Food and Agriculture Organization of the United Nations

The International Treaty ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

INTERNATIONAL TREATY ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

FOURTH MEETING OF THE STANDING COMMITTEE ON THE FUNDING STRATEGY AND RESOURCE MOBILIZATION

20-22 September 2021

FOOD INDUSTRY ANALYSIS PAPER

At its third meeting, the Standing Committee on the Funding Strategy and Resource Mobilization (the Funding Committee) requested the Secretariat, in developing the strategy to mobilize resources from the food processing industry further, to invite input from external experts, to provide a deeper understanding of the food processing industry along the food chain and the Treaty's value proposition.

This document contains the analysis on the food processing industry that has been undertaken by an external expert following the Funding Committee's third meeting. This analysis was also made available to the Committee over a seven-week period, between 22 July 2021 and 7 September 2021, via a virtual platform. The content of this document is entirely the responsibility of the author and does not necessarily represent the views of the Secretariat of the International Treaty on Plant Genetic Resources.

FOOD PROCESSING INDUSTRY

Mapping the landscape for the FAO paper

Prepared in support of the International Plant Treaty

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Summary

- The purpose of this report is to help the FAO better understand the food and drink manufacturing sector, in order to be able to engage with it in connection with the International Plant Treaty. This is timely in light of the UN's Food Systems Summit 2021 and following the Post-2020 Global Biodiversity Framework being developed under the Convention on Biological Diversity
- The food and drink manufacturing or processing sector is one stage in a complex agri-food chain which starts with the input industries and ends with the final consumer, whose influence projects back through all the earlier stages. This already highly integrated chain is becoming increasingly inter-connected with developments such as e-commerce
- One manifestation of this can be seen in the way some seed companies are branding their products for the final consumer
- Several trends in the food and drink sector are of possible relevance to seeds
    - Plant-based foods
    - Functional foods
    - 3rd party certifications
    - GM labelling
- The food and drink sector is valued at approximately $6 trillion, split roughly equally between food and drink
- There are many ways of subdividing it, but the main sectors are meat, dairy, bakery, snack foods, ready meals, confectionery, alcoholic beverages and non-alcoholic beverages
- The industry is highly fragmented in terms of companies, with the top 10 companies only accounting for around 10% of the market for both food and drinks
- Of the top 100 companies around 70% are stock-market listed, 20% privately owned and 10% cooperatives
- Food and drink companies tend to be very international in nature with global supply chains and a presence in many countries
- The farmer focus of companies varies widely depending on the sectors in which the companies operate and their supply chain strategies
- Environmental, social and governance (ESG) issues are playing an increasingly important role in all industries, including food and drink, and influencing investment decisions. Within the ESG universe the issue of biodiversity is rapidly rising up the environmental agenda and increasingly considered to be on a par with climate change
- Around 70% of the top 100 issue reports on ESG which are either stand-alone or integrated with their financial reporting. The others either cover it on their web sites, or make no reference at all
- There are numerous frameworks for reposting ESG, ranging from general and widely adopted ones such as the Sustainable Development Goals (SDGs) and Global Reporting Initiative (GRI), to much more specific ones
- ESG issues of particular relevance to the food companies in the agriculture area and possible touch points for the FAO include
    - Preserving biodiversity: this is rising up the ESG agenda
    - Adaptation to climate change
    - Good agricultural practice
    - Supporting farmer communities/Responsible sourcing

- Several companies have specific seed-related initiatives which they include as part of their ESG activities
- The dimensions of ESG-focus and farmer-focus can be used to divide the food and drink market into different segments which the FAO could use to help decide where to focus its own efforts, and how to develop its marketing strategy
- Possible approaches for the FAO in each segment were suggested, with different messages for different sectors. In other words, the marketing methodology of segmentation/targeting/positioning was adopted.

Introduction and Methodology

The objective of the consultancy is to support the Treaty's Secretariat and Standing Committee on the Funding Strategy and Resource Mobilization (SFC) in the further development of the Treaty's strategy on mobilizing resources from the food processing industry for consideration of the SFC and the Governing Body of the International Treaty.

The main aim of the assignment is to gain a better understanding of the landscape of the food processing industry, and food chain more generally, as well as the Treaty's value proposition in this space, and possible entry points/areas of synergy for resource mobilisation and partnership.

The particular tasks encompass the following:

1. Provide the analysis upon which a better understanding can be based, and write this up into a short (<15 pages) report. This will include the development of a value proposition for food manufacturers which can act as a basis for future engagement by the International Treaty and development of communications materials. It will also include identification of entry points for the Treaty, including through relevant CSR initiatives.
2. Provide presentation/s to the SFC and be available to answer questions on the analysis undertaken.
3. Initiate a process of making introductions to key personnel in the food processing sector, in order to inform the analysis, develop networks and implement the strategy.

In order to meet the above objectives a relational database of the top 100 food companies was constructed and populated with information on their business profiles and Environmental, Social and Governance (ESG) activities. The database will be made publicly available at a later stage. Inputs were obtained from:

- The companies themselves, particularly their web sites and ESG reports
- A database of 210 public private partnerships (PPPs) in Agriculture put together for The Syngenta Foundation for Sustainable Agriculture and in which many of the Top 100 food companies feature prominently
- The author's own network

Using this database, the food manufacturing sector was then segmented according to the following criteria:

- Acknowledgement of farmers' roles: to what extent do companies acknowledge farmers' roles in their supply chain?
- ESG activities, particularly relating to agriculture and farming, with specific seed-related projects highlighted

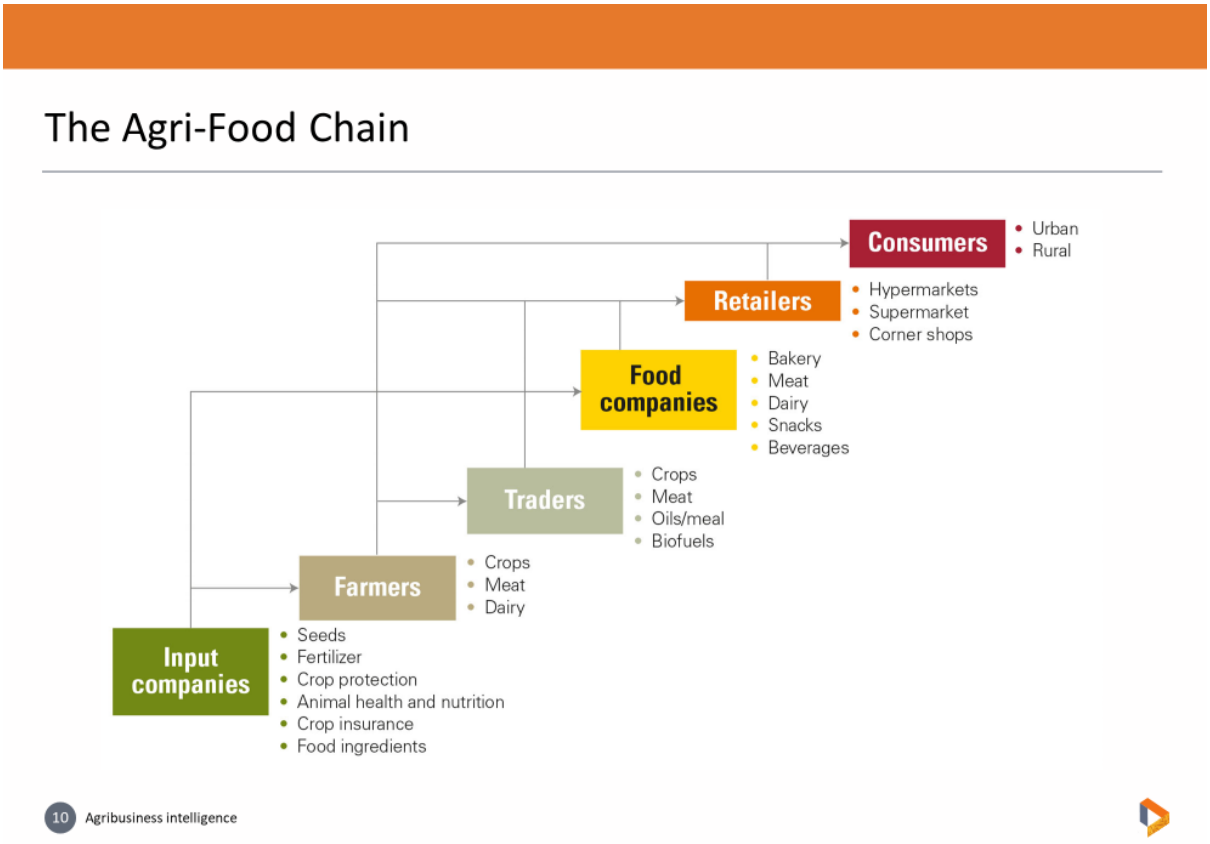
Different market segments were identified and possible approaches for the FAO in each suggested, with different messages for different sectors. In other words, the marketing methodology of segmentation/targeting/positioning was adopted.

The final stage will be to identify specific contacts in the target companies.

Overall food chain

The overall agri-food chain starts with the input industries which provide farmers with the products they require to produce their crop and livestock and flows through to the final consumer. This is shown in Figure 1.

FIGURE 1: THE AGRI-FOOD CHAIN



Source: (KPMG, 2013)

This value chain is complex and very globalised. Its globalised nature was one factor behind its resilience during the pandemic. The food sector was extremely successful in continuing to provide its products during 2020 whilst many other sectors experienced significant problems. Another important characteristic of the food chain is its high degree of integration. One manifestation of this is the significant influence the final consumer has on all the upstream activities. It is a mantra in the food processing industry to 'put…the consumer at the heart of everything…'[1].

1 'Change of menu: Kraft Heinz bets on old brands to win new consumers', Financial Times 31st May 2021

The stages and links in the agri-food value chain are becoming increasingly fluid with developments in technology and marketing. For example, the growth of on-line marketing and internet shopping is forging new links between manufacturers and customers. Even seeds companies, who operate at the beginning of the value chain, are reaching out to the final consumer. For example Rijk Zwaan, a leading vegetables seed company, has developed its SN!BS brand which is a line of small, health snack vegetables for the 'eat on the go' market, hoping to stimulate retailers to broaden and deepen their category of healthy snacks.

Some key metrics for the different stages in the value chain are shown in Table 1

Table 1: Key metrics for the different stages in the agri-food chain					
Sector	Input	Farmers	Traders	Food companies	Retailers
Sales% US $bn (approx..)	400	3,000	1,000	6,000	5,400
Number of players	100s	450 million	Tens	Thousands	Millions
EBIT %	15%	Variable	2-5%	10-20%	5%
R&D % sales	<1% (fertilizers) – 15% (Seeds)	0%	<1%	1-2%	<1%
R&D spend: US $bn	10	-	Low	8	Low
Composition /sub-sectors	Seed Fertilizer Crop protection Machinery Animal health & nutrition Crop insurance	Grains Fruit & vegetables Meat Dairy	Handling Primary processing Secondary processing	Bakery, meat, dairy, snacks, ready meals, beverages, produce	Multiples, discounters, wholesalers, Independents
Range	R&D-based majors to generic manufacturers	Smallholders to agroholdings	Global agribusinesses to local middleman	SMEs to multinationals	Wet markets and corner shops to hypermarkets

Source: (KPMG, 2013), updated to 2019 for food company sales and seed R&D % spend

Overall market & Sectors

The overall value of the food processing sector is of the order of $6 trillion. The main sub-sectors are shown in Table 2

Table 2: Main sectors of the food processing sector				
	Sector	Products	Crops	Leading companies
Food ($2.7 tn)	Bakery ($0.2tn)	Bread Cakes Biscuits	Wheat Oilseeds	Grupo Bimbo, Mondelez, Flowers Foods, Yamazaki Baking
	Snacks ($0.4tn)	Crisps Pot noodles Breakfast cereals	Potatoes Oilseeds Cereals Sugar	Mondelez; Kraft; Unilever, GM, Kellogg, McCain; PepsiCo
	Ready meals ($0.2tn)			Nestle; Kraft-Heinz; General Mills; Tyson
	Confectionary ($0.2tn)	Chocolate Sweets	Cocoa Sugar Palm oil	Mars, Ferrero, The Hershey Company
	Meat ($1.2tn)	Beef Pork Chicken	Pasture Maize Oilseeds	JBS, Smithfield, Tyson, Marfrig
	Dairy ($0.7tn)	Milk Cheese Yoghurts	Pasture Maize Oilseeds	Danone, Nestle,Lactalis, Fonterra, DFA + 10 others
	Other	Fresh produce Cooking aids Condiments Sauces Sugar	F&V Maize	Total Produce
Drink ($3.0 tn)	Alcoholic beverages ($1.5tn)	Beer Wine Spirits	Barley Wheat	Anheuser-Busch InBev Heineken, Suntory, Asahi, Diageo, Kirin Molson-Coors, Carlsberg Andalou Efes
	Non- alcoholic beverages ($0.9tn)	Tea/coffee Bottled water Carbonated drinks	Tea Coffee Fruits Cocoa	PepsiCo, Coca-Cola, Monster, Red Bull, Keurig Dr Pepper, Jacobs Douwe Egberts

In addition to the companies focused on food processing, listed above, there are the traders, such as Cargill, Olam, AND, Bunge and Louis Dreyfus, which are also involved in sourcing and primary production.

Whilst some sectors rely on a narrow range of crops, others draw from a much wider variety. Depending on which sectors they operate in, companies may source inputs from 20-30 different crops. The willingness of any individual company to engage with the International Treaty Implementation may be partly influenced by the crops with which it has a connection.

A new sector which is emerging and growing fast is that of plant-based, driven by both environmental and nutritional considerations. On the environmental side the incentive is to avoid the greenhouse gas

emissions generated by livestock production. On the nutritional side a plant-based diet is perceived to be healthier. Many of the major food processors are diversifying their ranges to expand the plant-based component. In addition there a high degree of innovation in plant-based foods with numerous start-up companies in this space and a high level of venture capital flowing into it.

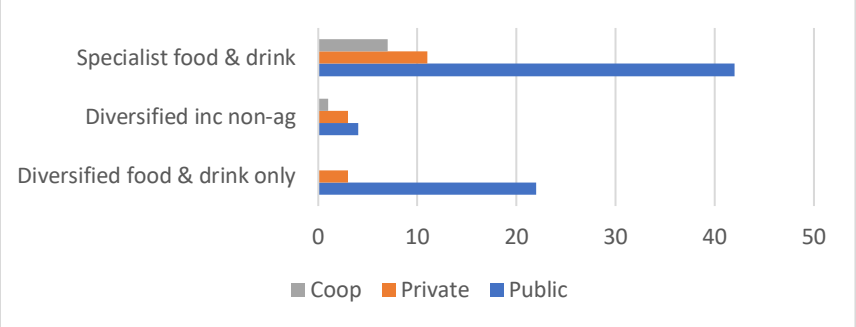
Types of company

Food Engineering (Food Engineering, 2020) publishes an annual list of the top 100 Food Companies, along with their sales. This list is given in the Appendix. These companies can be segmented according to various criteria: type of company; product scope; ownership; country of origin.

- Type of company
    - Specialist food company operating in one major sector
    - Diversified food company operating across several sectors
    - Companies operating in food and non-food
- Product scope: sectors in which the company operates (see Appendix)
- Ownership
    - Public (stock-market listed)
    - Private
    - Co-operative

Figure 2 displays the distribution of companies by type and ownership. 70% of companies are public, 20% private and 10% cooperatives. Cooperatives feature prominently amongst the dairy companies.

FIGURE 2: DISTRIBUTION OF TYPE AND OWNERSHIP OF THE TOP 100 FOOD COMPANIES



About two-thirds are specialist, focusing on a particular area such as meat, dairy or beverages. A quarter are diversified food & drink companies. 10% also have non-food interests. Public companies tend to disclose more on both the financial and Environmental, Social and Governance (ESG) sides.

Notable characteristics of the food processing sector are that it is very international – most of the top 100 companies have significant global sales – and very fragmented – the top 10 companies account for only 10% of the market in both the food and drink segments.

Whilst this report focuses on the food manufacturers, it is important to recognise that many retailers have their own labels for which they commission the manufacture of products, and, as such, are also involved in processing. Some of these, notably Walmart, the largest retailer in the world by far, have

their own extensive ESG programmes. However, retailers tend to be much less international in their reach, normally focusing on their home market, or at most a handful of others.

In terms of geographic focus, most of the leading food processors are global in nature, with strong representation in developing countries. The apotheosis of this is Coca-Cola: it is allegedly possible to find their iconic product in the most remote parts of the world. Purely local food processors tend to be relatively small in size. There have long been calls to develop the food processing sector in Africa, for example, so that local companies can appropriate more of the downstream value, to boost economic growth and to reduce imports. However, in practice this has been a challenging objective to realise.

Food industry trends and drivers

Some major trends occurring in the industry are listed in Table 3. Several of these trends could be touch-points for the seed industry and these are highlighted in the table below.

Table 3: Trends impacting the food processing sector

Trend	Details	Possible touchpoint with seeds
Clean label	Fewer more natural-sounding ingredients	
3rd party certifications	Fairtrade; Rainforest Alliance; Non-GMO, organic	Conditions of farmer equity – could relate to seed access Some seed companies have organic seed ranges
Traceability to the origin	Increasing interest in where ingredients come from. Nestle has a table of % sources traceability for each of its crops	
Fresh	A migration from frozen or canned products	
Sustainability	Includes ingredients and packaging	Biodiversity dimension
Plant-based foods	Focus on vegetarian, vegan and flexitarian consumers	New plant-based foods could drive demand for new seeds
Functional foods	Foods that can make specific health claims	Seeds with specific nutritional properties – e.g. Quinoa
Increasing internet presence	In retail, marketing and consumer searches. Omni-channels	
Unique and varied experience	E.g. Micro brews vs Budweiser or Heineken	
Own label	Supermarkets are increasingly selling their own label versions in competition to branded products	This trend is likely to make retailers increasingly concerned about the sourcing of their products and receptive to seed-related initiatives
GM labelling	Depending on the country there may be a requirement to label GM crops.	The seed determines whether or not a crop is GM

Source: (Paul Hughes, IHS Markit, 2021); the author

To address the key above trends which have potential implications on the way that companies view seeds and other PGRFA.

- 3rd party certification is indicative of concerns about sustainable production in general and biodiversity in particular. This provides a clear potential entry point for seeds
- Sustainability: there is a clear link to seeds through the biodiversity angle. Seeds also have an important role in adaptation to climate change, particularly through the development of drought tolerant and heat tolerant varieties
- The growth of interest in plant-based foods could lead to increased opportunities for a greater diversity of crops and hence seeds
- Functional foods can also present opportunities for currently niche crops and seeds to become more attractive
- The growth of own label product sold by supermarkets could increase supermarkets already considerable interest in how crops are produced, including the seed dimension

Generally environmental issues are rising up the agenda.

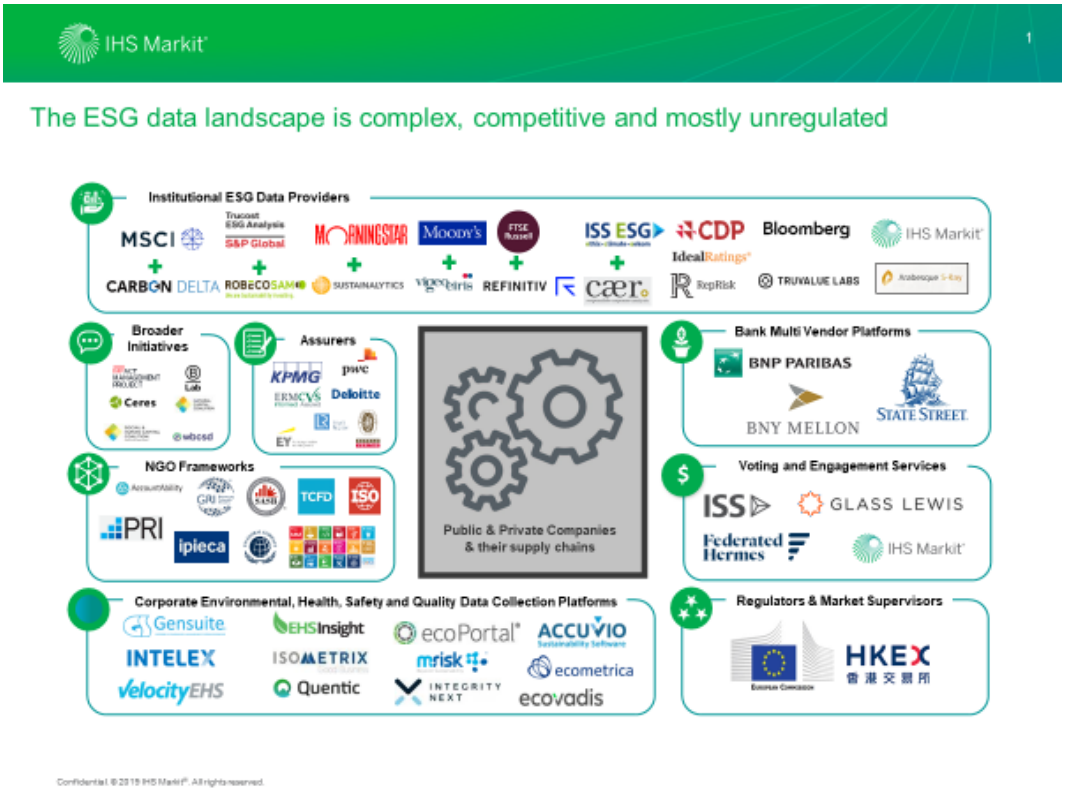
ESG schemes, certification, etc

Introduction

A major development over the last 10 years has been the increasing importance of Environmental, Social and Governmental (ESG) considerations in the operation of all organisations, whether from the public or private sectors. In the past, the area was often referred to as Corporate Social Responsibility. That description is still used today by some companies, along with others, such as 'Responsibility Reporting' and 'Sustainability reporting'. Within the private sector, ESG considerations increasingly drive investment decisions and shareholder actions.

The ESG ecosystem is complex and evolving with many different types of actor involved: the companies themselves, auditors/assurers, multilateral bodies such as the UN, data providers, voting and engagement services. This is illustrated in Figure 3.

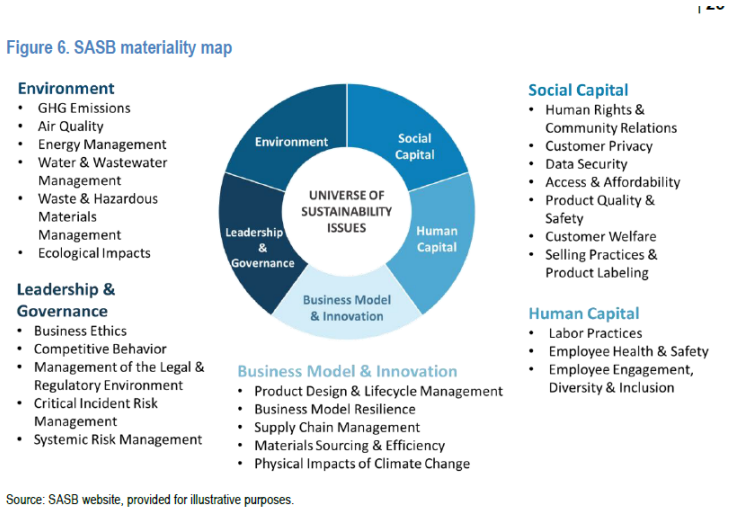
Figure 3: The ESG Ecosystem



(Bourne, 2021)

Examples of some of the main ESG considerations are shown in Figure 4 which shows the different issues taken into account by the Sustainable Accounting Standards Board, the guidance of which is followed by several food and drink companies.

FIGURE 4: SASB ESG ISSUES



Source: (OECD, 2020)

The main ESG-related issues of specific relevance to the food industry and seeds are likely to fall under the environmental and social areas and would include the following:

- Environmental impacts
    - Good agricultural practice
    - Preserving biodiversity
    - Provision of seeds to help adapt to climate change
- Social impacts
    - Supporting farmer communities, especially smallholders
        - Fair remuneration
        - Access to seeds

According to a recent survey by IHS Markit (IHS Markit, 2021), the continuing rise of biodiversity is the second most important of the top 10 ESG trends for 2021 the first being the 'rise of sustainable investing and growth of ESG-related funds to continue'. 'The Economist' also recently had a feature on biodiversity as an issue rapidly rising up the environmental agenda and now on a par with climate change. (The Economist, 2021).

Agriculture has a bigger impact on land, water and biodiversity than any other sector. It accounts for 38% of the global land area, with associated impacts on biodiversity, and consumes 70% of water. In addition, in contributes 14% of greenhouse gases. But, because of its complexity and distributed nature it presents the greatest challenges in terms of mitigation. It also provides employment for over 40% of the world's economically active population so there are massive social considerations, especially relating to small farmers in emerging economies. One emerging ESG theme concerns local communities and indigenous peoples.

Examples of schemes associated with the above areas and relevant to seeds are shown below.

Table 4: ESG-related schemes

General Area	Specific area	Example schemes	Seed dimension
Environment	Good agricultural practice	GlobalGAP	Access to good seed
	Biodiversity	Rainforest Alliance, RSPO, BCI, Etc	Preservation of genetics
	Organic		Organic seed brands
	Adaptation to climate change		Provision of drought and heat-tolerant seeds
Social	Supporting farmer communities	Individual company schemes and PPPs	
	Fair remuneration/ farmer incomes	Fairtrade Utz Certified 4C	
	Access to seeds	Companies providing seeds	Access and affordability
Both	Responsible sourcing		

Other related and more recent concepts related to ESG and agriculture, and adopted by some food companies, are those of 'Regenerative Agriculture' and protection of 'Natural capital', although in the case of the former there is debate about the precise definition.

How do companies address ESG?

Evidence could be found for over 80% of the top 100 food companies addressing ESG to a greater or lesser extent. There is a wide range of approaches, reflecting the many dimensions of ESG and wide range of company business profiles. Certain 'norms' are widely adopted. For example, it is very common practice for companies to judge their activities against the UN's SDGs. Many companies also adopt GRI reporting. However, beyond that there is a plethora of different and sometimes overlapping schemes providing companies with a huge amount of choice as to which to adopt e.g. FTSE4Good, DJSI. Other organisations which rate companies' ESG performance are Sustainalytics, MCSI, CSR Hub, DNV ESG and Sustainability Assurance. A challenge for the FAO in entering this space will be how it differentiates itself from other schemes and initiatives.

In addition to participation in formal/external ESG schemes many companies also have their own internal approaches. One manifestation of this is involvement in PPPs designed to help small farmers. The most comprehensive database on this was set up by the Syngenta Foundation for Sustainable Agriculture, which tracks PPPs up until 2015. The prevalence of food manufacturers in this is shown in Table 5.

Table 5: Food company participation in PPPs

Company	# PPPs	Focus crops
Cargill	9	Cocoa, soybeans, diverse
Mars	7	Cocoa (also sequenced the genome)
Unilever	7	Tea, soybeans, diverse
Pepsico	5	Wide range
SAB Miller (AB InBev)	5	Barley/Cassava
Coca-Cola	4	Fruits
Walmart	4	
Nespresso (Nestle)	4	Coffee (also sequenced the genome)
Olam	4	
Kraft	2	Cocoa/Cashew
Nestle	2	Cocoa/coffee
Diageo	1	Sorghum
GM	1	
Heineken	1	Sorghum
ADM	1	Cocoa

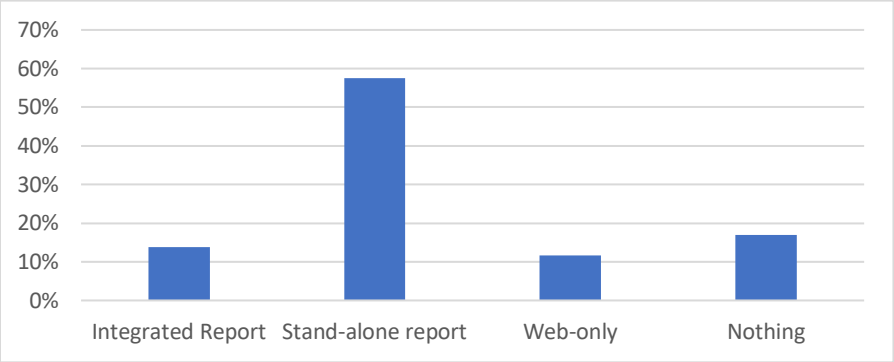
Source: (Syngenta Foundation for Sustainable Agriculture, 2015)

How companies report ESG

The most assiduous companies have detailed ESG reports with multiple monitoring metrics and affiliation to many certification and evaluation schemes. These ESG reports may either be stand-alone or integrated with the company's Annual (Financial) Report. At the other extreme, a company may merely make some general allusion to the area on its web site, or not mention ESG at all.

Figure 5 shows the prevalence of different reporting approaches amongst the top 100 food processing companies.

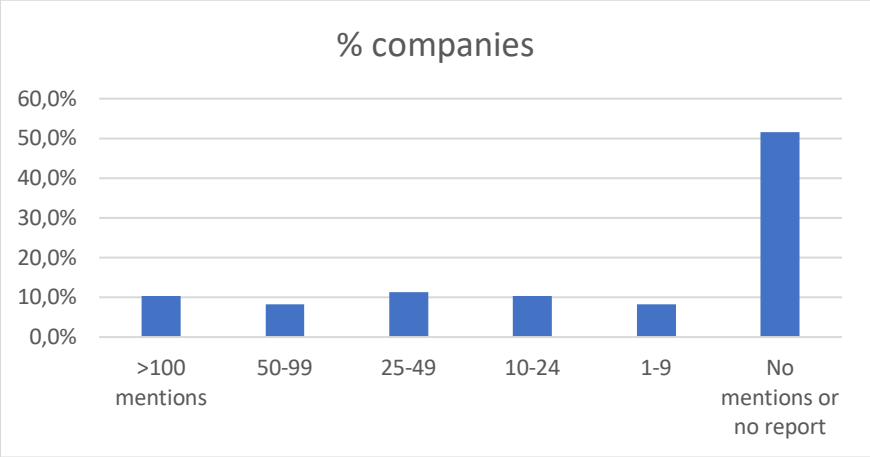
Figure 5: ESG reporting approaches of the top 100 food companies



As far as the FAO is concerned a company's approach to ESG could provide a good indication of how fertile a ground it is likely to be for cooperation. Specifically, the prominence of ESG activities involving farmers could be a good indicator.

Analysis of the number of times 'farm…' was mentioned in each ESG report was conducted to identify those companies which had particular engagement with primary agriculture.

FIGURE 6: # TIMES FARM OR FARMER MENTIONED IN ESG REPORT OF TOP 100 FOOD PROCESSING COMPANIES



15 companies also have specific seed initiatives such as providing seedlings to farmers or developing new varieties. This represents around 20% of companies with a crop focus, i.e. excluding meat and dairy companies (7 and 17 companies, respectively). Examples of seed-related initiatives were as follows:

- Andalou Efes has developed and registered 17 barley varieties
- Del Monte has worked with seed companies to develop new varieties of cauliflower and melon
- Lindt & Sprunglie has distributed 6 million cocoa seeds to farmers

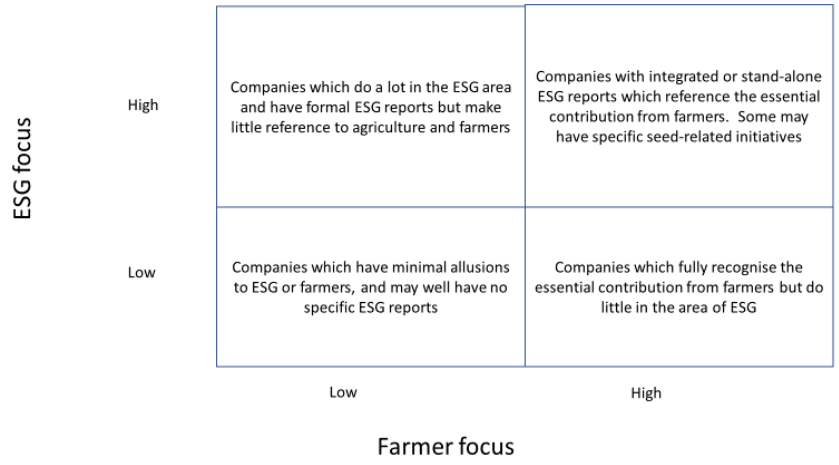
Developing partnerships with the food processing industry: entry points and exploring areas of potential mutual interest

Based on the above analysis it is possible to segment food processing companies into different types according to:

(a) Their ESG aspiration
(b) Their association with farmers and primary agriculture

This results in 4 segments.

FIGURE 7: FOOD COMPANY SEGMENTATION ACCORDING TO ESG POSITION AND PROXIMITY TO FARMERS AND FAO VALUE PROPOSITION



The FAO's approach to how it engages with the sector can be seen in marketing terms. A classic marketing approach is firstly to segment the market, as above (Figure 7), secondly to decide which segment(s) to target and thirdly to decide what position to adopt in each segment. The message the FAO uses for each segment might be different.

Using marketing theory again, the positioning, or marketing programme consists of four elements, commonly referred to as the '4Ps': product, price, promotion and place (meaning distribution strategy). The table below examines each of these in relation to the FAO's potential offer.

Table 6: The 4Ps as applied to the FAOs Food Sector Engagement Strategy		
The '4Ps'	Relevance to FAO	Suggestions
Product	What is the FAO's offer or value proposition?	Enhance biodiversity Promote farmer equity
Price	What will the FAO charge and how	One-off-payment; amount
Place (distribution)	How will the FAO access the food companies	Through identified contacts; Via the ESG function
Promotion	To what extent and how will the FAO publicise this initiative	

Thinking specifically about the 'product' dimension the sort of messages for the 4 different segments identified above could be as described in Table 7

Table 7: Possible FAO value propositions for different market segments	
Segment	FAO Value proposition for the IST
High ESG/High farmer focus	A way of recognising the specific importance of seeds in providing environmental (biodiversity) and social benefits
High ESG/Low farmer focus	A way of contributing to farmer welfare though increasing productivity and access to seeds
Low ESG/High farmer focus	Using support for the International Plant Treaty as a vehicle of improving ESG credentials and contributing towards ESG certification
Low ESG/Low farmer focus	A quick win addressing both the environmental and social benefits of the International Plant Treaty

For companies which already have seed-related initiatives, and/or allude to the importance of seeds in the ESG report, more honed messages may be appropriate. For companies with existing seed initiatives, association with the International Plant Treaty could be seen as formal recognition of their seed efforts. For companies without any specific seed-related initiatives but which recognise the importance of seeds in their ESG communications, association with the International Plant Treaty could be seen as a formal initiative which validates their seed awareness.

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Appendix: Top 100 Food Companies and which sectors they operate in

Company	HQ location	Type of company	2019 sales	Trader	Meat	Dairy	Bakery	Cereals & Snacks	Coffee/ Tea	Beverages	Beer/wine/spirits	Confectionary	Ready meals	Other
Nestlé	Switzerland	Diversified	76.80			✔			✔			✔	✔	
PepsiCo Inc.	US	Diversified	67.16					✔		✔				
Anheuser-Busch InBev	US	Specialist	52.33								✔			
JBS	Brazil	Specialist	48.80		✔									
Tyson Foods	US	Specialist	42.41		✔									
Mars	US	Diversified inc. non-ag	37.63									✔		
The Coca-Cola Company	US	Specialist	37.27							✔				
Louis Dreyfus	Netherlands	Diversified	33.60	✔										
Archer Daniels Midland Co.	US	Diversified inc. non-ag	32.95	✔										
Cargill	US	Diversified inc. non-ag	31.70	✔										
Danone	Denmark	Specialist	28.32			✔								✔
Heineken	Netherlands	Specialist	26.85								✔			
Mondelez International	US	Diversified	25.87				✔	✔				✔		
Kraft Heinz Company	US	Diversified	24.98		✔	✔		✔	✔					✔
Smithfield Foods/WH Group	US/HK	Specialist	23.35		✔									
Unilever	UK	Diversified inc. non-ag	21.60						✔					
Suntory	Japan	Specialist	21.46								✔			
Olam International	Singapore	Diversified	21.14	✔										

Appendix: Top 100 Food Companies and which sectors they operate in

Company	HQ location	Type of company	2019 sales	Trader	Meat	Dairy	Bakery	Cereals & Snacks	Coffee/ Tea	Beverages	Beer/wine/spirits	Confectionary	Ready meals	Other
Lactalis	France	Specialist	20.72			✔								
Asahi Group	Japan	Specialist	19.08								✔			
CHS Inc.	US	Diversified inc. non-ag	18.90	✔										
General Mills Inc.	US	Diversified	16.87				✔	✔						
Diageo	UK	Specialist	16.37								✔			
Dairy Farmers of America	US	Specialist	15.86			✔								
Grupo Bimbo (Mexico)	Mexico	Specialist	15.10				✔							
Kirin Holdings	Japan	Specialist	15.01								✔			
Kellogg Company	US	Diversified	13.58					✔						✔
Coca-Cola European Partners			13.46							✔				
Fonterra	New Zealand	Specialist	13.26			✔								
Yili Group	China	Specialist	13.07			✔								
Ferrero	Italy	Specialist	12.77									✔		
Marfrig Group	Brazil	Specialist	12.66			✔								
Royal FrieslandCampina	Netherlands	Specialist	12.65			✔								
Bunge	US	Diversified	12.21	✔										
Arla Foods	Denmark	Specialist	11.79			✔								
China Mengniu Dairy Co.	China	Specialist	11.44			✔								

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Company	HQ location	Type of company	2019 sales	Trader	Meat	Dairy	Bakery	Cereals & Snacks	Coffee/ Tea	Beverages	Beer/wine/spirits	Confectionary	Ready meals	Other
Saputo	Canada	Specialist	11.24			✔								
Keurig Dr Pepper	US	Specialist	11.12							✔				
NH Foods	Japan	Diversified	10.88		✔	✔					✔			✔
Molson Coors Brewing Co.	US	Specialist	10.58								✔			
Pernod Ricard	France	Specialist	10.28											
McCain Foods Ltd	Canada	Specialist	10.27					✔						✔
Associated British Foods	UK	Diversified	10.22											✔
Femsa	Mexico	Diversified inc. non-ag	10.01							✔				
Carlsberg	Denmark	Specialist	9.88								✔			
Meiji Holdings	Japan	Specialist	9.63			✔						✔		
ConAgra Brands	US	Diversified	9.54					✔						
Hormel Foods Corporation	US	Diversified	9.50					✔						✔
Yamazaki Baking	Japan	Specialist	9.13				✔					✔		
Thai Bev	Thailand	Specialist	8.61								✔			
Brasil Foods	Brazil	Diversified	8.49		✔			✔					✔	✔
Danish Crown	Denmark	Specialist	8.47		✔						✔			
Coca-Cola Bottlers Japan	Japan		8.39							✔				
Constellation Brands	US	Diversified	8.34								✔			

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Company	HQ location	Type of company	2019 sales	Trader	Meat	Dairy	Bakery	Cereals & Snacks	Coffee/ Tea	Beverages	Beer/wine/spirits	Confectionary	Ready meals	Other
Maruha Nichiro Corp.	Japan	Diversified	8.15			✔								✔
Kerry Group	Ireland	Diversified	8.11		✔	✔		✔						✔
Campbell Soup Company	US	Diversified	8.11					✔		✔				
The Hershey Company	US	Specialist	7.99									✔		
The Hershey Company	US	Specialist	7.99									✔		
Hangzhou Wahaha Group	China		7.97							✔				
Ajinomoto	Japan	Diversified inc. non-ag	7.91											✔
Coca-Cola HBC	US		7.87							✔				
Itoham Yonekyu	Japan		7.82		✔									
Itoham Yonekyu	Japan	Specialist	7.82		✔									
The JM Smucker Company	US	Diversified	7.80				✔		✔	✔				✔
Sudzucker	Germany	Specialist	7.47											✔
Dean Foods Company	US	Specialist	7.33			✔								
Barry Callebaut	Switzerland	Specialist	7.24									✔		
Oetker Group	Germany	Diversified inc. non-ag	7.23					✔		✔	✔			
DMK Deutsches Milchkontor	Germany	Specialist	6.96			✔								
Total Produce	Ireland	Specialist	6.91											
Red Bull	Austria	Specialist	6.80							✔				

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Company	HQ location	Type of company	2019 sales	Trader	Meat	Dairy	Bakery	Cereals & Snacks	Coffee/ Tea	Beverages	Beer/wine/spirits	Confectionary	Ready meals	Other
Jacobs Douwe Egberts	Netherlands	Specialist	6.73						✔					
Bacardi	Bermuda	Specialist	6.40								✔			
Muller Group	Germany	Specialist	6.39			✔								✔
OSI Group	US	Diversified	6.30		✔		✔							✔
LMVH	France	Specialist inc. non-ag	6.25								✔			
Ingredion Inc.	US	Diversified	6.21											✔
Sodiaal	France	Specialist	5.81			✔								
Nissui	Japan	Diversified	5.75											✔
Post Holdings	US	Diversified	5.68					✔						✔
Vion	Netherlands	Specialist	5.63		✔									
Savencia Fromage & Dairy	France	Specialist	5.61			✔								
Agropur Cooperative	Canada	Specialist	5.46			✔								
McCormick Corporation	US	Specialist	5.35											✔
Morinaga Milk Industry	Japan	Specialist	5.23			✔						✔		
Schreiber Foods	US	Specialist	5.10			✔								
E & J Gallo Winery	US	Specialist	5.00								✔			
Perdue Farms	US	Diversified	4.90	(✔)	✔									
Nisshin Seifun Group	Japan	Specialist	4.66				✔							

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Company	HQ location	Type of company	2019 sales	Trader	Meat	Dairy	Bakery	Cereals & Snacks	Coffee/ Tea	Beverages	Beer/wine/spirits	Confectionary	Ready meals	Other
Lindt & Sprungli	Switzerland	Specialist	4.56									✔		
Ito En	Japan	Specialist	4.43						✔					
Nissin Foods Group	Japan	Specialist	4.30					✔						
Treehouse Foods	US	Diversified	4.29					✔		✔				
Sapporo Holdings	Japan	Diversified	4.29							✔	✔			
Monster Beverage Corp.	US	Specialist	4.20							✔				
J R Simplot	US	Diversified	4.20					✔						✔
Flowers Foods	US	Specialist	4.12				✔							
Anadolu Efes	Turkey	Specialist	4.10								✔			
Tsingtao Brewery	China	Specialist	4.05								✔			
Land O' Lakes Inc.	US	Specialist	4.00			✔								
Barilla	Italy	Specialist	3.90											✔
Lamb Weston	US	Specialist	3.76										✔	✔

Source: (Food Engineering, 2020), the author