract value (%)</td>
<td>CN0102-22</td>
</tr>
<tr>
<td></td>
<td>Percentage of supplier and contract production facilities verified to meet animal welfare standards</td>
<td>Quantitative</td>
<td>Percentage (%)</td>
<td>CN0102-23</td>
</tr>
<tr>
<td></td>
<td>Discussion of strategy to manage opportunities and risks to livestock supply presented by climate change</td>
<td>Discussion &amp; Analysis</td>
<td>n/a</td>
<td>CN0102-24</td>
</tr>
<tr>
<td>Environmental Risks in Animal Feed Supply Chains</td>
<td>Percentage of feed sourced from regions with High or Extremely High Baseline Water Stress</td>
<td>Quantitative</td>
<td>Percentage by weight (%)</td>
<td>CN0102-25</td>
</tr>
<tr>
<td></td>
<td>Discussion of strategy to manage opportunities and risks to feed sourcing presented by climate change</td>
<td>Discussion &amp; Analysis</td>
<td>n/a</td>
<td>CN0102-26</td>
</tr>
</tbody>
</table>
APPENDIX IV: Analysis of SEC Disclosures | Meat, Poultry & Dairy

The following graph demonstrates an aggregate assessment of how representative U.S.-listed Meat, Poultry & Dairy companies are currently reporting on sustainability topics in their SEC annual filings.

<table>
<thead>
<tr>
<th>Type of Disclosure on Sustainability Topics</th>
<th>NO DISCLOSURE</th>
<th>BOILERPLATE</th>
<th>INDUSTRY-SPECIFIC</th>
<th>METRICS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meat, Poultry &amp; Dairy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greenhouse Gas Emissions</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy Management</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Withdrawal</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land Use &amp; Ecological Impacts</td>
<td>96%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food Safety</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workforce Health &amp; Safety</td>
<td>96%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antibiotic Use in Animal Production</td>
<td>85% /1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Animal Care &amp; Welfare</td>
<td>85% /1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental &amp; Social Impacts of Animal Supply Chains</td>
<td>98% /2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Risks in Animal Feed Supply Chains</td>
<td>98% /2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

IWG Feedback*

* Percentage of IWG participants that agreed topic was likely to constitute material information for companies in the industry.

(-) denotes that the issue was added after the IWG was convened.

/1 During the IWG phase, the issue “Animal Care & Welfare” included a discussion of what now are two separate disclosure topics: “Antibiotic Use in Animal Production” and “Animal Care & Welfare”.

/2 During the IWG phase, elements of the “Environmental & Social Impacts of Animal Supply Chains” and the “Environmental Risks in Animal Feed Supply Chains” disclosure topics were discussed in two different IWG issues (i.e. “Climate Change Adaptation” and “Supply Chain Management”). IWG scores presented in this table are an average of both.
REFERENCES

1 Data from Bloomberg Professional service, accessed May 26, 2015, using the ICS <GO> command. The data represent global revenues of companies listed on global exchanges and traded over-the-counter (OTC) from the Meat, Poultry & Dairy industry, using Level 3 of the Bloomberg Industry Classification System.


5 Ibid.


7 Neveill Antal, Industry Report 3116 Meat, Beef, & Poultry Processing in the US.


9 Neveill Antal, Industry Report 3116 Meat, Beef, & Poultry Processing in the US.

10 Author’s calculation based on data from Bloomberg Professional service, accessed May 26, 2015, using the ICS <GO> command. The data represents global revenues of companies listed on global exchanges and traded OTC from the Meat, Poultry & Dairy industry, using Level 3 of the Bloomberg Industry Classification System. Calculation is GAAP net income divided by GAAP revenues.


12 Neveill Antal, Industry Report 3116 Meat, Beef, & Poultry Processing in the US.


14 Neveill Antal, Industry Report 3116 Meat, Beef, & Poultry Processing in the US.


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INDUSTRY BRIEF | MEAT, POULTRY & DAIRY | 45


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137 Tavernise, “F.D.A Restricts Antibiotic Use for Livestock.”


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150 Ibid., p. 4.


156 Ibid.


158 Data from Bloomberg Professional service, accessed June 19, 2015, using the BICS <GO> command.


163 Srinivas, “Brazil Beef Industry Pledges Cut Amazon Deforestation.”


167 “The Effects of Climate Change on Livestock Production,” Pig Site.

168 Hamerschlag, “California’s Climate Change Policy Leaves Agriculture in the Dust.”


167 Huffstutter and Polansek, “Drought Sends California Cattle Packing—to Texas.”


172 Ibid.

173 Ibid., p. 51.


178 “Sourcing Dairy,” Dean Foods.


184 Beckman et al., "Agriculture's Supply and Demand for Energy and Energy Products."


186 Ibid.


