

# CATERING TO THE CLIMATE

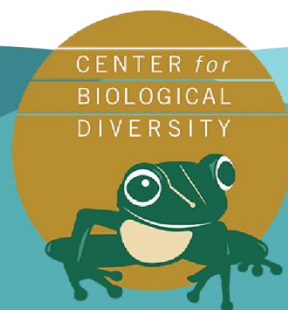
HOW EARTH-FRIENDLY MENUS AT EVENTS CAN HELP SAVE THE PLANET

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## EXECUTIVE SUMMARY

From office parties to conferences, campus dining halls to school cafeterias, board meetings to weddings, the meals served at events can support sustainability goals and values. While some venues and catering companies offer prepackaged, low-impact, plant-based menus or the option to design such a menu, the majority do not.

Meat-heavy diets threaten the planet. Food production accounts for as much as 30% of global greenhouse gas emissions, with nearly half of that coming from meat and dairy production.<sup>1,2,3</sup> In the United States, 80% of agricultural land is used for raising animals and feed crops<sup>4</sup>, while half of consumed water goes toward meat production.<sup>5</sup>

Climate impacts cannot be mitigated without significantly reducing meat consumption and the emissions associated with animal agriculture, according to the Intergovernmental Panel on Climate Change.<sup>6</sup>

Menus have the ability to shape perspectives. Meals frequently drive discussions, and what is served at events can determine food policies, on an individual, organizational, or, with higher-profile events, even national or global level.

Sustainable solutions with low-impact “Earth-friendly” plant-based menus (organic, ethically sourced, healthy, and local where possible) can make a significant environmental impact. In 2018 catering sales in the United States were more than \$11 billion.<sup>7</sup> Over the past three years, the industry has grown by nearly 8% annually.<sup>8</sup>

For this report we analyzed the environmental impact of common catering menu choices as well as plant-based alternatives. We also address some of the barriers event organizers face in shifting menus and recommended solutions.

### KEY FINDING:

Replacing conventional menu choices with Earth-friendly options can reduce the carbon footprint of an event by ten tons of greenhouse gas equivalents for events with 500 attendees. For a 500-person event, the benefits of serving a low-impact menu are equivalent to:

- Saving five acres of habitat from animal agriculture;
- Avoiding the emissions from 22,000 miles driven by car or about 50 people flying round-trip from New York City to Chicago;
- Preventing 17 tons of manure pollution; and
- Conserving nearly 100,000 gallons of water from irrigation and food processing.

### RECOMMENDATION:

Event planners, caterers and venues should serve plant-based menus by default to reduce the environmental footprint of events and provide sustainable food for attendees.



# FOODPRINT MENU

*The environmental costs of popular catering items*

~BREAKFAST~	GHG (lb CO2e)	LAND USE (ft2)	WATER (gal)
Bagel with vegan cream cheese	0.8	14	14
Bagel with cream cheese	1.5	14	24
Soy milk	0.4	2	4
Milk	1.4	6	9
~LUNCH~			
Black bean burrito	1.2	11	36
Beef burrito	15	200	120
Pork Burrito	9	92	110
Portobello mushroom and pepper fajitas	1.4	11	30
Beef fajitas	8.8	140	41
Chicken fajitas	1.6	17	20
Roasted veggie sandwich	1	13	23
Ham and cheese sandwich	5.5	41	53
~DINNER~			
Black bean and sweet potato power bowl	0.6	5	7
Black bean tacos	1.7	14	39
NY strip steak with mashed potatoes and veggies	37	590	270
Creamy garlic pasta with roasted tomatoes	0.6	4	17
Chicken alfredo	6.1	45	53
Veggie lasagna	11	73	130
Beef lasagna	28	340	180

*Plant-based meals offer delicious options that are better for climate, land, water and wildlife.*



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## METHODOLOGY

For the menu calculation analysis, the Center for Biological Diversity compiled detailed recipes for two sample menus — one with conventional foods and one with a selection of “low-impact” dishes (Tables 1 and 2).

All ingredient units were converted to weights using standard food-preparation conversion factors and information from the USDA FoodData database.<sup>9</sup> Recipes and resulting impacts are presented on a per-serving basis.

Environmental impact factors for climate change, land use, water use and manure production were estimated for all major foods and food categories. Impacts were calculated on a life-cycle basis, including resources used in food and animal feed production (such as fertilizers and pesticides), farming operations, food and feed transportation, refrigeration, food processing, and packaging and pre-consumer losses.

Climate change impacts are measured in terms of carbon-dioxide-equivalent greenhouse gases (CO<sub>2</sub>e). Land use indicates the total land occupation for growing the crops and raising the animals necessary to produce each food item, reported in square feet (ft<sup>2</sup>). The manure production factor indicates the share of solid waste produced by the animals that generated each animal-source food, including the harvested animals as well as breeding animals.

Manure used as fertilizer on crops was not included because this study focused on manure created as a waste product, and not the end use of that waste. Water use reported in this study includes surface water and groundwater allocated to irrigation, animal upkeep and food processing, but not the share of natural precipitation utilized in food production.

Data on climate, land and water impacts for most food products were sourced primarily from a recent life-cycle model of the environmental impacts of the global food system.<sup>10</sup> The model was pared down to North American food producers for food products where North American data were available.

Climate change impact data for some high-emitting animal products were selected from a review of recent studies specific to North America.<sup>11</sup> Data on manure production by animals raised for meat and milk products were based on a review of life-cycle assessment studies and agricultural extension publications.<sup>12</sup>

## RESULTS

Climate change, land use, water use and manure production generated by meals on the conventional menu (Table 1) are generally much higher than the alternative low-impact menu (Table 2).

Only one low-impact dish has a carbon footprint over two pounds CO<sub>2</sub>e, while 7 out of 9 conventional dishes generate over five pounds CO<sub>2</sub>e and three exceed 10 pounds. Except for the vegetarian lasagna, all low-impact dishes require less than 15 ft<sup>2</sup> of farmland (i.e. habitat loss).

All of the conventional dishes require *more* than 15 ft<sup>2</sup> of farmland and all four beef-containing meals require over 100 ft<sup>2</sup>. All low-impact dishes except the vegetarian lasagna use less than 40 gallons of water, while most conventional dishes require 50 gallons or more.

*Table 1: Total life-cycle greenhouse gas emissions (GHG), land use, solid manure production and water use associated with the production of a conventional American dining menu on a per-serving basis.*

	<b>GHG (lb CO<sub>2</sub>e)</b>	<b>Habitat Loss (ft<sup>2</sup>)</b>	<b>Manure (lbs)</b>	<b>Water Use (gal)</b>
<b>Breakfast</b>				
<i>Bagel with cream cheese</i>	1.5	14	3.9	24
<i>Milk</i>	1.4	6	3.3	9
<b>Lunch</b>				
<i>Beef burrito</i>	15	200	32	120
<i>Beef fajitas</i>	8.8	140	15	41
<i>Chicken fajitas</i>	1.6	17	0.3	20
<i>Ham and cheese sandwich</i>	5.5	41	14	53
<i>Pork burrito</i>	9	92	26	110
<b>Dinner</b>				
<i>Beef lasagna</i>	28	340	66	180
<i>Chicken alfredo</i>	6.1	45	10	53
<i>NY strip steak with mashed potatoes and veggies</i>	37	590	59	270

Table 2: Total life-cycle greenhouse gas emissions (GHG), land use, solid manure production and water use associated with the production of an alternative low-impact American dining menu on a per-serving basis.

\*Two low-impact dishes contain dairy products and therefore have manure footprints – the black bean and sweet potato power bowl contains yogurt and the veggie lasagna contains cheese.

	GHG (lb CO <sub>2</sub> e)	Habitat Loss (ft <sup>2</sup> )	Manure (lbs)	Water Use (gal)
<b>Breakfast</b>				
Bagel with vegan cream cheese	0.8	14	0	14
Soy milk	0.4	2	0	4
<b>Lunch</b>				
Black bean burrito	1.2	11	0	36
Portobello mushroom and pepper fajitas	1.4	11	0	30
Roasted veggie sandwich	1.0	13	0	23
<b>Dinner</b>				
Black bean and sweet potato power bowl	0.6	5	0.6*	7
Black bean tacos	1.7	14	0	39
Creamy garlic pasta with roasted tomatoes	0.6	4	0	17
Veggie lasagna	11	73	36*	130

On average, low-impact meals reduce GHG emissions by 85% at lunch and dinner (Table 3). Serving soy milk and vegan cream cheese reduces breakfast GHG emissions by 60%. Low-impact meals also reduce habitat loss, water use and manure production at every meal.

Because all but two low-impact dishes are free of animal products, they have no manure footprint. (The black bean and sweet potato power bowl contains yogurt, and the veggie lasagna contains cheese.) For most conventional dishes, however, the manure footprint is much greater than the actual weight of the food served.

Table 3: Average benefits — environmental footprint reductions — of an alternative “low-impact” menu over a conventional American dining menu.

	GHG Savings	Habitat Loss Reduction	Water Use Savings
Breakfast	60%	21%	46%
Lunch	85%	88%	57%
Dinner	85%	93%	72%

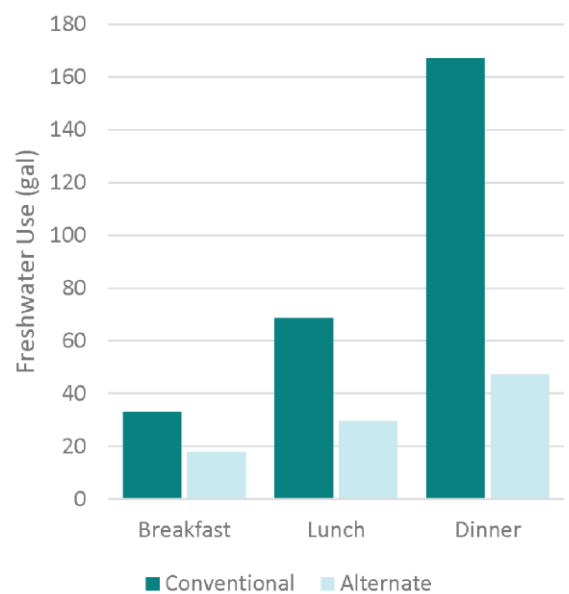
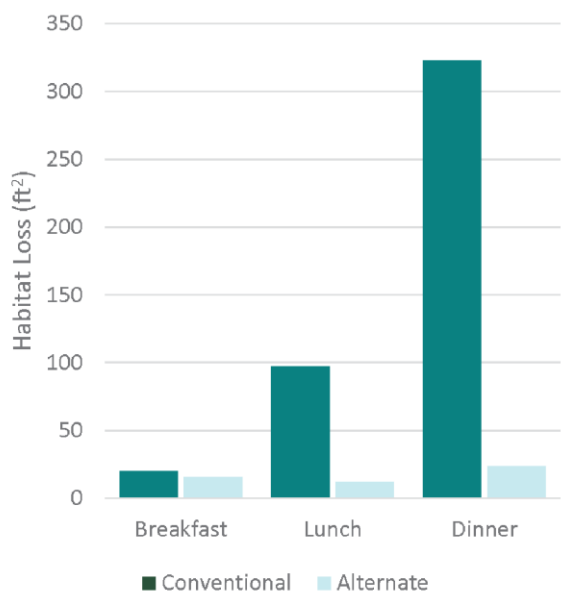
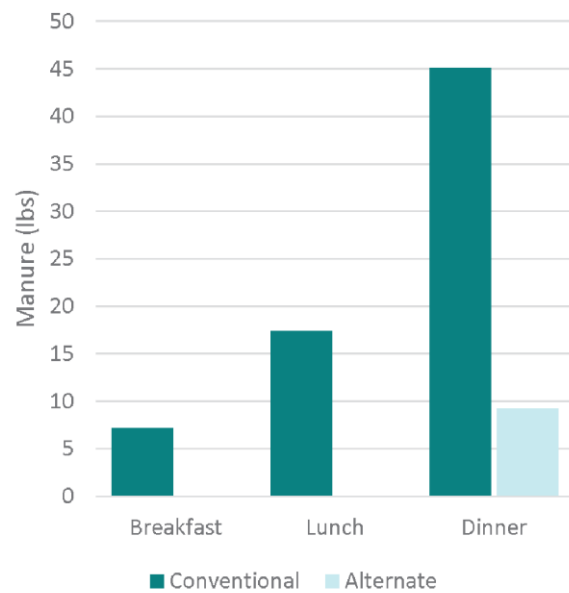
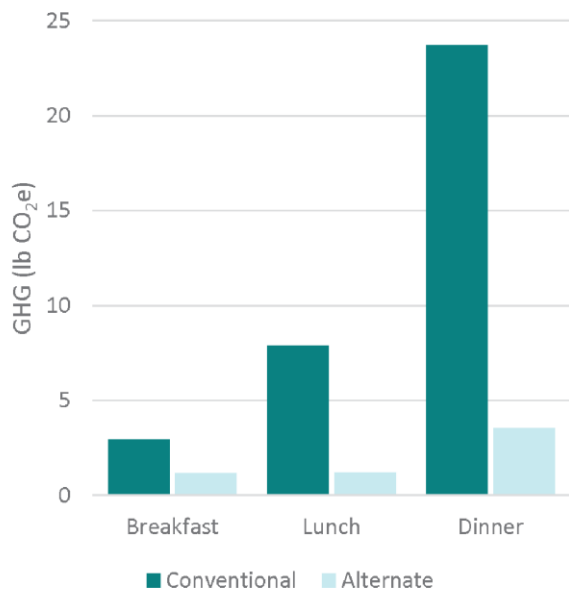


Figure 1: Average total life-cycle greenhouse gas emissions (GHG), habitat loss, solid manure production and water use associated with the production of conventional and alternative “low-impact” dishes at each meal, per serving.

## ANALYSIS AND DISCUSSION

### INDIVIDUAL BENEFITS

At an event with both conventional and low-impact menu selections, low-impact food options can substantially reduce the environmental footprint per attendee (Table 4).

The greenhouse gas benefits of an individual selecting low-impact dishes instead of conventional dishes for a daylong event that serves breakfast, lunch and dinner are equivalent to cutting the pollution of driving 41 miles, powering the average home for one day or charging 2,100 smart phones.<sup>13</sup> In addition, the low-impact meal choices per person would spare over 400 square feet of farmland, prevent about 100 pounds of manure pollution, and save 250 gallons of water.

*Table 4: Environmental footprint reductions due to selection of alternative “low-impact” dishes instead of conventional dishes by one person for one day. Negative values indicate environmental benefits.*

	<b>Dish Substitutions</b>	<b>GHG (lb CO<sub>2</sub>e)</b>	<b>Habitat Loss (ft<sup>2</sup>)</b>	<b>Manure (lbs)</b>	<b>Water Use (gal)</b>
<i>Breakfast</i>	Sub. bagel w/ vegan cream cheese & soy milk for bagel w/ cream cheese & dairy milk	-1.8	-4.2	-7.2	-15
<i>Lunch</i>	Sub. black bean burrito for pork burrito	-7.8	-81	-26	-72
<i>Dinner</i>	Sub. creamy garlic pasta with roasted tomatoes for beef lasagna	-27	-330	-66	-160
<b>TOTAL</b>		<b>-37</b>	<b>-420</b>	<b>-99</b>	<b>-250</b>

### OVERALL EVENT BENEFITS

For a venue or caterer, serving low-impact dishes can substantially reduce the environmental footprint of an event. Using the example menus in this study, providing meals for a two-day event (breakfast, lunch and dinner on day one, breakfast and lunch only on day two, and assuming 10% extra servings provided to guarantee selection for attendees) could provide a carbon footprint reduction of two tons for every 100 attendees.

The low-impact menu also spares about one acre of farmland and reduces water use by about 20,000 gallons for every 100 attendees. These environmental benefits increase significantly for larger events (Table 5).



Earth-friendly, low-impact meals provide greenhouse gas benefits of 60% to 85%, land use benefits up to 93%, and water use benefits up to 72% over conventional meals, in addition to nearly eliminating manure pollution. Even at medium-sized events, these improvements could substantially improve menu sustainability across many environmental metrics.

Table 5: Environmental footprint reductions due to providing alternative “low-impact” dishes instead of conventional dishes for over two days.

	<b>GHG (tons CO<sub>2</sub>e)</b>	<b>Habitat Loss (acres)</b>	<b>Manure (tons)</b>	<b>Water Use (gal)</b>
<b>100-person event</b>				
<i>Breakfast</i>	0.19	0.01	0.40	1,700
<i>Lunch</i>	0.73	0.22	0.96	4,300
<i>Dinner</i>	1.1	0.75	2.0	13,000
<b>TOTAL</b>	<b>2.0</b>	<b>1.0</b>	<b>3.3</b>	<b>19,000</b>
<b>150-person event</b>				
<i>Breakfast</i>	0.29	0.02	0.59	2,500
<i>Lunch</i>	1.1	0.32	1.4	6,400
<i>Dinner</i>	1.7	1.1	3.0	20,000
<b>TOTAL</b>	<b>3.1</b>	<b>1.5</b>	<b>5.0</b>	<b>29,000</b>
<b>500-person event</b>				
<i>Breakfast</i>	1.0	0.1	2.0	8,400
<i>Lunch</i>	3.7	1.1	4.8	21,000
<i>Dinner</i>	5.6	3.8	9.9	66,000
<b>TOTAL</b>	<b>10</b>	<b>4.9</b>	<b>17</b>	<b>96,000</b>

Most of these benefits come from environmentally friendly dinner menu items, even though we assume dinner is only served once at a two-day event (Figure 2). But the results for breakfast and lunch show that even very minor changes in event catering like switching from dairy to plant-based dairy alternatives can improve food service sustainability across many environmental metrics.

For a 500-person event, the benefits of serving a low-impact menu are equivalent to preventing 22,000 miles driven by car or about 50 people flying round-trip from New York City to Chicago. The habitat benefits are equivalent to sparing five acres of farmland. In addition, the low-impact menu would prevent 17 tons of manure pollution and save nearly 100,000 gallons of water from irrigation and food processing.

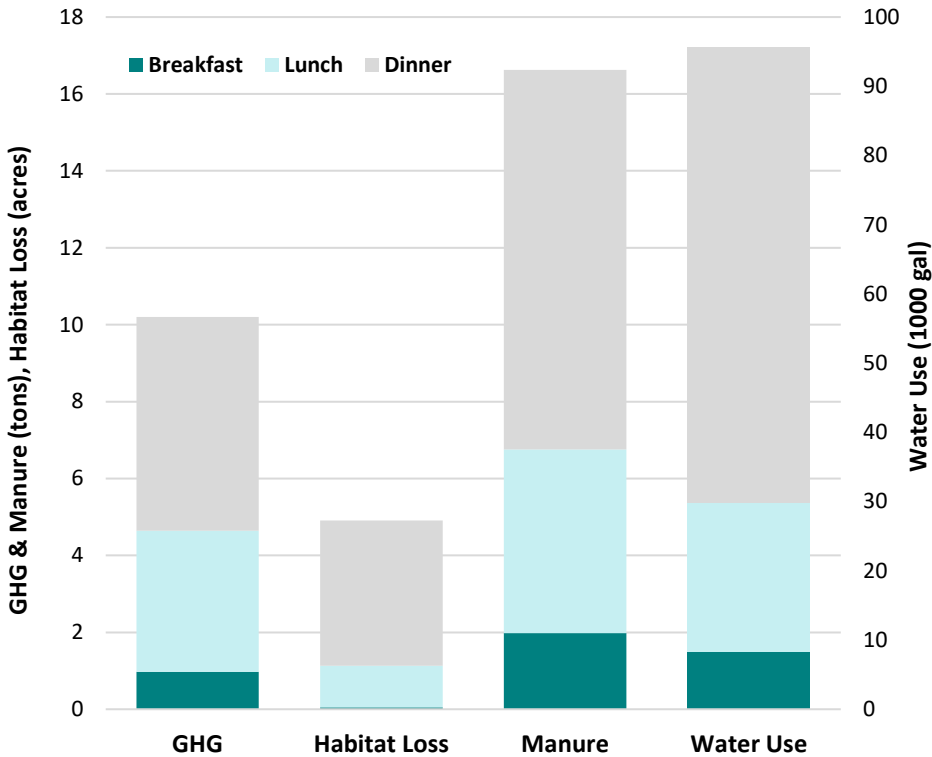


Figure 2: Environmental footprint reductions due to providing alternative low-impact dishes instead of conventional dishes for 500 people over two days.

## OBSTACLES AND OPPORTUNITIES

Between June and October 2019, the Center for Biological Diversity surveyed 25 event planners and venues to determine obstacles and opportunities to implementing Earth-friendly, low-impact menus.

We asked which option they would prefer when working with venues and caterers: an entirely plant-based menu at every meal served; a “default-veg” menu (a plant-based menu with the option for attendees to opt-in for a meat or dairy item); or doubling (and improving) the amounts of plant-based options available, including non-dairy milks and cheeses.

83% of respondents favored creating an entirely plant-based menu or a default-veg menu. Compared to simply increasing the number of plant-based options, menus centered around plant-based dishes simplify planning and have greater environmental benefits.

### Sample Menu Interests

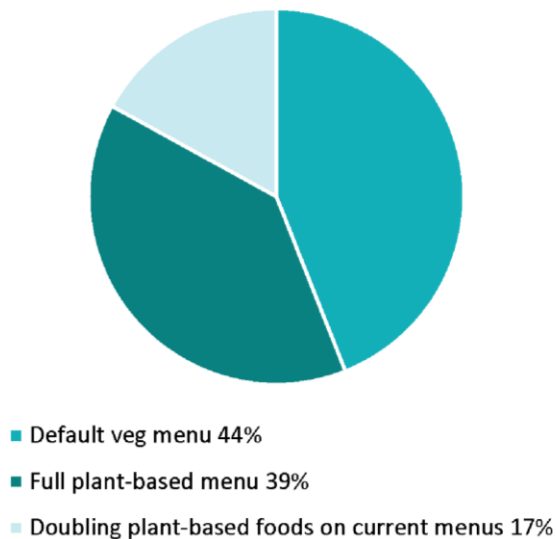


Figure 3: Survey results indicate that event planners are willing to work with different options to lower the environmental footprint of their menus, whether by serving all plant-based menus or doubling the plant-based options.

40% of respondents identified venue limitations or availability of food as an obstacle to offering Earth-friendly menus. If venues and caterers offered “greener” options, event planners would be more willing to switch to low-impact menus.

### Biggest Obstacles Limiting Plant-based Foods at Events

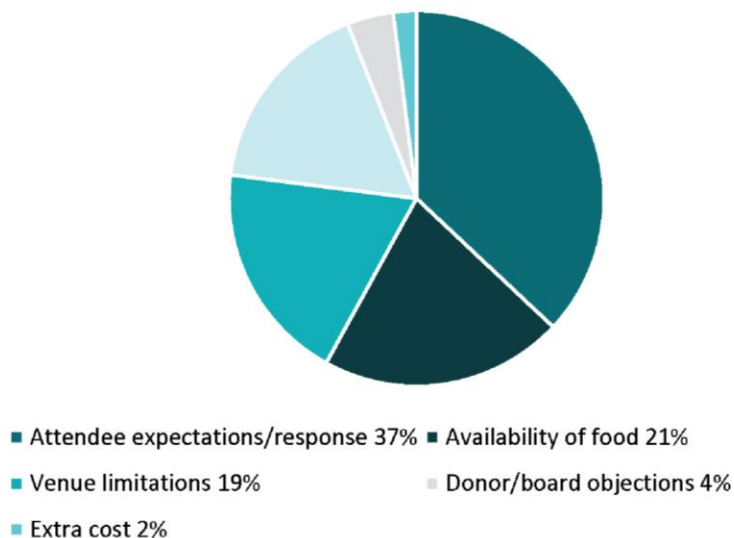


Figure 4: Survey results from event organizers show that the perception of attendees was a leading concern.

It's also important for venues and caterers to note that the leading obstacle identified by respondents was the perception that event attendees may not be satisfied with plant-based options. Yet the growing momentum of using plant-based menus successfully and with positive attendee experience (as well as growing demand from attendees) is evidenced by the increasing amount of venues and caterers designing these menus.

In order to successfully transition to Earth-friendly menus, plant-based dishes must be flavorful, filling, and marketed in an appealing way.<sup>14,15</sup> Venues and caterers should ensure that chefs are trained in making delicious plant-based foods and that the menu descriptions focus on taste rather than impact. Several leading nonprofit organizations offer such training without fees. Furthermore, the dishes analyzed in this report are familiar substitutions that are already offered by common venues and the food industry.

## CONCLUSION

Our analysis found that replacing animal products with plant-based ingredients consistently improves food sustainability at all meals for catered events. Small changes in purchasing, such as replacing dairy with plant-based milks and cheeses, can have substantial effects on sustainability, climate change, and health and wellness goals for suppliers and their clients.

What's more, plant-based options are becoming more desired and flavorful. For example, popular plant-based burgers are nearly indistinguishable from beef and reduce carbon emissions by 90%.<sup>16</sup>

Plant-based menus that eliminate all animal products have the lowest impact across all metrics. That said, there are many different ways that venues and caterers can reduce the environmental impact of their food, including entirely plant-based menus, default-veg menus or increasing the ratio of plant-based to meat-based items.

The environmental savings of low-impact menus are enormous, and the public demand for these menus is rapidly growing. It's time for the event and catering industry to reduce its environmental footprint by taking advantage of delicious, affordable plant-based meals.

## APPENDIX A: SUPPLEMENTARY RESULTS

Environmental impacts were assessed for several recipes that were not selected for the main report. The following tables show the assessment results for all recipes in the original scope of work:

*Table 6: Total life-cycle greenhouse gas emissions (GHG), land use, solid manure production and water use associated with the production of a conventional American dining menu on a per-serving basis.*

	<b>GHG (lb CO<sub>2</sub>e)</b>	<b>Land Use (ft<sup>2</sup>)</b>	<b>Manure (lbs)</b>	<b>Water Use (gal)</b>
<b>Breakfast</b>				
<i>Bacon</i>	2.1	18	6.5	14
<i>Bagel with cream cheese</i>	1.5	14	3.9	24
<i>Milk</i>	1.4	6	3.3	9
<i>Scrambled Eggs</i>	2.0	15	4.3	23
<i>Yogurt with fruit and granola</i>	1.8	9	3.5	16
<b>Lunch</b>				
<i>Beef burrito</i>	15	200	32	120
<i>Beef fajitas</i>	8.8	140	15	41
<i>Chicken fajitas</i>	1.6	17	0.3	20
<i>Cobb salad</i>	4.9	38	8.3	46
<i>Ham and cheese sandwich</i>	5.5	41	14	53
<i>Pork burrito</i>	9.0	92	26	110
<i>Tuna salad sandwich</i>	1.1	7	0.0	12
<b>Dinner</b>				
<i>Beef lasagna</i>	28	340	66	180
<i>Chicken alfredo</i>	6.1	45	10	53
<i>Grilled salmon with mashed potatoes and veggies</i>	2.5	28	0.0	82
<i>NY strip steak with mashed potatoes and veggies</i>	37	590	59	270
<i>Roast chicken with potatoes and veggies</i>	3.2	31	0.7	30
<i>Surf and turf</i>	28	410	43	120

Table 7: Total life-cycle greenhouse gas emissions (GHG), land use, solid manure production and water use associated with the production of an alternative low-impact American dining menu on a per-serving basis.

	<b>GHG (lb CO<sub>2</sub>e)</b>	<b>Land Use (ft<sup>2</sup>)</b>	<b>Manure (lbs)</b>	<b>Water Use (gal)</b>
<b>Breakfast</b>				
<i>Avocado toast</i>	1.4	13	0	26
<i>Bagel with vegan cream cheese</i>	0.8	14	0	14
<i>Oatmeal with fruit</i>	0.6	4	0	21
<i>Soy milk</i>	0.4	2	0	4
<i>Veggie scramble</i>	2.2	23	0	72
<b>Lunch</b>				
<i>Black bean burrito</i>	1.2	11	0	36
<i>Chickpea salad sandwich</i>	0.9	20	0	24
<i>Portobello mushroom and pepper fajitas</i>	1.4	11	0	30
<i>Roasted veggie sandwich</i>	1.0	13	0	23
<i>Vegan cobb salad</i>	1.2	8	0	20
<b>Dinner</b>				
<i>Black bean and sweet potato power bowl</i>	0.6	5	0.6	7
<i>Black bean tacos</i>	1.7	14	0	39
<i>Creamy garlic pasta with roasted tomatoes</i>	0.6	4	0	17
<i>Peanut Bali bowl</i>	2.4	29	0	61
<i>Veggie lasagna</i>	11	73	36	130
<i>Veggie stir fry</i>	0.9	15	0	28

## RESULTS FOR THE SAME MENU ANALYSIS PRESENTED IN METRIC UNITS:

Table 8: Total life-cycle greenhouse gas emissions (GHG), land use, solid manure production and water use associated with the production of a conventional American dining menu on a per-serving basis.

	<b>GHG (kg CO<sub>2</sub>e)</b>	<b>Land Use (m<sup>2</sup>×yr)</b>	<b>Manure (kg)</b>	<b>Water Use (L)</b>
<b>Breakfast</b>				
<i>Bacon</i>	0.97	1.7	3.0	52
<i>Bagel with cream cheese</i>	0.69	1.3	1.8	90
<i>Milk</i>	0.64	0.6	1.5	35
<i>Scrambled Eggs</i>	0.90	1.3	1.9	87
<i>Yogurt with fruit and granola</i>	0.80	0.9	1.6	59
<b>Lunch</b>				
<i>Beef burrito</i>	6.6	19	14	460
<i>Beef fajitas</i>	4.0	13	6.7	160
<i>Chicken fajitas</i>	0.72	1.6	0.2	75
<i>Cobb salad</i>	2.2	3.6	3.8	170
<i>Ham and cheese sandwich</i>	2.5	3.8	6.5	200
<i>Pork burrito</i>	4.1	8.6	12	410
<i>Tuna salad sandwich</i>	0.48	0.7	0	45
<b>Dinner</b>				
<i>Beef lasagna</i>	13	31	30	680
<i>Chicken alfredo</i>	2.8	4.2	4.7	200
<i>Grilled salmon with mashed potatoes and veggies</i>	1.1	2.6	0	310
<i>NY strip steak with mashed potatoes and veggies</i>	17	55	27	1,000
<i>Roast chicken with potatoes and veggies</i>	1.5	2.9	0.3	110
<i>Surf and turf</i>	12	38	20	460

Table 9: Total life-cycle greenhouse gas emissions (GHG), land use, solid manure production and water use associated with the production of an alternative low-impact American dining menu on a per-serving basis.

	<b>GHG (kg CO<sub>2</sub>e)</b>	<b>Land Use (m<sup>2</sup>×yr)</b>	<b>Manure (kg)</b>	<b>Water Use (L)</b>
<b>Breakfast</b>				
<i>Avocado toast</i>	0.63	1.2	0	99
<i>Bagel with vegan cream cheese</i>	0.34	1.3	0	52
<i>Oatmeal with fruit</i>	0.28	0.4	0	79
<i>Soy milk</i>	0.19	0.2	0	15
<i>Veggie scramble</i>	1.00	2.2	0	270
<b>Lunch</b>				
<i>Black bean burrito</i>	0.54	1.1	0	130
<i>Chickpea salad sandwich</i>	0.42	1.9	0	91
<i>Portobello mushroom and pepper fajitas</i>	0.63	1.0	0	110
<i>Roasted veggie sandwich</i>	0.48	1.2	0	88
<i>Vegan cobb salad</i>	0.57	0.7	0	75
<b>Dinner</b>				
<i>Black bean and sweet potato power bowl</i>	0.29	0.5	0.3	27
<i>Black bean tacos</i>	0.76	1.3	0	150
<i>Creamy garlic pasta with roasted tomatoes</i>	0.26	0.3	0	63
<i>Peanut Bali bowl</i>	1.1	2.7	0	230
<i>Veggie lasagna</i>	5.1	6.8	17	480
<i>Veggie stir fry</i>	0.43	1.4	0	110



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