

DRIVING SUSTAINABILITY IN AGRIFOOD SYSTEMS: THE STRATEGIC VALUE OF SASB STANDARDS

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ABSTRACT

To achieve sustainable transition in agrifood systems, it is pertinent that measurable and financially significant indicators be integrated into green management approaches. The purpose of this particular report is to emphasize the role played by Sustainability Accounting Standards Board (SASB) standards as an analytical approach in assessing and evaluating environmental and social performance across the agrifood value chain. Using corporate sustainability reports from prominent agrifood firms, it is found that agrifood SASB-related standards identify sector-level issues, such as water recycling (e.g., Nestle S.A.: 32%), adoption of renewable energy sources (e.g., Danone S.A.: 41.1%; General Mills Inc.: 99% renewable electricity), greenhouse gas reduction (e.g., Nestle S.A.: -13.58%; Danone S.A.: -13.96% Scope 1), and workforce safety (e.g., Tyson Foods Inc.: 0.42 cases per 200,000 hours). It is found that SASB standards have better application in activities such as processing, packaging, and distribution, whereas its application is emerging in primary production. The analysis highlights the value of SASB, which can be employed together with other standards like GRI and ESRS, generating a sense of alignment that goes beyond one-dimensional materiality and employs multi-dimensional reporting. Ultimately, the research asserts that the inclusion of SASB standards within agrifood operations is a positive force through its ability to promote transparency and resource efficiency, and to combat global issues like climate, water, and supply chain.

1. INTRODUCTION

The rising demand for food production at the global level, along with the requirement to reduce its negative impacts on the environment, necessarily requires harmonizing sustainability assessment practices, and this could be done by developing a more comprehensive approach across the entire agri-food sector [1]. The present practices of sustainability assessment tools often limit their capacity to capture the specificity of each context and multifunctionality within heterogeneous systems such as mixed cropping systems integrated farming, and diverse supply chain structures—revealing the need for more comprehensive approaches [1]. This highlights the need for integrated frameworks capable of harmonizing the environmental, social, and economic dimensions of performance. In this context, sustainability accounting proves to be a key mechanism to assist businesses in integrating financial and non-financial information to gauge their environmental footprint, social responsibility, and commitment to the achievement of the Sustainable Development Goals (SDGs) [2]. The integration of financial and sustainability information has become extremely important for agri-food companies to fulfill stringent environmental regulations and to promote sustainable production/consumption models [3]. In addition to Sustainability Accounting Standards Board (SASB), several other major sustainability reporting frameworks have a significant impact on global disclosure practices. The Global Reporting Initiative (GRI) and the European Sustainability Reporting Standards (ESRS) provide broad, stakeholder-oriented approaches that offer a wide range of environmental, social, and governance topics. GRI maintains a multi-stakeholder approach, whereas ESRS maintains a concept of double materiality. SASB maintains a focus on investor-centric financial materiality [4]. SASB standards enable organizations to provide industry perspective, about sustainability-related risks and opportunities that may affect the organization's cash flow, access to finance, and cost of capital in the near, medium,



and long term. Although these frameworks provide extensive guidance, their effective implementation requires careful consideration of the agrifood -specific factors such as biological dependencies, seasonal variability, and complex supply chains [5]. These distinctions underscore the need for methodologies that, at their core, have the capability to measure sustainability in various types of agrifood activities, transcending general approaches to accommodate specific subsector dynamics [6]. The complexity associated with collecting environmental data, and the fact that there are no universally accepted environmental methodologies, represent challenges that affect sustainability accounting within the agrifood sector significantly [7]. Recent methodological innovations have enabled more accurate quantification approaches, thus accounting for aspects such as social, economic, and sustainability, addressing previous gaps where specialized metrics were limited [6]. This study contributes to this evolving discourse exploring the role and value of SASB standards, in providing a financially material and industry-specific perspective [8]. Such standards are intended to be able to complement a wider framework and facilitate a more structured approach to sustainability assessment within the agrifood sector. To address the challenges associated with value chain-based sustainability assessment in general, and in agrifood systems in particular, this study adopts the SASB framework. It provides industry-specific disclosure standards, and industry consistency and comparability in reporting are ensured [9], [10], [11]. It's a robust basis for assessing ESG value within the food and agricultural value chain in particular. These standards are developed to help businesses identify, measure, manage, and report on sustainability issues to financial condition or operating performance [11], [12]. Specifically, for the agrifood industry, SASB standards provide specific standards for agricultural products, meat, poultry and dairy, and food and beverage processing, categorizing industries based on their business models, resource models, sustainability models, and innovation models [9]. Though SASB does not offer an exhaustive set of sustainability standards, its financially material set of standards can offer significant insights with respect to operations-related risks as well as opportunities, in combination with other frameworks for sustainability like GRI and ESRS, towards ensuring long-term ecological and economic viability in the agrifood sector with regards to global sustainable standards and requirements.

2. METHODOLOGY

The present study aims at collecting data by exploring the reports from companies operating within the agrifood sector, with the main objective being to analyze the applicability of SASB standards. The analysis is then proposed, as highlighted by the study, within illustrative examples derived from available corporate data. The SASB standards are proposed as a useful tool for assessing financially sustainability issues, particularly in sectors where ESG performance is increasingly linked to operational resilience and investor expectations [13]. The integration of metrics based on SASB allows the carrying out of a robust assessment of environmental and social impacts. The analysis of SASB standards applied within the agri-food sector is proposed, along with a discussion on their relevance and importance, focusing particularly on how these would lead to significant improvements within sustainability-related issues. To present a specific understanding on the applicability of SASB standards within the context of the agri-food sector, Table 1 summarizes the main sustainability focus areas and their relevance within food and agriculture-related operations. Aspects like greenhouse gas emissions, energy efficiency, water management, reduction of wastes, accountability within supply chains, workforce safety, and product quality, represent the core dimensions of environmental and social issues. Furthermore, Table 1 illustrates the comprehensive nature of SASB standards and demonstrates their potential to serve as a basis upon which to measure sustainability across the entire agri-food chain.

Table 1: Key SASB Standards for Sustainability in the Agri-food Value Chain

SASB Category	Focus Area	Relevance to Agri-food Sector
Greenhouse Gas Emissions	Scope 1 & 2 emissions, reduction strategies	Climate impact of farming, processing, logistics
Energy Management	Total energy use, renewable share	Efficiency in production and processing plants
Water Management	Withdrawal, recycling, efficiency	Irrigation, food processing, water scarcity risks
Waste & Pollution	Waste generation, recycling, landfill diversion	Food waste, packaging waste, circular economy
Supply Chain Management	Supplier audits, traceability, certifications	Transparency in sourcing raw materials
Workforce & Safety	Injury rates, training, labor practices	Worker health in farming and food processing
Product Quality & Safety	Recalls, certifications (organic, HACCP, ISO)	Consumer trust and compliance with food safety

Since the crucial role of water in agricultural industry, SASB standards facilitate the monitoring of water usage in various aspects of the agrifood value chain [6]. These standards are an important aspect in recognizing financially material opportunities that can help enhance water efficiency and mitigate water scarcity-related risks [5]. The management of water resources by conducting a systematic assessment and then a report on water-related impacts has now become an essential part of sustainability accounting in the agrifood sector [14]. In the same context, the agrifood sector can enhance their water efficiencies to mitigate negative environmental impacts, as well as face the challenges related to ensuring regulatory compliance to enhance their reputation among environment-friendly stakeholders [15], [14]. This comprehensive tracking enables businesses to identify inefficiencies and adopt green technologies to reduce their dependence on non-efficient sources of energy, and increasingly use green energy, thereby reducing operational costs but also greenhouse gas emissions. These are key metrics to measure the direct and indirect greenhouse emissions resulting from agriculture, processing, and transportation activities, and thereby de-carbonize food systems globally [16]. By providing a clear framework for reporting GHG emissions under Scope 1 and 2 in line with SASB standards, reducing their emissions to achieve the goal of becoming carbon neutral to build a circular economy [6]. Such integration of SASB standards into agrifood operations contributes to a transition towards circular economy models by encouraging the adoption of strategies such as avoided food waste, circular packaging design, and regenerative farming [17]. These circular economy concepts, in conjunction with innovative Life Cycle Assessment methodologies, promote valuable policy-making ideas with sustainable practices in agri-food systems [17], [18]. The sustainable practice of efficient waste management, including a reduction in food wastes and better recycling, is a major additive factor in circular economy concepts, creating minimal environmental impacts [19], [20]. This comprehensive approach to waste management not only minimizes the depletion of natural resources but also is aligned with global initiatives such as the UN's Sustainable Development Goal 12 (SDG12), advancing sustainable consumption and production [21]. These standards are essential for ensuring ethical sourcing processes, environmental sustainability, and social equality within these complicated global value chains [17]. Organizations will therefore be able to establish transparency within their respective production processes using the SASB standards, and will be able to address risks associated with either upstream or downstream operations. Besides this, organizations will also be able to create confidence among consumers with regards to the link of sustainable development for their respective products by: closely examining labor practices, environmental impacts for the resources used in the process, and the carbon footprints for their transport operations [22]. Table 2 summarizes some of the key standards of SASB that have been used in various operations of the agrifood value chains, considering certain measurable criteria such as water usage, energy usage, greenhouse gas emissions, wastes, supply chains, workforce safety, and product quality. Contrary to the general framework and overview of Section 2 above, Table 2 below shows and highlights specific codes and techniques used and employed by various organizations, considering each code and its application in agrifood value chains and value chains generally.

Table 2: Key Sustainability Indicators in Agrifood Operations

Category	Specific Standards (SASB Code)	Example of Measurement	Application in Agrifood	Ref
Water Management	FB-AG-140a.1 – Total water withdrawn	m ³ per year, liters per ton of product	Irrigation efficiency, water footprint of crops	[23]
	FB-AG-140a.2 – % water recycled	% of total withdrawn reused	Processing plants recycling water	[24]
Energy Management	FB-AG-130a.1 – Total energy consumed	GJ per year	Energy intensity in dairy/meat processing	[25]
	FB-AG-130a.2 – % renewable energy	% of total	Transition to solar/biogas in farms	[24]
Greenhouse GAS Emissions	FB-AG-110a.1 – Scope 1 emissions	Metric tons CO ₂ e	Direct emissions from livestock, machinery	[26]
	FB-AG-110a.2 – Scope 2 emissions	Metric tons CO ₂ e	Purchased electricity for processing	[26]
Waste Management	FB-AG-150a.1 – Waste generated	Tons per year	Packaging waste, food waste	[27]



	FB-AG-150a.2 – % recycled/diverted	% of total	Composting, recycling packaging	[27]
Supply Chain ESG	FB-AG-430a.1 – % suppliers audited	% of suppliers	Ensuring sustainable sourcing of raw materials	[28]
Workforce & Safety	FB-AG-320a.1 – Injury rate	Incidents per 200,000 hours worked	Worker safety in farms and factories	[29]
Food Safety	FB-AG-250a.1 – Recalls issued	Number per year	Food safety compliance	[25]
	FB-AG-250a.2 – % certified products	% of portfolio	Organic, fair trade, HACCP certifications	[24]

3. RESULTS

The following section highlights the implications of SASB standards implementation in the agrifood systems, to demonstrate improvements in farming, processing, and distribution practices that contribute to sustainability and stakeholder trust. The implementation of SASB standards has been successfully achieved to demonstrate the positive impacts of water management with precise irrigations and reduction of carbon footprints with sustainable land use practices. Besides, the application of SASB standards has an impact, as it goes as far as assessing ecological damages caused by pesticides and fertilizer application. Thus, it allows farmers to adopt less harmful practices for the environment [6]. Processing and packaging companies that adhere to SASB standards. At this stage, the focus changes and highlights how SASB standards ensure that there is efficiency in processing, efficient and eco-friendly packing, and appropriate disposal strategies, hence minimizing the impact of processed foods on the environment. Such measures include life cycle assessments and implementation of circular economy principles, among others [30]. Retail and distribution embracing transparency and accountability measures. This entails best practices for reducing food loss or waste, logistical measures for minimizing carbon footprint, and fair sourcing throughout the entire chain [31]. This holistic approach to sustainable practices across the supply chain builds trust among consumers and allows for a more sustainable approach to food from farm to fork. This also entails examining ways in which businesses have successfully reduced their environmental footprint or increased social equity through SASB reporting methodologies, as well as challenges such as complexity in gathering data or traditional business mindsets' resistance to change [32]. Overcoming these challenges may require new and creative "digital" media for integrating and processing such information, as well as successful engagement tools for encouraging a culture of sustainability across the enterprise. This yields a more sustainable agrifood system, capable of handling the diverse challenges emerging from a rapidly shifting global environment [33]. The holistic integration of SASB standards, therefore, is very important in addressing global issues like climate change, scarcity, as well as food insecurity, while at the same time promoting the sustainability of agricultural value chains [34]. The various examples of how the agrifood industry leaders are applying SASB standards are presented in Table 3. Through the representation of various agri-food industry leaders, various sustainability reporting initiatives are presented as examples, such as relating the companies to various sustainability indicators like water recycling, renewable energy, greenhouse gas emissions, generation of wastes, as well as audits of both workforce safety. Table 3, therefore, is a clear representation of both successes and challenges associated with the application of sustainability standards. From the general overview of how these agrifood industry leaders are applying the SASB standards, it is clear that the standards are helpful in enhancing transparency, as well as acting as a vital tool in improving efficiencies. The SASB standards have already been integrated into agrifood sustainability reporting, particularly in terms of water efficiency, energy, greenhouse emissions, generation of wastes, as well as supply chains. These metrics are used by companies within this sector with the aim of promoting transparency, revealing various inefficiencies, and disclosing significant sustainability-related financial issues. Though this practice has not been prevalent within various subsectors, such as primary farming, within the agrifood sector, it has been more common within the processing and manufacturing subsectors. The aforementioned companies have utilized SASB indicators, such as those highlighted in Table 3, with the aim of disclosing various sustainability-related issues, such as resource use, emission, and worker safety.

Table 3: Practical Applications of SASB Standards by Leading Agri-food Companies

Company	Agrifood Segment	Applied SASB Standards	Reported Value / Practice	Ref.
Nestlé	Crop farming & food processing	FB-AG-140a.2 – % water recycled	32% of total water withdrawn recycled (2023)	[23]
		FB-AG-110a.1 – Scope 1 emissions	13.58% reduction in net greenhouse gas emissions compared to the 2018 baseline	
		FB-AG-130a.2 – % renewable energy	91.9% renewable electricity usage	
		FB-AG-150a.2 – % recycled/diverted	36.2% of cocoa and coffee responsibly sourced	
Danone	Dairy production	FB-AG-130a.2 – % renewable energy	41,1% of total energy from renewable sources (2024)	[35]
		FB-AG-140a.1 – Total water withdrawn	59,889 thousand of m ³ , ↓1.80% decrease from 2023	
		FB-AG-130a.1 – Total energy consumed	4,589,057 MWh (2023), ↓10.59% decrease from 2023	
		FB-AG-110a.1 – Scope 1 emissions	573 Ktons CO ₂ equivalent (2023), ↓13.96% decrease from 2023	
General Mills	Food processing	FB-AG-110a.1	0.59 million metric tons CO ₂ e (2024)	[27]
		FB-AG-130a.1	9,280,800 gigajoules (GJ); 99% renewable electricity	
		FB-PF-140a.1	9,177,081 cubic meters. Approximately 1% of our water withdrawals are from water stressed areas	
		FB-PF-250a.2	96% of global co-production sites, 85% of global ingredient suppliers and 90% of North American ingredient	
Unilever	Retail & distribution	FB-AG-430a.1 – % suppliers audited	65% of tier-1 suppliers audited for ESG compliance (2023)	[28]
		FB-AG-110a.1 – Scope 1 emissions	70% since 2020	
		FB-AG-150a.1 – Waste generated	200,000 tons of virgin plastic by 2024 and remains committed to its zero plastic waste goal by 2030.	
Tyson Foods	Meat production	FB-AG-320a.1 – Injury rate	0.42 incidents per 200,000 hours worked (2023)	[29]
Olam International	Primary agriculture & crop sourcing	FB-AG-110a.1-Scope 1 emissions	1.06 million tCO ₂ e (2023)	[36]
		FB-AG-110a.2 – Scope 2 emissions	0.52 million tCO ₂ e (2023)	
		FB-AG-140a.1 – Total water withdrawn	14.8 million m ³ (2023)	
		FB-AG-150a.2 – % recycled/diverted	41% waste diverted from landfill	
		FB-AG-430a.1 – % suppliers audited	78% of priority suppliers assessed	
Archer Daniels Midland (ADM)	Crop origination & primary agriculture	FB-AG-130a.1 – Total energy consumed	~57 million GJ (2023)	[37]
		FB-AG-110a.1 – Scope 1 emissions	4.6 million tCO ₂ e (2023)	
		FB-AG-110a.2 – Scope 2 emissions	2.0 million tCO ₂ e (2023)	
		FB-AG-140a.1 – Total water withdrawn	~255 million m ³ (2023)	

Table 3 analyses that all the major agri-food corporations focus intensely but in a different dimension of sustainability, depending on the problems confronted in that line of business. Nestle, a leader in crop farming and food processing, ranked high in all major environmental parameters, including water recycling (32%), high reduction in net GhGs emissions (13.58% less than the 2018 baseline), and a nearly complete transformation to renewable electricity supplies (91.9%). The information gives a clue about the maturity of environmental practices in a line of business with high dependence on natural resources [23]. Danone was the first company in 2016 to adopt SASB in its Integrated Report



[38]. In the dairy production segment of Danone, there is a noticeable decline in every major SASB metric, with a 1.80% reduction in water usage, a 10.59% reduction in energy consumption, and a 13.96% reduction in Scope 1 emissions. In conjunction with Danone's 41.1% contribution to renewable energy, it is understandable that this sector is working hard to mitigate the severe environmental impacts of milk production, as dairy farming is a major environmental strain [35]. General Mills, which represents the food processing and packaging industry, also focuses on energy efficiency and water management. The total energy consumption for them amounts to 9.28 million GJ, with an impressive 99% of that being renewable electricity. The total water withdrawals for the company stand at 9.17 million m³, of which merely 1% is from water-stressed regions, which speaks well for water risk management. A high level of conformance for food safety certification standard FB-PF-250a.2 serves to emphasize the importance of quality assurance and traceability for this segment [27]. Unilever, which represents an industry with large-scale operations in the retail and distribution segment, focuses on supply chain responsibility and waste. Its ESG audits cover 65% of its tier-1 suppliers, and it has succeeded in reducing Scope 1 emissions by 70% since 2020, which shows that its approach is aligned with combining environmental, social, and transparency goals. Its efforts towards a plastic-neutral 2030 goal help to emphasize how large-scale CE principles are being put into place [28]. Tyson Foods, which represents the meat production segment, has focused on social sustainability, and the injury rate of 0.42 incidents per 200,000 hours worked can be considered a representative SASB indicator [29]. This can be explained by the fact that the focus is on the specific problems of a sector related to labor, considering that in this high-risk field, the issue of worker health and safety is an important criterion for sectoral resilience. The cases of Olam International and Archer Daniels Midland (ADM) provide further support to the understanding that SASB indicators do not only cover processing and distribution activities but also pertain to activities directly related to primary production and sourcing of agricultural commodities. This is evidenced by the report from Olam International, which has a substantial presence in crop cultivation and sourcing of materials for the company, where the firm reports SASB-aligned data such as 1.06 million tCO₂e for scope 1 emissions, 0.52 million tCO₂e for scope 2 emissions, 14.8 million m³ for total water withdrawal, and sustainability assessments for 78 percent of its total suppliers based on environment- and social-related criteria [36]. Similarly, ADM also reports around 57 million GJ for total energy consumption, 4.6 million tCO₂e for scope 1 emissions, 2.0 million tCO₂e for scope 2 emissions, and around 255 million m³ for water withdrawal for the company, which has a presence in crop origination and primary grain handling activities [37]. On the whole, an analysis of Table 3 suggests that the SASB standards can be used for an effective, sectoral approach to sustainability, which can allow for comparing information that is "actually relevant to the environmental and social challenges that each agrifood subsector is facing." The fact that there are different indicators for each company serves to prove the value of SASB for the financial analysis of sustainability. Additionally, using SASB standards in conjunction with other broader frameworks such as the GRI or ESRS has the possibility to offer a more holistic approach to business sustainability – i.e., SASB's focus on materiality and finance, but from a broader and more multidimensional perspective.

4. CONCLUSION

This study demonstrates that the SASB standards offer an informative and financially material framework to measure sustainability performance for companies within the agrifood sector. Nevertheless, it is also revealed that SASB does not constitute a holistic sustainability measurement tool on its own. Even though the SASB metrics successfully capture the significant issues faced by companies in terms of their operations—like water efficiency, energy efficiency, greenhouse gas emissions, waste generation, and safety concerns for the employees—they do not encompass other macro environmental issues like the maintenance of biodiversity, soil rejuvenation, animal welfare, etc. From the empirical examples provided in the study, which focuses on top agrifood organizations, it is evident that SASB indicator adoption is more prevalent in processing, manufacturing, and distribution activities due to better data availability as well as better control. This is not the case, however, for primary agricultural activities, where structural issues have hindered the development of data supply. The findings highlight that for SASB standards to be more effective; they must be considered and applied in conjunction with broader reporting frameworks such as GRI and ESRS. Through adopting such an approach, it enables companies to link financial materiality to stakeholder and double materiality considerations, facilitating a more holistic approach to sustainability reporting. Following this, it would be useful to subject integrated assessment models to future research that incorporate financial



considerations by SASB and link these to environmental and social considerations, to facilitate a more holistic assessment of sustainability for agrifood systems and to further support this industry in achieving a more sustainable path to a “climate-resilient” and “circular” state.

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