



# IDENTIFYING COOL FOOD MEALS: 2022 UPDATE

RICHARD WAITE AND STACY BLONDIN

## ABSTRACT

Cool Food is a global initiative that aims to help food providers sell dishes with smaller climate footprints. This technical note outlines the methods used by World Resources Institute (WRI) to identify a set of Cool Food Meals on a food provider's menu. Drawing on the calculation methods established under the Cool Food Pledge, Cool Food Meals must fall under a maximum threshold of per-meal greenhouse gas (GHG) emissions based on recipe data submitted to WRI. In addition, Cool Food Meals are subject to a nutrition safeguard to ensure they meet a minimum threshold of nutritional quality. Publicly recognizing climate-friendly food providers, and steering consumers toward low-emitting menu options, can help accelerate the transition toward a sustainable food future.

## INTRODUCTION: SHIFTING DIETS, COOL FOOD, AND A SUSTAINABLE FOOD FUTURE

As the global population grows toward 10 billion by 2050, changing the way the world produces and consumes food will be essential for achieving global food security, halting deforestation, mitigating climate change, and meeting other environmental targets (Searchinger et al. 2019). One important solution to help feed a growing population while reducing agriculture's pressure on natural resources and the climate will be to shift diets that are high in meat—especially beef and lamb—toward more plant-based foods (Hallström et al. 2015; Ranganathan et al. 2016; Clark and Tilman 2017; Willett et al. 2019).

## CONTENTS

Abstract.....	1
Introduction: Shifting Diets, Cool Food, and a Sustainable Food Future .....	1
Identifying Cool Food Meals.....	2
Conclusions .....	9
References .....	10
Endnotes .....	11
Acknowledgments.....	12
About the Authors .....	12

*Technical notes document the research or analytical methodology underpinning a publication, interactive application, or tool.*

**Suggested Citation:** Waite, R., and S. Blondin. 2022. "Identifying Cool Food Meals: 2022 Update." Technical Note. Washington, DC: World Resources Institute. Available online at: <https://doi.org/10.46830/writn.20.00092.v2>.

The Cool Food Pledge ([www.coolfoodpledge.org](http://www.coolfoodpledge.org)) aims to help dining facilities—from hotels and hospitals to restaurants and company cafeterias—offer consumers delicious food while reducing food-related greenhouse gas (GHG) emissions by 25 percent by 2030 (and by 38 percent per calorie), relative to a 2015 base year—a level of ambition in line with the goals of the Paris climate agreement (Waite et al. 2019). Launched in 2019, the Cool Food Pledge is led by a partnership of environment and health organizations (World Resources Institute [WRI], United Nations Environment Programme [UNEP], EAT, Carbon Neutral Cities Alliance, Health Care Without Harm, Practice Greenhealth, the Sustainable Restaurant Association, and Climate Focus), with WRI serving as secretariat. The Cool Food Pledge celebrates food providers committed to serving more climate-friendly food, empowers Pledge members with insights from the latest behavioral science, and tracks members' progress against the GHG target annually. As of this publication, more than 50 members serving more than 3.4 billion meals per year have committed to the Cool Food Pledge.

Cool Food Meals is an initiative launched by WRI in 2020 that complements the Cool Food Pledge by identifying meals on food providers' menus that are particularly climate-friendly (i.e., in line with 2030 GHG reduction targets). This 2022 update to the 2020 technical note incorporates consumption pattern updates from FAO's Food Balance Sheets (FAO 2022), adds Cool Food Meals thresholds for two additional regions (Latin America and Oceania), and removes mention of Cool Food "Heroes," a designation that has been discontinued.

## IDENTIFYING COOL FOOD MEALS

If all food providers everywhere signed up to the Cool Food Pledge and achieved the collective targets, their absolute food-related emissions would fall by 25 percent by 2030, relative to a 2015 baseline. However, because food demand is projected to grow by 21 percent during that period (Searchinger et al. 2019), food-related emissions *intensity* (measured per calorie) would need to fall even more—by 38 percent by 2030—to achieve the absolute 25 percent emissions reduction (Waite et al. 2019).<sup>1</sup>

Consistent with the Cool Food Pledge target-setting and GHG measurement methods (Waite et al. 2019), a "Cool Food Meal" is defined herein as a meal that would help a consumer eat a diet with a food-related GHG emissions intensity falling at least 38 percent below the regional average diet. Designating and promoting such meals on a

food provider's menu should, therefore, enable consumers to make climate-friendly choices consistent with a science-based 2030 GHG reduction target.

## Meal Definition

To define what constitutes a "meal," we use the definition of "main dish" from the U.S. Food and Drug Administration (FDA 2019), which states products must satisfy the following criteria:

- They should weigh at least 6 ounces (oz) (170 grams [g]) per labeled serving, and contain not less than 40 g of food(s) from at least two of the following food groups: bread/cereal/rice/pasta, fruits/vegetables, dairy, and meat/fish/eggs/beans/nuts.
- They should not be sauces or other types of condiment or garnish.
- They should be commonly understood by consumers to be a main dish, and not a snack/beverage/dessert.

## GHG Emissions Thresholds

To identify the GHG emissions thresholds below which a meal can qualify as a Cool Food Meal, we first use data from FAO's Food Balance Sheets (FAO 2022) and the Cool Food calculator (Waite et al. 2019) to estimate the GHG emissions associated with the regional average diet in 2015, including food-related GHG emissions from agricultural supply chains along with food-related carbon opportunity costs (Box 1). The calculator includes regional default emission and conversion factors from several recent sources (Poore and Nemecek 2018; Searchinger et al. 2018; FAO 2022).

We then divide the region's total annual food-related GHG emissions in 2015 by total population and by 365 to calculate the regional average food-related GHG emissions per person per day. Reducing this amount by 38 percent gives the total "allowable" food-related GHG emissions per person per day, in line with a regional GHG reduction target for 2030 (Table 1).

To determine a per-meal "allowable" amount of food-related GHG emissions, we multiply the daily allowable amount by 30 percent (for lunches and dinners) and 20 percent (for breakfasts), under the assumption that the three daily meals comprise 80 percent of daily calories (20 percent for breakfast, 30 percent for lunch, 30 percent for dinner). The remaining 20 percent of calories are allocated to snacks, beverages, and desserts. This eating pattern roughly mirrors recent observations in the United

## Box 1 | Painting a More Complete Picture of Agriculture's Climate Impacts

The Cool Food calculator (Waite et al. 2019) estimates two measures of the climate impacts of food production and consumption:

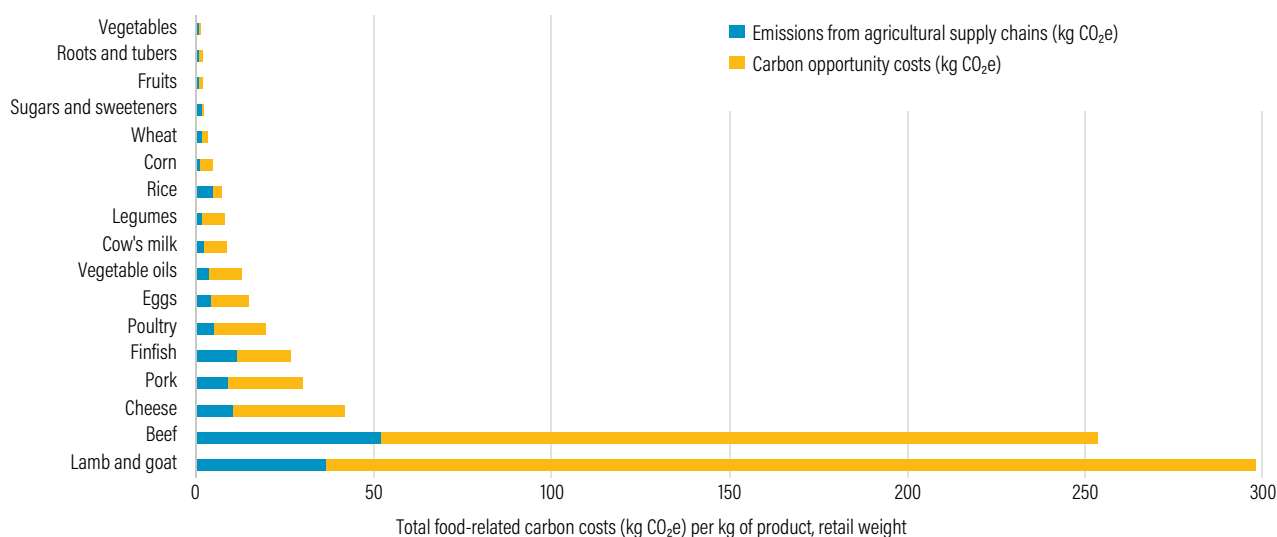
**Agricultural supply chain emissions.** The majority of these GHG emissions are related directly to the purchased foods and occur on farms to produce both food and animal feed (Poore and Nemecek 2018). They include livestock-related emissions (enteric fermentation, manure management, livestock wastes on pastures) as well as emissions from soil fertilization, energy use, and rice paddies. The minority of these emissions occur at supply chain stages between the farm gate and the point of purchase, including transport, packaging, and processing (Poore and Nemecek 2018). The calculator also estimates emissions associated with food losses that occur at each supply chain step.

**Carbon opportunity costs.** Life-cycle assessments of food production commonly either do not account for emissions from land-use change, or only account for recent (e.g., past 20 years) land-use change. However, all agricultural land use has an opportunity cost. Carbon opportunity costs estimate the “missed potential carbon sink” if the land used to produce the food sourced by the food provider were instead able to return to its native vegetation (e.g., forests) (Schmidinger and Stehfest 2012; Hayek et al. 2020).

Conversely, this metric is also an estimate of the likely potential additional carbon losses to clear natural ecosystems to produce another unit of a food. Shifting consumption toward plant-based foods, which have lower carbon opportunity costs, can help prevent future deforestation (Hawken 2017). Because carbon losses from converting native ecosystems to agriculture occur quickly, but food production often continues on a cleared plot of land for many years, the calculation annualizes carbon opportunity cost values over a 33-year period (Searchinger et al. 2018).

In a world where population and food demand continue to grow while deforestation must be halted and reversed to stabilize the climate below dangerous levels of warming (IPCC 2019; Searchinger et al. 2019), counting both agricultural supply chain emissions and carbon opportunity costs (Figure B1) paints a more complete picture of the climate impacts of food production and consumption choices, and can encourage more efficient uses of the world's finite land. Of course, climate change mitigation is not food providers' only sustainability goal, and providers should also bear in mind other important goals related to their food purchases and sales, including other environmental (e.g., water), social (e.g., labor conditions, animal welfare), and economic (e.g., profitability) goals (Waite et al. 2019).

FIGURE B1 | ANIMAL-BASED FOODS ARE MORE RESOURCE INTENSIVE THAN PLANT-BASED FOODS



*Notes:* The abbreviation kg CO<sub>2</sub>e stands for kilogram of carbon dioxide equivalent. “Retail weight” for meats and fish refer to raw and boneless products. Global average factors shown.  
*Sources:* Poore and Nemecek 2018; Searchinger et al. 2018.

Table 1 | **Maximum Food-Related Greenhouse Gas Thresholds for Cool Food Meals**

REGION	AVERAGE FOOD-RELATED GHG EMISSIONS PER PERSON PER DAY, 2015 (KG CO <sub>2</sub> E)			"ALLOWABLE" FOOD-RELATED GHG EMISSIONS PER PERSON PER DAY (KG CO <sub>2</sub> E)			"ALLOWABLE" FOOD-RELATED GHG EMISSIONS PER MEAL (KG CO <sub>2</sub> E)		
EMISSIONS TYPE	Agricultural supply chain emissions	Carbon opportunity costs	Total	Agricultural supply chain emissions	Carbon opportunity costs	Total	Agricultural supply chain emissions	Carbon opportunity costs	Total
CHANGE FROM PREVIOUS CATEGORY	N/A			-38% (62% of previous category)			30% of previous category for lunch or dinner 20% of previous category for breakfast		
EUROPE	4.94	15.34	20.28	3.06	9.51	12.57	0.92 <i>0.61</i>	2.85 <i>1.90</i>	<b>3.77</b> <b>2.51</b>
LATIN AMERICA	7.74	16.62	24.36	4.80	10.30	15.11	1.44 <i>0.96</i>	3.09 <i>2.06</i>	<b>4.53</b> <b>3.02</b>
NORTH AMERICA	7.03	23.69	30.72	4.36	14.69	19.05	1.31 <i>0.87</i>	4.41 <i>2.94</i>	<b>5.71</b> <b>3.81</b>
OCEANIA	8.06	27.12	35.19	5.00	16.82	21.82	1.50 <i>1.00</i>	5.05 <i>3.36</i>	<b>6.55</b> <b>4.36</b>

Notes: Total GHG figure includes GHG emissions from agricultural supply chains plus annualized carbon opportunity costs. Total GHG figure is used for determining eligibility. Breakfast figures are in italics. Tea, coffee, and alcoholic beverages are omitted from the analysis. Numbers may not sum correctly due to rounding.

N/A = Not applicable.

Sources: FAO (2022) on regional dietary data (total food supply); Waite et al. (2019) on GHG calculation methods.

States (Kant 2018) as well as dietary guidance in the United Kingdom (Public Health England 2020). Table 1 shows examples of maximum thresholds for food-related GHG emissions per breakfast and per lunch or dinner in the Americas, Europe, and Oceania.

To identify Cool Food Meals on a food provider's menu, the provider must submit recipe information for candidate meals, including default side dishes, to WRI. WRI then uses the Cool Food calculator to estimate the associated food-related GHG emissions from agricultural supply chains and food-related carbon opportunity costs.

As with the Cool Food Pledge, if the food provider has any alternative emission factors (e.g., primary farm-level data, detailed estimates of mixed items such as premade burgers or soups, emissions of precooked items), requests

to use alternative data may be submitted to WRI for consideration. To be accepted, the data must be of equal or higher quality than the secondary data in the Cool Food calculator in terms of the data quality indicators in Table 2 (technological representativeness, temporal representativeness, geographical representativeness, completeness, and reliability).

Meals falling below the total GHG thresholds, which include agricultural supply chain emissions and carbon opportunity costs (e.g., 5.71 kg CO<sub>2</sub>e per lunch or dinner for North America), potentially qualify as Cool Food Meals, subject to the nutrition safeguard below. Table 3 outlines emissions for a series of hypothetical lunch meals for a North American food provider and demonstrates which would fall below the total emissions threshold for lunches in North America.

Table 2 | Data Quality Indicators

INDICATOR	DESCRIPTION	COMMENT ON SPECIFIC DATA SET IN COOL FOOD CALCULATOR		
		POORE AND NEMECEK (2018)	SEARCHINGER ET AL. (2018)	FOOD PROVIDER'S FOOD PURCHASE DATA
Technological representativeness	The degree to which the data set reflects the actual food production technology or technologies used.	Regional emissions data come from more than 38,000 farms in 119 countries, and 40 food types representing approximately 90 percent of global calorie and protein consumption.	Data come from a global model based on data sets on vegetation, soils, crops, and livestock products, covering more than 50 food types.	Data are drawn from most recent year available, organized into food types that match the two emission factor data sets.
Temporal representativeness	The degree to which the data set reflects the actual time (e.g., year) or age of the activity.	Median reference year is 2010.	Reference year is 2005.	Data are drawn from most recent year available.
Geographical representativeness	The degree to which the data set reflects the actual geographic location of the activity (e.g., country or site).	Emission factors that are available at global, regional, or country level; each observation (primary study) is weighted by share of national agricultural production it represents, and each country by share of global production.	Emission factors are global, reflecting the global nature of total food demand.	Food provider records majority region of origin of each food type.
Completeness	The degree to which the data are statistically representative of the relevant activity. Includes the percentage of locations for which data are available and used out of the total number that relate to a specific activity, and seasonal and other normal fluctuations in data.	See "Technological representativeness," above.	See "Technological representativeness," above.	See "Technological representativeness," above.
Reliability	The degree to which the sources, data collection methods, and verification procedures used to obtain the data are dependable.	Data come from a peer-reviewed academic source.	Data come from a peer-reviewed academic source.	Food providers make a good-faith effort to accurately provide all food purchase data.

Sources: Based on WRI and WBCSD 2011; Weidema and Wesnæs 1996, modified by WRI in Waite et al. 2019.

Table 3 | Illustration of Application of Greenhouse Gas Threshold to Identify Potential Cool Food Meals

MEAL	FOOD-RELATED GHG EMISSIONS (KG CO <sub>2</sub> E PER MEAL)			POTENTIALLY QUALIFIES AS COOL FOOD MEAL?
	AGRICULTURAL SUPPLY CHAIN EMISSIONS	CARBON OPPORTUNITY COSTS	TOTAL	
Lunch 1 (with side)	6.25	19.46	25.71	No
Lunch 2 (with side)	1.88	4.43	6.31	No
Lunch 3 (with side)	1.55	4.34	5.89	No
<b>North America maximum threshold per meal (lunch or dinner)</b>	<b>1.31</b>	<b>4.41</b>	<b>5.71</b>	<b>N/A</b>
Lunch 4 (with side)	1.30	3.25	4.55	Yes
Lunch 5 (with side)	0.91	2.99	3.90	Yes
Lunch 6 (with side)	0.53	1.70	2.23	Yes

Notes: Illustrative data for six lunch meals from one food provider in North America. Total GHG figure includes GHG emissions from agricultural supply chains plus annualized carbon opportunity costs. Total GHG figure is used for determining eligibility.

N/A = not applicable.

Sources: FAO (2022) on regional dietary data (total food supply); Waite et al. (2019) on GHG calculation methods.

## Nutrition Safeguard

While the primary aim of identifying Cool Food Meals is to promote climate-friendly menu items that meet the environmental criteria above, we recognize that health is an essential component of dietary sustainability (FAO 2012; Willett et al. 2019). As FAO points out, sustainable diets must be nutritionally adequate, safe, and healthy—thereby contributing to a healthy life for present and future generations (FAO 2012). Nutrient-dense diets that are high in fiber, fruits, and vegetables and low in sodium, saturated fat, and sugar have been linked to reduced chronic disease risk and improved health outcomes, suggesting ample opportunities for serving meals that are both good for climate and human health (Tilman and Clark 2014; USDA/HHS 2015; Willett et al. 2019). However, such “win-win” outcomes are not automatic, and promoting meals that are relatively good for the climate, but pose a threat to human health, would jeopardize a broader societal goal of achieving dietary sustainability (Garnett 2016). This section lays out a nutrition safeguard for Cool Food Meals.

The nutrition safeguard draws from a family of “nutrient profiling” models and scoring systems that have evolved over the past two decades to assess and compare the nutritional quality of foods, meals, and/or diets (Drewnowski 2005; Poon et al. 2018). Nutrient profiling involves classifying foods, meals, and/or diets according to their nutritional composition to determine their relative healthfulness. This can be done for the purpose of promoting health and preventing disease by informing consumer decision-making, motivating corporate product reformulation, and/or informing policy change (WHO 2010).

After considering several possible nutrient profiling model options, we ultimately selected a system based on a model developed by the British Food Standard Agency (FSA) as appropriate for determining Cool Food Meal eligibility due to its extensive vetting and global adoption since 2007, in addition to its compatibility with food providers’ readily available nutrient data. Details of the FSA development process have been documented extensively elsewhere

(Rayner et al. 2004; Rayner et al. 2005). The FSA model assesses nutrient density in adherence with science-based public health guidelines for four “unfavorable” and three “favorable” dietary components detailed below (U.K. Department of Health 2011). The system has demonstrated validity across a number of contexts (Cooper et al. 2016; Arambepola et al. 2008; Drewnowski and Fulgoni 2008; Rayner et al. 2005) and has been validated internationally for a range of applications (Rayner 2017). The FSA model was more recently adapted for use in front-of-pack food labeling and food reformulation in France (Santé Publique France 2020), resulting in the Nutri-Score system (Julia et al. 2014), which has been adopted for use within several European countries, including Belgium, Switzerland, and Germany.

Similar to the FSA score, the Nutri-Score determines the nutritional quality of a food or meal on a scale ranging from -15 (healthiest) to +40 (least healthy) based on a meal’s food group and nutrient content per 100 grams. Specifically, the Nutri-Score system accounts for four “unfavorable” components, which are considered unhealthy when consumed in excess (calories, saturated fat, sugars, and sodium) (Table 4) and three “favorable” components (protein, fiber, and fruits/vegetables/pulses/

nuts/oils) on a per 100 gram basis (Table 5).

To calculate the Nutri-Score for an individual meal, 0–10 points are assigned for each unfavorable component, representing a maximum of 40 points in total. Concurrently, 0–5 points are assigned for each favorable component, representing a maximum of 15 points in total. The favorable points are subtracted from the unfavorable points under the following conditions (U.K. Department of Health 2011):

- If a food scores 0–10 unfavorable points, then the overall score is calculated as follows: Total unfavorable points minus total favorable points.
- If a food scores 11 or more unfavorable points, but scores 5 points for fruit/vegetables/pulses/nuts/oils, then the overall score is calculated as follows: Total unfavorable points minus total favorable points.
- If a food scores 11 or more unfavorable points, and less than 5 points for fruit/vegetables/pulses/nuts/oils, then the overall score is calculated as follows: Total unfavorable points minus favorable points for fiber and fruit/vegetables/pulses/nuts/oils only (points for protein are excluded).

Table 4 | **Nutrient Content Thresholds for “Unfavorable” Meal Components and Corresponding Nutri-Score Point Values (per 100 grams)**

POINTS	ENERGY (KJ)	SATURATED FAT (G)	TOTAL SUGAR (G)	SODIUM (MG)
0	≤ 335	≤ 1	≤ 4.5	≤ 90
+1	> 335	> 1	> 4.5	> 90
+2	> 670	> 2	> 9	> 180
+3	> 1,005	> 3	> 13.5	> 270
+4	> 1,340	> 4	> 18	> 360
+5	> 1,675	> 5	> 22.5	> 450
+6	> 2,010	> 6	> 27	> 540
+7	> 2,345	> 7	> 31	> 630
+8	> 2,680	> 8	> 36	> 720
+9	> 3,015	> 9	> 40	> 810
+10	> 3,350	> 10	> 45	> 900

Note: 1 calorie (kcal) is equal to 4.184 kilojoules (kJ).

Sources: U.K. Department of Health 2011; Santé Publique France 2020.



Nutri-Score assigns “grades” to the scores as follows (Santé Publique France 2020):

- A: -15 to -1
- B: 0 to 2
- C: 3 to 10
- D: 11 to 18
- E: 19 to 40

To screen out particularly unhealthy meals, meals scoring greater than 10 (corresponding to Nutri-Score’s D or E categories) are excluded from consideration as Cool Food Meals.

Following the example above, applying the nutrition safeguard may exclude additional meals from consideration as Cool Food Meals (Tables 6 and 7).

Table 5 | **Nutrient Content Thresholds for “Favorable” Meal Components and Corresponding Nutri-Score Point Values (per 100 grams)**

POINTS	FRUIT, VEGETABLES, PULSES, NUTS, AND HEALTHY OILS (% WEIGHT)	FIBER (G)	PROTEIN (G)
0	≤ 40	≤ 0.9	≤ 1.6
-1	> 40	> 0.9	> 1.6
-2	> 60	> 1.9	> 3.2
-3	N/A	> 2.8	> 4.8
-4	N/A	> 3.7	> 6.4
-5	> 80	> 4.7	> 8.0

Notes: Fiber is measured following the Association of Official Analytical Chemists (AOAC) and is the standard for food labeling purposes in the United States (Phillips et al. 2019). “Healthy oils” includes rapeseed (canola), walnut, and olive oils as further elaborated in Santé Publique France (2020).

N/A = Not applicable.

Sources: U.K. Department of Health 2011; Santé Publique France 2020.

Table 6 | **Illustration of Calculation of Nutri-Score for Three Meals (Nutrients per 100 grams)**

MEAL	“UNFAVORABLE” MEAL COMPONENTS				“FAVORABLE” MEAL COMPONENTS			TOTAL NUTRI-SCORE
	Energy (kJ)	Saturated fat (g)	Total sugar (g)	Sodium (mg)	Fruit, vegetables, pulses, nuts, and healthy oils (% weight)	Fiber (g)	Protein (g)	
Lunch 4 (with side)	800 (+2)	2.2 (+2)	2.0 (0)	420 (+4)	20% (0)	1.1 (-1)	10.0 (-5)	2
Lunch 5 (with side)	980 (+2)	4.2 (+4)	1.5 (0)	600 (+6)	10% (0)	0.5 (0)	N/A (0)	12
Lunch 6 (with side)	700 (+2)	1.6 (+1)	5.2 (+1)	250 (+2)	50% (-1)	1.7 (-1)	5.2 (-3)	1

Notes: Illustrative data for three lunch meals below the Cool Food maximum GHG threshold from one food provider in North America. Scoring figures are in italics. 1 calorie (kcal) is equal to 4.184 kilojoules (kJ). “Healthy oils” includes rapeseed (canola), walnut, and olive oils as given in Santé Publique France (2020).

N/A = Not applicable.

Sources: U.K. Department of Health 2011; Santé Publique France 2020.



Table 7 | Illustration of Application of Nutrition Safeguard to Identify Potential Cool Food Meals

	FOOD-RELATED GHG EMISSIONS (KG CO <sub>2</sub> E PER MEAL)			POTENTIALLY QUALIFIES AS COOL FOOD MEAL BASED ON GHG EMISSIONS?	NUTRI-SCORE (NUTRITION SAFEGUARD)	QUALIFIES AS COOL FOOD MEAL?
	AGRICULTURAL SUPPLY CHAIN EMISSIONS	CARBON OPPORTUNITY COSTS	TOTAL			
Lunch 1 (with side)	6.25	19.46	<b>25.71</b>	No	Not calculated	No
Lunch 2 (with side)	1.88	4.43	<b>6.31</b>	No	Not calculated	No
Lunch 3 (with side)	1.55	4.34	<b>5.89</b>	No	Not calculated	No
<b>North America maximum thresh- old per meal (lunch or dinner)</b>	<b>1.31</b>	<b>4.41</b>	<b>5.71</b>	<b>N/A</b>	<b>10</b>	<b>N/A</b>
Lunch 4 (with side)	1.30	3.25	<b>4.55</b>	Yes	2	Yes
Lunch 5 (with side)	0.91	2.99	<b>3.90</b>	Yes	12	No
Lunch 6 (with side)	0.53	1.70	<b>2.23</b>	Yes	1	Yes

*Notes:* Illustrative data for six lunch meals from one food provider in North America. Total GHG figure includes GHG emissions from agricultural supply chains plus annualized carbon opportunity costs. Total GHG figure is used for determining eligibility.

N/A = Not applicable.

*Sources:* FAO (2022) on regional dietary data (total food supply); Waite et al. (2019) on GHG calculation methods; U.K. Department of Health (2011) and Santé Publique France (2020) on nutrition safeguard.

## CONCLUSIONS

Cool Food Meals complements the Cool Food Pledge by identifying particularly low-emitting meals on food providers' menus that consumers can choose to help fight climate change. This designation aims to help consumers choose dishes that contribute to an overall diet in greater alignment with 2030 targets for food-related GHG emissions reduction.

These initiatives and accompanying marketing campaigns aim to steer consumers toward the low-emitting options on menus, help shift the market toward climate-friendly food providers, and inspire others across the food service industry to accelerate the transition toward a sustainable food future.

## REFERENCES

- Arambepola, C., P. Scarborough, and M. Rayner. 2008. "Validating a Nutrient Profile Model." *Public Health Nutrition* 11 (4): 371–78. doi:10.1017/S1368980007000377.
- Clark, M., and D. Tilman. 2017. "Comparative Analysis of Environmental Impacts of Agricultural Production Systems, Agricultural Input Efficiency, and Food Choice." *Environmental Research Letters* 12 (6). IOP Publishing: 064016. doi:10.1088/1748-9326/aa6cd5.
- Cooper, S.L., F.E. Pelly, and J.B. Lowe. 2016. "Construct and Criterion-Related Validation of Nutrient Profiling Models: A Systematic Review of the Literature." *Appetite* 100 (May): 26–40. doi:10.1016/j.appet.2016.02.001.
- Drewnowski, A. 2005. "Concept of a Nutritious Food: Toward a Nutrient Density Score." *American Journal of Clinical Nutrition* 82 (4): 721–32. doi:10.1093/ajcn/82.4.721.
- Drewnowski, A., and V. Fulgoni. 2008. "Nutrient Profiling of Foods: Creating a Nutrient-Rich Food Index." *Nutrition Reviews* 66 (1): 23–39. doi:10.1111/j.1753-4887.2007.00003.x.
- FAO (Food and Agriculture Organization of the United Nations). 2012. "Sustainable Diets and Biodiversity: Directions and Solutions for Policy, Research and Action. Proceedings of the International Scientific Symposium: Biodiversity and Sustainable Diets against Hunger." Rome: FAO.
- FAO. 2022. "FAOSTAT." <http://www.fao.org/faostat/en/#data>.
- FDA (U.S. Food and Drug Administration). 2019. "CFR—Code of Federal Regulations Title 21." Washington, DC: FDA. <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcr/CFRSearch.cfm?fr=101.13>.
- Garnett, T. 2016. "Plating Up Solutions." *Science* 353 (6305): 1202–4. doi:10.1126/science.aah4765.
- Hallström, E., A. Carlsson-Kanyama, and P. Börjesson. 2015. "Environmental Impact of Dietary Change: A Systematic Review." *Journal of Cleaner Production* 91 (March): 1–11. doi:10.1016/j.jclepro.2014.12.008.
- Hawken, P. 2017. *Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming*. London: Penguin Books.
- Hayek, M.N., H. Harwatt, W.J. Ripple, and N.D. Mueller. 2020. "The Carbon Opportunity Cost of Animal-Sourced Food Production on Land." *Nature Sustainability* (September). 1–4. doi:10.1038/s41893-020-00603-4.
- IPCC (Intergovernmental Panel on Climate Change). 2019. "Climate Change and Land: An IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems." Geneva: IPCC.
- Julia, C., E. Kesse-Guyot, M. Touvier, C. Méjean, L. Fezeu, and S. Hercberg. 2014. "Application of the British Food Standards Agency Nutrient Profiling System in a French Food Composition Database." *British Journal of Nutrition* 112 (10): 1699–705. doi:10.1017/S0007114514002761.
- Kant, A.K. 2018. "Eating Patterns of US Adults: Meals, Snacks, and Time of Eating." *Physiology and Behavior* 193 (September): 270–78. doi:10.1016/j.physbeh.2018.03.022.
- Phillips, K.M., D.B. Haytowitz, and P.R. Pehrsson. 2019. "Implications of Two Different Methods for Analyzing Total Dietary Fiber in Foods for Food Composition Databases." *Journal of Food Composition and Analysis* 84 (December): 103253. doi:10.1016/j.jfca.2019.103253.
- Poon, T., M.-È. Labonté, C. Mulligan, M. Ahmed, K.M. Dickinson, and M.R. L'Abbé. 2018. "Comparison of Nutrient Profiling Models for Assessing the Nutritional Quality of Foods: A Validation Study." *British Journal of Nutrition* 120 (5): 567–82. doi:10.1017/S0007114518001575.
- Poore, J., and T. Nemecek. 2018. "Reducing Food's Environmental Impacts through Producers and Consumers." *Science* 360 (6392): 987–92. doi:10.1126/science.aag0216.
- Public Health England. 2020. "Keep Track of Calories with 400-600-600." <https://www.nhs.uk/oneyou/for-your-body/eat-better/keep-track-of-calories-400-600-600>.
- Ranganathan, J., D. Vennard, R. Waite, P. Dumas, B. Lipinski, and T. Searchinger. 2016. "Shifting Diets for a Sustainable Food Future." *Creating a Sustainable Food Future* 11 (April): 90.
- Rayner, M. 2017. "Nutrient Profiling for Regulatory Purposes." *Proceedings of the Nutrition Society* 76 (3): 230–36. doi:10.1017/S0029665117000362.
- Rayner, M., P. Scarborough, A. Boxer, and L. Stockley. 2005. "Nutrient Profiles: Development of Final Model (Final Report)." London: Food Standards Agency.
- Rayner, M., P. Scarborough, and L. Stockley. 2004. "Nutrient Profiles: Options for Definitions for Use in Relation to Food Promotion and Children's Diets." Oxford, UK: British Heart Foundation Health Promotion Research Group, Department of Public Health.
- Santé Publique France. 2020. "Nutri-Score Frequently Asked Questions: Scientific and Technical." Saint-Maurice, France: Santé Publique France. <https://www.santepubliquefrance.fr/determinants-de-sante/nutrition-et-activite-physique/articles/nutri-score>.
- Schmidinger, K., and E. Stehfest. 2012. "Including CO<sub>2</sub> Implications of Land Occupation in LCAs—Method and Example for Livestock Products." *International Journal of Life Cycle Assessment* 17 (8): 962–72. doi:10.1007/s11367-012-0434-7.
- Searchinger, T., R. Waite, C. Hanson, J. Ranganathan, P. Dumas, and E. Matthews. 2019. "World Resources Report: Creating a Sustainable Food Future—A Menu of Solutions to Feed Nearly 10 Billion People by 2050 (Final Report)." Washington, DC: World Resources Institute. <http://www.sustainablefoodfuture.org>.

## ENDNOTES

Searchinger, T., S. Wiersma, T. Beringer, and P. Dumas. 2018. "Assessing the Efficiency of Changes in Land Use for Mitigating Climate Change." *Nature* 564 (7735): 249. doi:10.1038/s41586-018-0757-z. Tilman, D., and M. Clark. 2014. "Global Diets Link Environmental Sustainability and Human Health." *Nature* 515 (7528): 518–22. doi:10.1038/nature13959.

U.K. Department of Health. 2011. "Nutrient Profiling Technical Guidance." London: U.K. Department of Health.

USDA/HHS (U.S. Department of Agriculture and U.S. Department of Health and Human Services). 2015. "Scientific Report of the 2015 Dietary Guidelines Advisory Committee." Washington, DC: USDA/HHS.

Waite, R., D. Vennard, and G. Pozzi. 2019. "Tracking Progress toward the Cool Food Pledge: Setting Climate Targets, Tracking Metrics, Using the Cool Food Calculator, and Related Guidance for Pledge Signatories." Technical Note. Washington, DC: World Resources Institute. [www.coolfoodpledge.org](http://www.coolfoodpledge.org).

Weidema, B.P., and M.S. Wesnæs. 1996. "Data Quality Management for Life Cycle Inventories—An Example of Using Data Quality Indicators." *Journal of Cleaner Production* 4 (3): 167–74. doi:10.1016/S0959-6526(96)00043-1.

WHO (World Health Organization). 2010. "Nutrient Profiling: Report of a WHO/IASO Technical Meeting." Geneva: WHO.

Willett, W., J. Rockström, B. Loken, M. Springmann, T. Lang, S. Vermeulen, T. Garnett, et al. 2019. "Food in the Anthropocene: The EAT–Lancet Commission on Healthy Diets from Sustainable Food Systems." *Lancet* 393 (10170): 447–92. doi:10.1016/S0140-6736(18)31788-4.

WRI and WBCSD (World Resources Institute and World Business Council for Sustainable Development). 2011. "Corporate Value Chain (Scope 3) Accounting and Reporting Standard." <http://ghgprotocol.org/standards/scope-3-standard>.

1.  $0.75 / 1.21 = 0.62$ . This means that to achieve a 25 percent reduction in overall food-related GHG emissions as food demand grows by 21 percent, a 38 percent reduction in food-related GHG emissions per calorie would be necessary.

## ACKNOWLEDGMENTS

We are pleased to acknowledge our institutional strategic partners that provide core funding to WRI: the Netherlands Ministry of Foreign Affairs, Royal Danish Ministry of Foreign Affairs, and Swedish International Development Cooperation Agency.

The authors acknowledge the following individuals for their valuable guidance and critical reviews: Sophie Attwood (WRI), Jackie Bertoldo (Stanford University), Kylee Chang (WRI), Mindy Gomes Casseres (Blue House Sustainability), Christian Bugge Henriksen (University of Copenhagen), Edwina Hughes (WRI), Alan Phipps (Pure Strategies), Gerard Pozzi (WRI), Becky Ramsing (Johns Hopkins University), John Stoddard (Health Care Without Harm), Vandana Vasudevan (WRI), Daniel Vennard (WRI), Haijun Zhao (WRI), and Jessica Zions (WRI). Thanks to Joseph Poore (University of Oxford) and Jessica Zions (WRI) for reviewing the updated Cool Food Meals thresholds in 2022. We thank Shazia Amin for her careful copyediting and LSF Editorial for proofreading. We thank Romain Warnault and Shannon Collins for design and layout.

For this publication, WRI is grateful for the generous financial support of the Oak Foundation, the Sally Mead Hands Foundation, and Panera LLC.

This document represents the views of the authors alone. It does not necessarily represent the views of Cool Food partners or funders.

## ABOUT THE AUTHORS

**Richard Waite** is a Senior Research Associate in the Food and Climate Programs at WRI. He is the Data Lead for Cool Food, an initiative that helps major food providers reduce food-related GHG emissions in line with climate science, and an author of the *World Resources Report: Creating a Sustainable Food Future*, which focuses on solutions to feed 10 billion people by 2050. He holds an MA in International Development Studies, with concentrations in Environment and Food Security, from the George Washington University's Elliott School of International Affairs.

Contact: richard.waite@wri.org.

**Stacy Blondin** is a Behavioral Science Associate in the Food Program at WRI. She conducts field and online research applying behavior change approaches to encourage consumers to shift toward more sustainable diets. Prior to joining WRI, she completed her doctoral degree at Tufts University's Friedman School of Nutrition Science and Policy in Food Policy and Applied Nutrition. She conducted her dissertation research on dietary sustainability within national school meal programs, with a focus on food waste and plant-forward meals. She also holds an MSPH degree in International Health and Nutrition from Johns Hopkins Bloomberg School of Public Health.

Contact: stacy.blondin@wri.org.

## ABOUT WRI

World Resources Institute is a global research organization that turns big ideas into action at the nexus of environment, economic opportunity, and human well-being.

### Our Challenge

Natural resources are at the foundation of economic opportunity and human well-being. But today, we are depleting Earth's resources at rates that are not sustainable, endangering economies and people's lives. People depend on clean water, fertile land, healthy forests, and a stable climate. Livable cities and clean energy are essential for a sustainable planet. We must address these urgent, global challenges this decade.

### Our Vision

We envision an equitable and prosperous planet driven by the wise management of natural resources. We aspire to create a world where the actions of government, business, and communities combine to eliminate poverty and sustain the natural environment for all people.

### Our Approach

#### COUNT IT

We start with data. We conduct independent research and draw on the latest technology to develop new insights and recommendations. Our rigorous analysis identifies risks, unveils opportunities, and informs smart strategies. We focus our efforts on influential and emerging economies where the future of sustainability will be determined.

#### CHANGE IT

We use our research to influence government policies, business strategies, and civil society action. We test projects with communities, companies, and government agencies to build a strong evidence base. Then, we work with partners to deliver change on the ground that alleviates poverty and strengthens society. We hold ourselves accountable to ensure our outcomes will be bold and enduring.

#### SCALE IT

We don't think small. Once tested, we work with partners to adopt and expand our efforts regionally and globally. We engage with decision-makers to carry out our ideas and elevate our impact. We measure success through government and business actions that improve people's lives and sustain a healthy environment.

Maps are for illustrative purposes and do not imply the expression of any opinion on the part of WRI, concerning the legal status of any country or territory or concerning the delimitation of frontiers or boundaries.



Copyright 2022 World Resources Institute. This work is licensed under the Creative Commons Attribution 4.0 International License. To view a copy of the license, visit <http://creativecommons.org/licenses/by/4.0/>