

Reducing climate change impacts from the global food system through diet shifts

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Supplementary Methods

1. Uncertainty analysis

The IPCC AR6¹ indicates that production-based emissions, including the total territorial GHG emission accounts and the allocation of emissions to economic sectors, are the largest contributors to the uncertainty of consumption-based emissions, which serve as the data source for emissions in this study. Tukker et al.² emphasize that harmonizing territorial emissions across different trade datasets is the single most important factor that reduces the uncertainty of consumption-based emissions by up to 50%. Similar to the uncertainty analysis performed by Tubiello et al.³⁻⁵ and Hong et al.⁶, we assess the uncertainty range of the dietary GHG emissions from different food products using a Monte Carlo approach by simulating (10000 times) the uncertainties caused by activity data, emission factors, and parameters in each emission process⁶⁻⁸. IPCC default uncertainty ranges⁹ and individual uncertainty ranges from previous studies (Supplementary Table 23) are applied to derive uncertainty ranges of activity data, emission factors, and parameters^{3,5,6}. Uncertainty ranges of 95% confidence intervals are adopted in this study. Detailed uncertainty ranges of dietary emissions and emission changes at the national and regional levels are provided in Supplementary Tables 2, 3, 11, and 12 and Supplementary Datasets 17 and 18.

Uncertainties arising from original statistical data for traded products¹⁰ or household expenditure¹¹ from the existing database are not considered in this study because their uncertainty ranges cannot be obtained, and we acknowledge the largely unknown magnitude of their uncertainties. Additionally, since we cannot extract key variables of the scenario simulation, altering data sources, such as using different emission inventories or replacing physical trade flow data with monetary trade datasets (e.g., input-output datasets), for sensitivity testing may be beyond the scope of this study. However, previous research has confirmed¹²⁻¹⁵ that using physical trade flow data of products instead of monetary trade datasets can eliminate the uncertainty introduced by highly aggregated sectors lacking product details. All data used in this study are in physical units.

Supplementary Discussion

1. Comparison with other studies of simulated changes in global food-related emissions for diet shifts

We compare the volume of global dietary emission changes under the planetary health diet provided in this study with other studies related to diet shifts. We first compare results with recent studies which also simulate the adoption of a planetary health diet^{16,17}. Semba et al.¹⁷ estimates that global food emissions would fall by 23%, and Tuninetti et al.¹⁶ suggest global water consumption would decrease by 12%. We found our result, indicating a 17% reduction in global dietary emissions, agrees well within an acceptable range. However, we notice some pioneering studies^{18,19} quantifying impacts from the food system report higher estimated emission reduction percentages resulting from diet shift. They differ from our study in terms of the research scope, data sources, and scenario settings. Here we explain the differences from the following aspects:

First, our study employs different data sources for emissions from the food system. The assessment of dietary emissions is based on the global consumption-based emissions (CBE) inventory (including CO₂, CH₄, and N₂O)⁸ of detailed food products. This inventory is derived from the national emission datasets from FAOSTAT²⁰, which provides data on country- and process-specific emissions from the food system based on activity data and IPCC Tier 1 Methodology. National emissions datasets cover the complete global food supply chains, including agricultural land use and land use change (LULUC), agricultural production, and beyond-farm activities, in contrast to only specific processes such as agricultural activities. Emissions are distributed to detailed crops and livestock products using different approaches^{6,8} to obtain the emission intensity of specific products. In terms of estimation of emissions from global food consumption, this approach to some extent addresses issues associated with commodity-specific GHG emissions factors derived from LCA analysis (e.g., the study by Springmann et al. in 2016¹⁸), avoiding inconsistencies of system boundaries^{21,22} and the omission of differences in emissions from different origins along global food supply chains²³.

Second, the scope of analysis in this study differs from the abovementioned studies. The CBE inventory applied in this study attributes production-based emissions to final consumers through the physical trade flow (PTF) model¹². Consequently, total global consumption-based emissions are equal to the global total production-based emissions (PBE) from FAOSTAT but are then reallocated to the place of consumption rather than the country where emissions occur. CBE is complementary to PBE⁸, aiding in understanding the extent to which final consumers trigger emissions along the entire global supply chain. CBE provides information for allocating responsibility and informs emission mitigation from the consumer perspective. Thus, CBE is more suitable for investigating the impact of changing consumer lifestyles and behaviors such as diet shifts. The applied PTF model, capable of distinguishing re-exports of products beyond only bilateral trade, is widely used to link the impacts along the entire global supply chain induced by final consumers with product details^{12,13,24}.

Third, we note that there are certain differences in the coverage of food products in different studies (for example, 62 types of products in the study by Springmann et al. in 2018¹⁹). Based on our data availability, this study focuses on dietary emissions from 140 types of products in 139 countries/areas. To be compatible with the food classification of the EAT-Lancet planetary health diet, we use nutritive factors to convert the intake amount of food products into calorie contents and aggregate them into different food categories to simulate the diet shifts.

Fourth, scenario settings and assumptions vary. The reference diet option for global diet shifts differs across studies. For example, Springmann et al. (2016)¹⁸ opt for diets with large reductions in animal products (ruminant meat, total meat, dairy) or specific dietary patterns that include reduced or no meat (such as Mediterranean, “pescatarian,” and vegetarian diets), while Springmann et al. (2018)¹⁹ select flexitarian diet. In contrast, we use the EAT-Lancet planetary health diet²⁵ as the recommended diet option. This planetary health diet provides reference intake levels of different food categories. Not all food categories need to be reduced. For instance, although the intake of animal-based products (especially red meat) in many countries is excessive, the current net supply of plant-based proteins (mainly legumes and nuts) is below the recommended levels in all countries¹⁶. Therefore, emissions from the intake of legumes and nuts, many of which are produced in countries with emission-intensive land use and agriculture activities such as Brazil^{6,26}, would increase substantially. As a result, the global emission decrease would be partly offset. However, if we only focus on specific products, global emissions from red meat and grains would decrease by nearly 60% and 40%, respectively, in this study. These results further indicate that, while a global diet shift would lead to an overall significant reduction in dietary emissions, the increased intake of plant-based proteins used as substitutes for animal-based proteins to meet nutritional needs could impose certain emission pressures. Therefore, when undertaking a diet shift, it may be necessary to consider additional measures along the entire supply chain (such as improving production efficiency, adjusting trade structures, etc.) to achieve an overall mitigation of emissions in the food system.

It is worth noting that the differences in research scope, data sources, models, and scenario setting can all result in varied research outcomes. These factors need to be considered in conjunction with the research questions and data availability. In this study, we focus more on the differences in dietary emissions and emission changes among population groups.

2. Explanations and discussion of some calculation results

2.1 Countries with high per capita dietary GHG footprints in this study

Bolivia has the highest country-average per capita dietary GHG footprint with 6.1 t CO₂-eq, followed by Luxembourg (6.0 t CO₂-eq), Slovakia (6.0 t CO₂-eq), Mongolia (5.7 t CO₂-eq), the Netherlands (5.4 t CO₂-eq), Namibia (5.3 t CO₂-eq), Qatar (4.9 t CO₂-eq), Zambia (4.8 t CO₂-eq), and New Zealand (4.8 t CO₂-eq). According to the emission shares from land use and land use change (LULUC), agricultural production,

and beyond-farm activities (Supplementary Table 24 and Supplementary Dataset 20), the high dietary footprints of these countries are attributed to different emission processes along the global food supply chain.

We find that Bolivia and Namibia have a high average footprint due to large proportions of food products associated with emission-intensive LULUC activities in their average diets, with LULUC emissions contributing 78% and 72% of the total consumption-based emissions, respectively (Supplementary Table 24). In 2019, the land-use change and forestry sector produced the largest amount of GHG emissions in Bolivia, accounting for 128% of total production-based GHG²⁷. Hong et al.⁶ found that the land intensity of agricultural production in Namibia is among the highest levels globally. Other countries with a high emission footprint as well as a high share of LULUC emissions including Zambia, the Democratic Republic of the Congo, Malaysia, and Indonesia, all identified as hotspot countries with high levels of emission intensity of land use in the study by Hong et al.^{6,26}.

The largest proportion of average dietary emissions in Mongolia and New Zealand, which rely on livestock production (such as beef and mutton in Mongolia^{28,29} and dairy products in New Zealand⁸), is attributable to agricultural production. According to previous research^{6,20,30}, these countries exhibit both high per capita agricultural production and high emissions intensity in agricultural production.

In contrast, over 70% of the average dietary GHG footprints of Luxembourg, Slovakia, and Qatar are associated with beyond-farm processes, such as food processing, food transportation, food retail, etc. These countries, all net importers of agricultural products³¹⁻³³, have a relatively small agricultural sector and rely on imports to meet their domestic food demand. Li et al.²² found that food transportation is the largest contributor to food-related emissions from beyond-farm activities along global food supply chains. They also pointed out that food products transported at high tonnages (for example, vegetables and fruit contributing 36% of total food-miles emissions—almost twice the amount of greenhouse gases released during their production) and/or products that require temperature-controlled transportation (for example, dairy products) contribute the majority of emissions from food transportation²². In this study, we find that the largest share of per capita dietary GHG footprints in Luxembourg and Slovakia comes from vegetables and fruits, while in Qatar the main contribution is from the intake of red meat and dairy products (Supplementary Dataset 1).

2.2 Comparison of per capita dietary emissions with other studies

Results show that per capita dietary GHG footprints in the UK are considerably smaller than per capita footprints in many low-income countries including Angola, Chad, and Zambia.

Per capita dietary emission levels depend not only on the quantity of food consumption (or intake) but also on the emission intensity of product processes along global supply chains. Food supply chain processes include agricultural land use and land use change (LULUC), agricultural production, and other beyond-farm processes (e.g., food processing and transport). However, the majority (over 70%) of global GHG emissions

from the food system were associated with land use and land use change (LULUC) and agricultural production^{5,34}.

On the one hand, low-income countries are not always countries with low per capita food emissions. Hong et al.⁶ pointed out that countries with the highest land-use emission intensity are uniformly poor countries with a mix of tropical and land-intensive systems. The African countries mentioned above, all located in South Central Africa, rely heavily on domestic production with minimal food imports^{8,26}. South Central Africa, Latin America (mainly Brazil), and Southeast Asia (mainly Indonesia) have the world's richest carbon-dense and often still pristine, undegraded natural systems⁶. Thus, sharp increases in LULUC activities (e.g., deforestation) for cropland expansion in these regions are driving the high levels of land-use emissions^{6,26}. At the same time, these less affluent countries exhibit relatively high emissions from agricultural production due to limited access to industrial farm inputs, greater reliance on bioenergy, high land requirements of agricultural production, and low-quality farmland^{6,26}. These factors contribute to a high level of emission increase resulting from a simulated diet shift in the South-Central African region.

On the other hand, the UK's largest sources of food are domestically produced or mainly imported from other European countries, contributing to over 80% of the UK's food consumption³⁵. According to previous studies^{6,26}, the emission intensity of both LULUC activities and agricultural production in Western European countries, including the UK, is much lower than in the aforementioned land-intensive African countries. Despite higher levels of food consumption and imports in the UK, the per capita food-related GHG footprints are lower than in low-income but emission-intensive countries such as Angola, Chad, and Zambia⁸.

2.3 Explanation of dietary emission increase in some countries

Results of national emission changes for adopting the planetary health diet show that Slovenia would have a considerable emission increase percentage. We find that the overwhelming majority of Slovenia's dietary emission increase is attributed to the rise in legumes and nuts.

On one hand, based on available data and our analyses, we found that the intake of legumes and nuts in Slovenia is below the recommended level of the EAT-Lancet planetary health diet (Supplementary Dataset 14). According to the planetary health diet, legumes and nuts are crucial plant-based protein sources for substituting animal-based proteins²⁵, resulting in a substantial increase in emissions that offset the decline in emissions from decreased animal-based products, grains, and all sugars (Supplementary Dataset 2).

On the other hand, results show that although Slovenia's total dietary emission amounts are considerably lower than other European countries, the per capita emissions related to legumes and nuts are relatively high. The underlying reason is the country's dependence on imports. Studies^{8,17} reveal that almost all of Slovenia's legumes and nuts are imported. Despite the low intake levels of these products, the

per capita emissions of legumes and nuts are high because these imported products are produced in regions with high emission intensity of land use⁶ (e.g., soybean from South American countries such as Brazil and Argentina, and nuts from Indonesia³⁶). At the same time, these imported products are also linked to high levels of beyond-farm emissions, including emissions from food processing, transportation, and retail, along the global supply chain (Supplementary Table 24). Since we select 2019 as the baseline year and do not alter the trade and supply structure, as we acknowledge in the Limitations, calculation results indicate that in certain countries, the substitution of plant-based protein products imported from high-emission regions will increase considerably, potentially surpassing the emission reductions from other products.

Supplementary Figures (Supplementary Fig. 1 to 23)

Supplementary Fig. 1 Total and per capita dietary emissions of beef, lamb, and pork for 139 countries/areas in 2019.

Supplementary Fig. 2 Total and per capita dietary emissions of dairy products for 139 countries/areas in 2019.

Supplementary Fig. 3 Total and per capita dietary emissions of poultry, eggs, and fish for 139 countries/areas in 2019.

Supplementary Fig. 4 Total and per capita dietary emissions of grains for 139 countries/areas in 2019.

Supplementary Fig. 5 Total and per capita dietary emissions of tubers and starchy vegetables for 139 countries/areas in 2019.

Supplementary Fig. 6 Total and per capita dietary emissions of vegetables and fruits for 139 countries/areas in 2019.

Supplementary Fig. 7 Total and per capita dietary emissions of legumes and nuts for 139 countries/areas in 2019.

Supplementary Fig. 8 Total and per capita dietary emissions of added fats for 139 countries/areas in 2019.

Supplementary Fig. 9 Total and per capita dietary emissions of all sugars for 139 countries/areas in 2019.

Supplementary Fig. 10 Definition of eighteen countries/regions in this study.

Supplementary Fig. 11 Per capita dietary GHG footprints from all types of products for each decile of national populations in 2019.

Supplementary Fig. 12 Changes in dietary emissions of beef, lamb, and pork for adopting the planetary health diet in countries and regions.

Supplementary Fig. 13 Changes in dietary emissions of dairy products for adopting the planetary health diet in countries and regions.

Supplementary Fig. 14 Changes in dietary emissions of poultry, eggs, and fish for adopting the planetary health diet in countries and regions.

Supplementary Fig. 15 Changes in dietary emissions of grains for adopting the planetary health diet in countries and regions.

Supplementary Fig. 16 Changes in dietary emissions of tubers and starchy vegetables for adopting the planetary health diet in countries and regions.

Supplementary Fig. 17 Changes in dietary emissions of vegetables and fruits for adopting the planetary health diet in countries and regions.

Supplementary Fig. 18 Changes in dietary emissions of legumes and nuts for adopting the planetary health diet in countries and regions.

Supplementary Fig. 19 Changes in dietary emissions of added fats for adopting the planetary health diet in countries and regions.

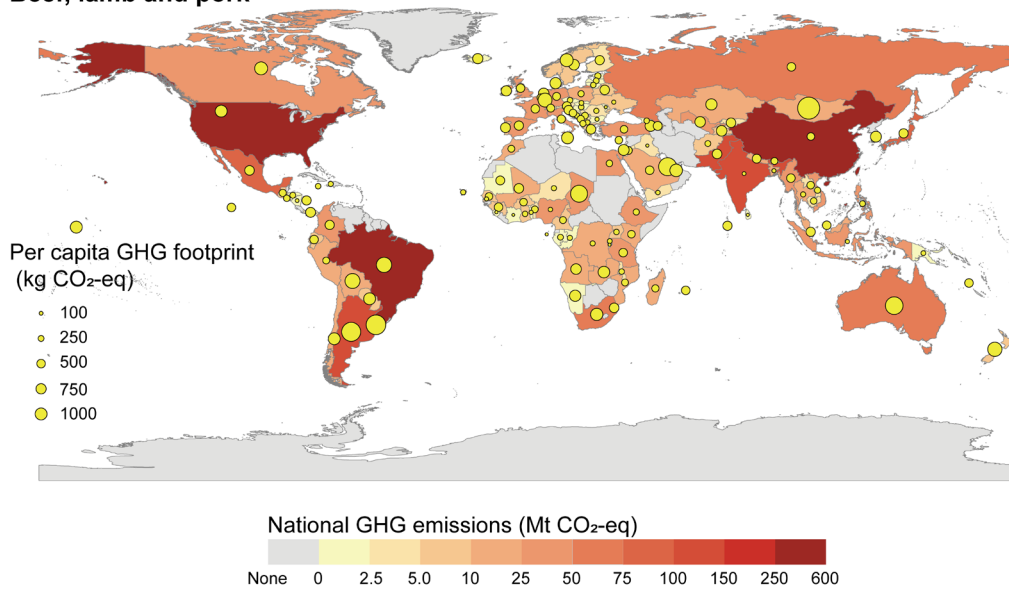
Supplementary Fig. 20 Changes in dietary emissions of all sugars for adopting the planetary health diet in countries and regions.

Supplementary Fig. 21 Scatterplot for percentage change in national emissions as a function of per capita GDP in 139 countries/areas.

Supplementary Fig. 22 Diet gap between the current dietary intake and the reference intake level of EAT-Lancet planetary health diet across expenditure groups for regional expenditure deciles.

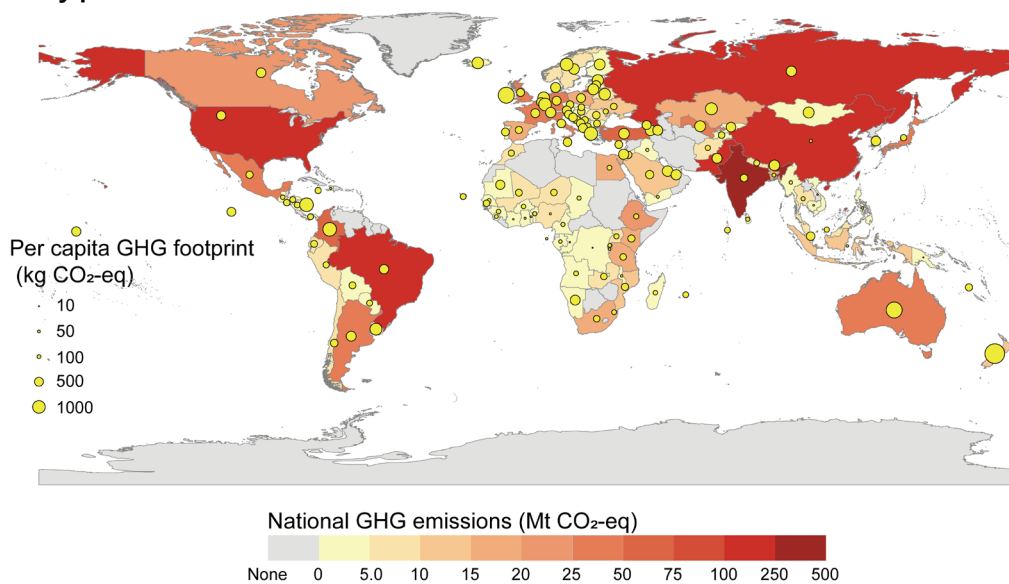
Supplementary Fig. 23 Research framework in this study.

Beef, lamb and pork



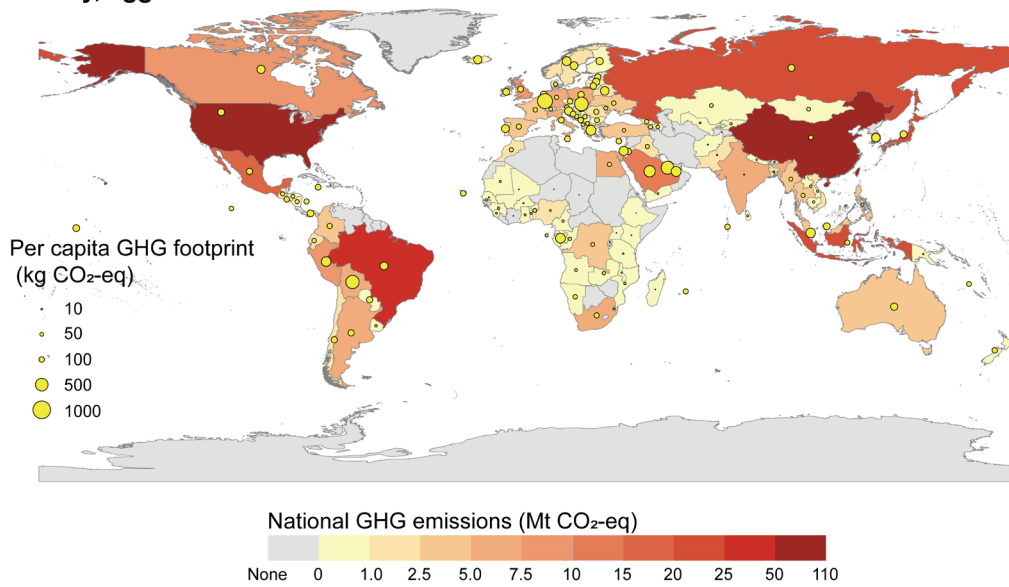
Supplementary Fig. 1 Total and per capita dietary emissions of beef, lamb, and pork for 139 countries/areas. The base map layer: "World Countries" from Environmental Systems Research Institute (ESRI), 2023 (available at <https://hub.arcgis.com/datasets/esri::world-countries/about>).

Dairy products



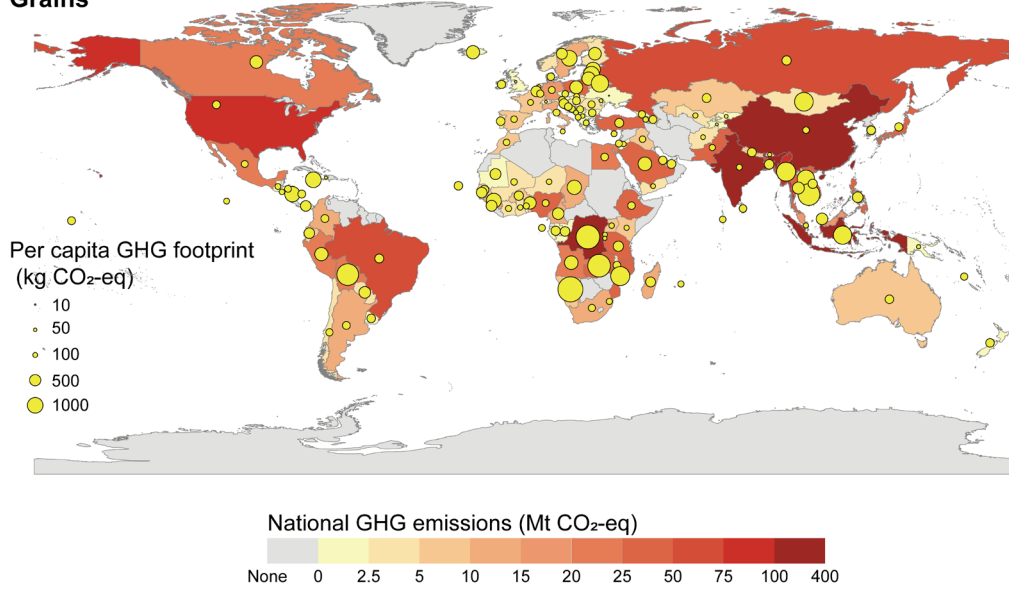
Supplementary Fig. 2 Total and per capita dietary emissions of dairy products for 139 countries/areas. The source of base map see Supplementary Fig. 1

Poultry, eggs and fish



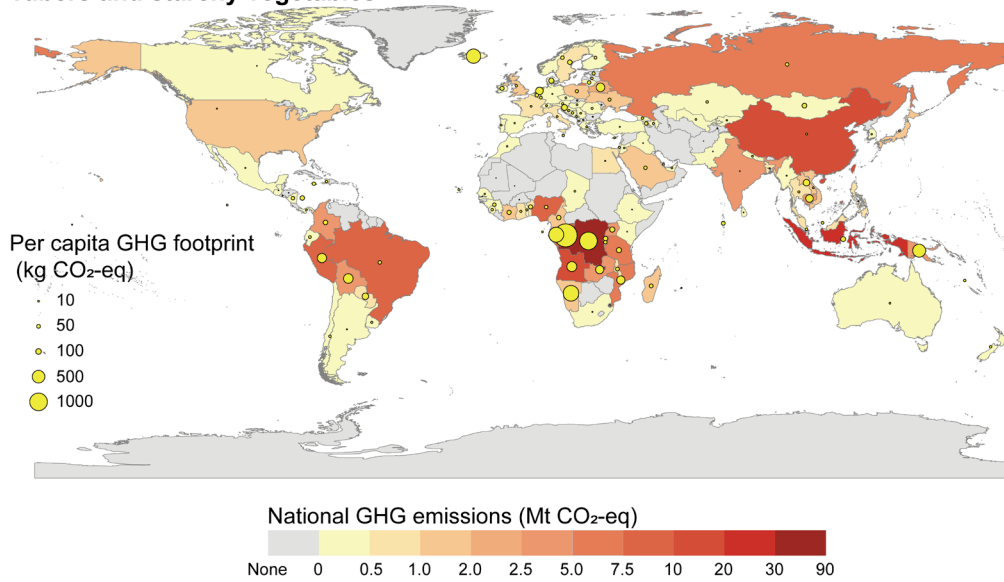
Supplementary Fig. 3 Total and per capita dietary emissions of poultry, eggs, and fish for 139 countries/areas. The source of base map see Supplementary Fig. 1

Grains



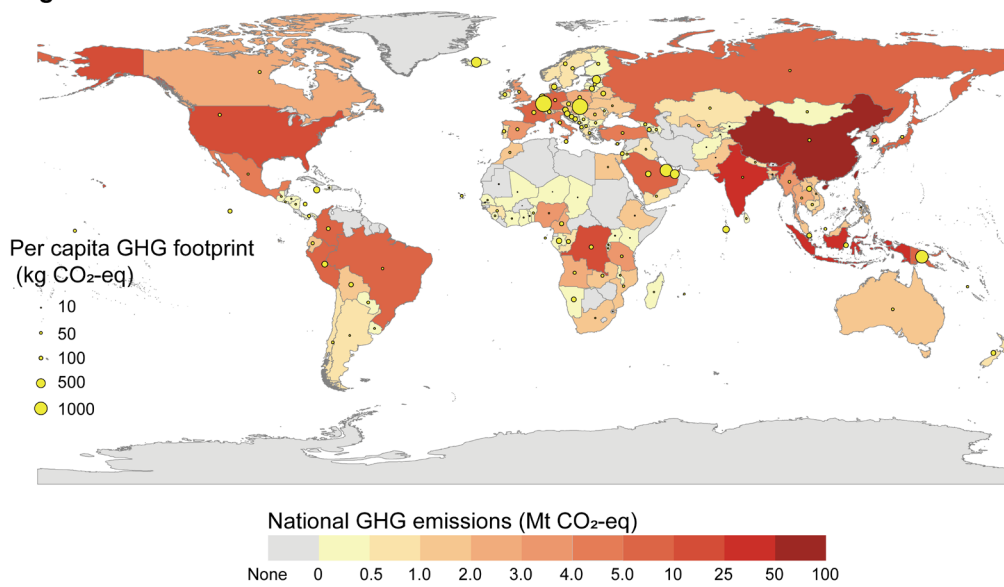
Supplementary Fig. 4 Total and per capita dietary emissions of grains for 139 countries/areas. The source of base map see Supplementary Fig. 1

Tubers and starchy vegetables



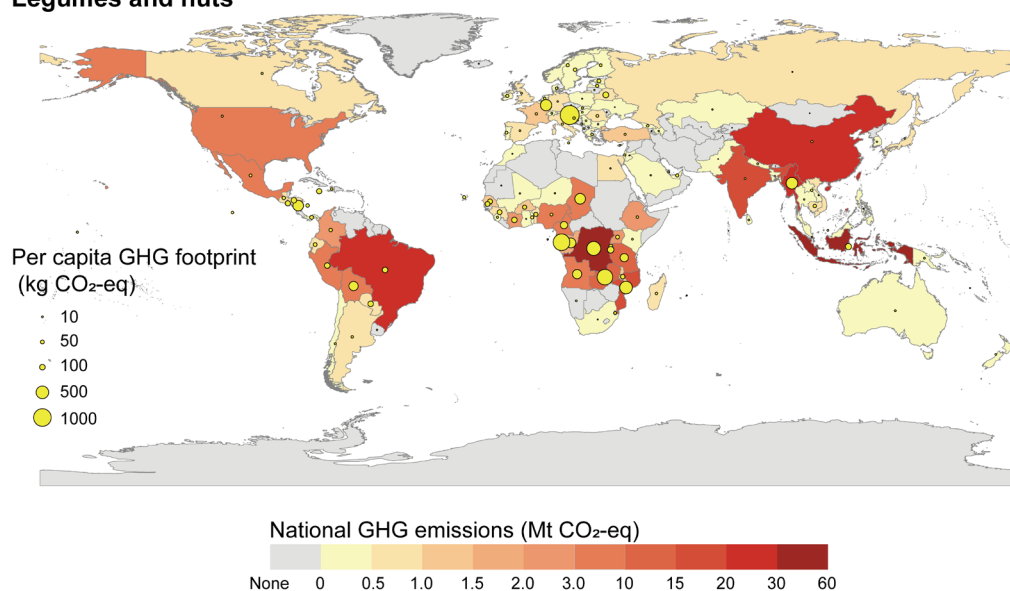
Supplementary Fig. 5 Total and per capita dietary emissions of tubers and starchy vegetables for 139 countries/areas. The source of base map see Supplementary Fig. 1

Vegetables and fruits



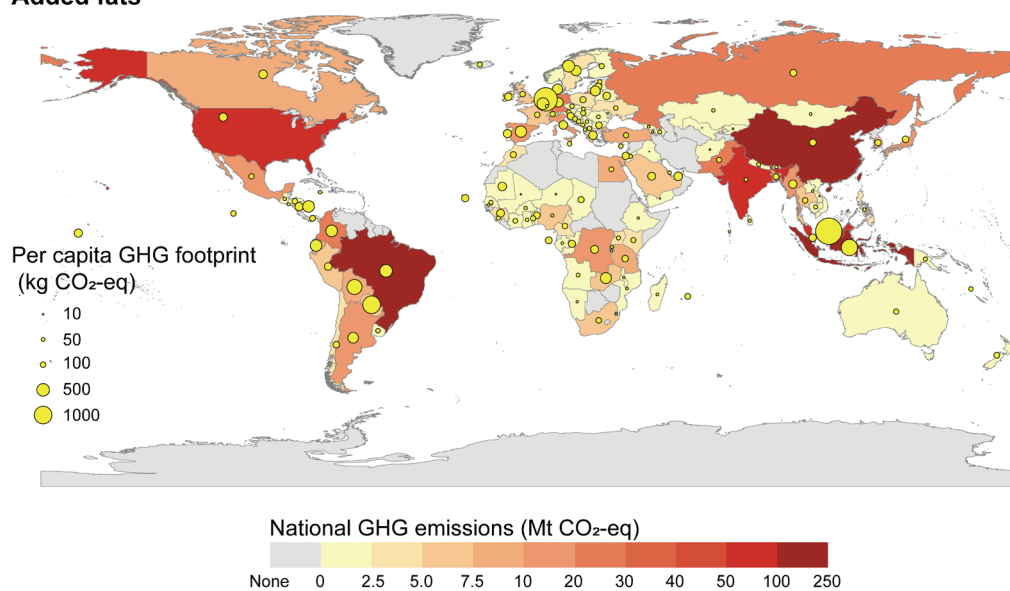
Supplementary Fig. 6 Total and per capita dietary emissions of vegetables and fruits for 139 countries/areas. The source of base map see Supplementary Fig. 1

Legumes and nuts



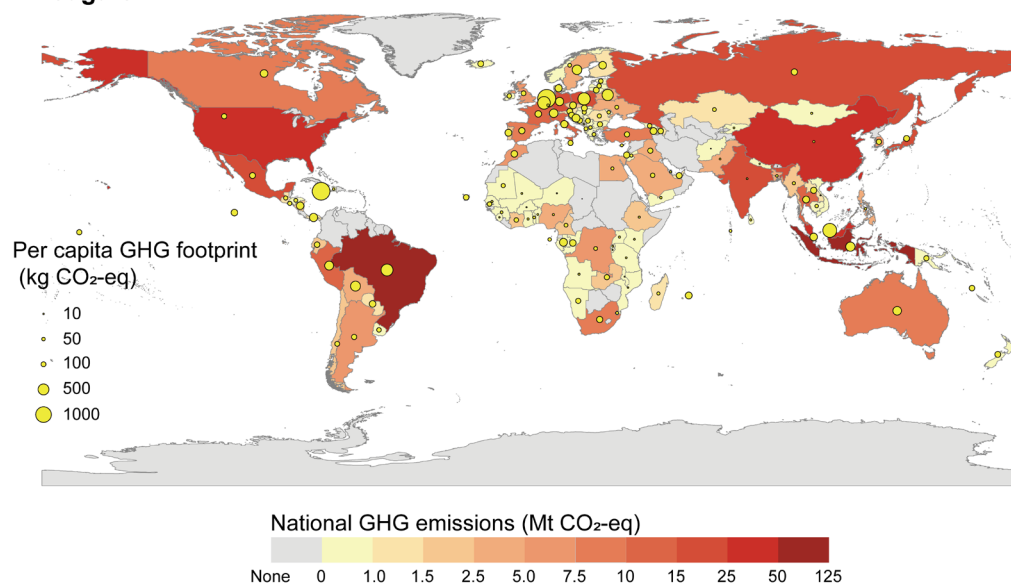
Supplementary Fig. 7 Total and per capita dietary emissions of legumes and nuts for 139 countries/areas. The source of base map see Supplementary Fig. 1

Added fats

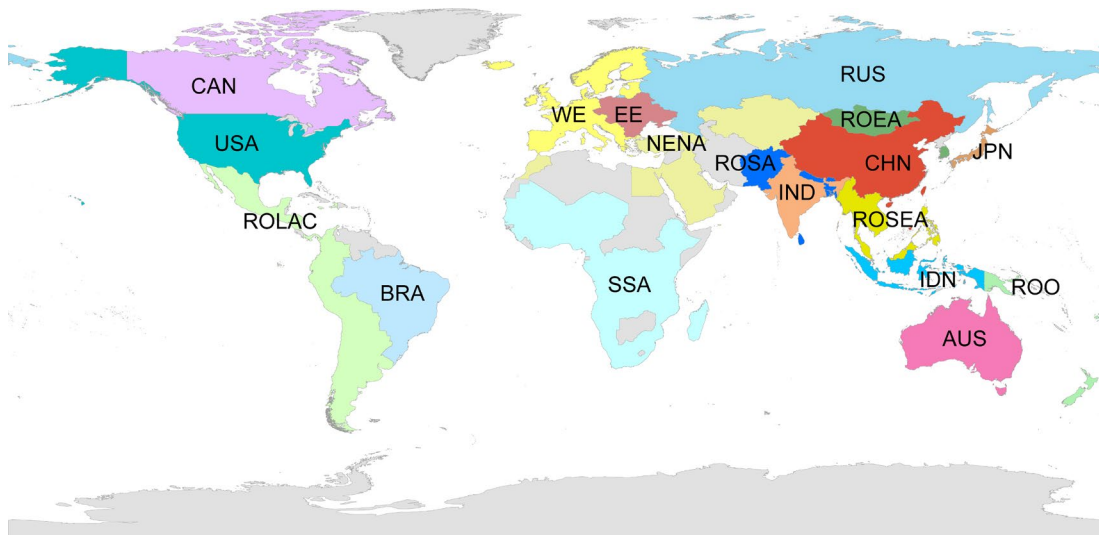


Supplementary Fig. 8 Total and per capita dietary emissions of added fats for 139 countries/areas. The source of base map see Supplementary Fig. 1

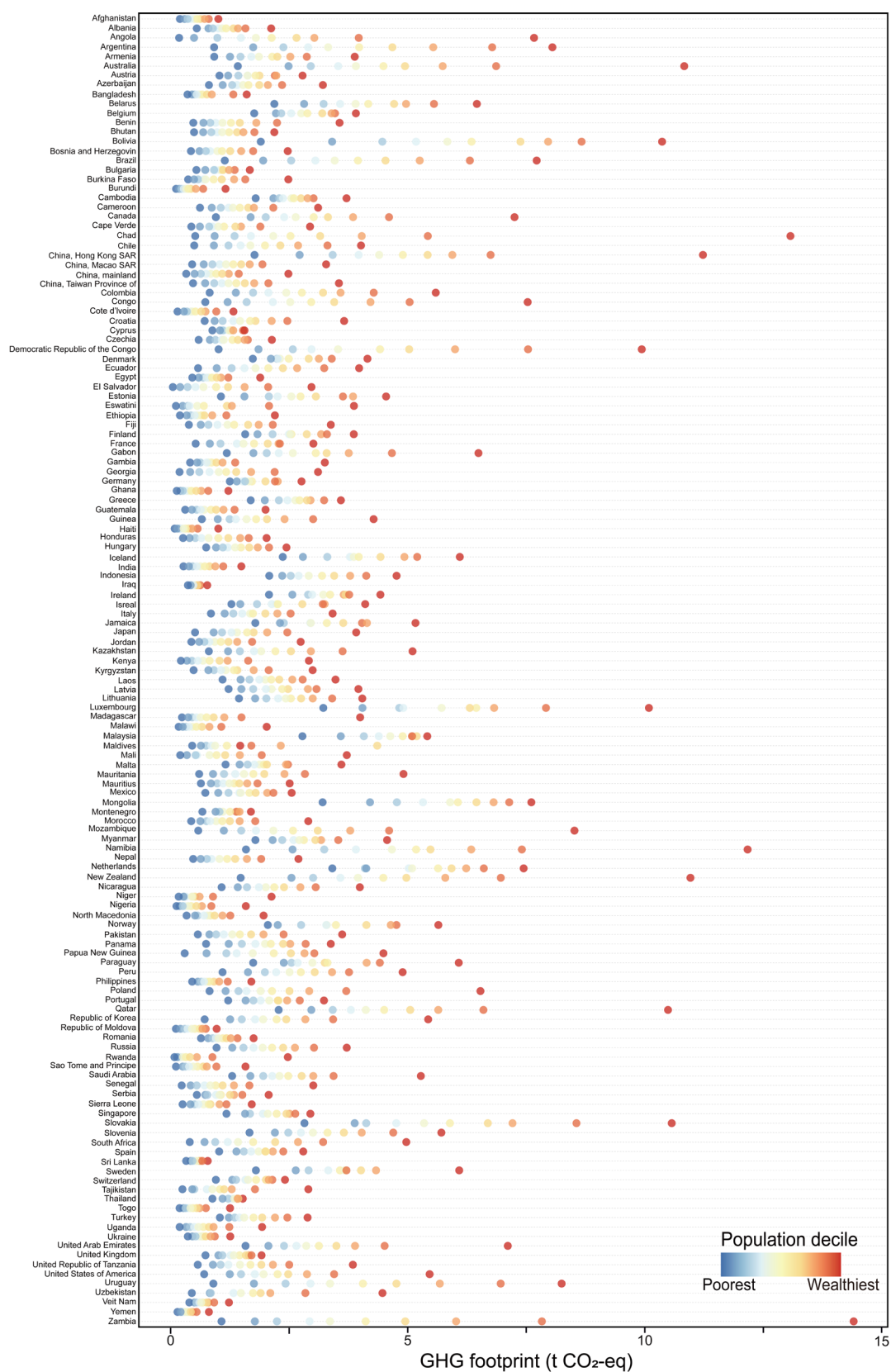
All sugars



Supplementary Fig. 9 Total and per capita dietary emissions of all sugars for 139 countries/areas. The source of base map see Supplementary Fig. 1

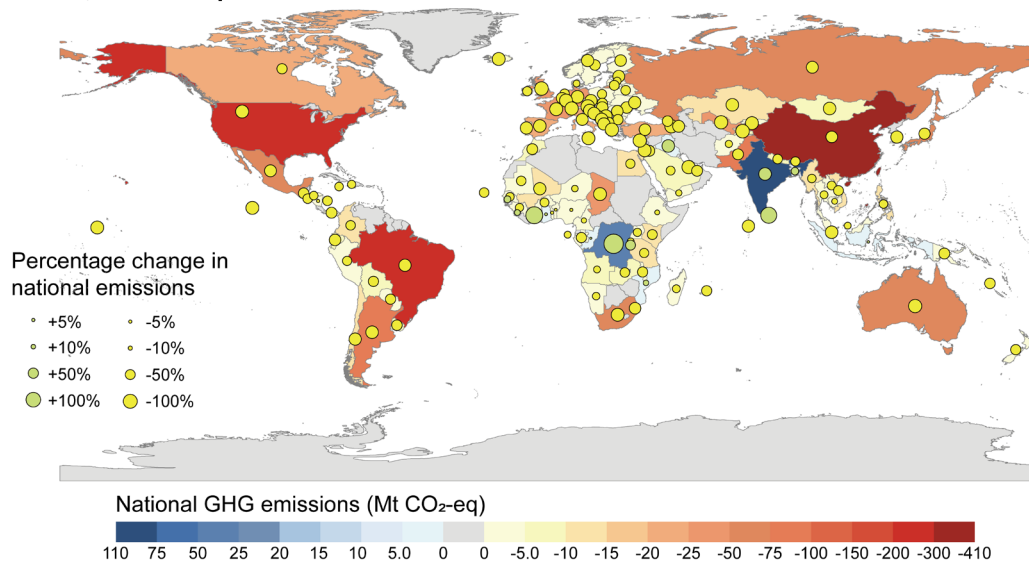


Supplementary Fig. 10 Definition and scope of eighteen regions in this study. AUS: Australia; BRA: Brazil; CAN: Canada; CHN: China; ROEA: Rest of East Asia; EE: East Europe; IND: India; IDN: Indonesia; JPN: Japan; ROLAC: Rest of Latin America and the Caribbean; NENA: Near East and North Africa; ROO: Rest of Oceania; RUS: Russia; ROSA: Rest of South Asia; ROSEA: Rest of Southeast Asia; SSA: Sub-Saharan Africa; USA: United States of America; WE: Western Europe. Details for the division and scope of 18 countries/regions are shown in Supplementary Table 8. For the source of the base map see Supplementary Fig. 1



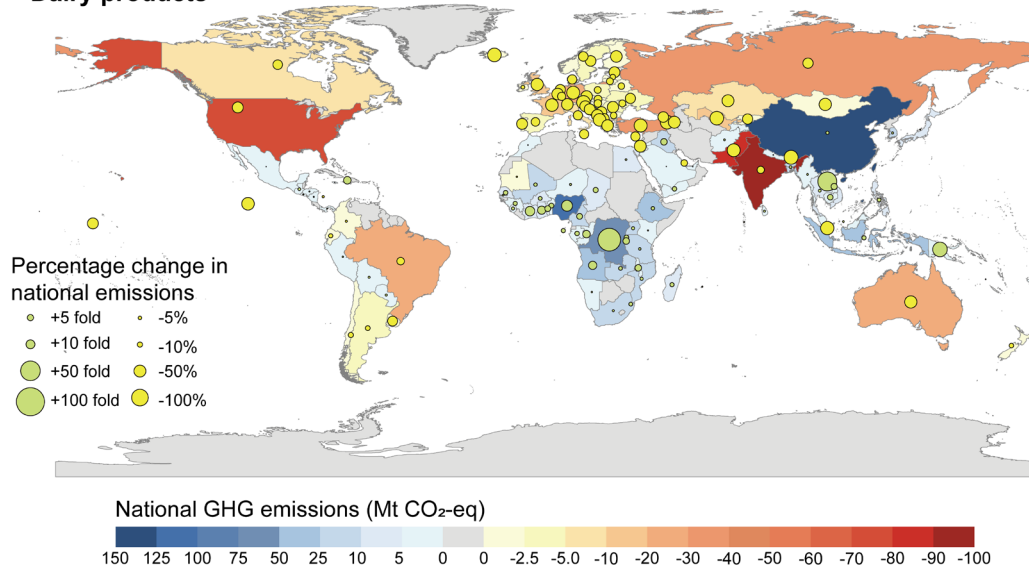
Supplementary Fig. 11 Per capita dietary GHG footprints from all types of products for each decile of national populations in 2019. The colors of bubbles indicate expenditure deciles ranging from the poorest in blue to the wealthiest in red and are comparable only within each country.

Beef, lamb and pork



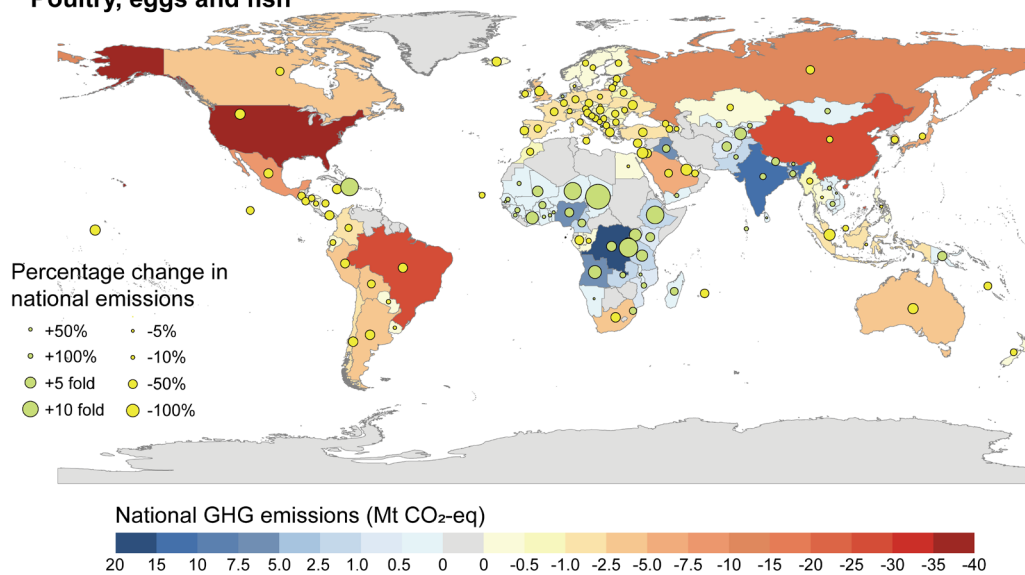
Supplementary Fig. 12 Changes in dietary emissions of beef, lamb, and pork for adopting the planetary health diet in countries and regions. The source of base map see Supplementary Fig. 1

Dairy products



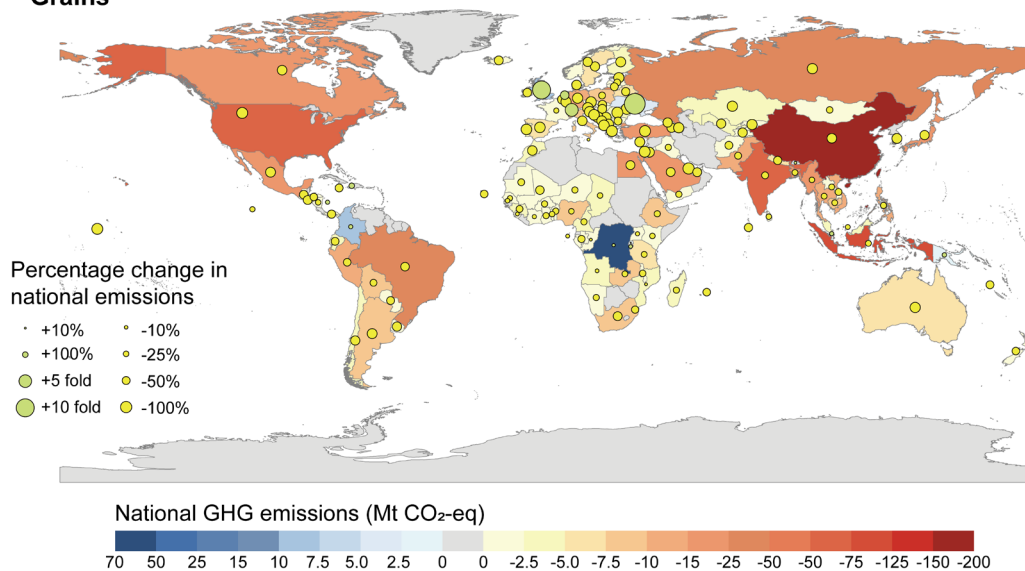
Supplementary Fig. 13 Changes in dietary emissions of dairy products for adopting the planetary health diet in countries and regions. The source of base map see Supplementary Fig. 1

Poultry, eggs and fish



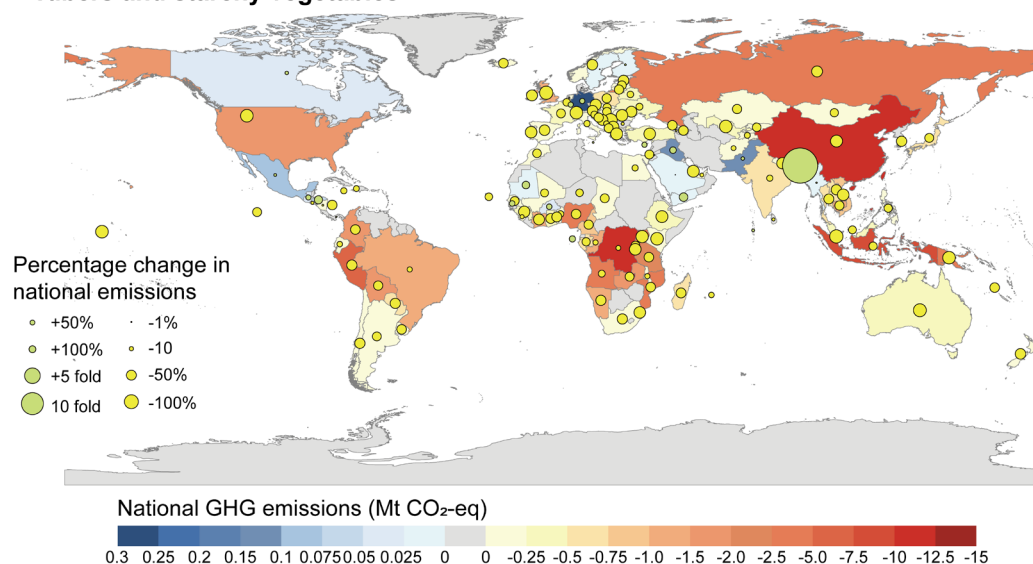
Supplementary Fig. 14 Changes in dietary emissions of poultry, eggs, and fish for adopting the planetary health diet in countries and regions. The source of base map see Supplementary Fig. 1

Grains



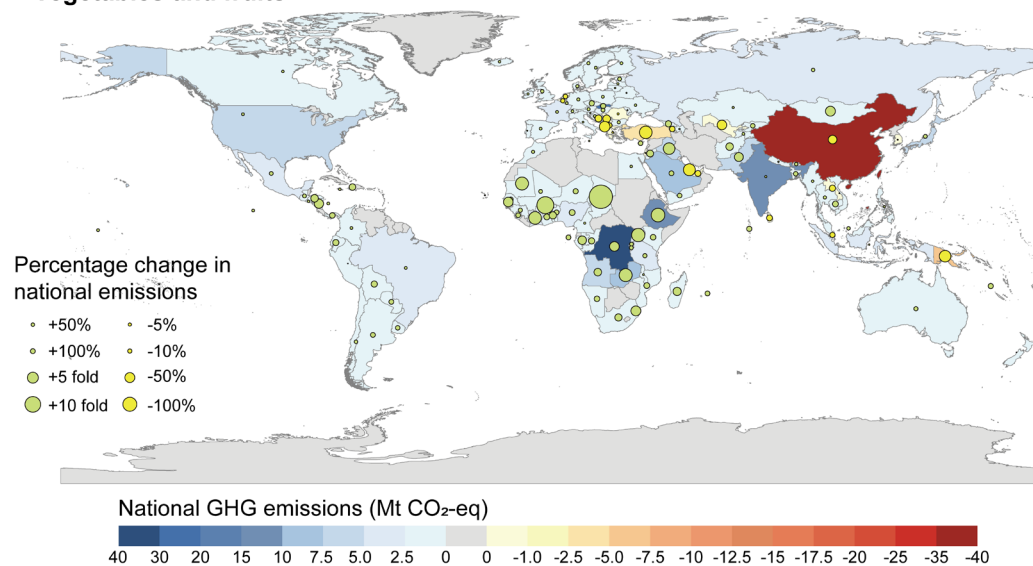
Supplementary Fig. 15 Changes in dietary emissions of grains for adopting the planetary health diet in countries and regions. The source of base map see Supplementary Fig. 1

Tubers and starchy vegetables



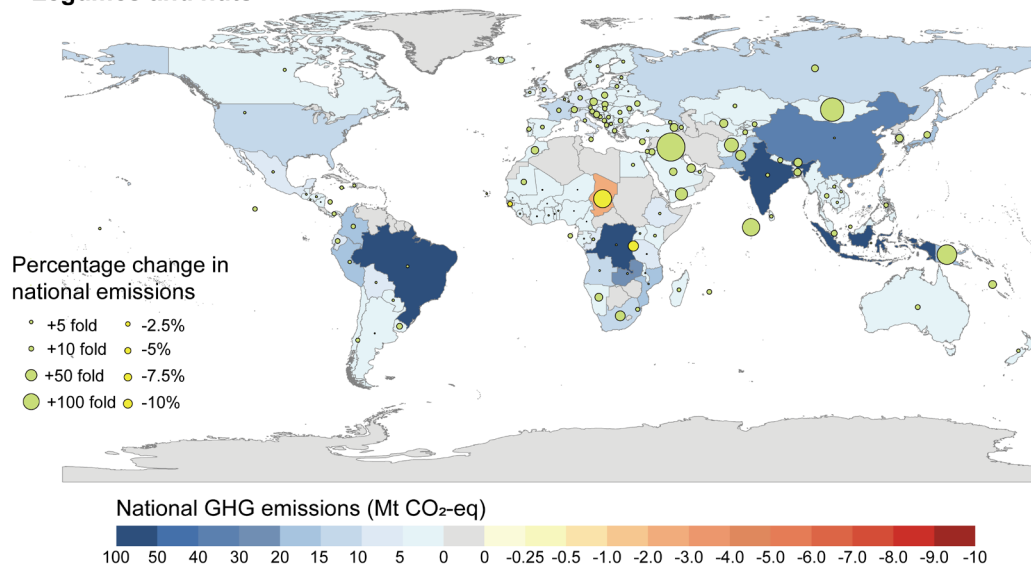
Supplementary Fig. 16 Changes in dietary emissions of tubers and starchy vegetables for adopting the planetary health diet in countries and regions. The source of base map see Supplementary Fig. 1

Vegetables and fruits



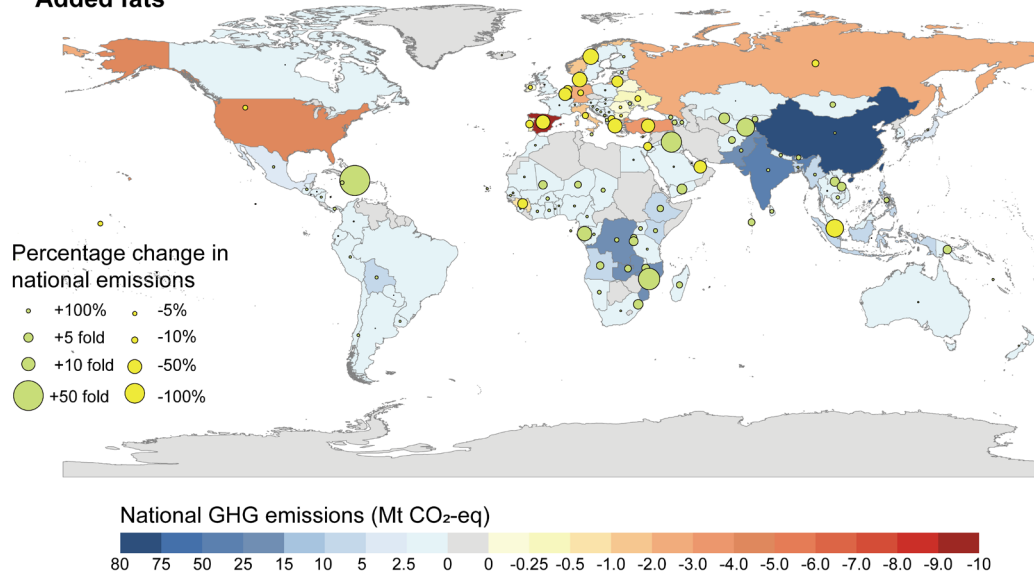
Supplementary Fig. 17 Changes in dietary emissions of vegetables and fruits for adopting the planetary health diet in countries and regions. The source of base map see Supplementary Fig. 1

Legumes and nuts

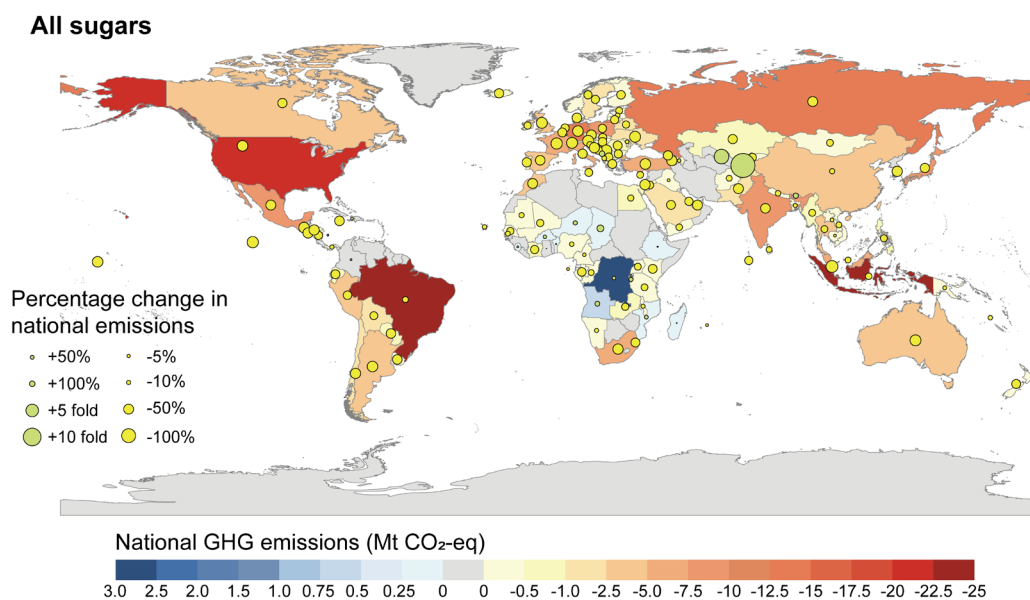


Supplementary Fig. 18 Changes in dietary emissions of legumes and nuts for adopting the planetary health diet in countries and regions. The source of base map see Supplementary Fig. 1

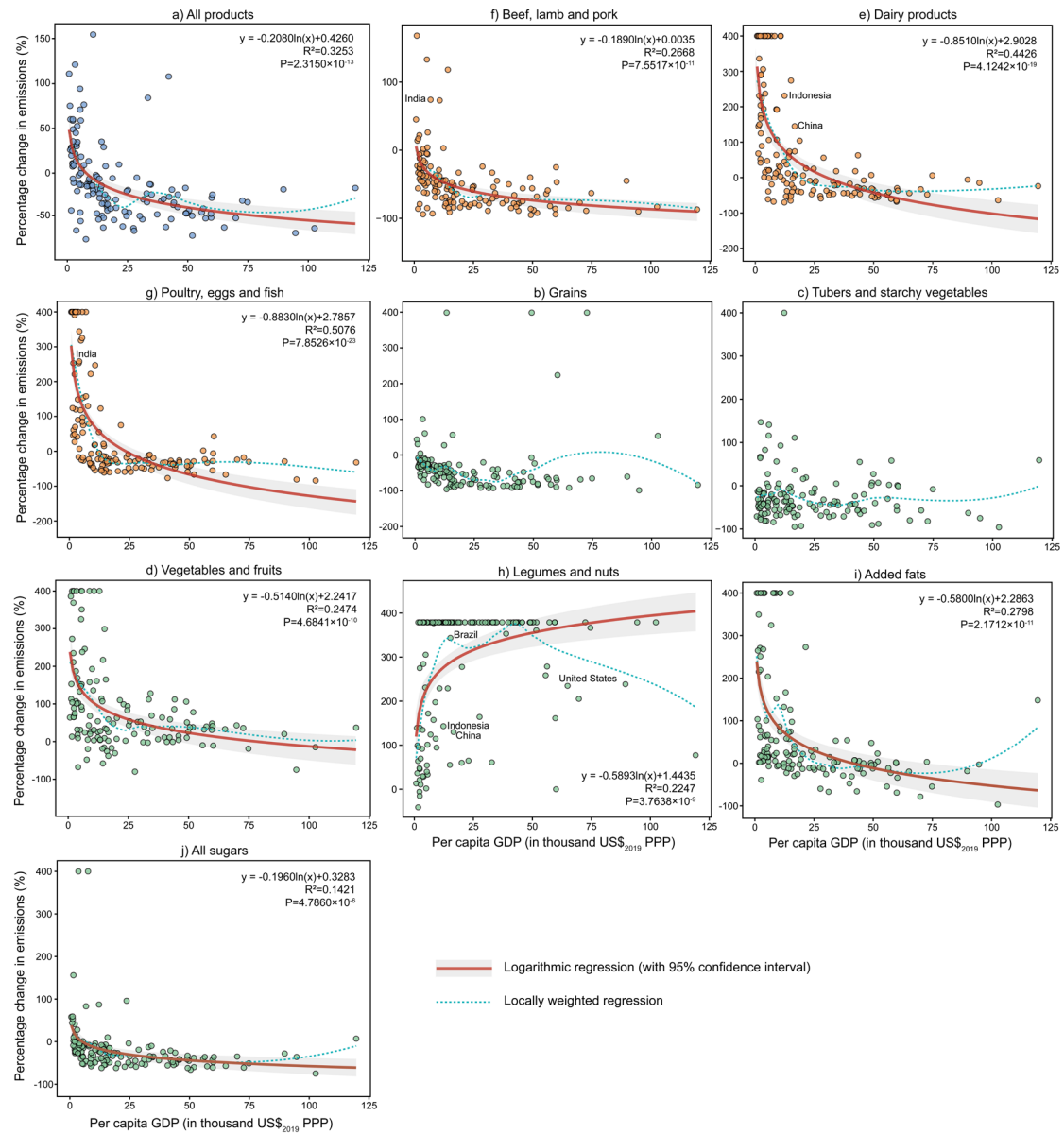
Added fats



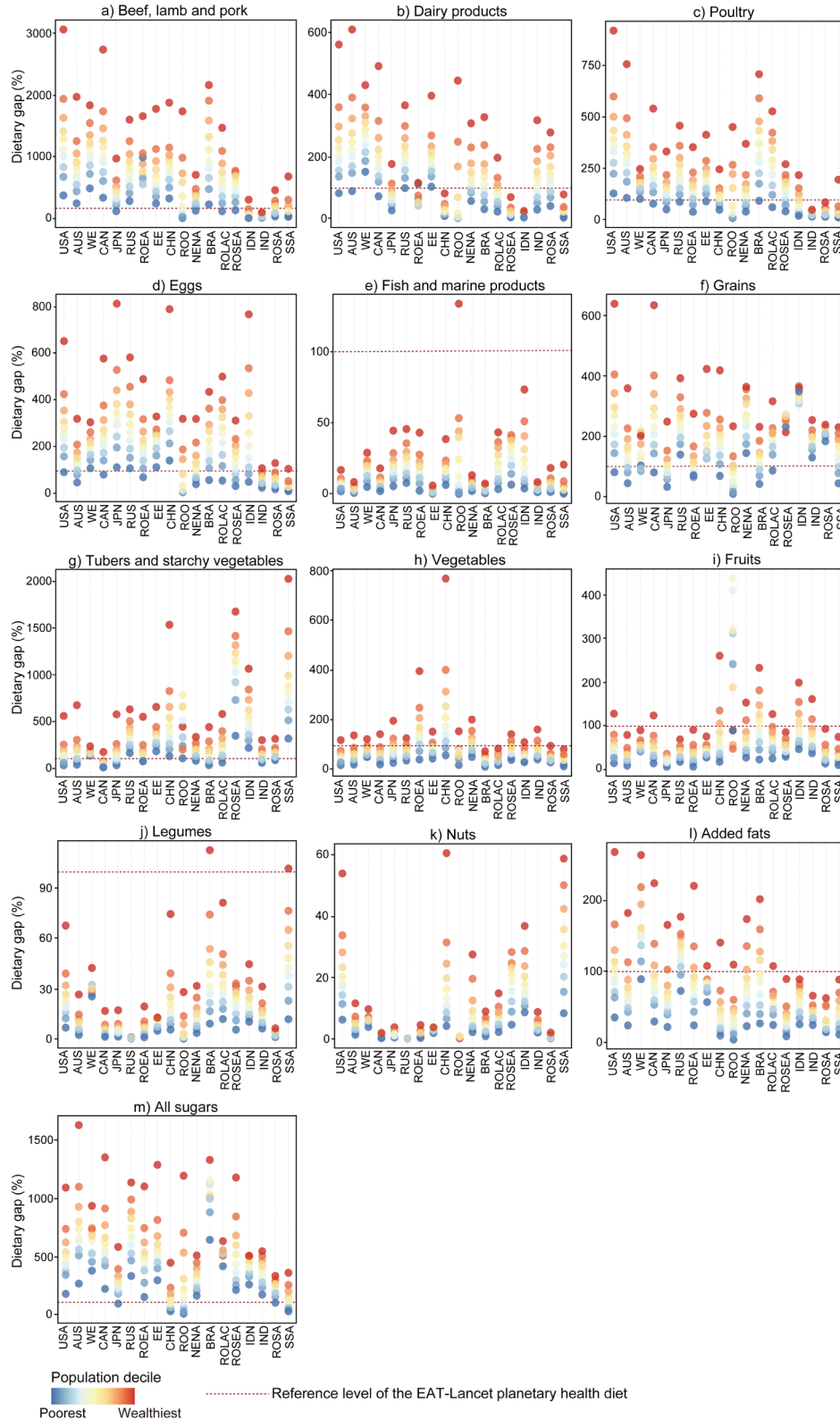
Supplementary Fig. 19 Changes in dietary emissions of added fats for adopting the planetary health diet in countries and regions. The source of base map see Supplementary Fig. 1



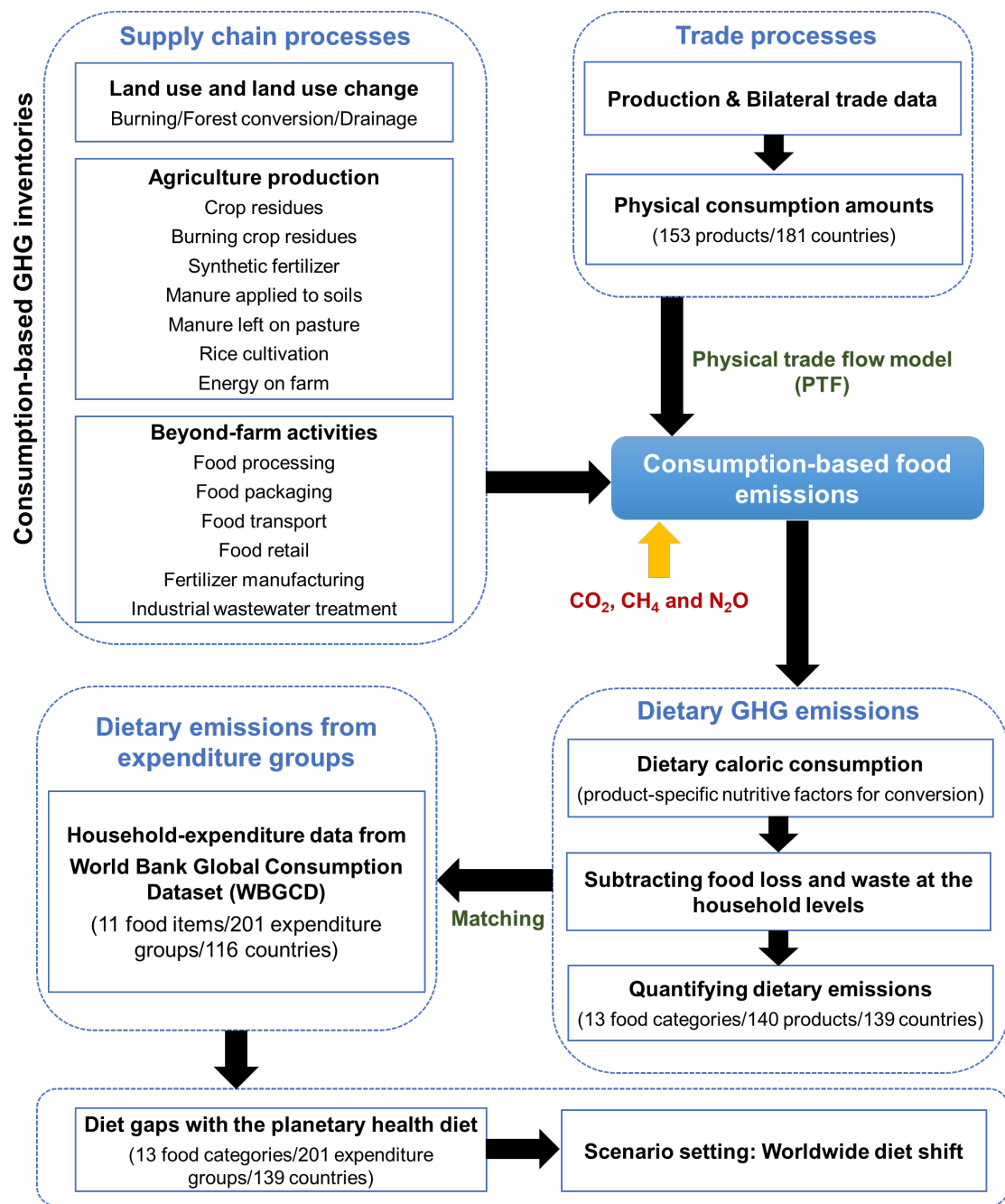
Supplementary Fig. 20 Changes in dietary emissions of all sugars for adopting the planetary health diet in countries and regions. The source of base map see Supplementary Fig. 1



Supplementary Fig. 21 Scatterplot for percentage change in national emissions as a function of per capita GDP in 139 countries/areas. The x-axis represents the country-average per capita GDP, and the y-axis represents the percentage change in national emissions of (a) all types of and (b-j) different food categories. When the percentage change exceeds 400%, we represent it as 400% to enhance the visibility of data point trends. Logarithmic regression (red solid line) and locally weighted regression analyses (blue dotted line) are used to determine the relationship between the percentage change in emissions (dependent variable) and the country-average per capita GDP (independent variable). Only a blue dotted line is shown in the sub-graph of grains and tubers and starchy vegetables due to the non-significant regression results of other regression models. The coefficients of determination (R^2) and the exact p -values from the two-sided Student's t -test for the logarithmic regression are indicated. The error bands (grey shaded areas) represent 95% confidence intervals around the fitted logarithmic regression lines. Blue, orange, and green dots represent all types of products, animal-based products, and plant-based products, respectively.



Supplementary Fig. 22 Diet gap between the current dietary intake and the reference intake level of EAT-Lancet planetary health diet across expenditure groups. (a-m) GHG footprints from different food categories. The colors of the bubbles indicate expenditure deciles ranging from the poorest in blue to the wealthiest in red and are comparable only within each region.



Supplementary Fig. 23 Research framework in this study.

Supplementary Tables (Supplementary Tables 1 to 24)

Supplementary Table 1: Total dietary GHG emissions and uncertainty ranges (with 95% confidential interval) of 139 countries/areas in 2019.

Supplementary Table 2: Total dietary GHG emissions and uncertainty ranges (with 95% confidential interval) of 18 regions in 2019.

Supplementary Table 3: National population of 139 countries/areas in 2019 in this study.

Supplementary Table 4: Contributions of different food categories to the total calorie content and associated emissions of global diets in 2019.

Supplementary Table 5: The 2019 per capita GDP of 18 regions.

Supplementary Table 6: The 2019 per capita GDP of 139 countries/areas.

Supplementary Table 7: List of 139 countries/areas in this study and their mapping relationships with the WBGCD country list in Supplementary Table 19.

Supplementary Table 8: Division, abbreviation, and scope of 18 aggregated regions and countries in this study.

Supplementary Table 9: National GHG footprint Gini coefficients of dietary intake of aggregated food categories in 139 countries/areas.

Supplementary Table 10: Global and regional GHG footprint Gini coefficients of dietary intake of aggregated food categories.

Supplementary Table 11: Total dietary emission changes and uncertainty ranges (with 95% confidential interval) for adopting the planetary health diet in 139 countries/areas.

Supplementary Table 12: Total dietary emission changes and uncertainty ranges (with 95% confidential interval) for adopting the planetary health diet in 18 regions.

Supplementary Table 13: Global and national populations with increased/decreased dietary emissions for adopting the planetary health diet in 139 countries/areas.

Supplementary Table 14: Food products with caloric values and their mapping relationship with WBGCD sectors in Supplementary Table 20.

Supplementary Table 15: Data sources used for this study.

Supplementary Table 16: Factors of food loss and waste for different food categories at the household consumption stage in regions.

Supplementary Table 17: Scientific targets for dietary intake as recommended by the EAT-Lancet planetary health diet.

Supplementary Table 18: 13 types of food categories and their scope of food products in Supplementary Table 8.

Supplementary Table 19: Country list in the World Bank Global Consumption Dataset (WBGCD).

Supplementary Table 20: Sectors with goods and services in the World Bank Global Consumption Dataset (WBGCD).

Supplementary Table 21: GHG footprint Gini coefficient of 13 food categories in 139 countries/areas in this study.

Supplementary Table 22: GHG footprint Gini coefficient of 13 food categories in 18 regions in this study.

Supplementary Table 23: The uncertainty ranges of activity data, parameters, and emission factors during food-related emission processes.

Supplementary Table 24: Shares of emissions from LULUC, agricultural activities, and beyond-farm activities in per capita dietary emissions in 139 countries/areas in 2019.

Supplementary Table 1: Total dietary GHG emissions and uncertainty ranges (with 95% confidential interval) in 139 countries/areas in 2019 (unit: t CO₂-eq). See Supplementary Dataset 17 for uncertainty ranges of national dietary emissions from different food categories in 2019.

Country	Total dietary emissions	Minimum values	Maximum values
Afghanistan	21093486	15904314	26596077
Albania	3423087	2650371	4236579
Angola	79978084	50294877	109828792
Argentina	181867122	135734684	229246551
Armenia	6161944	4792447	7605547
Australia	120180719	83320162	157465110
Austria	15969073	12220382	19865742
Azerbaijan	17439509	13545388	21556687
Bangladesh	125677749	86749926	165727180
Belarus	39232483	28593630	50274177
Belgium	32931529	24239963	41321344
Benin	17378689	11649232	23192722
Bhutan	937660	713742	1179367
Bolivia	71755924	47648301	96559917
Bosnia and Herzegovina	3796709	2863073	4764732
Brazil	847536803	601246087	1101507752
Bulgaria	7341707	5387009	9369805
Burkina Faso	21305760	14849018	27959641
Burundi	5038601	3386867	6740418
Cape Verde	472796	352513	597577
Cambodia	43601224	27400349	59938196
Cameroon	40221794	26253434	54439148
Canada	119538355	88351020	151544167

Chad	57187290	39341540	75405861
Chile	38324961	28688635	48381692
China, Hong Kong SAR	38092718	28670513	48072217
China, Macao SAR	904187	669764	1151061
China, Taiwan Province of	34978473	25130080	45190234
China, mainland	1468214706	1084166587	1874127066
Colombia	141591340	101803777	182947761
Congo	17305946	10947624	23815935
Cote d'Ivoire	15238115	10064503	20432824
Croatia	7056253	5496925	8660408
Cyprus	1477591	1128707	1846545
Czechia	13433162	10459058	16547952
Democratic Republic of the Congo	401445319	246812030	556683815
Denmark	15455316	11314966	19487598
Ecuador	36063731	24695257	47644737
Egypt	94604035	70549070	119471142
El Salvador	6822937	5020127	8718884
Estonia	3615864	2665755	4588354
Eswatini	2083029	1541739	2655497
Ethiopia	87136248	61442564	113956800
Fiji	1279579	946326	1627678
Finland	14553878	10718065	18519142
France	108859792	83271333	135297332
Gabon	6904911	4554842	9275216
Gambia	2571179	1779619	3383801
Georgia	4998564	3838533	6215177
Germany	153016730	113239374	194032837

Ghana	15066979	10566116	19668948
Greece	27489518	20496352	34587923
Guatemala	15879597	11625281	20297110
Guinea	25400351	16939659	34019311
Haiti	4090999	3041251	5176934
Honduras	9840320	6997948	12767698
Hungary	14309641	10798891	17959130
Iceland	1379276	1157699	1609586
India	1010721848	745147032	1289624438
Indonesia	871220510	549962690	1194446342
Iraq	20998357	16901062	25200665
Ireland	16100678	12077902	20327885
Israel	21202444	16163331	26510164
Italy	111097342	83340327	139519329
Jamaica	9653252	7751791	11567519
Japan	213837910	159429752	269767585
Jordan	11819660	8872051	14899044
Kazakhstan	44183486	34060700	54846193
Kenya	52769146	39182990	67257551
Kyrgyzstan	9080262	6953907	11363782
Lao People's Democratic Republic	15494318	10037975	20983749
Latvia	4399372	3176137	5655766
Lithuania	6976467	5086790	8913803
Luxembourg	3766219	2892642	4657220
Madagascar	28990415	19921936	38301690
Malawi	12717517	8637625	16891880
Malaysia	146003487	97185868	195485985

Maldives	790723	607999	980537
Mali	23498465	17039451	30176321
Malta	898639	669776	1135392
Mauritania	8994615	6663693	11416408
Mauritius	1719405	1275749	2184497
Mexico	206775164	157191923	258422555
Mongolia	18833230	13765318	24067933
Montenegro	745253	558701	941859
Morocco	44411276	34257881	54979176
Mozambique	92861588	58053617	127807726
Myanmar	156078943	103000739	209730627
Namibia	13333114	8998443	17689532
Nepal	36350458	26471043	46690147
Netherlands	91781006	68301035	115631147
New Zealand	22991071	17427932	28825757
Nicaragua	14753183	9519093	20042746
Niger	14661410	10843332	18658384
Nigeria	108359470	75172075	142372055
North Macedonia	1856819	1399835	2335881
Norway	19657648	14468849	24906936
Pakistan	349646420	262661804	442772314
Panama	8810074	6153777	11534517
Papua New Guinea	18208172	11430672	24945134
Paraguay	23882041	16074867	31733135
Peru	89810467	59877491	120095733
Philippines	95809296	65133951	127629173
Poland	93344179	74380671	112942714

Portugal	21836478	16226805	27615868
Qatar	14068305	10707059	17443272
Republic of Korea	120616111	89141097	152787377
Republic of Moldova	1962975	1548493	2410011
Romania	21016161	15984661	26346375
Russia	311025202	234319925	390202332
Rwanda	7026844	4868217	9250683
Sao Tome and Principe	132750	95338	170924
Saudi Arabia	91510448	72384998	111139396
Senegal	17993354	12639901	23464691
Serbia	9800182	7095497	12606742
Sierra Leone	6344408	4205304	8536561
Singapore	12361262	8912431	15863702
Slovakia	32661744	24935091	40356567
Slovenia	6949730	5209918	8715598
South Africa	115335723	87492105	144999240
Spain	87834169	63930073	112481241
Sri Lanka	11730149	8191706	15370443
Sweden	36358082	25400240	47589308
Switzerland	14912031	11035861	18913546
Tajikistan	10420621	7948794	13046800
Thailand	90418352	64760950	116637123
Togo	4243676	2925515	5586541
Turkey	150042826	114837436	186809955
Uganda	34390053	24007752	45024286
Ukraine	30424221	23065280	38261018
United Arab Emirates	33270824	24885331	41882850

United Kingdom of Great Britain and Northern Ireland	92878171	69112939	117731239
United Republic of Tanzania	102991762	69451471	137379548
United States of America	782565053	581370618	991191766
Uruguay	14257760	10790182	17850886
Uzbekistan	59968865	45792735	75070233
Viet Nam	68210166	47024686	90154363
Yemen	11217518	8465343	14110425
Zambia	89464279	56879042	122168595
Global	11395688421	8162552318	14731779863

Supplementary Table 2: Total dietary GHG emissions and uncertainty ranges (with 95% confidential interval) of 18 regions in 2019 (unit: Mt CO₂-eq). See Supplementary Dataset 18 for uncertainty ranges of regional dietary emissions from different food categories in 2019.

Country	Total dietary emissions	Minimum values	Maximum values
United States	783	581	991
Australia	120	83	157
Western Europe	915	680	1157
Canada	120	88	152
Japan	214	159	270
Russia	311	234	390
Rest of East Asia	139	103	177
Eastern Europe	254	195	314
China	1542	1139	1969
Rest of Oceania	42	30	55
Near East and North Africa	647	496	805
Brazil	848	601	1102
Rest of Latin America and the Caribbean	867	628	1114
Rest of Southeast Asia	628	423	836
Indonesia	871	550	1194
India	1011	745	1290
Rest of South Asia	546	401	699
Sub-Saharan Africa	1530	1019	2051

Supplementary Table 3: National population of 139 countries/areas in 2019 in this study³⁷. Detailed population in 201 expenditure groups of 139 countries/areas are shown in Supplementary Dataset 1.

Code	Country	Population
1	Afghanistan	38927
2	Albania	2879
3	Angola	32866
4	Argentina	45195
5	Armenia	2959
6	Australia	25500
7	Austria	9005
8	Azerbaijan	10139
9	Bangladesh	164688
10	Belarus	9449
11	Belgium	11591
12	Benin	12122
13	Bhutan	771
14	Bolivia	11673
15	Bosnia and Herzegovina	3279
16	Brazil	212559
17	Bulgaria	6949
18	Burkina Faso	20904
19	Burundi	11890
20	Cape Verde	378
21	Cambodia	16719
22	Cameroon	26545

23	Canada	37742
24	Chad	16426
25	Chile	19116
26	China, Hong Kong SAR	7548
27	China, Macao SAR	652
28	China, Taiwan Province of	23817
29	China, mainland	1439323
30	Colombia	50882
31	Congo	5517
32	Cote d'Ivoire	26378
33	Croatia	4105
34	Cyprus	1206
35	Czech Republic	10708
36	DR Congo	89562
37	Denmark	5791
38	Ecuador	17644
39	Egypt	102334
40	El Salvador	6487
41	Estonia	1326
42	Swaziland	1938
43	Ethiopia	114962
44	Fiji	894
45	Finland	5539
46	France	65274
47	Gabon	2225

48	Gambia	2417
49	Georgia	3988
50	Germany	83784
51	Ghana	31070
52	Greece	10423
53	Guatemala	17915
54	Guinea	13132
55	Haiti	11402
56	Honduras	9906
57	Hungary	9661
58	Iceland	339
59	India	1380004
60	Indonesia	273523
61	Iraq	40224
62	Ireland	4940
63	Israel	8658
64	Italy	60463
65	Jamaica	2960
66	Japan	126477
67	Jordan	10201
68	Kazakhstan	18779
69	Kenya	53772
70	Kyrgyzstan	6525
71	Laos	7278
72	Latvia	1888

73	Lithuania	2723
74	Luxembourg	625
75	Madagascar	27690
76	Malawi	19131
77	Malaysia	32367
78	Maldives	541
79	Mali	20251
80	Malta	442
81	Mauritania	4650
82	Mauritius	1273
83	Mexico	128934
84	Mongolia	3279
85	Montenegro	628
86	Morocco	36911
87	Mozambique	31258
88	Myanmar	54410
89	Namibia	2539
90	Nepal	29137
91	Netherlands	17136
92	New Zealand	4820
93	Nicaragua	6622
94	Niger	24207
95	Nigeria	206142
96	TFYR Macedonia	2083
97	Norway	5422

98	Pakistan	220893
99	Panama	4312
100	Papua New Guinea	8947
101	Paraguay	7133
102	Peru	32971
103	Philippines	109581
104	Poland	37849
105	Portugal	10195
106	Qatar	2881
107	Republic of Korea	51269
108	Moldova	4034
109	Romania	19238
110	Russia	145936
111	Rwanda	12952
112	Sao Tome and Principe	220
113	Saudi Arabia	34814
114	Senegal	16744
115	Serbia	8738
116	Sierra Leone	7975
117	Singapore	5851
118	Slovakia	5460
119	Slovenia	2078
120	South Africa	59307
121	Spain	46753
122	Sri Lanka	21414

123	Sweden	10098
124	Switzerland	8657
125	Tajikistan	9538
126	Thailand	69801
127	Togo	8280
128	Turkey	84337
129	Uganda	45741
130	Ukraine	43733
131	United Arab Emirates	9892
132	UK	67887
133	Tanzania	59736
134	USA	331002
135	Uruguay	3473
136	Uzbekistan	33468
137	Viet Nam	97339
138	Yemen	29825
139	Zambia	18385

Supplementary Table 4: Contributions of different food categories to the total calorie content and associated emissions of global diets in 2019. See Supplementary Dataset 21 for more details on 18 regions.

Food categories	Total caloric intake (10 ⁹ kcal)	GHG emissions	Shares of caloric intake	Shares of emissions	GHG emissions per unit of calories (kg/1000kcal)
Grains	4364067	2421	51%	21%	0.55
Tubers and starchy vegetables	443852	270	5%	2%	0.61
Vegetables and fruits	429721	444	5%	4%	1.03
Dairy products	420279	2188	5%	19%	5.21
Beef, lamb and pork	421128	3269	5%	29%	7.76
Poultry, eggs, and fish	296809	512	3%	4%	1.73
Legumes and nuts	288790	316	3%	3%	1.09
Added fats	748827	1260	9%	11%	1.68
All sugars	1152186	716	13%	6%	0.62
All types of food	8565659	11396	100%	100%	1.33

Supplementary Table 5: The 2019 per capita GDP of 18 regions according to data from the World Bank³⁸ and the International Monetary Fund³⁹.

Ranking	Name of regions	Per capita GDP in 2019 (in US\$ ₂₀₁₉ PPP)
1	United States	65120
2	Australia	51909
3	Western Europe	49955
4	Canada	49832
5	Japan	42271
6	Russia	30068
7	Rest of East Asia	28237
8	Eastern Europe	26877
9	China	16655
10	Rest of Oceania	16459
11	Near East and North Africa	16054
12	Brazil	15308
13	Rest of Latin America and the Caribbean	14336
14	Rest of Southeast Asia	13440
15	Indonesia	12361
16	India	6898
17	Rest of South Asia	4738
18	Sub-Saharan Africa	3971

Supplementary Table 6: The 2019 per capita GDP of 139 countries/areas according to data from the World Bank³⁸ and the International Monetary Fund³⁹.

Code	Name of country	Per capita GDP in 2019 (in US\$ ₂₀₁₉ PPP)
1	Afghanistan	2168
2	Albania	14407
3	Angola	6882
4	Argentina	23008
5	Armenia	14925
6	Australia	51909
7	Austria	59704
8	Azerbaijan	15055
9	Bangladesh	5699
10	Belarus	20106
11	Belgium	55805
12	Benin	3290
13	Bhutan	12298
14	Bolivia	8890
15	Bosnia and Herzegovina	16119
16	Brazil	15308
17	Bulgaria	25170
18	Burkina Faso	2200
19	Burundi	761
20	Cape Verde	8124
21	Cambodia	4654
22	Cameroon	3916

23	Canada	49832
24	Chad	1628
25	Chile	25600
26	China, Hong Kong SAR	16655
27	China, Macao SAR	16655
28	China, Taiwan Province of	16655
29	China, mainland	16655
30	Colombia	15872
31	Congo	3852
32	Cote d'Ivoire	5350
33	Croatia	31588
34	Cyprus	44039
35	Czechia	44213
36	Democratic Republic of the Congo	1105
37	Denmark	59911
38	Ecuador	11873
39	Egypt	12281
40	El Salvador	9406
41	Estonia	39007
42	Eswatini	8862
43	Ethiopia	2274
44	Fiji	13803
45	Finland	51812
46	France	50501
47	Gabon	15092

48	Gambia	2172
49	Georgia	15625
50	Germany	57398
51	Ghana	5573
52	Greece	31156
53	Guatemala	9041
54	Guinea	2653
55	Haiti	3244
56	Honduras	5852
57	Hungary	34646
58	Iceland	59608
59	India	6898
60	Indonesia	12361
61	Iraq	10736
62	Ireland	89716
63	Israel	40937
64	Italy	45800
65	Jamaica	10679
66	Japan	42271
67	Jordan	9939
68	Kazakhstan	27469
69	Kenya	4796
70	Kyrgyzstan	5481
71	Lao People's Democratic Republic	8173
72	Latvia	32928

73	Lithuania	39958
74	Luxembourg	119542
75	Madagascar	1653
76	Malawi	1582
77	Malaysia	28848
78	Maldives	21447
79	Mali	2313
80	Malta	49221
81	Mauritania	5739
82	Mauritius	24681
83	Mexico	20224
84	Mongolia	12986
85	Montenegro	23792
86	Morocco	8566
87	Mozambique	1340
88	Myanmar	5034
89	Namibia	10434
90	Nepal	4088
91	Netherlands	60208
92	New Zealand	45852
93	Nicaragua	5627
94	Niger	1269
95	Nigeria	5292
96	North Macedonia	18007
97	Norway	69916

98	Pakistan	5376
99	Panama	34179
100	Papua New Guinea	4115
101	Paraguay	14187
102	Peru	13275
103	Philippines	9102
104	Poland	34976
105	Portugal	37299
106	Qatar	94693
107	Republic of Korea	43410
108	Republic of Moldova	13319
109	Romania	33067
110	Russia	30068
111	Rwanda	2284
112	Sao Tome and Principe	4184
113	Saudi Arabia	49019
114	Senegal	3576
115	Serbia	19405
116	Sierra Leone	1726
117	Singapore	102631
118	Slovakia	33453
119	Slovenia	42089
120	South Africa	14440
121	Spain	43109
122	Sri Lanka	14217

123	Sweden	56404
124	Switzerland	72669
125	Tajikistan	3727
126	Thailand	18760
127	Togo	2161
128	Turkey	27708
129	Uganda	2345
130	Ukraine	13348
131	United Arab Emirates	74827
132	United Kingdom of Great Britain and Northern Ireland	49289
133	United Republic of Tanzania	2687
134	United States of America	65120
135	Uruguay	24552
136	Uzbekistan	7718
137	Viet Nam	10687
138	Yemen	2404
139	Zambia	3515

Supplementary Table 7: List of 139 countries/areas in this study and their mapping relationships with the WBGCD country list in Supplementary Table 19.

No	Name of country	UN classification ⁴⁰	World Bank classification by income level ⁴¹	Code in the 181 country list from Li et al. ⁸	Code in WBGCD	Replacement for missing data	Name of country in WBGCD	Abbreviations
1	Afghanistan	Developing	Low income	1	1	1	Afghanistan	AFG
2	Albania	Developed	Upper middle income	2	3	3	Albania	ALB
3	Angola	Developing	Lower middle income	4	2	2	Angola	AGO
4	Argentina	Developing	Upper middle income	6	No data	16	Brazil	BRA
5	Armenia	Developing	Upper middle income	7	4	4	Armenia	ARM
6	Australia	Developed	High income	8	No data	112	USA	USA
7	Austria	Developed	High income	9	5	5	Austria	AUT
8	Azerbaijan	Developing	Upper middle income	10	6	6	Azerbaijan	AZE
9	Bangladesh	Developing	Lower middle income	13	11	11	Bangladesh	BGD
10	Belarus	Developed	Upper middle income	15	14	14	Belarus	BLR
11	Belgium	Developed	High income	16	8	8	Belgium	BEL

12	Benin	Developing	Lower middle income	18	9	9	Benin	BEN
13	Bhutan	Developing	Lower middle income	19	17	17	Bhutan	BTN
14	Bolivia	Developing	Lower middle income	20	15	15	Bolivia	BOL
15	Bosnia and Herzegovina	Developed	Upper middle income	21	13	13	Bosnia and Herzegovina	BIH
16	Brazil	Developing	Upper middle income	23	16	16	Brazil	BRA
17	Bulgaria	Developed	Upper middle income	25	12	12	Bulgaria	BGR
18	Burkina Faso	Developing	Low income	26	10	10	Burkina Faso	BFA
19	Burundi	Developing	Low income	27	7	7	Burundi	BDI
20	Cape Verde	Developing	Lower middle income	28	24	24	Cape Verde	CPV
21	Cambodia	Developing	Lower middle income	29	58	58	Cambodia	KHM
22	Cameroon	Developing	Lower middle income	30	20	20	Cameroon	CMR
23	Canada	Developed	High income	31	No data	112	USA	USA
24	Chad	Developing	Low income	33	103	103	Chad	TCD
25	Chile	Developing	High income	34	No data	16	Brazil	BRA

26	China, Hong Kong SAR	Developing	---	35	18	18	China	CHN
27	China, Macao SAR	Developing	---	36	18	18	China	CHN
28	China, Taiwan Province of	Developing	---	37	18	18	China	CHN
29	China, mainland	Developing	Upper middle income	38	18	18	China	CHN
30	Colombia	Developing	Upper middle income	39	23	23	Colombia	COL
31	Congo	Developing	Lower middle income	41	22	22	Congo	COG
32	Cote d'Ivoire	Developing	Lower middle income	44	19	19	Cote d'Ivoire	CIV
33	Croatia	Developed	High income	45	45	45	Croatia	HRV
34	Cyprus	Developed	High income	47	25	25	Cyprus	CYP
35	Czechia	Developed	High income	48	26	26	Czech Republic	CZE
36	Democratic Republic of the Congo	Developing	Low income	50	21	21	DR Congo	COD
37	Denmark	Developed	High income	51	28	28	Denmark	DNK

38	Ecuador	Developing	Upper middle income	55	No data	16	Brazil	BRA
39	Egypt	Developing	Lower middle income	56	29	29	Egypt	EGY
40	El Salvador	Developing	Upper middle income	57	97	97	El Salvador	SLV
41	Estonia	Developed	High income	58	31	31	Estonia	EST
42	Eswatini	Developing	Lower middle income	59	102	102	Swaziland	SWZ
43	Ethiopia	Developing	Low income	60	32	32	Ethiopia	ETH
44	Fiji	Developing	Upper middle income	62	34	34	Fiji	FJI
45	Finland	Developed	High income	63	33	33	Finland	FIN
46	France	Developed	High income	64	35	35	France	FRA
47	Gabon	Developing	Upper middle income	66	36	36	Gabon	GAB
48	Gambia	Developing	Low income	67	41	41	Gambia	GMB
49	Georgia	Developing	Upper middle income	68	38	38	Georgia	GEO
50	Germany	Developed	High income	69	27	27	Germany	DEU
51	Ghana	Developing	Lower middle income	70	39	39	Ghana	GHA
52	Greece	Developed	High income	71	42	42	Greece	GRC

53	Guatemala	Developing	Upper middle income	73	43	43	Guatemala	GTM
54	Guinea	Developing	Lower middle income	74	40	40	Guinea	GIN
55	Haiti	Developing	Lower middle income	76	46	46	Haiti	HTI
56	Honduras	Developing	Lower middle income	77	44	44	Honduras	HND
57	Hungary	Developed	High income	78	47	47	Hungary	HUN
58	Iceland	Developed	High income	79	No data	33	Finland	FIN
59	India	Developing	Lower middle income	80	49	49	India	IND
60	Indonesia	Developing	Upper middle income	81	48	48	Indonesia	IDN
61	Iraq	Developing	Upper middle income	83	51	51	Iraq	IRQ
62	Ireland	Developed	High income	84	50	50	Ireland	IRL
63	Israel	Developed	High income	85	No data	33	Finland	FIN
64	Italy	Developed	High income	86	52	52	Italy	ITA
65	Jamaica	Developing	Upper middle income	87	53	53	Jamaica	JAM
66	Japan	Developed	High income	88	No data	27	Germany	DEU
67	Jordan	Developing	Lower middle income	89	54	54	Jordan	JOR

68	Kazakhstan	Developing	Upper middle income	90	55	55	Kazakhstan	KAZ
69	Kenya	Developing	Lower middle income	91	56	56	Kenya	KEN
70	Kyrgyzstan	Developing	Lower middle income	94	57	57	Kyrgyzstan	KGZ
71	Lao People's Democratic Republic	Developing	Lower middle income	95	59	59	Laos	LAO
72	Latvia	Developed	High income	96	65	65	Latvia	LVA
73	Lithuania	Developed	High income	99	63	63	Lithuania	LTU
74	Luxembourg	Developed	High income	100	64	64	Luxembourg	LUX
75	Madagascar	Developing	Low income	101	68	68	Madagascar	MDG
76	Malawi	Developing	Low income	102	79	79	Malawi	MWI
77	Malaysia	Developing	Upper middle income	103	No data	105	Thailand	THA
78	Maldives	Developing	Upper middle income	104	69	69	Maldives	MDV
79	Mali	Developing	Low income	105	72	72	Mali	MLI
80	Malta	Developed	High income	106	73	73	Malta	MLT

81	Mauritania	Developing	Lower middle income	107	77	77	Mauritania	MRT
82	Mauritius	Developing	Upper middle income	108	78	78	Mauritius	MUS
83	Mexico	Developing	Upper middle income	109	70	70	Mexico	MEX
84	Mongolia	Developing	Lower middle income	110	75	75	Mongolia	MNG
85	Montenegro	Developed	Upper middle income	111	74	74	Montenegro	MNE
86	Morocco	Developing	Lower middle income	112	66	66	Morocco	MAR
87	Mozambique	Developing	Low income	113	76	76	Mozambique	MOZ
88	Myanmar	Developing	Lower middle income	114	No data	113	Viet Nam	VNM
89	Namibia	Developing	Upper middle income	115	80	80	Namibia	NAM
90	Nepal	Developing	Lower middle income	116	84	84	Nepal	NPL
91	Netherlands	Developed	High income	117	No data	37	UK	GBR
92	New Zealand	Developed	High income	119	No data	112	USA	USA
93	Nicaragua	Developing	Lower middle income	120	83	83	Nicaragua	NIC
94	Niger	Developing	Low income	121	81	81	Niger	NER
95	Nigeria	Developing	Lower middle income	122	82	82	Nigeria	NGA

96	North Macedonia	Developed	Upper middle income	123	71	71	TFYR Macedonia	MKD
97	Norway	Developed	High income	124	No data	33	Finland	FIN
98	Pakistan	Developing	Lower middle income	126	85	85	Pakistan	PAK
99	Panama	Developing	High income	127	86	86	Panama	PAN
100	Papua New Guinea	Developing	Lower middle income	128	89	89	Papua New Guinea	PNG
101	Paraguay	Developing	Upper middle income	129	91	91	Paraguay	PRY
102	Peru	Developing	Upper middle income	130	87	87	Peru	PER
103	Philippines	Developing	Lower middle income	131	88	88	Philippines	PHL
104	Poland	Developed	High income	132	90	90	Poland	POL
105	Portugal	Developed	High income	133	No data	30	Spain	ESP
106	Qatar	Developing	High income	134	No data	29	Egypt	EGY
107	Republic of Korea	Developed	High income	135	No data	112	CHN	China
108	Republic of Moldova	Developed	Upper middle income	136	67	67	Moldova	MDA
109	Romania	Developed	High income	137	92	92	Romania	ROU

110	Russia	Developed	Upper middle income	138	93	93	Russia	RUS
111	Rwanda	Developing	Low income	139	94	94	Rwanda	RWA
112	Sao Tome and Principe	Developing	Lower middle income	143	99	99	Sao Tome and Principe	STP
113	Saudi Arabia	Developing	High income	144	No data	29	Egypt	EGY
114	Senegal	Developing	Lower middle income	145	95	95	Senegal	SEN
115	Serbia	Developed	Upper middle income	146	98	98	Serbia	SRB
116	Sierra Leone	Developing	Low income	148	96	96	Sierra Leone	SLE
117	Singapore	Developing	High income	149	No data	37	UK	GBR
118	Slovakia	Developed	High income	150	100	100	Slovakia	SVK
119	Slovenia	Developed	High income	151	No data	100	Slovakia	SVK
120	South Africa	Developing	Upper middle income	153	115	115	South Africa	ZAF
121	Spain	Developed	High income	154	30	30	Spain	ESP
122	Sri Lanka	Developing	Lower middle income	155	61	61	Sri Lanka	LKA
123	Sweden	Developed	High income	157	101	101	Sweden	SWE

124	Switzerland	Developed	High income	158	No data	37	UK	GBR
125	Tajikistan	Developing	Lower middle income	160	106	106	Tajikistan	TJK
126	Thailand	Developing	Upper middle income	161	105	105	Thailand	THA
127	Togo	Developing	Low income	162	104	104	Togo	TGO
128	Turkey	Developing	Upper middle income	166	108	108	Turkey	TUR
129	Uganda	Developing	Low income	168	110	110	Uganda	UGA
130	Ukraine	Developed	Lower middle income	169	111	111	Ukraine	UKR
131	United Arab Emirates	Developing	High income	170	No data	29	Egypt	EGY
132	United Kingdom of Great Britain and Northern Ireland	Developed	High income	171	37	37	UK	GBR
133	United Republic of Tanzania	Developing	Lower middle income	172	109	109	Tanzania	TZA
134	United States of America	Developed	High income	173	112	112	USA	USA
135	Uruguay	Developing	High income	174	No data	16	Brazil	BRA

136	Uzbekistan	Developing	Lower middle income	175	No data	106	Tajikistan	TJK
137	Viet Nam	Developing	Lower middle income	178	113	113	Viet Nam	VNM
138	Yemen	Developing	Low income	179	114	114	Yemen	YEM
139	Zambia	Developing	Lower middle income	180	116	116	Zambia	ZMB

Supplementary Table 8: Division, abbreviation and scope of 18 aggregated regions and countries in this study.

Code	Name of country/region	Abbreviation	Country code in the country list of Supplementary Table 7
1	Australia	AUS	6
2	Brazil	BRA	16
3	Canada	CAN	23
4	China	CHN	26, 27, 28, 29
5	Eastern Europe	EE	10, 17, 35, 57, 104, 108, 109, 118, 130
6	Indonesia	IDN	60
7	India	IND	59
8	Japan	JPN	66
9	Near East and North Africa	NENA	5, 8, 20, 34, 39, 49, 61, 63, 67, 68, 70, 86, 106, 113, 125, 128, 131, 136, 138
10	Rest of East Asia	ROEA	84, 107
11	Rest of Latin America and the Caribbean	ROLAC	4, 14, 25, 30, 38, 40, 53, 55, 56, 65, 83, 93, 99, 101, 102, 135
12	Rest of Oceania	ROO	44, 92, 100
13	Rest of South Asia	ROSA	1, 9, 13, 78, 90, 98, 122

14	Rest of Southeast Asia	ROSEA	21, 71, 77, 88, 103, 117, 126, 137
15	Russia	RUS	110
16	Sub-Saharan Africa	SSA	3, 12, 18, 19, 22, 24, 31, 32, 36, 42, 43, 47, 48, 51, 54, 69, 75, 76, 79, 81, 82, 87, 89, 94, 95, 111, 112, 114, 116, 120, 127, 129, 133, 139
17	United States	USA	134
18	Western Europe	WE	2, 7, 11, 15, 33, 37, 41, 45, 46, 50, 52, 58, 62, 64, 72, 73, 74, 80, 85, 91, 96, 97, 105, 115, 119, 121, 123, 124, 132

Supplementary Table 9: National GHG footprint Gini coefficients of dietary intake of aggregated food categories in 139 countries/areas. Detailed GF-Gini coefficients of 13 types of food categories see Supplementary Table 21.

Region	Grains	Tubers and starchy vegetables	Vegetables and fruits	Dairy products	Beef, lamb, and pork	Poultry, eggs, and fish	Legumes and nuts	Added fats	All sugars	All types of products
Afghanistan	0.090	0.327	0.348	0.191	0.362	0.307	0.345	0.131	0.147	0.251
Albania	0.079	0.350	0.290	0.180	0.300	0.354	0.340	0.219	0.124	0.200
Angola	0.252	0.438	0.486	0.764	0.606	0.623	0.449	0.417	0.620	0.446
Argentina	0.251	0.372	0.315	0.344	0.314	0.289	0.336	0.310	0.108	0.307
Armenia	0.185	0.215	0.215	0.160	0.313	0.331	0.215	0.109	0.100	0.223
Australia	0.288	0.410	0.306	0.285	0.300	0.280	0.358	0.291	0.252	0.291
Austria	0.087	0.155	0.158	0.125	0.264	0.136	0.156	0.241	0.113	0.163
Azerbaijan	0.071	0.297	0.228	0.236	0.309	0.326	0.235	0.138	0.153	0.212
Bangladesh	0.072	0.265	0.237	0.396	0.484	0.415	0.263	0.582	0.352	0.267
Belarus	0.069	0.163	0.296	0.184	0.314	0.218	0.177	0.082	0.207	0.171
Belgium	0.098	0.164	0.172	0.154	0.154	0.135	0.165	0.162	0.109	0.129
Benin	0.323	0.323	0.323	0.323	0.323	0.323	0.323	0.323	0.324	0.323

Bhutan	0.144	0.285	0.227	0.243	0.233	0.295	0.269	0.145	0.156	0.231
Bolivia	0.138	0.263	0.264	0.402	0.336	0.338	0.263	0.122	0.122	0.228
Bosnia and Herzegovina	0.092	0.313	0.341	0.336	0.361	0.320	0.324	0.237	0.156	0.276
Brazil	0.239	0.372	0.315	0.344	0.313	0.289	0.362	0.310	0.106	0.276
Bulgaria	0.130	0.142	0.221	0.198	0.221	0.194	0.193	0.129	0.139	0.162
Burkina Faso	0.140	0.335	0.226	0.476	0.435	0.358	0.235	0.312	0.216	0.318
Burundi	0.252	0.265	0.207	0.770	0.521	0.461	0.251	0.261	0.615	0.363
Cape Verde	0.112	0.347	0.449	0.441	0.506	0.404	0.349	0.184	0.139	0.297
Cambodia	0.059	0.201	0.230	0.261	0.296	0.296	0.211	0.153	0.127	0.108
Cameroon	0.078	0.341	0.314	0.548	0.316	0.295	0.325	0.335	0.262	0.245
Canada	0.289	0.410	0.306	0.285	0.297	0.280	0.360	0.291	0.246	0.288
Chad	0.484	0.484	0.484	0.484	0.484	0.484	0.484	0.484	0.484	0.484
Chile	0.244	0.372	0.315	0.344	0.311	0.289	0.339	0.310	0.107	0.297
China, Hong Kong SAR	0.250	0.380	0.414	0.376	0.247	0.247	0.390	0.414	0.414	0.266
China, Macao SAR	0.250	0.380	0.414	0.376	0.247	0.247	0.397	0.414	0.414	0.293

China, Taiwan Province of	0.250	0.380	0.414	0.376	0.247	0.247	0.394	0.414	0.414	0.300
China, mainland	0.250	0.380	0.414	0.376	0.247	0.247	0.406	0.414	0.414	0.302
Colombia	0.138	0.349	0.305	0.309	0.305	0.360	0.344	0.202		0.278
Congo	0.306	0.347	0.271	0.522	0.564	0.496	0.278	0.297	0.337	0.343
Cote d'Ivoire	0.215	0.342	0.295	0.631	0.562	0.475	0.297	0.259	0.378	0.320
Croatia	0.266	0.264	0.255	0.257	0.266	0.261	0.257	0.273	0.281	0.263
Cyprus	0.115	0.143	0.122	0.104	0.112	0.087	0.130	0.169	0.122	0.097
Czechia	0.177	0.234	0.248	0.202	0.290	0.198	0.240	0.145	0.124	0.195
Democratic Republic of the Congo	0.314	0.368	0.254	0.684	0.413	0.402	0.296	0.282	0.407	0.327
Denmark	0.123	0.166	0.153	0.131	0.165	0.150	0.163	0.307	0.136	0.148
Ecuador	0.207	0.372	0.315	0.344	0.311	0.289	0.334	0.310	0.106	0.279
Egypt	0.142	0.230	0.213	0.275	0.252	0.252	0.227	0.204	0.233	0.221
El Salvador	0.484	0.548	0.362	0.450	0.531	0.416	0.533	0.306	0.234	0.460
Estonia	0.223	0.264	0.264	0.209	0.230	0.231	0.264	0.159	0.182	0.217

Eswatini	0.368	0.469	0.405	0.596	0.570	0.506	0.432	0.381	0.183	0.515
Ethiopia	0.172	0.210	0.231	0.289	0.607	0.555	0.214	0.377	0.381	0.364
Fiji	0.154	0.249	0.154	0.408	0.416	0.408	0.164	0.265	0.097	0.321
Finland	0.101	0.169	0.175	0.133	0.269	0.150	0.168	0.243	0.138	0.147
France	0.587	0.257	0.319	0.213	0.269	0.247	0.287	0.243	0.241	0.256
Gabon	0.222	0.305	0.213	0.414	0.457	0.268	0.213	0.154	0.234	0.265
Gambia	0.200	0.433	0.688	0.309	0.438	0.538	0.687	0.571	0.575	0.337
Georgia	0.195	0.304	0.324	0.451	0.534	0.479	0.322	0.139	0.117	0.375
Germany	0.102	0.157	0.145	0.121	0.161	0.140	0.148	0.282	0.150	0.140
Ghana	0.243	0.332	0.265	0.512	0.415	0.358	0.286	0.296	0.208	0.351
Greece	0.157	0.150	0.115	0.128	0.127	0.108	0.138	0.081	0.108	0.119
Guatemala	0.163	0.247	0.271	0.407	0.342	0.347	0.249	0.285	0.104	0.294
Guinea	0.177	0.338	0.221	0.612	0.446	0.300	0.221	0.226	0.239	0.289
Haiti	0.209	0.320	0.286	0.488	0.414	0.456	0.311	0.231	0.309	0.375
Honduras	0.080	0.336	0.271	0.305	0.502	0.365	0.335	0.526	0.060	0.319

Hungary	0.165	0.204	0.250	0.204	0.194	0.171	0.231	0.169	0.136	0.194
Iceland	0.101	0.169	0.175	0.133	0.242	0.150	0.171	0.243	0.139	0.153
India	0.088	0.258	0.245	0.351	0.314	0.244	0.251	0.139	0.181	0.269
Indonesia	0.029	0.254	0.248	0.379	0.608	0.418	0.249	0.198	0.111	0.145
Iraq	0.027	0.261	0.212	0.173	0.315	0.275	0.249	0.106	0.026	0.118
Ireland	0.107	0.140	0.160	0.100	0.164	0.111	0.143	0.132	0.108	0.114
Israel	0.097	0.169	0.175	0.133	0.337	0.150	0.171	0.243	0.138	0.199
Italy	0.229	0.211	0.232	0.208	0.218	0.210	0.220	0.247	0.195	0.217
Jamaica	0.142	0.250	0.247	0.259	0.325	0.197	0.249	0.192	0.135	0.172
Japan	0.276	0.410	0.306	0.285	0.302	0.280	0.371	0.291	0.256	0.289
Jordan	0.125	0.303	0.245	0.245	0.404	0.206	0.275	0.331	0.164	0.294
Kazakhstan	0.179	0.219	0.249	0.329	0.298	0.317	0.226	0.132	0.100	0.284
Kenya	0.228	0.479	0.322	0.388	0.495	0.545	0.456	0.298	0.214	0.404
Kyrgyzstan	0.283	0.143	0.228	0.276	0.277	0.277	0.195	0.102	0.237	0.272
Lao People's Democratic	0.062	0.278	0.208	0.549	0.389	0.229	0.257	0.369	0.455	0.175

Republic										
Latvia	0.180	0.237	0.247	0.202	0.254	0.202	0.238	0.152	0.135	0.189
Lithuania	0.160	0.196	0.199	0.168	0.246	0.151	0.197	0.149	0.122	0.165
Luxembourg	0.127	0.206	0.217	0.178	0.185	0.138	0.216	0.166	0.224	0.178
Madagascar	0.389	0.504	0.465	0.779	0.432	0.546	0.473	0.412	0.406	0.462
Malawi	0.180	0.447	0.292	0.674	0.582	0.531	0.398	0.318	0.405	0.399
Malaysia	0.050	0.133	0.228	0.139	0.110	0.110	0.180	0.093	0.152	0.097
Maldives	0.106	0.228	0.203	0.165	0.835	0.284	0.221	0.123	0.137	0.418
Mali	0.285	0.326	0.368	0.434	0.489	0.466	0.363	0.328	0.272	0.436
Malta	0.719	0.156	0.153	0.120	0.169	0.127	0.155	0.190	0.111	0.175
Mauritania	0.151	0.358	0.253	0.401	0.435	0.554	0.357	0.255	0.197	0.322
Mauritius	0.212	0.212	0.212	0.212	0.212	0.212	0.212	0.212	0.212	0.212
Mexico	0.074	0.266	0.178	0.206	0.306	0.196	0.237	0.088	0.120	0.192
Mongolia	0.050	0.246	0.265	0.178	0.178	0.211	0.265	0.078	0.099	0.131
Montenegro	0.191	0.204	0.201	0.090	0.211	0.211	0.200	0.173	0.212	0.147

Morocco	0.212	0.269	0.320	0.379	0.362	0.362	0.281	0.246	0.172	0.300
Mozambique	0.288	0.433	0.249	0.735	0.562	0.531	0.335	0.271	0.434	0.388
Myanmar	0.035	0.217	0.265	0.385	0.368	0.219	0.235	0.126	0.145	0.144
Namibia	0.168	0.292	0.252	0.569	0.444	0.444	0.258	0.412	0.372	0.293
Nepal	0.073	0.251	0.287	0.335	0.402	0.348	0.251	0.200	0.290	0.285
Netherlands	0.223	0.157	0.189	0.134	0.164	0.142	0.182	0.188	0.124	0.138
New Zealand	0.289	0.410	0.306	0.285	0.296	0.280	0.362	0.291	0.246	0.289
Nicaragua	0.131	0.328	0.252	0.283	0.515	0.426	0.328	0.141	0.112	0.207
Niger	0.287	0.295	0.533	0.270	0.765	0.576	0.515	0.482	0.341	0.420
Nigeria	0.388	0.422	0.405	0.444	0.419	0.457	0.405	0.378	0.317	0.402
North Macedonia	0.200	0.234	0.359	0.263	0.316	0.319	0.307	0.224	0.233	0.268
Norway	0.101	0.169	0.175	0.133	0.280	0.150	0.169	0.243	0.139	0.178
Pakistan	0.089	0.227	0.206	0.280	0.382	0.315	0.220	0.151	0.093	0.292
Panama	0.079	0.240	0.203	0.284	0.318	0.242	0.238	0.222	0.092	0.210
Papua New Guinea	0.384	0.408	0.234	0.711	0.644	0.707	0.235	0.333	0.482	0.330

Paraguay	0.180	0.313	0.411	0.428	0.276	0.434	0.324	0.109	0.136	0.199
Peru	0.111	0.243	0.187	0.269	0.397	0.388	0.235	0.092	0.174	0.220
Philippines	0.043	0.236	0.222	0.359	0.467	0.392	0.232	0.231	0.074	0.213
Poland	0.335	0.331	0.328	0.329	0.330	0.333	0.330	0.331	0.331	0.332
Portugal	0.097	0.180	0.190	0.135	0.205	0.151	0.184	0.153	0.076	0.149
Qatar	0.142	0.230	0.213	0.275	0.252	0.252	0.229	0.204	0.232	0.241
Republic of Korea	0.276	0.410	0.306	0.285	0.300	0.280	0.331	0.291	0.255	0.289
Republic of Moldova	0.216	0.252	0.310	0.326	0.406	0.360	0.286	0.208	0.122	0.298
Romania	0.061	0.126	0.228	0.176	0.235	0.196	0.131	0.153	0.108	0.159
Russia	0.162	0.214	0.208	0.207	0.266	0.266	0.208	0.131	0.190	0.211
Rwanda	0.455	0.431	0.285	0.695	0.684	0.558	0.433	0.426	0.614	0.557
Sao Tome and Principe	0.277	0.325	0.335	0.526	0.638	0.525	0.325	0.299	0.332	0.360
Saudi Arabia	0.142	0.230	0.213	0.275	0.252	0.252	0.226	0.204	0.234	0.217
Senegal	0.112	0.363	0.352	0.492	0.581	0.614	0.352	0.318	0.183	0.371
Serbia	0.167	0.191	0.220	0.187	0.296	0.211	0.201	0.153	0.135	0.210

Sierra Leone	0.181	0.377	0.277	0.716	0.542	0.396	0.279	0.253	0.416	0.284
Singapore	0.223	0.157	0.189	0.134	0.171	0.142	0.170	0.188	0.123	0.144
Slovakia	0.171	0.173	0.226	0.157	0.226	0.157	0.201	0.180	0.168	0.212
Slovenia	0.171	0.173	0.226	0.157	0.263	0.157	0.204	0.180	0.163	0.197
South Africa	0.133	0.337	0.329	0.417	0.497	0.321	0.333	0.153	0.136	0.372
Spain	0.127	0.180	0.190	0.135	0.186	0.151	0.185	0.153	0.076	0.147
Sri Lanka	0.044	0.212	0.169	0.266	0.187	0.353	0.188	0.088	0.086	0.130
Sweden	0.362	0.161	0.160	0.137	0.177	0.159	0.160	0.177	0.169	0.172
Switzerland	0.223	0.157	0.189	0.134	0.170	0.142	0.177	0.188	0.139	0.144
Tajikistan	0.245	0.305	0.250	0.319	0.382	0.478	0.279	0.178		0.359
Thailand	0.050	0.133	0.228	0.139	0.110	0.110	0.161	0.094	0.151	0.077
Togo	0.141	0.395	0.325	0.596	0.409	0.290	0.381	0.289	0.341	0.300
Turkey	0.071	0.233	0.203	0.199	0.362	0.236	0.209	0.145	0.044	0.179
Uganda	0.157	0.248	0.247	0.461	0.462	0.451	0.247	0.274	0.362	0.348
Ukraine	0.149	0.208	0.217	0.192	0.243	0.246	0.215	0.160	0.117	0.197

United Arab Emirates	0.142	0.230	0.213	0.275	0.252	0.252	0.229	0.204	0.234	0.236
United Kingdom of Great Britain and Northern Ireland	0.223	0.157	0.189	0.134	0.170	0.142	0.169	0.189	0.123	0.147
United Republic of Tanzania	0.168	0.245	0.201	0.275	0.462	0.353	0.210	0.322	0.400	0.288
United States of America	0.288	0.410	0.306	0.285	0.302	0.280	0.332	0.291	0.246	0.292
Uruguay	0.229	0.372	0.315	0.344	0.314	0.289	0.339	0.310	0.106	0.309
Uzbekistan	0.247	0.305	0.250	0.319	0.372	0.478	0.256	0.178		0.334
Viet Nam	0.038	0.217	0.265	0.385	0.360	0.219	0.258	0.109	0.142	0.179
Yemen	0.098	0.258	0.296	0.343	0.399	0.291	0.264	0.212	0.134	0.269
Zambia	0.279	0.449	0.293	0.680	0.604	0.555	0.317	0.415	0.447	0.396

Supplementary Table 10: Global and regional GHG footprint Gini coefficients of dietary intake of aggregated food categories. Detailed regional GF-Gini coefficients of 13 types of food categories see Supplementary Table 22.

Region	Grains	Tubers and starchy vegetables	Vegetables and fruits	Dairy products	Beef, lamb, and pork	Poultry, eggs, and fish	Legumes and nuts	Added fats	All sugars	All types of products
Australia	0.288	0.410	0.306	0.285	0.300	0.280	0.358	0.291	0.252	0.291
Brazil	0.239	0.372	0.315	0.344	0.313	0.289	0.362	0.310	0.106	0.276
Canada	0.289	0.410	0.306	0.285	0.297	0.280	0.360	0.291	0.246	0.288
China	0.250	0.380	0.414	0.376	0.247	0.247	0.406	0.414	0.414	0.301
Eastern Europe	0.343	0.206	0.405	0.252	0.316	0.305	0.187	0.232	0.393	0.321
Indonesia	0.029	0.254	0.248	0.379	0.608	0.418	0.249	0.198	0.111	0.145
India	0.088	0.258	0.245	0.351	0.314	0.244	0.251	0.139	0.181	0.269
Japan	0.276	0.410	0.306	0.285	0.302	0.280	0.371	0.291	0.256	0.289
Near East and North Africa	0.136	0.201	0.197	0.282	0.252	0.281	0.330	0.244	0.201	0.235
Rest of East Asia	0.238	0.321	0.318	0.245	0.211	0.306	0.356	0.316	0.285	0.213
Rest of Latin America and the Caribbean	0.134	0.280	0.258	0.330	0.361	0.299	0.226	0.240	0.083	0.279

Rest of Oceania	0.472	0.421	0.368	0.741	0.633	0.655	0.257	0.333	0.330	0.363
Rest of South Asia	0.027	0.208	0.241	0.287	0.389	0.338	0.266	0.293	0.189	0.264
Rest of Southeast Asia	0.062	0.130	0.285	0.407	0.315	0.354	0.235	0.381	0.421	0.205
Russia	0.162	0.214	0.208	0.207	0.266	0.266	0.208	0.131	0.190	0.211
Sub-Saharan Africa	0.109	0.153	0.187	0.485	0.525	0.469	0.134	0.275	0.394	0.273
United States	0.288	0.410	0.306	0.285	0.302	0.280	0.332	0.291	0.246	0.292
Western Europe	0.169	0.095	0.200	0.150	0.189	0.123	0.107	0.171	0.131	0.157
Global	0.047	0.112	0.313	0.339	0.397	0.473	0.121	0.283	0.365	0.267

Supplementary Table 11: Total dietary emission changes and uncertainty ranges (with 95% confidential interval) for adopting the planetary health diet in 139 countries/areas (unit: t CO₂-eq). See Supplementary Dataset 17 for uncertainty ranges of national dietary emission changes from different food categories.

Country	Total dietary emissions	Minimum values	Maximum values
Afghanistan	2316222	1744091	2973504
Albania	-1637837	-1258628	-2038043
Angola	61234628	40882584	82665553
Argentina	-108824300	-81815712	-136321410
Armenia	-3767812	-2886055	-4706467
Australia	-84266835	-58043864	-110760551
Austria	-7988932	-6103635	-9984093
Azerbaijan	-8766819	-6771497	-10892020
Bangladesh	22886406	17487708	29108380
Belarus	-11678603	-8414341	-15070460
Belgium	-14494019	-10806745	-18294997
Benin	3739685	2783721	4776445
Bhutan	-424380	-331649	-526898
Bolivia	-6688156	-5123064	-8481616
Bosnia and Herzegovina	-1357448	-1035159	-1693770
Brazil	-286846759	-217263697	-360279116
Bulgaria	-1403364	-1048031	-1781777
Burkina Faso	1546813	1276740	1865356
Burundi	5598908	4046039	7243315
Cape Verde	-61125	-48541	-74908
Cambodia	-4744626	-2638572	-6832909
Cameroon	12061182	9191889	15258540
Canada	-54009626	-39887081	-68512432

Chad	-23978404	-17412232	-30762958
Chile	-16976872	-12865445	-21318522
China, Hong Kong SAR	-14945717	-11064232	-19047093
China, Macao SAR	-316416	-236369	-402815
China, Taiwan Province of	-14676842	-10381870	-19173316
China, mainland	-411086991	-310352265	-518337995
Colombia	10754724	4832555	16542639
Congo	5633333	3540498	7723271
Cote d'Ivoire	10822805	7786994	13970992
Croatia	-2082953	-1682636	-2503370
Cyprus	-527789	-400828	-667771
Czechia	-4439317	-3491031	-5467507
Democratic Republic of the Congo	301929398	191604913	413083521
Denmark	-4287197	-3124887	-5468665
Ecuador	-866521	-1448933	-405837
Egypt	-17621023	-12973021	-22327561
El Salvador	-877626	-709176	-1056218
Estonia	-1130797	-810109	-1465187
Eswatini	274504	169298	380244
Ethiopia	51104706	37037566	66149226
Fiji	-233318	-177268	-293938
Finland	-6975303	-5114010	-8910420
France	-45638141	-35249104	-56634990
Gabon	2007249	1207699	2806935
Gambia	259306	223618	301359
Georgia	-1209587	-940563	-1504475

Germany	-77698881	-58157201	-98073703
Ghana	8850305	6305650	11541220
Greece	-14237086	-10556535	-17995436
Guatemala	-2349813	-1758384	-2970412
Guinea	-2805419	-1541572	-4007173
Haiti	4964989	3586884	6437198
Honduras	481211	212797	741436
Hungary	-1862156	-1379701	-2411083
Iceland	-628732	-507992	-755490
India	88878011	60706679	117901451
Indonesia	-34609634	-17823101	-51207633
Iraq	32560235	25752038	39677657
Ireland	-2950735	-2182946	-3752246
Israel	-12840038	-9756514	-16119253
Italy	-42413016	-31906692	-53299369
Jamaica	-1873424	-1688728	-2060039
Japan	-57011936	-43149598	-71500413
Jordan	-1648193	-1090467	-2239656
Kazakhstan	-27317612	-20969417	-34005448
Kenya	-1314256	-1849831	-801207
Kyrgyzstan	-4887725	-3763577	-6111637
Lao People's Democratic Republic	-2321949	-1455415	-3185925
Latvia	-1007434	-709054	-1309885
Lithuania	-2022180	-1438116	-2618685
Luxembourg	-633997	-483527	-790297
Madagascar	8314000	5795567	10890059

Malawi	3524054	2569805	4538463
Malaysia	-7679035	-5173386	-10259857
Maldives	74864	98814	51864
Mali	-1520064	-1300349	-1622432
Malta	-404162	-291930	-521745
Mauritania	-1208774	-920591	-1504845
Mauritius	-350993	-257429	-452983
Mexico	-80699741	-62248666	-100062215
Mongolia	-9785083	-7471088	-12212210
Montenegro	-320736	-243540	-402868
Morocco	-11220785	-8667915	-13902143
Mozambique	55754356	35300932	76464727
Myanmar	-20526754	-14275277	-26977839
Namibia	-1863603	-1182653	-2546443
Nepal	-7353816	-5618766	-9127039
Netherlands	-22262368	-16847143	-27752238
New Zealand	-5551835	-4212651	-6958675
Nicaragua	-34670	15491	-76318
Niger	3778482	2905610	4742865
Nigeria	102258333	78674822	127627072
North Macedonia	-740692	-558845	-932400
Norway	-9915814	-7221641	-12637678
Pakistan	-154543467	-121697919	-191381477
Panama	-1115310	-958170	-1312587
Papua New Guinea	9552940	6097627	13058221
Paraguay	-3415415	-2443005	-4405367
Peru	-5752279	-4487434	-7047920

Philippines	-6316132	-3939681	-8880098
Poland	-22496113	-17995906	-27149009
Portugal	-10112569	-7403414	-12924877
Qatar	-9451879	-7168515	-11737875
Republic of Korea	-22520861	-15982224	-29378832
Republic of Moldova	-449372	-350082	-559068
Romania	-6851937	-5125953	-8716177
Russia	-149515624	-113609735	-186865572
Rwanda	4219878	3192062	5388149
Sao Tome and Principe	46005	32183	60163
Saudi Arabia	-15327621	-11978106	-18833711
Senegal	2402624	1733131	3137525
Serbia	-5154314	-3729474	-6629831
Sierra Leone	1241302	941818	1563492
Singapore	-7651250	-5518334	-9824474
Slovakia	27485185	20948306	33925561
Slovenia	7505708	15400783	24618346
South Africa	-39652747	-30873802	-49300203
Spain	-45306642	-32335354	-58686973
Sri Lanka	4121865	3052568	5239707
Sweden	-14459958	-10043255	-18990693
Switzerland	-4620702	-3533170	-5779856
Tajikistan	-6703682	-5119299	-8380953
Thailand	-5309374	-3462105	-7143534
Togo	1049514	806474	1307819
Turkey	-97129558	-74230874	-121025213
Uganda	12183438	8609195	15877839

Ukraine	-8544568	-6740735	-10621496
United Arab Emirates	-10873769	-7918021	-13915072
United Kingdom of Great Britain and Northern Ireland	-42100871	-32454964	-52533912
United Republic of Tanzania	8602612	5952602	11574536
United States of America	-477197409	-356780478	-602881223
Uruguay	-6881742	-5237750	-8580909
Uzbekistan	-44473389	-34026671	-55612182
Viet Nam	-15718205	-10323799	-21252173
Yemen	5481956	4108797	6935874
Zambia	40178387	25191546	55581785
Global	-1940175081	-1514230625	-2391783973

Supplementary Table 12: Total dietary emission changes and uncertainty ranges (with 95% confidential interval) for adopting the planetary health diet in 18 regions (unit: Mt CO₂-eq). See Supplementary Dataset 18 for uncertainty ranges of regional dietary emission changes from different food categories.

Country	Total dietary emissions	Minimum values	Maximum values
United States	-477	-357	-603
Australia	-84	-58	-111
Western Europe	-363	-270	-459
Canada	-54	-40	-69
Japan	-57	-43	-72
Russia	-150	-114	-187
Rest of East Asia	-32	-23	-42
Eastern Europe	-30	-24	-38
China	-441	-332	-557
Rest of Oceania	4	2	6
Near East and North Africa	-236	-179	-295
Brazil	-287	-217	-360
Rest of Latin America and the Caribbean	-220	-171	-269
Rest of Southeast Asia	-70	-47	-94
Indonesia	-35	-18	-51
India	89	61	118
Rest of South Asia	-133	-105	-164
Sub-Saharan Africa	636	422	856

Supplementary Table 13: Global and national populations with increased/decreased dietary emissions for adopting the planetary health diet in 139 countries/areas (unit: person). See Supplementary Dataset 19 for the population with increased/decreased dietary emissions in 201 expenditure groups.

Country	Emission increase population	Shares in the national population	Emission decrease population	Shares in the national population
Afghanistan	23266520	59.8%	15660480	40.2%
Albania	208945	7.3%	2670055	92.7%
Angola	29694206	90.3%	3171794	9.7%
Argentina	6961618	15.4%	38233382	84.6%
Armenia	96604	3.3%	2862396	96.7%
Australia	1158762	4.5%	24341238	95.5%
Austria	144436	1.6%	8860564	98.4%
Azerbaijan	569111	5.6%	9569889	94.4%
Bangladesh	125926307	76.5%	38761693	23.5%
Belarus	1793688	19.0%	7655312	81.0%
Belgium	180435	1.6%	11410565	98.4%
Benin	8962036	73.9%	3159964	26.1%
Bhutan	115336	15.0%	655664	85.0%
Bolivia	4437993	38.0%	7235007	62.0%
Bosnia and Herzegovina	873650	26.6%	2405350	73.4%
Brazil	57028053	26.8%	155530947	73.2%
Bulgaria	1521045	21.9%	5427955	78.1%
Burkina Faso	13587192	65.0%	7316808	35.0%
Burundi	11335060	95.3%	554940	4.7%
Cape Verde	198835	52.6%	179165	47.4%
Cambodia	5077231	30.4%	11641769	69.6%
Cameroon	21483828	80.9%	5061172	19.1%

Canada	6007277	15.9%	31734723	84.1%
Chad	6637035	40.4%	9788965	59.6%
Chile	4246230	22.2%	14869770	77.8%
China, Hong Kong SAR	1433663	19.0%	6114337	81.0%
China, Macao SAR	173688	26.6%	478312	73.4%
China, Taiwan Province of	4953555	20.8%	18863445	79.2%
China, mainland	476117166	33.1%	963205834	66.9%
Colombia	30389645	59.7%	20492355	40.3%
Congo	4163654	75.5%	1353346	24.5%
Cote d'Ivoire	22860349	86.7%	3517651	13.3%
Croatia	1298932	31.6%	2806068	68.4%
Cyprus	23413	1.9%	1182587	98.1%
Czechia	1678979	15.7%	9029021	84.3%
Democratic Republic of the Congo	77504090	86.5%	12057910	13.5%
Denmark	610714	10.5%	5180286	89.5%
Ecuador	9629772	54.6%	8014228	45.4%
Egypt	35407671	34.6%	66926329	65.4%
El Salvador	3391325	52.3%	3095675	47.7%
Estonia	265524	20.0%	1060476	80.0%
Eswatini	1358148	70.1%	579852	29.9%
Ethiopia	99019056	86.1%	15942944	13.9%
Fiji	387264	43.3%	506736	56.7%
Finland	95318	1.7%	5443682	98.3%
France	13290766	20.4%	51983234	79.6%
Gabon	1755886	78.9%	469114	21.1%

Gambia	1926605	79.7%	490395	20.3%
Georgia	1642664	41.2%	2345336	58.8%
Germany	538566	0.6%	83245434	99.4%
Ghana	26382095	84.9%	4687905	15.1%
Greece	80884	0.8%	10342116	99.2%
Guatemala	8776246	49.0%	9138754	51.0%
Guinea	5981633	45.6%	7150367	54.4%
Haiti	10740690	94.2%	661310	5.8%
Honduras	5796049	58.5%	4109951	41.5%
Hungary	3802332	39.4%	5858668	60.6%
Iceland	9872	2.9%	329128	97.1%
India	863275081	62.6%	516728919	37.4%
Indonesia	136478271	49.9%	137044729	50.1%
Iraq	40151728	99.8%	72272	0.2%
Ireland	857274	17.4%	4082726	82.6%
Israel	89927	1.0%	8568073	99.0%
Italy	9642182	15.9%	50820818	84.1%
Jamaica	892669	30.2%	2067331	69.8%
Japan	42763898	33.8%	83713102	66.2%
Jordan	5576663	54.7%	4624337	45.3%
Kazakhstan	1049422	5.6%	17729578	94.4%
Kenya	32624104	60.7%	21147896	39.3%
Kyrgyzstan	645893	9.9%	5879107	90.1%
Lao People's Democratic Republic	2437588	33.5%	4840412	66.5%
Latvia	546181	28.9%	1341819	71.1%
Lithuania	461546	16.9%	2261454	83.1%

Luxembourg	196904	31.5%	428096	68.5%
Madagascar	22612398	81.7%	5077602	18.3%
Malawi	14972170	78.3%	4158830	21.7%
Malaysia	8944791	27.6%	23422209	72.4%
Maldives	446106	82.5%	94894	17.5%
Mali	12487131	61.7%	7763869	38.3%
Malta	11404	2.6%	430596	97.4%
Mauritania	2447274	52.6%	2202726	47.4%
Mauritius	435494	34.2%	837506	65.8%
Mexico	19274678	14.9%	109659322	85.1%
Mongolia	63156	1.9%	3215844	98.1%
Montenegro	18834	3.0%	609166	97.0%
Morocco	14940592	40.5%	21970408	59.5%
Mozambique	27077550	86.6%	4180450	13.4%
Myanmar	17590994	32.3%	36819006	67.7%
Namibia	1070730	42.2%	1468270	57.8%
Nepal	12692758	43.6%	16444242	56.4%
Netherlands	3508701	20.5%	13627299	79.5%
New Zealand	1736836	36.0%	3083164	64.0%
Nicaragua	4054562	61.2%	2567438	38.8%
Niger	20607060	85.1%	3599940	14.9%
Nigeria	184353074	89.4%	21788926	10.6%
North Macedonia	411920	19.8%	1671080	80.2%
Norway	78504	1.4%	5343496	98.6%
Pakistan	44565034	20.2%	176327966	79.8%
Panama	1458329	33.8%	2853671	66.2%
Papua New Guinea	7915049	88.5%	1031951	11.5%

Paraguay	2832644	39.7%	4300356	60.3%
Peru	15552464	47.2%	17418536	52.8%
Philippines	62390623	56.9%	47190377	43.1%
Poland	17320305	45.8%	20528695	54.2%
Portugal	284766	2.8%	9910234	97.2%
Qatar	18604	0.6%	2862396	99.4%
Republic of Korea	23274421	45.4%	27994579	54.6%
Republic of Moldova	1502406	37.2%	2531594	62.8%
Romania	2223731	11.6%	17014269	88.4%
Russia	11055088	7.6%	134880912	92.4%
Rwanda	11077742	85.5%	1874258	14.5%
Sao Tome and Principe	170373	77.4%	49627	22.6%
Saudi Arabia	13642217	39.2%	21171783	60.8%
Senegal	12557818	75.0%	4186182	25.0%
Serbia	280527	3.2%	8457473	96.8%
Sierra Leone	5663189	71.0%	2311811	29.0%
Singapore	59139	1.0%	5791861	99.0%
Slovakia	5402114	98.9%	57886	1.1%
Slovenia	2075267	99.9%	2733	0.1%
South Africa	21937731	37.0%	37369269	63.0%
Spain	1094827	2.3%	45658173	97.7%
Sri Lanka	20896677	97.6%	517323	2.4%
Sweden	1575950	15.6%	8522050	84.4%
Switzerland	865192	10.0%	7791808	90.0%
Tajikistan	1005476	10.5%	8532524	89.5%
Thailand	17149230	24.6%	52651770	75.4%
Togo	6614224	79.9%	1665776	20.1%

Turkey	265927	0.3%	84071073	99.7%
Uganda	36258752	79.3%	9482248	20.7%
Ukraine	9232629	21.1%	34500371	78.9%
United Arab Emirates	2206681	22.3%	7685319	77.7%
United Kingdom of Great Britain and Northern Ireland	3241762	4.8%	64645238	95.2%
United Republic of Tanzania	36494360	61.1%	23241640	38.9%
United States of America	25854593	7.8%	305147407	92.2%
Uruguay	621751	17.9%	2851249	82.1%
Uzbekistan	1861490	5.6%	31606510	94.4%
Viet Nam	25422437	26.1%	71916563	73.9%
Yemen	25851001	86.7%	3973999	13.3%
Zambia	14826493	80.6%	3558507	19.4%
Global	3185122728	43.1%	4210947272	56.9%

Supplementary Table 14: Food products with caloric values^{42,43} and their mapping relationship with WBGCD sectors in Supplementary Table 20. Products in gray italic text are not included as dietary food products in this study.

Code	Products	Sector code in the WBGCD	Code of food-related sectors in Supplementary Table 20	Calories (kcal/100 gram)
1	apple	30	11	48
2	juice_apple	30	11	47
3	apricos	30	11	45
4	avocados	30	11	119
5	bananas	30	11	60
6	blueberry	30	11	55
7	cherries	30	11	65
8	coconut	30	11	184
9	oil_coconut	29	10	884
10	cranberry	30	11	47
11	grapefruits	30	11	16
12	juice_grapefruits	30	11	39

13	grapes	30	11	53
14	wine	2	1	68
15	juice_grapes	30	11	61
16	kiwi	30	11	52
17	lemon&limes	30	11	15
18	Juice_lemon	30	11	22
19	mangoes_mangosteens_guavas	30	11	45
20	melons	30	11	17
21	oranges	30	11	34
22	juice_oranges	30	11	42
23	other_fruits	30	11	45
24	juice_other_fruits	30	11	48
25	papayas	30	11	26
26	peaches	30	11	33
27	pears	30	11	54

28	persimmons	30	11	82
29	pineapples	30	11	26
30	juice_pineapples	30	11	56
31	plums&sloes	30	11	52
32	strawberry	30	11	28
33	watermelon	30	11	17
34	artichoke	30	11	20
35	asparagus	30	11	12
36	bean_green	30	11	50
37	cabbages and other brassicas	30	11	19
38	carrots and turnips	30	11	38
39	cauliflowers&brocoli	30	11	9
40	chilli&pepper	30	11	25
41	cucumber	30	11	13
42	eggplants	30	11	21

43	garlic	30	11	130
44	ginger	30	11	347
45	Leeks, other alliaceous vegetables	30	11	37
46	Lettuce and chicory	30	11	12
47	maize_green	30	11	56
48	Mushrooms and truffles	30	11	24
49	onion_dry	30	11	31
50	onion_shallot_green	30	11	24
51	peas_green	30	11	31
52	Pumpkins, squash and gourds	30	11	19
53	spinach	30	11	16
54	tomatoes	30	11	17
55	juice_tomatoes	30	11	17
56	paste_tomatoes	30	11	84
57	peeled_tomatoes	30	11	19

58	vegetable_fresh_nes	30	11	22
59	vegetable_dehydrated	30	11	341
60	vegetable_frozen	30	11	71
61	vegetable_homogenized_preparations	30	11	41
62	vegetable_preserved_frozen	30	11	54
63	vegetable_preserved_nes	30	11	38
64	vegetable_in_vinegar	30	11	29
65	cassava	10	5	109
66	dried_cassava	10	5	255
67	flour_cassava	10	5	338
68	starch_cassava	10	5	362
69	potatoes	10	5	67
70	flour_potatoes	10	5	349
71	potato_frozen	10	5	73
72	roots_tuber_nes	10	5	91

73	flour_roots_tuber_nes	10	5	282
74	sweet_potato	10	5	92
75	cocoa_bean	25	9	414
76	cocoa_paste	25	9	472
77	cocoa_powder&cake	25	9	261
78	<i>coffee_green</i>	2	1	47
79	<i>coffee_extract</i>	2	1	129
80	<i>coffee_roasted</i>	2	1	56
81	<i>coffee_substitutes_containing</i>	2	1	56
82	<i>tea</i>	2	1	40
83	<i>tobacco</i>	2	1	40
84	sugar_cane_beet_aggregated	25	9	50
85	sugar_refined	25	9	387
86	sugar_confectionery	25	9	310
87	sugar_raw_centrifugal	25	9	373

88	suagr_crops_nes	25	9	390
89	maple_sugar_syrups	25	9	348
90	sugar_nes	25	9	348
91	brazil_nuts	30	11	315
92	cashew_nuts	30	11	252
93	chestnuts	30	11	158
94	groundnuts	30	11	414
95	oil_groundnuts	30	11	884
96	groundnuts_prepared	30	11	580
97	hazelnuts	30	11	291
98	walnuts	30	11	289
99	beans_bambara	10	5	365
100	beans_dry	10	5	341
101	beans_green	10	5	50
102	Broad beans, horse beans, dry	10	5	343

103	barley	5	3	332
104	<i>barley_feed</i>	---	---	332
105	<i>barley_beer</i>	2	1	49
106	barley_pearled	5	3	346
107	buckwheat	5	3	330
108	maize	5	3	356
109	<i>maize_feed</i>	---	---	356
110	maize_flour	5	3	363
111	maize_germ	5	3	373
112	oil_maize	5	3	884
113	millet	5	3	340
114	mixed_grain	5	3	340
115	flour_mixed_grain	5	3	364
116	oats	5	3	385
117	oats_rolled	5	3	384

118	rice_paddy	18	7	280
119	rice_broken	18	7	360
120	rice_flour	18	7	366
121	rice_husked	18	7	357
122	rice_milled	18	7	360
123	rye	5	3	319
124	sorghum	5	3	343
125	triticale	5	3	327
126	wheat	5	3	334
127	<i>wheat_feed</i>	---	---	213
128	wheat_flour	5	3	364
129	oil_palm_fruits	29	10	327
130	oil_palm	29	10	884
131	oil_palm_kernel	29	10	884
132	olive	29	10	175

133	oil_olive	29	10	884
134	rapeseed	29	10	494
135	<i>rapeseed_cake_feed</i>	---	---	494
136	oil_raped	29	10	884
137	sesame_seed	29	10	573
138	oil_sesame_seed	29	10	884
139	soybean	29	10	335
140	<i>soybean_cake_feed</i>	---	---	261
141	soya_sauce	29	10	56
142	soya_paste	29	10	114
143	oil_soybean	29	10	884
144	sunflower_seed	29	10	308
145	oil_sunflower_seed	29	10	884
146	beef (cattle&bufflo)	3	2	238
147	meat_pig	16	6	220

148	poultry	16	6	185
149	lamb&mutton	16	6	263
150	eggs	16	6	139
151	milk_whole_fresh_cow&sheep	4, 22	4, 8	61
152	freshwater_fish	16	6	69
153	marine_products	16	6	86

Supplementary Table 15: Data sources used for this study.

Data	Temporal resolution	Spatial resolution	Units	Activity resolution	Source
Production quantity	2019	Country-level	tonne	Products	FAOSTAT statistics ⁴⁴
Bilateral trade matrix-imports	2019	Country-level	tonne	Products	FAOSTAT statistics ¹⁰
Land use and land use change (LULUC) emissions	2019	Country-level	kilotonne	Processes (CO ₂ /CH ₄ /N ₂ O)	FAOSTAT statistics ²⁰
Farm-gate emissions	2019	Country-level	kilotonne	Processes (CO ₂ /CH ₄ /N ₂ O)	FAOSTAT statistics ²⁰
Livestock production emissions	2019	Country-level	kilotonne	Processes (CO ₂ /CH ₄ /N ₂ O)	FAOSTAT statistics ²⁰
Livestock production emission intensity	2019	Country-level	kg CO ₂ -eq /kg protein	Processes (CO ₂ /CH ₄ /N ₂ O)	Assessment Model (GLEAM) ⁴⁵ (for comparison)
Pre- and post-production emissions	2019	Country-level	kilotonne	Processes (CO ₂ /CH ₄ /N ₂ O)	FAOSTAT statistics ²⁰
Population	2019	Country-level	1000 person	Population	UN World Population Prospects 2022 ³⁷
Domestic material consumption	2019	Country-level	tonne	Products	Calculated based on trade and production data ⁸
Annual per capita food supply quantity	2019	Country-level	kg/person/year	Products	FAOSTAT statistics ⁴⁶
Nutritive factors	---	---	kcal/100 gram	Products	FAO ^{42,43}
Food waste factors at household levels	---	Regional-level	%	Food categories	Study by Gustavsson et al. ⁴⁷
Household-expenditure shares	2011	Country-level	%	Product categories	World Bank Global Consumption Dataset (WBGCD) ¹¹ , Study by Zhong et al. ⁴⁸
Recommended caloric intake levels of the EAT-Lancet planetary health diet	---	Global-level	kcal/person/day	Food categories	The study by Willett et al. ²⁵

Supplementary Table 16: Factors of food loss and waste for different food categories at the household consumption stage in regions⁴⁷.

Food categories	Grains	Roots and tubers	Oilseeds and pulses	Fruits and vegetables	Meat	Fish and seafood	Dairy	No data
Mapping food categories in Supplementary Table 17	1	2	10, 11, 12	3, 4	6, 7, 8	9	5	13
Europe and Russia	25.0%	17.0%	4.0%	19.0%	11.0%	11.0%	7.0%	0.0%
North America and Oceania	27.0%	30.0%	4.0%	28.0%	11.0%	33.0%	7.0%	0.0%
Industrialized Asia	20.0%	10.0%	4.0%	15.0%	8.0%	8.0%	5.0%	0.0%
Sub-Saharan Africa	1.0%	2.0%	1.0%	5.0%	2.0%	2.0%	0.1%	0.0%
North Africa, West and Central Asia	12.0%	6.0%	2.0%	12.0%	8.0%	4.0%	2.0%	0.0%
South and Southeast Asia	3.0%	3.0%	1.0%	7.0%	4.0%	2.0%	1.0%	0.0%
Latin America	10.0%	4.0%	2.0%	10.0%	6.0%	4.0%	4.0%	0.0%

Supplementary Table 17: Scientific targets for dietary intake as recommended by the EAT-Lancet planetary health diet²⁵ (based on an intake of 2500 kcal/day).

Food categories	Foods	Macronutrient intake (possible range) (g/day)	Caloric intake (kcal/day)
Grains	Rice, wheat, corn, and other grains	232	811
Tubers and starchy vegetables	Potatoes and cassava	50 (0-100)	39
Vegetables	All vegetables	300 (200-600)	78
Fruits	All fruits	200 (100-300)	126
Dairy products	Whole milk or equivalents	250 (0-500)	153
	Beef, lamb and pork	14 (0-28)	30
Animal-based protein sources	Chicken and other poultry	29 (0-58)	62
	Eggs	13 (0-25)	19
	Fish	28 (0-100)	40
Plant-based protein sources	Legumes (including dry beans, lentils, peas, and soy foods)	75 (0-100)	284
	Nuts (peanuts and tree nuts)	50 (0-75)	291
Added fats	Unsaturated oils	40 (20-80)	354
	Saturated oils	11.8 (0-11.8)	96
All sugars	All sweeteners	31 (0-31)	120

Supplementary Table 18: 13 types of food categories and their scope of food products in Supplementary Table 14.

No	Food category	Code of food products in	Per capita caloric intake (kcal/day)
1	Grains	103, 106, 107, 108, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 128	811
2	Tubers and starchy vegetables	65, 66, 67, 68, 69, 70, 71, 72, 73, 74	39
3	Vegetables	34-64	78
4	Fruits	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 55, 132	126
5	Dairy	151	153
6	Beef, lamb and pork	146, 147, 149	30
7	Poultry	148	62
8	Eggs	150	19
9	Fish	152, 153	40
10	Legumes	94, 96, 99, 100, 101, 102, 139, 141, 142	284
11	Nuts	91, 92, 93, 94, 97, 98	291
12	Added fats	95, 129, 130, 131, 133, 134, 136, 137, 138, 143, 144, 145	450
13	All sugars	75, 76, 77, 78, 84, 85, 86, 87, 88, 89, 90	120
14	Wine, coffee, tea, tobacco	14, 78, 79, 80, 81, 82, 83, 105	Not considered in this study
15	Feed	104, 109, 127, 135, 140	Emissions have been allocated to animal-based products

Supplementary Table 19: Country list in the World Bank Global Consumption Dataset (WBGCD)¹¹.

Code of country in WBGCD	Abbreviations of country	Name of country in WBGCD ⁴⁸⁻⁵⁰
1	AFG	Afghanistan
2	AGO	Angola
3	ALB	Albania
4	ARM	Armenia
5	AUT	Austria
6	AZE	Azerbaijan
7	BDI	Burundi
8	BEL	Belgium
9	BEN	Benin
10	BFA	Burkina Faso
11	BGD	Bangladesh
12	BGR	Bulgaria
13	BIH	Bosnia and Herzegovina
14	BLR	Belarus
15	BOL	Bolivia
16	BRA	Brazil
17	BTN	Bhutan
18	CHN	China
19	CIV	Cote d'Ivoire
20	CMR	Cameroon
21	COD	DR Congo
22	COG	Congo

23	COL	Colombia
24	CPV	Cape Verde
25	CYP	Cyprus
26	CZE	Czech Republic
27	DEU	Germany
28	DNK	Denmark
29	EGY	Egypt
30	ESP	Spain
31	EST	Estonia
32	ETH	Ethiopia
33	FIN	Finland
34	FJI	Fiji
35	FRA	France
36	GAB	Gabon
37	GBR	UK
38	GEO	Georgia
39	GHA	Ghana
40	GIN	Guinea
41	GMB	Gambia
42	GRC	Greece
43	GTM	Guatemala
44	HND	Honduras
45	HRV	Croatia
46	HTI	Haiti
47	HUN	Hungary

48	IDN	Indonesia
49	IND	India
50	IRL	Ireland
51	IRQ	Iraq
52	ITA	Italy
53	JAM	Jamaica
54	JOR	Jordan
55	KAZ	Kazakhstan
56	KEN	Kenya
57	KGZ	Kyrgyzstan
58	KHM	Cambodia
59	LAO	Laos
60	LBR	Liberia
61	LKA	Sri Lanka
62	LSO	Lesotho
63	LTU	Lithuania
64	LUX	Luxembourg
65	LVA	Latvia
66	MAR	Morocco
67	MDA	Moldova
68	MDG	Madagascar
69	MDV	Maldives
70	MEX	Mexico
71	MKD	TFYR Macedonia
72	MLI	Mali

73	MLT	Malta
74	MNE	Montenegro
75	MNG	Mongolia
76	MOZ	Mozambique
77	MRT	Mauritania
78	MUS	Mauritius
79	MWI	Malawi
80	NAM	Namibia
81	NER	Niger
82	NGA	Nigeria
83	NIC	Nicaragua
84	NPL	Nepal
85	PAK	Pakistan
86	PAN	Panama
87	PER	Peru
88	PHL	Philippines
89	PNG	Papua New Guinea
90	POL	Poland
91	PRY	Paraguay
92	ROU	Romania
93	RUS	Russia
94	RWA	Rwanda
95	SEN	Senegal
96	SLE	Sierra Leone
97	SLV	El Salvador

98	SRB	Serbia
99	STP	Sao Tome and Principe
100	SVK	Slovakia
101	SWE	Sweden
102	SWZ	Swaziland
103	TCD	Chad
104	TGO	Togo
105	THA	Thailand
106	TJK	Tajikistan
107	TLS	Timor-Leste
108	TUR	Turkey
109	TZA	Tanzania
110	UGA	Uganda
111	UKR	Ukraine
112	USA	USA
113	VNM	Viet Nam
114	YEM	Yemen
115	ZAF	South Africa
116	ZMB	Zambia

Supplementary Table 20: Sectors with goods and services in the World Bank Global Consumption Dataset (WBGCD).

Sector code	Sectors in the WBGCD	Food-related
Sector 1	Air transport	
Sector 2	Beverages and tobacco products	Food sector 1
Sector 3	Bovine meat products	Food sector 2
Sector 4	Business services nec	
Sector 5	Cereal grains nec	Food sector 3
Sector 6	Chemical, rubber, plastic products	
Sector 7	Dairy products	Food sector 4
Sector 8	Electricity	
Sector 9	Financial services nec	Food sector 5
Sector 10	Food products nec	
Sector 11	Gas manufacture, distribution of natural gas	
Sector 12	Insurance	
Sector 13	Leather products	
Sector 14	Machinery and equipment nec	
Sector 15	Manufactures nec	
Sector 16	Meat products nec	Food sector 6
Sector 17	Motor vehicles and parts	
Sector 18	Paddy rice	Food sector 7
Sector 19	Paper products, publishing	
Sector 20	Petroleum, coal products coal, oil and petroleum products	
Sector 21	Public Administration, Defense, Education, Health	
Sector 22	Raw milk	Food sector 8

Sector 23	Recreational and other services	
Sector 24	Retail, wholesale, hotel, restaurant, repair	
Sector 25	Sugar	Food sector 9
Sector 26	Textiles	
Sector 27	Transport equipment nec	
Sector 28	Transport nec	
Sector 29	Vegetable oils and fats	Food sector 10
Sector 30	Vegetables, fruit, nuts	Food sector 11
Sector 31	Water	
Sector 32	Water transport	
Sector 33	Wearing apparel	

Supplementary Table 21: GHG footprint Gini coefficient of 13 types of food categories in 139 countries/areas in this study. The abbreviation and contents of each food category see Supplementary Table 18.

Code	Country	1	2	3	4	5	6	7	8	9	10	11	12	13	All categories
1	Afghanistan	0.0897	0.3273	0.3475	0.3475	0.1907	0.3618	0.3065	0.3065	0.3065	0.3436	0.3475	0.1310	0.1471	0.2508
2	Albania	0.0791	0.3500	0.2897	0.2897	0.1800	0.2997	0.3543	0.3543	0.3543	0.3480	0.2897	0.2187	0.1238	0.2000
3	Angola	0.2524	0.4383	0.4856	0.4856	0.7641	0.6060	0.6226	0.6226	0.6226	0.4420	0.4856	0.4171	0.6196	0.4459
4	Argentina	0.2508	0.3722	0.3146	0.3146	0.3441	0.3139	0.2892	0.2892	0.2892	0.3414	0.3146	0.3097	0.1083	0.3066
5	Armenia	0.1854	0.2153	0.2150	0.2150	0.1599	0.3133	0.3306	0.3306	0.3306	0.2149	0.2150	0.1094	0.0998	0.2229
6	Australia	0.2883	0.4096	0.3058	0.3058	0.2853	0.2997	0.2796	0.2796	0.2796	0.3771	0.3058	0.2907	0.2521	0.2906
7	Austria	0.0872	0.1550	0.1575	0.1575	0.1253	0.2642	0.1362	0.1362	0.1362	0.1551	0.1575	0.2414	0.1130	0.1627
8	Azerbaijan	0.0705	0.2975	0.2279	0.2279	0.2355	0.3090	0.3256	0.3256	0.3256	0.2774	0.2279	0.1377	0.1530	0.2117
9	Bangladesh	0.0722	0.2646	0.2371	0.2371	0.3957	0.4837	0.4150	0.4150	0.4150	0.2640	0.2371	0.5817	0.3517	0.2674
10	Belarus	0.0694	0.1627	0.2960	0.2960	0.1843	0.3140	0.2182	0.2182	0.2182	0.1646	0.2960	0.0823	0.2074	0.1712
11	Belgium	0.0984	0.1638	0.1718	0.1718	0.1539	0.1540	0.1351	0.1351	0.1351	0.1641	0.1718	0.1616	0.1087	0.1291
12	Benin	0.3227	0.3227	0.3227	0.3227	0.3227	0.3227	0.3227	0.3227	0.3227	0.3227	0.3227	0.3227	0.3241	0.3227

13	Bhutan	0.1439	0.2852	0.2273	0.2273	0.2431	0.2333	0.2951	0.2951	0.0000	0.2773	0.2273	0.1445	0.1555	0.2311
14	Bolivia	0.1381	0.2629	0.2644	0.2644	0.4021	0.3361	0.3376	0.3376	0.3376	0.2629	0.2644	0.1223	0.1216	0.2285
15	Bosnia and Herzegovina	0.0916	0.3133	0.3411	0.3411	0.3358	0.3610	0.3198	0.3198	0.3198	0.3164	0.3411	0.2365	0.1562	0.2762
16	Brazil	0.2387	0.3722	0.3146	0.3146	0.3441	0.3132	0.2892	0.2892	0.2892	0.3713	0.3146	0.3097	0.1065	0.2765
17	Bulgaria	0.1297	0.1416	0.2209	0.2209	0.1977	0.2208	0.1936	0.1936	0.1936	0.1820	0.2209	0.1290	0.1388	0.1622
18	Burkina Faso	0.1402	0.3349	0.2264	0.2264	0.4761	0.4348	0.3577	0.3577	0.3577	0.2433	0.2264	0.3119	0.2162	0.3178
19	Burundi	0.2518	0.2655	0.2069	0.2069	0.7702	0.5205	0.4606	0.4606	0.4606	0.2645	0.2069	0.2608	0.6150	0.3630
20	Cape Verde	0.1121	0.3467	0.4487	0.4487	0.4406	0.5055	0.4045	0.4045	0.4045	0.3486	0.4487	0.1843	0.1389	0.2966
21	Cambodia	0.0586	0.2013	0.2300	0.2300	0.2606	0.2965	0.2965	0.2965	0.2965	0.2068	0.2300	0.1528	0.1267	0.1080
22	Cameroon	0.0776	0.3406	0.3143	0.3143	0.5477	0.3161	0.2952	0.2952	0.2952	0.3294	0.3143	0.3347	0.2618	0.2455
23	Canada	0.2894	0.4096	0.3058	0.3058	0.2853	0.2971	0.2796	0.2796	0.2796	0.3803	0.3058	0.2907	0.2455	0.2885
24	Chad	0.4843	0.4843	0.4843	0.4843	0.4843	0.4843	0.4843	0.4843	0.4843	0.4843	0.4843	0.4843	0.4843	0.4843
25	Chile	0.2441	0.3722	0.3146	0.3146	0.3441	0.3111	0.2892	0.2892	0.2892	0.3659	0.3146	0.3097	0.1066	0.2974

26	China, Hong Kong SAR	0.2499	0.3802	0.4141	0.4141	0.3764	0.2472	0.2472	0.2472	0.2472	0.3874	0.4141	0.4141	0.4141	0.2663
27	China, Macao SAR	0.2499	0.3802	0.4141	0.4141	0.3764	0.2472	0.2472	0.2472	0.2472	0.3935	0.4141	0.4141	0.4141	0.2929
28	China, Taiwan Province of	0.2499	0.3802	0.4141	0.4141	0.3764	0.2472	0.2472	0.2472	0.2472	0.3885	0.4141	0.4141	0.4141	0.2998
29	China, mainland	0.2499	0.3802	0.4141	0.4141	0.3764	0.2472	0.2472	0.2472	0.2472	0.4002	0.4141	0.4141	0.4141	0.3022
30	Colombia	0.1384	0.3491	0.3050	0.3050	0.3086	0.3054	0.3597	0.3597	0.3597	0.3469	0.3050	0.2025	0.0000	0.2782
31	Congo	0.3060	0.3472	0.2707	0.2707	0.5223	0.5642	0.4956	0.4956	0.4956	0.2832	0.2707	0.2970	0.3372	0.3432
32	Cote d'Ivoire	0.2150	0.3422	0.2950	0.2950	0.6308	0.5622	0.4750	0.4750	0.0000	0.3079	0.2950	0.2590	0.3780	0.3199
33	Croatia	0.2660	0.2645	0.2549	0.2549	0.2570	0.2664	0.2609	0.2609	0.2609	0.2624	0.2549	0.2726	0.2811	0.2629
34	Cyprus	0.1152	0.1431	0.1219	0.1219	0.1045	0.1122	0.0868	0.0868	0.0868	0.1345	0.1219	0.1687	0.1216	0.0971
35	Czechia	0.1766	0.2337	0.2479	0.2479	0.2017	0.2898	0.1981	0.1981	0.1981	0.2374	0.2479	0.1449	0.1240	0.1948
36	Democratic Republic of the Congo	0.3143	0.3678	0.2544	0.2544	0.6842	0.4129	0.4016	0.4016	0.4016	0.3143	0.2544	0.2818	0.4065	0.3273
37	Denmark	0.1231	0.1657	0.1526	0.1526	0.1307	0.1651	0.1496	0.1496	0.1496	0.1643	0.1526	0.3071	0.1361	0.1481
38	Ecuador	0.2065	0.3722	0.3146	0.3146	0.3441	0.3111	0.2892	0.2892	0.2892	0.3437	0.3146	0.3097	0.1065	0.2794

39	Egypt	0.1424	0.2298	0.2133	0.2133	0.2747	0.2522	0.2522	0.2522	0.2522	0.2282	0.2133	0.2036	0.2326	0.2208
40	El Salvador	0.4844	0.5475	0.3617	0.3617	0.4500	0.5314	0.4156	0.4156	0.4156	0.5390	0.3617	0.3063	0.2338	0.4598
41	Estonia	0.2229	0.2643	0.2638	0.2638	0.2085	0.2299	0.2309	0.2309	0.2309	0.2641	0.2638	0.1585	0.1818	0.2167
42	Eswatini	0.3677	0.4687	0.4048	0.4048	0.5959	0.5701	0.5059	0.5059	0.5059	0.4414	0.4048	0.3805	0.1831	0.5150
43	Ethiopia	0.1717	0.2098	0.2310	0.2310	0.2886	0.6072	0.5549	0.5549	0.5549	0.2122	0.2310	0.3768	0.3813	0.3642
44	Fiji	0.1539	0.2490	0.1538	0.1538	0.4081	0.4162	0.4083	0.4083	0.4083	0.1701	0.1538	0.2654	0.0970	0.3211
45	Finland	0.1007	0.1689	0.1751	0.1751	0.1325	0.2688	0.1502	0.1502	0.1502	0.1686	0.1751	0.2430	0.1383	0.1468
46	France	0.5874	0.2575	0.3186	0.3186	0.2132	0.2693	0.2472	0.2472	0.2472	0.2734	0.3186	0.2427	0.2412	0.2563
47	Gabon	0.2222	0.3053	0.2129	0.2129	0.4136	0.4566	0.2682	0.2682	0.2682	0.2130	0.2129	0.1545	0.2338	0.2647
48	Gambia	0.2002	0.4326	0.6877	0.6877	0.3088	0.4385	0.5376	0.5376	0.5376	0.6869	0.6877	0.5714	0.5752	0.3374
49	Georgia	0.1947	0.3042	0.3245	0.3245	0.4513	0.5342	0.4794	0.4794	0.4794	0.3088	0.3245	0.1391	0.1169	0.3753
50	Germany	0.1025	0.1574	0.1449	0.1449	0.1207	0.1610	0.1395	0.1395	0.1395	0.1520	0.1449	0.2817	0.1496	0.1397
51	Ghana	0.2434	0.3317	0.2649	0.2649	0.5120	0.4153	0.3578	0.3578	0.3578	0.2945	0.2649	0.2963	0.2076	0.3506
52	Greece	0.1568	0.1497	0.1154	0.1154	0.1282	0.1272	0.1083	0.1083	0.1083	0.1496	0.1154	0.0815	0.1076	0.1187
53	Guatemala	0.1633	0.2474	0.2707	0.2707	0.4074	0.3420	0.3474	0.3474	0.3474	0.2488	0.2707	0.2854	0.1037	0.2940

54	Guinea	0.1768	0.3385	0.2207	0.2207	0.6116	0.4461	0.3005	0.3005	0.3005	0.2208	0.2207	0.2265	0.2386	0.2890
55	Haiti	0.2090	0.3199	0.2862	0.2862	0.4877	0.4142	0.4561	0.4561	0.4561	0.3146	0.2862	0.2307	0.3092	0.3747
56	Honduras	0.0797	0.3358	0.2710	0.2710	0.3054	0.5017	0.3650	0.3650	0.3650	0.3352	0.2710	0.5258	0.0600	0.3189
57	Hungary	0.1645	0.2036	0.2497	0.2497	0.2044	0.1937	0.1712	0.1712	0.1712	0.2199	0.2497	0.1685	0.1365	0.1939
58	Iceland	0.1011	0.1689	0.1751	0.1751	0.1325	0.2418	0.1502	0.1502	0.1502	0.1704	0.1751	0.2430	0.1386	0.1534
59	India	0.0879	0.2585	0.2446	0.2446	0.3508	0.3143	0.2439	0.2439	0.2439	0.2563	0.2446	0.1388	0.1811	0.2689
60	Indonesia	0.0290	0.2537	0.2483	0.2483	0.3794	0.6084	0.4180	0.4180	0.4180	0.2503	0.2483	0.1978	0.1106	0.1448
61	Iraq	0.0270	0.2613	0.2123	0.2123	0.1729	0.3146	0.2750	0.2750	0.2750	0.2613	0.2123	0.1059	0.0261	0.1185
62	Ireland	0.1072	0.1396	0.1598	0.1598	0.1003	0.1643	0.1115	0.1115	0.1115	0.1417	0.1598	0.1320	0.1078	0.1139
63	Israel	0.0971	0.1689	0.1751	0.1751	0.1325	0.3373	0.1502	0.1502	0.1502	0.1693	0.1751	0.2431	0.1382	0.1989
64	Italy	0.2290	0.2112	0.2315	0.2315	0.2083	0.2179	0.2101	0.2101	0.2101	0.2113	0.2315	0.2471	0.1946	0.2169
65	Jamaica	0.1423	0.2498	0.2475	0.2475	0.2594	0.3251	0.1967	0.1967	0.1967	0.2493	0.2475	0.1924	0.1346	0.1721
66	Japan	0.2763	0.4096	0.3058	0.3058	0.2853	0.3015	0.2796	0.2796	0.2796	0.3898	0.3058	0.2907	0.2560	0.2890
67	Jordan	0.1253	0.3025	0.2453	0.2453	0.2453	0.4044	0.2060	0.2060	0.2060	0.2857	0.2453	0.3305	0.1644	0.2944
68	Kazakhstan	0.1789	0.2194	0.2492	0.2492	0.3292	0.2981	0.3171	0.3171	0.3171	0.2230	0.2492	0.1324	0.0996	0.2844

69	Kenya	0.2276	0.4788	0.3223	0.3223	0.3881	0.4948	0.5451	0.5451	0.5451	0.4643	0.3223	0.2985	0.2141	0.4036
70	Kyrgyzstan	0.2827	0.1434	0.2276	0.2276	0.2764	0.2771	0.2771	0.2771	0.2771	0.1467	0.2276	0.1023	0.2373	0.2722
71	Lao People's Democratic Republic	0.0624	0.2778	0.2078	0.2078	0.5494	0.3886	0.2290	0.2290	0.2290	0.2896	0.2078	0.3693	0.4549	0.1753
72	Latvia	0.1796	0.2370	0.2468	0.2468	0.2025	0.2537	0.2020	0.2020	0.2020	0.2372	0.2468	0.1516	0.1353	0.1893
73	Lithuania	0.1599	0.1961	0.1992	0.1992	0.1684	0.2455	0.1510	0.1510	0.1510	0.1964	0.1992	0.1485	0.1217	0.1650
74	Luxembourg	0.1269	0.2056	0.2168	0.2168	0.1775	0.1853	0.1381	0.1381	0.0000	0.2153	0.2168	0.1657	0.2243	0.1779
75	Madagascar	0.3889	0.5036	0.4648	0.4648	0.7792	0.4323	0.5458	0.5458	0.5458	0.4783	0.4648	0.4119	0.4063	0.4619
76	Malawi	0.1802	0.4475	0.2919	0.2919	0.6736	0.5823	0.5312	0.5312	0.5312	0.4245	0.2919	0.3179	0.4054	0.3987
77	Malaysia	0.0499	0.1334	0.2279	0.2279	0.1395	0.1098	0.1098	0.1098	0.1098	0.1533	0.2279	0.0934	0.1524	0.0968
78	Maldives	0.1055	0.2280	0.2032	0.2032	0.1647	0.8349	0.2840	0.2840	0.2840	0.2259	0.2032	0.1229	0.1365	0.4184
79	Mali	0.2851	0.3263	0.3679	0.3679	0.4338	0.4887	0.4661	0.4661	0.4661	0.3593	0.3679	0.3281	0.2718	0.4355
80	Malta	0.7187	0.1562	0.1526	0.1526	0.1205	0.1686	0.1273	0.1273	0.1273	0.1555	0.1526	0.1901	0.1112	0.1746
81	Mauritania	0.1510	0.3575	0.2526	0.2526	0.4008	0.4352	0.5544	0.5544	0.5544	0.3573	0.2526	0.2547	0.1968	0.3219
82	Mauritius	0.2121	0.2121	0.2121	0.2121	0.2121	0.2121	0.2121	0.2121	0.2121	0.2121	0.2121	0.2121	0.2122	0.2122

83	Mexico	0.0740	0.2663	0.1779	0.1779	0.2063	0.3059	0.1958	0.1958	0.1958	0.2528	0.1779	0.0877	0.1196	0.1915
84	Mongolia	0.0499	0.2461	0.2645	0.2645	0.1783	0.1780	0.2113	0.2113	0.2113	0.2643	0.2645	0.0780	0.0992	0.1314
85	Montenegro	0.1906	0.2039	0.2013	0.2013	0.0898	0.2109	0.2109	0.2109	0.2109	0.2022	0.2013	0.1728	0.2124	0.1469
86	Morocco	0.2124	0.2688	0.3200	0.3200	0.3794	0.3619	0.3619	0.3619	0.3619	0.2690	0.3200	0.2461	0.1725	0.3001
87	Mozambique	0.2879	0.4332	0.2489	0.2489	0.7350	0.5618	0.5305	0.5305	0.5305	0.3734	0.2489	0.2707	0.4341	0.3876
88	Myanmar	0.0349	0.2165	0.2651	0.2651	0.3849	0.3680	0.2191	0.2191	0.2191	0.2279	0.2651	0.1264	0.1447	0.1439
89	Namibia	0.1679	0.2918	0.2524	0.2524	0.5695	0.4439	0.4439	0.4439	0.4439	0.2583	0.2524	0.4116	0.3717	0.2934
90	Nepal	0.0733	0.2506	0.2868	0.2868	0.3355	0.4021	0.3483	0.3483	0.3483	0.2506	0.2868	0.1996	0.2898	0.2853
91	Netherlands	0.2233	0.1573	0.1891	0.1891	0.1342	0.1641	0.1424	0.1424	0.1424	0.1775	0.1891	0.1885	0.1238	0.1382
92	New Zealand	0.2887	0.4096	0.3058	0.3058	0.2853	0.2961	0.2796	0.2796	0.2796	0.3767	0.3058	0.2907	0.2455	0.2889
93	Nicaragua	0.1309	0.3277	0.2519	0.2519	0.2825	0.5155	0.4258	0.4258	0.4258	0.3276	0.0000	0.1411	0.1121	0.2071
94	Niger	0.2868	0.2951	0.5329	0.5329	0.2703	0.7647	0.5760	0.5760	0.5760	0.4994	0.5329	0.4817	0.3412	0.4198
95	Nigeria	0.3884	0.4216	0.4050	0.4050	0.4444	0.4190	0.4574	0.4574	0.4574	0.4050	0.4050	0.3783	0.3172	0.4018
96	North Macedonia	0.1997	0.2341	0.3590	0.3590	0.2627	0.3156	0.3193	0.3193	0.3193	0.2711	0.3590	0.2238	0.2332	0.2683
97	Norway	0.1008	0.1689	0.1751	0.1751	0.1325	0.2796	0.1502	0.1502	0.1502	0.1687	0.1751	0.2428	0.1386	0.1781

98	Pakistan	0.0885	0.2271	0.2057	0.2057	0.2796	0.3820	0.3147	0.3147	0.3147	0.2224	0.2057	0.1509	0.0929	0.2915
99	Panama	0.0788	0.2396	0.2032	0.2032	0.2843	0.3178	0.2425	0.2425	0.2425	0.2384	0.2032	0.2218	0.0922	0.2098
100	Papua New Guinea	0.3838	0.4083	0.2338	0.2338	0.7109	0.6437	0.7066	0.7066	0.7066	0.2370	0.2338	0.3334	0.4816	0.3301
101	Paraguay	0.1801	0.3135	0.4109	0.4109	0.4278	0.2761	0.4340	0.4340	0.4340	0.3190	0.4109	0.1089	0.1365	0.1987
102	Peru	0.1108	0.2427	0.1872	0.1872	0.2694	0.3972	0.3884	0.3884	0.3884	0.2385	0.1872	0.0916	0.1742	0.2201
103	Philippines	0.0433	0.2360	0.2219	0.2219	0.3594	0.4668	0.3925	0.3925	0.3925	0.2328	0.2219	0.2306	0.0739	0.2126
104	Poland	0.3350	0.3313	0.3283	0.3283	0.3295	0.3297	0.3326	0.3326	0.3326	0.3312	0.3283	0.3309	0.3310	0.3315
105	Portugal	0.0966	0.1795	0.1904	0.1904	0.1348	0.2052	0.1507	0.1507	0.1507	0.1797	0.1904	0.1526	0.0764	0.1487
106	Qatar	0.1424	0.2298	0.2133	0.2133	0.2747	0.2522	0.2522	0.2522	0.0000	0.2298	0.2133	0.2043	0.2317	0.2409
107	Republic of Korea	0.2761	0.4096	0.3058	0.3058	0.2853	0.2998	0.2796	0.2796	0.2796	0.3754	0.3058	0.2907	0.2550	0.2891
108	Republic of Moldova	0.2159	0.2522	0.3103	0.3103	0.3258	0.4056	0.3596	0.3596	0.3596	0.2585	0.3103	0.2082	0.1218	0.2976
109	Romania	0.0611	0.1258	0.2280	0.2280	0.1762	0.2350	0.1963	0.1963	0.1963	0.1272	0.2280	0.1534	0.1085	0.1589
110	Russia	0.1625	0.2137	0.2080	0.2080	0.2068	0.2661	0.2661	0.2661	0.2661	0.2088	0.2080	0.1314	0.1899	0.2111
111	Rwanda	0.4550	0.4308	0.2848	0.2848	0.6951	0.6842	0.5578	0.5578	0.5578	0.4328	0.0000	0.4257	0.6144	0.5574

112	Sao Tome and Principe	0.2765	0.3249	0.3349	0.3349	0.5257	0.6378	0.5254	0.5254	0.5254	0.3252	0.3349	0.2988	0.3319	0.3603
113	Saudi Arabia	0.1424	0.2298	0.2133	0.2133	0.2747	0.2522	0.2522	0.2522	0.2522	0.2279	0.2133	0.2036	0.2335	0.2166
114	Senegal	0.1121	0.3630	0.3522	0.3522	0.4919	0.5809	0.6139	0.6139	0.6139	0.3522	0.3522	0.3178	0.1833	0.3708
115	Serbia	0.1670	0.1911	0.2204	0.2204	0.1867	0.2963	0.2109	0.2109	0.0000	0.1943	0.2204	0.1527	0.1349	0.2103
116	Sierra Leone	0.1814	0.3769	0.2772	0.2772	0.7159	0.5415	0.3959	0.3959	0.3959	0.2810	0.2772	0.2526	0.4162	0.2838
117	Singapore	0.2233	0.1573	0.1891	0.1891	0.1342	0.1713	0.1424	0.1424	0.0000	0.1676	0.1891	0.1885	0.1227	0.1442
118	Slovakia	0.1707	0.1733	0.2258	0.2258	0.1567	0.2262	0.1566	0.1566	0.1566	0.1898	0.2258	0.1801	0.1681	0.2117
119	Slovenia	0.1711	0.1733	0.2258	0.2258	0.1567	0.2633	0.1566	0.1566	0.1566	0.1920	0.2258	0.1801	0.1631	0.1975
120	South Africa	0.1332	0.3373	0.3290	0.3290	0.4169	0.4972	0.3214	0.3214	0.3214	0.3345	0.3290	0.1532	0.1357	0.3721
121	Spain	0.1270	0.1795	0.1904	0.1904	0.1348	0.1858	0.1507	0.1507	0.1507	0.1814	0.1904	0.1525	0.0764	0.1475
122	Sri Lanka	0.0437	0.2116	0.1685	0.1685	0.2655	0.1875	0.3529	0.3529	0.3529	0.2056	0.1685	0.0878	0.0857	0.1303
123	Sweden	0.3617	0.1609	0.1598	0.1598	0.1371	0.1772	0.1593	0.1593	0.1593	0.1604	0.1598	0.1769	0.1688	0.1721
124	Switzerland	0.2233	0.1573	0.1891	0.1891	0.1342	0.1702	0.1424	0.1424	0.1424	0.1621	0.1891	0.1876	0.1386	0.1437
125	Tajikistan	0.2450	0.3049	0.2497	0.2497	0.3186	0.3818	0.4779	0.4779	0.4779	0.2889	0.2497	0.1776	0.0000	0.3586

126	Thailand	0.0499	0.1334	0.2279	0.2279	0.1395	0.1098	0.1098	0.1098	0.1098	0.1475	0.2279	0.0941	0.1514	0.0766
127	Togo	0.1413	0.3953	0.3245	0.3245	0.5956	0.4093	0.2898	0.2898	0.2898	0.3873	0.3245	0.2893	0.3406	0.2998
128	Turkey	0.0706	0.2335	0.2028	0.2028	0.1986	0.3624	0.2363	0.2363	0.2363	0.2243	0.2028	0.1453	0.0439	0.1789
129	Uganda	0.1567	0.2484	0.2470	0.2470	0.4610	0.4624	0.4511	0.4511	0.4511	0.2474	0.2470	0.2736	0.3620	0.3477
130	Ukraine	0.1487	0.2077	0.2172	0.2172	0.1921	0.2432	0.2464	0.2464	0.2464	0.2127	0.2172	0.1598	0.1167	0.1974
131	United Arab Emirates	0.1424	0.2298	0.2133	0.2133	0.2747	0.2522	0.2522	0.2522	0.2522	0.2292	0.2133	0.2040	0.2335	0.2357
132	United Kingdom of Great Britain and Northern Ireland	0.2233	0.1573	0.1891	0.1891	0.1342	0.1699	0.1424	0.1424	0.1424	0.1648	0.1891	0.1886	0.1227	0.1468
133	United Republic of Tanzania	0.1681	0.2448	0.2006	0.2006	0.2748	0.4619	0.3531	0.3531	0.3531	0.2194	0.2006	0.3219	0.4001	0.2884
134	United States of America	0.2878	0.4096	0.3058	0.3058	0.2853	0.3017	0.2796	0.2796	0.2796	0.3508	0.3058	0.2908	0.2456	0.2918
135	Uruguay	0.2295	0.3722	0.3146	0.3146	0.3441	0.3143	0.2892	0.2892	0.2892	0.3451	0.3146	0.3097	0.1065	0.3095
136	Uzbekistan	0.2474	0.3049	0.2497	0.2497	0.3186	0.3719	0.4779	0.4779	0.4779	0.2815	0.2497	0.1776	0.0000	0.3344
137	Viet Nam	0.0385	0.2165	0.2651	0.2651	0.3849	0.3596	0.2191	0.2191	0.2191	0.2468	0.2651	0.1087	0.1419	0.1791

138	Yemen	0.0980	0.2575	0.2958	0.2958	0.3426	0.3987	0.2914	0.2914	0.2914	0.2615	0.2958	0.2117	0.1342	0.2691
139	Zambia	0.2793	0.4486	0.2929	0.2929	0.6801	0.6036	0.5551	0.5551	0.5551	0.3347	0.2929	0.4145	0.4470	0.3956

Supplementary Table 22: GHG footprint Gini coefficient of 13 types of food categories in 18 regions in this study. The abbreviation and contents of each food category see Supplementary Table 18.

Region	1	2	3	4	5	6	7	8	9	10	11	12	13	All categories
Australia	0.288	0.410	0.306	0.306	0.285	0.300	0.280	0.280	0.280	0.377	0.306	0.291	0.252	0.291
Brazil	0.239	0.372	0.315	0.315	0.344	0.313	0.289	0.289	0.289	0.371	0.315	0.310	0.106	0.276
Canada	0.289	0.410	0.306	0.306	0.285	0.297	0.280	0.280	0.280	0.380	0.306	0.291	0.246	0.288
China	0.250	0.380	0.414	0.414	0.376	0.247	0.247	0.247	0.247	0.400	0.414	0.414	0.414	0.301
Eastern Europe	0.343	0.206	0.324	0.418	0.252	0.316	0.322	0.204	0.428	0.166	0.302	0.232	0.393	0.321
Indonesia	0.029	0.254	0.248	0.248	0.379	0.608	0.418	0.418	0.418	0.250	0.248	0.198	0.111	0.145
India	0.088	0.258	0.245	0.245	0.351	0.314	0.244	0.244	0.244	0.256	0.245	0.139	0.181	0.269
Japan	0.276	0.410	0.306	0.306	0.285	0.302	0.280	0.280	0.280	0.390	0.306	0.291	0.256	0.289
Near East and North Africa	0.136	0.201	0.204	0.188	0.282	0.252	0.281	0.280	0.262	0.266	0.422	0.244	0.201	0.235
Rest of East Asia	0.238	0.321	0.313	0.327	0.245	0.211	0.310	0.283	0.320	0.406	0.327	0.316	0.285	0.213
Rest of Latin America and the Caribbean	0.134	0.280	0.254	0.260	0.330	0.361	0.300	0.296	0.335	0.219	0.265	0.240	0.083	0.279
Rest of Oceania	0.472	0.421	0.236	0.415	0.741	0.633	0.652	0.688	0.674	0.306	0.272	0.333	0.330	0.363

Rest of South Asia	0.027	0.208	0.206	0.283	0.287	0.389	0.350	0.320	0.692	0.239	0.407	0.293	0.189	0.264
Rest of Southeast Asia	0.062	0.130	0.286	0.285	0.407	0.315	0.349	0.375	0.320	0.230	0.257	0.381	0.421	0.205
Russia	0.162	0.214	0.208	0.208	0.207	0.266	0.266	0.266	0.266	0.209	0.208	0.131	0.190	0.211
Sub-Saharan Africa	0.109	0.153	0.278	0.109	0.485	0.525	0.477	0.433	0.644	0.139	0.123	0.275	0.394	0.273
United States	0.288	0.410	0.306	0.306	0.285	0.302	0.280	0.280	0.280	0.351	0.306	0.291	0.246	0.292
Western Europe	0.169	0.095	0.182	0.213	0.150	0.189	0.119	0.143	0.300	0.099	0.125	0.171	0.131	0.157
Global	0.047	0.112	0.280	0.349	0.339	0.397	0.505	0.379	0.643	0.123	0.128	0.283	0.365	0.267

Supplementary Table 23: The uncertainty ranges of activity data, parameters, and emission factors during food-related emission processes⁸.

	Emission process	Gas	Product	Activity data (AD)/parameters	Uncertainty range (AD)	Uncertainty source (AD)	Emission factors (EF, default)	Uncertainty range (EF)	Unit (EF)	Source (EF)
1	CH ₄ _forest_fires	LULUC						±50%		3-5
2	N ₂ O_forest_fires	LULUC						±50%		3-5
3	CH ₄ _fires_humid_tropical _forests	LULUC						±50%		3-5
4	N ₂ O_fires_humid_tropical _forests	LULUC						±50%		3-5
5	CO ₂ - net_forest_conversion	LULUC						±50%		3-5
6	CH ₄ - fires_in_organic_soils	LULUC						±50%		3-5
7	CO ₂ - fires_in_organic_soils	LULUC						±50%		3-5
8	CO ₂ - drained_organic_soils	LULUC						±50%		3-5
9	N ₂ O- drained_organic_soils	LULUC						±50%		3-5
10	CH ₄ _savanna_fires	LULUC						±50%		3-5
11	N ₂ O_savanna_fires	LULUC						±50%		3-5
12	N ₂ O-crop_residues	Agricultural product ion	Crops Leaching	Residues N content (t N yr-1) Fraction of	±40% 0.1-0.8	IPCC 2006 (Sect. 5.2.1) ⁹ Subject judgment IPCC 2006	0.01 0.0075	0.003 - 0.03 0.0005-	kg N ₂ O– N/kg N kg N ₂ O–	IPCC 2006 (Tab.11.1) ⁹ IPCC 2006

13	CH ₄ - burning_crop_residues	Agricultural product ion		leaching (0.3) Biomass burned (t dry matter)	±40%	(Tab.11.3) ⁹ IPCC 2006 (Sect.5.2.1) ⁹ Subject judgment	2.7	0.025 The factor of 2 (–50% to +100%)	N/kg N g CH ₄ /kg dry matter	(Tab.11.3) ⁹ IPCC 2006 (Tab. 2.5) ⁹ Subject judgment
14	N ₂ O- burning_crop_residues	Agricultural product ion					0.07	The factor of 2 (–50% to +100%)	g N ₂ O/kg dry matter	IPCC 2006 (Tab. 2.5) ⁹ Subject judgment
15	N ₂ O_synthetic_fertilizer	Agricultural product ion	Soil	N Consumption (t N yr-1)	±20%	Subject judgment	0.01	0.003 - 0.03	kg N ₂ O– N/kg N	IPCC 2006 (Tab.11.1) ⁹
			Volatilization	Fraction of volatilization (0.1)	0.03-0.3	IPCC 2006 (Tab.11.3) ⁹	0.01	0.002 - 0.05	kg N ₂ O– N/kg N	IPCC 2006 (Tab.11.3) ⁹
			Leaching	Fraction of leaching (0.3)	0.1-0.8	IPCC 2006 (Tab.11.3) ⁹	0.0075	0.0005- 0.025	kg N ₂ O– N/kg N	IPCC 2006 (Tab.11.3) ⁹
16	N ₂ O_manure_applied_to _soils	Agricultural product ion	Soil	Manure N (t N yr-1)	±30%	IPCC 2006 (Sect.10.2.3) ⁹ Subject judgment	0.01	0.003 - 0.03	kg N ₂ O– N/kg N	IPCC 2006 (Tab.11.1) ⁹
			Volatilization	Fraction of volatilization (0.2)	0.05-0.5	IPCC 2006 (Tab.11.3) ⁹	0.01	0.002 - 0.05	kg N ₂ O– N/kg N	IPCC 2006 (Tab.11.3) ⁹
			Leaching	Fraction of leaching (0.3)	0.1-0.8	IPCC 2006 (Tab.11.3) ⁹	0.0075	0.0005- 0.025	kg N ₂ O– N/kg N	IPCC 2006 (Tab.11.3) ⁹
17	CH ₄ _rice_cultivation	Agricultural	Rice,	Area	±10%	IPCC 2006 (Sect.	10–27.5	The factor	g CH ₄	IPCC 1996

		ural product ion	paddy	harvested (ha)	5.2.1) ⁹			of 2 (–50% to +100%)	m ² yr ⁻¹	(Tab.4.13) ⁵¹ Subject judgment
18	CO ₂ _energy_on_farm	Agricult ural product ion						0.5%-20%		52
19	CH ₄ _energy_on_farm	Agricult ural product ion						0.5%-20%		52
20	N ₂ O_energy_on_farm	Agricult ural product ion						0.5%-20%		52
21	N ₂ O_manure_left_on_pas- ture	Agricult ural product ion	Dairy, non- dairy, buffalo, poultry and pigs Sheep and other animals	Manure N (t N yr-1)	±30%	IPCC 2006 (Sect.10.2.3) ⁹ Subject judgment	0.02	0.007 - 0.06	kg N ₂ O– N/kg N	IPCC 2006 (Tab.11.1) ⁹
							0.01	0.003 - 0.03	kg N ₂ O– N/kg N	IPCC 2006 (Tab.11.1) ⁹
			Volatilization	Fraction of volatilization (0.2)	0.05-0.5	IPCC 2006 (Tab.11.3) ⁹	0.01	0.002 - 0.05	kg N ₂ O– N/kg N	IPCC 2006 (Tab.11.3) ⁹
			Leaching	Fraction of	0.1-0.8	IPCC 2006	0.0075	0.0005-	kg N ₂ O–	IPCC 2006

				leaching (0.3)		(Tab.11.3) ⁹	0.025	N/kg N	(Tab.11.3) ⁹	
22	CH ₄ _enteric_fermentation	Agricultural product ion	Dairy cattle	Stocks (heads)		IPCC 2006 (Sect. 10.2.3) ⁹	42–128	±30%	kg CH ₄ /head/yr	IPCC 2006 (Tab.10.11) ⁹
			Non-dairy cattle				27–60	±30%		IPCC 2006 (Tab.10.11) ⁹
			Buffalo				55	±30%		IPCC 2006 (Tab.10.10) ⁹
			Sheep/goats				5–8	±30%		IPCC 2006 (Tab.10.10) ⁹
			Pigs				1–1.5	±30%		IPCC 2006 (Tab.10.10) ⁹
23	CH ₄ _manure_management	Agricultural product ion	Dairy cattle	Stocks (heads)	±20%	IPCC 2006 (Sect.10.2.3) ⁹	1–93	±30%	kg CH ₄ /head/yr	IPCC 2006 (Tab.10.14) ⁹
			Non-dairy cattle				0–13	±30%		IPCC 2006 (Tab.10.14) ⁹
			Buffalo				1–9	±30%		IPCC 2006 (Tab.10.14) ⁹
			Sheep				0.10–0.37	±30%		IPCC 2006 (Tab.10.15) ⁹
			Goats				0.11–0.26	±30%		IPCC 2006 (Tab.10.15) ⁹
			Market swine				0–45	±30%		IPCC 2006 (Tab.10.14) ⁹
			Breeding				0–37	±30%		IPCC 2006

			swine							(Tab.10.14) ⁹
			Poultry				0.01–0.09	±30%		IPCC 2006
										(Tab.10.15) ⁹
24	N ₂ O_manure_management	Agricultural product ion	Manure	Manure N (t N yr ⁻¹)	±30%	IPCC 2006 (Sect.10.2.3) ⁹ Subject judgment	0–0.02	The factor of 2 (–50% to +100%)	kg N ₂ O–N/kg N	IPCC 2006 (Tab.10.21) ⁹
			Volatilization	Fraction of volatilization	±30%	IPCC 2006 (Tab.10.22) ⁹ Subject judgment	0.01	0.002 - 0.05	kg N ₂ O–N/kg N	IPCC 2006 (Tab.11.3) ⁹
25	CO ₂ _direct_energy_consumption_livestock	Agricultural product ion						0.5%-20%		52
26	CO ₂ _indirect_energy_consumption	Agricultural product ion						0.5%-20%		52
27	CO ₂ _fertilizer_manufacturing	Fertilizer manufacturing						±30%		52
28	N ₂ O_fertilizer_manufacturing	Fertilizer manufacturing						±30%		52
29	CO ₂ _processing	Proces						±30%		5

		sing		
30	CH ₄ _processing	Proces	±30%	5
		sing		
31	N ₂ O_processing	Proces	±30%	5
		sing		
32	CO ₂ _packaging	Packag	±30%	5
		ing		
33	CH ₄ _packaging	Packag	±30%	5
		ing		
34	N ₂ O_packaging	Packag	±30%	5
		ing		
35	CO ₂ _retail	Retail	±30%	5
36	CH ₄ _retail	Retail	±30%	5
37	N ₂ O_retail	Retail	±30%	5
38	CO ₂ _transport	Transp	±30%	5
		ort		
39	CH ₄ _transport	Transp	±30%	5
		ort		
40	N ₂ O_transport	Transp	±30%	5
		ort		
41	CH ₄ _industrial_wastewat	Industrial wastewater	±30%	5
	er_disposal	disposal		
42	N ₂ O_industrial_wastewat	Industrial wastewater	±30%	5
	er_disposal	disposal		

Supplementary Table 24: Shares of emissions from LULUC, agricultural activities, and beyond-farm activities in per capita dietary emissions in 139 countries/areas in 2019. See Supplementary Dataset 20 for per capita dietary emissions from LULUC, agricultural production, and beyond-farm activities.

Country	Land use and land use change (LULUC)	Agricultural activities	Beyond-farm activities
Afghanistan	4.2%	91.7%	4.1%
Albania	9.6%	77.8%	12.7%
Angola	87.2%	12.2%	0.6%
Argentina	19.3%	77.3%	3.5%
Armenia	6.7%	85.4%	7.9%
Australia	51.4%	37.9%	10.7%
Austria	12.1%	49.3%	38.6%
Azerbaijan	9.4%	79.8%	10.8%
Bangladesh	35.8%	61.1%	3.1%
Belarus	47.2%	30.7%	22.1%
Belgium	30.0%	53.9%	16.1%
Benin	57.6%	39.8%	2.7%
Bhutan	3.0%	93.8%	3.2%
Bolivia	78.1%	20.2%	1.6%
Bosnia and Herzegovina	16.8%	57.3%	25.9%
Brazil	43.8%	52.9%	3.3%
Bulgaria	31.4%	48.7%	19.9%
Burkina Faso	37.1%	61.4%	1.5%
Burundi	63.4%	35.7%	0.9%
Cape Verde	30.5%	62.1%	7.5%
Cambodia	66.2%	32.5%	1.3%
Cameroon	71.2%	26.1%	2.7%

Canada	36.4%	47.2%	16.4%
Chad	45.4%	54.5%	0.1%
Chile	19.5%	68.5%	12.1%
China, Hong Kong SAR	22.7%	72.4%	4.8%
China, Macao SAR	26.2%	63.4%	10.4%
China, Taiwan Province of	40.1%	38.3%	21.6%
China, mainland	22.1%	65.2%	12.7%
Colombia	40.9%	54.5%	4.6%
Congo	91.9%	7.0%	1.0%
Cote d'Ivoire	65.3%	29.6%	5.1%
Croatia	11.5%	48.6%	40.0%
Cyprus	14.5%	64.3%	21.1%
Czechia	14.3%	55.0%	30.8%
Democratic Republic of the Congo	98.4%	1.5%	0.1%
Denmark	27.7%	53.6%	18.7%
Ecuador	53.1%	42.3%	4.7%
Egypt	17.4%	61.7%	20.9%
El Salvador	28.2%	63.4%	8.4%
Estonia	36.5%	29.0%	34.5%
Eswatini	18.5%	76.0%	5.5%
Ethiopia	39.5%	59.2%	1.4%
Fiji	25.9%	60.6%	13.5%
Finland	46.2%	38.1%	15.7%
France	13.2%	59.6%	27.2%
Gabon	83.9%	14.1%	2.0%
Gambia	34.0%	62.3%	3.7%
Georgia	9.5%	60.9%	29.6%

Germany	29.9%	48.4%	21.7%
Ghana	40.4%	51.3%	8.3%
Greece	17.4%	34.0%	48.6%
Guatemala	26.3%	65.3%	8.4%
Guinea	47.0%	51.6%	1.4%
Haiti	15.6%	75.0%	9.4%
Honduras	38.9%	54.8%	6.4%
Hungary	21.2%	35.9%	42.9%
Iceland	13.5%	78.7%	7.8%
India	8.5%	81.2%	10.4%
Indonesia	84.4%	13.1%	2.6%
Iraq	2.3%	52.2%	45.5%
Ireland	21.9%	62.2%	16.0%
Israel	18.2%	64.2%	17.6%
Italy	22.3%	48.9%	28.8%
Jamaica	33.7%	60.2%	6.1%
Japan	31.8%	47.9%	20.3%
Jordan	22.6%	58.2%	19.2%
Kazakhstan	7.0%	78.4%	14.6%
Kenya	15.1%	81.8%	3.1%
Kyrgyzstan	2.2%	91.8%	6.0%
Lao People's Democratic Republic	68.3%	29.5%	2.2%
Latvia	46.4%	37.3%	16.3%
Lithuania	35.5%	32.5%	32.0%
Luxembourg	5.1%	14.3%	80.6%
Madagascar	38.6%	60.3%	1.1%
Malawi	50.6%	48.3%	1.0%

Malaysia	70.2%	22.0%	7.8%
Maldives	24.0%	63.1%	12.9%
Mali	18.1%	80.8%	1.1%
Malta	26.2%	54.0%	19.8%
Mauritania	22.3%	73.2%	4.5%
Mauritius	23.6%	63.4%	13.0%
Mexico	16.7%	70.7%	12.6%
Mongolia	26.0%	61.6%	12.3%
Montenegro	25.9%	57.3%	16.8%
Morocco	17.8%	66.8%	15.5%
Mozambique	91.0%	8.7%	0.3%
Myanmar	56.8%	42.7%	0.6%
Namibia	72.1%	25.6%	2.2%
Nepal	17.8%	80.6%	1.6%
Netherlands	40.6%	45.0%	14.4%
New Zealand	13.2%	72.3%	14.5%
Nicaragua	79.6%	17.9%	2.5%
Niger	11.0%	87.3%	1.8%
Nigeria	40.9%	50.7%	8.4%
North Macedonia	17.8%	64.5%	17.7%
Norway	30.3%	30.1%	39.5%
Pakistan	9.5%	87.4%	3.1%
Panama	47.5%	43.2%	9.2%
Papua New Guinea	92.2%	6.6%	1.2%
Paraguay	65.0%	33.3%	1.7%
Peru	73.3%	23.7%	3.0%
Philippines	25.3%	67.8%	6.9%

Poland	16.9%	52.0%	31.1%
Portugal	31.8%	47.6%	20.6%
Qatar	8.8%	23.3%	67.9%
Republic of Korea	26.0%	37.2%	36.8%
Republic of Moldova	8.3%	70.7%	21.0%
Romania	19.2%	55.1%	25.7%
Russia	21.5%	39.0%	39.5%
Rwanda	48.5%	49.9%	1.5%
Sao Tome and Principe	46.1%	46.2%	7.7%
Saudi Arabia	15.4%	54.9%	29.7%
Senegal	37.5%	59.2%	3.3%
Serbia	39.7%	46.3%	13.9%
Sierra Leone	53.1%	44.9%	2.0%
Singapore	44.7%	39.1%	16.2%
Slovakia	1.5%	6.3%	92.3%
Slovenia	18.9%	23.8%	57.2%
South Africa	21.1%	75.1%	3.8%
Spain	34.7%	49.5%	15.9%
Sri Lanka	29.2%	60.9%	9.9%
Sweden	65.5%	27.4%	7.1%
Switzerland	24.1%	48.8%	27.1%
Tajikistan	0.0%	98.5%	1.5%
Thailand	22.1%	63.8%	14.1%
Togo	50.0%	42.7%	7.3%
Turkey	9.6%	73.5%	17.0%
Uganda	44.7%	54.0%	1.3%
Ukraine	19.2%	58.1%	22.6%

United Arab Emirates	24.9%	43.4%	31.7%
United Kingdom of Great Britain and Northern Ireland	25.3%	55.5%	19.2%
United Republic of Tanzania	56.5%	42.4%	1.1%
United States of America	21.6%	58.9%	19.5%
Uruguay	5.2%	92.2%	2.6%
Uzbekistan	0.0%	91.5%	8.5%
Viet Nam	6.8%	77.1%	16.1%
Yemen	17.4%	71.4%	11.2%
Zambia	83.6%	16.2%	0.1%

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