Global Journal of human-social science: H Interdisciplinary
Volume 24 Issue 1 Version 1.0 Year 2024
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-460X & Print ISSN: 0975-587X

Environmental Sustainability Practices in Large Brazilian Food Companies in Light of the 2030 Agenda Goals

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Keywords: *sustainability; sustainable development; agenda 2030; RIO+20; food companies.*

GJHSS-H Classification: *FOR Code: 0502*

Strictly as per the compliance and regulations of:

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I. Introduction

Companies contribute to the development social and economic of a country or a region. Through their products, they become present in the homes and lives of their consumers. Consequently, sustainability has become important for organizations and corporate businesses (Castro, Campos & Trevisan, 2018). Therefore, Nguyen and Kanbach (2023) highlight that in recent years, the integration of sustainability strategies in companies has shown significant growth.

The concept of sustainable development, understood as "that which meets the needs of the present without compromising the possibility of future generations meeting their needs" (United Nations, 1987), requires society to have a continuous relationship with the environment, considering the conservation of its characteristics for the essential development of life as we know it on Earth. The corporate world is not oblivious to this perspective. Soon, it began to rethink its way of producing and reproducing, considering the environmental, social, and economic impacts, preferably in that order of importance, given the climate emergency and the socio-environmental factors linked to it and arising from it (Silva et al., 2022; Nguyen & Kanbach, 2023).

At this juncture, the companies are awer that their activities have significant impacts on natural ecosystems, on the well-being of societies, and the maintenance of the conditions necessary for human prosperity, with preservation of the planet for future generations (Silveira et al., 2022). Goés et al. (2023) argue that companies have sought to become more sustainable from an environmental point of view, prioritizing management oriented towards their different stakeholders in the search to mitigate adverse impacts on the environment.

Moçato et al. (2019) explain that the change in business consciousness is the result of post-industrial society, in which the improvement in the quality of life, the appreciation of human beings, respect for the environment, the business organization of multiple targets, and the valorization of social actions are sought to the detriment of the industrial period, where profit and economic success appeared as the only objectives to be achieved. Lu et al. (2020) understands that

companies have sought to reduce their negative impacts while at the same time prioritizing actions to maximize their positive environment impacts. Regarding this issue, Dias (2019, p. 83) states that companies "are indirectly responsible for the growth of interest in the environment, as they were the causes of the main environmental disasters of the 20th century that, in some way, awakened collective consciousness to these problems."

To succeed and update the set of sustainable development perspectives for the 21st century on a global scale, took place at the United Nations in New York, between September 25 and 27, 2015, the most important conference on sustainability, called the United Nations Sustainable Development Summit, where were defined that Sustainable Development Goals (SDGs) - with 17 objectives, 169 targets and more than 500 indicators - that must be achieved by the year 2030, taking into account what is foreseen in the document "Transforming Our World: the 2030 Agenda for Sustainable Development" (Lu et al., 2020).

Marked by constant and systematic negative impacts on the environment after the Industrial Revolution, society has recently begun to review its practices that are harmful to the ecological balance, becoming aware of the need for more sustainable measures. In this regard, "sustainable development has become the central concept of the current generation" (Sachs, 2015, p. 1). In 2020 the so-called "Decade of Action" with the aim intending to intensify actions based on the SDGs, aiming to meet the goals within deadlines respective pre-determined. To achieve the goals, efforts were put in such as the SDG Action Manager, a methodology available in five languages that "empowers companies of all sizes, worldwide, to adopt meaningful measures and track their progress towards global goals" (Nações Unidas Brasil, 2020). Pizzi et al. (2020) demonstrated that the involvement and contribution of the business sector to the SDGs is increasing.

In this context, the vocation of companies to incorporate socio-environmental issues into their management practices, with the purpose of benefiting but society as a whole, was reinforced, supported by a reorientation of organizational values (Lara & Oliveira, 2017). Rosati and Faria (2019a) emphasize that companies can play a significant role in sustainable development. It is clear, therefore, that business continuity is directly linked to the inclusion of sustainability in business practice, adopting systems oriented towards stakeholders and with greater transparency in reporting results (Rosati & Faria, 2019a; Martins et al., 2021; Goés et al., 2023).

As a result, companies are invited to invest in a sustainable culture, driven by commitment to environmental issues, going beyond simple, strictly superficial advertising (Silva Filho et al., 2019). Therefore, by promoting innovation policies, reverse logistics, circular economy, use of clean and renewable energy and fighting climate change, the companies contribute to change of paradigms, in response to the main challenges of this century (Rossi et al., 2020).

Therefore, the aim of this research is to find the fundamentals sustainability management in the Brazilian food industry, in the light of the objectives and targets set out in the 2030 Agenda, in the light of the commitments made at Rio+20. Given its environmental impact, the food industry can make a significantly contribute to more sustainable development.

II. Literature Review

a) *Environmental dimension of sustainability*

Although not synonymous, sustainability and sustainable development are treated as equivalent terms in some studies (Sartori, Latrônico & Campos, 2014). Still, "these views are frequently at odds, depending on the social group that defends them, bringing to the surface crucial questions such as what exactly is being supported, on what scale, by whom, for whom, and with what mechanisms" (Machado & Matos, 2020, p. 22).

According to Dovers and Handmer (1992), sustainability is the ability of a human system, natural or mixed, to resist or adapt to endogenous or exogenous change for an indefinite period. On the other hand, sustainable development is a path of intentional change and improvement that maintains or increases this system attribute when responding to the needs of the present population. The authors, then, argue that sustainable development is the way to achieve sustainability, characterizing it as a goal, not a means.

On the other hand, Elkington (2012) argues that sustainable development will only be achieved through a balance between the three pillars of the Triple Bottom Line: environmental, economic, and social. For him, sustainable development is the objective to be achieved, and sustainability – translated into sustainable actions – is the means, that is, the process to achieve it. Adding an ecological vision, environmental sustainability is the ability of something or someone to sustain itself over some time without the resources necessary to do so – especially non-renewable natural ones – being exhausted. Therefore, for a company to be considered sustainable, it is essential to plan to reduce raw materials (Santos & Baptista, 2016). It is important to highlight that sustainability is not limited to the environmental dimension. However, to meet the purposes of this study, ecological practices based on sustainability adopted by companies were considered.

The environmental dimension is related to the impact of human activities on the environment. Moldan, Janoušková and Hák (2012) emphasize that environmental sustainability studies biogeophysical aspects, aiming to maintain or improve the integrity of

life support systems on Earth. Likewise and Barbieri (2016) argues that the environment is everything that involves or surrounds living beings, and environmental problems are intrinsically linked to the use of the environment to have the resources necessary for the production of goods and services.

b) 2030 Agenda and the Sustainable Development Goals

In the quest to promote sustainable development, the negotiations contained in the document "Transforming Our World:" were concluded in August 2015. The 2030 Agenda for Sustainable Development". The SDGs were adopted as part of a new "action plan for people, the planet and prosperity" (Nações Unidas Brasil, 2015, s. p.). All of this formed part of a new sustainable development agenda, based on the dimensions People, Planet, Peace, Prosperity and Partnerships, completing the work of the old Millennium Development Goals (MDGs), without "leaving anyone behind" (Nações Unidas Brasil, 2017).

The 2030 Agenda recognizes that private business activity, investment and innovation are the main drivers of productivity, inclusive economic development and job creation. Therefore, companies appear as fundamental actors for sustainable development, not only for their financing but also for guaranteeing the capillarity of actions, given the strong predisposition of the private sector to establish dialogue with employees and the community (Silva et al., 2022).

Van Zanten and Van Tulder (2021) highlight that companies play a decisive role in achieving the Sustainable Development Goals (SDGs). The authors argue that the challenges for sustainable development are interconnected, requiring that business strategies have a systemic approach to promoting sustainability, instead through the integration of the different SDGs, instead of treating them as isolated silos.

Therefore, it is possible to say that, currently, not relating sustainability to the organizational context and business performance has become something inconceivable. Even though some companies disagree with this scenario, it is certain that the failure to apply sustainability in their operations certainly causes several problems – including, it threatens the continuity of the company's activities and its performance in the market (Dias & Marques, 2017). Thus, it appears that there is a necessary relationship of interdependence between the prosperity of organizations and the good of the planet and its inhabitants.

Sustainability should not be understood by business sectors only as an opportunity to increase business profits since the efficiency in the use of natural resources, the reduction of greenhouse gas emissions, the diversification of agricultural production, the valorization of production that keeps the forest standing, the preservation of rivers and biodiversity could become the key to economic competitiveness in the future (Mello & Toni, 2013). Furthermore, companies' systemic understanding of sustainability can help them avoid greenwashing practices (Van Zanten & Van Tulder, 2021).

Toussaint, Cabanela and Muñoz-Dueñas (2022) understand that the SDGs are a good starting point for analyzing the challenges and problems of the food production chain, among other things, as they involve the various levels of government, different stakeholders, and the food industry. This work, it should be noted that the food industry, as argued by Chaurasia et al. (2021), who studied the nutraceutical industry – that is, products that, in addition to nutrition, are also used as medicines – plays a relevant role in creating a world with zero hunger, thus being fundamental for health and well-being of the population, and, equally, for an environmentally and socially sustainable world.

Forsman-Hugg et al. (2013) showed growing concern about the social and environmental conditions of food production, especially in Europe. According to Luhmann and Theuvsen (2016), discussions about food availability gave way to concerns centered on according quality and ethical aspects of food production. Gider and Hamm (2019) stated that European food companies were required to disclose information about their activities related to environmental, social, and employee issues, mainly because food production can impact climate change and biodiversity. Hence, the concern with sustainable consumption and production priority themes for global action plans, such as the SDGs. Therefore, it is a fact that food companies seeking continuity must have initiatives aimed at achieving these goals.

c) Sustainability in the global food industry

Palazzo and Vollero (2022) state that the number of articles dealing with sustainable food supply chain management has grown, probably due to increased awareness of environmental problems and the need to reduce global hunger, increased food risks, understanding of the benefits of reducing food waste, health management and the well-being of people in all geographical areas. However, few studies combine the various sustainability constructs with the main elements of sustainable food supply chain management.

Rajiic et al. (2022) studied the companies' involvement of the food food sector with sustainability based on the environmental dimension. The results showed that companies are trying to reduce energy consumption, greenhouse gas (GHG) emissions, water withdrawal, and total waste. Schwarz et al. (2016) compared the local Belgian and global Peruvian asparagus value chains and explore their sustainability performance, and found that neither supply chain invariably performs better in terms of sustainability.

Adams, Donovan and Topple (2023) showed that the lack of a governmental regulatory and environmental framework is a significant barrier to sustainability in the company. Commitment to sustainability depends fundamentally on top management, which is seen as an essential internal factor. Donner and de Vries (2023) point out that company values, practical actions of social responsibility, the collaborative approach, the involvement and cooperation of stakeholders, are possible paths to sustainability.

It is therefore clear that many companies around the world are adopting sustainable practices in their operations to minimize their environmental impact and promote social responsibility. In addition, companies are investing in innovation and technology to develop new products and processes that are more sustainable. However, it should be made clear that there are few studies evaluating sustainability management in the food industry in terms of its environmental dimension, based on the goals and targets set out in the 2030 Agenda.

d) The Brazilian food industry

The Brazilian Food Industry Association (ABIA) represents 38 thousand large, medium, and small companies, of which 86 large companies are members. In 2022, the industry had revenues of US$157.5 billion. The Brazilian food industry also generated, in 2022, 1.8 million direct employment, accounting for 24.2% of jobs in the Brazilian manufacturing industry; that is, it is representing the largest generator of employment in the manufacturing industry in Brazil (ABIA, 2023).

ABIA's current survey points out that, in 2022, the Brazilian food industry recorded a 16.56% growth in revenue compared to 2021, different a drop of 8.2% seen in the COVID-19 pandemic period of 2020/2021. This result indicates that, in 2022, there was a 28.8% share of the sector's total sales, that is, export + domestic sales. In 2022, the Brazilian food industry contributed with 85.5% Brazil's trade balance, that is, around US$ 52.83 billion, and represented 17.9% of total Brazilian exports. Therefore, it is a result that represents 10.8% of the national GDP. The Brazil is the second largest exporter of processed foods in the world in volume and the 5th in value, with its foods available in more than 190 countries. Therefore, the numbers express the sector´s relevance of the national scene (ABIA, 2023).

In 2012, ABIA prepared a document to integrate the discussions at the United Nations Conference on Sustainable Development, Rio+20. In the document, ABIA (2012, p. 9) points out that the food industry in Brazil "has been demonstrating clear efforts to become more sustainable" and that "since the Rio-92 Conference, the industry has been engaged in international debates on sustainable development and strives to design and adopt best practices."

According to ABIA (2012. p. 9), global projections "of population growth and an increase in the pattern of food consumption," especially in developing countries, "further elevate the importance of best social and environmental practices in the production of food and beverage for everyone." Given this reality, "Brazil, being a major global producer and supplier of food, should play a central role in defining the direction of sustainable development."

ABIA (2012. p. 9) emphasizes that "the relationship between the food industry and sustainable development" occurs "much beyond the gates of food factories across the country." According to the institution, "interactions with the value chain, from farmers to consumers, are fundamental to sustainability this industry."

In light of the 2030 Agenda, organizations' commitment to the SDGs is not restricted to just a few priority actions, according to their convenience. These global objectives and goals have intertwined elements that require a total commitment from organizations to achieve them.

Regarding environmental sustainability, the ABIA document (2012) points out that its actions encompass the following elements: i) Search for energy efficiency and clean energy sources; ii) Energy generation from burning waste from industry itself (sugar cane bagasse, rice husk, animal waste, among others); iii) Reduction of water consumption and reuse; iv) Fighting deforestation, preserving and defending biodiversity; v) Agricultural exploration in areas free from devastation; vi) Use of raw materials from renewable sources; vii) Concrete actions to minimize the causes and effects of climate change; viii) Creation of carbon credit projects (by 2020 projects would remove from the atmosphere or avoid the emission of 34.8 million tons of carbon dioxide, which is equivalent to planting and conserving 2,654 square kilometers of native cerrado for 20 years); ix) Control the use of agricultural and animal pesticides, etc., to avoid damage to health and contamination of soil and water; x) Use of renewable and environmentally friendly packaging; xi) Minimization of waste generation; xii) Establishment of reverse logistics and correct disposal of waste throughout the production chain; xiii) Fighting food waste; xiv) Development of new sustainable technologies for the production chain; and, xv) Work to raise awareness and train actors in the chain to act in a sustainably manner.

Given, it is clear that there is a movement in the Brazilian food industry in favor of sustainable development. However, few scientific studies allow us to identify the measures adopted by the food industries, making this a significant gap for our survey.

Based on the assumption that food companies are fundamental to the development of society, the

following questions are posed as survey problems: Given the commitments made in 2012 by the Brazilian Food Industry Association (ABIA) at Rio+20, what advances have been made in environmental sustainability? And what are the environmental sustainability practices in large Brazilian food companies in light of the 2030 Agenda goals?

The present study sought to identify and discuss practices aimed at environmental sustainability in large Brazilian food companies in light of the 2030 Agenda goals, and the commitments made by the Brazilian Food Industry Association (ABIA) at Rio+20.

The work is justified due to the growing importance of studies that contribute to analyzing of the environmental impacts of business management. Even though there is already a range of indicators available to measure sustainability in organizations (Souza, De Benedicto & Silva, 2021), Almeida Filho and Lauar (2021) and Rosati and Faria (2019b) state that the applicability of the Sustainable Development Goals in the context of companies still lacks academic evaluations.

It is known that the responsibility for fulfilling the SDGs lies with Nation-States. However, many topics involve local challenges, which require specific actions by companies and other actors. As a result, the need for a global governance for sustainability, from public policies, to companies and civil society (Silva, 2021). Roma (2019, p. 39) endorses this idea by arguing that achieving the goals and objectives of the 2030 Agenda "requires a coordinated effort not only at the level of government spheres but also of the private sector, NGOs and the entire Brazilian society," to allow the potential of this global agenda to induce sustainable development to materialize and produce the desired benefits for society. Ardekani et al. (2023), in turn, argue that the Covid-19 pandemic may have negatively impacted the adoption of sustainable initiatives by agribusiness. Hence the relevance of identifying and discussing practices aimed at the environmental sustainability of Brazilian food companies in light of the objectives of the 2030 Agenda.

Djekic et al. (2021) highlight that the food supply chain is fundamental to achieving the SDGs, mainly because it is a global chain and plays a crucial role in feeding the world. In this regard, the large food companies are essential stakeholder in this chain, influencing farmers, food processors, traders, and consumers.

In the case of the Brazilian food industry, its involvement in favor of sustainable development is expected. However, there are few studies on the current scenario of the Brazilian food industry in terms of its practices around sustainable development and environmental sustainability based on the goals and targets set out in the 2030 Agenda. Considering the commitment made by ABIA at Rio+20, as well as its influence in the consolidation of the 2030 Agenda, there is a need for more in-depth studies, and comparisons regarding measures in favor of the SDGs.

III. Survey Methods and Procedures

Based on studies by Chizzotti (2018) and Gil (2019), this survey has an applied nature, a qualitative approach and a descriptive and exploratory objective.

Regarding the procedures for data collection, the survey was characterized as documentary and bibliographic. According to Gil (2019), documentary survey uses primary sources, that is, data and information that have not yet been study in a scientific way, while bibliographic survey uses sources made up of material that has already been published.

We sought to identify, based on sustainability reports from Brazilian companies in the food industry, the leading practices aimed at environmental sustainability, and discussing the results found based on the SDGs. It is worth noting that, in 2012, ABIA made commitments in favor of environmental sustainability from the discussions held at the United Nations Conference on Sustainable Development, Rio+20. Such obligations are explained in institution documents (ABIA, 2012, 2013).

Among the 38,000 large, medium, and small companies represented by the Brazilian Food Industry Association (ABIA), 86 large companies stand out for being members (ABIA, 2023). Initially, filtering was carried out to identify, among the 86 associated companies, which ones demonstrated the obligations made by ABIA at the Rio+20 Conference in favor of environmental sustainability. Of this total, 77 of them do not explain the commitments assumed by ABIA, despite the fact that even though sustainability report also highlights sustainable actions. Nine associated companies highlight the pledges made by ABIA at the Rio+20 Conference in favor of environmental sustainability. Namely: Ambev, Bunge, Carrefour, Coca-Cola, JBS, Nestlé, PepsiCo, TetraPak, Unilever.

To select the actions that are related to the commitments assumed by ABIA, the proposal made by Caralli et al. (2004) on critical success factors (CSFs). In the case of this survey, to apply the method, the information was collected from the sources already mentioned and was grouped to represent the main activities that are carried out in the companies. This information was organized and analyzed into affinity groups so that critical factors could be identified. To apply the critical success factors (CSFs) method, the following script was followed: 1. Scope definition; 2. Data collection; 3. Data analysis; 4. Identification of critical factors; 5. Analysis of critical success factors.

Data analysis for this survey took place using a technique called content analysis. For Silva and Fossá (2015), content analysis must follow the following steps: (i) General reading of the collected material; (ii) Coding

for formulating analysis categories using the theoretical framework and the indications brought by the general reading; (iii) Cutting the material into comparable recording units (words, sentences, paragraphs) with the same semantic content; (iv) Establishment of categories that differ thematically in the recording units (transfer from raw data to organized data). To facilitate the identification and understanding of the actions promoted over the last ten years, analysis categories were created according to a list of commitments assumed by ABIA. From a temporal perspective, the survey was carried out in 2023.

Therefore, unlike other research on the food industry, this research assessed the management for sustainability of the Brazilian food industry, considering the commitment made by ABIA at Rio+20, but in the light of the objectives and targets set out in the 2030 Agenda.

IV. Results

a) Presentation of collected data

Data collection was carried out based on 15 categories of analysis were considered, as shown in Table 1. These categories were selected based on commitment made by ABIA at Rio+20. Only companies were studied ABIA member companies that develop sustainability policies. The companies studied are listed in table 1.

Table 1: Analysis categories according to a list of commitments assumed by ABIA

Analysis category 1: Search for energy efficiency and clean energy sources	
Company	**Actions**
JBS	Biolins Cogeneration Unit (thermoelectric and steam energy from biomass). (JBS, 2019).
	JBS Biodiesel (from beef tallow). (JBS, 2019).
	Friendly Oil Project (JBS, 2019).
	Replacement of conventional lamps with LED models (JBS, 2019).
Ambev	Wind Farm (AMBEV, 2020).
	Solar plants to supply Ambev distribution centers (AMBEV, 2020).
	SAVEe platform (sharing information and guidance on reducing consumption and improving energy management). (AMBEV, 2021).
	Partial replacement of fossil fuels and electricity with renewable sources, such as vegetable oil, biomass and biogas (AMBEV, 2020).
	Acquisition of boilers to generate steam and work with sources such as biomass and biogas (AMBEV, 2020).
Bunge	Sugar and bioenergy joint venture (generation of renewable energy from sugar cane bagasse). (Decker, 2019).
Analysis category 2: Generation of energy from burning waste from the industry itself	
JBS	Burning poultry fat in boilers, replacing fossil fuel, no longer consuming natural resources and disposing of fat as waste, minimizing greenhouse gas emissions for steam generation by 98% (JBS, 2021).
Analysis category 3: Reducing consumption and reusing water	
Coke	Elimination of waste points; conscious and efficient use of water resources; construction of pipes to distribute treated water to production lines; inclusion of an additional Hi-flow polishing filter; increasing water distribution capacity; modernization of bathrooms generating water savings of 60 m^3 per day or 21,900 m^3 per year; recovery of sand and coal backwash water (FIESP, 2016).
Ambev	Water availability and quality in 100% of communities in areas of water stress (AMBEV, 2021).
	Reuse of water in irrigation of pasture areas on farms in Anápolis and Uberlândia, increasing productivity per area (AMBEV, 2021).
	Water reuse in an aluminum industry in São Luis (MA). (AMBEV, 2021).
	Reuse of water for irrigation of productive areas for a small community of farmers in Água Claras (SE). (AMBEV, 2021).
	Use of effluents to generate electrical energy through a microturbine in Santa Catarina,
	Ponta Grossa (PR) and Sete Lagoas (MG). (AMBEV, 2021).
	Água AMA, in partnership with Yunus Social Business. Ambev reverts 100% of the profits from its AMA sales to drinking water distribution projects (AMBEV, 2021).
	Reuse of internal effluent (AMBEV, 2020).
	Use for fertigation in rice cultivation, in Viamão (RS). (AMBEV, 2020).
Analysis category 4: Fighting deforestation, preserving and defending biodiversity	
Nestlé	Nescafé Colmeia, produced by bees that pollinated coffee trees, allowing the preservation of biodiversity, reduces the impact of farming on the environment, reduces the amount of water used, supporting regenerative farms (NESTLE, 2022).
Analysis category 5: Agricultural exploration in areas free from devastation	

PepsiCo	Potato cultivation with producers consistent with the Sustainable Agriculture Program, partially using an aeroponic system (PEPSICO, 2021).
Analysis category 6: Use of raw materials from renewable sources	
TetraPak	Use of recycled polymers in packaging (TETRAPAK, 2022).
Analysis category 7: Concrete actions to minimize the causes and effects of climate change	
Ambev	Replacement of traditional truck fleets with electric trucks (Estigarribia, 2020).
Analysis category 8: Creation of carbon credit projects	
JBS	Net Zero 2040: project that aims to reduce greenhouse gas emissions through projects that aim to balance the impact of emissions through the recovery of degraded areas, increasing carbon stocks in the soil, regenerative agriculture and promoting innovation (JBS, 2021).
Ambev	Acquisition of a fleet of Volkswagen electric trucks, powered 100% by electrical energy from clean sources (Estigarribia, 2020).
Analysis category 9: Control of the use of agricultural and animal pesticides, etc., in order to avoid damage to health and contamination of soil and water	
	Among ABIA member companies, the survey carried out for this study was not conclusive in this category.
Analysis category 10: Use of renewable and environmentally friendly packaging	
Tetrapak	Forest Stewardship Council sustainability standard, in which the forests where raw materials are obtained are managed in a way that protects biodiversity and ensures renewability (TETRAPAK, 2021).
	The polymers used in the lids are made from a mix of recycled and non-recycled materials, but the corresponding mass of recycled materials has been tracked throughout Tetra Pak's supply chain (TETRAPAK, 2021).
	Tetra Top packaging: top and lid are made with high-density polyethylene (HDPE), produced from Brazilian sugar cane (TETRAPAK, 2016).
Ambev	PET bottle made with 100% recycled material (AMBEV, 2022).
	Ambev Vidros produces glass bottles by recycling shards and uses them as raw material for 47% of the packaging made at the unit (AMBEV, 2022).
Analysis category 11: Minimizing waste generation	
Nestlé	Its goal is to make 100% of its packaging reusable or recyclable by 2025: candy boxes without the outer plastic film, reducing 450 tons/year of plastic (NESTLE, 2021).
	RE Initiative (REduce, REthink, REcreate). (NESTLE, 2021).
Analysis category 12: Establishment of reverse logistics and correct waste disposal throughout the production chain	
Nestlé	Reverse logistics, enabling the recycling of packaging that is destined for partner cooperatives. The raw material obtained is transformed into new items such as plant pots, buckets, trash cans, shovels, traffic cones and benches, among others (NESTLE, 2021).
Ambev	Zero Plastic Pollution: elimination and replacement; returnable and recycled packaging; Innovation and partnerships (AMBEV, 2021).
	Ambev Vidros: production of glass bottles from recycled shards (AMBEV, 2021).
	Reciclo Bees: integrates reverse logistics into the urban distribution logistics of products destined for bars and restaurants. Through distribution centers, it offers a free collection and disposal service for post-consumer packaging. Partnership with Startup Green Mining to recycle glass and empty plastic packaging (ABERJE, 2021).
Carrefour	Partnership with Startup Green Mining to recycle glass and empty plastic packaging (ABERJE, 2021).
Analysis category 13: Fighting food waste	
Unilever	Unidos Pela Comida (United for Food): ensuring that food that would otherwise be wasted in the food production chain country will be transformed into meals for people in vulnerable situations (UNILEVER, 2021).
Analysis category 14: Development of new sustainable technologies for the production chain	
PepsiCo	100% sustainable potato cultivation, part of which is produced using an aeroponic system, increasing productivity per hectare by 30 to 37% and reducing the cost per ton produced by 25%; soil regeneration through the use of forage plants and crop rotation in potato production; 60% reduction in the use of clean water in the washing stage (PEPSICO, 2021).
Ambev	Partnership with Lemon, which aims to expand the use of renewable sources in bars and restaurants (ABIR, 2020).
	Partnership with Luming Intelligence Energetics in order to generate energy from biogas, reducing carbon emissions (ABIR, 2020).
Analysis category 15: Work to raise awareness and train actors in the chain to act in a sustainable way	
Ambev and Coca-Cola	Recycle for Brazil: aims to develop waste picker cooperatives in Brazil, aiming to increase the income of waste pickers, with management guidance, donation of equipment and encouragement of networking with other cooperatives (AMBEV, 2020; Coca Cola, 2018).

Source: survey data.

b) Analysis and discussion of results

The results reveal that the food industry has directed efforts towards the development of sustainability practices. Table 1 lists the actions of food companies in favor of sustainability. As observed by Ardekani et al. (2023), who studied Brazilian agribusiness, the Brazilian food industry, despite COVID-19, maintained its commitments to a more sustainable world. Barbosa et al. (2022) demonstrated that collaboration is fundamental to the sustainable performance of companies in the agri-food industry, especially those companies oriented towards internationalization. Companies in the sector that adopt sustainable practices promote, among other things, efficient use of resources and preservation of the environment.

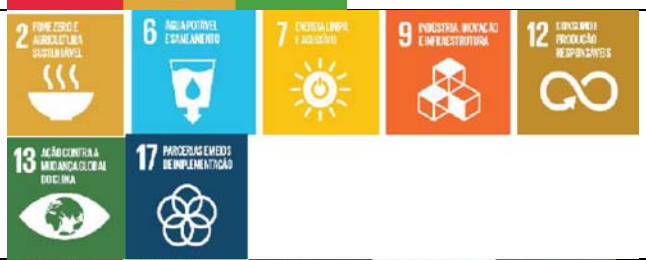
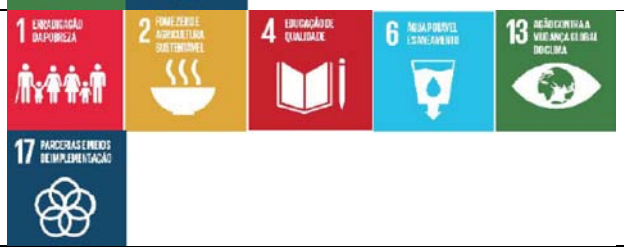
The environmental pillar reflects the impact of human activities on the environment, being directly related to the food industry, the destination of 58% of agricultural production on the national scene, as stated in the 2023 ABIA annual report and, in parallel, responsible for 10.8 % of Brazil's Gross Domestic Product (ABIA, 2023).

This data demonstrates the industry's relevance as a driver of measures that favor environmental sustainability and therefore justify the categories of analysis listed by ABIA (2012). However, the same data cited may raise questions about the relatively small number of companies analyzed. It is essential to highlight, in this context, that were studies only companies associated with ABIA (Brazilian Food Industry Association).

Considering the categories listed by ABIA, sources for analysis in this work, the first aspect considered was their respective correlation with the SDGs. It should be noted that in the perception of Toussaint, Cabanela, and Muñoz-Dueñas (2022), the SDGs defined by the United Nations are an exciting starting point for sustainability in the food industry, as they suggest challenges that encompass social issues and challenges related to food. If business activity is considered in a generalized way, it is expected that SDGs 8, 9, and 12 actions above be a source of the aforementioned actions, therefore, with sustainable and inclusive economic growth. Based on the effectiveness of these SDGs, decent work is promoted, and built resilient and innovative infrastructures, with sustainable production and consumption patterns. These are aspects that guide subsequent decision-making, considering the power and influence that organizations exert over the community (Dias & Marques, 2017). Furthermore, the aspects that make up the 15 categories of analysis must also consider the other SDGs, based on the assumption that the commitment should not be restricted to just a few measures (Menezes, 2019). Table 2 establishes an interface between the analysis categories listed by ABIA and the Sustainable Development 2030 Agenda Goals.

Table 2: Interface between the analysis categories listed by ABIA and the Sustainable Development Goals

Analysis Category	SDG linked to the topic
Search for energy efficiency and clean energy sources	
Generation of energy from burning waste from the industry itself	
Reducing consumption and reusing water	
Fighting deforestation, preserving and defending biodiversity	
Agricultural exploration in areas free from devastation	
Use of raw materials from renewable sources	

Concrete actions to minimize the causes and effects of climate change	
Creation of carbon credit projects	
Control of the use of agricultural and animal pesticides, in order to avoid damage to health and contamination of soil and water	
Use of renewable and environmentally friendly packaging	
Minimizing waste generation	
Establishment of reverse logistics and correct waste disposal throughout the production chain	
Fighting food waste	
Development of new sustainable technologies for the production chain	
Work to raise awareness and train actors in the chain to act in a sustainable way	

Source: Prepared by the authors based on survey data.

Correlating the analysis categories to the SDGs, the industry's commitment to complying with many points discussed in the 2030 Agenda is clear. Some measures satisfactorily meet the Goals, especially those in the "Planet" pillar. Topics 5 (Gender Equality), and 16 (Peace, Justice and Effective Institutions) are the only ones not listed in the foreground.

However, it is essential to note that for category 9, control of the use of agricultural and animal pesticides, to avoid damage to health and contamination of soil and water, no concrete or well-designed actions were found, which implies a possible gap in favor of compliance with the agreement reached, a factor of concern, considering that Brazil is a country in evidence in the problematic pesticides market (Friedrich et al., 2021).

Furthermore, few actions were detected for categories 2 – Energy Generation from the Burning of Industry's Own Waste; 4 – Fighting Deforestation, Preservation and Defense of Biodiversity; 5 – Agricultural

exploration in areas free from devastation; 6 – Use of raw materials from renewable sources; and 7 – Concrete actions to minimize the causes and effects of climate change. It is essential to highlight the interconnection between some points mentioned, such as, for example, the actions that promote the generation of energy from the burning of waste also imply the use of raw materials from renewable sources and, consequently, contribute to the minimization of climate changes.

It is also essential to highlight sustainability practices have to the use of renewable packaging (category 10). In the fight against the generation of plastic waste, initiatives promoting alternatives are promising. For example, they imply the minimization of waste generated, and to favoring the reverse logistics. Another happy advance concerns the development of new technologies and the promotion of training in favor of sustainability, enabling the propensity of an industry that is increasingly attentive to the real needs of the environment. Pizzi et al. (2020) demonstrated the business sector's involvement with the SDGs, with innovation for sustainability being one of the main survey axes. Venturelli et al. (2022) showed, through a case study, that sustainable innovation is essential for incorporating the Global Goals and for companies in the food sector to achieve competitive advantages.

V. Final Considerations

Undoubtedly, large companies relate to issues that have a global impact. In this context, sustainability has been a topic of great relevance in national and international debates, given demand for a sustainable stance from organizations due to the urgency to maintain the conditions necessary for quality life on Planet Earth.

The Brazilian food industry is an integral part of this scenario. This arises not only from its participation in the national GDP but considering that it is directly related by agriculture, it a decisive and vital sector for environmental sustainability, especially in a country like Brazil, where this industry competes for space with sensitive biomes and ecosystems, unique throughout the world, and threatened by economic activities.

However, the dimension of the term sustainability needs to be organized so that the sustainable actions of food companies are technically based and not just work to maintain a production model that sees environmental sustainability only as a competitive advantage, characterizing greenwashing actions when Marketing strategies deceive consumers and erode the elements that can attribute sustainability to something or someone.

On the context of the food sector and the companies studied, the commitment of companies associated with ABIA seems evident sustainable and environmentally positive practices. In addition, guiding a company's actions based on the objectives and goals that make up the 2030 Agenda for Sustainable Development can constitute a strategic parameter to be achieved, as an action plan drawn up based on the SDGs has the potential to contribute to the prosperity of organizations, the planet and the people who live on it, endorsing other frameworks designed to achieve sustainable development, with the difference that this is a global agenda widely accepted by the various types of organizations.

Although there are still many gaps, without the full achievement of some goals by the niche addressed in this survey, it is recommended that good environmental sustainability practices be further disseminated. For future studies, it is suggested that the theoretical contributions discussed in this work can be effectively applied in the context of companies.

Acknowledgment

This work was carried out with support from the National Council for Scientific and Technological Development – CNPq.

The authors would like to thank the support of ARNI/PPORPIT/Unifesspa by Edital 04/2023 - PAPQ.

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