
University of Guelph

Child Care and Learning Centre
Food Sustainability Report



July 2022

Foreword



“ The planet is heating up, becoming unlivable. Increasingly we are seeing more devastating wild fires, extensive and lingering droughts; we have witnessed more flooding and more weather disturbances that are destabilizing food production, living conditions, and human and animal well-being. It is senseless to allow this trajectory to continue. There is no dispute that the climate emergency is driven by human activity, with the greatest emissions and pollution coming from animal agriculture. For the sake of current and future children, we must do all that we can to reverse global warming.

By children developing a personal relationship with food, how it is grown, and how we are part of nature, they become champions of sustainability. Food should nourish life. Shifting to plant-based menus for all public institutions is essential to prevent further



calamities and avert further transgressions of planetary boundaries. Achieving international climate change goals will not be possible without this commitment. Fortunately, the future is very hopeful and very delicious. The Child Care and Learning Centre (CCLC) at the University of Guelph has proven how feasible, and sensible, this transition can be. The CCLC has significantly reduced its foodprint, its waste, and costs, as they demonstrate leadership and illuminate the path for effective organizational and social change. Only by adopting plant-based diets, can the rights of all children to a habitable planet be assured. ”

Dr. Kathleen Kevany

Associate Professor, Dalhousie University,
Faculty of Agriculture
Author / Editor of *Plant-based diets for succulence
and sustainability*

Glossary

Terms

Anthropogenic Greenhouse Gas Emissions

These are emissions caused by human activities, including the burning of fossil fuels, deforestation, land use and land-use changes, livestock production, fertilisation and waste management, as well as industrial processes.

Carbon Footprint

The carbon footprint of food refers to the greenhouse gas emissions released during a food's life cycle. This is measured in kilograms of carbon dioxide equivalents (kg CO₂e) which express the impact of multiple greenhouse gases in terms of the equivalent global warming potential of carbon dioxide.

Carbon Intensity

This is the carbon footprint per kilogram of each food item (kg CO₂e / kg). It's useful to think about foods in terms of their carbon intensity, as this allows for the comparison of items served in different portion sizes.

Carbon Saving

A reduction in carbon footprint can also be described as a carbon saving, often following the implementation of sustainability initiatives.

Climate-smart

Foodsteps defines 'climate-smart' foods as those with a 'Very Low' impact, given they help to meet wider climate goals. 'Very Low' impact foods fall within daily food carbon allowances established by the EAT-Lancet Commission to align with the Paris Agreement pledge to limit global warming to 1.5°C above pre-industrial levels.¹

Hotspot

Hotspots refer to concentrations of greenhouse gas emissions. This term might be used in reference to particularly high emitting ingredients in the CCLC's food procurement, or life cycle stages contributing the most emissions to a food's overall carbon footprint.

Life Cycle

This describes the journey of food from farm through to waste. Foodsteps' carbon footprint assessments aim to cover an item's full life cycle, accounting for emissions from farming, processing, packaging, transport, retail, cooking and waste.

¹ https://eatforum.org/content/uploads/2019/07/EAT-Lancet_Commission_Summary_Report.pdf



Symbols



Reduction (in emissions etc.)



No change (in emissions etc.)



Carbon Footprint kg CO₂e



Mains



Snacks





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Food production accounts for approximately one third of global anthropogenic greenhouse gas emissions, and animal-based products are estimated to be responsible for around 57% of food-related emissions.¹

Food is integral to transforming both personal and environmental health. Additionally, ingredients with great nutritional benefits such as fibre-rich fruits, vegetables and pulses are also typically kinder to the planet. Despite this, visibility around the fundamental role of food in the climate crisis remains low. The transition to sustainable food systems hinges on increased understanding of the environmental impacts of food to ensure a '**climate-smart**' diet can be accessible to everyone.

Foodsteps uses leading scientific data to unpack food emissions from farm-to-waste, or cradle-to-grave. In this assessment, Foodsteps compares the carbon footprint of old and new recipes served in the Child Care and Learning Centre (CCLC) at the University of Guelph, following the shift to an entirely plant-based menu. Removing animal-based products from the menu has had a significant effect on the CCLC's **carbon footprint**, cutting the monthly carbon footprint from food by 64.7%.

¹ Xu et al. (2021) Global greenhouse gas emissions from animal-based foods are twice those of plant-based foods. Nature Food, 2: 724-732.



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Overall Changes

Since switching to a plant-based menu, the CCLC has significantly reduced its environmental impact. The monthly carbon footprint of the new CCLC menu is 64.7% lower than the old menu, with a monthly carbon saving of approximately 1,963 kilograms of CO₂e. That's the same as an individual taking 5 return flights from Toronto to New York (more than one a week!), or driving 4,858 miles.

Following this trend, the CCLC is estimated to make annual carbon savings of 25,585 kilograms of CO₂e - the same as 66 return flights from Toronto to New York, or driving 63,328 miles - simply by making a change to the types of food served.

23,893 kg CO₂e annual carbon savings is the same as

66

Return flights from Toronto to New York



30

Car trips from Toronto to Vancouver

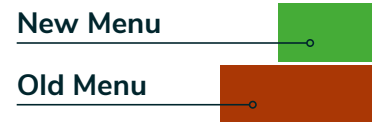


Or heating **8** homes for a year





This assessment separates the CCLC menu into 2 distinct categories: Mains and Snacks. These both saw carbon footprint reductions following the removal of animal-based products. The Mains category achieved particularly large carbon savings of 74.0%, meanwhile the carbon footprint of Snacks fell by 7.2%. There were fewer Snacks on the old menu, many of which were already plant-based, leading to smaller carbon savings.



64.7% monthly reduction in carbon footprint



74.0%
reduction in
carbon footprint
of Mains

2,611 kg CO₂e

678 kg CO₂e



7.2%
reduction in
carbon footprint
of Snacks

407 kg CO₂e

377 kg CO₂e

Carbon Footprint Breakdown

What is the source of greenhouse gas emissions in the CCLC's menu?

Food has a complex **life cycle**, and greenhouse gases are released at various stages from farm to waste. When looking at the environmental impact of any ingredient, it's important to take into account where the food was sourced from, how far it has

travelled, how it is processed, packaged and cooked, and how much may have been wasted. In these calculations, we assessed the impact of the CCLC menu all the way from farm to waste.



Emissions from farm have more than halved

Farm emissions remain the most significant contributor to the overall footprint, although actual farm emissions have more than halved. This is in part due to the large volumes of methane released during the farming of ruminant animals such as cows and sheep - a greenhouse gas with a relatively high warming impact. Additional sources may include fertiliser, fuel use, and waste management (among others).



Emissions from feed have disappeared

Feeding animals is often a major contributor to the carbon footprint of meat and dairy products, as the feed itself must be grown, packaged, processed and transported. And large animals like cows and pigs need a lot of feeding! Emissions from the feed stage have therefore completely disappeared from the new plant-based menu, falling from 22% of the total monthly footprint to 0%.

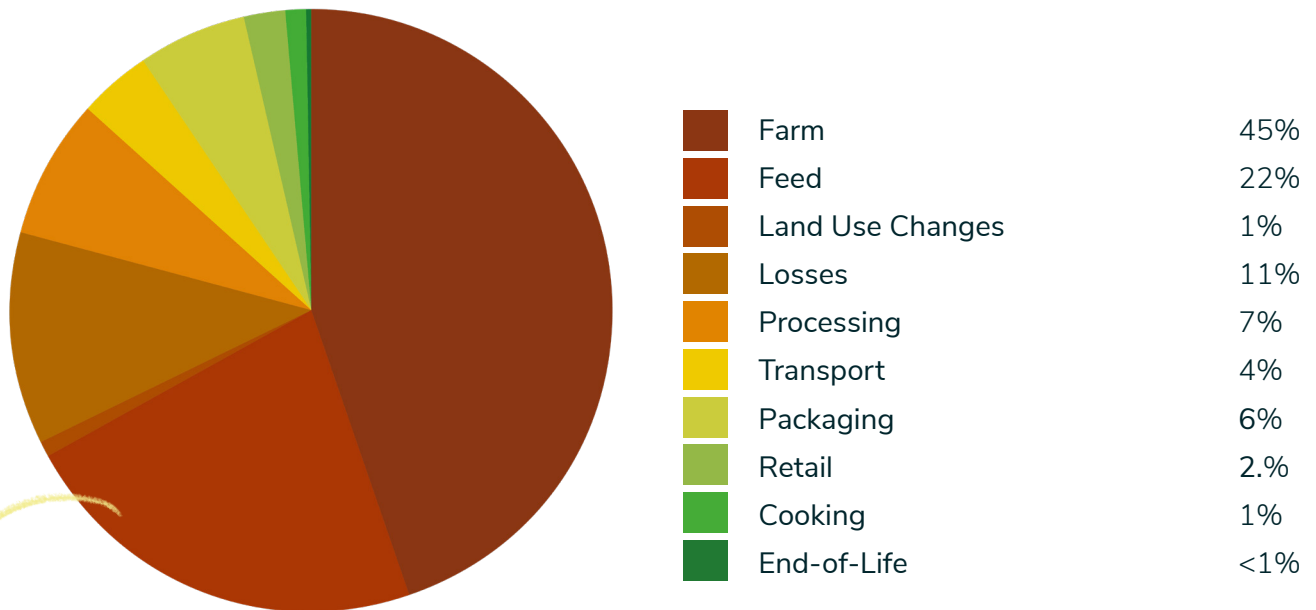


End-of-life emissions have remained largely the same

The proportion of the total footprint attributed to end-of-life (waste) emissions has increased, although actual emissions from waste have fallen slightly. This shows that despite containing more 'perishable' foods, such as fruits and vegetables, emissions from food waste have remained relatively stable.

Old Menu

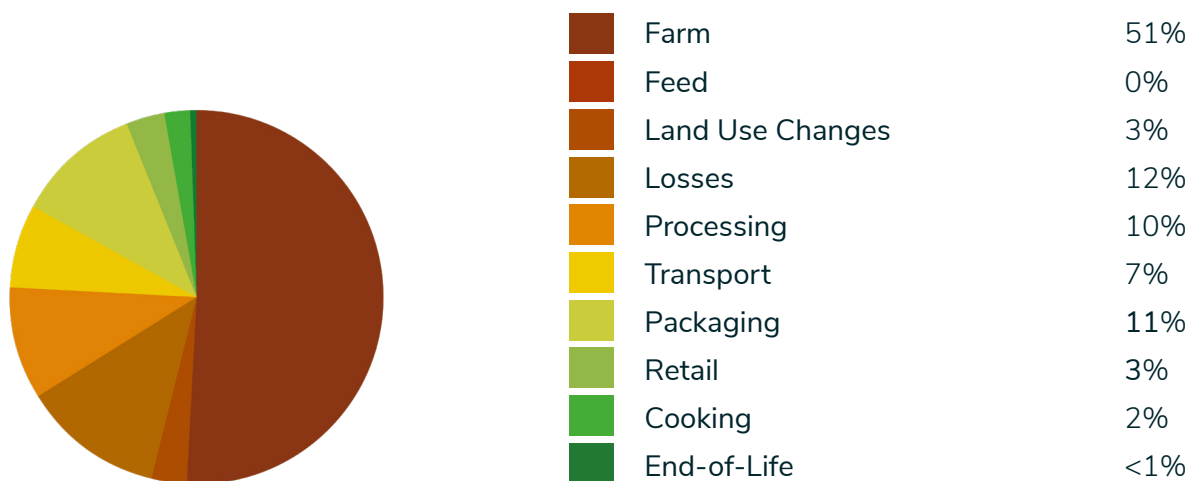
 3,034 kg CO₂e per month



 **65%** Reduction in emissions

New Menu

 1,072 kg CO₂e per month



¹ Transport information is modelled using average data, and therefore may not accurately represent the University of Guelph's hyper local

sourcing (see Appendix for more detailed methodology).

Which main meals have the highest and lowest carbon footprint?

This table highlights the top 10 highest and lowest carbon footprint mains served on the CCLC's menu, based on a single portion size.

The lowest carbon footprint items are largely made up of plant-based items from the new menu, all of which have been allocated a 'Very Low' impact rating by Foodsteps. Perhaps surprisingly, Chicken Chow Mein has ranked as the 8th lowest carbon footprint main. This is because chicken makes up a relatively small proportion of the overall meal, and tends to have a lower carbon intensity compared to ruminant meats like beef and lamb.

The top 10 highest carbon footprint mains can all be found on the old menu. This links to the large presence of animal-based ingredients on the old menu, including meat, fish and dairy products. Another surprise may come from the two vegetarian meals which have landed amongst the most carbon-intensive meals served on the CCLC's old menu. This can be attributed to their use of high impact dairy ingredients such as butter and cheese.

NEW New plant-based menu **OLD** Old menu

Lowest Carbon Footprint Items

Recipe	Carbon Footprint per serving	Rating (Carbon footprint per kilogram)
1 NEW Rainbow Quinoa Bowl	0.11 kg CO ₂ e	VERY LOW
2 NEW Navy Bean Pizza (Hummus and Veggies)	0.12 kg CO ₂ e	VERY LOW
3 NEW Baked Falafel w/ Tahini Kale & Cucumber Salad, Garlic Sauce, Pita	0.13 kg CO ₂ e	VERY LOW
4 NEW White Bean Mac and Cheese (Peas & Spinach)	0.13 kg CO ₂ e	VERY LOW
5 NEW Lentil and Tempeh Burger w/ Avocado Aioli (Spinach & Sweet Potato Wedges)	0.16 kg CO ₂ e	VERY LOW
6 NEW Ghormeh Sabzi (Herb Stew) + Sesame Flat Bread & Garlic Yogurt Dip	0.16 kg CO ₂ e	VERY LOW
7 NEW Quinoa Salad with Marinated Tofu	0.17 kg CO ₂ e	VERY LOW
8 OLD Chicken Chow Mein	0.19 kg CO ₂ e	LOW
9 NEW Red Lentil Pizza (Hummus & Veggies)	0.20 kg CO ₂ e	VERY LOW
10 NEW Garlic Ginger Fried Rice w/ Tofu	0.20 kg CO ₂ e	VERY LOW

Highest Carbon Footprint Items

Recipe	Carbon Footprint per serving	Rating (Carbon footprint per kilogram)
1 OLD Halal Beef Meatloaf w/ Mashed Potatoes (Rice and Veggies)	3.92 kg CO ₂ e	VERY HIGH
2 OLD Halal Beef Shepherd's Pie (Mashed Potatoes, Rolls, Veggies)	2.65 kg CO ₂ e	VERY HIGH
3 OLD Halal Beef Burrito Bake (Veggies)	1.81 kg CO ₂ e	HIGH
4 OLD Tuna Salad Wrap (Tomato Basil Soup)	1.39 kg CO ₂ e	MEDIUM
5 OLD Halal Beef and Barley Stew (Multigrain Rolls & Veggies)	0.94 kg CO ₂ e	MEDIUM
6 OLD Roasted Vegetables Pasta Bake (Peas)	0.92 kg CO ₂ e	MEDIUM
7 OLD Halal Butter Chicken (Rice and Veggies)	0.87 kg CO ₂ e	MEDIUM
8 OLD Salmon (Rice & Veggies)	0.79 kg CO ₂ e	MEDIUM
9 OLD Vegetarian Chilli (Corn Bread & Veggies)	0.75 kg CO ₂ e	LOW
10 OLD Steamed Cod w/ Tomato and Sweet Potato Sauce (Rice & Veggies)	0.64 kg CO ₂ e	MEDIUM



Which snacks have the highest and lowest carbon footprint?*

This table highlights the top 10 highest and lowest carbon footprint snacks served on the CCLC's menu, based on a single portion size.

The majority of the lowest carbon footprint items are plant-based, except for the Berry Yogurt Dip. Yogurt itself is a relatively low carbon dairy product, requiring less processing than other milk derivatives such as butter and cheese.

In line with this, the top two highest impacting snacks contain cheddar cheese. Large volumes of milk are required to make blocks of cheese, especially for hard cheeses like cheddar, which contributes to its high footprint. For example, it can take ten times the amount of milk to make 1 kilogram of cheese.

NEW New plant-based menu **OLD** Old menu

Lowest Carbon Footprint Items

Recipe	Carbon Footprint per serving	Rating (Carbon footprint per kilogram)
1 NEW Hummus (w/ Vegetable Platter)	0.02 kg CO ₂ e	VERY LOW
2 NEW Kamut Porridge	0.03 kg CO ₂ e	VERY LOW
3 OLD Hummus (w/ Vegetable Platter)	0.03 kg CO ₂ e	VERY LOW
4 NEW Chia Seed and Coconut Milk Pudding	0.05 kg CO ₂ e	VERY LOW
5 NEW Chocolate Avocado Dip	0.05 kg CO ₂ e	LOW
6 OLD Berry Yogurt Dip	0.05 kg CO ₂ e	LOW
7 NEW Soft Apple Breakfast Cookies	0.06 kg CO ₂ e	VERY LOW
8 OLD Apple Sauce and Graham Crackers	0.06 kg CO ₂ e	LOW
9 NEW Whole Wheat Muffin	0.07 kg CO ₂ e	VERY LOW
10 NEW Whole Wheat Tortilla Chips with Avocado Hummus	0.07 kg CO ₂ e	LOW

*This list excludes snacks which remained unchanged following the switch to an entirely plant-based menu.

👣 Highest Carbon Footprint Items

Recipe	Carbon Footprint per serving	Rating (Carbon footprint per kilogram)
1 OLD Whole Wheat Cheddar Biscuits	0.43 kg CO ₂ e	MEDIUM
2 OLD Cheddar Cheese and Crackers	0.28 kg CO ₂ e	VERY HIGH
3 NEW Toasted Coconut and Strawberry Granola Bars	0.21 kg CO ₂ e	LOW
4 NEW Apricot, Oat and Toasted Coconut Granola Bars	0.19 kg CO ₂ e	LOW
5 OLD Berry Yogurt & Homemade Granola	0.17 kg CO ₂ e	VERY LOW
6 OLD Homemade Granola w/ Berry Yogurt	0.17 kg CO ₂ e	VERY LOW
7 NEW Pumpkin Seed Granola Bars	0.15 kg CO ₂ e	VERY LOW
8 OLD CCLC Granola Bars	0.14 kg CO ₂ e	VERY LOW
9 OLD Whole Wheat Tea Biscuits	0.14 kg CO ₂ e	LOW
10 OLD Oatmeal Berry Bake	0.14 kg CO ₂ e	MEDIUM



What's the difference between dairy and non-dairy milk?

Drinking one cup of oat milk instead of dairy milk leads to carbon savings of 0.424 kg CO₂e. That's the same as charging your phone 54 times, or once a day for nearly 8 weeks.

Where are impacts coming from across old and new menus?

Meat and dairy ingredients are the greatest contributors to the carbon footprint of the CCLC's old menu, making up 60.4% of old menu emissions. In fact, meat and dairy emissions from the old menu exceed total emissions from the new menu. By contrast, meat alternatives (such as tofu, tempeh and pulses) and dairy alternatives (such as non-dairy milks, yogurts and butters) make up 17.6% of total emissions from the new menu.





Carbon Footprint

kg CO₂e per month

Old Menu

3,203 kg CO₂e

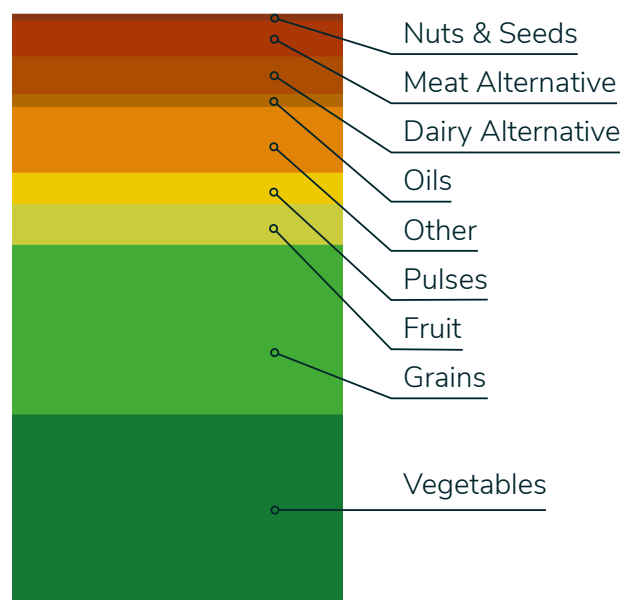


This graph shows that emissions are more evenly distributed across different food groups in the new plant-based menu. Vegetables are the highest footprint category in the new menu, and contribute a much smaller 32.7% of emissions. In fact, minced beef alone contributed more to the overall emissions from the old menu, at 36.4%.

This can be compared to the highest emitting ingredient in the new menu, tinned tomatoes, which make up 14.2% of total emissions. Perhaps surprisingly, tomatoes can be a relatively carbon-intensive vegetable product due to the significant energy requirements for greenhouse growing, and further processing into pastes and purées.

New Menu

1,058 kg CO₂e



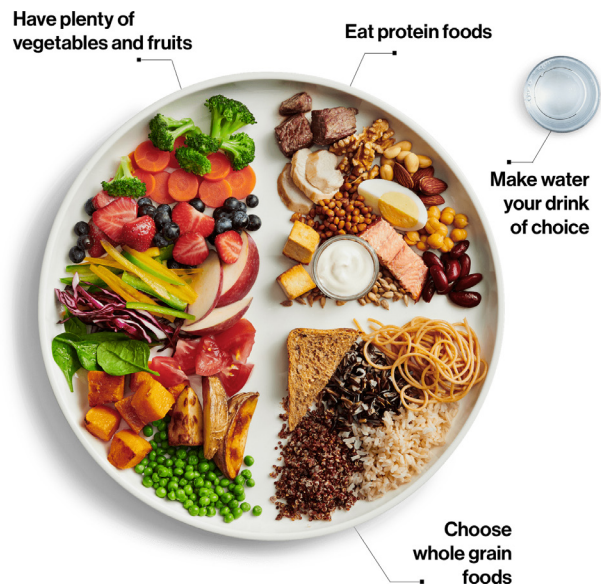
Canada's food guide

“As Public Health Dietitians, we are constantly engaging with community partners to increase the intake of nutritious foods for the health of people and the planet.

We raise awareness of the social¹ and ecological determinants of health.² We promote the foundations of positive relationships with food, especially in the early years, to create life-long habits that promote sustained health. We use Canada's Food Guide³ to support our work.

The guide states, “Healthy Eating is more than the foods you eat.” Eating with others and enjoying your food are as important to healthy eating as specific food choices. Child care centres can create supportive food environments for children to explore a variety of foods. Food choices can be an acknowledgement of the effects of climate change, a celebration of culture, and as a testament to the knowledge and connection to the land and the sacred food it provides, shared by Canada's Indigenous Peoples.

Canada's Dietary Guidelines recognize that food choices have a powerful impact on the environment and how a stable and thriving food environment can positively influence food and beverage choices.



Canadians are encouraged to “eat plenty of vegetables and fruit, whole grains and protein foods. Choose protein foods that come from plants more often.” Plant-based proteins are an affordable and nutritious choice that supports the Canadian food system and can have a positive impact on the fragility of our environment. By implementing the recommendations of Canada's Dietary Guidelines⁴ in institutional procurement practices and menu development, we can build a strong foundation for nutritious food choices in our communities. ”

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¹ <https://www.cpha.ca/what-are-social-determinants-health>

² https://www.cpha.ca/sites/default/files/assets/policy/edh-discussion_e.pdf

³ <https://food-guide.canada.ca/en/food-guide-snapshot/>

⁴ <https://food-guide.canada.ca/en/guidelines/>



Appendix

This carbon footprint assessment accounts for emissions from the CCLC's old and new menus over the course of one month. Monthly servings are based on the assumption that each Main or Snack is consumed by 140 children and adults once in a four week rotation. This has been scaled linearly in order to estimate the annual impact of the CCLC's menu changes.

Foodsteps uses leading life cycle assessment (LCA) data to account for impacts at each stage of a food's life cycle including farming, packaging, processing, transport, retail, cooking and waste. LCA values are largely based on a study by Poore and Nemecek (2018)¹. Where exact LCA values could not be found for certain ingredients, proxy foods with comparable production systems were assumed best fit. In some cases, additional processing and packaging penalties were also applied.

LCA values used were for average Canadian sourcing, using UN Comtrade and FAO data to weight study data according to where food in Canada is typically sourced from. Where otherwise specified, country-specific LCA values were used (if available) to reflect the ingredient's specific origin. This is currently applied on a regional level, in line with the data, meaning that the University of Guelph's hyper local sourcing could not be accounted for.

¹ Poore, & Nemecek. (2018) Reducing food's environmental impact through producers and consumers. *Science*, 360: 987–992.



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