Food producers and net zero: a review of progress

April 2024

Cristóbal Budnevich Portales, Valentin Jahn, Simon Dietz and Ali Amin

Transition Pathway Initiative

LSE Grantham Research Institute on Climate Change and the Environment

About the LSE Transition Pathway Initiative Centre

The Transition Pathway Initiative (TPI) Centre is an independent, authoritative source of research and data on the progress of corporate and sovereign entities in transitioning to a low-carbon economy.

The TPI Centre is part of the Grantham Research Institute on Climate Change and the Environment, which is based at the London School of Economics and Political Science (LSE). The TPI Centre is the academic partner of TPI, a global initiative led by asset owners and supported by asset managers. As of March 2024, over 150 investors globally, representing around US$60 trillion combined Assets Under Management and Advice, have pledged support for TPI.

The TPI Centre provides data on publicly listed equities, corporate bond issuers, banks, and sovereign bond issuers. The TPI Centre's company data:

- assess the quality of companies' governance and management of their carbon emissions and of risks and opportunities related to the low-carbon transition;
- evaluate whether companies' current and planned future emissions are aligned with international climate targets and national climate pledges, including those made as part of the Paris Agreement;
- form the basis for the Climate Action 100+ Net Zero Company Benchmark Disclosure Framework assessments; and
- are published alongside the methods online and fully open access at www.transitionpathwayinitiative.org and on GitHub.

About the authors

Cristóbal Budnevich Portales is a Research Analyst at the TPI Centre.

Valentin Jahn is the Principal Research Project Manager at the TPI Centre.

Simon Dietz is the Research Director at the TPI Centre and a Professor of Environmental Policy in the Department of Geography and Environment at the London School of Economics and Political Science.

Ali Amin is a Research Project Manager at the TPI Centre.

Acknowledgements

The authors would like to thank Carmen Nuzzo, Executive Director of the TPI Centre and Beata Bienkowska, Deputy Director of the TPI Centre, for their feedback on this report. Natalie Pearson copy-edited the report.

The views in this report are those of the authors and do not necessarily represent those of the host institutions or funders. The authors declare no conflict of interest in preparing this report. For the full disclaimer about the data and information published in this report, see p20.

This paper was first published in April 2024 by the Transition Pathway Initiative Centre.

Suggested citation: Budnevich Portales C, Jahn V, Dietz S and Amin A (2024) *Food producers and net zero: a review of progress*. London: TPI Global Climate Transition Centre, London School of Economics and Political Science.

Contents

Executive summary

The food sector is responsible for up to one-third of global greenhouse gas emissions. Achieving the goals of the Paris Agreement – limiting the global temperature increase to well below 2°C above pre-industrial levels, while pursuing efforts to limit the increase to 1.5°C – therefore necessitates a transformation of global food systems, making food a priority sector in the transition to a low-carbon economy. The attention given to food systems at the 2023 UN Climate Change Conference (COP28) is evidence of this.

However, efforts to assess companies' alignment with the Paris goals have tended to be restricted to the energy and industrial sectors. A major reason for the neglect of food is the methodological challenges in assessing the 'Paris alignment' of companies in this sector. Low-carbon scenarios for the food sector are scarcer than for energy/industry, and do not provide comparable data with what food companies disclose, or account for the high level of product differentiation in the sector. Many data challenges arise from the sector's complex supply chains, differences in agricultural practices, and the lack of consistent, detailed company disclosure of sourced agricultural inputs.

In response to these challenges, the TPI Centre has produced a new methodology to assess the Carbon Performance of food producers. It quantifies food producers' historical and future greenhouse gas emissions and compares them with low-carbon benchmarks for the sector. The methodology focuses on capturing material greenhouse gas emissions and activity data from food producers, encompassing both operational emissions (Scopes 1 and 2) and the crucial upstream value chain emissions associated with agricultural activities and land-use change (Scope 3, Category 1 – purchased goods and services).

The TPI Centre's Carbon Performance assessments are designed to be used alongside its Management Quality assessments to fully understand where companies are in their decarbonisation journey, identifying those actively managing the transition to a low-carbon economy and those lagging behind.

This report presents and analyses the results from applying the Carbon Performance methodology to the world's 26 largest publicly listed food producers, which had a combined market capitalisation of approximately US$930 billion in 2022.

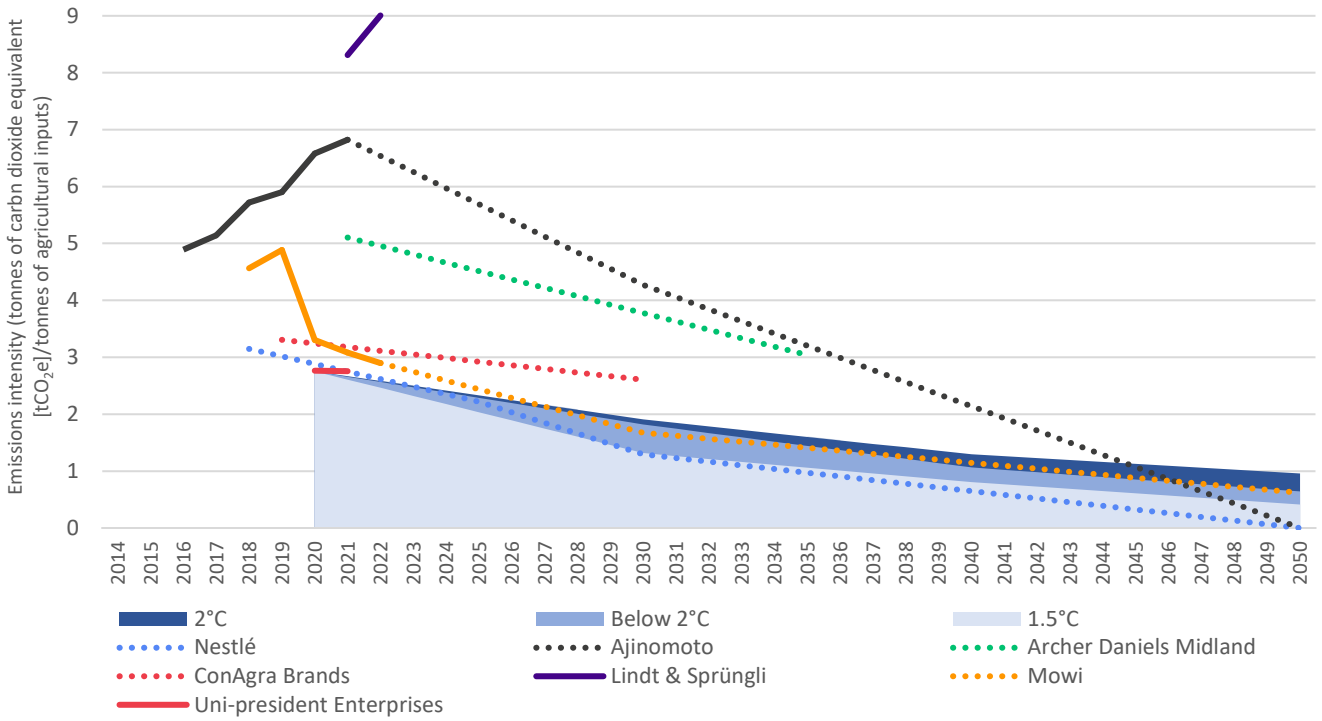
Key findings and recommendations

- Of the 26 food producers assessed, only seven have reported sufficient data to enable the assessment of their historical emissions intensities and emissions reduction targets on a comparable basis. The 73% of companies classified as 'no or unsuitable disclosure' is the highest proportion within any sector assessed by the TPI Centre during the 2023 cycle. Most food producers do not disclose sourced agricultural inputs in physical units (mass) – information that is essential for calculating companies' emissions intensity pathways in a way that is comparable across companies of different sizes and with different product portfolios.
- Most of the food producers assessed have set an emissions reduction target; only two have not set any. Among the 26 companies, 22 medium- and 16 long-term targets have been set. However, due to disclosure limitations – including on sourced agricultural inputs – only five of the 22 medium-term targets (23%) and three of the 16 long-term targets (19%) can currently be assessed using our Carbon Performance methodology. There is also a notable absence of short-term targets, with only two companies setting suitable targets covering the period up to 2026.
- No food producer is aligned with the 1.5°C benchmark throughout the three assessed timeframes, i.e. in the short (2025), medium (2035) and long term (2050). No company aligns with 1.5°C in the short term; only one (Nestlé) aligns in the medium term; and two (Ajinomoto and Nestlé) align in the long term (see Figures ES1 and ES2 below).
- Different factors can influence food producers' historical emissions intensities, including the mix of sourced agricultural inputs, the origin of sourced inputs and the energy efficiency of firms' manufacturing plants. For example, Lindt & Sprüngli's relatively high emissions intensity can be

attributed to the substantial share of cocoa in its sourced input mix, which embodies a high carbon footprint.

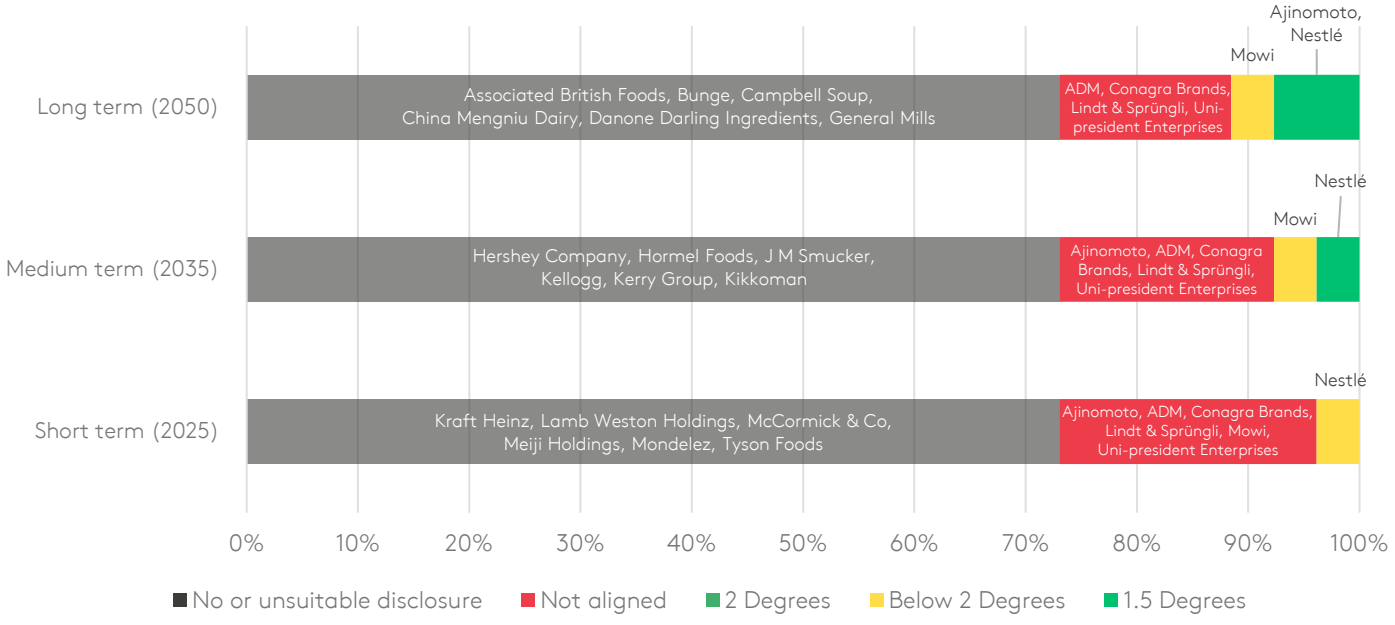
- Besides setting more ambitious emissions targets, a key recommendation of this report is that food producers must improve the disclosure of Scope 3 emissions and purchased agricultural inputs. This includes explicitly stating if emissions from agriculture, land use, land-use change and forestry are included in their Scope 3 emissions accounting and emissions targets. This will enable more food producers to be assessed against the TPI Carbon Performance methodology and inform investors' engagement and decision-making. Existing disclosures by some companies in our sample suggest such disclosure is feasible.

Figure ES1. Emissions intensity pathways for food producers



Notes: Solid lines are the historical data for companies. The dashed lines correspond to the estimated forward-looking values of the firms' targets. The coloured areas are the emissions intensity benchmarks.

Figure ES2. Food producers' alignment with emissions intensity benchmarks by time horizon



Note: Companies with no or unsuitable disclosure are listed once, as their alignment scores remain constant.

1. Introduction

The food sector and its contribution to climate change

Due to its direct dependence on nature and immense requirements for land and sea, the food sector has a fundamental impact on the natural environment. According to the Food and Agriculture Organization (FAO), agriculture is responsible for 90% of global deforestation [1]. The United Nations Environmental Programme (UNEP) finds that agriculture is the key driver of global biodiversity loss, responsible for 86% of the species that are at risk of extinction [2]. As such, agriculture is one of the greatest forces negatively affecting the balance of different ecosystems worldwide [3]. At the same time, agriculture heavily depends on the ecosystem services that the natural environment provides.

A major environmental impact of agriculture is greenhouse gas emissions. Although it is notoriously difficult to measure, studies indicate that the sector is responsible for between one-quarter and one-third of total emissions globally, with some studies suggesting an even greater contribution [4][5][6]. Consequently, a transformation of global food systems is required to achieve the Paris Agreement goal of limiting the global temperature rise to well below 2°C above pre-industrial levels, while pursuing efforts to limit the increase to 1.5°C [7]. While decarbonisation efforts have primarily focused on the energy, transportation, industrial and materials sectors, the critical role of food and agriculture in achieving net zero goals is receiving increasing recognition, as exemplified by the focus on this issue during the 2023 UN Climate Change Conference (COP28).

Food system emissions are produced at various stages of the value chain but are mostly concentrated upstream in the value chain. Upstream emissions from agriculture contribute around 80% of global food sector emissions [3][8] (see Figure 1.1a). A further breakdown of these emissions shows the largest share (37%) comes from livestock/aquaculture, which can be closely linked to farming and breeding of ruminant animals, followed by crop production (33%), which is associated with rice cultivation and the use of synthetic fertilisers (see Figure 1.1b). The remainder are associated with land use change (21%) and other sources such as burning of the savannah and cultivated organic soils [3][8]. Greenhouse gases are also emitted by energy-intensive processes in the middle and downstream stages of the food value chain, which includes the manufacturing, transport and packaging of food products; these stages account for around 20% of the food system's global emissions [3][9][10][11].

From the perspective of a food producers' emissions accounting, upstream emissions fall under Scope 3, Category 1 – purchased goods and services. They are therefore of critical importance to include in the analysis. As such, the TPI Centre incorporates this element within its Carbon Performance methodology for food producers.

Figure 1.1a. Food system emissions by stage in the value chain

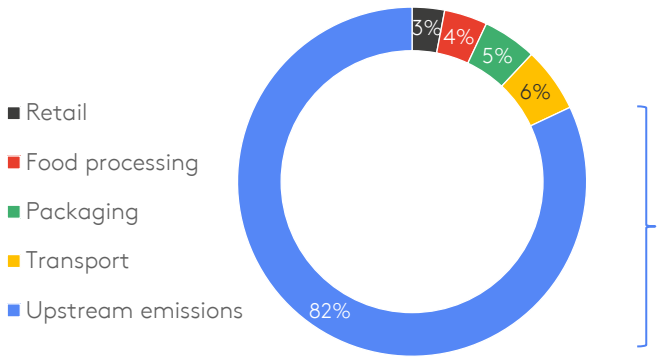
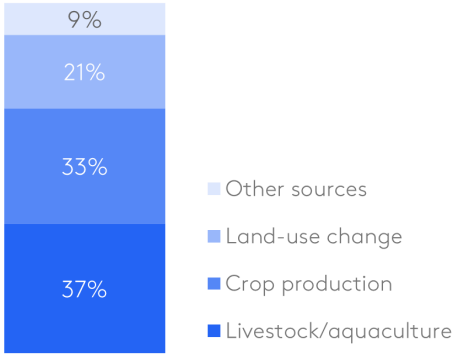


Figure 1.1b. Breakdown of upstream emissions by source



Carbon Performance methodology overview

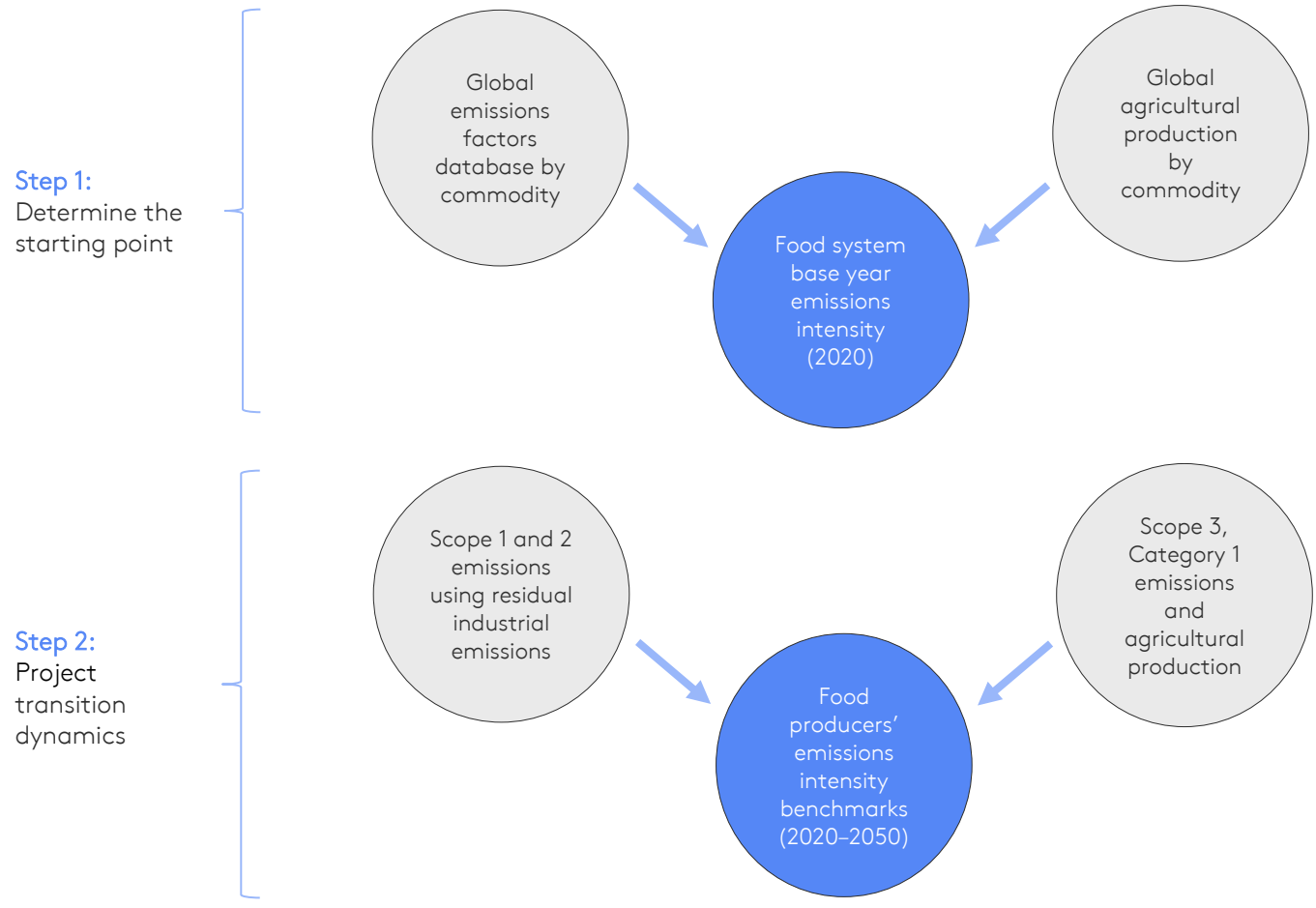
The TPI Centre recently published a note on methodology to accompany the first round of food producers' Carbon Performance assessment results [12]. Our Carbon Performance methodology allows for a comparison of food producers' historical and forward-looking emissions pathways based on emissions targets, with three low-carbon benchmark pathways corresponding to the Paris Agreement goals (1.5°C, Below 2°C and 2°C). The methodology thus tests companies' 'Paris alignment'. The benchmarks account for emissions from energy and from land use, land-use change, and forestry (LULUCF). Emissions are normalised by a measure of company activity that is comparable across the sector.

A major challenge is that food producers do not disclose emissions and activity data in a manner that is consistent with the models that can be used to develop benchmarks. For example, companies often disclose activity data as weight of product sold instead of sourced agricultural inputs. This inconsistency means the information disclosed by companies needs to be harmonised with the scenario data produced by models of the low-carbon transition.

Our low-carbon benchmark pathways for the food sector are generated in two steps:[1]

1. A baseline value is established for the food sector's emissions intensity in the starting year of 2020. This is achieved by aggregating data on global agricultural production, combined with data on global emissions factors of agricultural commodities.
2. Changes in the food sector's emissions intensity are estimated from 2020 onwards along different low-carbon scenarios. Scenario data is used from Integrated Assessment Models (IAMs) in the academic literature that simulate changes in agriculture and LULUCF emissions (Scope 3) and is complemented with operational emissions (Scope 1 and 2) data from the International Energy Agency (IEA).

Figure 1.2. The two-step approach to developing low-carbon benchmarks for food producers



[1] For further details and adjustments to the methodology, see: *Carbon Performance assessment of food producers: note on methodology*.

Emissions intensity metric

The Carbon Performance methodology is based on an emissions intensity metric that incorporates Scope 1, 2 and 3 (Category 1 – purchased agricultural goods emissions), measured in units of tonnes of CO_2 equivalent (tCO_2e) per tonne of sourced agricultural inputs:

$$Emissions\ Intensity = \frac{Scope\ 1 + Scope\ 2 + Scope\ 3\ \ (Category\ 1, Purchased\ agricultural\ inputs)}{sourced\ agricultural\ inputs} \qquad \textit{(Equation 1)}$$

The inclusion of emissions from Scope 3 (Category 1 – purchased agricultural inputs subcategory) is crucial as the majority of the emissions attributed to food producers come from upstream in the value chain (see Figures 1.1a; 1.1b). These upstream emissions are mainly attributable to direct emissions from LULUCF, coupled with related emissions from farming crops and raising livestock.[2]

Given the significance of emissions from LULUCF for food producers, it is essential for companies to explicitly state the inclusion of agriculture and LULUCF emissions in their greenhouse gas emissions accounting and decarbonisation targets.

The denominator in the emissions intensity measure is sourced agricultural inputs rather than final food products. The reason for this choice is that unprocessed agricultural inputs align more closely with the commodities included in the emissions factors and global production data used to derive the benchmark pathways. It is currently unfeasible to produce low-carbon benchmark pathways for final food products.

[2] If the Scope 3, Category 1 (purchased goods and services) emissions breakdown is not available (as is the case for most companies evaluated), we assume purchased agricultural inputs emissions to be the same as total emissions from this category, as these typically represent the majority of the emissions.

2. Assessment results

Assessed companies

The TPI Centre has applied its new Carbon Performance methodology to 26 of the world's largest publicly listed food producers. These companies are drawn from the 'Food Products (3577)' and 'Farming, Fishing, and Plantations (3573)' subsectors of the consumer goods sector under the Industry Classification Benchmark (ICB), version 2.6. Company size is measured by free-float market capitalisation. The 26 companies were selected to optimise sector coverage (based on market capitalisation) within the scope of the study.

The combined market capitalisation of the firms analysed exceeded US$928 billion in 2022, representing nearly 76% of the total market capitalisation of the sector (see Table 2.1 below). Most of the assessed companies have headquarters in the USA (15) and Europe (6), with the remaining five based in Asia, but most operate globally. Companies' public disclosures were evaluated between 1 May and 17 July 2023.[3]

As Carbon Performance is only one measure of corporate climate action, the TPI Centre also provides a Management Quality assessment based on qualitative indicators that evaluate and track the quality of companies' climate governance and management. These two assessments are complementary and should be used together (for further details please refer to [13]).

Emissions intensity pathways and alignment scores

The results of the assessment, presented in Figure 2.1 below, show companies' historical emissions intensities and – where greenhouse targets have been set – their projected future emissions intensities. The company pathways are compared with three different benchmarks: 1.5°C; Below 2°C; and 2°C.

Companies are categorised into four groups.

- Group 1: Companies that have no or unsuitable disclosures.
- Group 2: Companies with historical emissions intensity data but no projected forward-looking values.
- Group 3: Companies with historical emissions intensity data and projected forward-looking values, whose pathways do not align with any of the benchmarks.
- Group 4: Companies with historical emissions intensity data and projected forward-looking values, whose pathways align with one or more of the benchmarks.

Out of the 26 companies in the sample, 19 (73%) have no or unsuitable disclosures, meaning they cannot be assessed against the TPI Centre's emissions intensity benchmarks; hence they belong to Group 1. This is because a considerable number of companies do not disclose their sourced agricultural inputs in units of mass, a metric which is required to calculate an emissions intensity pathway.

Group 2 comprises Lindt & Sprüngli and Uni-President Enterprises. They both lack quantifiable forward-looking targets and their historical emissions do not align with any of the benchmarks.

Group 3 is also formed of two companies: ADM and ConAgra Brands. While they disclose quantified emissions reduction targets, they are not ambitious enough for their emissions intensity pathways to align with the benchmarks in any given year.

The emissions pathways of the companies in Group 4 (Ajinomoto, Mowi and Nestlé) align with one or more of the benchmarks at some point during the assessment horizon.

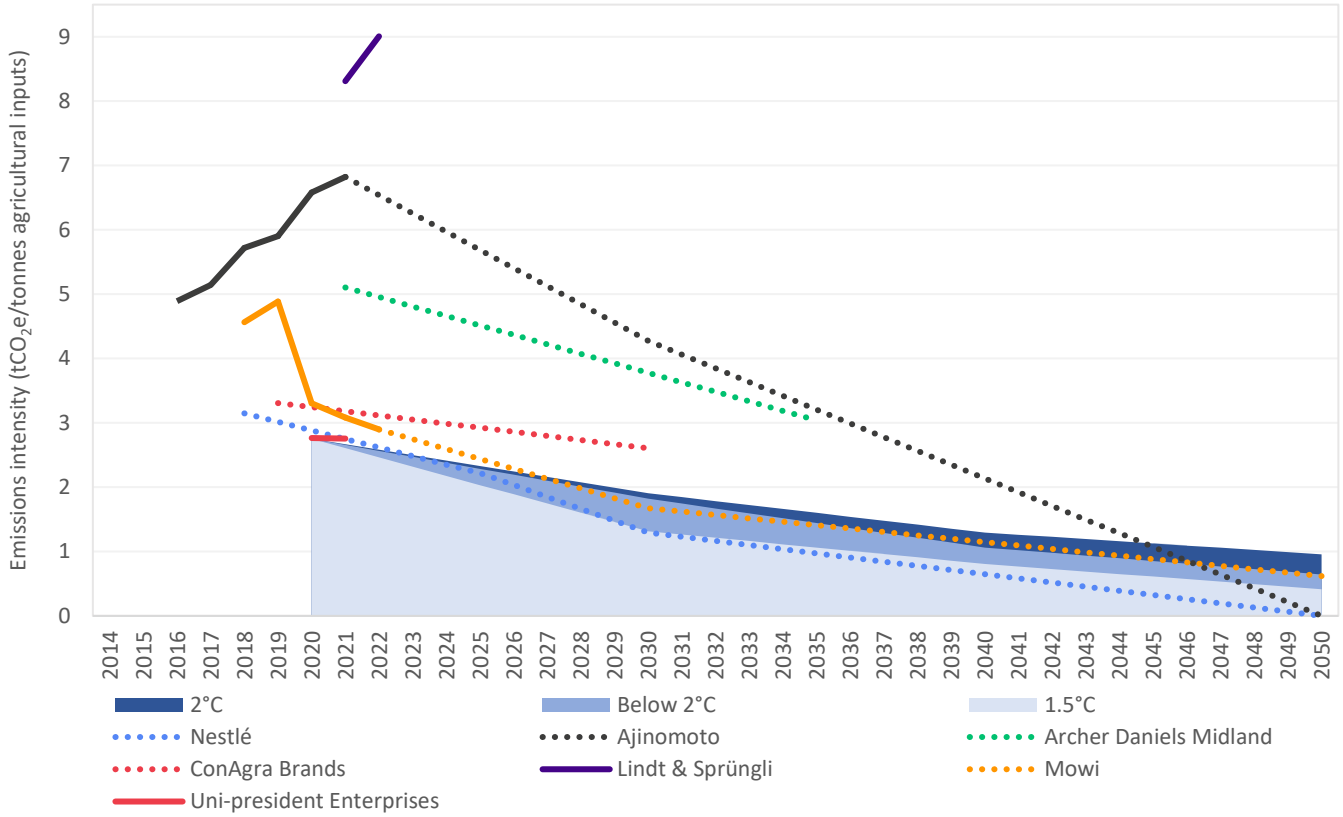
[3] Following the Carbon Performance assessments, companies were given three weeks to provide feedback after they were sent out on 26 June 2023. The results in this report are based solely on the assessment and feedback provided by the companies, supported by publicly available sources (e.g., company sustainability reports, as well as responses to the annual CDP questionnaire).

Table 2.1. Sample of food producers used by the TPI Centre

	Company name	Market capitalisation (US$ billion)	Country of headquarters
1	Nestlé	339.7	Switzerland
2	Mondelez International	85.5	USA
3	Kraft Heinz	44.9	USA
4	Archer Daniels Midland (ADM)	44.1	USA
5	General Mills	43.3	USA
6	Danone	35.4	France
7	Hershey Company	30.9	USA
8	Hormel Foods	26.2	USA
9	Tyson Foods	24.1	USA
10	Kellogg	22.8	USA
11	McCormick & Co	21.7	USA
12	China Mengniu Dairy	20.0	China
13	Kerry Group	18.9	Ireland
14	Associated British Foods	16.5	UK
15	ConAgra Brands	16.1	USA
16	Lindt & Sprüngli	15.6	Switzerland
17	Ajinomoto	15.0	Japan
18	J M Smucker	14.5	USA
19	Campbell Soup	13.8	USA
20	Bunge	13.8	USA
21	Uni-President Enterprises	13.0	Taiwan
22	Kikkoman	12.5	Japan
23	Mowi*	11.3	Norway
24	Darling Ingredients	11.2	USA
25	Lamb Weston Holdings	9.9	USA
26	Meiji Holdings	7.4	Japan

*Notes: Market capitalisation corresponds to the average quarterly value for the year 2022, based on data provided by FTSE Russell. *Mowi is the only company categorised in the farming and fishing subsector. All other companies belong to the food products subsector based on the ICB sector classification (version 2.6).*

Figure 2.1. Food producers' emissions intensity pathways



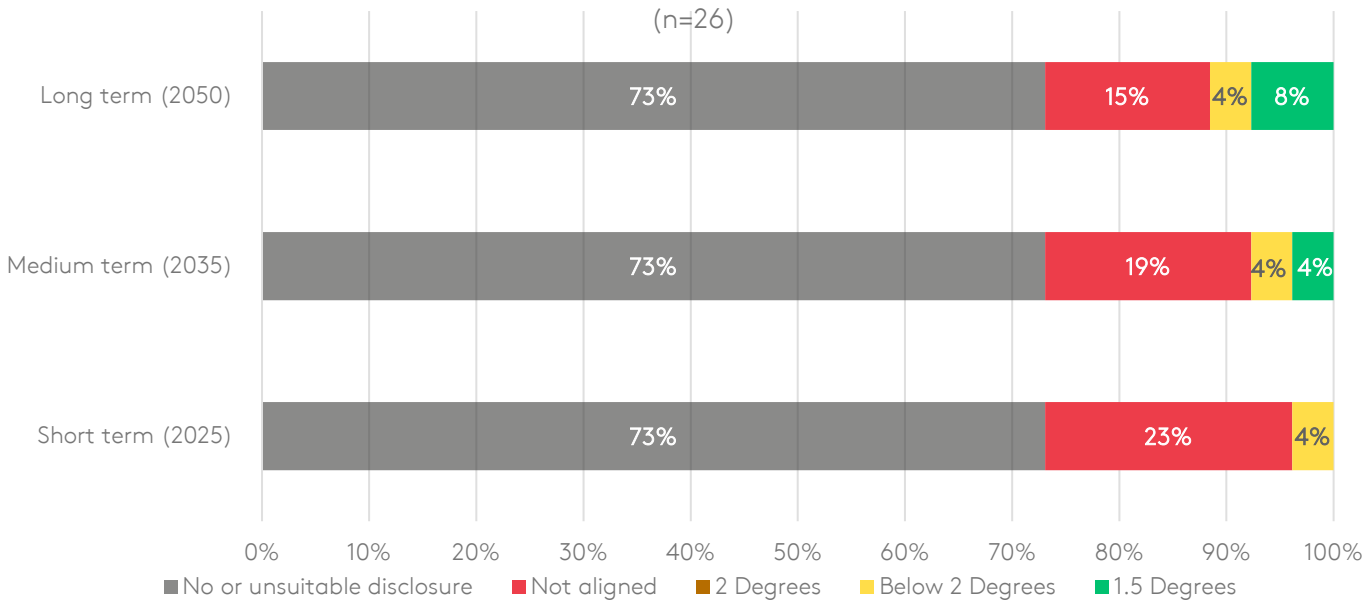
Note: Solid lines represent companies' historical data. Dotted lines show the estimated forward-looking values of the firms' targets. If a company has only a dotted line, it means that only one historical data point could be calculated. The coloured areas are the emissions intensity benchmarks.

These data can be used to assess companies' alignment with the emissions intensity benchmarks in the short (2025), medium (2035), and long term (2050).[4] In the short term (2025), only one company is aligned with any of TPI's benchmarks: Nestlé, which aligns with the Below 2°C benchmark. In the medium term (2035), two companies align with TPI's benchmarks: Mowi, which aligns with Below 2°C; and Nestlé, which aligns with the 1.5°C benchmark. In the long term, Ajinomoto and Nestlé are aligned with 1.5°C, and Mowi is aligned with Below 2°C. Figure 2.2 below shows a summary of the alignment scores of the 26 food producers for each timeframe.

Overall, the assessment results reveal that limited disclosure is a significant problem in the food sector (see Section 3, Table 3.1 for details on the food producers' disclosure gap). Among all high-emitting sectors assessed by the TPI Centre during the 2023 cycle, food producers exhibited the highest proportion of companies with 'no or unsuitable disclosure' by a large margin (73% versus 50% for the next highest sector: cement). Furthermore, the ambition of assessed company targets appears insufficient, with over half of those disclosing relevant information failing to align with any TPI benchmarks across any of the three timeframes.

[4] If a company's projected emissions pathway does not extend to the specified benchmark years (2025, 2035 or 2050), we use the company's last reported value (whether historical or projected) and compare it with the benchmark values of the specified years. The timeframe for short-term alignment will be extended to 2027 in the next assessment cycle in 2024, and may be updated annually.

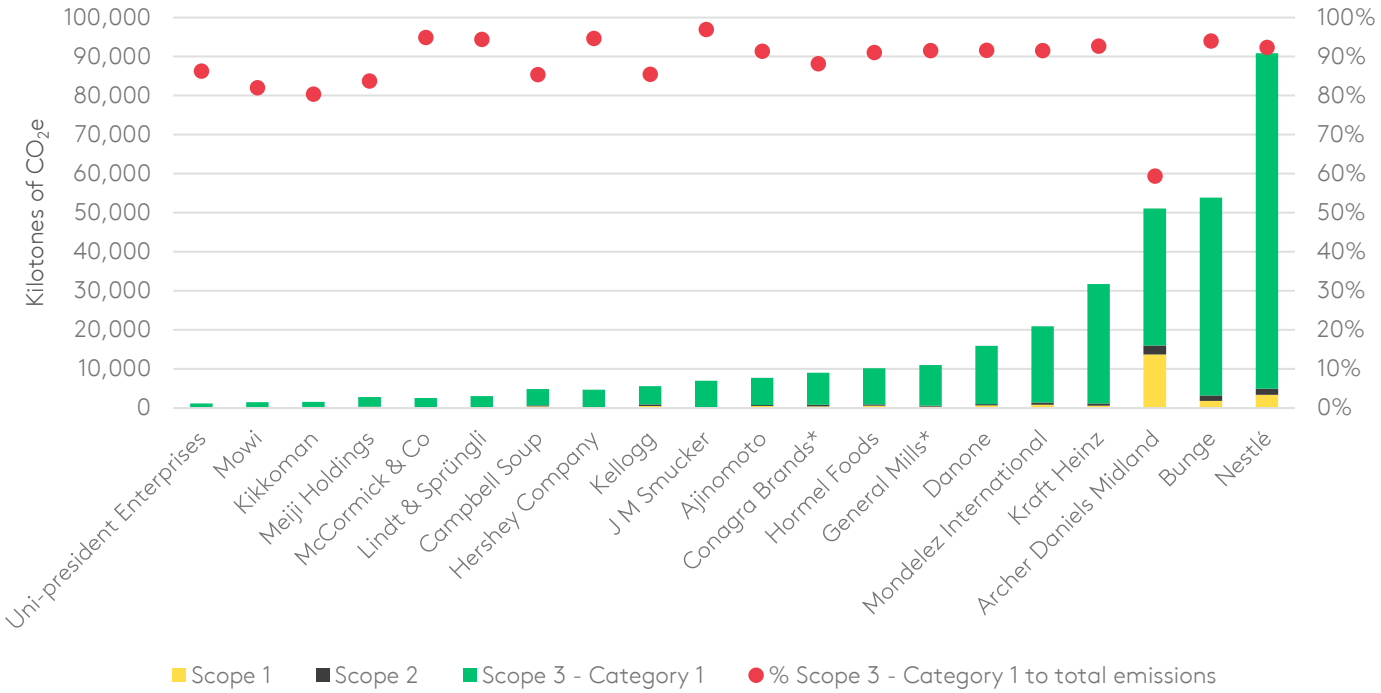
Figure 2.2. Food producers' alignment with emissions intensity benchmarks by time horizon



Food producers' emissions breakdown and further analysis

To demonstrate the materiality of upstream value chain emissions in the food sector, Figure 2.3 shows the share of upstream emissions in total Scope 1, 2 and 3 (Category 1) emissions for the year 2021. Scope 3 (Category 1) emissions account for more than 80% of total relevant emissions for all companies in the sample except for ADM. The mean share is nearly 90%. The figure also highlights the concentrated nature of the sector, with six of the 20 companies who report Scope 1, 2 and 3 (Category 1) emissions accounting for 80% of total food sector emissions (Nestlé, Bunge, ADM, Kraft Heinz, Mondelez International and Danone). Collectively, the absolute emissions total approximately 340 million tonnes of CO_2e, which is comparable to over half of the total Scope 1 emissions from the aviation sector in 2021 [14].

Figure 2.3. Food producers' emissions breakdown and Scope 3 (Category 1) as a proportion of total emissions, 2021

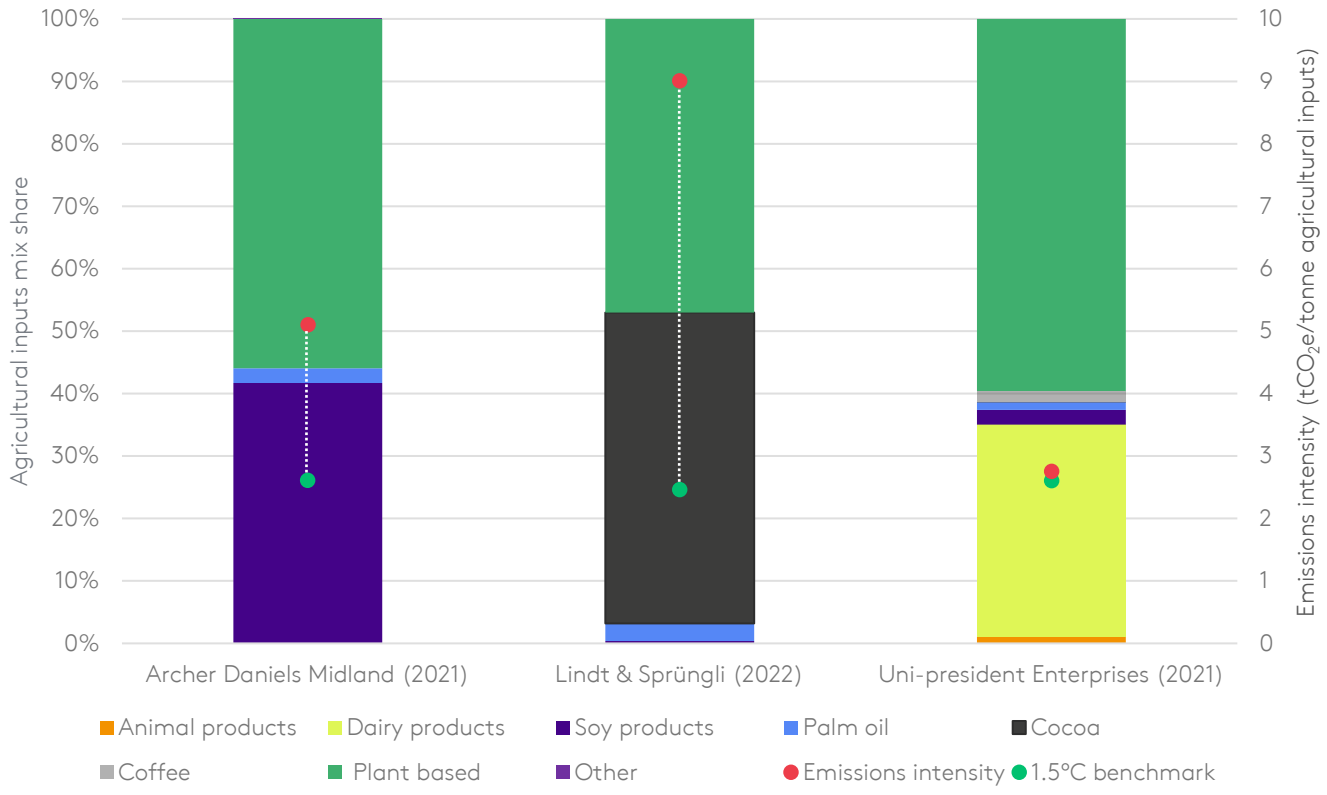


*Notes: *The reported data for Conagra Brands and General Mills is from 2020 due to unavailable disclosure for the 2021. Twenty of 26 companies reported Scope 1, 2 and 3 (Category 1) emissions.*

The mix of agricultural inputs sourced can have a substantial impact on a company's emissions intensity (see Figure 2.4). For the three companies that provide a breakdown of their sourced agricultural inputs, we evaluate their emissions intensity based on a simple categorisation of their input mix.[5] Lindt & Sprüngli's relatively high emissions intensity can be explained by the high share of cocoa in their input mix: dark chocolate has a global median carbon footprint of 46.8 kilograms of CO_2 equivalent ($kgCO_2e$) per kilogram of product [3] [8]. In contrast, Uni-president Enterprises' emissions intensity is only slightly above the 1.5°C benchmark. This might seem counter-intuitive given that dairy products tend to embody relatively high greenhouse emissions. For instance, cheese has a global median emissions intensity of 23.9$kgCO_2e$ per kilogram of product. However, Uni-president Enterprises' emissions intensity is lower because it only sources milk, which has a global median intensity of 3.2$kgCO_2e$ per kilogram of product [3] [8]. The results highlight that food companies face different challenges in their efforts to decarbonise in line with international climate goals.

Other factors, including where inputs are sourced from[6] and how energy-efficient manufacturing plants are, can affect food producers' emissions intensities. ADM's emissions intensity is difficult to reconcile with its sourced input mix as almost 98% of the company's sourced ingredients are soy and other plant-based products, which generally have a low emissions intensity. However, this can be explained by a high emissions intensity in the food processing stage. ADM's large share of Scope 1 and 2 emissions as a proportion of its total emissions (40%) is suggestive of this. As shown in Figure 2.4, ADM's large share of Scope 1 and 2 emissions as a proportion of its total emissions makes it an outlier within the sector.

Figure 2.4. Effect of sourced agricultural inputs mix (left axis) on company's emissions intensity (right axis), 2021–2022



Notes: ADM and Uni-president Enterprises are compared against the 2021 1.5°C emissions intensity benchmark, whereas Lindt & Sprüngli is compared against the 2022 value due to a more comprehensive disclosure of its sourced inputs for that year. The white dotted lines represent the difference between each company's emission intensity and the 1.5°C emissions intensity benchmark value for the assessed year.

[5] These categories include animal products, dairy products, cocoa coffee, palm oil, plant-based products, soy products, and others.

[6] For further details please check [3] [8].

3. Disclosure gaps and targets

Company disclosure gaps and the evolution of disclosures

In the 2023 Carbon Performance assessment cycle, 19 of the 26 food producers (73%) were found to have no disclosures or unsuitable disclosures, meaning that this proportion could not be assessed. The reasons for this are summarised below and detailed in Table 3.1.

- Six companies did not disclose data on Scope 3 (Category 1) greenhouse gas emissions.
- Sixteen companies did not disclose the quantity of their sourced agricultural inputs in physical units (mass), the denominator of the emissions intensity metric. In addition, only three of 26 companies provided a breakdown of sourced inputs by commodity type. Without this, companies' emissions intensities cannot be verified using emissions factors from the academic literature.
- Two companies disclosed both sourced agricultural inputs and Scope 1, 2 and 3 (Category 1) emissions, but inconsistent reporting boundaries prevented their emissions intensity pathways from being calculated.
- Nineteen of 26 companies did not explicitly mention whether their emissions disclosures and emissions reduction targets factored in emissions from LULUCF. Given the materiality of upstream emissions for food producers, their inclusion is essential to the accurate assessment of companies' Carbon Performance.

Table 3.1 shows the years for which companies made the relevant data publicly available. These data are grouped into two categories: essential and desirable. Essential elements are the minimum data required to estimate an emissions intensity value. Desirable elements allow for a more precise calculation, enhancing the accuracy of companies' disclosure.

On average, food producers started disclosing Scope 3 (Category 1) emissions and their sourced agricultural inputs in units of mass in 2018, with some having reported them as early as 2013. However, only seven companies explicitly mention the inclusion of LULUCF emissions in their accounting and targets, with an average starting year of 2019.[7] Additionally, only four companies disclosed a Scope 3 (Category 1) breakdown and five disclosed sourced agricultural inputs by type, starting in 2020 on average (see Box 3.1 below for a case study).

These trends illustrate that company disclosure in the food producers' sector is a relatively new phenomenon compared to other sectors assessed by the TPI Centre such as electricity utilities, in which disclosures typically began in 2013 or 2014. This gap may be attributed to the complexities of collecting Scope 3 (Category 1) emissions data.

We also assessed the progress made by the ten companies from the 2022 pilot assessment cycle (listed in bold in Table 3.1).[8] The reassessment of these initially assessed companies showed a lack of progress: none had disclosed any new information relevant to the calculation of emissions intensity pathways, thus they continued to have no or unsuitable disclosures.

[7] During this first Carbon Performance assessment cycle, the TPI Centre assumed, where appropriate, that LULUCF emissions were included in company reporting, even if they did not explicitly state this. This assumption will be revisited in future assessment cycles.

[8] See the full results of the pilot assessment in the TPI Centre's 2022 discussion paper.

Table 3.1. Food producers' disclosures, with the year in which they were made available

	Essential			Desirable	
	Discloses Scope 3 (Category 1)	Explicit mention of LULUCF emissions included in Upstream Scope 3 accounting	Discloses sourced inputs in units of mass	Discloses Scope 3 (Category 1) from purchased agricultural inputs	Discloses sourced inputs by commodity in units of mass
Total share (and number) of companies disclosing related data	77% (20)	27% (7)	38% (10)	15% (4)	19% (5)
Average year of disclosure	2018	2019	2018	2020	2020
Ajinomoto	2016	n/a	2014	n/a	n/a
Archer Daniels Midland (ADM)	2019	2021	2021	n/a	2021
Associated British Foods	n/a	n/a	n/a	n/a	n/a
Bunge	2018	2018	n/a	n/a	n/a
Campbell Soup	2018	n/a	n/a	n/a	n/a
China Mengniu Dairy	n/a	n/a	n/a	n/a	n/a
ConAgra Brands	2018	2021	2019	2020	n/a
Danone	2015	n/a	n/a	n/a	n/a
Darling Ingredients	n/a	n/a	2019	n/a	n/a
General Mills	2014	n/a	n/a	n/a	n/a
Hershey Company	2019	2020	n/a	n/a	n/a
Hormel Foods	2021	n/a	n/a	n/a	n/a
JM Smucker	2019	n/a	n/a	n/a	n/a
Kellogg	2019	n/a	n/a	n/a	n/a
Kerry Group	n/a	n/a	n/a	n/a	n/a
Kikkoman	2018	n/a	2018	n/a	2018
Kraft Heinz	2017	n/a	n/a	n/a	n/a
Lamb Weston Holdings	n/a	n/a	n/a	n/a	n/a
Lindt & Sprüngli	2020	2021	2019	2021	2019
McCormick & Co	2018	n/a	n/a	2018	n/a
Meiji Holdings	2017	n/a	2014	n/a	2021
Mondelez International	2013	2017	n/a	2019	n/a
Mowi	2018	n/a	2018	n/a	n/a
Nestlé	2013	2018	2013	n/a	n/a
Tyson Foods	n/a	n/a	n/a	n/a	n/a
Uni-president Enterprises	2020	n/a	2020	n/a	2020

Note: Companies in bold represent the subset of companies that were part of the pilot assessment cycle on which the 2022 discussion paper was based.

Box 3.1. Good practice example: Lindt & Sprüngli's disclosure

In its 2021 and 2022 Sustainability Reports, Lindt & Sprüngli disclosed its Scope 3 (Category 1) emissions by sub-category, quantifying the contributions of its main sourced inputs, which are cocoa and other raw materials (dairy, sugar and hazelnuts). Furthermore, the company states that it has analysed satellite imagery of its cocoa farms over the past 20 years to increase the accuracy of their calculated emissions from land-use change.

Similarly, Lindt & Sprüngli discloses the quantity of sourced agricultural inputs by type in units of mass, including cocoa, sugar, palm oil, hazelnuts and sugar. This comprehensive disclosure allows the company's historical emissions intensity pathway to be accurately calculated [15] [16].


Photo: BBC World Service, Flickr

Target-setting

To complement our analysis of the disclosure gap in the food producers' sector, we have mapped all companies' emissions reduction targets according to their time horizon and suitability for assessments of Carbon Performance (see Table 3.2). Our analysis reveals that most food producers have set medium- (2027–2035) and long-term (2036-2050) emissions targets: 85% of companies (22 of 26) have medium-term targets and 62% (16 of 26) have long-term targets (see Box 3.2 below for a case study). However, only 23% of medium-term targets (5 of 22) and 19% of long-term targets (3 of 16) can ultimately be assessed on Carbon Performance. This is due to a combination of two factors:

1. Some companies set emissions reduction targets on a basis that is inconsistent with the TPI Centre's Carbon Performance methodology. For instance, companies may set targets on a group-wide basis rather than stating how they will apply them to their food-producing operations specifically. Targets that are stated on a basis consistent with the TPI Centre's methodology are labelled "suitable" targets and are highlighted in green in Table 3.2. below.
2. When companies' historical emissions intensities cannot be calculated due to a lack of disclosure, the future emissions intensities implied by their targets cannot be measured either, as there is no baseline against which to apply the targets. This limitation also applies to suitable targets as defined in point (1), explaining why some companies with suitable targets could still not be assessed during the 2023 cycle.

Box 3.2. Good practice example: Nestlé's Net Zero Roadmap

In March 2023, Nestlé published a Net Zero Roadmap which outlines its plan to achieve net zero greenhouse gas emissions by 2050. The company sets an interim goal which aims for a 50% reduction in emissions by 2030 compared to 2018 levels. Nestlé's decarbonisation strategy prioritises reductions across all scopes of emissions, with a particular emphasis on Scope 3.

Nestlé has defined intermediate objectives that will support its goal to achieve net zero by 2050. These include: 100% renewable electricity use in all its sites by 2025; transforming its product portfolio by promoting plant-based alternatives; and sourcing 50% of its key ingredients through regenerative agricultural methods by 2030. The listing of interim actions to support long-term decarbonisation goals allow investors and practitioners to evaluate companies' current and planned actions to reduce their emissions [17] [18].


Photo: Geograph

Table 3.2. Emissions reduction target-setting in the food producers' sector

	Short-term targets [2023–2026]	Medium-term targets [2027–2035]	Long-term targets [2036–2050]
Ajinomoto		**2030**	**2050**
ADM		**2035**	
Associated British Foods		2030	
Bunge		2030	
Campbell Soup		2030	
China Mengniu Dairy	2025	2030	2050
ConAgra Brands		**2030**	
Danone		2030	2050
Darling Ingredients			2050
General Mills		2030	2050
Hershey Company		2030	
Hormel Foods			
JM Smucker		2030	
Kellogg		2030	2050
Kerry Group		2030	2049
Kikkoman		2030	2050
Kraft Heinz		2030	2050
Lamb Weston Holdings		2030	
Lindt & Sprüngli	2023	Year-on-year target	Year-on-year target
McCormick & Co		2030	2050
Meiji Holdings		2030	2050
Mondelez International	2025		2050
Mowi		**2030**	**2050**
Nestlé	**2025**	**2030**	**2050**
Tyson Foods		2030	2050
Uni-president Enterprises			
Share (and number) of companies with targets	15% (4)	85% (22)	62% (16)
Total targets suitable for carbon assessment	2	16	12
Share (and number) of total targets assessed in 2023	25% (1)	23% (5)	19% (3)

Note: In bold and italics, companies that have an emissions intensity pathway and, in bold, the years for which the company's targets can be assessed under the TPI Centre's methodology. Green cells represent targets that are (or could be) quantified in the company Carbon Performance assessment if a historical data point was available, while red cells represent targets set on an inconsistent boundary with TPI Centre's methodology.

4. Conclusions, recommendations and next steps

Achieving international climate goals enshrined in the Paris Agreement demands significant decarbonisation across many economic sectors – including food production. Projections based on current trends and stated policies suggest that food systems will continue to contribute around one-third of global greenhouse emissions in 2050 [7] [19]. Therefore, food producers, including leading publicly listed companies, have a crucial role to play in driving the transition to a low-carbon food system.

Yet few food producers can demonstrate alignment with the Paris temperature goals at present. Most do not provide suitable disclosures for the assessment of their Carbon Performance. Only two of 26 companies have long-term targets aligned with 1.5°C (Ajinomoto and Nestlé); only one company is aligned with 1.5°C in the medium term (Nestlé); and none are aligned with 1.5°C in the short term.

Assessing the Carbon Performance of food producers is complex and requires relatively detailed information on emissions and activity. This goes some way to explain the current lack of suitable company disclosures in the sector. Through their engagement with food producers, investors can play a key role in promoting better disclosures. Improved disclosures for food producers would include advancements in the following areas:

1. Disclosure of sourced agricultural inputs: Companies should disclose data on the quantity of sourced agricultural inputs in physical units (ideally by commodity). The practice of reporting on responsibly sourced commodities, already undertaken by some companies, suggests the feasibility of data collection and reporting in this area.
2. Scope 3 (Category 1) emissions and clarity on LULUCF: Companies should break out emissions associated with agricultural inputs from broader Scope 3 (Category 1) disclosures. They should also explicitly state whether agricultural and LULUCF emissions are factored into these disclosures. As a large source of emissions for food producers, this information is crucial for understanding the coverage of their reporting and the underlying ambition of their emissions reduction efforts.
3. Verification of disclosed data: Companies should consider verifying their reported data on emissions and sourced agricultural inputs. This could contribute to increased confidence in the accuracy of company disclosures.

The TPI Centre will continue to conduct yearly Carbon Performance assessments of food producers. We plan to progressively expand our company coverage, thereby creating an accessible record with which to analyse the sector's historical environmental performance and its decarbonisation efforts in the pursuit of net zero emissions.

References

[1] FAO [Food and Agriculture Organization] (2022) FRA 2020 Remote Sensing Survey. *FAO Forestry Paper No. 186*. Rome. https://doi.org/10.4060/cb9970en

[2] Benton T, Bieg C, Harwatt H et al. (n.d.). *Food system impacts on biodiversity loss*.

[3] Ritchie H, Rosado P and Roser M (2022) *Environmental Impacts of Food Production*. Our World In Data. https://ourworldindata.org/environmental-impacts-of-food

[4] Crippa M, Solazzo E, Guizzardi D et al. (2021) Food systems are responsible for a third of global anthropogenic GHG emissions. *Nat Food* 2: 198–209. https://doi.org/10.1038/s43016-021-00225-9

[5] Costa C, Wollenberg E, Benitez M et al. (2022) Roadmap for achieving net-zero emissions in global food systems by 2050. *Scientific Reports 12*(1): 15064. https://doi.org/10.1038/s41598-022-18601-1

[6] Tubiello F, Rosenzweig C, Conchedda G, et al. (2021). Greenhouse gas emissions from food systems: Building the evidence base. *Environmental Research Letters 16*(6): 065007. https://doi.org/10.1088/1748-9326/ac018e

[7] Ruggeri Laderchi C, Lotze-Campen H, DeClerck, F et al. (2024). The Economics of the Food System Transformation. Food System Economics Commission (FSEC), *Global Policy Report*.

[8] Poore J and Nemecek T (2018) Reducing food's environmental impacts through producers and consumers. Science, 360(6392): 987-992.

[9] Clark M, Domingo N, Colgan K et al. (2020) Global food system emissions could preclude achieving the 1.5° and 2°C climate change targets. *Science*, *370*(6517): 705–708. https://doi.org/10.1126/science.aba7357

[10] Tubiello F et al. (2014) Agriculture, Forestry and Other Land Use Emissions by Sources and Removals by Sinks. *ESS Working Paper No.2*. http://www.fao.org/docrep/019/i3671e/i3671e.pdf

[11] FAO (2020) Emissions due to agriculture. Global, regional and country trends 2000–2018. *FAOSTAT Analytical Brief Series No 18*. Rome https://www.fao.org/3/cb3808en/cb3808en.pdf

[12] Dietz S and Jahn V (2024) *Carbon Performance assessment of food producers: note on methodology*. London: Transition Pathway Initiative Centre, London School of Economics and Political Science.

[13] Jahn V, Ingham R and and Dietz S (2024) *TPI's methodology report: Management Quality and Carbon Performance Version 5.0*. London: Transition Pathway Initiative Centre, London School of Economics and Political Science.

[14] IEA [International Energy Agency] (2023) Net Zero Roadmap: A Global Pathway to Keep the 1.5 °C Goal in Reach. IEA: Paris https://www.iea.org/reports/net-zero-roadmap-a-global-pathway-to-keep-the-15-0c-goal-in-reach

[15] Lindt & Sprüngli (2022) *Sustainability Report 2021*.

[16] Lindt & Sprüngli (2023) *Sustainability Report 2022*.

[17] Nestlé (2023) *Accelerate, Transform, Regenerate: Nestlé's Net Zero Roadmap. March 2023*.

[18] Jahn V and Dietz S (2023) *Response to the Transition Plan Taskforce (TPT) Disclosure Framework and Implementation Guidance consultation*. London: Grantham Research Institute on Climate Change and the Environment, London School of Economics and Political Science.

[19] Nguyen H (2018) *Sustainable food systems: Concept and framework*. Food and Agricultural Organisation (FAO).

Disclaimer

1. Data and information published in this report and on the TPI Centre website are intended principally for investor use but, before any such use, you should read the TPI Centre's website terms and conditions to ensure you are complying with some basic requirements which are designed to safeguard the TPI Centre while allowing sensible and open use of the methodologies and of the data processed by the TPI Centre. References in these terms and conditions to "data" or "information" on the website shall include the Carbon Performance data, the Management Quality indicators or scores, and all related information.
2. By accessing the data and information published in this report and on the website, you acknowledge that you understand and agree to the website terms and conditions. In particular, please read paragraphs 4 and 5 below which detail certain data use restrictions.
3. The processed data and information provided by the TPI Centre can be used by you in a variety of ways – such as to inform your investment research, your corporate engagement and proxy-voting, to analyse your portfolios and publish the outcomes to demonstrate to your stakeholders your delivery of climate policy objectives and to support the TPI Centre in its initiative. However, you must make your own decisions on how to use the TPI Centre's data as the TPI Centre cannot guarantee the accuracy of any data made available, the data and information on the website is not intended to constitute or form the basis of any advice (investment, professional or otherwise), and the TPI Centre does not accept any liability for any claim or loss arising from any use of, or reliance on, the data or information. Furthermore, the TPI Centre does not impose any obligations on supporting organisations to use TPI Centre data in any particular way. It is for individual organisations to determine the most appropriate ways in which the TPI Centre can be helpful to their internal processes.
4. Subject to paragraph 3 above, the Management Quality and the Carbon Performance indicators that are part of the TPI online tool and available publicly on the TPI Centre's website are:
    - Free, if they are used for internal and not for commercial purposes, including for research, as one of the inputs to inform portfolio construction, for financial decision-making including cases of lending and underwriting, for engagement and client reporting, for use in proprietary models as part of climate transition analysis and active investment management.
    - Restricted, unless licensed where the use is for further commercial exploitation through redistribution, derived data creation, analytics, and index or fund creation (inclusive of where the index is used as the basis for the creation of a financial product, or where TPI data is a key constituent of a fund's construction).
5. Notwithstanding any other provision of these website terms and conditions, none of the data or information on the website may be reproduced or made available by you to any other person except that you may reproduce an insubstantial amount of the data or information on the website for the uses permitted above.
6. The data and information on the website may not be used in any way other than as permitted above. If you would like to use any such data or information in a manner that is not permitted above, you will need the TPI Centre's written permission. In this regard, please email all inquiries to info@transitionpathwwayinitiative.org.

LSE Transition Pathway Initiative Centre

Grantham Research Institute on Climate Change
and the Environment

London School of Economics and Political Science

Houghton Street

London WC2A 2AE, UK

T +44 (0)20 7107 5027

E tpi@lse.ac.uk

Transition Pathway Initiative

C/o UNPRI Association

5th Floor, 25 Camperdown Street

London E1 8DZ, UK

T +44 (0)20 3714 3141

E info@transitionpathwayinitiative.org

@tp_initiative

transitionpathwayinitiative.org

Transition Pathway Initiative

Grantham Research Institute on Climate Change and the Environment