TECHNICAL APPENDIX

True Cost of Food
School Meals Case Study

The ROCKEFELLER FOUNDATION

CENTER FOR GOOD FOOD PURCHASING

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Technical Appendix: Guidelines

This case study is the first attempt to apply true cost accounting to an evaluation of the National School Lunch Program and the School Breakfast Program, along with proposed changes to these programs. When analyzing their combined annual budget of $18.7 billion, we relied on widely cited and publicly available data sources. We also used, wherever possible, existing monetary conversion and estimation approaches from prevailing literature.

Previous studies have shown that these programs – where school meals are offered either for free or at a reduced price to eligible children in grades K-12 – help support better health outcomes, higher educational achievement rates, and lower childhood poverty levels. Our analysis takes into account those findings and others, but it is important to note that for some of the impact areas we examined there are gaps in the literature and estimation approaches. Where gaps existed, we worked with leading experts to identify novel approaches and, when feasible, offer them here for broader review and discussion. Through this work we also became aware of different methodologies and approaches that we ultimately did not use in our analysis but we have highlighted here for consideration by others.

We also recognize that scientific consensus on measuring the true cost of food is still evolving. This report uses the framework laid out in the July 2021 report True Cost of Food: Measuring What Matters to Transform the U.S. Food System, and the methodology and quantification are based on a set of guidelines, as set forth below. By using the existing framework, we hope to reinforce movement towards a refined, (inter-)nationally agreed-on framework as the basis for food system-related decisions.

By providing this detailed appendix, we invite others to review and build on this work and encourage further research and discussion.

The decision guidelines used in this report are:

Quantification accounts for primary impact only: for each impact area, only primary impacts are captured. Secondary/downstream impacts may be significant even if not currently captured.

Work is based on existing literature: impacts were quantified based on existing scientific literature; therefore, areas of impact that have not been well studied may be underestimated compared to other areas (e.g., biodiversity loss costs are less studied than health costs).

Metrics included were expansive, not exhaustive: Metrics are prioritized based on potential impact and availability of scientifically acknowledged monetization factors; however, some metrics lack quality data and/or cannot be monetized.

The quantification is conservative: Metrics were included only if impact size and monetization factors were widely cited; any metrics understudied or underreported were not included in our estimates. For those with widely cited impact and monetization factors, the most conservative estimate of well-cited options was used:

- Estimates are conservative because of the limited numbers of metrics included (e.g., metrics not included add $0 to analysis). Metrics excluded for data quality reasons almost certainly would increase value estimates had they been included.
- Estimates are conservative within included metrics (i.e. when different papers have varying estimates, the highest quality data that was conservative was used). As such, the quantification represents a conservative estimate of the program's true cost and value.

The estimations captured parts of the value chain: Metrics included were assessed as either metrics related to the production of school meals (e.g., the impact of growing, processing, and transporting the food) or those related to the consumption of school meals (e.g., health impacts from improved diet).

The type of costs captured varied: Impact areas capture costs and benefits differentially based on characteristics of the metric itself and the way monetization is measured.

The estimations were restricted to the US: Impact areas capture costs for food produced and consumed in the United States (includes food imports at consumption level).

In adhering to these principles, the work in this report also highlights multiple areas where deeper study is required to understand and quantify costs. Accordingly, the estimations of cost and value of the National School Lunch Program and the School Breakfast Program are expected to change with increasing development and completeness of the methodology.

The True Value of the current school meals program

FIGURE 1

Metric	Bn USD
SCHOOL MEALS PROGRAM COST	$18.70
SCHOOL MEALS PROGRAM BENEFITS	$39.46
TRUE VALUE OF SCHOOL MEALS PROGRAM	**$20.76**

The true value of the current school meals program is estimated through a comparison to a counterfactual scenario if the program did not exist in its current form, namely that it provides healthy, nutritious meals to millions of students, with many of those meals going to low-income students who may be food insecure. Consequently, estimates are compared to a hypothetical situation that food consumed in schools reflects the average child's diet and poverty alleviation/food insecurity among school children is not averted through free and reduced-price meals.

Both costs and benefits of the current program are compared to the counterfactual scenario to estimate the true value. Costs are estimated to be $18.7 billion per year, based on the annual federal budget for the National School Lunch Program (NSLP) of $14.2 billion[i] and School Breakfast Program (SBP) of $4.5 billion.[ii]

To estimate the benefits of the current program, there are 3 subsequent sections:

1. Estimating the benefits of the current program compared to the counterfactual scenario
2. Discounting these benefits based on the time they take to accrue
3. Summarizing the true value estimate of school meals after accounting for discounted benefits

Estimating the benefits of the current program compared to the counterfactual scenario

In estimating the benefits of the current program, metrics included were assessed as either metrics related to the production of school meals (e.g., impact of growing, processing, and transporting the food) or those related to the consumption of school meals (e.g., health impacts from improved diet).

Production metrics

Production metrics follow a two-step process. The first step estimates what the true cost of school meals would be if school meals reflected the overall US food system. This estimate is based on the proportional contribution of school meals to each metric among system-wide food costs from Reset the Table: Measuring What Matters to Driver U.S. Food System Transformation,[iii] where retail expenditure is estimated to be approximately $1.1 trillion. The proportional contribution to each metric of retail food expenditure is summarized to the right. Note that each metric's proportions should not be summed to fit the retail expenditure estimate (e.g., sum to 100%) seeing as these costs are current unaccounted costs of the food system not reflected in the current retail expenditure.

Though most production metrics fall into either the environment, biodiversity, or livelihoods impact areas, health impacts from pollution, a metric within the human health impact area, is assumed to follow the same logic as other environmental metrics related to pollution and is separated from other health metrics.

FIGURE 2

Impact area	Metric	Metric Food system impact cost (bn USD)[iv]	% of expenditure
ENVIRONMENT	GHG emissions	$222.56	21%
	Water use / water depletion	$60.20	6%
	Soil erosion	$66.79	6%
BIODIVERSITY	Land use	$342.45	32%
	Soil, air, and water pollution	$147.00	14%
LIVELIHOODS	Child labor	$0.98	0%
	Underpayment	$33.26	3%
	Lack of benefits	$76.47	7%
	Occupational health / safety	$24.06	2%
ECONOMY	Agriculture Subsidies	$21.42	2%
HUMAN HEALTH	Health impacts from pollution	$36.01	3%
OVERALL	TOTAL	$1,031.20	

Figure 3 estimates the total school meal cost spent on food rather than other costs, such as labor or supplies. Applying the proportions in Figure 2 to the value of food in school meals, estimated to be $8.42 billion, Figure 4 summarizes the true cost of food in school meals if they reflected the overall US food system.

FIGURE 3

PROGRAM EXPENDITURE	$18.7[v, vi]	bn USD
% FOOD EXPENDITURE	45%[vii]	% of total expenditure
SCHOOL MEAL FOOD EXPENDITURE	$8.42	bn USD

FIGURE 4

Impact area	Metric	% of expenditure	School meal food expenditure (bn USD)	School meal impact costs if same as national (bn USD)
ENVIRONMENT	GHG emissions	21%	$8.42	$1.74
	Water use / water depletion	6%	$8.42	$0.47
	Soil erosion	6%	$8.42	$0.52
BIODIVERSITY	Land use	32%	$8.42	$2.68
	Soil, air, and water pollution	14%	$8.42	$1.15
LIVELIHOODS	Child labor	0%	$8.42	$0.01
	Underpayment	3%	$8.42	$0.26
	Lack of benefits	7%	$8.42	$0.60
	Occupational health / safety	2%	$8.42	$0.19
ECONOMY	Agriculture Subsidies	2%	$8.42	$0.17
HUMAN HEALTH	Health impacts from pollution	3%	$8.42	$0.28
OVERALL	**TOTAL**			**$8.06**

However, it is well noted that the food in school meals does not reflect the overall US food system. For instance, school meals have a healthier dietary score than the general diet and serve higher proportions of fruits and vegetables, and lower proportions of red meat, sugar, and sodium.[viii]

As such, the second step in quantifying the production benefits of the current school meals program is adjusting these costs to account for school meals more closely resembling national dietary guidelines than the general American diet. The difference from this adjustment is the benefit of the current school meals program. In other words, the benefits of the current program are the reduced cost estimates attributable to school meals being healthier and more nutritious than the overall diet.

The estimation assumes that the proportion of school food retail expenditure among all food expenditure would be equivalent to the proportion of impacts contributed by school food consumption. Food compositions in school meals might be different from all food expenditures, leading to differential (not proportional) impact on production metrics.

Metrics related to livelihoods (e.g., underpayment, lack of benefits) and economy are assumed to be the same for school meals as the general food system. As such, there is no difference and no savings accrued to these metrics.

Environmental and biodiversity benefits were calculated for the current school meals programs and yielded an existing net benefit of $2.3 billion assuming all school meals were strictly following the Dietary Guidelines under normal operating conditions. However, these benefits are excluded from this section, in accordance with our guidelines, due to differences of opinion in the academic literature and in expert consultation. There may be benefits to the environment if shifts are made, and we therefore include these numbers as a basis for further calculations later in this report within the modeled drivers. In the case where there are environmental and biodiversity differences, the paper sources its estimates from the World Wildlife Fund (WWF), which has a tool to calculate environmental impact of different diets and has estimates for biodiversity loss, GHG emissions, cropland use, grazing land use, water use,and eutrophication.[ix] The two specific diets entered into the tool were the current diet in the US and National Guidelines diet. In doing so, we assume that school meals closely follow national guidelines with respect to production metrics (e.g., GHG emissions). The full list of adjustments from WWF, subsequent savings, and reasoning are below in Figure 5 for demonstration purposes.

FIGURE 5

Impact area	Metric	School meal impact costs (bn USD)	Current diet -> NDG diet[x]	Difference (bn USD)	Reasoning
ENVIRONMENT	GHG emissions	$1.74	22%	$0.39	Difference between current diet and diet according to national guidelines (GHG emissions)
	Water use / water depletion	$0.47	23%	$0.11	Difference between current diet and diet according to national guidelines (water use)
	Soil erosion	$0.52	42%	$0.22	Assumed same as land use
BIODIVERSITY	Land use	$2.68	42%	$1.13	Difference between current diet and diet according to national guidelines (total land use, including cropland and grazing land use)
	Soil, air, and water pollution	$1.15	34%	$0.39	Difference between current diet and diet according to national guidelines (using eutro-phication as a proxy)
HUMAN HEALTH	Health impacts from pollution	$0.28	22%	$0.06	Assumed same as GHG emissions. Soil, air, and water pollu-tion was not used since eutrophication (e.g., water pollution) was the proxy
OVERALL	**TOTAL**			**$2.30**	

Consumption metrics

Consumption metrics differ from production metrics in that the impacts from consuming school meals are largely in future health and income as an adult, and therefore a different methodology from production metrics was used. A summary of the initial savings and difference associated with consumption metrics is listed to the right in Figure 6, with subsequent subsections detailing adjustments made to individual metrics.

FIGURE 6

Impact area	Metric	Difference (bn USD)
HUMAN HEALTH	Food insecurity	$15.54
HUMAN HEALTH	Dietary NCDs	$3.44
POVERTY ALLEVIATION	Reduced earnings	$23.78
POVERTY ALLEVIATION	Victimization of street crime	$16.23
POVERTY ALLEVIATION	Corrections and crime deterrence costs	$9.91
POVERTY ALLEVIATION	Increased child homelessness costs	$7.84
POVERTY ALLEVIATION	Incarceration	$6.73
POVERTY ALLEVIATION	Child maltreatment costs	$3.28
OVERALL	**TOTAL**	**$86.75**

Dietary NCDs metrics

Dietary noncommunicable diseases (NCDs) follow a similar logic to the production metrics, in that we first estimate the percentage of system-wide costs attributable to school meals and make an additional adjustment for the assertion that school meals are healthier than the general American diet.

The first calculation is based on the US food system-wide estimates for Dietary NCDs ($603.54 billion),[xi] which are based on the Disability Adjusted Life Years (DALYs) accrued as an adult due to dietary factors.[xii] These costs include both productivity loss and direct medical costs attributable to dietary-related disease. Rosettie et al (2018) estimates that 35% of adult diet is attributable to childhood diet, and by extension 35% of the diet-related health costs from the US system can be attributed to childhood diet.[xiii] Liu et al (2021) estimates that school meals represent 8.7% of the overall energy intake for children aged 5 to 19, with the percent likely higher during the school year.[xiv] Through these attribution estimates, school meals would contribute 3.05% of systemwide dietary NCD costs if the program reflected the general American diet.

Again, school meals represent a healthier source of food than the general diet and the difference from this second adjustment represents the savings from the current school meals program.[xv] Liu et al (2021) provides an American Heart Association (AHA) dietary score for school meals as well as for the food children consume from grocery stores, restaurants, and other sources.[xvi] The paper estimates the AHA dietary score for children aged 5-19 for food in schools to be 39.5 out of a score of 80, and the score for food consumed from grocery stores, restaurants, and other sources to be 34.3, 26.1, and 33.1, respectively.[xvii] Using a weighted average of scores based on energy intake, a calculated AHA score of 30.2 reflects the food children eat outside of school.

FIGURE 7

Setting	Energy Intake	AHA Dietary Score	AHA Optimal Score	Difference to optimal score
GROCERY STORES	64.6%	34.3	80	45.7
RESTAURANTS	20.3%	26.1	80	53.9
SCHOOLS	6.9%	39.5	80	40.5
OTHER SOURCES	8.2%	33.1	80	46.9
WEIGHTED AVERAGE OF GROCERY STORES, RESTAURANTS, AND OTHER SOURCES		30.2	80	49.8

We then calculate the improvement in the gap between the current diet and the AHA optimal diet. The 18.7% difference between the two scores (40.5 and 49.8) and the optimal diet is calculated to be the difference and benefits associated with school meals, summarized below in Figure 8.[xviii] This could underestimate the health benefit (due to the assumed proportional relationship between dietary intake and health risks, while the further away from the optimal diet, the more disease is expected).

FIGURE 8

Impact area	Metric	Food system cost (bn USD)[xix]	Percent of system costs attributable to school meals (incl discounting)[xx xxi]	Attributable Costs to School Meals (bn USD)	Current diet -> school meals[xxii]	Difference (bn USD)
HUMAN HEALTH	Dietary NCDs	$603.54	3.05%	$18.38	18.7%	$3.44

Poverty alleviation and food insecurity estimates

The counterfactual scenario to which school meals are being compared does not include nutritional safety net components like free or reduced-price meals. As such, the food insecurity and poverty alleviated by free and reduced-price meal programs represent benefits of the current program which would not exist in the counterfactual.

To estimate the benefit of these programs, McLaughlin and Rank (2018) estimate the cost of childhood poverty in the US to be over $1 trillion per year, broken down into increased health costs (e.g., from food insecurity), reduced earnings, and other poverty-related cost metrics.[xxiii] Using their cost estimates and the estimated number of children experiencing poverty in the US of 10.46 million,[xxiv] we estimate the annual cost per child living in poverty in the US. The US Census bureau also estimates that school lunches lift 722,000 children out of poverty each year.[xxv]

Combining these inputs, Figure 9 below summarizes the benefit of child poverty alleviation attributable to school lunches.

McLaughlin and Rank state that their cost estimates may be slightly inflated given their definition of poverty is based on the official US poverty line. For a more conservative estimate, the paper recommends using the Supplemental Poverty Measure (SPM), an estimate 20% lower than that used. This conservative estimate was taken for the purposes of this paper.[xxvi] Most research on child poverty uses the official poverty measure (OPM), but there is considerable overlap in individuals considered in poverty between the two measures, and the bulk of research on the OPM would translate to the SPM.[xxvii] [xxviii] The studies using the SPM are still being developed, and the assumption in making these calculations is that the findings from research using the official poverty measure will be borne out by research using the supplemental poverty measure to measure poverty.

FIGURE 9

Cost of childhood poverty	Total cost (bn USD)[xxix]	Total cost (bn USD, adjusted for inflation to 2019)	Number of children in US in poverty[xxx]	Annual cost per child	Children < 18 lifted out of poverty attributable to school lunches[xxxi]	Adjustment for most conservative estimate using SPM[xxxii]	Benefit of child poverty alleviation attributable to school lunches (bn USD)
Annual cost of childhood poverty from reduced earnings	$294.00	$317.52	10,460,000	$30,356	722,000	80%	$17.53
Annual cost of childhood poverty from increased victimization of street crime	$200.60	$216.65	10,460,000	$20,712	722,000	80%	$11.96
Annual cost of childhood poverty from increased health costs	$192.10	$207.47	10,460,000	$19,834	722,000	80%	$11.46
Annual cost of childhood poverty from increased corrections and crime deterrence costs	$122.50	$132.30	10,460,000	$12,648	722,000	80%	$7.31
Annual cost of childhood poverty from increased child homelessness costs	$96.90	$104.65	10,460,000	$10,005	722,000	80%	$5.78
Annual cost of childhood poverty from incarceration	$83.20	$89.86	10,460,000	$8,590	722,000	80%	$4.96
Annual cost of childhood poverty from child maltreatment costs	$40.50	$43.74	10,460,000	$4,182	722,000	80%	$2.42
Annual cost of childhood poverty	**$1,029.80**	**$1,112.18**	**10,460,000**	**$106,327**	**722,000**	**80%**	**$61.41**

The current school meals program represents both breakfast and lunch, and Figures 10, 11 and 12 below summarize the process of estimating poverty alleviation attributable to school breakfast based on the cost estimates for lunch multiplied by the difference in participation rates. While the Supplemental Poverty Measure calls out the benefit of school lunches, it excludes school breakfasts in its calculations. Thus, the calculations here are assuming a similar, additional benefit from school breakfasts on poverty alleviation, with adjustments to account for less participation and lower financial benefit impact from breakfasts provided.

FIGURE 10

Step	Estimate
NSLP AVERAGE DAILY PARTICIPATION (MN)	29.60[xxxiii]
SBP AVERAGE DAILY PARTICIPATION (MN)	14.77[xxxiv]
PERCENTAGE DIFFERENCE IN PARTICIPATION RATES	50%

FIGURE 11

Step	Estimate
SCHOOL LUNCH COST (USD)	$3.81
SCHOOL BREAKFAST COST (USD)	$2.71
RATIO OF BREAKFAST TO LUNCH COST	71.1%

FIGURE 12

Cost of childhood poverty	Total cost (bn USD)[xxxv]	Total cost (bn USD, adjusted for inflation to 2019)	Number of children in US in poverty[xxxvi]	Annual cost per child	Children < 18 lifted out of poverty attributable to school breakfast	Adjustment for most conservative estimate using SPM[xxxvii]	Adjustment for school breakfast to school lunch ratio	Benefit of child poverty alleviation attributable to school breakfast (bn USD)
ANNUAL COST OF CHILDHOOD POVERTY FROM REDUCED EARNINGS	$294.00	$317.52	10,460,000	$30,356	361,732	80%	71%	$6.25
ANNUAL COST OF CHILDHOOD POVERTY FROM INCREASED VICTIMIZATION OF STREET CRIME	$200.60	$216.65	10,460,000	$20,712	361,732	80%	71%	$4.26
ANNUAL COST OF CHILDHOOD POVERTY FROM INCREASED HEALTH COSTS	$192.10	$207.47	10,460,000	$19,834	361,732	80%	71%	$4.08
ANNUAL COST OF CHILDHOOD POVERTY FROM INCREASED CORRECTIONS AND CRIME DETERRENCE COSTS	$122.50	$132.30	10,460,000	$12,648	361,732	80%	71%	$2.60
ANNUAL COST OF CHILDHOOD POVERTY FROM INCREASED CHILD HOMELESSNESS COSTS	$96.90	$104.65	10,460,000	$10,005	361,732	80%	71%	$2.06
ANNUAL COST OF CHILDHOOD POVERTY FROM INCARCERATION	$83.20	$89.86	10,460,000	$8,590	361,732	80%	71%	$1.77
ANNUAL COST OF CHILDHOOD POVERTY FROM CHILD MALTREATMENT COSTS	$40.50	$43.74	10,460,000	$4,182	361,732	80%	71%	$0.86
ANNUAL COST OF CHILDHOOD POVERTY	**$1,029.80**	**$1,112.18**	**10,460,000**	**$106,327**	**361,732**	**80%**	**71%**	**$21.89**

The costs of poverty associated with increased health costs, though sourced from the same paper as poverty alleviation metrics, has been relabeled 'food insecurity' and categorized in the human health impact area. There may be some overlap in the poverty-associated increased health costs and the overall health costs due to the current food system as calculated in the Consumption metrics of this report. The remaining poverty alleviation metrics, and food insecurity costs, are summarized below.

An alternative approach to calculating the benefits of school meals on poverty would be to calculate an income to poverty ratio. This ratio would be calculated as the financial benefit of school meals as a percentage of the poverty line threshold. One could then apply the income to poverty ratio to the costs of childhood poverty to ascertain a benefit. For the purposes of this analysis, a more conservative approach was taken with the methodology described previously.

FIGURE 13

Cost of childhood poverty	Benefit of poverty alleviation attributable to school meals (bn USD)	Note
REDUCED EARNINGS	$23.78	
VICTIMIZATION OF STREET CRIME	$16.23	
FOOD INSECURITY	$15.54	Categorized in human health impact area
CORRECTIONS AND CRIME DETERRENCE COSTS	$9.91	
INCREASED CHILD HOMELESSNESS COSTS	$7.84	
INCARCERATION	$6.73	
CHILD MALTREATMENT COSTS	$3.28	
ANNUAL COST OF CHILDHOOD POVERTY	**$83.30**	

Discounting these benefits based on the time they take to accrue

Many of the health and poverty alleviation benefits from school meals do not accrue until significantly later in a student's life course (e.g., as an adult). For instance, students who eat healthy, nutritious meals in school are unlikely to see benefits like an averted heart attack, stroke, or type II diabetes diagnosis until well after they graduate. A similar reasoning can be said for poverty alleviation metrics, where metrics like reduced earnings and incarceration are not likely to happen until well into adulthood. To ascertain the most accurate benefits of the school meals program compared to current costs, discount factors were therefore applied to many of the metrics related to health and poverty alleviation.

Benefits related to livelihoods and economy impact areas are not discounted, and this logic holds true for any benefits that could be included related to the environment and biodiversity. These metrics have discounting factors built into their monetization estimates and therefore are not discounted further.[xxxviii]

FIGURE 14

Impact area	Metric	Baseline benefit (bn USD, with discounts included)	Additional discount applied	Baseline benefit with discount (bn USD)
ENVIRONMENT	GHG emissions	$0.39	0%	$0.39
	Water use / water depletion	$0.11	0%	$0.11
	Soil erosion	$0.22	0%	$0.22
BIODIVERSITY	Land use	$1.13	0%	$1.13
	Soil, air, and water pollution	$0.39	0%	$0.39
LIVELIHOODS	Child labor	$-	0%	$-
	Underpayment	$-	0%	$-
	Lack of benefits	$-	0%	$-
	Occupational health / safety	$-	0%	$-
ECONOMY	Agriculture Subsidies	$-	0%	$-
HUMAN HEALTH	Health impacts from pollution	$0.06	0%	$0.06
OVERALL	TOTAL	$2.30		$2.30

The following section (including dietary NCDs, food insecurity, and poverty alleviation metrics) outlines the methodology for each discount per year of delayed benefit composed of a multiplicative effect with the number of years discounted. To arrive at these methods, there are three primary inputs: a yearly discount factor, the average age of a schoolchild of 12 years old (assumed to be the average age of a five-year-old starting school and 18-year-old graduating high school), and the age of an event particular to that metric (e.g., heart attack) to calculate the number of years to discount from the average schoolchild age.

Discounting Dietary NCDs metric

A discount factor of 3% annually is applied to Dietary NCDs, a typical discount factor used in healthcare analysis in the United States.[xxxix]

The age of 'event' for Dietary NCDs is an average of the average ages for diabetes diagnosis (45 years old),[xl] heart attack (68.4 years old),[xli] and stroke (69.2 years old)[xlii] to ensure a more accurate reflection of the entire category, and not just one event or pathology. The subsequent average is approximately 61 years old, and when subtracting the average school child age, Dietary NCDs is discounted for 50 years.

Applying this multiplicative discount rate, 22% of the original NCDs benefit remains, or 78% is subtracted.

Discounting Food Insecurity metric

Food insecurity and its health impacts are assumed to follow the same discount logic as the Dietary NCDs.

Discounting Poverty Alleviation metrics

Some poverty alleviation costs accrue during childhood (e.g., child homelessness costs, child maltreatment costs) and are therefore not discounted.

Other metrics (e.g., reduced earnings, corrections and crime deterrence, incarceration) accrue into adulthood and are thus discounted. Economic analyses using discount factors on these metrics varies significantly, and up to 7% per year in some short-term analyses.[xliii] For the purposes of this paper, a 3% annual discount rate was assumed to be a conservative, yet realistic longer term discount rate. Using the average age of employment of 39 years old (average between 17 years old and 61 years old, the average age of retirement),[xliv] these metrics are discounted for 28 years. After this calculation, 43% of the original total remains and 57% is subtracted.

Summarizing the true value estimate of school meals after accounting for discounted benefits

After incorporating baseline benefits and discounts for certain metrics, Figures 15 and 16 summarize the benefits of the current school meals program at $39.46 billion per year. When compared with the costs of $18.7 billion per year, the current school meals program creates $20.76 billion in value per year.

FIGURE 15

Impact area	Benefits without discounts (bn USD)	Benefits with discounts applied (bn USD)
ENVIRONMENT*	$-	$-
BIODIVERSITY*	$-	$-
LIVELIHOODS	$-	$-
ECONOMY	$-	$-
HUMAN HEALTH	$19.04	$4.20
POVERTY ALLEVIATION	$67.76	$35.26
TOTAL TRUE COST	**$86.80**	**$39.46**

*These metrics are excluded from totals for this specific analysis, as explained above; they are added back in for discussion as part of the Maximizing Participation and Improving Dietary Composition drivers.

FIGURE 16

Impact area	Metric	Baseline benefit without additional discount (bn USD)	Additional discount applied	Baseline benefit with discount (bn USD)
ENVIRONMENT*	GHG emissions	$-	0%	$-
	Water use/water depletion	$-	0%	$-
	Soil erosion	$-	0%	$-
BIODIVERSITY*	Land use	$-	0%	$-
	Soil, air, water pollution	$-	0%	$-
LIVELIHOODS	Labor (free, forced, child)	$-	0%	$-
	Underpayment	$-	0%	$-
	Lack of social security/healthcare benefits	$-	0%	$-
	Occupational health and safety issues	$-	0%	$-
ECONOMY	Agricultural subsidies	$-	0%	$-
HUMAN HEALTH	Health impacts from pollution	$0.06	0%	$0.06
	Dietary NCDs	$3.44	78%	$0.75
	Food insecurity	$15.54	78%	$3.39
POVERTY ALLEVIATION	Reduced earnings	$23.78	57%	$10.14
	Increased child homelessness costs	$7.84	0%	$7.84
	Victimization of street crime	$16.23	57%	$6.92
	Corrections and crime deterrence costs	$9.91	57%	$4.22
	Child maltreatment costs	$3.28	0%	$3.28
	Incarceration	$6.73	57%	$2.87
OVERALL	**TOTAL**	**$86.80**		**$39.46**

*These metrics are excluded from totals for this specific analysis, as explained above; they are added back in for discussion as part of the Maximizing Participation and Improving Dietary Composition drivers.

The True Value of different drivers compared to the current program

Similar to the baseline value being compared to a counterfactual scenario, each driver quantified in the main report is compared to the current school meals program. The difference in each impact area is subsequently combined with the cost to evaluate the true value of each driver.

Maximizing participation and increasing access

FIGURE 17

Metric	Bn USD
MAXIMIZING PARTICIPATION COST	$13.09
MAXIMIZING PARTICIPATION BENEFITS	$20.58
TRUE VALUE OF MAXIMIZING PARTICIPATION	**$7.49**

Maximizing participation involves increasing the number of students utilizing the school meals program by reducing barriers to access and reducing stigma, among other interventions. The true value of this use case is estimated to be at least $7.49 billion per year if all students who are eligible for free or reduced-price meals participate in both breakfast and lunch programs. This estimate comes from a preliminary benefit estimate of $20.58 billion and cost estimate of $13.09 billion.

Calculating the benefits of maximizing participation

To calculate the benefits of maximizing participation within the current school meals program, benefits from the current program are extrapolated to an increased population size that currently qualifies for school meals. Additionally, the benefits of decreased food waste are generated, and the overall sum of those benefit calculations are added together.

Extrapolating benefits of the current school meals program

Calculating the benefits of this intervention takes the benefits of the current school meals program and extrapolates those benefits based on the increase in utilization from each student currently eligible for free or reduced-price meals but not currently using them, or a 40% increase in the number of meals currently served. Figure 18 walks through the logic for arriving at the 40% increase estimate. Note that measuring the increase in meals based only on the meals served at free or reduced price would increase this estimate. However, the more conservative estimate of 40% is used.

FIGURE 18

Step	Metric	Unit
Number of students eligible for free or reduced-price lunch[xlv]	26.2	million students
Meals required per day to serve each free / reduced-price eligible student 2 meals, per day	52.4	millions of meals per day
NSLP average daily participation[xlvi]	29.6	millions of meals per day
Percent of lunches provided at free or reduced price[xlvii]	75%	percent of NSLP meals
Number of lunches provided at free or reduced price	22.2	millions of meals
SBP average daily participation[xlviii]	14.77	millions of meals
Percent of breakfasts provided at free or reduced price[xlix]	85%	percent of SBP meals
Number of breakfasts provided at free or reduced price	12.55	millions of meals
Number of meals provided at free or reduced price per day	34.75	millions of meals
Additional meals needing to be served per day to cover all student eligible for free / reduced-price meals	**17.66**	**millions of meals**
Total number of meals provided by the NSLP and SBP programs	**44.37**	**millions of meals**
Percentage increase from current meals served	**40%**	**percent increase**

In a scenario where every student who is eligible for free or reduced-price meals does not access those meals, these models can be altered to estimate the true value of different percentage increases in utilization. Based on the 40% increase, Figure 19 summarizes the benefits of increased utilization of school meals.

FIGURE 19

Impact area	Metric	Food system impact cost (bn USD)	% of expenditure	Baseline benefit with discount (bn USD)
ENVIRONMENT	GHG emissions	$0.39	40%	$0.15
	Water use/water depletion	$0.11	40%	$0.04
	Soil erosion	$0.22	40%	$0.09
BIODIVERSITY	Land use	$1.13	40%	$0.45
	Soil, air, water pollution	$0.39	40%	$0.16
LIVELIHOODS	Child labor	$-	40%	$-
	Underpayment	$-	40%	$-
	Lack of benefits	$-	40%	$-
	Occupational health / safety	$-	40%	$-
ECONOMY	Agricultural subsidies	$-	40%	$-
HUMAN HEALTH	Health impacts from pollution	$0.06	40%	$0.02
	Dietary NCDs	$0.75	40%	$0.30
	Food insecurity	$3.39	40%	$1.35
POVERTY ALLEVIATION	Reduced earnings	$10.14	40%	$4.03
	Increased child homelessness costs	$7.84	40%	$3.12
	Victimization of street crime	$6.92	40%	$2.75
	Child maltreatment costs	$3.28	40%	$1.30
	Corrections and crime deterrence costs	$4.22	40%	$1.68
	Incarceration	$2.87	40%	$1.14
OVERALL	**TOTAL**	**$41.70**		**$16.60**

Calculating the benefits of reduced food waste

Improving the quality of school meals leads to reduced food waste, as students will increase their uptake of meals. Increased quality of school meals may include best practices such as improving meals' nutrition, taste, and incorporating student input through a test kitchen. To understand the impacts of reduced food waste in school meals, the ReFed Insights Engine combines data from more than 50 public and proprietary datasets and provides granular estimates of how much food goes uneaten in the U.S., as well as the causes and destinations of food waste.[i] Figure 20 shows the impact of food waste on the school meals sector. ReFed estimates that the true value of wasted food in the K-12 setting is up to $5.09 billion. Assuming that this figure includes surplus from meals that do not qualify for free or at a reduced price, an adjustment factor is applied to estimate the amount of food waste that could be saved specifically from free or reduced-price meals.

FIGURE 20

Step	Metric	Unit
TONS OF FOOD SURPLUS	607,474	tons
GHGS ASSOCIATED WITH FOOD SURPLUS	2,885,980	CO2e emissions
COST OF FOOD SURPLUS	**$5.09**	**bn USD**
ESTIMATION OF FOOD SURPLUS ATTRIBUTED TO FREE/REDUCED-PRICE MEALS	78%	
ESTIMATION OF FOOD SURPLUS AVOIDED	**$3.99**	**bn USD**

The extrapolated benefits of the school meals program are added with the benefits of reducing food waste to determine overall benefits from increased utilization.

FIGURE 21

Step	Benefits (bn USD)
EXTRAPOLATING BENEFITS FROM THE CURRENT SCHOOL MEALS PROGRAM	$16.60
ESTIMATION OF FOOD SURPLUS AVOIDED	$3.99
TOTAL	**$20.58**

Calculating the costs of maximizing participation

The costs associated with maximizing participation from all eligible students has two cost components totaling $13.09 billion: increased program costs from serving additional meals and the cost of nutritional educational programs to encourage participation. We use the cost of nutrition education programs as a rough proxy for a variety of student outreach and engagement interventions that are shown to increase participation.

Other costs, including infrastructure to help families navigate the school meals application process, have not been included but are likely necessary to truly maximize participation.

The current budget of the school meals program, $18.7 billion,[li] [lii] is assumed to increase proportionately by the number of additional meals served for all eligible students, 40% in this driver. As such, the increased program costs are estimated to be $7.44 billion per year.

The cost of a nutritional education program for all students is based on a cost-benefit analysis of the Food, Health, and Choices nutrition education curriculum in New York City.[liii] The curriculum is a 24-lesson program on nutrition education delivered to fifth graders over the school year.[liv] Based on the estimates in the analysis, the program cost $111.20 per child. Extrapolating this to every public school student in the US, an estimated cost would be $5.65 billion. Figure 22 outlines the logic of the calculation.

FIGURE 22

Step	Estimate	Unit
TOTAL COST OF PROGRAM FOR 5TH GRADERS[LV]	$8,537,900	USD
NUMBER OF 5TH GRADERS IN PROGRAM[LVI]	76,778	children
COST PER STUDENT	$111.20	USD
NUMBER OF PUBLIC SCHOOL STUDENTS IN THE US[LVII]	50,800,000	children
ESTIMATED COST FOR ALL STUDENTS	**$5.65**	**bn USD**

Improving dietary composition

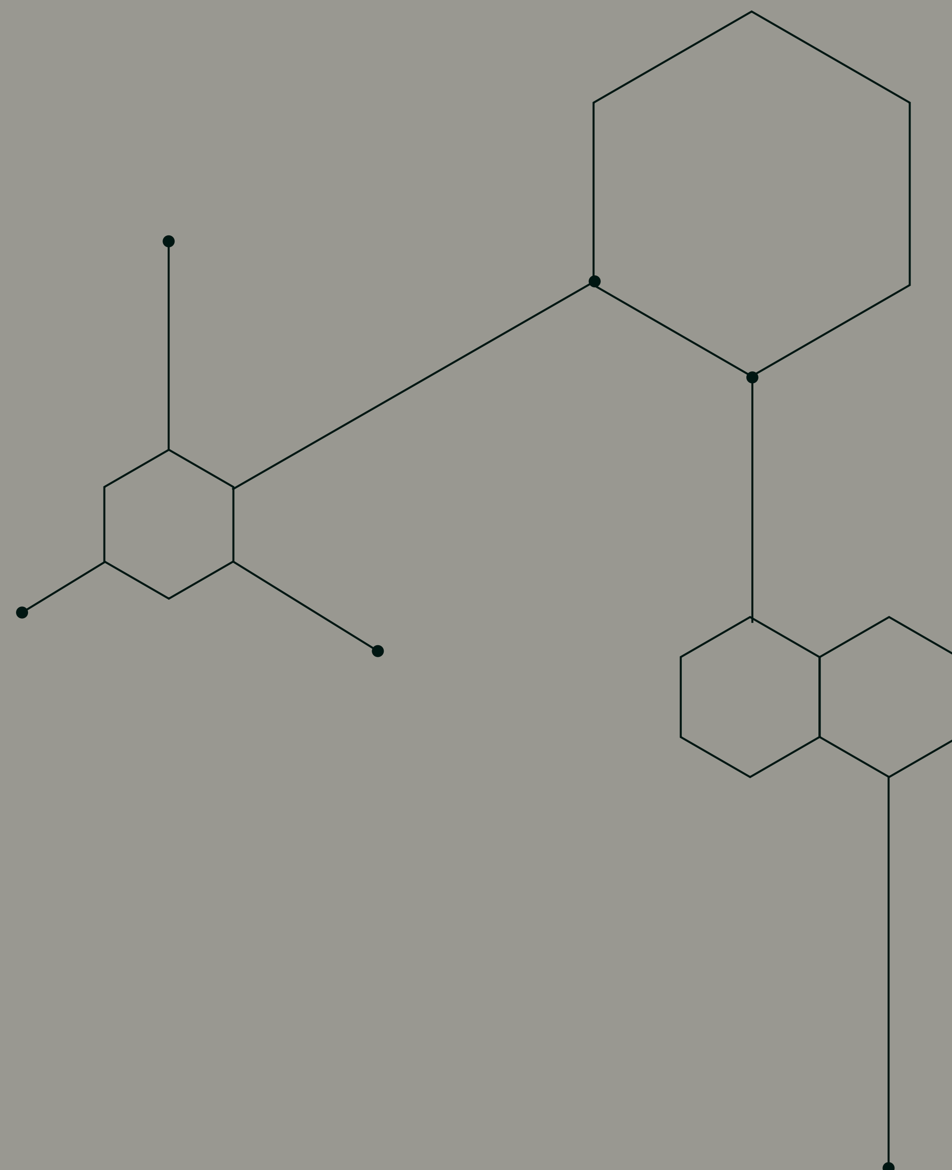


FIGURE 23

Metric	Bn USD
IMPROVING DIETARY COMPOSITION COST	$3.52
IMPROVING DIETARY COMPOSITION BENEFITS	$5.04
TRUE VALUE OF IMPROVING DIETARY COMPOSITION	**$1.52**

Improving dietary composition involves adapting federal, state, or local standards to strengthen dietary requirements for school meal programs and supporting schools to improve meal quality through scratch cooking. The driver quantified in the paper explored transitioning the current dietary pattern in school meals to an even healthier, Mediterranean Diet per the Dietary Guidelines for Americans.[lviii] The true value of this use case is estimated to be $1.52 billion per year, coming from a preliminary benefit estimate of $5.04 billion and cost estimate of $3.52 billion. The specific components of the diet are specified below, with subsequent sections related to the benefits and costs of implementation.

Components of the Healthy, Mediterranean Diet

The Dietary Guidelines for Americans (DGA) specifies a meal pattern that follows a Healthy, Mediterranean-Style Diet. Components of the diet were provided in serving sizes (e.g., 1 cup, 1 oz); however, to estimate the impact that this transition could have, the specific dietary components need to be converted into calories (e.g., kcal). The conversion is based on a 2,000 calorie diet.

To do so for each food group, we multiply the servings specified in the DGA by calories per unit of a proxy food (e.g., apple slices for fruits). Significant variability exists within food groups, and the proxy food methodology may be affected by such variability. An alternative methodology would be to use average calories per unit for a food group. The specific dietary components and their calorie calculations using proxy foods are in Figure 24. A high-level summary of the Mediterranean dietary components in terms of calories per unit, day, and week are also provided.

Summary by food group

FIGURE 24

Food group[lix]	Unit / day[lx]	Unit[lxi]	Notes	Calories per unit[lxii]	Calories per day	Calories per week
VEGETABLES	2.5	Cup eq / day	Based on 'vegetable'	118	295	2,065
FRUITS	2.5	Cup eq / day	Based on apple slices	57	143	998
GRAINS	6	Ounce eq / day	Based on cereal	108	648	4,536
DAIRY	2	Cup eq / day	Based on 1% fat milk	103	206	1,442
PROTEIN FOODS	6.5	Ounce eq / day	Based on poultry	77	501	3,504
OILS	27	Grams / day	Based on 'oil'	9	243	1,701
LIMIT ON CALORIES FOR OTHER USES	240	kcal / day	Calories already provided	1	240	1,680
TOTAL					**2,275**	**15,925**

The WWF calculator used in the baseline benefit estimation provides a way to compare this Mediterranean diet, after being converted to calories per week, to the current American diet as well as National Dietary Guidelines.[lxiii] At a high level, the Mediterranean diet calls for an increase in whole grains, roots and tubers, and seafood, and a decrease in sugar and red meat compared to both the current diet and National Dietary Guidelines. Figure 25 below details the comparison between these three diets in terms of percentage changes.

DGA provides details on the meat, poultry, and eggs components of the Mediterranean diet as an aggregated metric, yet these combined groups must be separated for entry in the WWF calculator. This paper assumes that 20% of the meat, poultry, and eggs components of the Mediterranean diet applies to meat, 60% to poultry, and 20% to eggs.

FIGURE 25

WWF food component[lxiv]	Healthy Mediterranean Diet component[lxv]	Calories per week	Comparison to Current American Diet[lxvi]	Comparison to National Dietary Guidelines[lxvii]
GRAINS	Grains (whole and refined)	4,536	40%	89%
FRUITS AND VEGETABLES	Fruits, dark green vegetables, other vegetables	1,480	76%	4%
ROOTS AND TUBERS	Red and orange vegetables, starchy vegetables	828	79%	141%
LEGUMES, NUTS, AND SEEDS	Beans / peas / lentils and nuts / seeds / soy products	1,037	40%	19%
RED MEAT	20% of meat, poultry, and eggs	369	-64%	-24%
FISH	Seafood	870	585%	454%
POULTRY	60% of meat, poultry, and eggs	1,108	23%	158%
DAIRY	Dairy	1,442	-1%	-18%
EGGS	20% of meat, poultry, and eggs	369	17%	213%
FATS AND OILS	Oils	1,701	-66%	-66%
SUGAR	Limits on calories for other uses	1,680	-27%	-27%

Calculating the benefits

The benefits of transitioning to this diet follow one of three patterns: health benefits, environmental / biodiversity benefits, and benefits of increased utilization. Figure 26 highlights the benefits by metrics. Metrics related to livelihoods and the economy were assumed to not have any benefits from this driver, likely an underestimation of its impact.

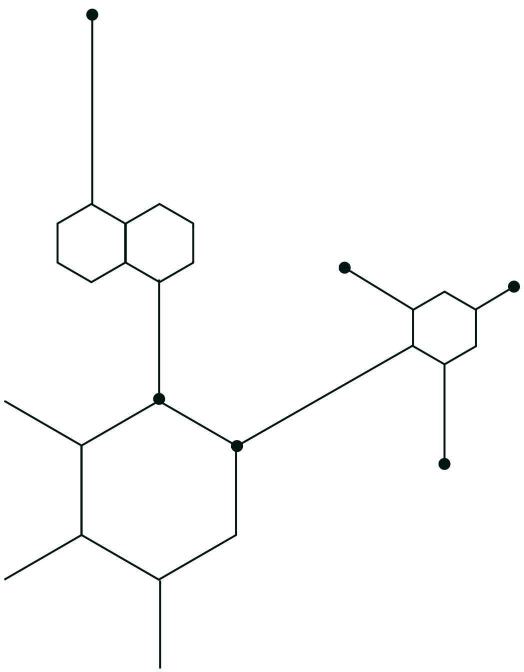
FIGURE 26

Impact area	Metric	Baseline benefit with discount (bn USD)	Savings from dietary shift (bn USD)	Underlying change
ENVIRONMENT	GHG emissions	$0.39	-$0.04	NDG -> Healthy Med Diet (GHG)
	Water use/water depletion	$0.11	$0.00	NDG -> Healthy Med Diet (water use)
	Soil erosion	$0.22	$0.02	NDG -> Healthy Med Diet (land use)
BIODIVERSITY	Land use	$1.13	$0.12	NDG -> Healthy Med Diet (land use)
	Soil, air, water pollution	$0.39	$0.05	NDG -> Healthy Med Diet (eutrophication)
LIVELIHOODS	Child labor	$-	$0.00	No change assumed for driver
	Underpayment	$-	$0.00	No change assumed for driver
	Lack of benefits	$-	$0.00	No change assumed for driver
	Occupational health / safety	$-	$0.00	No change assumed for driver
ECONOMY	Agricultural subsidies	$-	$0.00	No change assumed for driver
HUMAN HEALTH	Health impacts from pollution	$0.06	$0.01	In line with soil, air, water pollution
	Dietary NCDs	$0.75	$0.63	School meals -> Healthy Med Diet in AHA score
	Food insecurity	$3.39	$0.37	Increased participation from healthier meals
POVERTY ALLEVIATION	Reduced earnings	$10.14	$1.11	Increased participation from healthier meals
	Victimization of street crime	$7.84	$0.76	Increased participation from healthier meals
	Child maltreatment costs	$6.92	$0.46	Increased participation from healthier meals
	Corrections and crime deterrence costs	$4.22	$0.36	Increased participation from healthier meals
	Incarceration	$2.87	$0.32	Increased participation from healthier meals
OVERALL	**TOTAL**	**$41.70**	**$5.04**	

Health benefits

Health benefits are calculated using the percentage difference in AHA dietary score since a higher dietary score indicates a healthier diet, contributing to more health benefits.[lxviii]

The current food served in schools received a 39.5 out of 80 in Liu et al (2021).[lxix] To compare the Mediterranean diet to food served in schools, the Mediterranean diet was scored according to the following criteria from AHA. Metrics related to livelihoods and the economy were assumed to not have any benefits of this driver, likely an underestimation of its impact.[lxx]



eTable 1. Dietary Components of the American Heart Association (AHA) 2020 Strategic Impact Goals and Scoring Standards

Component	Points Range	Scoring Standard[a]	
		Max	Min
AHA Score[b]	**0-80**		
FRUITS AND FRUITS AND VEGETABLES[c]	0-10	≥4.5 cups equiv. per day	0
WHOLE GRAINS	0-10	≥3 oz equiv. per day	0
FISH AND SHELLFISH	0-10	≥1 oz equiv. per day	0
NUTS, SEEDS AND LEGUMES[D]	0-10	≥4 servings per day	0
SUGAR-SWEETENED BEVERAGES	10-0	≤5.14 fl oz per day	>16 fl per day
PROCESSED MEAT	10-0	≤0.5 oz equiv. per day	>1.764 oz equiv. per day
SODIUM	10-0	≤1500 mg per day	>4500 mg per day
SATURATED FAT	10-0	≤7% energy	>15% energy

[a] Intakes between the minimum and maximum standards are scored proportionately.
[b] All AHA dietary variables were energy-adjusted to 2000kcal/d prior to analysis.
[c] According to the AHA 2020 Goals, up to 3 cups/wk (0.42 cups/d) of starchy vegetables (e.g., potatoes, peas, corn) could be included; this maximum was incorporated into the analysis, with higher intake not contributing toward the score. 100% fruit juice could also be included; while its contribution was not capped in the original AHA 2020 Goals and thus not in our score, some organizations recommend no more than 1 serving/d of 100% fruit juice.
[d] A serving of nuts, seeds and legumes is 1-oz equivalent of nuts and seeds or 1/2 cup of legume.

Following this, the Mediterranean diet quantified received a score of 73.8 out of 80.

FIGURE 27

AHA Score Component[lxxi]	Healthy Med Diet component[lxxii]	Unit per day[lxxiii]	Unit[lxxiv]	AHA Score	Possible AHA Score	Percent of perfect score
FRUITS AND VEGETABLES	Fruits and vegetables (dark green veg, red and orange veg, starchy vegetables, other vegetables) (does not include peas, lentils, and soybeans)	4.79	Cup equiv / day	10	10	100%
WHOLE GRAINS	Whole grains (not including refined grains)	3	oz equiv / day	10	10	100%
FISH AND SHELLFISH	Seafood (calculated from 15 oz / week)	2.14	oz equiv / day	10	10	100%
NUTS, SEEDS, AND LEGUMES	Assumed to follow guidelines			10	10	100%
SUGAR-SWEETENED BEVERAGES	Assumed to follow guidelines			10	10	100%
PROCESSED MEAT	Meat, poultry, eggs (calculated based on 15% of all meat)	0.98	oz equiv / day	3.8	10	38%
SODIUM	Assumed to follow guidelines			10	10	100%
SATURATED FAT	Assumed to follow guidelines			10	10	100%
TOTAL AHA SCORE FOR HEALTHY MED DIET				**73.8**	**80**	**92%**

Comparing the AHA score of the Mediterranean diet to the AHA score of food served in schools, an 85% difference between the two scores' variation from the optimal diet (40.5 and 6.2) is the difference and benefits associated with a healthy, Mediterranean diet compared to the current school meals diet. Subsequently, the health benefits from food consumption (e.g., Dietary NCDs) were increased by 85% compared to the current school meals program, assuming a proportional impact on health in relation to diet change.

FIGURE 28

Setting	AHA Dietary Score	AHA Optimal Score	Difference to optimal score
HEALTHY MEDITERRANEAN DIET	73.8	80	6.2
SCHOOLS	39.5	80	40.5

Production benefits

The WWF calculator referenced above can be used to quantify the environmental and biodiversity impacts of different diets.[lxxv] After inputting the specific caloric components of the Mediterranean diet, its comparison to the current American diet and the National Dietary Guidelines are shown in Figure 29. For this comparison, school meals are assumed to closely mirror National Dietary Guidelines from the calculator.

Note that there is a slight increase in GHG emissions from the transition, likely because of a significant increase in the amount of seafood being served. There is also a very slight increase in water use, likely because of the increased amount of grains.

FIGURE 29

Metric	Unit	Current diet[lxxvi]	National guidelines	Healthy Med Diet[lxxviii]	NDG to Healthy Med Diet[lxxix]
GHG EMISSIONS	Mt CO2eq	925	719	799	-11%
WATER USE	km3	88	68	69	-1%
CROPLAND USE	000 ha	124,770	92910	89,930	3%
GRAZING LAND USE	000 ha	250,950	123790	95,245	23%
BIODIVERSITY LOSS	sp.yr	0.1	0.07	0.05	29%
EUTROPHICATION	000 t PO43-eq	4,665	3,080	2,690	13%

The WWF calculator disaggregates cropland and grazing land impact. Figure 30 below summarizes the process of combining these impacts under the 'land use' metric using mean species abundance (MSA) and subsequent monetization factors. At its conclusion, the Mediterranean diet is estimated to have 11% less land use than National Dietary Guidelines.

FIGURE 30

Metric	Unit	Current diet[lxxx lxxxi]	National guidelines[lxxxii lxxxiii]	Healthy Med Diet[lxxxiv lxxxv]
CROPLAND USE	000 ha	124,770	92,910	89,930
GRAZING LAND USE	000 ha	250,950	123,790	95,245
CROPLAND USE	bn USD	$180.93	$134.73	$130.41
GRAZING LAND USE	bn USD	$161.73	$79.78	$61.38
TOTAL LAND USE	bn USD	$342.66	$214.51	$191.79

FIGURE 31

	MSA[lxxxvi]	Monetization Factor (/MSAhayr)[lxxxvii]	Unit
CROPLAND USE	0.9	$1,611.22	USD
GRAZING LAND USE	0.4	$1,611.22	USD

FIGURE 32

CURRENT TO NDG	Current to Healthy Med Diet	NDG to Healthy Med Diet
37%	44%	11%

Benefits of increased utilization

Other metrics related to poverty alleviation are assumed to benefit from increased utilization of healthier, nourishing meals. A USDA study found that schools with healthier lunches have higher participation rates, and this 11% difference was then applied to the benefits of the current program that would be increased through improved dietary composition.[lxxxviii]
The specific metrics following this methodology are listed with the reasoning 'increased participation from healthier meals'.

Calculating the costs

The specific cost estimates to the right include improvement costs based on Healthy, Hunger Free Kids Act (HHFKA) implementation, increased food costs from procuring healthier foods from HHFKA (including labor costs), additional subsidies and technical assistance support from USDA, and additional costs for schools to train their staff and improve their facilities with equipment (e.g., freezers, ovens) along with the maintenance required.

FIGURE 33

Category	Cost	Unit	Specific components of category
IMPROVEMENT COST[LXXXIX]	$1.36	bn USD/year	Infrastructural costs based on HHFKA implementation (adjusted to one year)
INCREASED FOOD COSTS	$1.09	bn USD/year	Yearly cost (currently assumed 6 cent increase for breakfast as well)[xc]
ADDITIONAL COSTS (POTENTIALLY YEARLY) SUBSIDIZED BY USDA[XCI]	$0.036	bn USD/year	Additional support / subsidies from USDA
ADDITIONAL COSTS (POTENTIALLY YEARLY) FOR SCHOOLS	$1.04	bn USD/year	Additional costs for school districts if maximal training / improvements are done
TOTAL	**$3.52**	**bn USD/year**	

The improvement costs, food costs, and additional costs subsidized by USDA are based on implementation costs from HHFKA, which contain infrastructural costs, increased food procurement costs, increased labor costs, and additional USDA subsidies.[xcii xciii] Implementing a healthier diet is assumed to mirror many of these implementation costs. Additional costs for schools may include the cost of equipment, repairs, and training of staff. Heavy infrastructural investments may be required for schools to be able to cook healthy, nutritious meals like electrical systems, water systems, and other large building infrastructures. Expert interviews estimate that nearly half of schools in the US do not have the necessary equipment for scratch cooking, and this heavy infrastructural investment represents a significant additional cost.

Optimizing procurement

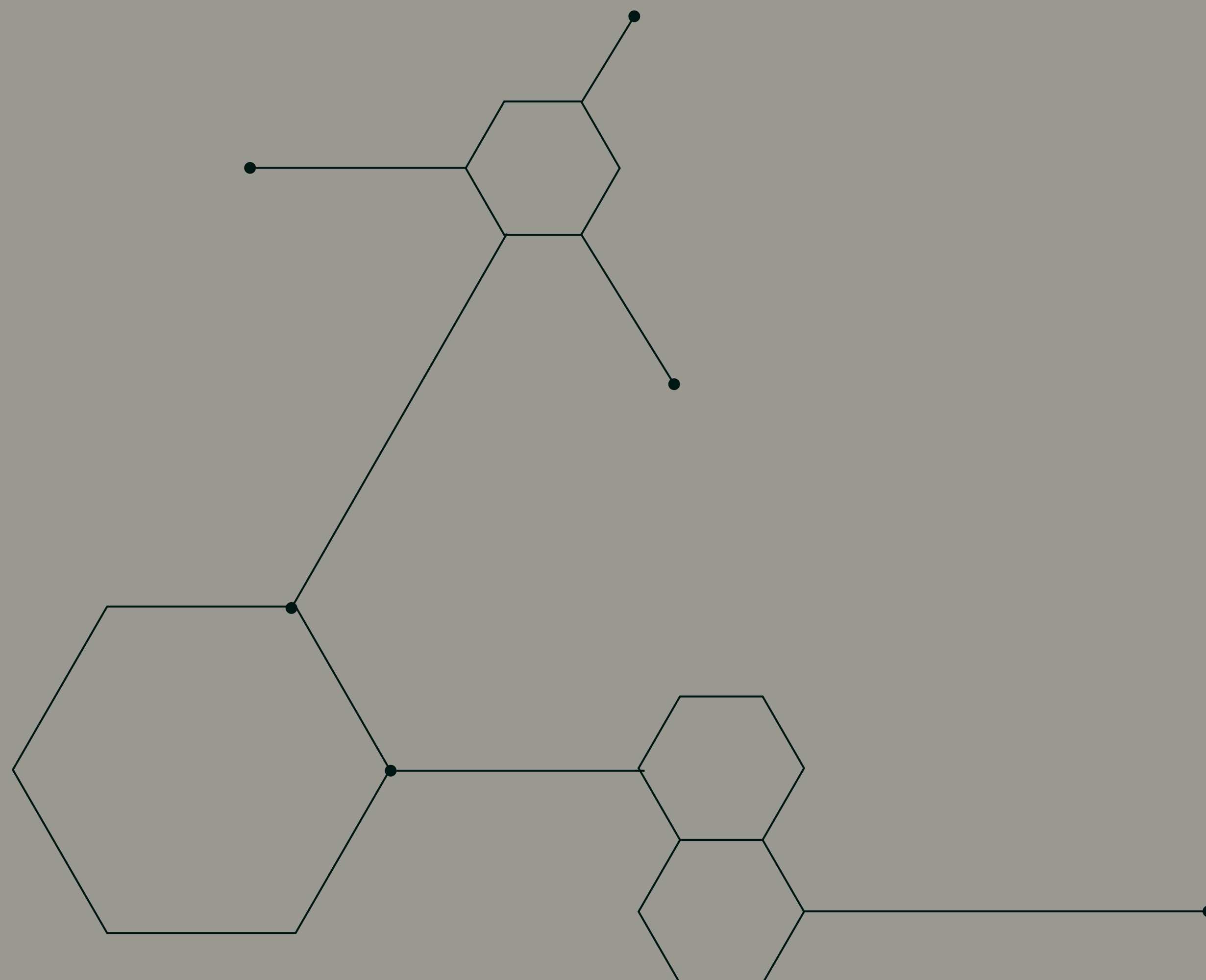


FIGURE 34

Metric	Bn USD
OPTIMIZING PROCUREMENT COST	$--
OPTIMIZING PROCUREMENT BENEFITS	$1.28
TRUE VALUE OF OPTIMIZING PROCUREMENT	$1.28

Benefits of values-based procurement

The Good Food Purchasing Program is a procurement model that helps public institutions, like school districts, prioritize food purchases that align with the values of local economies, environmental sustainability, valued workforce, animal welfare, and nutrition. Values-based procurement is one of the most effective levers to ensure that the billions of dollars spent on food each year also benefits the public good. The program is owned and operated by the Center for Good Food Purchasing, which has amassed a database of food purchasing information from its enrolled institutions.

The benefits of aligning food purchases with values are displayed in Figure 35 using methodology developed by the Center for Good Food Purchasing (informed by researchers, scientists, and subject matter experts).[xciv] The costs are assumed to be neutral for this scenario, as public institutions have shown that they are able to make meaningful shifts within the constraints of their current budgets.[xcv]

FIGURE 35

Impact area	Metric	Benefit	Unit	Underlying change
LIVELIHOODS	Annual local employment	19,552	jobs	Increase local procurement to 30% of spend
	Annual local wages	$971,432,140	USD	Increase local procurement to 30% of spend
ENVIRONMENT	CO2 emissions averted	2.98	bn lbs	Reduce beef purchases by 30%
	Water saved	14,100	mn gal	Reduce beef purchases by 30%
	Pesticide reduction	567,000	lbs	Replace top 20 conventional produce items with organic items
	Pesticide reduction	47,600	acres	Replace top 20 conventional produce items with organic items

Calculating local jobs and wages

The primary input to this model is institutional purchasing data collected by the Center for Good Food Purchasing, which categorizes purchases into different industry sectors using the North American Industry Classification System (NAICS). Using this NAICS categorization, employment and wages data from the Bureau of Labor Statistics (BLS) and Gross Domestic Product (GDP) data from the Bureau of Economic Analysis (BEA) are found representing each category of food purchases.

With this secondary data, the industry sector labor ratio is calculated for each NAICS industry represented by institutional purchasing data. This labor ratio determines the jobs and wages that can be attributed to a dollar of institutional purchasing, based on the purchase's food category and location.

Once the labor ratios for all industry sectors are determined from institutional purchasing data, the industry sector labor ratios are multiplied with the corresponding institutional purchases to find attributable jobs and wages. Then, all attributable jobs, wages, and food purchases are aggregated across institutions and regions. After that, a multiplier for jobs and a multiplier for wages per dollar of institutional food spend are calculated (by dividing the aggregate attributable jobs and wages by the aggregate food purchases). Finally, these multipliers are used to model labor impact for the school meals food budget.

Calculating greenhouse gas emissions and water use

The greenhouse gas (GHG) emissions reductions are the difference between the GHG emissions and water use of the reduced food category (e.g., beef, meat and eggs, dairy) and the replacement plant proteins (e.g., beans, pulses, and tofu). The replacement plant proteins are based on the most common lower-impact plant proteins that institutions purchase. The replacement assumes an equal substitution by weight.

The GHG emissions are the product of multiplying the food weight by the GHG emissions factor for the food category.[xcvi] This factor includes food-related emissions along the total supply chain (feed, farm, processing, transport, packaging, and losses) for North America. The water use is the product of multiplying the food weight by the water use factor for the food category. This factor includes food-related freshwater withdrawals for North America. Where North American factors are unavailable, global factors are used. Monetization factors are then applied to estimate the financial benefit from these resource savings.[xcvii]

Calculating pesticide use

To determine pesticide load, the top 20 produce items sourced domestically and purchased by institutions are identified. The twenty produce items included in the calculator are apples, broccoli, carrots, celery, corn, cucumbers, grapes, kale, lettuce, nectarines, onions, oranges, peaches, pears, potatoes, spinach, squash, strawberries, tangerines, and tomatoes. Then, the Category 1B pesticides from the Whole Foods Responsibly Grown list[xcviii] are identified that may be applied to these 20 items. Category 1B pesticides are defined as high-risk pesticides including all organophosphate and N-methyl carbamate pesticides.

USDA National Agricultural Statistics Service (NASS) data[xcix] is used to determine the pesticide application rate for each of these 20 items, which included the pounds of pesticides applied per acre per year on average for the pesticides applied to these items. Using USDA data, the yield (lb/acre) for each produce item is calculated. The application rate and yield are used to estimate the pounds of pesticides applied per pound of conventionally grown product.

FIGURE 36

Metric	Value	Unit	Conversion	Value (bn USD)	Underlying change
ANNUAL LOCAL WAGES	$971	mn USD	--	$0.97	Increase local procurement to 30% of spend
CO2 EMISSIONS AVERTED	2.98	bn lbs	$0.08 USD / lb CO2 eq	$0.23	Reduce beef purchases by 30%
WATER SAVED	14.1	bn gal	$0.05 USD / gal	$0.08	Reduce beef purchases by 30%
TOTAL MONETARY BENEFIT				**$1.28**	

Increased reimbursement for school meals

Increased funding for school meals would enhance schools' abilities to make the shifts described on the previous page. An additional 10 to 25 cents per meal in the school meals programs would enable schools to purchase more True Value foods. Based on the number of breakfasts and lunches served per year by the school meals programs, an increase in $0.25 per meal would result in a cost of $1.8 billion, or 10% of the expenditure of the current school meals programs.

FIGURE 37

Step	Metric	Unit
NUMBER OF BREAKFASTS SERVED	2.45	bn meals
NUMBER OF LUNCHES SERVED	4.87	bn meals
TOTAL BREAKFASTS AND LUNCHES SERVED ANNUALLY	7.32	bn meals
ADDITIONAL REIMBURSEMENT PER MEAL	$0.25	USD
COST OF ADDITIONAL REIMBURSEMENT	**$1.82**	**bn USD**

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