

HEMATIC RESEARCH

10 FOR 2021: INVESTING IN THE CIRCULAR FOOD ECONOMY

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Executive Summary

This report aims to support investors interested in gauging environmental, social and governance (ESG) risks and opportunities in the global food value chain. We survey key subindustries - from agrochemicals, agriculture and aquaculture to packaged food, food retail and restaurants - in search of solutions that may support the principles of the circular economy (CE). These principles include minimizing waste and pollution, extending the use-phase of products and ecosystem regeneration. We identify 10 publicly traded companies in this space that are taking steps to manage the ESG impacts of their operations, supply chains and product offerings, while also developing related solutions. Finally, we assess a set of CE themed investment funds and discuss approaches to portfolio construction, engagement and financing strategies.

Key insights

Agricultural Chemicals: Pesticides, Fertilizers and Preservatives

- Firms offering biological pesticides may benefit from growth in this market, which is poised to reach USD 7.1bn in 2025, up from USD 2.8bn in 2018.
- The precision agriculture market is expected to grow from USD 3.9bn in 2018 to USD 9bn by 2025. Large industry players are investing in new technology.
- The natural food preservatives market, which is valued at USD 796mn as of 2018, is on course to reach USD 1.06bn by 2028.

Agriculture and Aquaculture: Best and Worst Practices

- Agricultural intensification is set to continue as demand for food production is on course to grow between 25% and 70% over the next 30 years.
- Momentum is building for organic food producers as the global organic food market surpassed USD 110bn in 2018, up from USD 15bn in 2000.
- The aquaculture industry is valued at USD 230bn and has enjoyed average annual growth around 6% since 2000.
- The price of fish oil and fishmeal feed stocks is set to increase 72% to 92% by 2030 from 2010, partly due to supply constraints.

Food Consumption: Impacts and Solutions Linked to Food and Packaging Waste

- Without concerted actions, 2.1 billion tonnes of food will be wasted annually in 2030, worth USD 1.5tn. Investable food waste solutions may offer upside.
- Between 30% and 40% of food waste happens before it reaches markets driven primarily by improper use of commodity inputs and lack of storage.
- The EU will ban single use plastics for which alternatives exist. The UK will levy a tax on plastic packaging that use less than 30% recycled materials.

Asset Management: Developing Portfolio, Engagement and Financing Strategies

- On average, eight CE funds outperformed the FTSE All World Index by 18 percentage points as of December 2020 with similar levels of volatility.
- The beverage and food subsectors accounted for less than one-fifth of signatories to the New Plastics Global Commitment in 2019.
- Between 2014 and 2020, the number of green, social and sustainable Second Party Opinions by Sustainalytics grew at average annual rate of 103%.

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Introduction

Investment themes for the new year This report is the seventh edition of Sustainalytics' 10 for series - an annual publication that focuses on 10 key environmental, social and governance (ESG) themes for investors to think about in the new year and over the longer term. Assessing risks and opportunities The themes, analysis and companies profiled in each installment of the 10 for series have varied from year to year, with underlying narratives focused on topics such as workforce diversity, cybersecurity and climate change. Last year's contribution, 10 for 2020: Creating Impact Through Thematic Investing, explored the fundamental role that the Sustainable Development Goals (SDGs) have come to play in shaping investors' sustainability roadmaps. Food security and ESG impacts In 10 for 2021, we similarly look at mounting ESG risks in the equities market with an eye towards solutions, focusing on activities that can have a positive impact on the environment, society and potentially investment portfolios. While we see investor interest building around many broad, systemic ESG risks, such as the impacts of COVID-19 and strengthening ESG policies in the US, Europe and globally, this report is narrowly focused on the food value chain because of a confluence of factors. Global food security continues to be a critical concern that has been heighted by the pandemic.¹ Yet the environmental and social footprint of food production, distribution and consumption continues to grow.² A narrow but deep dive 10 for 2021 takes a deep dive into key industries directly connected to the global

A harrow but deep dive 10 for 2021 takes a deep dive into key industries directly connected to the global food economy. As outlined in Exhibit 1.1, the 10 firms and solutions showcased in this report stem from three key areas of the food value chain: 1) agrochemicals and preservatives, 2) agriculture and aquaculture and 3) food consumption.

Beyond assessing firms directly linked to food production and consumption, we explore approaches to circular economy (CE) themed asset management.

Exhibit 1.1: 10 Companies offering ESG solutions supportive of a more circular food economy

	Company	Domicile	Subindustry	Soulition Type	Example
als & ves	Novozymes A/S	Denmark	Specialty Chemicals	Biological pesticides	Long-term goal of supplying its microbial technology to 250-500 million acres of crops, through the BioAg Alliance.
chemic eservati	Yara International ASA	Norway	Agricultural Chemicals	Precision farming	Scaling up its digital farming solutions and aiming to generate positive cash flow from digital farming by 2023.
Agro	Koninklijke DSM N.V.	Netherlands	Specialty Chemicals	Natural Food Preservatives	Participates in the Champions 12.3 initiative, which aims to reduce global food waste and food losses at retail, production and supply chains level by 2030.
ulture	Archer-Daniels- Midland Co. (ADM)	US	Agriculture	Organic feed	Offers certified organic food products, such as flour, grains, dried fruits, beans and soy, vegetable oil, nuts and animal feed products.
Agriculture & Aquacı	Olam International Ltd.	Singapore	Agriculture	Certified sustainable products	Offers products that have been certified by recognized sustainable certification schemes, including Rainforest Alliance and UTZ certified coffee and coccoa products, and Bonsucro sugar.
	Bakkafrost P/F	Faroe Islands	Packaged Foods	Using fish waste	New bio-gas plant will have capacity to convert 90-100,000 tonnes of agricultural waste annually, produce renewable energy and liquid fertilizer. Also expanding production of fishmeal derived from fish trimmings and off-cuts.
	Lerøy Seafood Group ASA	Norway	Packaged Foods	Integrated Multi-Trophic Aquaculture	Partnered with the Bellona Foundation to form the company Ocean Forest. Through co-cultivation of marine biomass, Ocean Forest aims remove more CO2 than it generates and produce new food and feed products.
Food Consumption	Starbucks Corp.	US	Restaurants	Using Recycled Plastics	Goal to achieve a 50% reduction in waste sent to landfill from stores and manufacturing facilities and aims to double the recycled content of its packaging by 2022
	Tesco PLC	UK	Food Retail	Reducing Food Waste	First UK supermarket to publish food waste data since 2013; slashed food waste by 17% in 2018-2019 compared to previous year, avoided food waste accounted for 0.45% of annual sales.
	Danone SA	France	Packaged Foods	Reducing and Recover Waste	Set a goal to reduce food waste and maximize its recovery within own operations by 50% by 2025 (2016 baseline).

Source: Sustainalytics



The food value chain

Growing demand, risk and opportunity The UN Food and Agriculture Organization (FOA) forecasts that the world's population will reach 9.7 billion by 2050.³ According to a recent study published in the journal Bioscience, this growth will correspond with an increase in demand for food production of 25% to 70% over the next 30 years.⁴ The projected increase in demand for food may suggest that portfolio exposure to the food economy can present upside. However, meeting the growing demand for food while limiting negative environmental and human health impacts remains a challenge. Circular food economy To assess ESG risks in the food value chain, our study draws on key components of Sustainalytics' ESG Risk Ratings, including Material ESG Issue (MEI) analysis, management indicators, controversy records and solutions research. Our findings shed light on how companies in this space manage risks and pursue opportunities supportive of the CE, such as minimizing waste and pollution, extending the life of products and regenerating natural systems.⁵ Agrochemicals and preservatives Agrochemicals and preservatives Agrochemical products play a major role in assuring food production worldwide. As agricultural land is limited, pesticides and fertilizers are valuable inputs to

increase land productivity. However, our research indicates that agrochemical manufactures are generally underprepared to manage key environmental and social risks linked to the production and application of their products. Material risks include carbon intensity, emissions, effluents and waste (EWW) and the environmental and social (E&S) impacts of products and services (P&S).

Yara, DSM and Novozymes Yara, DSM and Novozymes are three companies featured in this report for having relatively strong management approaches to mitigate such risks. They also offer biological alternatives to pesticides or precision farming tools, which may help mitigate unwanted impacts of hazardous pesticides and the contamination of the environment through excessive use of pesticides and fertilizers (Exhibit 1.2).







Agriculture and aquaculture

Land and water Farming, fisheries and aquaculture play a vital role in feeding the world's population and supporting economic and social development. However, as societies have moved from traditional to industrial modes of production, negative environmental and social impacts have reached unprecedented magnitudes. Material environmental impacts include emissions, water use, deforestation and biodiversity loss.

Olam International and ADM The agriculture subindustry faces mounting ESG risks stemming from production and supply chains; however, some companies are exploring solutions that use natural processes and technological innovation. While mitigating the negative impacts of industrial agriculture remains crucial, solutions on offer include certified sustainable coffee, cocoa and sugar (Olam International), and certified organic food and animal feed (ADM).

Lerøy Seafoods and Bakkafrost Key solutions in the seafood industry include steering away from wild stocks and moving from monoculture aquaculture to Integrated Multi-Tropic Aquaculture (IMTA). Seafood production on land can new technologies and approaches, such as recirculating aquaculture systems, that help maximize energy and water efficiency, while avoiding the risks of operating in open water. Lerøy Seafoods and Bakkafrost are leading the way in developing sustainable aquaculture practices and offering these types of solutions (Exhibit 1.3).

Exhibit 1.3: Seafood producers - ESG management and incidents



Integrated Multi-Tropic Aquaculture (IMTA)
Monoculture aquaculture with some co-cultivation
Involved in wild catch + aquaculture

*Composite indicator: mean of Sustainable Aquaculture and Sustainable Agriculture management scores. Incident data range: November 2010 to November 2020. Source: Sustainalytics

Food consumption

Food and packaging waste present environmental and social problems, ranging from world hunger and the overexploitation of natural resources to water stress, biodiversity impacts, climate change and inefficient resource use. For investors, these issues can present risks because they can affect portfolio companies' costs, revenues and reputation.



Hungry for change

Danone, Tesco and Starbucks

On the positive side, businesses can tap into opportunities to streamline processes and integrate circular approaches into their value chains. With emerging regulations around waste globally, firms at the forefront of addressing these issues through strong waste management programmes and solutions will be well positioned to ride the wave and limit their regulatory risks. Danone, Tesco and Starbucks are three large food companies offering solutions that we look at more closely in this report (Exhibit 1.4).



Exhibit 1.4: Food and packaging waste risk management and market cap*

*Circle size indicates highest Event Category for Environmental Impact of P&S and EEW. Smallest circle = Category 0 (Aeon only), mid = Category 1, large = Category 2. Source: Sustainalytics

Asset management

A look at CE themed funds Despite a limited track record, CE funds demonstrated robust performance in 2020, suggesting investors can generate competitive returns while tackling pressing sustainability issues. As shown Exhibit 1.5, comparing a sample of CE funds to the FTSE All World index, we find that the Erste WWF fund had the highest excess return of 77% over the past year, though it also experienced higher volatility. Fund performance over a longer timeframe and further research are necessary to assess CE investing thoroughly.

CE themed engagement and financing Investors can also engage with companies in adopting circular approaches to achieve mutual environmental goals. We outline related engagement and financing strategies at play in the market.

Other industries primed

While the food value chain is the primary focus in this report, we note that other sectors, such as technology and healthcare, are also exposed to related risks and opportunities. Investors looking to develop a CE thesis will find ample opportunity to innovate strategies across a wide range of industries and markets.





Exhibit 1.5: One-year annualized total returns and risk (standard deviation)*

*Orange: CE pure play strategy; Teal: Mixed; Grey: Benchmark. Return (gross) and risk (as measured by standard deviation) in USD from Jan 1, 2020 to Dec 31, 2020. Sources: Sustainalytics, Morningstar Direct

Exhibit 1.6 presents an overview of the structure of the report.

Exhibit 1.6: Investing in a more circular food economy



Source: Sustainalytics



Agrochemicals & Preservatives

Helping to feed the world

Agrochemical products play a major role in assuring food production worldwide. As agricultural land is limited, pesticides and fertilizers are valuable inputs to increase land productivity. While such inputs can help meet increasing demand for food, limiting their negative impacts on the environment and human health remains a challenge.

For investors, the projected increase in demand for food suggests that the agrochemicals industry may present upside in the near term. According to Phillips McDougall, the amount of crop protection products used globally has grown from less than 1.5 million tonnes in 2000 to 2.8 million tonnes in 2016, driven largely by herbicide production (Exhibit2.1).⁷ This trend is on course to continue, with some estimates indicating that the agrochemicals market will grow from USD 243bn in 2019 to USD 300bn by 2024.⁸

This chapter considers the risks that the production and application of agrochemicals pose to the environment, human health and investors' equity and bond portfolios. Overall, we find that most agrochemical manufacturers are underprepared to tackle three material ESG issues (MEIs): 1) Carbon – Own Operations, 2) Emissions, Effluents and Waste, and 3) Environmental and Social Impact of Products. On the opportunity side, we identify firms offering solutions that enable more sustainable farming practices, including biological alternatives to conventional agrichemicals and precision farming. Outside the agricultural chemicals field, we also observe a surge in opportunities for chemicals firms offering natural preservation solutions that extend the shelf life of food products.



Exhibit 2.1: Crop protection volume, active substances used globally

Sources: Phillips McDougall, 2017, Sustainalytics



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The seeds of innovation

Production and application risks

Agrochemical effects on human health Agrochemical companies can expose investors to ESG risks through the production and application of pesticides and fertilizers, which can result in impacts ranging from toxic emissions, effluents and waste (EEW) incidents to large carbon footprints. Certain pesticides (e.g., glyphosate) have also been linked to harmful effects on human health, due to their hazardous properties and inappropriate uses.

Regulations and bans in the US and EU The environmental and social impacts of some pesticides have been under increased regulatory scrutiny globally, resulting in the ban of some – until recent years – widely used pesticides. In the US, for example, six of the most commonly used pesticides in 1968 are currently banned due to their negative impact on human health and the environment.⁹ Many of the pesticides on the market, such as glyphosate and atrazine, are targets of regulatory discussions about potential bans and further restrictions.

In May 2020, the EU announced that it will take action by revising its Sustainable Use of Pesticides Directive to reduce the use of chemical and more hazardous pesticides by 50% by 2030.¹⁰ As part of the EU Green Deal, the EU also aims to reduce the use of fertilizers by at least 20% by 2030.¹¹

Fertilizers

Emissions, effluents and waste The production of fertilizers releases air pollutants and water pollution, and generates hazardous waste through the production of phosphoric and sulfuric acids. Beyond their environmental impacts, such pollution can result in significant compliance and clean-up costs for chemical companies. An example is the case of Mosaic Co., the world's largest phosphate mining company, which in 2015 agreed to a USD 2bn settlement in connection with a federal lawsuit over the mishandling of 60 billion pounds (27.2 million metric tonnes) of hazardous waste.¹²







Carbon footprint	The production and application of fertilizers are energy intensive. Technological
	improvements can help reduce energy needs, but this reduction is limited by the
	nature of ammonia production. Fertilizer prices are, therefore, sensitive to carbon
	prices set through emissions trading systems. Copenhagen Economics, an
	economic consultancy, estimates that a carbon price in European markets of
	EUR 50 (~USD 57) would lead to a 30% increase in fertilizer production costs,
	compared to a scenario of no carbon pricing (Exhibit 2.2, p. 12). ¹³

Pesticides

Persistent human and ecological risks The application of pesticides is linked to environmental and social risks due to their persistence in the environment and their effects on non-target organisms. Pesticide driftage, which is the airborne movement of chemicals from an area of application to unintended sites, can impact neighbouring crops and ecosystems.¹⁴ Beyond their direct environmental impacts, pesticide driftage can also create financial risks for companies from lawsuits or a potential product ban by regulators.

Environmental impacts Within our sample, four companies that manufacture agrochemicals – Bayer, BASF, Syngenta and Corteva – have a Category 3 (i.e. significant) event rating related to Environmental Impact of Products in the period from 2017 to 2020 (Exhibit 2.3). Most of these incidents were related to dicamba driftage. Although the US Environmental Protection Agency (EPA) had approved the use of dicamba, in February 2020, jurors in a federal court in Cape Girardeau awarded USD 265mn (to be paid by BASF and Bayer) to a Missouri farmer who claimed that dicamba destroyed his peach orchards.¹⁵ In June 2020, the US Court of Appeals for the Ninth Circuit announced that it would no longer approve three dicamba-based herbicides, XtendiMax (Bayer), Engenia (BASF) and FeXapan (Corteva), which had registrations set to expire in 2020.¹⁶ In October 2020, however, after "conducting assessments based on the best available science," the EPA approved new five-year registrations for XtendiMax and Engenia for use on dicamba-tolerant cotton and soybean crops.

Exhibit 2.3: Agrochemical production and application controversies*



Emissions, Effluents and Waste Environmental Impact of Products Social Impact of Products

*Events data for 19 companies the Agriculture Chemicals, Diversified Chemicals and Pharmaceutical subindustries, involved in agrochemicals manufacturing, 2017-2020 **Source:** Sustainalytics



Social Impacts The highest-level controversies involving agrochemical manufacturing relate to Social Impact of Products, particularly with regard to pesticide impacts on human health. A case in point is the litigation that Bayer faces related to its glyphosate-based Roundup product. Bayer has a Category 5 (severe) event rating on this issue for its production of glyphosate, a pesticide that has been associated with the development of cancer and is linked to costly lawsuits. In June 2020, Bayer agreed to pay up to USD 10.9bn to settle 75% of its glyphosaterelated lawsuits.¹⁷ The outcome of the more than 35,000 claims not included in the settlement remains uncertain.

Solutions sprouting

Deloitte estimates that the combined markets for biological pesticides and precision farming will be worth USD 16.1bn by 2025, compared to USD 6.7bn in 2018. ¹⁸ Players in the agrochemicals industry are seizing this opportunity through the acquisitions of Agriculture technology (AgTech) firms. BASF, Bayer and Deere have together acquired 11 AgTech firms since 2014.¹⁹ Nutrien also acquired several AgTech firms, including Agrible, for USD 63mn, in 2018.²⁰

Digital Farming The use of technology in agriculture can help ensure that optimal amounts of agricultural chemicals are used at the production stage and the application stage to help prevent the overuse of pesticides, fertilizers and scarce resources, such as water. Precision agriculture is a farming management approach that uses digital techniques to monitor, measure and analyze the needs of individual fields and crops, optimizing production processes. This approach enables farmers to account for soil variations and adapt their fertilizer and pesticide strategy, reducing costs and environmental impacts.²¹ A study by OnFarm found that for an average farm using agricultural technologies, including precision farming, crop yields increase by 1.75%, while water use for irrigation decreases by 8%.²² We expect significant growth in the precision agriculture market, which is on course to increase from USD 3.9bn in 2018 to USD 9bn by 2025 (Exhibit 2.4).

Exhibit 2.4: Market value for precision farming, biopesticides, 2018-2025



Source: Deloitte (2019)23



M&As

Regulations favour alternatives	We anticipate that these agrochemical solutions will be bolstered by emerging
	regulations in key markets. While the largest players in the market, including
	BASF, Bayer and Corteva are based in the US and Europe, their operational
	footprints are global. In the EU, several regulations and initiatives are on course
	to spur growth in the biological pesticides and fertilizers market.

Tailwinds in the EUAs part of the EU's Circular Economy Action Plan, a revised EU Fertilizing
Products Regulation will come into effect in May 2022. While the current
regulation focuses on conventional synthetic fertilizers, and prevents the trade
of nutrient fertilizers of plant or animal origin across borders, the revised version
is on course to creating a push for biological fertilizers by enabling easier access
to the market for manufacturers and by creating a single, uniform regulation that
will replace the current diverging national rules.²⁴ Similar to what has happened
with other EU regulations, we expect these initiatives to be replicated in other
markets, including regions in Asia.

North American context In North America, biopesticides are subject to different regulatory requirements than synthetic chemicals. In the US, some of the costly safety, ecological and health trials required for traditional agrochemicals, such as assessment of carcinogenicity effects, do not need to be conducted for biopesticides, which are considered less of a risk by the EPA.²⁵ Nevertheless, the EPA still evaluates biopesticides, which must be found to have "no unreasonable adverse effects" to people or the environment in order to receive approval.

Biological alternatives Broad bans on several pesticides, including neonicotinoids and paraquat, together with increasing regulatory and consumer scrutiny on crop protection products, such as glyphosate, are poised to continue driving growth in the market for biological alternatives to traditional agrochemical products. These alternatives include biofertilizers and biopesticides. They use biological control agents, such as fungi or bacteria, which are less toxic to the environmental and human health. Agriculture enzymes can also be used to reduce the need for traditional fertilizers. ²⁶

Food preservation solutions Other areas in which chemical companies contribute to a more circular food chain include natural preservation solutions to extend the life of food products without the use of artificial preservatives. The natural food preservatives market, worth USD 796mn as of 2018, is expected to be valued at USD 1.06bn by 2028.²⁷

Agrochemicals and preservatives – company analysis

Many of the risks related to the production and application of agrochemicals are captured under three material ESG issues (MEIs) within Sustainalytics' Risk Rating Framework: Carbon – Own Operations (Own Ops), Environmental and Social (E&S) Impact of Products, and Emissions Effluents and Waste (EEW). Our analysis indicates that most agrochemical manufactures demonstrate weak management of these MEIs, raising concerns about future risks, including evolving carbon and environmental regulations and increasing awareness of the impact of hazardous pollutants on human health and the environment.



Productions and application risks

Focusing on the big 10 For this study, we focus on 10 major firms in the chemicals industry that produce agricultural and speciality chemicals used in food production. The past decade saw a series of M&A resulting in five agrochemicals firms dominating the landscape: Bayer, Corteva, BASF, Syngenta (under ChemChina) and FMC Corp. Besides these five companies, our sample includes the fertilizer-focused companies Yara, Nutrien, the Mosaic Company and Sociedad Quimica Y Minera de Chile. Our sample also includes two specialty chemical companies that produce enzymes and bio-preservatives: Novozymes and DSM.

Seven of these 10 companies offer a range of solutions that can reduce the overuse of pesticide and fertilizers or avoid food waste. These solutions include biological alternatives to traditional pesticides or fertilizers, agricultural enzymes, precision farming tools, and food preservation solutions. A summary of these solutions is outlined in Exhibit 2.5.

Exhibit 2.5: Selection of companies offering solutions to the increase in agrochemicals usage and food waste

Company	Solution Description
Nutrien	Nutrien's Echelon platform provides a variety of tools including precision soil sampling, variable rate nutrient and seeding recommendations, yield data analysis and weather monitoring.
Yara	Yara's N-Sens is a sensor that is installed on top of tractors to scan and analyze the crops' need for nitrogen supply, adjusting nitrogen fertilizer application rates as needed.
BASF	BASF's outcome-based business models, which are marketed under its Xarvio brand, aims to enhance yield forecasts. The company has also invested in the development of biologicals, such as the insecticide Velifer, which is derived from a fungus.
Corteva	Corteva is collaborating with M2i, a leader in the field of pheromones for crop protection and animal health, on the research, development, and global commercialization of pheromone-based insect control solutions.
Bayer	Bayer offers digital solutions (Climate FieldView) to provide farmers with machine-generated agronomic data. The firm offers biological solutions, and has exclusive distribution rights over Flipper, a bioinsecticide, which is reportedly safe for pollinators.
Novozymes	Novozymes recently expanded its activities into microbes, used to replace or complement traditional fertilizers and pesticides, e.g. Actinovate, a microbial fungicide. It offers food preserving solutions, such as Ban, an organic anti-staling product.
DSM	DMS offers preservations products, such as DelvoCid, which protects food against bacteria, mold, and yeast, using natural preservatives.

Source: Sustainalytics

MEIs, events and solutions

High unmanaged risks	Exhibit 2.6 shows the relative positions of all 10 sampled chemicals firms regarding their combined unmanaged risk scores on the three key MEIs and their track record on related controversies. The wide range of these companies' combined unmanaged risk scores on these MEIs (10.7-18.6) and event categories (0-5) highlights substantial gaps in ESG risk management. We also differentiate companies based on their solutions offerings.
Corteva and FMC Corp are lagging	The higher unmanaged MEI risk scores of Corteva and FMC Corp are driven by weak management of environmental issues, and a lack of disclosure regarding measures implemented to tackle risks related to the release of air pollutants and effluents, and generation of hazardous waste. FMC Corp has, nevertheless, announced a large investment in the development of biopesticides and precision crop chemical technologies. Currently, the company's precision agriculture platform, Arc Farm Intelligence Platform, covers 3.8 million acres and represents USD 250 million of FMC's revenue outlook range of USD 4.72-4.78 billion for FY2020. By the end of 2021, the company aims to increase the reach of the



platform to USD 25 million, representing USD 1 billion of its revenue.²⁸ FMC is proactive in adapting its portfolio with more environmentally friendly products.

Corteva is in an exceptional case because it has not yet released its sustainability report since the separation from DowDuPont in April 2019. We expect the company's disclosure on ESG-related matters to improve after the release of its first report, scheduled to take place in 2021. While it faces more downside ESG risk than the other nine firms in our sample, Corteva is collaborating with a company that operates in the field of pheromones for crop protection, M2i, to develop pheronome-based insecticides.²⁹ Corteva also expects to grow in its Spinosyns Insecticides product line, which consists of naturally derived insecticides, by 30% between 2020 and 2023. Corteva expects the line to be worth over USD 1bn of its sales (USD 13.8 bn in FY2019) by 2023.³⁰

Exhibit 2.6: Agro and specialty chemical firms - MEIs, events and solutions



Yara and Nutrien leading the pack Yara and Nutrien stand out for their lower levels of unmanaged risk and lack of involvement in significant events (which form part of the MEI assessment, along with ESG indicators on related policies and programmes). Both companies offer biological alternatives and precision farming solutions, which may help position them to mitigate environmental and social risks, and to benefit from the increased demand for more sustainable alternatives to traditional agrochemical products.

Bayer and BASF While Bayer and BASF offer both biological alternatives and precision farming solutions, concerns include their involvement in events, with a Category 5 (severe) for Bayer, and a Category 3 (significant) for BASF. As noted above, Bayer has faced scrutiny concerning its production of glyphosate, a pesticide linked to the development of oncological diseases, while BASF's Category 3 controversy relates to dicamba driftage.



DSM and Novozymes Due to the nature of the products that they manufacture, specialty chemicals companies tend to have generally lower unmanaged risk compared to agrochemicals. Moreover, both companies have strong programmes to tackle ESG risks, which contribute to their overall lower unmanaged risk scores. Novozymes and DSM offer natural preservation solutions, including enzymes and cultures that extend the shelf life of food products. Novozymes offers microbial solutions that can be used to replace or complement traditional agrochemicals products use (Exhibit 2.5).

A bird's eye view

Overall, we observe that most chemical companies offering solutions such as digital farming or natural preservatives have, on average, lower unmanaged risk (26) than the average for the chemical industry (31.8), indicating that solutions offering and ESG risk mitigation may go hand in hand (Exhibit 2.6). Exceptions include Bayer and Nutrien, which have higher than average ESG risk scores.

Exhibit 2.6: Contributions of three MEIs to overall ESG risk rating scores



Our research indicates that the revenue streams from these products and services are still relatively limited within the agrochemical subindustry, with none of the sampled companies deriving more than 10% of its revenues from biological alternatives or precision farming solutions. Nevertheless, we expect that growing interest in the market and pressure from regulatory changes will lead to increased investments in these solutions in the coming years.

Harvesting insights

Our research indicates that agrochemical manufacturers generally have gaps in terms of their preparedness to manage the environmental and social risks linked to the production and application of their products. Still, we have identified players in the chemicals industry – Yara, DSM and Novozymes – that have strong management programmes to mitigate those risks. These companies also offer biological alternatives to pesticides, or precision farming tools, which may help mitigate the unwanted health impacts of hazardous pesticides, or contamination of the environment through excessive use of pesticides and fertilizers.



Overall ESG risk ratings

Yara, DSM and Novozymes



Yara International ASA

Closing the loop on food production

Domicile Norway Industry: Chemicals Subindustry: Agricultural Chemicals Ticker: OSL:YAR Mkt cap: USD 10,938 mn* * as of 13 January 2021

Rolling 30-day return (%)*



Jan-20 Mar-20 Jun-20 Sep-20 Dec-20 —Yara International ASA —Morningstar Global Agricultural Inputs *1 Jan. 2020 - 31 Dec. 2020 Source: Morningstar

Collaboration to close the loop

Looking beyond 2021

Key insights

- Yara has set a goal to reduce its carbon intensity by more than 10% by 2025, compared to 2018 levels.
- The company is working with Veolia, a provider of water, waste and energy management solutions, to transform organic waste streams into fertilizers.
- Yara is scaling up its digital farming solutions and aims to achieve positive cash flow from digital farming by 2023.

Overview

Based in Norway, Yara is a world leader in nitrogen production, with fertilizer being its largest end market. The company stands in the agricultural chemical subindustry for its focus on integrating renewable resources in food production. Yara has released a Position on the Circular Economy statement, outlining its commitment to move from a linear-consume-waste model into a circular one, focusing on three key areas: avoiding waste, industrial symbiosis and closing the cycle.³² Through the scaling up of its digital farming solutions, Yara also aims to achieve positive cash flow from digital farming by 2023.³³ As part of its effort to reduce carbon emissions, the company is collaborating with Nel, an electrolyzer manufacturer, to produce carbon-free hydrogen for fertilizer production. The two companies expect to start operating a 5 MW prototype in 2022, providing green hydrogen to one of Yara's ammonia plants in Norway.³⁴

Yara has been collaborating with Veolia, a company that provides water management, waste management and energy services, with a goal to close the nutrient cycle by transforming organic waste streams into fertilizers. Veolia stands to benefit from access to recovered nutrients and knowledge in handling materials, while sharpening Yara's expertise in mineral fertilizer production.³⁵

Yara has set a goal to become carbon neutral by 2050, and has an intermediate target of reducing its carbon intensity by more than 10% by 2025, compared to 2018 levels. The potential market for nutrient recycling towards fertilizers in Europe is estimated to be worth up to EUR 2bn. ³⁶ The new EU Fertilizer Regulation, which will come into effect in 2022, is likely to reinforce this growth trend. By having a partnership with Veolia to create revenue streams from the recycling of nutrients in agriculture, Yara appears well positioned to scale up its operations in this area.

Exhibit 2.7: Relevant assessment criteria for Yara

Data point	Category	Rating
Overall Unmanaged ESG Risk	Medium Risk	25
Subindustry Rank	1st Percentile	1 of 52
E&S Impact of Products and Services	Low Risk	3.4
Emissions, Effluents and Waste	Low Risk	2.7
Carbon - Own Operations	Medium Risk	4.8

Source: Sustainalytics



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Novozymes A/S

Catalysing a circular economy

Domicile: Denmark Industry: Chemicals Subindustry: Specialty Chemicals Ticker: CSE:NZYM.B Mkt cap: USD 16,020 mn* * as of 13 January 2021



Enabling consumers' carbon reduction

Looking beyond 2020

Key insights

- With a 48% share of the enzymes market, Novozymes is well positioned to benefit from the increased demand for environmental efficient solutions.
- Novozymes has recently expanded its activities into microorganisms, which can replace or complement traditional fertilizers and pesticide products.
- Novozymes has set a target to reduce its absolute CO₂ emissions by 50% by 2030, compared to a 2018 baseline.

Overview

Novozymes focuses on the R&D and production of industrial enzymes and microorganisms. The company has a dominant position in the industrial enzymes market, with a 48% market share.³⁷ In 2019, Novozymes set a series of sustainability goals that it aims to meet by 2030. These goals include the science-based target to reduce its absolute CO_2 emissions from own operations by 50% by 2030 (baseline: 2018). The firm's trajectory in reducing its carbon emissions has so far been positive. While Novozymes' revenues have increased by 48% since 2010, its absolute emissions have only risen by 10%.³⁸

Through product life cycle assessments, Novozymes can compare the environmental impact of conventional and enzyme-assisted solutions delivering the same benefit to users. According to these studies, in 2019, customers saved an estimated 87 million tons of CO_2 emissions by using the company's products. Novozymes' microorganisms can replace or complement the use of pesticides and fertilizers, minimizing impacts on the environment and human health.

Since 2014, Novozymes has collaborated with Bayer, through its BioAg Alliance, on the development of microbe-based products to be used in agriculture. In 2019, Novozymes included other companies, Univar Solutions and UPL, in the partnership.³⁹ The new set-up is expected to enable Novozymes to capture more value from its investments in BioAg and meet the long-term target of supplying microbial technology to 250-500 million acres of crops. Considering these initiatives, and the company's strong track record in meeting its sustainability commitments, Novozymes appears well prepared to tackle the social and environmental impact of its products' risks and opportunities.⁴⁰

Exhibit 2.8: Relevant assessment criteria for Novozymes

Data point	Category	Score/Assessment
Overall Unmanaged ESG Risk	Low	16.1
Subindustry Rank	1st Percentile	1 of 121
E&S Impact of Products and Services	Low	2.2
Emissions, Effluents and Waste	Negligible	1.1
Carbon - Own Operations	Negligible	1.6

Source: Sustainalytics



Koninklijke DSM N.V.

Unlocking value from limited resources

Domicile Netherlands Industry: Chemicals Subindustry: Specialty Chemicals Ticker: AMS:DSM Mkt cap: USD 24,142 mn* * as of 13 January 2021



Transformation towards lower impact

New prospects in 2021

Key insights

- DSM has set a science-based target of achieving a 30% reduction in its GHG emissions (scope 1 and 2) by 2030, compared to 2016 levels.
- In 2019, 63% of DSM's sales delivered performance in line with competing solutions.
- DSM is collaborating with Syngenta on the joint development of microbials for crop protection agents.

Overview

DSM operates in the fields of nutrition, health and materials. In recent years, the company has restructured its business through mergers and acquisitions to move towards a more nutrition-focused business model. In 2019, DSM derived 67% of revenue from its nutrition segment, which includes solutions that extend food products' shelf life. The company has also been collaborating with Syngenta on the development of microbial-based agricultural solutions, including bio-pesticides. In 2019, DSM submitted its feed solution product, Project Clean Cow, which enables a 30% emission reduction of GHG methane from cattle, for regulatory approval in the EU.⁴¹

DSM has made progress in reducing the environmental impact of its activities. At the end of 2019, the company had reduced its GHG emissions by 17% compared to the 2016 baseline. DSM also considers climate metrics when determining the compensation of its executives and board of directors. The firm evaluates the social and environmental impact of its products at each stage of the lifecycle and compares it with the main competing solution on the market. Products delivering high performance with a lower impact, "Brighter Living Solutions", accounted for 63% of the firm's sales in 2019.⁴²

DSM aims to source 75% of its electricity from renewable sources and to reduce its scope 1 and 2 GHG emissions by 30% by 2030 (baseline: 2016).⁴³ DSM is also part of the Champions 12.3 initiative, focused on reducing global food waste and food losses at the retail, production and supply chain levels by 2030.⁴⁴ Considering its proactive approach to the environmental and social impact of its products, DSM appears well positioned to take a leading role in the transformation towards a circular economy model. **Exhibit 2.8: Relevant assessment criteria for DSM**

Data Point	Category	Assessment
Overall Unmanaged ESG Risk	Low Risk	16.2
Subindustry Rank	2nd Percentile	2 of 121
E&S Impact of Products and Services	Negligible Risk	1.9
Emissions, Effluents and Waste	Low Risk	2.2
Carbon - Own Operations	Negligible Risk	1.8

Source: Sustainalytics



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Agriculture & Aquaculture

Sustaining the lifeline

Farming, fisheries and aquaculture play a vital role in feeding the world's population and supporting economic and social development. However, as societies have moved from traditional to industrial modes of production, negative environmental and social impacts have reached unprecedented magnitudes.

While agriculture and aquaculture companies and their shareholders stand to benefit from the growing demand for food, they also face material ESG risks. Intensive production in these industries contributes to biodiversity loss and climate change – issues of heighted public scrutiny and regulatory action. Moreover, climate change and volatile weather events present a physical challenge to the growth of agricultural and aquacultural commodities.

Still, capital can be directed to solutions that provide more sustainable methods of producing food. Organic, regenerative agricultural, and holistic approaches to farming on land and in the sea have become a major focus for food producers and are attracting a wave of investments. According to recent estimates, over 71.5 million hectares of land are certified as organic (1.5% of total global agricultural land).⁴⁵ The global organic foods market has grown from USD 15bn in 2000 to USD 110bn by the end of 2018 (Exhibit 3.1). Technological innovation is another source of solutions, with AgTech firms offering energy-efficient approaches to food production that use less water, land and transport.

This chapter explores the growing risks and opportunities facing firms involved in agriculture, wild fisheries and aquaculture. We find considerable variance in how companies in these industries manage ESG risks. While some focus on impact mitigation, others go beyond that by offering fresh solutions, such as certified organic produce and sustainable seafood standards.

Exhibit 3.1: Growth of organic foods market



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Risks and solutions



Overexploitation risks in agriculture

Feeding the world in 2050 Since roughly the start of the 20th century and well into the 21st century, farming and agriculture have grown increasingly industrial, intensive and expansive.⁴⁷ According to the Food and Agriculture Organization (FAO), global agricultural production grew over 150% between the 1960s and 2010, while the expansion of land for cultivation over that same period climbed 12%. 48 Increasingly efficient systems of producing greater quantities of food at lower prices have enabled this growth in food production to feed a world that has more than tripled in population since 1950.⁴⁹ To keep pace with population growth by 2050, food production will have to increase by as much as 70% from 2005 levels.⁵⁰ Reap what you sow Despite the growing demand for food, one-third of food is lost or wasted globally throughout the supply chain⁵¹ and the number of people affected by hunger globally has been on the rise since 2014.52 This growth in production has also led to negative environmental externalities caused by intensive farming, including climate change, deforestation, pollution, water shortages, eutrophication, methane emissions, nitrogen deposits, soil degradation and plastic waste. As shown in Exhibit 3.2, the food industry produces over a quarter of global greenhouse gas (GHG) emissions. Agriculture is responsible for 50% of habitable land use, 70% of global freshwater withdrawals and 78% of water eutrophication, i.e. pollution of global oceans and freshwater. Assessing investments These impacts and associated scrutiny from the public and regulators expose

These impacts and associated scrutiny from the public and regulators expose food production companies to mounting ESG risks. Investors can address these concerns by gauging the exposure of their holdings to these issues and developing related portfolio and corporate engagement strategies.



Exhibit 3.2: Global environmental impacts of agriculture and food

Sources: Our World in Data,53 Sustainalytics



- GHG Emissions Broad political momentum to reign in global GHG emissions in the wake of the Paris Agreement is driving stricter carbon regulations over the medium to long term. As governments set targets and implement action plans to reduce emission intensity, many are reviewing the agricultural sector. Tightening carbon rules may result in increased compliance costs and capital expenditure for R&D and restructuring operations. ⁵⁴ Food companies and investors alike are increasingly recognizing the materiality of this issue. Investors can address carbon risk exposure by underweighting, excluding or engaging with portfolio companies with operations that have outsized GHG intensity and footprints.
- Links between land and climate Of the 1.6 billion hectares of the world's productive land currently used to grow crops,⁵⁵ a third has been degraded by erosion, nutrient depletion, acidification, pollution and other unsustainable land management practices. ⁵⁶ Every continent is experiencing from 12% (Europe) to 37% (Australia and Oceania) stressed or declining productivity due to pressures on vegetated land (Exhibit 3.3). As outlined in the Intergovernmental Panel on Climate Change's (IPCC) special report on climate change, degraded land becomes less productive, restricting what can be grown, limiting the soil's carbon absorption abilities and reducing the amount of moisture that can be retained. ⁵⁷ This degradation exacerbates climate change, which further accelerates land degradation, putting food production and global markets at risk.
- Declining arable and productive land Climate change and biodiversity loss raise concerns about the long-term viability of some agribusinesses. The FAO forecasts that by 2050, the available arable and productive land per person will fall to a quarter of what it was in 1960.⁵⁸ The acceleration in deforestation and biodiversity loss further threatens food security, as it reduces the fertility of the land and increases the vulnerability of crops to pests and disease. Climate resilience and the ability to produce food is worsened by the fact that 75% of crop genetic diversity has already been lost.⁵⁹ The developing food crisis has the potential to destabilize economic growth.

Exhibit 3.3: Declining productivity (%) per continent



Sources: FAO,60 Sustainalytics



Running dry Agriculture is heavily dependent on water availability, accounting for the vast majority of global freshwater withdrawals and consumption. Approximately 70% of the water that humans use goes into food production.⁶¹ In early 2020, the world's biggest soy exporter, Brazil, marked down its soybean production forecast due to drought in the state of Rio Grande do Sul, which reduced its soybean production estimate from 19 million metric tonnes to 10 million tonnes.⁶² The World Economic Forum's annual report on global risks identifies the water crisis as one of the top 10 risks in terms of likelihood and impact.⁶³ Water stress can have harmful effects on human health, economic activity and investable assets.

Overexploitation risks in fisheries and aquaculture

The increasing efficiency and scaling of the fishing industry has led to a situation where, according to some estimates, global fishing capacity could catch the world's fish four times over and cause significant marine damage.⁶⁴ Overfishing has led to a situation where around 90% of fish stocks globally are classified as overexploited, fully exploited, depleted or near a state of collapse. 65 Consumption of this natural resource is outpacing natural regeneration. Planet Tracker reports that the world's biggest fishing nation, Japan, experienced a 66% decline in seafood production between 1985 and 2017, and warns that profits are at risk if overfishing and unsustainable fishing practices continue.⁶⁶

Better fish to fry With many wild fish stocks collapsing, farmed seafood has become integral to feeding the growing global population and to satisfying the rising demand for protein. By alleviating the pressure on wild stock, aquaculture has been framed as a sustainable solution. Between 1960 and 2015, aquaculture grew from providing 5% of the total reported global seafood supply to over 50%.⁶⁷ The industry, now valued at USD 230bn, has increased at an average annual growth rate of 6% since 2000, providing significant shareholder returns.⁶⁸ While wild catch plateaued in the 1990s, aquaculture grew from 13 million tonnes in 1990 to over 80 million tonnes in 2018 (Exhibit 3.4).69

Exhibit 3.4: World capture fisheries and aquaculture production





Scaling up

Taking stockWhile aquaculture has the potential to be more sustainable than wild catch, the
Farm Animal Investment Risk & Return (FAIRR) initiative, an investor network
representing USD 12tn AUM, flags several environmental challenges for the
aquaculture industry, including GHG emissions, effluents, habitat destruction,
biodiversity loss, fish feed supply, fish welfare, disease and antibiotic use.71Investors involved in the initiative recognize the risk to profits and look to engage
with the companies in the industry to improve their management practices and
mitigate risks. They also call for the broader investor community to take an
active position in reshaping food production, including aquaculture.

Animal welfare concern Highly stocked fish pens are susceptible to disease and sea lice, and poor handling can result in mass fish die-offs or fish escaping, which can cost millions in lost revenue. Some aquaculture companies have been involved in disputes with communities that have protested, petitioned and filed lawsuits over chemicals and medication used to treat salmon and the breeding of diseased or lice-infested fish, which have impacted surrounding marine ecosystems and wild salmon.⁷²

Another environmental risk of aquaculture is eutrophication, which occurs when the disposal of dead fish, fish faeces, and nutrient-rich matter pollutes local water sources and ecosystems. Farmed fish produce the second highest eutrophying emissions (run-off of excess nutrients) per kilogram (after beef), and farmed prawns follow at the third highest (Exhibit 3.5). In some instances, aquaculture companies have faced costly clean-up expenses and even had their licences revoked, where operational waste and disposal of dead fish has led to environmental damage.⁷³ While such costs and licence revocations can present a risk to investment returns, they can also create opportunities for targeted company engagement.



Exhibit 3.5: Food product by eutrophication emissions, select product groups

Sources: Our world in data,⁷⁴ Sustainalytics

The aquaculture industry also faces risks stemming from its dependency on wild fish stock to feed farmed fish. Approximately 70% of fishmeal and fish oil

Fish out of water

Fishy business



(FMFO) produced is derived from the harvest of small open-ocean fish, such as anchovies and sardines, which further exacerbates the depletion of wild stocks.⁷⁵ The World Bank projects that the price of FMFO will increase between 72% and 92% by 2030 from 2010, partly due to supply constraints.⁷⁶ Such a significant price hike could put profits at risk because feed already represents the largest cost in aquaculture. Companies are now turning to alternatives such as soya; however, soya production is a key driver of tropical deforestation and is becoming increasingly scrutinized by international organizations, society, governments and investors.⁷⁷ Investors can assess the supply chains of portfolio firms to gauge exposure.

Change on the horizon

Government and investor interest In a bid to preserve natural capital for future generations, governments are progressively pushing for regulations, while investors seek to mitigate the ESG risks of underperforming food companies and avoid the possibility of stranded assets. On the flip side, government funding to promote sustainable food systems through better ecological practices and technical innovation, along with investor interest, have spurred solutions. In the following section, we will look at the trends, developments and solutions that are blooming. Many of the key solutions are captured in the European Commission's Farm2Fork strategy (Exhibit 3.6).

Exhibit 3.6: Sustainable food production at the heart of the EU's Green Deal

EU's Farm2Fork Strategy	Ensuring sustainable food production
Renewable & bio-based	Investing in anaerobic digesters to produce biogas from sources of waste and residues.
Chemical pesticides	Use of safe alternative ways of protecting harvests from pests and diseases. Techniques include crop rotation and mechanical weeding.
Excess nutrients	Support sustainable agricultural practices, notably in hotspot areas of intensive livestock farming and of recycling of organic waste.
Animal feed	Reduce the dependency on critical feed materials by fostering plant proteins as well as alternative feed materials such as insects, marine feed stocks (e.g. algae) and by-products from the bio-economy (e.g. fish waste).
Animal welfare	Reduce overall EU sales of antimicrobials for farmed animals and in aquaculture by 50% by 2030.
Organic farming	Boost the development of the EU's organic farming area with a goal of 25% of total farmland by 2030.
Eco-schemes	Fund sustainable practices such as precision agriculture, agro-ecology, carbon farming and agroforestry.
Farmed seafood	Generate a lower carbon footprint than animal production on land. Support for the algae industry as an important source of alternative protein.

Sources: European Commission

Digging deeper

Assessing ESG risk and solutions – agriculture

A circular business model for agriculture involves the reuse of water and waste, including manure and fish by-products, which can replace synthetic fertilizers with organic matter. More efficient techniques can be applied, for instance to increase crop yields, without increasing resource input, or using extra land. Improved efficiency can be achieved through better fresh water and soil management, crop genetics, the use of drones to monitor and optimize agricultural operations, or drip irrigation, a technique that saves on water use.



Sprouts of innovation Organic farming and the use of biodynamics can help maintain good soil quality, while reducing the impact on biodiversity and generate energy from renewable energy sources. These practices could also close several loops and prove more profitable than conventional farming. While organic farming practices are atypical in the industry, some food companies support regenerative farming practices to improve soil health by limiting chemical inputs, rotating crops, reducing soil tillage, and using crop residues as compost. In this sense, agricultural companies are often laggards, as they display little effort in this field despite being highly exposed. However, some offer products that are certified organic or certified according to other sustainability standards (Exhibit 3.7).

Exhibit 3.7: Sustainable solutions and mitigation efforts

Company	Solution Description
Archer-Daniels-Midland (ADM)	The company provides organic animal feed products, as well as organic flour, grains, dried fruits, beans and soy, vegetable oil, nuts, among others. The organic certification is issued by USDA in most cases.
Costa Group Holdings	Costa group offers organic food options. The company received NASAA organic certification for dried dates, fresh avocadoes, bananas, and blueberries.
Olam International	Olam offers a range of products that have been certified by recognized sustainable certification schemes. These include Rainforest Alliance and UTZ certified coffee and cocoa products, and Bonsucro sugar.
IOI Corp.	IOI Corp Bhd. Reports that it aims to be 100% Roundtable on Sustainable Palm Oil (RSPO) certified by 2023.
Sime Darby Planation	Sime Darby Plantation reports that it is the world's largest producer of Certified Sustainable Palm Oil (CSPO) and is committed to implementing sustainability standards, such as the Roundtable on Sustainable Palm Oil (RSPO), and the Rainforest Alliance.
Bunge	Bunge reports that in 2019, it had managed a 21.2% reduction in water use (per mt of production) compared to its 2016 baseline. The company also has targets in place to reduce waste, emissions, and energy use.

Sources: Sustainalytics

Cross-section

To assess the preparedness of agriculture companies to manage material their ESG risks, we look at a sample of eight companies involved in a range of distinct business models, commodity focuses and domiciles, including US-based agricultural commodity processors and traders (ADM, Bunge), palm oil companies (Sime Darby Plantations, IOI Corp), companies that grow fruits, vegetables, nuts and spices (Olam, Costa), and animal feed producers based in China (New Hope Liuhe, Beijing Dabeinong).

Material environmental issues Five environmental MEIs account for about half of the overall ESG Risk Rating scores of each of the agriculture firms in our sample: Carbon – Own Operations (Own Ops), Environmental and Social (E&S) Impact of Products, Land Use and Biodiversity, Land Use and Biodiversity – Supply Chain, and Resource Use. While we assess all of these companies as having high to severe ESG risk, a 24-point spread separates the firm with the highest risk rating (Beijing Dabeinong Technology Group) and the lowest (IOI Corp Bhd), as shown in Exhibit 3.8.

Risky resource use The resource and land use MEIs are important drivers of the high levels of risk facing this subindustry. This is due to the high volumes of water used in agriculture, as well as companies' dependency on the availability of this resource. Changes in land use can lead to deforestation and a loss of biodiversity, and is an issue that companies face both in relation to their own operations, as well as within their supply chains. Significant controversies in the industry relate to land use and biodiversity, particularly regarding soy supply chains in South America, and palm oil plantations in Southeast Asia and Africa.





Exhibit 3.8: Agriculture firms - MEIs, events and solutions

Source: Sustainalytics

Sustainable solutions While IOI Corp and Sime Darby have the lowest overall ESG Risk Rating scores among the companies in our sample, ADM and Olam are similarly positioned in terms of overall ESG risk and, according to Sustainalytics' Sustainable Products Research, offer considerable levels of revenue exposure to sustainable food manufacturing. Olam offers certified sustainable products, such as Rainforest Alliance and UTZ-certified coffee and cocoa products, and Bonsucro sugar (estimated at 7.5% of FY2018 revenue). ADM also offers a range of organic products (representing an estimated 7.5% FY2018 revenue) and is involved in providing products for sustainable agriculture through its organic feed offering (representing an estimated 2.5% of FY2018 revenue). Although Costa also offers solutions related to organic food manufacturing, its ESG Risk Rating is severe (40.2).

Assessing solutions and ESG risk – fisheries and aquaculture Advanced aquaculture systems include co-cultivation and natural solutions to close resource loops and reduce exposure to environmental risks. Some companies are moving to land-based and recirculation aquaculture processes, which can mitigate risks associated with physical climate change, warming sea temperatures, algal blooms, sea lice and disease. Exhibit 3.9 highlights a selection of aquaculture companies offering such

solutions. Innovations range from reducing dependency on critical feed in favour of alternative marine biomass (e.g. algae) and by-products (fish-waste) to cocultivation. Cultivating different marine species can offer several solutions. Other circular solutions include converting fish waste to energy or bio-fertiliser.

Assessing risk management To assess both risk management practices in the seafood industry and compare companies offering different solutions, we focus on 10 major firms involved in aquaculture or wild catch fisheries. Most of the selected aquaculture companies are headquartered and located in Norway, the world's second-largest seafood exporter, but also have operations covering all the main salmon farming hotspots, including Chile, Canada, the Faroe Islands, Ireland and Scotland. Our



Symbiotic approaches

Co-cultivation

analysis also covers some of the biggest publicly traded seafood companies involved in wild catch and shrimp aquaculture in the Asia-Pacific region, an area that leads in seafood production.

Exhibit 3.9: Several pathways to circularity for the aquaculture industry

Company	Circular solutions
Tassal	Integrated Multi-Trophic Aquaculture (IMTA) is the co-cultivation of fed species (e.g. salmon) and extractive species (e.g. oysters and seaweed) which allows for excess nutrients and waste from fish farming operations to be absorbed by extractive species, improving water
Lerøy Seafood	Marine biomass used in IMTA can be harvested and converted into feed for salmon or other fed species. By-products from seafood production is another sustainable source of feed. The aquaculture industry is also exploring the use of microbial biomass (microalgae, yeast,
Grieg Seafood	Deploy 100% recyclable, long life and drinking water approved artificial seaweed made from PVC. Algae, shells and fish scales are also being tested as a viable alternative to plastic used in fishing and aquaculture.
Bakkafrost	Biological waste from fish can be converted into a biological fertiliser for agricultural production. The industry is also investing in biogas facilities to process the sludge and convert it into energy.
Charoen Pokphand Foods	Land based aquaculture which deploys a recirculation aquaculture system (RAS) can circulate water through elaborate a high-tech filtration system that removes and sanitizes waste. The waste can then be dehydrated and reused as nutrient-rich compost, biofuel, etc.

Sources: Sustainalytics Exhibit 3.10 shows the position of these 10 companies on a composite measure of two ESG management indicators: Sustainable Agriculture and Sustainable Aquaculture. For seafood companies, we assess management programmes for agricultural suppliers, including those sourcing vegetable materials as an ingredient in fish feed. For Sustainable Aquaculture we look at efforts to reduce the dependency on wild stock and the certification of operations.

We also compare companies in terms of the types of solutions they offer and the number of incidents they have experienced related to land use and biodiversity and their emissions, effluents and waste (EEW). Overall, we find that the aquaculture companies that demonstrate stronger management of these indicators generally outperform companies involved in wild catch, which have weaker disclosures on issues concerning sustainable seafood production.

Exhibit 3.10: Seafood producers - ESG management and incidents



Integrated Multi-Tropic Aquaculture (IMTA)
Monoculture aquaculture with some co-cultivation
Involved in wild catch + aquaculture

*Composite indicator: mean of Sustainable Aquaculture score and Sustainable Agriculture score. Incident data range: November 2010 to November 2020. Source: Sustainalytics



Management

Incidents

Integrated Multi-Tropic Aquaculture	Lerøy Seafood and Tassal Group are among the first firms in our sample to explore solutions in Integrated Multi-Tropic Aquaculture (IMTA). While Lerøy has a stronger management score and less involvement in controversies, Tassal has been implicated in several notable controversies, such as lawsuits filed and warnings issued by the Aquaculture Stewardship Council (ASC) over fish disease, alleged attempts to influence investigations into pollution from salmon pens and fish fatalities due to human error. ⁷⁸
Co-cultivation	Four companies – MOWI, Bakkafrost, Greig Seafood and SalMar – are also using co-cultivation in some form, in their battle against sea lice. These companies deploy cleaner fish-like lump suckers, which remove sea lice from the salmon. This natural solution reduces the need for medication and chemical treatments and improves animal wellbeing overall.
Plants save the day	Companies involved in fish farming are looking to reduce their dependency on wild fish stocks as raw materials for feed. Of the monoculture producers, Bakkafrost is a frontrunner, with the highest management score. The firm embraces circular solutions in several ways, such as using fish by-products for feed. Salmar and Mowi are moving to plant-based proteins and, where soya is used, these companies commit to using sustainable soya certified by ProTerra or Roundtable on Sustainable Palm Oil to avoid risks associated with soya-driven deforestation. Both display average management, but Mowi's involvement in controversies raises concern. Mowi has faced regulatory action in the UK, Chile and Canada related to pollution and chemical use, as well as criticism by NGOs over sourcing soya linked to land grabbing, illegal pesticides and deforestation in Brazil. ⁷⁹
Certifying sustainable seafood	Aquaculture companies operating their own farms can seek certification by the ASC for their farming operations, while fisheries can aim for Marine Stewardship Council (MSC) certification. Some companies extend efforts and seek certification of seafood from ocean to plate through the Chain of Custody Standard. Of the three companies with exposure to wild catch fisheries (Thai Union, Austevoll and Nippon), only the first two pursue MSC certification. Nippon's management score is the lowest, reflecting its lack of effort in sustainable seafood production, while Thai Union and Austevoll both score average management, reflecting their efforts to improve sustainability standards on aquaculture production and wild fisheries. However, Thai Union has been involved in several incidents, including reports of destructive fishing practices, illegal fishing and overfishing in its supply chain.
Two leaders	Overall, Lerøy, which offers IMTA, and Bakkafrost are clear frontrunners, with the strongest agriculture and aquaculture management systems, few incidents and notable efforts to deploy circular and natural solutions to environmental challenges.



Investing in the circle of life

Two sides of the coin: risk and solution While the agriculture and aquaculture industries face mounting ESG risks stemming from their production and supply chains, some companies are exploring solutions that leverage natural processes and technological innovation.

Landing on our feet Key environmental impacts of agriculture companies include emissions, water use, deforestation and biodiversity loss. While mitigating negative impacts remains crucial, solutions on offer include certified sustainable coffee, cocoa and sugar (Olam International), and certified organic food and animal feed (ADM).

The sea and solutions Key solutions in the seafood industry include steering away from wild stocks and moving from monoculture aquaculture to IMTA. Seafood production on land can embrace technology and recirculating aquaculture systems to maximize energy and water efficiency, while avoiding the risks of operating in open water. Looking ahead, we expect to see innovations in the blending of aquaculture and food production through aquaponics, reaping the benefits of the symbiotic relationship between fish and plants. While none of the seafood firms covered in this paper appears to have ventured into aquaponics yet, Lerøy Seafoods and Bakkafrost are leading the way on other circular and natural solutions.



Archer-Daniels-Midland Co. (ADM)

Global giant trying to decrease its footprint

Domicile United States Industry: Food Products Subindustry: Agriculture Ticker: NYS: ADM Mkt cap: USD 28,048 mn* * as of 13 January 2021



New prospects going forward

Key insights

- ADM, a global processor and trader of agricultural commodities, offers organic food and animal feed options.
- The company has targets to reduce its carbon emissions (25%), energy intensity (15%) and water intensity (10%) by 2035, from a 2019 baseline.
- Regarding its palm oil and soy supply chains, the firm focuses on improving the traceability of these commodities and monitoring supplier compliance.

Overview

As a global trader and processor of agricultural commodities, such as soya and palm oil, there are considerable ESG risks for ADM to manage, both socially and environmentally. In 2019 ADM established a board-level Sustainability Committee to bring its sustainability agenda at the highest level. ADM states that it has aligned its efforts with the UN Sustainable Development Goals (SDG). Its sustainability efforts focus on four main topics: Climate Action, Clean Water and Sanitation, Zero Hunger, and Life on Land.

The company has formulated new targets for 2035, having met all its previous environmental targets for 2019.⁸⁰ It has dedicated action plans in place for its palm oil and soya supply chains, as well as KPIs related to sustainable agriculture in the US. These KPIs revolve around enrolling farmers into sustainable agriculture projects, which focus mainly on addressing water quality and soil health, such as the Saving Tomorrow's Agricultural Resources (STAR) Program. The company also offers organic animal feed products and organic flour, grains, dried fruits, beans and soy, vegetable oil and nuts, among others. The organic certification is issued, in most cases, by the United States Department of Agriculture.

ADM has set ambitious targets, including reducing absolute Scope 1 and 2 GHG emissions by 25%, a 15% reduction in energy intensity and a 10% water intensity reduction per ton of product, and a target to ensure that 90% of waste is beneficially reused, recycled, or otherwise diverted from landfill. Regarding its palm oil supply chain, ADM currently is able to trace nearly all palm oil and palm kernel oil back to the milling level (97.6% and 99.6%, respectively), the company will endeavour to increase its traceability of palm oil and palm kernel oil back to the plantation level (currently 18.8% and 20%, respectively).

Exhibit 3.11: Relevant assessment criteria for ADM

Data point	Category	Assessment
Overall Unmanaged ESG Risk	High Risk	34.2
Subindustry Rank	6th Percentile	5 of 85
Products & Services for Sustainable Agriculture	Estimated revenue (FY 2018)	2.5%
Sustainable Food Manufacturing	Estimated revenue (FY 2018)	7.5%

Source: Sustainalytics



Olam International Ltd.

Mitigating environmental impact and offering certified products

Domicile: Singapore Industry: Food Products Subindustry: Agriculture Ticker: SES:032 Mkt cap: USD 3,651 mn* * as of 13 January 2021



The next decade

Key insights

- Olam has stated that it aims to achieve a regeneration of the living world, as part of its stated purpose to reimagine global agriculture and food systems.
- Olam mitigates its environmental impact by focusing on reducing emissions (50% by 2030) and waste, and supporting healthy soils and ecosystems.
- It offers products with sustainable certifications, such as Rainforest Alliance and UTZ certified coffee and cocoa products, and Bonsucro certified sugar.

Overview

Olam produces, sources, processes, packages and sells agricultural commodities. The firm offers a range of products that have been certified by recognized sustainable certification schemes. These include Rainforest Alliance and UTZ-certified coffee and cocoa products, and Bonsucro sugar. The company's stated purpose is to reimagine global agriculture and food systems with the aim of achieving a "regeneration of the living world." ⁸¹

As part of the Agriculture subindustry, Olam is exposed to considerable ESG risks, including those related to human rights, carbon emissions, water use, land use and supply chain management. The environmental priority areas on which Olam focuses are Climate Action, Healthy Ecosystems, Healthy Soils, Water and Reduced Waste. Olam is active in engaging its farmer supply base on environmental issues. It focuses on both agricultural yield improvements, as well as resilience to climate change. Other efforts Olam undertakes to mitigate its environmental impact include the use of renewable energy, eliminating unacceptable deforestation, agro-forestry, protection of conservation areas, and water stewardship. The firm seeks to restore degraded land through regenerative soil management, and to minimize waste and using agricultural by-products.

Olam aims to have zero waste diverted to landfill and 100% use of by-products within its own operations by 2024. By 2030, it aims to have reduced post-harvest loss by 50%, and to have reduced GHG emissions in own operations and Olam-managed farmers by 50%. In FY2018/2019, healthy soil was identified as a material issue, and the company will draft targets on this issue going forward, which will likely revolve around regenerative soil management and training farmers on the use of by-products and compost. These initiatives can lead to higher efficiencies and lower resource inputs and costs, which would benefit the company's bottom line.

Exhibit 3.12: Relevant assessment criteria for Olam

Data point	Category	Assessment
Overall Unmanaged ESG Risk	Medium Risk	33.1
Subindustry Rank	6th Percentile	8 of 85
Sustainable Food Manufacturing	Estimated revenue (FY 2018)	7.5%
Resource Use, MEI Management	Strong Management	68.3

Source: Sustainalytics



Bakkafrost P/F

Catch of the day

Domicile Faroe Islands Industry: Food Products Subindustry: Packaged Foods Ticker: BAKKA Mkt cap: USD 4,180 mn* * as of 13 January 2021



More Circular Action

Key insights

- Bakkafrost's vertically integrated model and control over its supply chain position the company as a frontrunner in sustainable seafood production.
- The company adopts circular methods covering fish feed, waste-to-energy, natural fertilizers and water efficiency.
- As a founding member of Global Salmon Initiative, Bakkafrost appears committed to sustainability and the circular economy.

Overview

Bakkafrost is at the forefront of sustainable seafood production and leading the industry in achieving circularity. The firm is a vertically integrated salmon farming company based in the Faroe Islands. By adopting this business model, Bakkafrost reduces its exposure to supply chain risks associated with feed and overfishing. It can guarantee species are caught in well-regulated legal fisheries.

In addition to the transparency of its fish feed supply, the company has also embraced a circular approach in its mission to use sustainable marine fishmeal. In 2019, the company increased the proportion of the fishmeal in its feed derived from fish trimmings and off-cuts to almost a third, up from a quarter the previous year, and it maintained the use of co-products in fish oil at more than half.

In 2019, Bakkafrost, began building a new biogas plant that will convert waste from its farms into renewable energy and natural liquid fertilizer. This plant is expected to decrease run-offs from farming activities into fjords and cut carbon emissions by 11,000 tonnes a year. Bakkafrost also recirculates water in its hatcheries and is currently recycling up to 99.7% of the water harvested.

Global Salmon Initiative leads the way Bakkafrost's business model and sustainability strategy position the firm as a frontrunner with respect to achieving circularity. Bakkafrost is a founding member of the Global Salmon Initiative, which sets ambitious targets on climate mitigation, responsible farming and the circular economy. As part of the initiative, the company commits to certifying its operations. In 2019, 80% of the salmon harvested came from ASC certified sites and it is on track for 100% by 2020.

Exhibit 3.13: Relevant assessment criteria for Bakkafrost

Data point	Category	Assessment
Overall Unmanaged ESG Risk	Medium Risk	25.7
Subindustry Rank	6th Percentile	17 of 299
Sustainable Aquaculture	Strong Management	100/100
Sustainable Agriculture	Average Management	50/100





Lerøy Seafood Group ASA

A different kettle of fish

Domicile Norway Industry: Food Products Subindustry: Packaged Foods Ticker: LSG Mkt cap: USD 4,212 mn* * as of 13 January 2021



Bioremediation

Committing to best practice

Key insights

- Lerøy Seafood Group and the Bellona Foundation have formed a company called Ocean Forest, which offers a regenerative approach to ocean farming.
- Lerøy explores natural solutions to salmon farming run-offs, sea lice and dependency on wild catch for fish feed.
- In 2019, Lerøy achieved 71% ASC certification of its Norwegian salmon and 100% global GAP certification of Atlantic salmon/rainbow trout.

Overview

Lerøy Seafood Group is a Norway-based company that produces, distributes and sells various seafood products. The firm is one of the first salmon farming companies to explore and apply regenerative ocean farming and move away from monoculture production. By developing a multi-tropic aquaculture system, Lerøy can reduce its environmental footprint and diversify its product portfolio.

Lerøy and the Bellona Foundation have formed a company called Ocean Forest. The goal is to establish new forms of biomass such as macro algae, which can be grown together with farmed fish, as can mussels and oysters. Large-scale cultivation of algae and shells will help to reduce climate change through the uptake and storage of CO₂, nitrogen and phosphorus, as well as its water filtration capabilities. Effluents are a big issue for the salmon farming industry, but through operating a diverse ocean farm, excess nutrients can be removed.

Lerøy aims to reduce its use of medication, chemicals and antibiotics in favour of natural solutions. Notably, the company reported that no antibiotics were used in 2019 to treat fish. However, sea lice continue to be a big challenge for the industry. In a bid to implement biological delousing at salmon farms, Lerøy is using cleaner fish-like lump suckers and ballan wrasse. The company reports lice per fish, number of cages treated for sea lice and the survival rate.

Lerøy has been a frontrunner with respect to sustainable seafood certification, being the first company worldwide certified according to the ASC standard. The company has also achieved MSC, Custody of Chain and Global G.A.P certification, all considered best practices within this industry. The company is also a member of the Global Sustainable Seafood Initiative (GSSI)

Exhibit 3.14: Relevant assessment criteria for Lerøy

Data point	Category	Assessment
Overall Unmanaged ESG Risk	Medium Risk	28.4
Subindustry Rank	11th Percentile	32 of 299
Sustainable Aquaculture	Strong Management	100/100
Sustainable Agriculture	Average Management	50/100
		Source: Sustainalytics



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Food Consumption

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Martin Vezér, PhD Manager, Thematic Research martin.vezer@sustainalytics.com Inefficiencies in food consumption are contributing to a global health crisis. While two billion people around the world diagnosed overweight or obese, another two billion go without enough food every day. ⁸² The Food and Agriculture Organisation (FAO) estimates that one-third of global food production is wasted each year.⁸³ Globally, 1.6 billion tonnes of food was wasted in 2015 alone, with an estimated value of USD 1.2tn. According to Boston Consulting Group, without concerted actions, 2.1 billion tonnes of food will be wasted in 2030, worth USD 1.5tn (Exhibit 3.1).⁸⁴

Inefficiencies in the food value chain can affect a firm's cost structure, translate into missed revenues and potentially reduce margins and returns for shareholders. Food and packaging waste present environmental and social problems, ranging from world hunger and the overexploitation of natural resources to water stress, biodiversity impacts and climate change. For investors, these issues can present portfolio risks because they can affect companies' costs, revenues and reputation.

On the positive side, businesses can tap into opportunities to streamline processes and integrate circular approaches in their value chains. Impact and mainstream investors alike can gain upside exposure to solutions addressing these challenges, while also mitigating related risks in their portfolios.

Food and packaging waste This chapter explores two aspects of consumption – food waste and food packaging waste. Our survey of the global equities market identifies companies that can present portfolio exposure to material ESG risks and solutions within three subindustries, specifically: food retailing, restaurants and packaged foods. Overall, we find that most companies are moderately prepared to deal with the issue of waste. While some firms have relevant programmes in place, all players exhibit room for improvement.

On the opportunity side, we identify firms that are implementing sustainable solutions that can help bring circularity to the food value. Key solutions include innovations in package recycling, food donations and transforming food waste into biofuel.

Exhibit 3.1: Estimated value of global food waste, USD bn



Sources: Boston Consulting Group,85 Sustainalytics



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The cost of trash

Resource shortage risks

According to the FAO, between 30% and 40% of food waste happens before it reaches markets and is primarily due to improper use of commodity inputs and lack of storage.⁸⁶ If this trend continues, it could lead to resource shortages in the food retail value chain, which may negatively affect the profitability and product margins of companies in the food retail industry.

Retail margins A recent report by the Ellen MacArthur Foundation estimates that the annual economic value loss of both plastics and food waste is roughly USD 1.4tn (Exhibit 3.2). Moreover, this waste accounts for more than 82% of the annual global carbon budget. The same report estimates that a shift towards a more circular economy can save companies and households up to EUR 1.8tn (USD 2.1tn) annually by 2030, through the reduction of expenses on primary resource costs. ⁸⁷ Solutions include investing in waste reduction systems, conducting life-cycle analysis for product offerings, using more recyclable materials and shifting from single use plastics to compostable alternatives.⁸⁸



Exhibit 3.2 Annual economic value loss from plastic and food waste, USD bn*

*Plastics data from 2016, food & agriculture data from 2019. Sources: Ellen MacArthur Foundation,⁸⁹ Sustainalytics

A 14:1 return on long-term

In the near term, we expect to see more investors – both in mainstream asset management and impact spaces – to look more closely at risks and opportunities around food and packaging waste, especially since the EU Commission reported that food companies investing to reduce waste in their production process can make a 14:1 return on investment over the long term.⁹⁰

Food waste risks – from the field to the pocket

Beyond impact investing

In the context of humanitarian concerns about poverty and hunger, addressing the issue of food waste can form the basis of an investment thesis for asset managers pursuing an impact investing agenda that is aligned with the UN Sustainable Development Goals (SDGs). However, food security is also an important issue for mainstream, fiduciary investors to address because it can affect macroeconomic and geopolitical stability.





Non-Food Food

*52.3bn tonnes of CO_2 , 2019 Source: Our World in Data⁹¹ The environmental footprint and related costs of waste in the food industry stem primarily from the fact that producing and distributing food requires significant amounts of land, water, energy and fertilizers. When produce goes to waste, so do the economically valuable inputs embedded in it. At a macro level, national governments and international bodies (particularly the EU), are looking into tightening regulations around food and packaging waste to reduce its impacts on both land and oceans.

Food retailers' carbon footprint (both own operations as well as in the supply chain) is facing increased scrutiny from investors and consumers. This scrutiny is coupled with a rise in consumer awareness of the environmental implications of their own consumption. According to data provided by Our World in Data, the GHG footprint of food production accounts for 26% of global emissions (Exhibit 3.3), which is roughly three times the carbon emissions from global aviation. Most of the waste occurs in the food production phase and crop production. The supply chain accounts for 45% of GHG emissions in the food production cycle, making waste one of the key drivers of GHG emissions, this issue is becoming more material for the food industry as whole. How firms respond may define their success or failure in mitigating carbon risks.

Recognizing the problems and opportunities in the food value chain, legislators are developing measures aimed at reducing food loss and waste. However, with few exceptions, such as fines imposed in the UK, most regulations have so far fallen short of establishing laws that would require companies to reduce waste. Exhibit 3.4 summarises a selection of flagship initiatives.

Exhibit 3.4: Select initiatives to reduce food waste

Region	Initiative	Summary of key elements and targets
Globally	SDG 12 - Responsible Consumption and Production	Target 12.3: by 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains.
EU	Various	Green New Deal, Circular Economy Action Plan, and Waste Legislation address circularity food system to reduce waste and tackle climate change; Farm-to-Fork Strategy (forthcoming) will propose specific target to cut food waste.
US	Interagency Agreement on Food	Joint non-binding initiative by Environmental Protection Agency, Food and Drug Administration, and Department of Agriculture to achieve SDG 12.3.
Australia	National Food Waste Strategy	Framework to support collective action towards halving food waste by 2030.
Japan	Food Loss Act	Measures to reduce household food waste by half by 2030; previously enacted Food Recycling Act to turn food waste into fertilizer and feed.
India	Recovery and Distribution of surplus food Regulation	Establishing protections for organizations and individuals who donate food in good faith, and a network of agencies to facilitate distribution.
UK	Fines for not adressing food waste	UK companies that do not address the issue of food waste could be fined between GBP 300 (USD 400) to GBP 10,000 (USD 13,000) for repeated offences.

Source: Sustainalytics93

Rules and bans on plastic

Regulators are also increasingly requiring companies to use more sustainable packaging, higher percentage of recycled and recyclable materials, and less single use plastic. Many countries and local governments have already enacted bans or put a price on thin, single-use plastic bags, ⁹⁴ with some encouraging results. ⁹⁵ Taking further steps, starting in 2021, the EU will ban single use plastic products for which alternatives exist on the market.⁹⁶ Similarly, the UK will levy a tax from 2022 on plastic packaging with less than 30% recycled materials.⁹⁷ Regulations have also come into effect to bridge gaps in the current consumption cycle, with the EU Landfill Directive prescribing reductions in the amount of biodegradable municipal waste, ⁹⁸ and mandatory garbage sorting introduced in a growing number of cities in China.⁹⁹



- Companies on the hook These requirements may increase costs for food companies in the short term because sustainable materials often carry a cost premium compared to cheap virgin plastic especially with low oil prices and challenges in finding suitable alternatives or switching suppliers. Still, companies that adapt early may be best positioned to work collaboratively with existing suppliers, secure a stable supply of new materials, and gradually redesign their products and processes. In doing so, they may also be able to spread costs over time, while capitalizing on consumer awareness and brand recognition. On the other hand, firms that delay changes may incur sudden costs and disruptions, become targets of environmental campaigns and suffer reputational damage for being associated with ocean pollution. Crucially, they might also lose access to certain markets if they fail to comply with stricter requirements.
- Campaigns against garbage Another pressing concern is the disposal of post-consumption packaging. Images of plastic garbage floating in the ocean have prompted public outcry and campaigns from environmental activists, posing considerable reputational risks for companies, as consumers become more aware of their purchasing habits. For example, Greenpeace has singled out 10 prominent consumer goods firms as some of the world's largest polluters because improper disposal of their product packaging accumulates in nature.¹⁰⁰ Campaigns have mainly focused on stimulating change across the food industry. As the problem grows and awareness increases, we expect stakeholders to voice their concerns more frequently and continue to put pressure on companies of various sizes to improve.

The untapped value of waste and closing the loop

Portfolio relevance

Investors are paying increasing attention to portfolio risks and impacts on natural capital, such as water, land and biodiversity.¹⁰¹ As investors strive to understand and mitigate their ESG risk profile, emissions from food waste represent a quick gain for investee companies. Companies adopting circular approaches may constitute an attractive investment proposition (Exhibit 3.5).



Exhibit 3.5: Estimated value of the eco-friendly packaging market, USD bn

Source: Markets and Markets, 2020¹⁰²



First mover advantage Firms that take proactive steps to adapt and comply with emerging regulations (even if not legally binding) related to food and packaging waste can benefit from first mover advantages. These advantages include getting ahead of industry norms, front running future – potentially more stringent – regulation and boosting their green image, which might improve brand recognition, customer loyalty and sales. Partnerships to support government efforts can have similar positive reputational effects for both companies and investors. Companies addressing issues around solid and hazardous waste management and those offering sustainable products may experience upside due to strengthening regulations around waste management.

Companies in action In response to evolving attitudes, perceptions and risks, food companies have introduced initiatives to reduce food waste. Examples of these solutions include using bruised produce in frozen or prepacked meals, discounting goods that are close to their expiry dates, collaborating with snack box start-ups, and donating to food banks and charities. Exhibit 3.6 highlights key initiatives from a sample of 10 companies in four subindustries: Food Retail, Packaged Foods, Soft Drinks and Restaurants.¹⁰³

Exhibit 3.6: Food waste reduction initiatives of selected companies

Company	Key initiatives and targets
Aeon	Target to cut food waste by 50% by 2025 and build a food resource recycling model in at least 10 locations across Japan by 2020.
Carrefour	Programmes to prevent organic waste and reduce packaging, part of the company's ambition to implement a circular model by 2025 and recover 100% of its waste.
Coles Group	Donations of meals to food rescue programmes (SecondBite and Foodbank), use of 'imperfect' produce in other value-add products, and divertion to animal feed of crops unsuitable for human consumption.
Danone	Goal to reduce food waste and maximize its recovery within own operations by 50% by 2025 (2016 baseline).
McDonalds	Goal to source 100% of packaging from renewable, recycled or certified sources, and to recycle packaging in 100% of McDonald's restaurants, by 2025.
Nestle	Working with suppliers to identify five key commodities in the supply chain where food losses and waste are most significant, while working toward SDG 12, target 12.3 to halve food waste by 2030
Starbucks	Goal to achieve a 50% reduction in waste sent to landfill from stores and manufacturing facilities and aims to double the recycled content of its packaging by 2022
Tesco	First UK supermarket to publish food waste data since 2013; slashed food waste by 17% in 2018-2019 compared to previous year; avoided food waste accounted for 0.45% of annual sales.
Woolworths Group	All stores have a programme to keep food out of landfill, including hunger relief initiatives (OzHarvest), animal stock feed at local farms and zoos, and commercial composting.
Yum! Brands	Recycling cooking oil into biodiesel, and avoided an estimated 14,500 MT of GHG emissions through food donation and recycling programmes globally (as of 2018).

Source: Sustainalytics

Taking the edge off food and packaging waste

Sustainalytics' ESG Risk Rating captures the way in which food companies across Packaged Foods, Food Retail and Restaurants address this issue through two MEIs: Environmental & Social Impact of Products & Services, and Emissions, Effluent and Waste. From more efficient inventory management, to lower waste disposal fees and higher revenues, companies can capture material business opportunities from curbing food losses.

ESG indicators and events For this study, we developed a composite indicator to measure company performance based on two indicators – Solid Waste Management and Green Procurement – that comprise part of the underlying management assessments for the two MEIs. Applying this composite indicator to firms in Packaged Foods (113 companies), Food Retailing (59) and Restaurants (30), we found that all of these subindustries demonstrate



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Two material ESG Issues

substantial room for improvement. Packaged Foods companies demonstrate the highest level of preparedness to address food waste related risks, with an average score of 45, closely followed by Food Retail (43), while Restaurants lag at 34 (Exhibit 3.7).

Packaged foods leading We attribute the differences in these average management scores to the B2B model of Packaged Foods companies, which allows for closer oversight of waste management. Food Retailers are pivotal in driving food waste reductions, as they find themselves in a sweet spot to influence the behaviour of different actors, from farmers to consumers.¹⁰⁴ However, for supermarkets, closing the loop requires more effort in terms of projecting the amount of goods that can be sold before expiry, and accounting for changing consumer preferences. Even more challenges exist for Restaurants, which have limited impact on consumers' habits.



Exhibit 3.7: Mean food waste management scores for three food subindustries



Assessing management In order to assess opportunities for investors to gain exposure to firms offering solutions to tackle food waste, we focus on a shortlist of 10 companies. As shown in Exhibit 3.8, the relative positions of these firms on our food waste management composite indicator and their involvement in controversies related to Emissions Effluence and Waste or Environmental Impact of Products and Services. Solutions, a common factor A common trait among these companies, regardless of industry or their proximity to food sources, is that they are integrating food waste reduction into their operations and managing the issue with a holistic "from farm to fork" view. Initiatives vary from engaging with local NGOs or charities (Coles and Woolworths in Australia, for example), to upcycling used inputs (Yum! Brands) and linking reductions in food waste data to annual sales (Tesco).



Exhibit 3.8: Food and packaging waste risk management and market cap*

*Circle size indicates highest Event Category for Environmental Impact of P&S and EEW. Smallest circle = Category 0 (Aeon only), mid = Category 1, large = Category 2. Source: Sustainalytics

Packaged Food leading the pack Danone and Nestlé stand out for strong management on the composite food waste management indicator, while their involvement in controversies (Category 2) is considered limited. This positions them as frontrunners in addressing the issues of food and packaging waste. Nestle's market cap is eight times larger than that of Danone, but Danone focuses on both reducing and recovering waste while Nestle focuses on the use of recycled plastics. These initiatives are key for Packaged Foods companies, an industry known for producing a high amount of packaging waste.

Investing in waste reduction Food retailers face the most scrutiny when it comes to how they tackle these issues. Most of the Food Retail companies in our sample showcase a similar performance clustered around a management score of 70-80 on the composite indicator. The only outlier is Carrefour, which underperforms relative to its peers in this sample, both on solid waste management and green procurement. Tesco, on the other hand, is an outperformer, despite being involved in a Category 2 controversy on environmental impact of products. Tesco's market cap (about USD 31bn) is almost twice as high as Carrefour's (about USD 16bn), which may provide it with an advantage with regard to funding projects that aim to provide solutions to new food and packaging waste.

Fuelling the future The restaurants in our sample score similarly when it comes to managing food waste (around 70 on the composite indicator, with limited involvement in controversies). Yum! Brands leads the pack in terms of both its initiatives on solid waste management and green procurement. Given its business model (which includes operating fast food restaurants such as KFC and Pizza Hut), this is key in mitigating both its food and packaging waste footprint. Yum China, a subsidiary of Yum Brands! is the first restaurant in China to receive the International Sustainability and Carbon Certification (ISCC) for converting its used cooking oil into sustainable biodiesel. McDonald's is an example of a company that, despite its ample size and resources, could still improve its solid waste monitoring and management and its green procurement practices,



particularly around process and product related requirements for its suppliers regarding environmental standards.

Circularity is the way forward

Closing the loop

As we have discussed in this chapter, investors in the food industry can face an array of material risks and opportunities to capture value in closing the loop. Leading companies in the food industry are responding to pressures from consumers, regulators and stakeholders while taking advantage of competitive and business opportunities. As investors become more aware of and concerned about ESG risks, including the humanitarian and environmental impacts of food and packaging waste, companies that offer innovative solutions to tackle problems may represent a compelling investment proposition. Key solutions across the Packaged Foods, Food Retail and Restaurants subindustries range from recycling programmes to reducing food waste and linking these efforts directly to their sales. With emerging regulations around waste globally, companies that are at the forefront of addressing these issues now, through strong waste management programmes or innovative solutions, will be well positioned to ride the wave and limit their regulatory risks, while being attractive for investors. Danone, Tesco and Starbucks are three examples that we look at more closely in the following company profiles.



Danone SA

Driving a revolution of food and packaging waste

Domicile France Industry: Food Products Subindustry: Packaged Foods Ticker: PAR:BN Mkt cap: USD 42, 743 mn* * as of 13 January 2021



Key insights

- Danone's 2030 goals address 17 SDGs and link them to the company's business strategy and philosophy.
- Targets around reducing food waste and rethinking its packaging place Danone among the frontrunners in the Packaged Foods industry.
- In 2019, Danone reported that 45% of its sales were covered by B-Corp certification.

Danone is among the leaders in the Packaged Foods industry when it comes to addressing food and packaging waste throughout its operations and supply chain. The firm is among a few companies in the industry that have committed to implementing circularity in their business models, looking both at food and packaging waste management. Danone has defined its 2030 goals in line with its "One Planet. One Health" frame of action. These are nine long-term goals that speak to the 17 SDGs and are embedded into the company's business strategy and philosophy.

Danone addresses SDG 12: Responsible Consumption and Production explicitly through its aim to include circularity in the way that it operates. In 2016, it released its Packaging Policy, which aims to ensure a circular economy of packaging, sourcing sustainable materials and co-creating a second life for any plastics it uses. In 2020, the company announced a EUR 200mn (USD 240mn) investment to explore next-generation packaging materials and models by 2025. Regarding food waste, the company committed as part of the Consumer Goods Forum (CGF) to reducing food waste and increasing its recovery within its own operations by 50% by 2025, compared to a 2016 base line.

Focus on E and S drives circularity Danone's 2030 strategy positions the firm as a frontrunner in addressing the issues of food and packaging waste, as the firm is honing its approach to responsible production. Furthermore, the company's success in becoming a certified B-Corp (setting a high standard of social and environmental performance) is a strong indication of Danone's commitment to ensuring that it is a driving force in implementing circularity throughout its entire food value chain, from its own operations through to its complex supply chain.

Exhibit 3.9: Relevant assessment criteria for Danone

Data point	Category	Assessment
Overall Unmanaged ESG Risk	Low risk	19.4
Subindustry Rank	1 st Percentile	2 of 299
Solid Waste Management	Strong management	100/100
Green Procurement	Strong management	100/100
		Source: Sustainalytics

a Morningstar company

Tesco PLC

Reducing the waste to yearly sales ratio

Domicile UK Industry: Food Retail Subindustry: Food Retail Ticker: TSCO (LON) Mkt cap: USD 30,978 mn* * as of 13 January 2021



The 4 R approach

An advocate of waste reporting

Key insights

- Tesco was the first UK food retailer to report year on year food waste data, including the amount of redistributed food surplus.
- Tesco is committed to driving progress towards SDG 12, particularly target 12.3, to halve global food waste by 2030.
- The company has urged the UK government to make reporting on waste mandatory for all retailers.

Tesco is at the forefront of addressing waste in its operations. It also acts as a driving force in rethinking the industry's approach to meeting consumer and regulatory demand in addressing both food and packaging waste. The firm was the first food retailer to track and publish its annual food waste data, starting in 2013. Tesco reports on food waste relative to sales, a metric that allows it to quantify the financial impact of its waste. In 2018/2019, it reported that 44,297 metric tonnes of food went to waste, accounting for 0.45% of its sales that year. In 2019/2020 the company reported that 77% of food still considered safe for consumption did not go to waste.

Tesco is taking a strong stance on reducing the use of plastic packaging from its stores by removing ready-meal trays, yoghurt container lids and straws. The firm is committed to more sustainable procurement practices and has indicated that it will no longer accept new products with excessive packaging or those made from materials that are difficult to recycle. Tesco introduced the Deposit Return System, which consists of recycling machines for plastic bottles that pay customers for each returned bottle. Tesco has collected over 1 million bottles through this system, amounting to USD 130,000 (GBP 100,000) worth of coupons for customers. With the aim of bringing circularity to its business model, Tesco has implemented the 4 R approach: remove, reduce, reuse, recycle.

Tesco is a signatory of the UK Plastics Pact, which aims at bringing together business across the entire plastics value chain to ensure fundamental changes in plastic design, production and reuse. As a leader in reducing waste, Tesco continues to work together with its suppliers to cut 200,000 tonnes of food waste from their combined operations. Tesco is a strong advocate of companies publishing their own food waste data, which is still voluntarily in the UK.

Exhibit 3.10: Relevant assessment criteria for Tesco

Data point	Category	Assessment
Overall Unmanaged ESG Risk	Low risk	18.5
Subindustry Rank	9 th Percentile	11 of 118
Solid Waste Management	Strong	100/100
Green Procurement	Adequate	60/100
		Source: Sustainalytics



Starbucks Corp.

A cup of circularity

Domicile US Industry: Consumer Services Subindustry: Restaurants Ticker: SBUX (NAS) Mkt cap: USD 125,562 mn* * as of 13 January 2021



—Starbucks Corp
—Morningstar Gbl Restaurants

*1 Jan. 2020 - 31 Dec. 2020 Source: Morningstar

The circular cup

Starting local

Circularity is in the next decade

Global commitments

Key insights

- In 2019/2020, Starbucks completed its first environmental footprint analysis with the World Wildlife Fund (WWF) and Quantis.
- Starbucks is a signatory of the Ellen MacArthur Foundation's New Plastics Economy Global Commitment.
- By 2030, Starbucks aims to achieve a 50% reduction in waste sent to landfill from both its stores and its manufacturing facilities.

Starbucks is joining other companies across the food industry in the commitment to address the issue of waste. In 2019/2020, the company completed its first environmental footprint analysis together with the World Wildlife Fund (WWF) and Quantis. This initiative focuses on quantifying the carbon, waste and water footprint of Starbucks' own operations and its supply chain across the globe, representing a starting point for setting up new targets.

Starbucks has set some preliminary targets to be achieved by 2030, incorporating the Science Based Targets initiative (SBTi) to improve its benchmarking with other companies in its sector. With regard to waste, the company aims to achieve a 50% reduction in the waste sent to landfill from its stores and manufacturing facilities.

Starbucks aims to double the recycled content of its packaging by 2022. In doing so, the company has teamed up with other industry players via the NextGen Cup Consortium and Challenge to close the loop, particularly for cups. The Challange aims to tackle the overall recyclability of cups.

When it comes to addressing food waste, the firm has limited local initiatives and has yet to implement a companywide strategy to address food waste mitigation.

In early 2020, Starbucks announced the company's 2030 environmental targets as a key pillar in celebrating its 50^{th} anniversary in 2021. These environmental goals reflect lessons that the company has learned and its vision for the next decade – a vision that puts the issue of waste at its core.

To strengthen this commitment, Starbucks has joined the Ellen MacArthur Foundation's New Plastics Economy Global Commitment as a first step towards implementing circularity in the way it addresses packaging.

Exhibit 3.10: Relevant assessment criteria for Starbucks

Data point	Category	Assessment		
Overall Unmanaged ESG Risk	Medium	20.8		
Subindustry Rank	7 th Percentile	8 of 116		
Solid Waste Management	Adequate	50/100		
Green Procurement	Adequate	60/100		
*		Source: Sustainalytics		

a Morningstar company

Circular Investing

Approaches to sustainable asset management

While the previous chapters of this report focused on investment risks and opportunities related to publicly listed companies that contribute directly to the food value chain, this chapter delves into how investors and asset managers can apply the principles of the circular economy (CE) more broadly in their investment strategies. First, we survey the state of play among a sample of 10 CE-themed funds covered by Morningstar Research. Collectively, our sample of funds has grown to USD 11.4bn as of December 2020, more than double the total size since January 2020 (Exhibit 5.1). Excluding RobecoSAM and Anima Investimento (i.e. funds with inception dates in 2020), our sample funds outperformed the FTSE All World (AW) Index on average, by 18 percentage points, in terms of one-year return. Erste WWF had the highest excess return of 77%, though it also experienced higher volatility – roughly 11% more than the FTSE AW.

Next, we consider three approaches that investors and asset managers can apply when developing a CE-themed strategy: 1) portfolio construction, 2) engagement, and 3) financing.

While CE funds remain relatively concentrated in certain sectors, investors can achieve a diversified portfolio using strategies such as the core-satellite approach. They can also develop engagement programmes by addressing a set of key risks and opportunities associated with a CE thesis. The rise of green and sustainability bonds suggests companies are progressively incorporating circular activity in their approaches to corporate financing. In 2020, most second party opinions (SPOs) provided by Sustainalytics were for financial institutions and corporate issuers. Sectors exposed to the food value chain accounted for only 13% of SPOs, though we anticipate more interest among companies in this space due to increasing environmental concerns from stakeholders.

Exhibit 5.1: Growth in CE fund market in 2020



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Opportunities in CE investing

Circular economy themed funds on the rise

Assessing 10 CE funds

Funds with the stated purpose of investing in CE take a variety of approaches to portfolio construction. Differences include sector and market allocations and the weight of portfolios dedicated to mitigating ESG risks and offering relevant solutions. As outlined in Exhibit 5.2, each of the funds in our sample presents a thesis that aligns with the tenets of CE, which include minimizing waste and pollution, extending the use phase of products and ecosystem conservation. While two of these funds (i.e. Erste WWF and Pictet GEO) have a track record dating back to 2001 and 2010, respectively, the other eight have inception dates within the last four years. This recent proliferation of CE funds is one indication of the growing interest in this topic among mainstream asset managers.

Exhibit 5.2: Investing in the circular economy, 10 funds in focus

Fund	Inception	Domicile	Thesis
Erste WWF Stock Environment	1-Jul-01	Austria	Invests in water treatment, recycling and waste management, renewable energy, energy efficiency, and mobility.
Pictet Global Environmental Opportunities	10-Sep-10	Luxembourg	Emphasis on holdings assessed to use resources efficiently, minimize waste and limit adverse environmental impacts. Thematic focus on issues of oceanic acidification, land use, chemical pollution, biodiversity, etc.
Federated Hermes Impact Opportunities	1-Dec-17	Ireland	It allocates about 8% to companies within the circular economy theme focusing on resource efficiency and waste reduction. Its other investment themes include future mobility and financial inclusion.
Decalia Circular Economy	1-May-18	Luxembourg	Invests in firms with a CE approach across the value chain: circular supplies, resource recovery, product life extension, sharing platforms, product as a service.
M&G Positive Impact Fund	1-Dec-18	United Kingdom	Invests in firms with circular products and excludes companies that breach the UN Global Compact principles or are involved in tobacco, controversial weapons or nuclear power.
BNP Paribas' Easy ECPI Circular Economy Leaders	1-Apr-19	Luxembourg	Tracks the ECPI Circular Economy Leaders Equity Index that uses a combination of circular economy categories (i.e. circular supplies, resource recovery, product life extension, sharing platforms, product as a service) and ESG ratings.
BGF Circular Economy (BlackRock)	1-0ct-19	Luxembourg	At least 80% of its equities are invested in firms contributing to the circular economy while excluding coal, and oil and gas.
Credit Suisse Responsible Consumer Fund	25-Nov-19	Luxembourg	Invests in firms that are capturing shifting consumer trends in food, urban systems, supply chains, and lifestyle, and are aligned with the circular economy.
RobecoSAM Circular Economy Equities	23-Jan-20	Luxembourg	Groups its offerings into four clusters: redesign inputs, enabling technologies, circular use, and loop resources. It prioritizes resource-efficient business models, including recycled and reused materials, and promoting eco-friendly nutrition.
Anima Investimento Circular Economy 2025	17-Jan-20	Italy	Combines bonds and a "multi-asset" component that gradually builds an exposure to firms with a circular economy focus.

Sources: Sustainalytics,¹⁰⁶ Morningstar

Pure-plays vs mixed funds

Looking at eight of the CE funds in our sample with inception dates prior to January 2020, the funds outperformed the FTSE AW based on one-year returns, with most having a similar level of volatility (difference <5%) (Exhibit 5.3). We characterize the Erste WWF, Federated Hermes and Credit Suisse as "mixed" in terms of combining a CE thesis with other environmental and social themes. The remaining funds are considered "pure-plays" in that they explicitly focus 100% of their investments on supporting CE. Erste WWF is a notable outperformer with an excess return of roughly 77%. Unsurprisingly, its level of volatility over this time frame was roughly 11% higher than the FTSE AW which is likely due to its higher allocation to small-cap stocks. The other mixed funds (i.e. Federated Hermes and Credit Suisse) were similar in terms of volatility to the pure-play CE funds and the FTSE AW. BNP Paribas' level of volatility is about 3% lower than the FTSE AW but still outperformed the benchmark with an excess return of 3%.





Exhibit 5.3: One-year annualized total returns and risk (standard deviation)*

*Orange: Pure play; Teal: Mixed; Grey: Vanguard FTSE All-World UCITS ETF (VWRD); Return (gross) and risk (as measured by standard deviation) in USD from Jan 1, 2020 to Dec 31, 2020. Source: Morningstar Direct

Overall, our sample of CE funds generated higher risk-adjusted returns than the FTSE AW benchmark over this period. While the timeframe is limited, this finding suggests that investors may not need to compromise on performance when investing in the CE. However, CE funds are generally concentrated, with most funds in our sample holding 50 or fewer companies. This lack of diversification may expose investors to risk that is above their preferred tolerance level.

Portfolio construction

Investors can adopt a variety of strategies to maintain a diversified portfolio that promotes a CE thesis. Common approaches include implementing a coresatellite portfolio and applying ESG-informed tilts to underlying companies.

The construction of a core-satellite portfolio can take many forms but generally uses a combination of active and passive strategies. The "core" component of the portfolio may consist of semi-active and/or index funds targeted at maintaining market exposure to a given benchmark. Active strategies are considered the "satellite(s)" of the portfolio, where stock selection may generate value through higher risk-adjusted returns. The satellite(s) often have a greater potential return than the core but typically carries higher risk (i.e. standard deviation). Its benchmark can also differ to reflect specific mandates, such as a focus on certain sectors or geographic region.

Exhibit 5.4 illustrates the concept of a core-satellite portfolio. In this hypothetical example, the index fund represents 70% of the overall portfolio, comprising the core of the portfolio, and is used to track the performance of the FTSE AW. The remaining 30% is the satellite strategy, which in this case relates to the circular economy and acts as a potential alpha driver.



Achieving diversification

Robust CE performance

Developing a core-satellite portfolio

An illustration

Exhibit 5.4: Hypothetical core-satellite portfolio



Source: Sustainalytics

Weighted tilting

While a CE strategy may include holdings in multiple sectors, this report focuses on companies in the materials (agricultural and specialty chemicals) and consumer (defensive and cyclical) sectors. Exhibit 5.5 summarizes key ESG and financial datapoints about the companies profiled in earlier chapters. A weighted tilt can be applied to individual holdings in a satellite portfolio based on ESG risk ratings and a combination of financial metrics, such as price-to-earnings (P/E), earnings per share (EPS) and return on assets.

Exhibit 5.5: Sample ESG and financial metrics for profiled companies*

Company	Subindustry	ESG Risk Rating (Qualitative)	Highest Controversy Level	P/E	EPS	R	eturn on ssets %
Yara International ASA	Agricultural Chemicals	Medium Risk	Category 1 - Low		17.3	2.4	3.9
Novozymes A/S B	Specialty Chemicals	Medium Risk	Category 1 - Low		31.9	10.9	15.4
Koninklijke DSM NV	Specialty Chemicals	Low Risk	Category 1 - Low		39.8	3.5	4.3
Archer-Daniels Midland Co	Agriculture	High Risk	Category 3 - Significant		17.9	2.8	3.7
Olam International Ltd	Agriculture	High Risk	Category 3 - Significant		8.0	0.2	2.6
Bakkafrost P/F	Packaged Foods	Medium Risk	Category 2 - Moderate		34.5	12.3	6.7
Leroy Seafood Group ASA	Packaged Foods	Medium Risk	Category 3 - Significant		21.2	2.9	5.7
Danone SA	Packaged Foods	Low Risk	Category 2 - Moderate		18.5	2.9	4.1
Tesco PLC	Food Retail	Low Risk	Category 3 - Significant		21.9	0.1	2.0
Starbucks Corp	Restaurants	Medium Risk	Category 3 - Significant		135.4	0.8	3.8

*P/E, EPS and Return on Assets are trailing 12-month values as of December 31, 2020.

Sources: Sustainalytics, Morningstar Direct

Measuring ESG performance

ESG data can be integrated into this type of strategy by, for example, overweighting firms that contribute to CE and demonstrate outperformance on key management indicators or material ESG issues (MEIs), such as those related to carbon emissions and resource use. Alternatively, companies that underperform on these measures and those involved in frequent or high impact ESG incidents can be underweighted.



Achieving CE goals through active ownership

Active ownership	Active ownership has become one of the leading strategies in addressing ESG issues because it can enable investors to encourage their portfolio companies to adopt practices that mitigate material risks. In this case, active ownership refers to shareholders using their rights and ownership position to encourage and help a company transition from a linear "take-make-dispose" model to a CE model. Such engagement and voting activities can be applied in conjunction with the portfolio approaches noted above. ¹⁰⁷
Proxy voting and engagement	The term "proxy voting" generally refers to the aspect of active ownership that involves exercising the voting rights attached to shares. In recent years, plastic pollution and sustainable packaging have been addressed by several shareholder-sponsored resolutions at large US companies. On the other hand, engagement involves ongoing dialogue between the investor and the company. Engagements may be undertaken individually or in collaboration with other investors. They often aim to encourage investee companies to sign onto industry-level, market-wide or global commitments.
The Global Commitment	The Ellen MacArthur Foundation and UN Environment Programme, for example, released the New Plastics Economy Global Commitment (Global Commitment) in October 2018 to create a circular economy for plastics. Since its release, the Global Commitment has attracted over 500 signatories consisting of companies that are part of the plastic packaging value chain, governments across five continents and financial institutions with a combined USD 4tn of assets under management. ¹⁰⁸ In 2019, roughly 62% of reporting signatories came from the consumer sectors, with 20% in packaging, as shown in Exhibit 5.6. ¹⁰⁹ While we expect packaging companies to be engaged in reducing plastic waste, the beverage and food industries combined account for less than one-fifth of signatories. This gap provides a potential focus area of engagement for investors and asset managers to encourage wider adoption of the Global Commitment.



Exhibit 5.6: Percent of reporting signatories in the consumer sector in 2019*

*Based on a sample of 143 business and government signatories

Source: Ellen MacArthur Foundation¹¹⁰



Investor engagement in plastic waste Several organizations have used the Global Commitment as the basis for helping investors better understand plastic waste while also addressing associated risks and opportunities. The UN Principles for Responsible Investment (PRI) established a Plastic Investor Working Group that consists of 29 global investors with USD 5.9tn in assets. The purpose of the group is to build a holistic understanding of plastic.

Thematic engagements In January 2019, Sustainalytics launched a three-year thematic engagement on *Plastics and the Circular Economy*, which encourages companies to improve their recycling practices, shift strategic focus towards redesign and innovation, as well as increase the reusability of their products. The programme has so far found that companies in exposed sectors are increasingly committed to addressing plastic waste issues and have started to incorporate circular principles within their business strategies more explicitly. ¹¹¹ Other relevant engagements include *Feeding the Future* and *Responsible Cleantech*, which explore solutions for food waste reduction and cleantech production.¹¹²

Financing the principles of the circular economy

The rise of green bonds In 2019, the global green bond market reached USD 258bn, a 51% increase compared to 2018.¹¹³ Despite representing a small portion of the USD 100tn global debt market, the large inflow of green bonds suggests increasing opportunity for investors to gain CE exposure through other asset classes besides public equity. Green bonds are debt instruments used to finance or refinance environmental initiatives. Similarly, sustainability bonds are also on the rise which are used to finance both environmental and social initiatives.

Roughly two-thirds of issuers commission SPOs from external review providers. This increases transparency to stakeholders over the use of proceeds.¹¹⁴ In total, Sustainalytics has delivered more than 500 SPOs to date using a similar scale to the International Capital Market Association's (ICMA) Green Bond Principles. The ICMA framework covers several CE principles, including eco-efficient products, pollution prevention and renewable energy.



Exhibit 5.7: Number of SPOs delivered by Sustainalytics by year and type



Increased transparency

Rising demand for SPOs Between 2014 and 2020, Sustainalytics saw average growth of roughly 103% in the number of SPOs published annually (Exhibit 5.7). Since 2015, green bonds have accounted for more than 60% of the SPOs provided by Sustainalytics. However, we have observed a rise in SPOs for the other two types of bonds in recent years. In 2020, Sustainalytics saw a significant increase in SPOs for social bonds – more than double the number prepared in 2019. Sustainability bonds accounted for at least one-quarter of the total number of SPOs in the past two years. For instance, Sustainalytics provided an SPO for Alphabet's Sustainability Bond Framework, with part of the proceeds allocated to circular activity. Alphabet's USD 5.75bn issuance is the largest sustainability or green bond issued by a company to date.¹¹⁵ It also suggests emerging opportunities in different sectors, such as technology and healthcare, to engage in CE principles. While sectors exposed to the food value chain (i.e. materials and consumers) accounted for less than 15% of SPOs, we anticipate more interest from companies in this space as environmental concerns from stakeholders continue to rise.

Emerging Markets From a geographical perspective, the highest number of issuers came from the US and Japan between 2014 and 2020. Overall, European countries (excluding the UK) accounted for at least 30% of the total number of SPOs delivered within this timeframe. While most issuers were from developed markets, several SPOs were delivered to issuers in emerging markets in Asia and Africa. Given that emerging markets may face resource constraints, the rise of SPOs in these areas suggests potential opportunities due to the rapid urbanisation and industrialisation underway there.¹¹⁶

The upside with CE investing

While the CE concept has roots outside the field of responsible investment, it has inspired an influx of activity in the public equity and debt markets. Despite a limited track record, CE funds have demonstrated robust performance in 2020, suggesting investors can generate competitive returns while tackling pressing sustainability issues. However, fund performance over a longer timeframe and further research are necessary to thoroughly assess CE investing. Investors can also engage with companies in adopting circular approaches to achieve mutual environmental goals. The 103% growth in SPOs for green, social, and sustainable bonds over the past five years suggests that companies are increasingly recognizing the value-add of ESG-linked loans.

The next frontier While the food value chain has been the primary focus in this report, other sectors, such as technology and healthcare, are certainly exposed to related risks and opportunities. Investors looking to develop a CE thesis will find ample opportunity to innovate strategies across a wide range of industries and markets.



An influx of circular activity

Conclusion

Three key areas of the food economyThis seventh instalment of Sustainalytics' 10 for series takes a deep dive into an
increasingly important segment of the global economy – the food value chain.
To help investors assess ESG risks related to this overarching theme, we focus
on three key areas of the food economy: agricultural chemicals and
preservatives, agriculture and aquaculture, and food consumption.Solutions offering potential upsideFor each of these three areas, we described the underlying drivers of ESG risk in
the equity market, identified leading edge solutions and profiled a set of
companies that are particularly well positioned in terms of their ESG risk
management and innovation. Ten solutions that we expect to gain momentum
in 2021 are:1. Biological pesticides

- 2. Precision farming
- 3. Natural food preservatives
- 4. Organic feed
- 5. Certified sustainable products
- 6. Using fish waste
- 7. Integrated multi-trophic aquaculture
- 8. Using recycled plastics
- 9. Reducing food waste
- 10. Recovering waste

CE funds making headway We also surveyed the state of play in CE themed approaches to asset management by assessing the performance of 10 funds that leverage the concept of CE investing.

Ideas for applying CE strategies Finally, we outlined three strategies for investors to consider when developing a CE investment thesis: portfolio construction, thematic engagement and financing.

Expanding horizons While a wider range of ESG issues will continue to play a role in shaping investors' agendas in 2021, we hope that readers of 10 for 2021 find value in the report's concentrated focus on the global food economy. Investors looking to develop a CE thesis can dig deeper into this theme and build on our approach by developing strategies related to other sectors of the global economy.



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