# GHG emissions of the world's largest meat and dairy companies

| Company | HQ location | Our emission calculations (Mt) | Their emission calculations (Mt) | Sector: Meat or Dairy | Scopes reported by companies |
|---|---|---|---|---|---|
| JBS S.A. | Brazil | 280,025,749 | 8,932,792 | Meat | 1,2,3 |
| Tyson Foods, Inc. | US | 118,098,886 | 5,771,988 | Meat | 1,2 |
| Cargill, Inc. | US | 86,303,855 | 12,358,273 | Meat | 1,2 |
| Dairy Farmers of America, Inc. | US | 52,150,572 | - | Dairy | - |
| Fonterra Co-operative Group Limited | New Zealand | 41,535,799 | 22,248,000 | Dairy | 1,2,3 |
| National Beef Packing Company, LLC | US | 41,458,401 | - | Meat | |
| Marfrig Global Foods S.A. | Brazil | 40,029,542 | 14,744,059 | Meat | 1,2,3 |
| Minerva Foods S.A. | Brazil | 34,713,450 | 325,437 | Meat | 1,2 |
| Smithfield Foods / WH Group, Ltd. | China | 30,107,612 | 1,126,284 | Meat | 1,2 |
| Le Groupe Lactalis | France | 23,854,117 | - | Dairy | - |
| BRF S.A. | Brazil | 23,057,014 | 1,539,604 | Meat | 1,2,3* |
| Arla Foods | Denmark | 22,432,349 | 1,694,000 | Dairy | 1,2,3* |
| Nestlé S.A. | Switzerland | 22,116,400 | 112,883,279** | Dairy | 1,2,3 |
| FrieslandCampina | Netherlands | 19,904,760 | 18,895,000 | Dairy | 1,2,3 |
| Dean Foods | US | 19,115,690 | 121,284 | Dairy | 1,2 |
| Danish Crown AmbA | Denmark | 16,514,543 | - | Meat | - |
| VION Food Group | Netherlands | 15,189,585 | - | Meat | - |
| California Dairies, Inc. | US | 14,290,370 | 198,310 | Dairy | - |
| Saputo Inc. | Canada | 14,290,370 | 734,190 | Dairy | 1,2 |
| Danone SA | France | 14,250,000 | 12,190,000 | Dairy | 1,2,3 |
| DMK Deutsches Milchkontor GmbH | Germany | 12,321,994 | 235,213 | Meat | 1 |
| New Hope Group, Ltd. | China | 12,150,609 | - | Meat | - |
| Groupe Bigard SA | France | 10,212,148 | 50,790 | Meat | 1,2 |
| Tönnies Lebensmittel GmbH & Co. | Germany | 10,908,555 | - | Meat | - |
| China Yurun Food Group Limited | China | 10,285,209 | - | Meat | - |
| Guangdong Wens Foodstuff Group Co., Ltd. | China | 10,277,779 | - | Meat | - |
| NH Foods Ltd. | Japan | 8,693,907 | 10,967,000 | Meat | 1,2,3 |
| Hormel Foods Corporation | US | 8,103,498 | 842,000 | Meat | 1,2 |
| Coren Group | Spain | 6,698,895 | - | Meat | - |
| CP Group | Thailand | 6,285,467 | 2,650,000 | Meat | 1,2,3 |
| ABP Food Group | Ireland | 5,399,624 | 187,000 | Meat | 1,2 |
| Perdue Farms, Inc. | US | 3,715,832 | - | Meat | - |
| Industrias Bachoco, S.A.B. de C.V. | Mexico | 3,699,318 | - | Meat | - |
| Koch Foods, Inc. | US | 3,435,081 | - | Meat | - |
| Arab Company for Livestock Development | Saudi Arabia | 3,256,630 | - | Meat | - |
| | | | | | |
| *Partial scope 3 reporting | | | | | |
| **Meat and dairy production emissions are not disaggregated from overall company emissions | | | | | |

## GHG emissions from meat and dairy production in the surplus countries, plus China

| Surplus protein countries | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Argentina | 256,239 | 273,379 | 223,579 | 221,069 | 229,208 | 245,033 | 234,358 | 236,931 | 227,645 | 235,115 | 247,021 |
| Australia | 93,868 | 92,460 | 93,834 | 94,700 | 96,127 | 102,089 | 110,611 | 110,112 | 95,750 | 95,583 | 100,209 |
| Brazil | 751,118 | 747,004 | 770,421 | 770,332 | 790,750 | 818,472 | 828,192 | 808,468 | 792,078 | 807,888 | 827,871 |
| Canada | 73,633 | 71,352 | 72,788 | 68,240 | 65,894 | 65,382 | 66,919 | 66,213 | 69,939 | 72,606 | 73,391 |
| European Union | 563,792 | 555,399 | 567,839 | 575,859 | 566,794 | 562,662 | 576,851 | 594,193 | 604,106 | 605,328 | 606,633 |
| New Zealand | 50,620 | 52,545 | 53,536 | 55,584 | 59,338 | 58,503 | 62,923 | 63,368 | 61,325 | 61,550 | 62,213 |
| United States | 695,884 | 682,752 | 691,853 | 693,793 | 693,589 | 691,663 | 671,857 | 670,371 | 700,071 | 727,313 | 745,834 |
| **China** | 929,613 | 951,606 | 982,710 | 987,084 | 1,028,076 | 1,048,797 | 1,078,320 | 1,055,555 | 1,045,704 | 1,047,457 | 1,058,322 |
| **Surplus protein countries + China Total** | 3,414,769 | 3,426,496 | 3,456,559 | 3,466,662 | 3,529,775 | 3,592,601 | 3,630,031 | 3,605,211 | 3,596,617 | 3,652,841 | 3,721,494 |
| **World Total** | 5,407,797 | 5,422,887 | 5,521,175 | 5,560,298 | 5,655,516 | 5,739,744 | 5,830,917 | 5,809,509 | 5,846,302 | 5,928,823 | 6,037,297 |

# A note about our methodology

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## A. Calculating corporate GHG emissions

The methodology for calculating corporate emissions involved a three-step process:

1) Determining the quantity of meat and milk processed in the year 2016 by each company, where possible. We utilised public company reports wherever possible, as well as data generated by WATT (Pig International, Poultry Trends), IFCN Dairy Research Network (formerly known as the International Farm Comparison Network) and Sterling Marketing (personal communication). All numbers are for 2016, except for dairy. Dairy volumes are based on the latest IFCN rankings which utilise 2015 volumes. For beef and poultry, we also determined the quantity of production per geographic region for each company, based on company reports.

2) Using the UN FAO's most recent GLEAM data (with a base year of 2010) to determine the GHG emissions per kilo of beef, pork, poultry and milk (emissions factors) for each company. The GLEAM data includes regionalised slaughter weights, carcass dressing percentages, and GHG emission intensity values on a per-tonne-of-product basis. For beef, poultry and milk, our calculation of emissions factors included a regional breakdown of production per company, given the available company data on geographic production and the GLEAM model's significant differences in emissions factors between regions. For pork, we used global averages to generate emissions factors for each company, given the lack of available company data on geographic production and the small variations in emissions factors for industrial production provided by the GLEAM model for the relevant regions.

3) Multiplying the production quantity by the emissions factors to get the totals for each company.

## B. Identifying corporate GHG emissions reporting and emissions reduction targets

We investigated the emissions reporting and emissions reduction targets of the 10 largest beef, pork, and poultry processors by volume and the 11 largest dairy processors by volume. Given the overlap in these "top 10" lists (e.g., Tyson appears on three lists: beef, pork, and poultry) the number of companies that appear on the four lists totals 35. A "top-11" list was chosen for dairy in order to include Danone because, although that company is ranked number 11 by milk intake volume (IFCN Dairy Research Center), it is in the top five when ranked by revenues (details in the Danone case study, below). Further, Danone has published detailed and interesting emission-reduction targets and plans.

For each of the 35 companies, we attempted to obtain several types of information:

- sustainability reports, corporate social responsibility reports, or similar documents or filings containing details on GHG emissions and/or emission-reduction targets and plans;
- greenhouse gas inventory/information filings with organisations such as CDP
- estimates of 2016 emissions (2015 for dairy), in order to compare company estimates to the values we generated using UN FAO's GLEAM methodology and data;
- estimates of 2015 or 2014 emissions, to calculate recent year-over-year increases or decreases;
- information about how emission values were calculated, including system boundaries or scope, geographical area(s), corporate divisions included, time period, etc.
- details of emission-reduction targets, including base year, target year, scope of emissions covered, and whether the target is for absolute emission reductions or is intensity-based; and
- where adequate emissions data and reduction targets existed, we examined how companies plan to reduce emissions and meet targets.

It is important to note that there exists no central repository for corporate emissions data or targets. Some companies publish this information in annual reports, others in sustainability reports, others on web pages, and still others in filings with third parties such as CDP. Thus, it is sometimes difficult to determine whether a given company does or does not have an emission-reduction target, or if the company is reporting its emissions.

This situation is made more difficult by the fact that the majority of companies, when we contacted them by email with questions regarding emissions and targets, did not reply. This often remained the case even after multiple emails to multiple addresses.

We based our characterisations of corporations' emissions data and targets on extensive research. Nonetheless, there remains the possibility that we may list a company as, for example, having no targets when in fact that company has published a target somewhere. As much as anything, this risk reflects the disorganised and dysfunctional state of corporate emissions reporting.

## C. Calculating national production volumes, aggregate GHG emissions and corporate concentration

To determine the share of world production by the surplus protein countries and China we used data for national and world production volumes of beef, pork, poultry (broiler meat) and milk provided by the United States Department of Agriculture, Foreign Agricultural Service (USDA FAS) between 2008 and 2018.

The USDA FAS national production volume data was multiplied by regional averages for emissions intensity determined by the FAO GLEAM methodology to calculate annual aggregate emissions for meat and dairy production for the selected countries. Annual world aggregate emissions for meat and dairy production were calculated using the FAO GLEAM methodology world averages for emissions intensity from meat and dairy production.

Calculations made by GRAIN and IATP of the levels of corporate concentration are based on USDA FAS national production volume data and carcass weight equivalent volumes for beef and pork determined by company-reported slaughter volumes for 2016 and FAO's GLEAM methodology carcass weight conversion factors. For chicken, volume is based on weight of slaughtered chicken as reported by companies for 2016. For milk, volume is based on milk intake as reported by IFCN for 2016.

To determine the share of world production by the surplus protein countries and China we used data for national and world production volumes of beef, pork, poultry (broiler meat) and milk provided by the United States Department of Agriculture, Foreign Agricultural Service (USDA FAS) between 2008 and 2018.

| Data sources of the report "Emissions impossible: How big meat and dairy are heating up the planet" | | | | | |
|---|---|---|---|---|---|
| http://bit.ly/20302050 | | | | | |
| http://bit.ly/livestock-products-corporate-emissions-B | | | | | |
| http://bit.ly/ours-theirs | | | | | |
| http://bit.ly/meat-and-dairy-country-numbers-production | | | | | |
| http://bit.ly/Concentration-2016 | | | | | |