

Plant-Based Trends in California's School Lunches

A Progress Report on
Climate-Friendly School Food



August 2023



Friends of the Earth
Climate-Friendly Cuisine
For Healthy Kids and a Healthy Planet



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Friends of the Earth
Climate-Friendly Cuisine
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Friends of the Earth's Climate-Friendly School Food Program helps school districts make the shift toward healthy, delicious, plant-forward and organic meals. We provide plant-based and organic procurement and technical assistance and marketing materials, support student and community engagement strategies, and link school districts with the resources they need to be successful. We also partner with school districts and NGOs to advocate for state and federal policy change. For more information or to request support, please email climatefriendlyfood@foe.org.

Dear Reader,

Friends of the Earth expresses our deepest gratitude to school nutrition service teams, organizations and policymakers that have been dedicated to improving California's school nutrition programs these past few years. Despite pandemic challenges, school nutrition staff increasingly understand the growing demand from students and the myriad environmental and health benefits of serving more plant-based school meals. There are numerous examples of climate-friendly school meal practices emerging across California, including school districts expanding organic purchasing, student engagement campaigns and menus featuring more culturally appropriate, plant-based school meals.

The coronavirus pandemic starkly revealed what we already knew — our underlying health is vitally important, and diet-related diseases that increase overall health risks are more prevalent among low-income people and communities of color. Even before the pandemic, school districts experienced a host of barriers to serving healthy plant-based school meals, including limited staff capacity and training for scratch meals, lack of culturally appropriate plant-based recipes and products, as well as higher food costs and the risk of declining participation rates when serving new entrées.

The past few years have presented unprecedented challenges to school nutrition services across the state, including extensive staffing shortages and considerable loss of revenue. Additionally, pandemic-related supply chain distribution problems created last-minute order changes and challenges to developing USDA-compliant school menus. Despite these significant challenges, we are witnessing an overwhelming commitment from school nutrition staff to serve healthy, climate-friendly, plant-based school meals.

As California's policymakers and support organizations continue to invest in and improve the quality of school meals, this progress report provides a snapshot of current school lunch entrée offerings served in California's largest school districts and how these compare to 2019 offerings. We hope this report will provide useful information on the progress that has been made, as well as the continued need for improvement in the quality and diversity of school meals. We also hope the report can help a range of stakeholders better understand the barriers and key recommendations for the policy and structural changes needed to scale up healthy, climate-friendly food for the health of our planet and the students we serve.

With gratitude,

Friends of the Earth



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I. Introduction – Executive Summary

As our climate crisis intensifies and more than half of Americans suffer from diet-related disease, California’s school nutrition service staff have heeded the urgent call to make school food healthier and more climate-friendly.^{1,2} This report highlights Friends of the Earth’s menu analysis comparing 2019 and 2022 school menu entrées served at the 25 largest school districts across the state. We found that, despite a host of barriers during the coronavirus pandemic, there were remarkable improvements in the frequency, quality and variety of plant-based entrées featured.

In October 2022, 68% of California’s largest school districts served plant-based entrée offerings daily or weekly, compared to only 44% of school districts in October 2019. High school and middle schools noticeably served plant-based offerings more frequently, with 14 out of 25 schools (56%) offering a plant-based entrée every day compared to 9 out of 25 (36%) in 2019. The number of elementary schools offering weekly plant-based entrées has more than tripled, from 4 out of 25 (16%) of elementary schools in 2019 to 14 out of 25 (56%) in 2022.

Across California, school districts are adding healthier, more ethnically diverse, whole-food, plant-based entrées on menus. These entrées — including tofu Katsu rice bowls, vegetarian lo mein, plant-based tamales and sticky Sichuan dumplings — reflect the diversity of students’ cultural, philosophical, religious, and health preferences. Out of all vegetarian entrée offerings, warm entrées increased by 5%, and in contrast to three years ago, less nutrient-dense nut-butter sandwich offerings decreased by 9%, suggesting an increase in higher-quality plant-based entrée offerings which are heartier and more beneficial for students.

These improvements come amidst major pandemic challenges as well as far-reaching school food

policy reforms from the California legislature that will deliver significant improvements in the quality, sustainability and access to school meals across the state, including:

- Implementation of the Universal Meals Program in 2021, allowing all students to eat breakfast and lunch for free regardless of income status.
- A first-of-its-kind Farm to School Incubator Grant Program, awarding \$25.5 million in 2022 with a priority on sourcing organic and climate-smart food. An additional \$50 million was included in the state budget for farm-to-school programming in 2023-24.
- Historic investments allocated in the state’s school meal programs, including \$600 million to upgrade school kitchen infrastructure and to provide staff training; and \$100 million to implement “school food best practices,” including offering plant-based, sustainably produced and California-grown foods and expanding scratch cooking, as well as accommodating students with restricted diets.

As California continues to lead the way on progressive school food policy reforms, our analysis of California’s school lunch entrées and trends since 2019 suggests that these investments are beginning to pay off but that more work is needed to reduce barriers to serving healthy, climate-friendly, plant-based entrées.

Two notable examples of where more work is needed are the prevalence of processed meat and cheese-heavy entrées. Nearly one in five entrées served in California’s top 25 school districts include processed meat, a known carcinogen. Another concern is the growing number of cheese-based entrées on California’s lunch menus, accounting for 57% of all menu entrées— raising climate concerns that we detail in [Section IV](#).

WHAT IS A PLANT-BASED MEAL?

Plant-based entrées (as opposed to salads or a side of fruit) are the main course of the meal, utilizing beans, peas, lentils and/or soy products as the main protein component. A plant-based meal contains no animal products or byproducts (e.g., no milk, yogurt, cheese or meat products).

Current Plant-Based Trends and Key Findings

Increased Daily Options of Plant Based Entrees

Significantly more districts provided plant-based options daily or weekly in 2022 (68% of districts) compared to 2019 (44% of districts). 14 of the largest 25 school districts offer a plant based meal daily.

Better Quality and Diversity of Plant-Based Options

There are significant improvements in the quality and diversity plant-based entrees, with new items added such as teriyaki tofu, vegan tamales and chana masala.

Increased Number of Plant-Based Entrees

The frequency of plant-based entrees increased by 16%, yet they still account for only 8% of all entrées offered.

Reduced Frequency of Meat-Based Entrees

The frequency of meat-based entrees decreased slightly by 4% yet accounted for nearly half (48%) of all entrées on the menu in 2022.

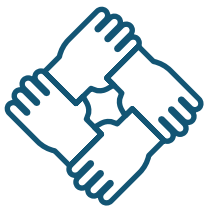
Significant Increase in Processed Meat

The number of entrees with processed meat increased by 11%, to nearly one-fifth (18%) of all entrées offered in 2022.

Menus Frequently Feature Cheese-Heavy Entrees

More the half (57%) all offerings on school menus contain cheese, and some of these also include meat (e.g., pepperoni pizza).

Why Plant-Based Entrées?



FOR EQUITY: Ensuring consistent access to plant-based options helps accommodate students who are following plant-based diets for religious, health, philosophical or other reasons. A recent Chartwells poll found that

37% of students said they would eat school lunch more often if there were more vegetarian and vegan choices. People of Color are three times more likely to follow a plant-based diet than white people, so providing plant-based options is especially important for racial equity.⁴



FOR HEALTH: Leading public health organizations all encourage fiber-rich, plant-forward diets. Expanding plant-based options would foster greater alignment with the Dietary Guidelines

for Americans,⁶ which recommend increasing consumption of beans, peas and lentils; increasing dietary fiber (which comes from plants); and replacing processed meats (e.g., hot dogs, sausages and bacon) with plant-based proteins.



FOR DIETARY NEEDS: Providing dairy-free entrées better meets the dietary needs of a wide variety of students. According to the National Institutes of Health, 95% of Asian Americans, 60 to 80% of African Americans, 80

to 100% of American Indians, and 50 to 80% of Hispanic people are unable to process lactose.⁵



FOR CLIMATE: This generation's students are bringing their climate activism to the cafeteria. Reams of scientific studies^{7,8,9} show that industrial animal agriculture plays a major role in driving climate change and

that plant-rich diets are a highly effective way to reduce our impact on the climate.



II. Methods & Limitations

Friends of the Earth analyzed 1,146 lunch menu entrée items offered during October 2022 to capture a snapshot of lunch entrée offerings on school menus in California's 25 largest school districts. We analyzed the trends in both the frequency and types of entrées served compared with data we gathered in October 2019 of 1,356 lunch menu items from California's 25 largest school districts (presented in our State of School Lunch in California report).

Using Friends of the Earth's menu analysis methodology from 2019 (which you can find here), we focused only on the protein, also known as the Meat/Meat Alternate (M/MA) category, within lunch entrées. This analysis does not include the grain, vegetables, fruit and milk that must accompany the M/MA to be credited as a federally reimbursable meal. Our analysis also did not include a la carte items, school breakfast, supper or snacks, and excluded salad bars due to methodological constraints. It is important to note that salad bars

are an important strategy that allows districts to make minimally processed plant-based protein and other fresh, healthy food regularly available to students as part of a reimbursable meal.

Because we do not have data on how often various entrée options are selected by students – this analysis centers primarily on how often they are *offered*. Future research is needed to better understand take rates among meat-based vs. plant-based offerings.

While California's largest school districts appear to be a reasonable proxy for menu trends across the state, collectively representing 1.83 million or approximately 33% of total students enrolled and roughly 121 million lunches served annually (SY 2021-22), we recognize that small- and mid-sized districts experience a unique set of challenges. More research is needed to understand the extent to which these trends reflect menus in small- and mid-sized school districts.

III. Key Findings and Trends in Plant-Based School Meals

Significant Improvements in Frequency of Plant-Based Offerings

Our analysis shows noteworthy progress since October 2019, with 68% of districts serving plant-based entrées daily or weekly across both elementary and middle/high school menus compared to only 44% doing so in October 2019.

High school and middle schools are serving plant-based offerings more frequently, with 14 out of 25 of their menus (56%) featuring a plant-based entrée every day, compared to only 9 out of 25 middle and high school menus (36%) in 2019. Only 4 out of 25 middle and high school menus (16%) are serving no plant-based options, a 42% decrease since 2019.

In stark contrast, only 1 out of 25 elementary schools (4%) served daily plant-based entrées and nearly one-fourth (24%) of all elementary districts served no plant-based offerings at all. While still lagging far behind high schools, the number of elementary schools offering *weekly* plant-based entrées has *more than tripled*, from 16% of elementary schools in 2019 to 56% in 2022. These trends show huge progress among elementary schools, which is significant given recent pandemic and staffing challenges.

Plant-Based Entrées Increased, But Meat Still Dominates School Menus

Overall, the share of plant-based entrées out of the total entrées offered throughout the month increased by 16% between 2019 and 2022 – the biggest increase compared to all other categories (i.e., beef, chicken, pork, turkey, fish and vegetarian categories). However, despite significant advancements, plant-based entrées still only accounted for 8% of the total menu entrée offerings on October 2022 menus.

Our analysis shows that meat entrées continue to make up a large portion of school menus, representing roughly half of all offerings. Meat entrées decreased only slightly from 50% of entrées offered in 2019 to 48% in 2022 (see Figure 3). Despite only slight improvements, all meat entrée categories (beef, chicken, pork and fish) slightly decreased between 2019 and 2022, except for turkey. Beef continues to represent a large portion – 12% of all of school menu entrées offered, very similar to 2019.

FIGURE 2

Availability of Plant-Based Entrée Offerings

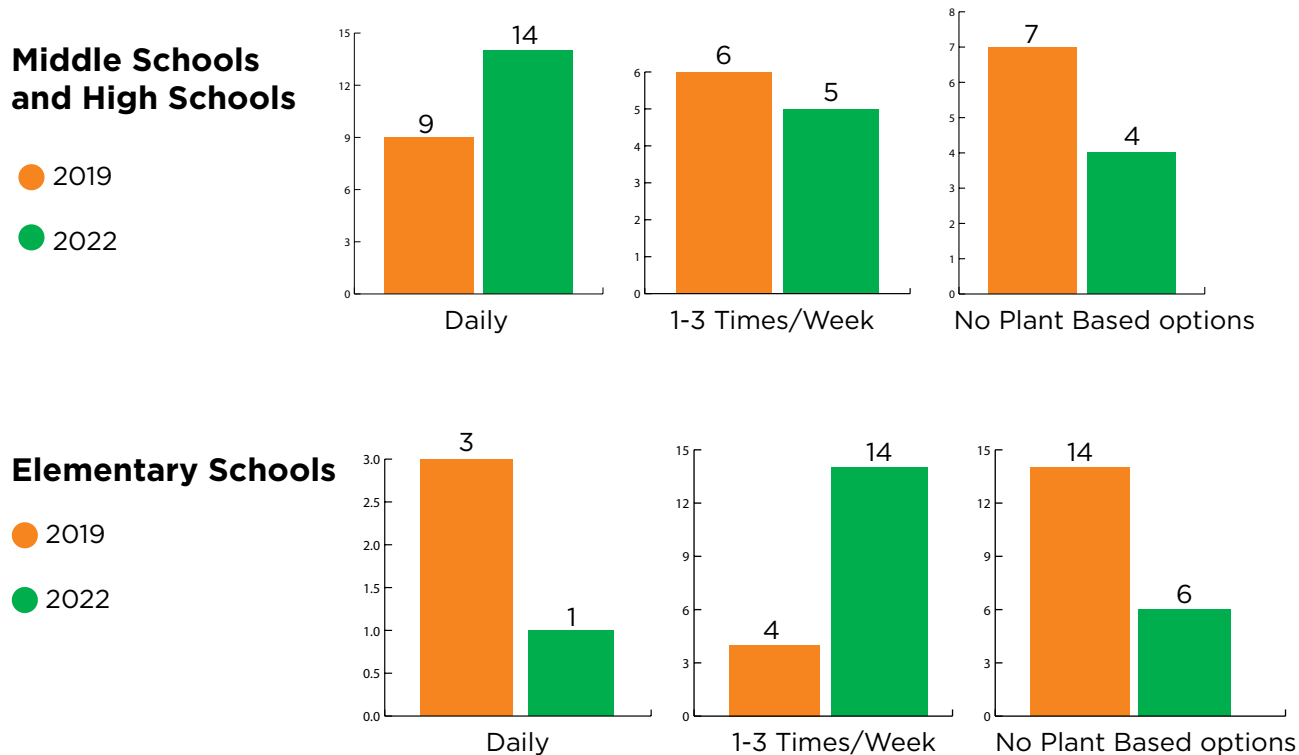
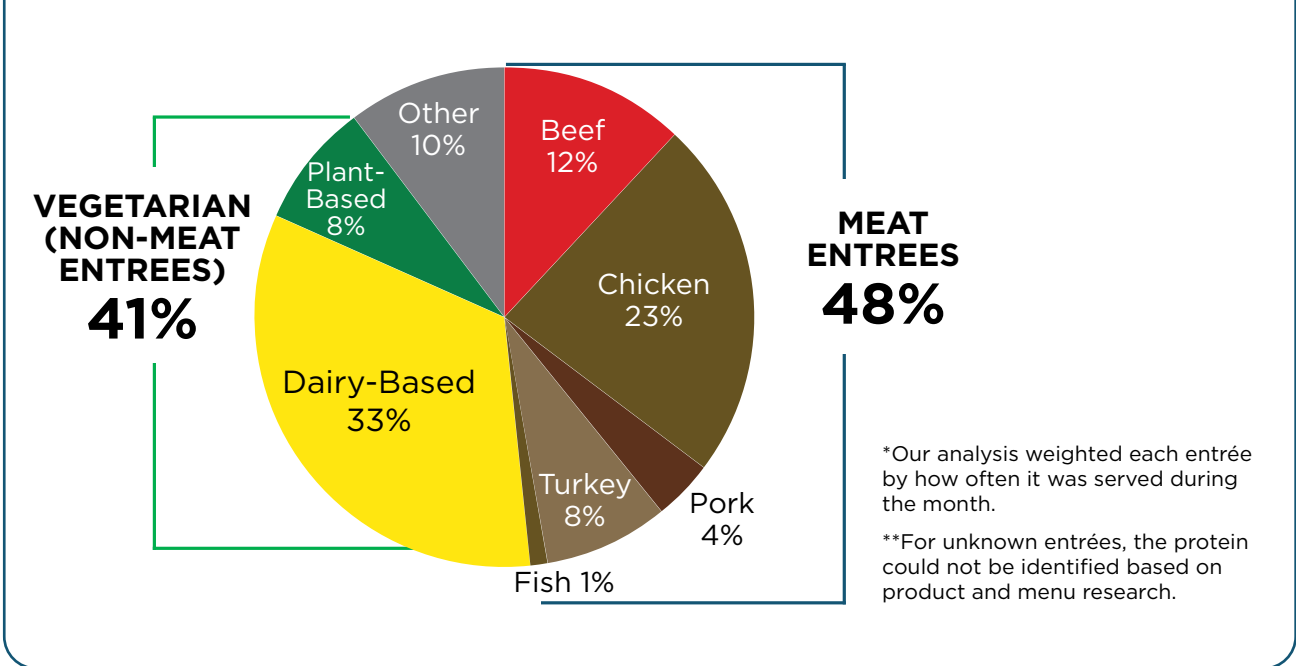


FIGURE 3

Frequency of 2022 Menu Entrées by Protein* Category



New Plant-Based Offerings: Hot Entrées and Higher Quality

Our analysis shows that school nutrition staff are making strides in offering new, higher-quality, whole-food, plant-based entrée dishes. California's top 25 largest districts featured 80 different plant-based entrées in October 2022, compared to 61 offerings in 2019. See Figure 4 for creative examples of culturally diverse, whole-food, plant-based entrées.

In 2022, 59% of plant-based entrées served were

hot, a 5% increase from 2019. Many of these warm plant-based dishes likely took the place of nut butter sandwiches, which decreased by 9% from 2019 to 2022, making up only 8% of all vegetarian offerings in 2022.

The added variety and higher quality of plant-based offerings is even more significant considering that the total number of entrées decreased by 300, likely due to nutrition service teams needing to pare down menus given pandemic-related challenges.

Examples of Plant-Based Entrées in California's 25 Largest School Districts in October 2022



Amazing Lo Mein



Bean Burrito



Chana Masala



Plant-Based
Nuggets



Rainbow Salad



Singapore Curry
Noodles



Sichuan Dumplings



Teriyaki Tofu



Thai Chili Tofu



Three Bean Chili



Tofu Katsu Bowl



Teriyaki Chickpeas



Vegan Tostada



Vegan Tamale



Thai Sweet Chili Bowl

Fewer Nut Butter Sandwiches

With the addition of more diverse, culturally appropriate, plant-based entrées on school menus, districts are making huge improvements in reducing their reliance on nut butter sandwiches as the only plant-based offering on the menu.

Figure 5 highlights the decrease in the number of elementary and middle/high schools that feature nut butter sandwiches as the *only* plant-based offering on the menu. Across both elementary schools and middle/high schools, there was a more than 30% decrease in districts that offered *only* nut butter sandwiches as a plant-based offering, further exemplifying the added variety of plant-based offerings on the menu.

FIGURE 5

Fewer School Districts Feature Nut Butter Sandwiches as the Only Plant-Based Option

	2019	2022	PERCENT CHANGE
Elementary School Districts	8 out of 25 (32%)	5 out of 25 (20%)	-37%
Middle/High School Districts	6 out of 25 (24%)	4 out of 25 (16%)	-33%

What About Pre-Made Processed Plant-Based Offerings?

Friends of the Earth encourages school districts to incorporate entrées that utilize whole plant-based ingredients, such as beans, lentils and tofu to their menus. Evidence from leading public health organizations¹⁰ and the Dietary Guidelines for Americans¹¹ supports that these are healthy, fiber-rich options. At the same time, we recognize the need to meet schools where they are, and at this time many schools must rely on pre-packaged or pre-made plant-based options. Lower-income schools may disproportionately need to rely on these options because they lack scratch-cooking staff capacity, training and equipment. For example, a school without scratch-cooking ability that's currently serving a pre made beef patty or heavily processed hot dog should consider pre made plant-based options such as a soy patty alongside the beef patty to accommodate vegetarian and vegan students. Where possible, we encourage schools to select organic and non-GMO plant-based products. For more information, visit **Eat Real's K-12 School Food Guide on How to Choose Nutritious Plant-Based Options.**

Sweetwater Union High School District, San Diego County

Sweetwater Union High School District, with leadership from nutrition service director Eric Span, offers plant-based, vegan options daily in all its school cafeterias. As the second-largest high school district in California, Sweetwater recognizes the diversity of students' diets and regularly conducts taste tests of plant-based items. Its creative menu includes a vegan burrito, falafel wraps, a pretzel dipper box, and a variety of scratch-cooked hummus-based entrées that are very popular with the students. Hot plant-based entrées are offered three out of five school days each week.

Lunch Lunch includes an entrée, fruit, vegetable and milk (1% white or nonfat chocolate). Assorted condiments offered daily.

	Mon	Tue	Wed	Thu	Fri
Entrées	Pizza By the Slice (Pepperoni or Cheese)	Turkey & Cheese Sandwich	Pizza By the Slice (Pepperoni or Cheese)	BBQ Chicken with Corn and Roll	Pizza By the Slice (Pepperoni or Cheese) Chicken & Mashed Potato Bowl
	Spaghetti w/ meat sauce Mediterranean Chicken Wrap	Chicken Teriyaki Rice Bowl Pizza Crunchers	BBQ Cheeseburger Chicken Caesar Salad w/Roll	Nashville Chicken Tenders w/Fries Hot Pepperoni Stuffed Sandwich	Bean & Cheese Pupusa w/Salsa
	Vegan Mediterranean Falafel Wrap	Vegan Teriyaki Chickpeas w/Rice	Vegan Tamale	Vegan Falafel Bistro Box	Vegan Taco Salad w/ Tortilla Chips
Sides	Seasonal Fresh Fruit Assorted Fruit Cups Baby Carrots Mexican Street Corn	Seasonal Fresh Fruit Cool Tropics Slushie Side Salad Spicy Lemon Cucumber Rounds	Seasonal Fresh Fruit Assorted Fruit Cups Baby Carrots Spicy Black Beans	Seasonal Fresh Fruit Cool Tropics Slushie Asian Broccoli Spicy Lemon Cucumber Rounds	Seasonal Fresh Fruit Assorted Fruit Cups Mexican Street Corn Baby Carrots

= Vegetarian
 = Vegan

Top Entrée Offerings on School Menus

Of the 21 different menu entrée categories offered in October 2022, we identified 15 of the most frequently offered school lunch entrées. Meat entrées account for 8 of the 15 (see Figure 6). Most notably, meat pizza and deli meat sandwiches together make up 9% of all entrées offered. These both contain processed meat, a known carcinogen according to the World Health Organization.^{12,13}

Our top entrée findings align with our overall findings, which show an increase in vegetarian (non-meat protein) offerings. Especially notable is that specialty vegetarian entrées, which are often scratch-cooked and made with whole plant-based foods, landed in the top 10 for the first time; and plant-based vegan bowls and specialty items landed in the top 13 (ranked #23 in 2019).

FIGURE 6

Top 15 School Lunch Entrées*

In California's 25 Largest School Districts
in October 2022

1. Battered chicken sandwich
2. Cheese pizza (V)
3. Meat pizza (HP)
4. Deli meat sandwich (HP)
5. Yogurt parfait (V)
6. Specialty vegetarian entrées (V)**
7. Cheeseburger
8. Chicken bowl
9. Bean and cheese entrée (V)
10. Chicken salad
11. Nut butter or seed sandwiches (V)
12. Plant-based bowls or specialty entrées (V)**
13. Beef crumbles
14. Hot dog (HP)
15. Hot cheese entrée bake

(V) Vegetarian

(HP) Contains highly processed meat products

Fort Bragg Unified School District, Mendocino County

Fort Bragg Unified School District, is a small district with 1,779 students, in Mendocino County, California. In Fall 2022, the nutrition services team partnered with the high school's culinary arts program to help create new plant-based recipes. Students made delicious dishes, including tempeh tacos, Pad Thai, a Korean noodle salad, ramen bowls, Cajun beans & dirty rice, and an assortment of vegetarian recipes. The class even hosted a plant-based spring roll competition with former students as the judges! The culinary arts program continues to work with Pilar Gray, Director of Nutrition Services, to incorporate healthful, climate-friendly, plant-based dishes on the menu that are available to students daily.



*Calculations were weighted by the frequency with which entrées were offered throughout the month, weighting each entrée equally across elementary and middle/high school menus. This does not necessarily indicate that these are the most widely consumed items as our data did not capture student consumption patterns or "take rates" of entrées.

**Examples of specialty vegetarian entrees include sandwiches, protein packs with cheese, pasta marinara and veggie burgers. Plant-based bowls or specialty entrees include tofu noodle bowls, plant-based wraps and vegan salads.

Increased Cheese-Heavy and Processed Entrées on Menus

Cheese-heavy entrées (both meat and vegetarian entrées combined) accounted for more than half (57%) of all menu offerings, a 9% increase from 2019. While we applaud school districts for serving more vegetarian entrées as a step toward accommodating a variety of student diets, reducing their carbon footprint and improving student health, 62% of all vegetarian entrées contained cheese.

The most widely served cheese-heavy vegetarian entrées include cheese pizza, bean and cheese burritos, bean and cheese tacos, baked potatoes with cheese, mozzarella sticks, cheesy bread, cheese enchiladas, macaroni and cheese, cheesy nachos and grilled cheese sandwiches — entrées that are generally low in fiber and heavily processed.

The type of heat-and-serve mac and cheese that is ubiquitous in school lunches is often highly processed, with a long list of ingredients revealing an abundance of fat, sodium, hydrogenated oils and synthetic additives (see *Figure 7*).

According to the 2020-2025 Dietary Guidelines for Americans, **“Replacing processed or high-fat meats (e.g., hot dogs, sausages, bacon) with seafood could help lower intake of saturated fat and sodium, nutrients that are often consumed in excess of recommended limits. Replacing processed or high-fat meats with beans, peas, and lentils would have similar benefits, as well as increasing dietary fiber, a dietary component of public health concern.”**¹⁴

FIGURE 7

Macaroni & Cheese (JTM Deli) Ingredient List

Water, Enriched Macaroni (Semolina, Egg White, Glycerol Monostearate, Niacin, Ferrous Sulfate, Thiamin Mononitrate, Riboflavin, Folic Acid), Cheddar Cheese (Pasteurized Milk, Cheese Culture, Salt, Enzymes), **Modified Food Starch,*** Contains less than 2% of Whey, Buttermilk Solids, Butter, Cream, **Sodium Phosphates,*** Salt, Whey Solids, Enzyme-modified Butter (Butter, Buttermilk Powder, Enzymes), **Maltodextrin,*** Dehydrated Butter (Butter, Buttermilk Powder), **Guar Gum,*** Annatto and Turmeric (for color), Sweet Whey, Natural Cheddar Cheese Flavor (Cheddar Cheese [Milk, Culture, Salt, Enzymes], Water, Whey, Dry Milk, Salt, **Sodium Phosphates,*** Enzymes), Yeast Extract, Corn Oil, Butter (Cream), Cream Solids, Sugar, Spice, **Disodium Inosinate and Disodium Guanylate,*** **Natural Flavor,*** Whey Powder, Coconut Oil, Corn Syrup Solids, Cheddar Cheese Blend (Whey, Cheddar Cheese [Cultured Milk, Salt, Enzymes], Reduced Lactose Whey, **Maltodextrin,*** Canola Oil, Salt, **Disodium Phosphate,*** Blue Cheese [Cultured Milk, Salt, Enzymes], Nonfat Dry Milk, Citric Acid, **Natural and Artificial Flavors***), **Sodium Caseinate,*** **Carrageenan,*** Paprika Extract, **Sunflower Lecithin,*** **Maltodextrin,*** White Distilled Vinegar, **Dipotassium Phosphate, Mono- and Diglycerides,*** Lactic Acid, **Yellow No. 5,*** Soybean Oil, Onion Powder, **Xanthan Gum,*** Dehydrated Garlic, Extractives of Turmeric.



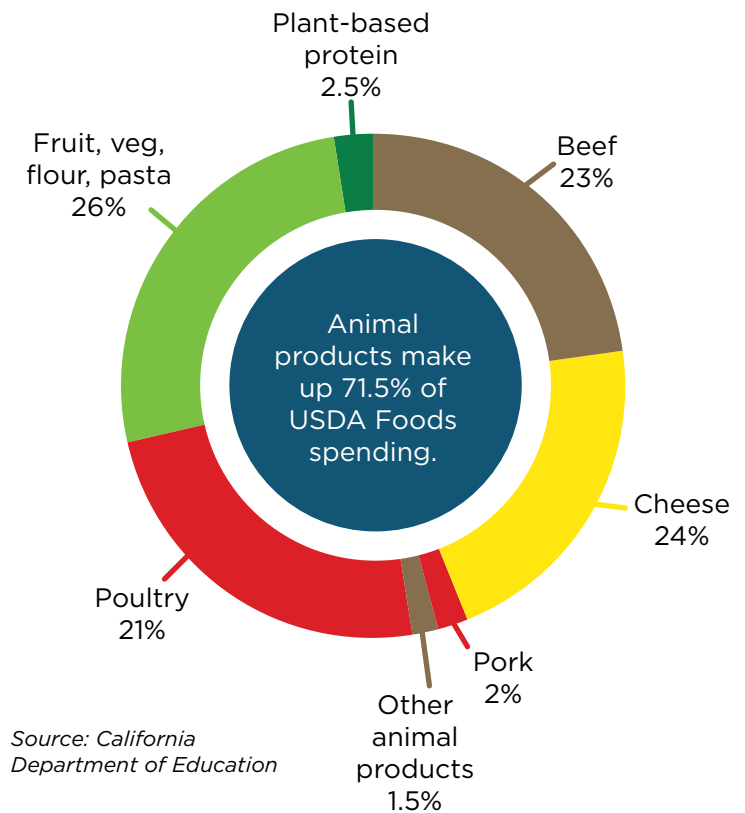
*Contains ultra-processed food products with artificial ingredients, colors, enhancers, flavors, and/or preservatives “manufactured” using industrial techniques not found in any kitchen. For more information and to learn more, please visit: Eat REAL’s Guide to Plant-Based Meals.

California Purchases from USDA Foods

The USDA Foods program provides select commodities to school districts at a low (subsidized) cost for school districts. While entrees with plant-based proteins represent 8% of menu offerings, beans and nut butter, the only plant-based sources of protein available through USDA Foods, make up a meager 2.5% of statewide USDA Foods' school purchases. According to 2021-2022 data of Processed/ Bulk and Direct Delivery USDA Foods (See full methodology here), industrially produced animal products account for the vast majority (72%) of California School district USDA Foods entitlement spending—\$122.4 million annually. Beef accounted for 23%, cheese 24% and poultry 21% of purchased products. This spend breakdown is very similar to our 2018-2019 analysis (presented in our State of School Lunch in California report), showing significant room for improvement in terms of reducing the overall climate footprint and health profile of USDA foods.

FIGURE 8

USDA Foods Spending by California School Districts: 2021-2022



Santa Ana Unified School District, San Diego County

Santa Ana Unified School District recently launched Plant-Based Wednesdays, an initiative dedicated to serving 100% plant-based options one day a week. Josh Goddard, the Director of Nutrition Services, launched the initiative to reduce the district's environmental impact and increase menu inclusivity for a growing number of students who follow a primarily plant-based diet. Plant-based entrées include burrito mojado, lentil picadillo bowl, and a hummus and cauliflower wrap. "As you can tell from the selections, we are creating a menu focused on and inspired by our rich local Latinx culture," said Josh. "The response from students, parents and staff has been overwhelmingly positive." Watch a video of the Plant-Based Wednesdays Initiative and see the delicious new menu offerings!





IV. Carbon Footprint of California’s School Lunch Entrées

With a growing number of processed meat and cheese-based entrées on California’s school lunch menus, adding more plant-based protein options and reducing student consumption of cheese and meat-based entrées are key strategies for reducing the carbon footprint of California’s school lunch programs. Pound for pound, lamb, beef, cheese and pork generate the most greenhouse gases (GHG) of all protein entrée categories.^{15,16}

Figure 9 compares the relative carbon footprint (CO₂-eq) per serving of the top 15 entrées on California’s school lunch menus. Beef entrées are typically 22 times¹⁷ more carbon-intensive than plant-based entrées and carry by far the largest carbon footprint. Over a 20-year period, methane generates 80 times more warming gases than carbon dioxide.¹⁸ Cheese-heavy entrées such as cheese pizza also have a relatively large carbon footprint.

Although beef represents only 12.3% of total menu offerings, it accounts for nearly 48% of the carbon footprint of protein entrées in lunches offered in California’s top 25 school districts. Meanwhile, plant-based proteins (such as beans, tofu and lentils), which make up 7.8% of the entrees offered, represent only 1% of the carbon footprint

As highlighted above, 57% of entrées used cheese to fulfill the Meat/Meat Alternate requirement entrée. These processed cheese dishes are neither low-carbon nor particularly healthy. (See Figure 7 for an example of ultra-processed ingredients in a cheese-heavy entrée).

When measured in terms of GHG emissions by gram of protein, dairy lands in third place, just after lamb and beef, in terms of climate impacts.¹⁹ Dairy products have large climate impacts because cows emit large quantities of methane through their digestive process (called enteric fermentation) and from their manure. Among dairy products, cheese has the highest carbon footprint because it takes roughly 10 pounds of milk to make one pound of cheese.

Even modest menu shifts to less carbon-intensive plant-based foods can help mitigate the impact of school food procurement on climate change.²⁰ If all school districts in California swapped out a beef

burger for a black bean burger just **one day per month**, it would save 220 million pounds of CO₂, which would be equivalent to eliminating 22,000 cars from the road for one year.²¹

Adding more plant-based entrées on school menus would generate a double win: generating significant carbon savings with little to no additional cost for school districts, while providing students with wholesome, fiber-rich plant-based foods.

FIGURE 10

The Burger Swap

Small school food shifts can make a big difference

If all school districts in California swapped out a beef burger for a black bean burger, **just once a month**, it would **save 220 million lbs of CO₂-eq.**



EQUIVALENT TO:



22,000 cars off the road for **1 year**



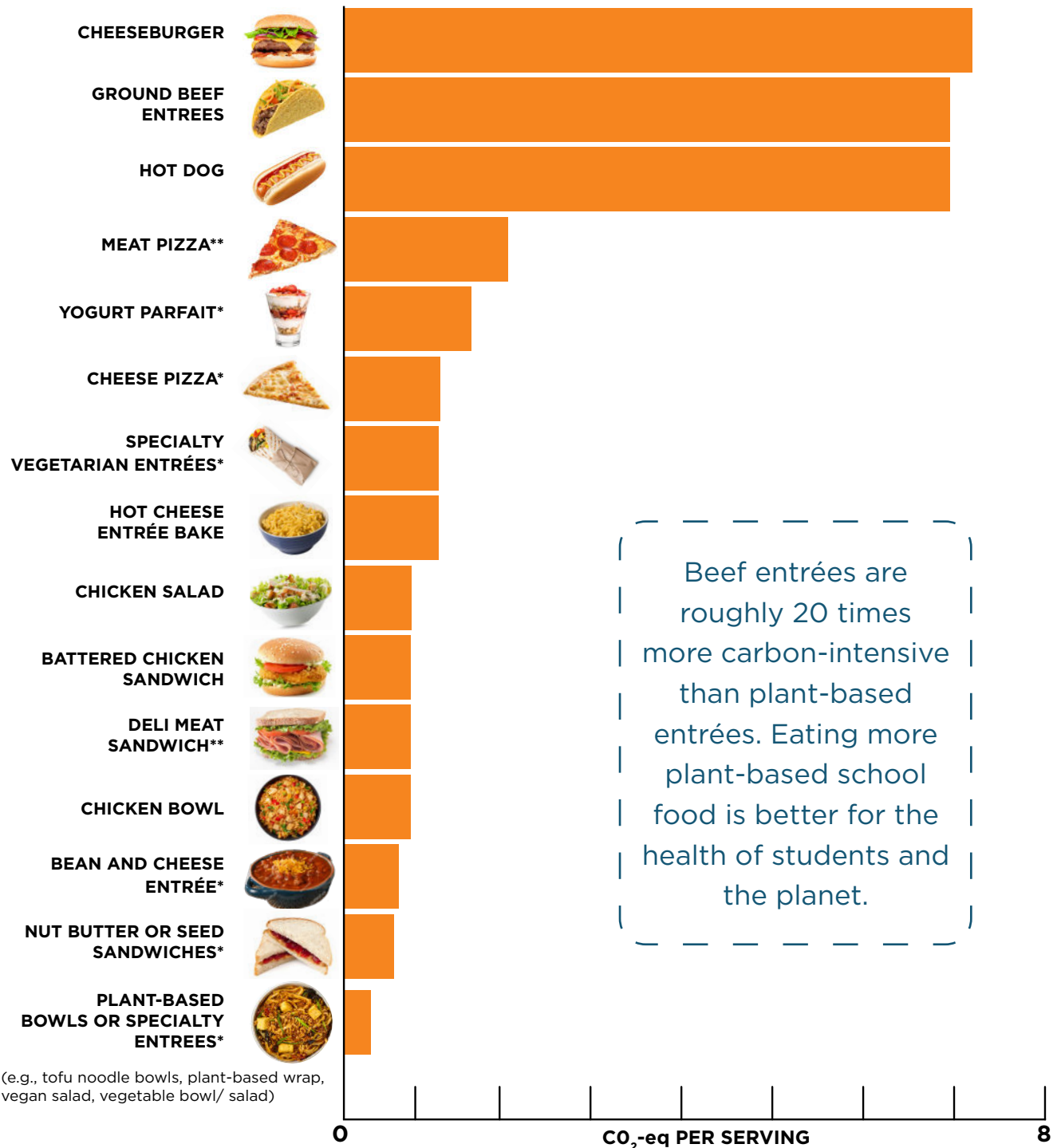
1.7 million tree seedling grown for **18 years**



26,000 residential solar systems for **1 year**

FIGURE 9

Carbon Footprint of Top 15 Entrees on CA School Food Menus



Beef entrées are roughly 20 times more carbon-intensive than plant-based entrées. Eating more plant-based school food is better for the health of students and the planet.

Source: Friends of the Earth menu analysis from the largest 25 school districts in California, using conversion factors from Poore and Nemecek 2018.



V. Discussion of Findings, Barriers and Opportunities

Our analysis reveals a promising surge in the diversity of vegetarian and plant-based meals offered in the 25 largest school districts in California. This trend is likely due to the tremendous student demand^{22,23} and an increase in organizational and policy support around plant-based meals, as well as menu development, kitchen infrastructure upgrades, staff training, increased scratch cooking, farm to school programming, and technical assistance for plant-based food purchasing.

However, despite the added variety and number of vegan and vegetarian entrées, meat- and dairy-heavy entrées continue to dominate school lunch menus, accounting for 92% of all menu offerings. We also found an unfortunate 11% increase in processed meat offerings between 2019 and 2022, and more than half (57%) of all lunch entrées offered contain cheese. Elementary districts are far behind middle and high schools in the frequency of plant-based offerings served, with only one of the 25 largest elementary school districts in California serving plant-based offerings daily.

Our findings demonstrate a clear need to increase the number of plant-based entrée offerings and the frequency with which they are offered. To make healthy, climate-friendly menus the norm, we must address larger systemic challenges and continue to uplift and support school nutrition service teams. A discussion of barriers and resources is provided below. For a list of policy recommendations, see page 19. A more detailed discussion of these barriers — along with solutions to overcome them — are outlined in Friends of the Earth's report, *Scaling Up Healthy, Climate-Friendly School Food: Strategies for Success*.

Staffing Shortages & Supply Chain Barriers:

Today's school food operations are struggling with staffing shortages and pandemic-related supply chain disruptions. Many California school districts reported that they lost over half their nutrition service staff, with few incoming applicants to fill open positions. Food service directors are having to resort to prepackaged goods, and plant-based entrées are less feasible to develop from a cost, labor and procurement perspective. Many of the school districts making improvements have noticeable advantages such as central kitchens, more staff, and larger budgets to work with.

Need for More Marketing of Plant-Based Foods:

Getting plant-based options added to the menu is only half the battle; students need to reach past familiar and addictive fast food options like hamburgers and pizza to a plant-based dish that is often unfamiliar to them. Schools need to have age- and culturally-appropriate marketing strategies for plant-based options in order to make them appealing. Students are more likely to choose healthier, plant-centered options when they understand where their food comes from and the benefits of plant-forward food to the planet, to animals, and to themselves. Visit Friends of the Earth's webpage for examples of marketing resources.

Barriers in USDA Foods Program Offerings:

By providing industrially processed meat and dairy at a highly subsidized price, the USDA Foods Program incentivized school districts to serve these products, including heavily processed meat and dairy items, that run counter to student health, environmental sustainability and equity goals. Popular plant-based protein options such as tofu, lentils, veggie burgers and plant-based nuggets are currently not available through the program. This makes it harder for school nutrition service teams to provide plant-based entrées at a feasible cost, especially compared to the heavily subsidized, more cost-effective meat and cheese items. USDA Food's high spending on animal products during SY2021-2022 suggests a misalignment with the agency's own 2020-25 Dietary Guidelines for Americans²⁴ and other leading public health recommendations for healthy eating. For a list of recommended changes to the program, see Friends of the Earth's Policy Brief on USDA Foods.

Outdated USDA Meal Patterns and Nutritional Guidelines:

Current USDA Food and Nutrition Service (FNS) meal pattern and nutrition guidelines have a plethora of limitations that create barriers for K-12 schools to serve fiber-rich, plant-based entrées. For a detailed discussion of these barriers and recommendations, see Friends of the Earth's Policy Brief on Regulatory Changes for Plant-Forward School Food.

Need for Greater Support of Plant-Based Vendors and Availability of Plant-Based Products with CN Labels or PFS Statements:

Plant-based vendors that prioritize non-GMO, minimally processed and ready-made products and that use whole, organic ingredients need more support on how to get Child Nutrition (CN) labels or Product Formulation Statements (PFS) that allow them to sell to school districts. Additionally, smaller and minority-owned vendors offering plant-based options need opportunities to connect with school nutrition service operators to better understand the school food market and schools' needs. Check out Plant-Based Foods Association's School Foods 101 webinar for an example of a training for plant-based vendors interested in selling food to K-12 schools.

Shifting toward plant-based K-12 menus at the scale necessary to help combat the intertwined crises of food insecurity, climate change and racial injustice requires multi-pronged, holistic strategies. The recent policy reforms and investments by the California legislature, including \$600 million to upgrade school kitchen infrastructure and staff training and \$100 million to the School Food Best Practices Fund, are expected to have a significant influence in supporting the continued expansion of climate-friendly menus.

Along with Friends of the Earth's work, organizations such as the Chef Ann Foundation, Eat REAL, the Center for Good Food Purchasing, Conscious Kitchen, Center for Ecoliteracy and many others have made a huge difference in providing technical support to California school nutrition service teams, including supporting expanding access, integrating more local and plant-

based food, improving nutritional quality, shifting to scratch cooking, and improving the school meal environment. We are seeing promising menu shifts that prove plant-based meals are gaining traction, including San Luis Coastal's Thai basil lentil burger, Milpitas Unified's chana masala, and Palo Alto USD's vegan pho with fresh veggies. Friends of the Earth's School Nutrition Services Resources webpage provides helpful resources and webinars for school nutrition staff interested in adding more climate-friendly, plant-based menu offerings, with information to support supply chain challenges, including a Plant-Based Products and Vendors List of non-GMO, plant-based, minimally processed and ready-made products that use mainly whole, organic ingredients. Friends of the Earth also provides direct technical support to help implement plant-based recipes which require minimal staff labor such as Elk Grove USD's crispy teriyaki tofu with brown rice, Long Beach USD's vegan Thai sweet chili rice bowl, and Monterey Peninsula USD's Mediterranean flatbread with hummus.

CONTACT US

To receive resources or support for plant-based menu development, email climatefriendlyfood@foe.org or visit www.climatefriendlyfood.org





VI. Conclusion and Recommendations

As our society faces a severe climate crisis alongside alarming rates of nutrition insecurity, both of which exacerbate racial inequalities, now is the time to invest in plant-based school meals. The coronavirus pandemic has brought public attention to the essential role school food plays to the health of our communities, especially communities of color disproportionately affected by diet-related disease. Even small steps to replace one or two entrées with healthy, culturally appropriate, plant-based protein offerings can generate important climate benefits while inspiring lifelong healthy eating habits amongst students.

We applaud the growing momentum and dedication to serving healthy, climate-friendly school meals in light of pandemic-related challenges — thanks to students, parents, nutrition service staff, policymakers, and non-

profit organizations. Nutrition service teams across the state are taking courageous steps to add innovative plant-based entrées to their menu. While not all barriers can be addressed through funding, we are encouraged by new programs emerging to support healthy, climate-friendly school meals. Bold policy reforms recently provided by California legislation — such as farm to school programming,²⁵ universal meals,²⁶ kitchen infrastructure and training funds,²⁷ and the School Food Best Practices funding²⁸ — will help to scale up healthy, climate-friendly, plant-based school meals in the years to come.

As this report shows, we must continue shifting menus toward healthier, plant-based options while changing our policies to make climate-friendly menus the default. Current and future generations of students deserve nothing less.



Los Gatos Union SD has developed engaging marketing materials that advertise vegan offerings in celebration of Earth Day.



Western Placer USD staff and students prepare for a taste testing event to receive student feedback on plant-based options.



Palo Alto USD is providing kitchen staff with training to experiment with new plant-based recipe development, such as these BBQ Jackfruit Sliders.



Oxnard Union High SD held a successful Farm-to-School Art Contest where students' artistic submissions were printed onto canvas and reusable bags.

Key Policy Recommendations for Healthy, Climate-Friendly School Foodservice



CONGRESS

- Expand and establish new grant programs and/or reimbursement incentives that help schools serve plant-based meals, such as the program envisioned in the Healthy Future Students and Earth Act (H.R. 4108 in the 117th Congress).
- Fund nutrition education, school gardens, improved kitchen facilities, equipment and staff training to facilitate scratch cooking and plant-based food preparation.
- Increase meal reimbursement rates and establish permanent universal free meals nationwide.
- Require that non-dairy milk options be made available to any student whose parent makes a request; and authorize school districts to provide a nutritionally equivalent non-dairy milk to any student.



USDA

- Reform the USDA Foods Program, including by expanding minimally processed and organic plant-based protein offerings (e.g., tofu, lentils and black bean burgers); offering climate-friendly food products such as organic options; eliminating processed lunch meats; and increasing transparency.
- Modify meal patterns to remove barriers to serving plant-based and plant-forward options and remove the requirement that dairy milk must be taken as part of a reimbursable meal.
- Provide dedicated technical assistance to School Food Authorities (SFAs) on strategies for expanding plant-based and plant-forward menu options.



CALIFORNIA POLICYMAKERS

- Provide continued financial incentives to schools for offering plant-based entrées and organic food options, similar to the recent \$100M appropriation for School Foods Best Practices.
- Provide continued funding for California's Farm to School Program, prioritizing sourcing from farms that use organic practices; culinary training for plant-based food preparation; and marketing and education on climate-friendly farming and culturally appropriate plant-based foods.
- Provide continued Kitchen Infrastructure and Training (KIT) funds for school food services to purchase kitchen equipment and upgrades and offer foodservice staff training.



SCHOOL DISTRICTS

- Pass wellness and/or nutrition policies that eliminate or significantly reduce processed meat on school food menus and encourage serving organic and plant-based food.
- Ask for more plant-based sources of protein and higher quality animal products in USDA Foods.
- Adopt a climate action resolution that commits to pursue climate-friendly foodservice and set a district-wide goal for reducing the carbon footprint of school food.
- Take advantage of CDFA funded culinary training opportunities, kitchen infrastructure and training funds, and farm to school programs to procure and serve scratch-cooked plant-forward entrées.
- Expand choices for plant-based offerings on school menus so that at least one plant-based entrée beyond nut butter sandwiches is featured every day.



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