True Cost of Food
Measuring What Matters to Transform the U.S. Food System

The ROCKEFELLER FOUNDATION

JULY 2021

Foreword

Covid-19 exposed longstanding fault lines in our food system. As lockdowns took hold, hunger and insecurity skyrocketed, and cars stretched for miles outside food pantries across the country. Producers faced surplus goods, while grocery store shelves sat empty, revealing a supply chain vulnerable to crisis and disruption. And the climate crisis, which our food system contributes to, continued unabated. The drastic nature of the present moment offers us an opportunity to achieve transformative change.

Although Americans have some of the most affordable food in the world, our food comes with hidden costs—to our health, to our climate, and to the farmers, fishers, ranchers, and food workers who ensure goods make their way to store shelves. As the pandemic made explicit, those workers bear the brunt of the unequal and unsustainable food system we live with today. In fact, our food system costs all of us far more than what's written on our receipt as we exit the check-out line.

Our food system is failing us, and too few people understand the true cost of the food we consume, and lack clear incentives to change a system that is costing us dearly. That's why accounting for the true cost of the food we eat is the first, necessary step towards remaking the incentive structure that drives our food system today.

Consider this: In 2019, American consumers spent an estimated $1.1 trillion on food. That price tag includes the cost of producing, processing, retailing, and wholesaling the food we buy and eat. It does not include the cost of healthcare for the millions who fall ill with diet-related diseases. Nor does $1.1 trillion include the present and future costs of the food system's contributions to water and air pollution, reduced biodiversity, or greenhouse gas emissions, which cause climate change. Take those costs into account and it becomes clear the true cost of the U.S. food system is at least three times as big—$3.2 trillion per year. The true cost of food disproportionately burdens people of color, who are more likely to suffer from diet-related diseases, have less access to water and sanitation, and often work in food production jobs for less than a living wage.

Americans pay that high cost even if consumers don't see it in the check-out line. And, if we don't change our food system, future generations will pay those high costs, too.

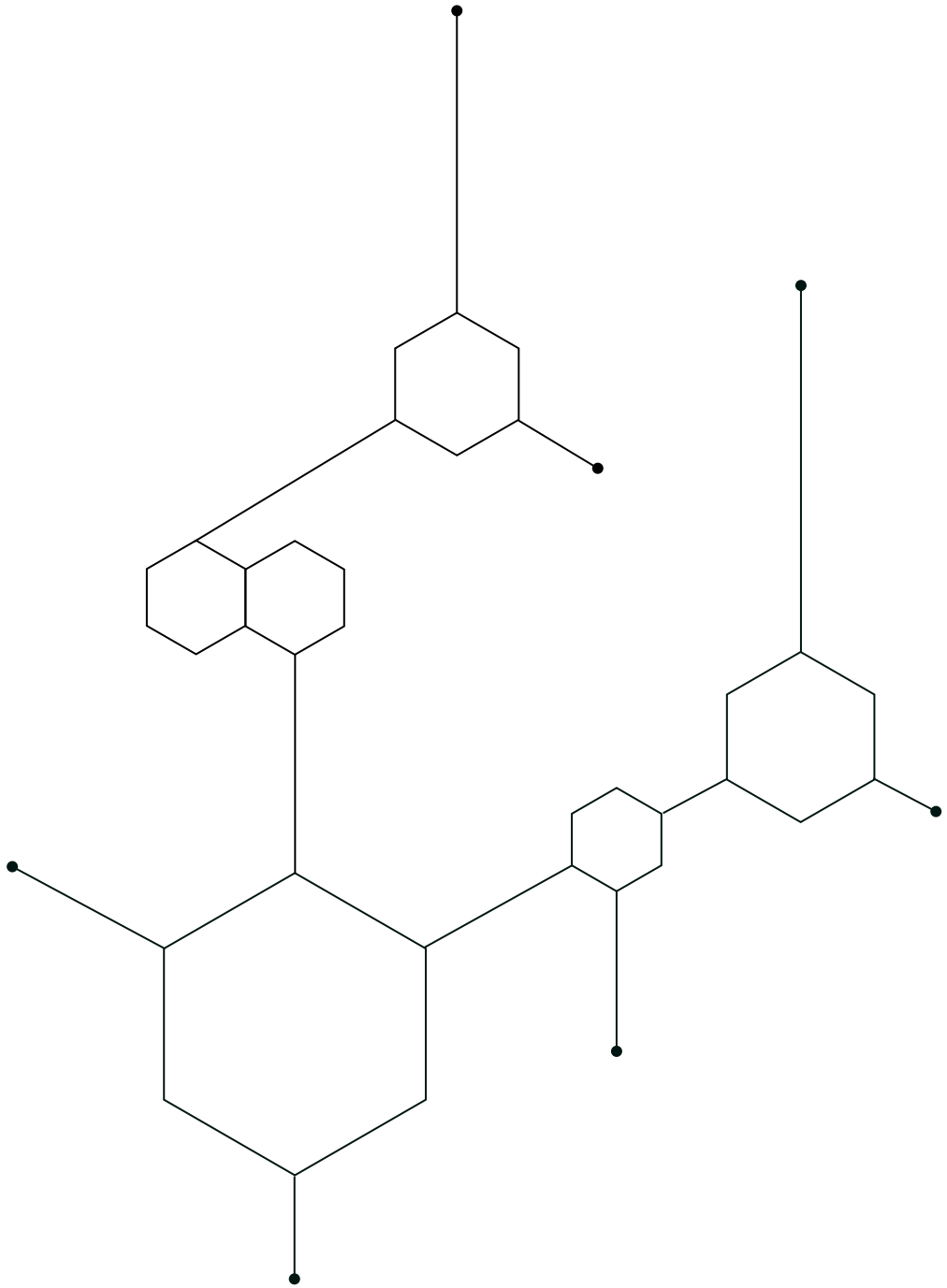
In this report, The Rockefeller Foundation presents the true cost of food in the U.S., which measures the costs of our food system today to our health, environment, and society. After publishing our July 2020 "Reset the Table" report, we spent the past several months working with experts and advocates across the field to model the impact of the U.S. food system. The result is a national analysis—a first—that can help us estimate the cost of our food more accurately, and thus, shift the incentive structure that perpetuates our unsustainable food system today.

Understanding the true cost is revolutionary and extremely difficult. Realizing a better food system requires facing hard facts. We must accurately calculate the full cost we pay for food today to successfully shape economic and regulatory incentives tomorrow. A better appreciation for food's true cost can help those trying to provide healthy and affordable food for all consumers. It can lead to better long-term decision making about fair, livable wages, and safe conditions for all workers. It can promote innovation to deliver more viable farming methods for rural farmers. And it can help protect, not harm, our planet. By quantifying the annual, true cost of food, The Rockefeller Foundation has taken a critical but limited first step. There is much more work to do and we invite all interested partners to continue building, improving, and expanding the model we made available here.

And we all need to act now. The Covid-19 pandemic revealed how unfit our food system is for the 21st century. Knowing the trust cost of our food system, as this report makes clear, is the right first step toward making it better, less costly, and less risky. With this kind of analysis, governments, advocates, corporations, and even individuals have the tools and the power to catalyze the systems-level change needed to develop a truly nourishing, equitable, and regenerative food system in the United States.

Onward,

Dr. Rajiv J. Shah,
President of
The Rockefeller Foundation



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An Urgent Need to Transform the U.S. Food System

The U.S. food system is in many ways a powerful story of innovation and evolution. Designed to address widespread malnutrition in the wake of the Great Depression, it feeds millions of families in the U.S. and around the world, and has expanded and innovated in remarkable ways.[i]

The food system now employs 10% of American workers[ii] who make it possible to produce, transport, and distribute food across the country. The system also provides millions of Americans with a wide variety of food year-round and is overwhelmingly effective in protecting people from foodborne infection.[iii]

But our food system has deep impacts that reach far beyond our plates. The U.S. food system's current set-up has led to costly impacts on the health of people, society, and the planet. Global warming, reduced biodiversity, water and air pollution, food waste, and the high incidence of diet-related illnesses are key unintended consequences of the current production system.

The burden of impact of these costs are disproportionately borne by communities that are marginalized and underserved, often communities of color, many of whom are the backbone as farmers, fishers, ranchers, and food workers. And while these issues are not new, the Covid-19 pandemic has further revealed and exacerbated them, creating urgency for immediate action to stem the costly impacts of our current food system.

As a country, we spend a total of $1.1 trillion a year on food[1,iv]. But when the impacts of the food system on different parts of our society—including rising health care costs, climate change, and biodiversity loss—are factored in, the bill grows. Accounting for these costs, the true cost of food is at least $3.2 trillion a year, more than three times the current expenditure on food.

Urgent action is needed. Global warming is approaching the 1.5C threshold, at which the risk of "run-away" climate change increases significantly and threatens catastrophic physical effects on both people and the planet. Poor nutrition is now the leading cause of poor health in the United States[v] and Covid-19 has further exposed the risks of poor nutrition. The majority of adult hospitalizations were "attributable to one of four pre-existing conditions: obesity, hypertension, diabetes, and heart failure, in that order."[vi]

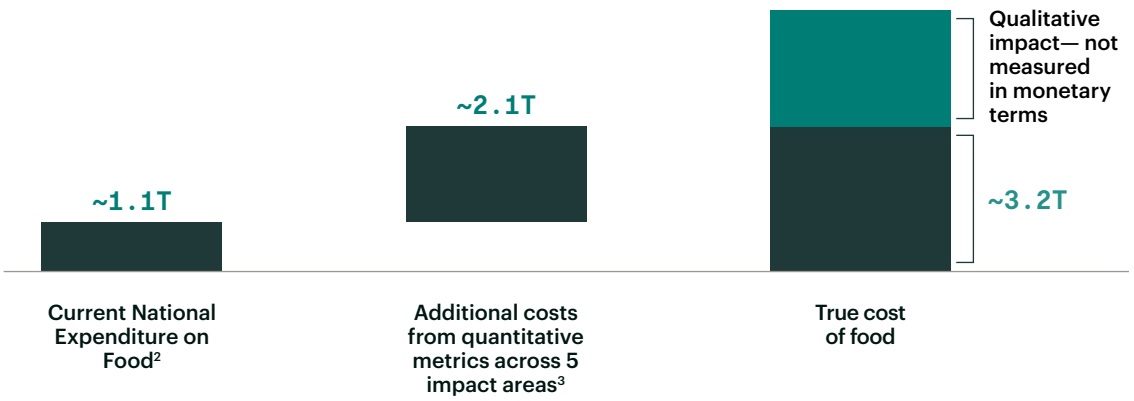
These dire human and planetary imperatives to transform the food system are not new, and the economic, public health, racial, and social consequences of a broken food system can no longer be ignored. For too long the food system has optimized for production volume, safety from food-borne infectious illnesses, and inexpensive calories, with success measured largely along these metrics.

We need holistic and transformational change to build a food system that provides healthy and affordable food for all consumers; fair, livable wages, and safe working conditions for workers; viable farming options for rural communities; and efficient and sustainable use of our natural resources, to name a few. We need a system that protects the environment and human health, while delivering fair returns to a broad set of stakeholders—from workers to consumers to producers. Without these changes, Americans today, and future generations, will be responsible for paying for these large and growing costs.

This report—drawing on the insights from dozens of experts from across the food system and existing research and analyses—is one of the first to identify the true cost of the food system in the U.S., which scientists and advocates have long argued is undervalued and comes at great cost to people and the planet.

1 The analysis of the U.S. Food system discussed in this report includes the production, processing, distribution, retail, and consumption stages of the supply chain. It does not include food service or hospitality in cost analyses. Exports are included at the production level, and imports are included for consumption.
2 Total spent by U.S. consumers, businesses, and governmental entities on food and beverages in grocery stores and other retailers and on away-from-home meals and snack.
3 Equity impact assessed for each area individually.

ESTIMATED TRUE COST OF FOOD IN THE U.S., ANNUAL (T USD)



How true cost accounting can improve decision-making

We believe there is significant opportunity to both address overall costs of the food system and increase the benefits or "total return" from the food system if innovations, products, and policies are designed with a more comprehensive view of system costs and benefits.

A first step in catalyzing change toward a more equitable, healthy, and resilient food system is to understand the economic underpinnings of the existing system. Currently, many food system actors do not account for costs related to the broader impacts on such areas as health, climate, and equity in their decision-making.

Even amongst players that actively consider the effect on these areas, the economic and regulatory incentives to address them often do not exist. To accelerate the development of technological innovations; facilitate the adoption of new revenue streams for environmental or nutrition services; change incentives for farmers, ranchers, and food producers; and shift consumer preferences towards a more sustainable, equitable, and nourishing food system we need clear and transparent understanding of those costs. This will also create transparency around the impact of the proposed changes on pricing, practices, and policy.

Broadly, while costs of certain inputs such as land costs, transportation and storage, and wages are fully or partially accounted for in food prices, other significant impacts—such as the depletion of natural resources, biodiversity loss, human health impacts, livable wages and working conditions—are not. This lack of transparency and the absence of a codified, unified framework to quantify the "true cost" of the food system means that there is neither a clear line of sight into such costs, nor incentives to reduce these true costs and optimize for the true benefits of food through public spending and private investments.

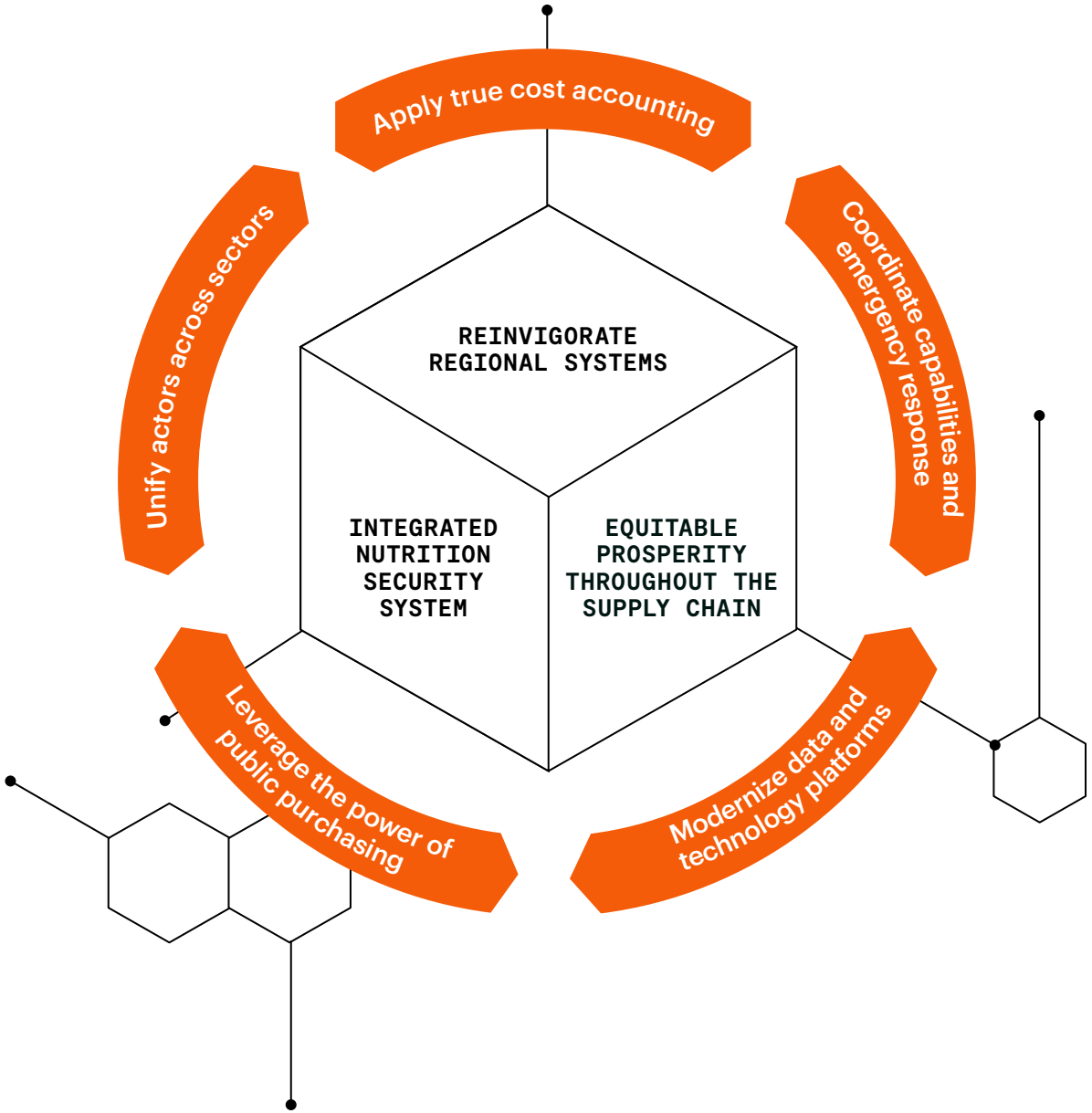
True cost accounting (TCA) provides the tools needed to do so.

It is worth noting that while it is critical to quantify the "true cost" of food to effectively address the impacts of the current food system, the sole solution for change cannot and should not be increasing consumer prices.
We believe that there is a myriad of options to reduce true cost: from redesigning public nutrition programs to dietary shifts, to adopting more resource-efficient business practices, to technological innovations to improve the nutritional value of products, to policy changes. Any reshaping of the food system must also consider the long-standing, and systemic, inequities and burdens already carried by marginalized communities, including the millions of households currently experiencing nutrition insecurity. As such, we should look for ways to meaningfully address the "true cost of food" without necessarily raising consumer prices or adopting changes that exacerbate existing inequities in the food system.

Such changes will require coordinated and concerted action from all actors in the system—federal, tribal, state, local, and territorial governments; investors; private companies; consumers; academics; and advocates—that have the opportunity and imperative to use true cost thinking to reshape policies and behaviors.

This report represents the continuation of a multi-year commitment by The Rockefeller Foundation to inform and drive food system transformation. Building on the Reset the Table report published in 2020, identifying the true cost of food is a critical step in ensuring that all food system stakeholders understand the full benefits and costs of the current system, and the inspiration and tools needed to transform the system to be more equitable, healthy, and resilient.

Recommendations from Reset the Table (2020) on the capabilities and shifts needed to transform the U.S. food system



BENEFITS OF THE FOOD SYSTEM

The food system, in its current form, also creates benefits that are not accounted for in food prices. Examples include:

- The U.S. has the most affordable food in the world—on average consumers spend less than 5% of their disposable income on food-at-home expenditures.[vii]
- At the same time, U.S. consumers can purchase a great variety of food throughout the year, generally in conveniently accessible locations and with little risk of foodborne illnesses.
- The food system is also supporting local economies across the country, including $1 billion in annual sales at farmers markets.[viii]
- In 2019, 22.2 million full- and part-time jobs were related to the agricultural and food sectors—10.9 percent of total U.S.[ix] employment.

While this report does not quantify these unaccounted benefits, it is important to consider them when designing interventions to reduce the unaccounted costs.

Our framework & approach

This economic analysis by The Rockefeller Foundation, along with input from dozens of food systems experts, is a first attempt at applying a true cost accounting framework to quantifying the true cost and impact of the current food system in the United States.

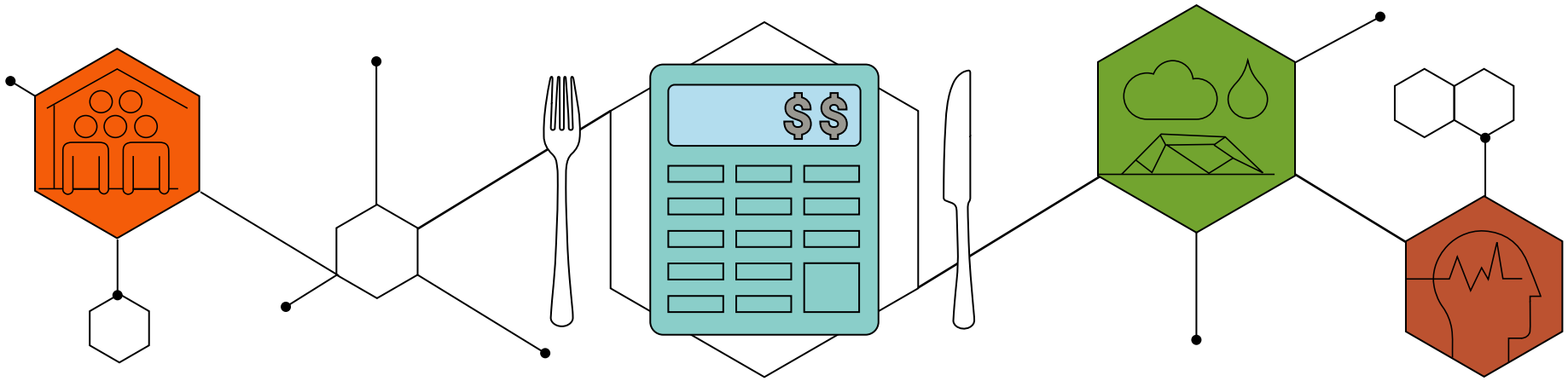
A complete overview of our True Cost Accounting methodology, including the full set of metrics considered, data sets used, monetization techniques employed, detailed calculations, and additional charts and tables, is available in the technical appendix.

Several other organizations have led important work in developing and defining methodologies to calculate the true cost of food and have completed case studies on individual food products or commodities. This work stands on the shoulders of work done on true cost accounting of food systems by academics, think-tanks, and other organizations both internationally and within the U.S.

However, we believe this analysis is the first to do both a U.S.-specific, national-level analysis and to include a comprehensive set of metrics across impact areas including human health, environment, and society.

TABLE 1 | Landscape of True Cost Accounting Efforts and Metrics Used

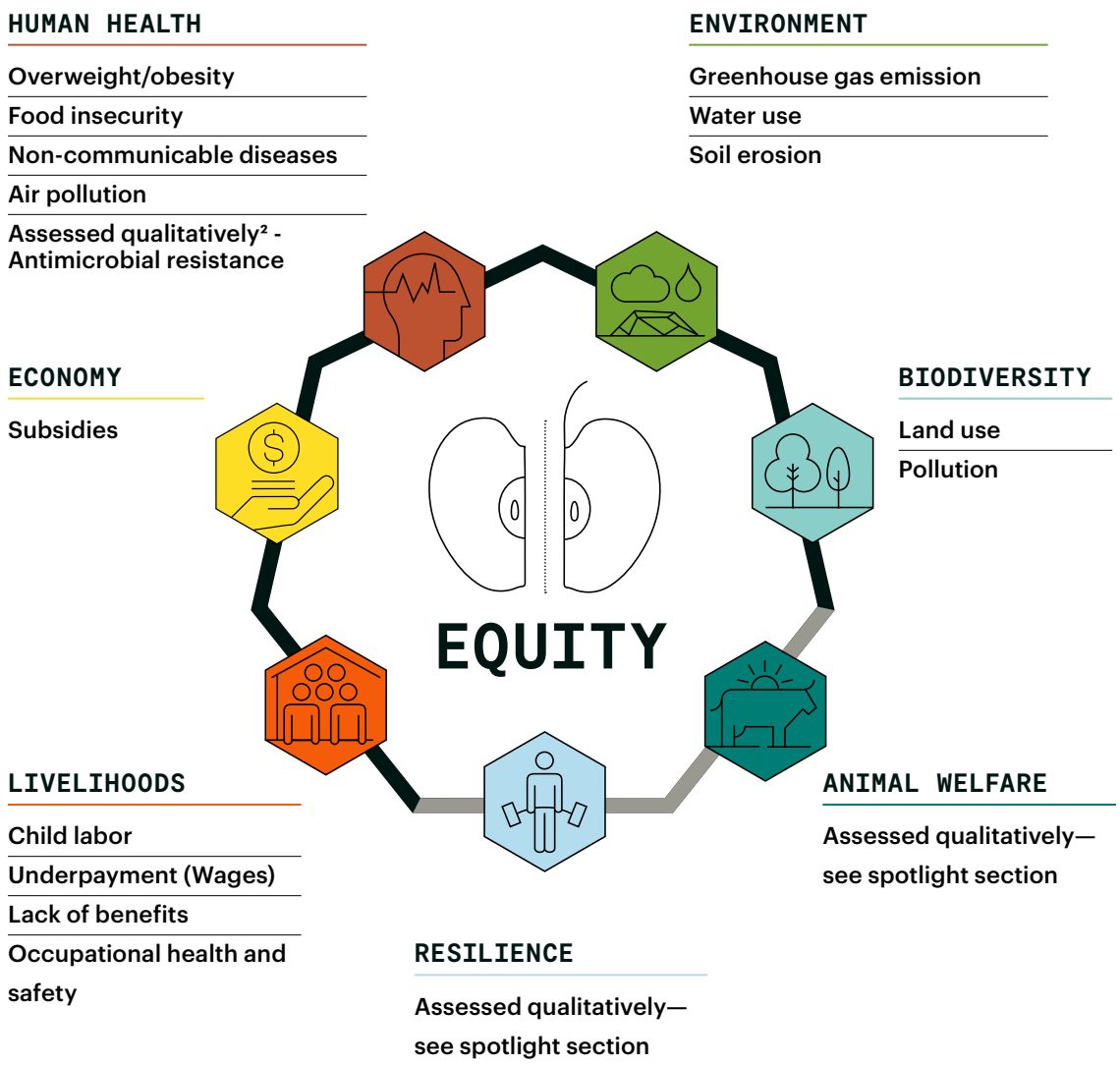
	TEEBAGRI-FOOD	FOOD AND LAND USE COALITION	WORLD BUSINESS COUNCIL FOR SUSTAINABLE DEVELOPMENT	FOOD TANK	TRUE PRICE	SUSTAINABLE FOOD TRUST	THE PRINCE'S CHARITIES	CAPITALS COALITION	WORLD WIDE FUND FOR NATURE
REPORT	TEEB for Agriculture and Food: Scientific and Economic Foundations Report	Growing Better: Ten Critical Transitions to Transform Food and Land Use	True Cost of Food: Unpacking the Value of the food system	The Real Cost of Food: Examining the Social, Environmental and Health Impacts of Producing Food	Monetisation Factors for True Pricing	The Hidden Cost of UK Food	What price resilience? Towards Sustainable and Secure Food Systems	TEEB for Agriculture and Food: Operational Guidelines for Business	Bending The Curve: The Restorative Power of Planet-based Diets
COMMON METRICS INCLUDED	GHG emissions, deforestation, eutrophication, health and safety issues, food security	GHG emissions, water scarcity, biodiversity loss, obesity, rural welfare	GHG emissions, freshwater use, biodiversity loss, soil use, non-communicable diseases, obesity	GHG emissions, air and water pollution, biodiversity loss, healthcare costs, workers rights	GHG emissions, eutrophication, acidification, land use, under-payment, discrimination	GHG emissions, water costs, air pollution, soil degradation, non-communicable diseases, antibiotic resistance	GHG emissions, water depletion, air pollution, water pollution, biodiversity loss, soil degradation	GHG emissions, water use, fertilizer use, food security, salaries and benefits	GHG emissions, water use, biodiversity loss, eutrophication, premature mortality



In our framework for estimating the true cost of food in the U.S., we identified five areas impacted by food production and consumption: Environment, Biodiversity, Livelihoods, Economy, and Human Health. We also sought to identify ways that Equity impacts true cost, and explored both the impacts of Animal Welfare and Resilience.

Within these impact areas, 14 individual metrics were selected to quantify the true cost of food. For the purposes of this report, we have focused on where we could access consistent and verified economic data sets. In other areas, we have spotlighted key findings and areas for additional work that needs to be done before true cost accounting can be fully applied.

It is important to note that costs that are captured in food prices, such as wages paid, packaging, food safety measures, economic costs of food disposal, and agricultural inputs, are not included in this framework because they are already included in our national expenditure on food.



2 Metrics were included only if impact size and monetization factors were widely cited; in the case when various estimates or monetization factors were published, the most conservative estimate was used. We highlight some of these areas throughout as areas needing further study.

OUR METHODOLGY IS EXPANSIVE BUT NOT EXHAUSTIVE

The metrics selected were expansive and captured many of the unaccounted costs of the food system, but there are other costs that were excluded here due to a lack of sufficient data or data quality (including mental health costs of the food system) or because it is ethically challenging to assign monetary value to issues such as animal suffering.

Further, this analysis focused only on primary impacts of the food system. Impacts that are downstream (such as national security, educational outcomes due to nutrition insecurity, secondary impacts on the environment) are not included, even if they are potentially significant.

Finally, the methodology was designed to eliminate redundancy wherever possible (i.e., double counting costs that affect more than one impact area) and to isolate food-related impacts as strictly as possible (i.e., to use published research to isolate the proportion of a chronic disease attributable to diet). **For these reasons, we believe the current quantification represents a conservative estimate of the true cost of food** and is expansive but not exhaustive.

2

The True Cost of our Food System is Three Times Higher than Expenditure on Food

Based on the framework above, the true cost of food, when considering health outcomes, healthcare costs, environmental costs, and other impacts, **is at least three times the current expenditure on food**.

- **The current food expenditure (for 2019) was estimated to be approximately 1.1 trillion dollars[x].** This can be generally interpreted as the price that we, collectively as a nation, currently pay to purchase our food. This includes production, processing, and retail and wholesale costs, but does not include post-retail and wholesale costs such as food service, preparation, and disposal costs.

- **The additional costs from the quantifiable metrics across impact areas is approximately $2.1 trillion.** This amount represents additional, externalized costs, beyond the $1.1 trillion expenditure, that are incurred within our food system but are not currently covered by the price of food.

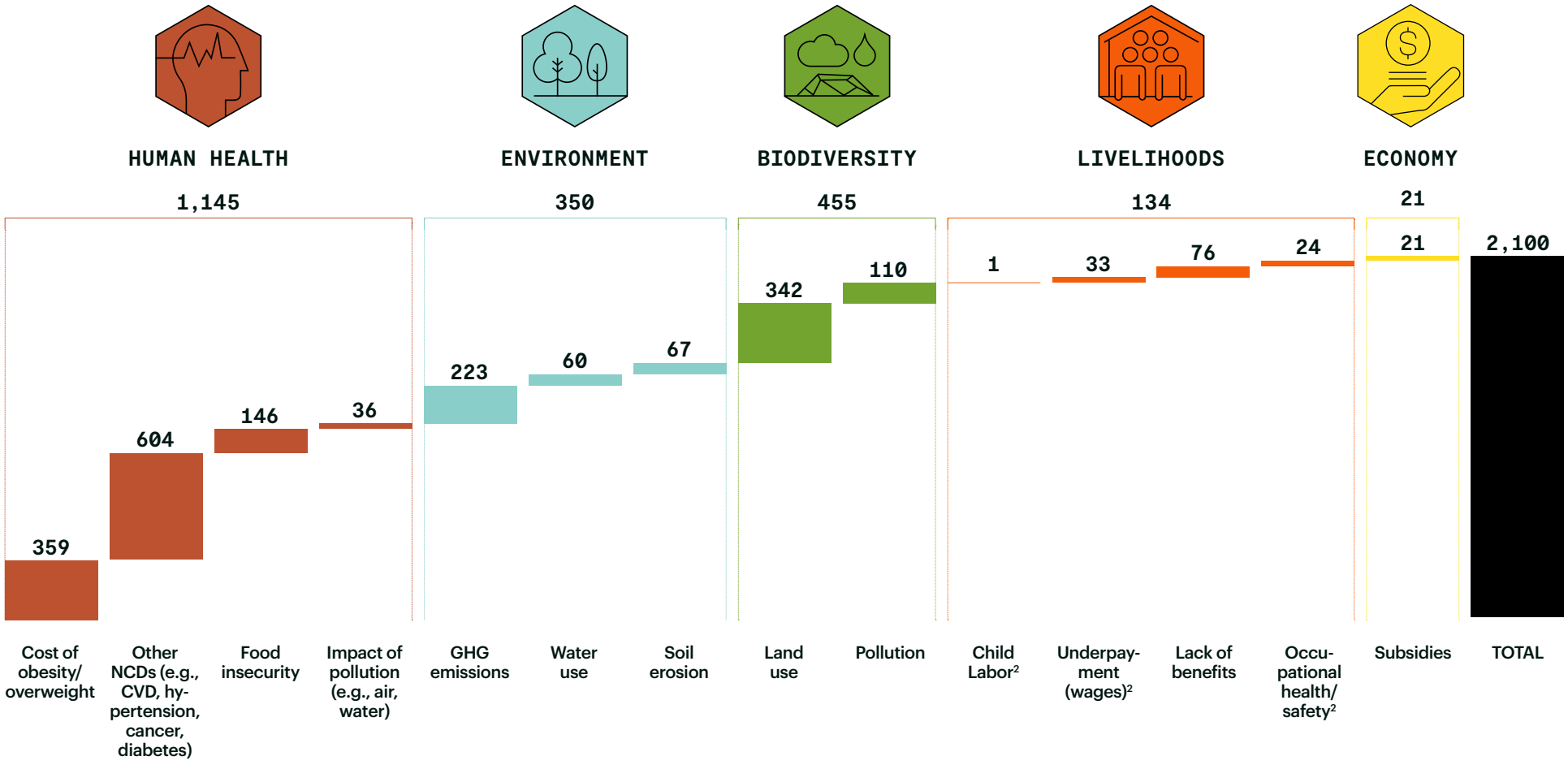
- **Therefore, the overall "true cost of food" in the United States is at least $3.2 trillion a year.** These externalized costs are being incurred by the public sector, businesses and producers, consumers, and in some cases, future generations.

- **Two areas contribute most of the ~$2.1 trillion to the true cost of the U.S. food system: Human Health and the Environment.**

In each of the following sections, we briefly unpack each impact area and the associated calculations. Additional details on all calculations can be found in the accompanying Technical Appendix.

1 Some metrics do not capture all connected costs due to low data availability or accessibility
2 Estimates noted to be particularly low due to underreporting of exploited labor along the value chain (e.g., incarcerated, undocumented individuals)

COSTS FROM QUANTITATIVE METRICS ACROSS 14 KEY METRICS[1], ANNUAL (bn USD)



Health costs are a significant driver of the true cost of food in the U.S., pointing to massive opportunity to invest in improved nutrition and healthy food access

Of the impact areas we assessed in our study, the costs related to human health were by far the greatest driver of unaccounted-for costs, at roughly $1.1 trillion. That figure alone nearly doubles the cost of our food system—our national 'bill' for diet-related disease is equal to all the money we currently pay for the food itself.

HUMAN HEALTH: $1.1T

PRIMARY IMPACTS: INCLUDED IN ANALYSIS	Share of direct medical costs attributable to diet and/or food Productivity loss associated with diet and/or food
SECONDARY IMPACTS: FOR FUTURE STUDY, NOT INCLUDED	• Reduced military readiness due to diet-related health conditions • Dietary contribution to mental health illnesses • Dietary contribution to educational achievement

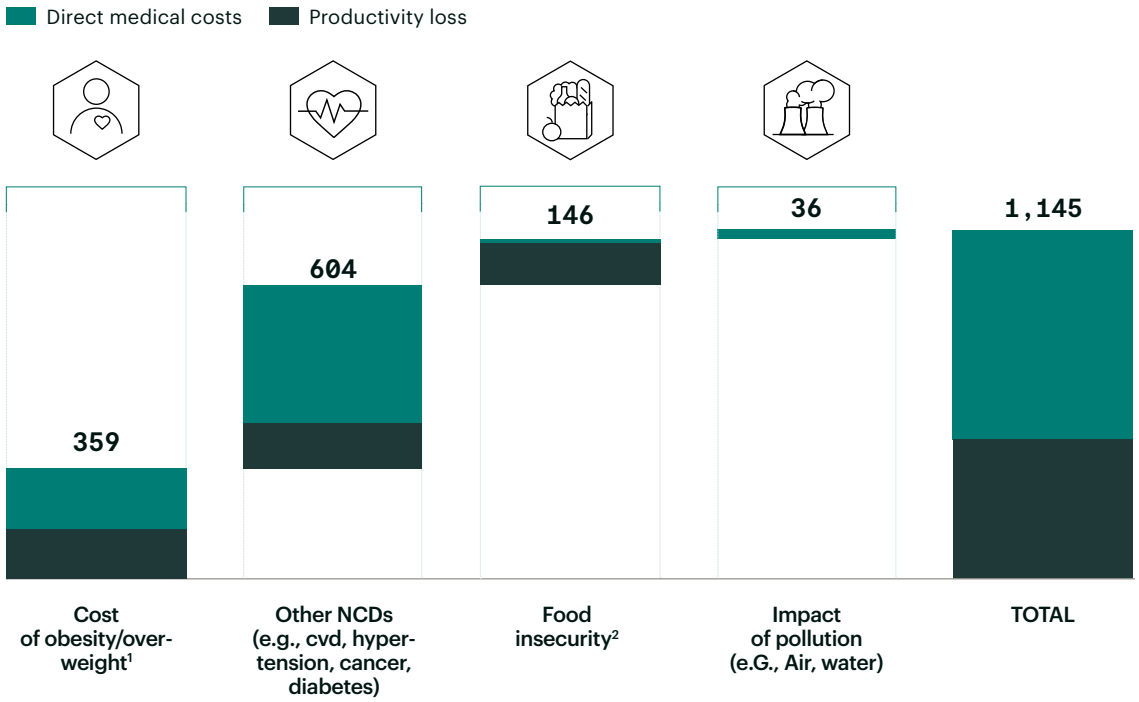
When considering the human health costs associated with food and diet, we captured both direct medical and healthcare costs, as well as lost productivity. We included costs from conditions that have clear attribution to diet or the food system including diet-related diseases, cost of food insecurity, and cost of diseases and work-related injuries from food production.

There are significant secondary impacts related to this area that we were not able to include in this initial analysis, such as mental health, educational achievement, and consequences for family members of those with poor metabolic health.

Even using this limited scope, human health impacts are the biggest "hidden" cost of the food system, with close to $1.1 trillion per year (est.) in health-related costs to American taxpayers. The majority of these costs—$604 billion—are attributable to health care costs related to diet-related diseases such hypertension, cancer, and diabetes. The additional costs are impacts from health care costs from workplace injuries, food insecurity and pollution, and additional costs attributable to obesity.

These results point to an enormous opportunity for a collective reimagining of how we support nutrition and diet-quality in the U.S. While nutrition programs and benefits—both public and private—have often been viewed as expensive, looking at them through a true cost lens reveals that they are in fact wise investments for strengthening our country's economy. It is also clear, as outlined later in this report, that communities of color bear the bulk of these costs and any efforts to address them must take the unique systemic barriers in place into account.

ESTIMATED HUMAN HEALTH FOOD SYSTEM COST, ANNUAL (BN, USD)



ANTIMICROBIAL RESISTANCE

Antimicrobial resistance (AMR) is an area that requires continued research and urgent action. Driven by the continued and widespread use of antibiotics in medicine and livestock production, AMR is recognized as a global health threat to health and safety.

In recent years, the U.S. has introduced several regulations to combat AMR. For example, the Food & Drug Administration (FDA) no longer permits the use of antibiotics used in human medicine for growth promotion, and veterinary oversight is required for 95% of antibiotics used for disease prevention and treatment [xi].

Despite these changes, in the U.S., AMR leads to 35,000 human deaths per year, with 2.8 million antibiotic resistant infections per year[xii]. Food systems are estimated to contribute 22% to the burden of AMR[xiii] but there is a need for more consistent data to build a TCA analysis of AMR's impact on health care and environmental impact and inform new policies and practices around their use.

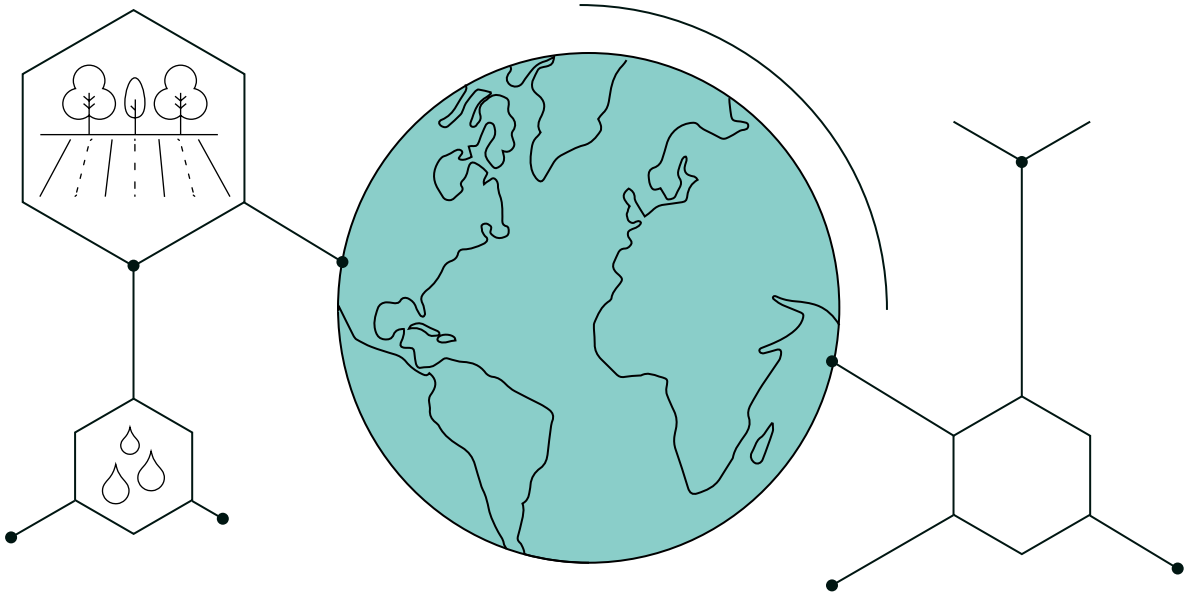
Environmental and biodiversity impacts underscore the need to continue to invest in sustainable production practices and technologies

When developing the framework for applying TCA to the environment, we broke down the analysis into two areas:

1. direct environmental impacts including greenhouse gas (GHG) emissions, water use, and soil erosion; and
2. the impact on biodiversity as a result through land use, and soil, water, and air pollution.

Secondary impacts in this issue area that were not analyzed include increased migration due to climate change, the risks of increased exposure to viruses due to deforestation, soil health, the likelihood of biodiversity collapse, impacts of food waste, and future food insecurity. This is also an area where the costs, as outlined later, are disproportionately borne by communities of color and proposed changes will need to take systemic barriers into account.

	ENVIRONMENT: $350 B	BIODIVERSITY: $455 B
PRIMARY IMPACTS: INCLUDED IN ANALYSIS	Greenhouse gas (GHG) emissions, water use, and soil erosion.	Land uses, air and water pollution, and impacts of soil pollution and run offs.
SECONDARY IMPACTS: FOR FUTURE STUDY, NOT INCLUDED	• Future food insecurity due to increased climate variability • Increased migration (climate refugees) • Soil health • Food waste	• Contribution to likelihood of biodiversity collapse • Increased exposure to novel viruses due to deforestation • Acidification

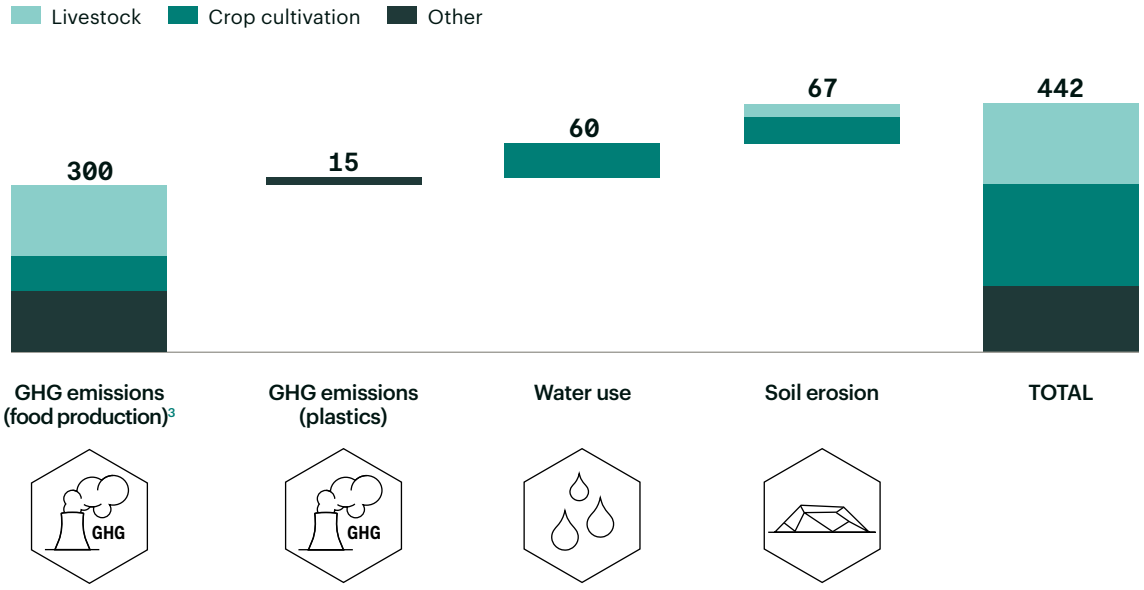


The unaccounted costs of the food system on the environment and biodiversity add up to almost $900 billion per year. These costs are largely attributable to two areas: greenhouse gas (GHG) emissions and biodiversity costs.

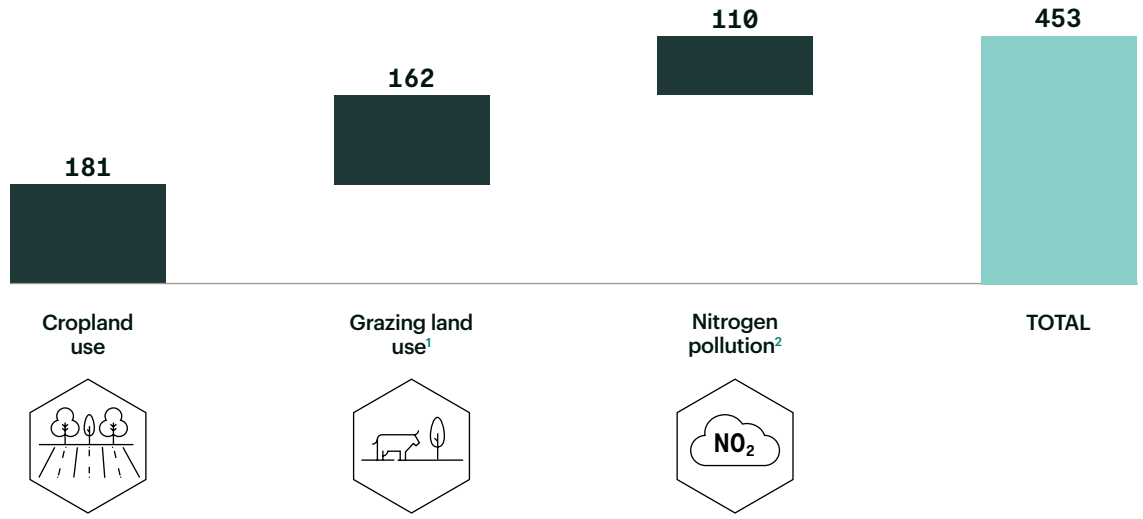
$400 billion **GHG emissions** contribute approximately in additional costs of the food system, primarily due to GHGs from food production and plastic.

$500 billion **Biodiversity costs** contribute approximately in additional costs of the food system in the U.S. The largest driving cost is land use and land transformation[3]– the use of cropland adds close to $180 billion, while grazing land adds close to $160 billion in additional costs.

ESTIMATED ENVIRONMENTAL FOOD SYSTEM COST, ANNUAL (bn USD)
Minimum estimate with GHG based on IPCC AR4 GWP100



BIODIVERSITY COSTS, ANNUAL (bn USD)
Impact area deep dive[1]



3 Both the cropland and grazing land use estimates come from WWF, who estimated the amount of land needed produce the food in the current diet. Land use estimates are calculated by estimating the amount of agricultural land occupying the different types of naturally occurring biomes in the U.S., applying monetization factors for restoration of these natural biomes (by additionally adjusting for the intensity of land use captured by the MSA coefficient—mean species abundance). In general, the more change from natural biomes and the more intense the farming methods, the higher the costs associated with biodiversity loss.

IMPROVING ANIMAL WELFARE

Animal welfare and suffering is an example of a food system impact that should be considered but that cannot, and perhaps should not, be monetized. More than 10 billion farm animals are killed each year in the U.S. for consumption, and in global rankings, the U.S. ranks low—below Mexico and Canada—for farm animal welfare (E, on a scale of A-G)[xiv].

Welfare concerns and climate impacts can be addressed using a variety of approaches, from decreasing animal protein consumption, to providing larger space for grazing and rearing, to regenerative production practices to minimizing extremely long-distance transport. Many of these options require relatively small investments—studies show that improving animal welfare standards would cost approximately $20 billion each year in the U.S.[xv]—but have other implications across the system, including possible supply shortages, higher consumer prices, and job losses.

A broad coalition is needed to advance the study of the true cost of animal production in the U.S..

Evidence suggests that societal costs are high, additional research is required

There is considerable evidence that food workers and producers are still largely unseen and under-counted. We estimate that the unaccounted livelihood costs are approximately $100 billion of the true cost of food. This includes costs of child labor; unlivable wages[4] and a lack of standard employment benefits such as healthcare for producers and workers across the value chain; and occupational health and safety costs.

This amount does not include secondary impacts such as mental health costs to farmers, fishers, or farm workers, or issues related to educational access.

	LIVELIHOODS: $134 B	ECONOMY: $21 B
PRIMARY IMPACTS: INCLUDED IN ANALYSIS	Labor, underpayment of wages, lack of benefits, occupational health, and safety issues	Agriculture subsidies
SECONDARY IMPACTS: FOR FUTURE STUDY, NOT INCLUDED	• Reduced access to and time spent on education • Increased rates of suicide amongst farmers	• Operating costs of food-related government bodies • Research and development cost

However, the use of TCA for social costs is complicated by several issues:

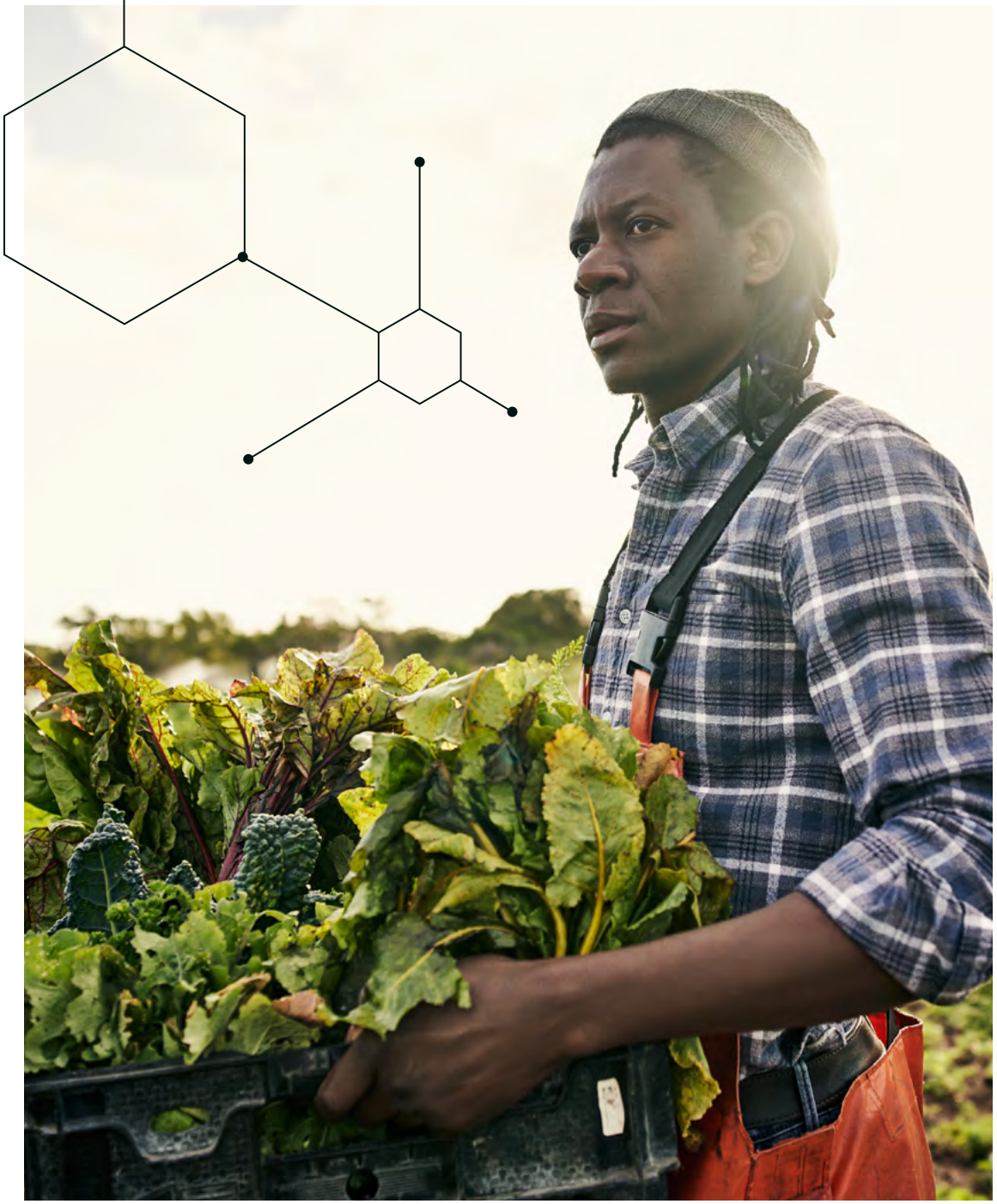
- Assigning the monetization factors to different areas, including assessing the degree to which workers in the industry are underpaid or lack benefits requires an inherent value judgment about what constitutes “fair” or “appropriate” payment.
- Intersection with other market areas, for example, wages and benefits also depend on labor market conditions and can only be imperfectly attributed to the food system.
- Lack of adequate data to study. For example, there is there is a widespread underreporting of food worker data across the supply chain, including a lack of validated metrics, high quality data, and codified definitions of impact.

4 The living wage in the United States is $16.54 per hour, or $68,808 per year, in 2019, before taxes for a family of four (two working adults, two children). *https://livingwage.mit.edu/articles/61-new-living-wage-data-for-now-available-on-the-tool#:~:text=The%20living%20wage%20in%20the,wage%20for%20most%20American%20families.*

Agriculture subsidies are not currently accounted for by food prices

The various agriculture subsidies, which represent economic costs that are currently not captured in food prices, **amount to approximately $20 billion a year.**[xvii] When developing our true cost accounting model, we focused on agricultural subsidies, but not on the costs of research and development or monitoring organizations.

While subsidies play a critical role in sustaining the livelihoods of many farmers, and as a result contribute to the economic health of many rural regions, they have many unintended consequences. This includes knock-on effects driven by distorted incentives for farmers (such as limiting crop rotation and conservation risk-management practices, which can lead to biodiversity loss and accelerated environmental degradation). In addition, the estimation here does not account for other distortions of the system by regulatory forces such as import tariffs, quotas, and demand-side support by federal nutrition programs (such as SNAP and school meals), which all function as "hidden subsidies" amounting to billions each year.



Communities of color bear disproportionate costs of the food system

Our research clearly shows that unaccounted costs across all issue areas disproportionately impact communities of color. The long-term impacts on these communities (e.g., in terms of educational achievement, income instability from transience of jobs, family safety nets, etc.) are not quantified in this study because many of these impacts cannot be monetized and aggregated using this methodology.

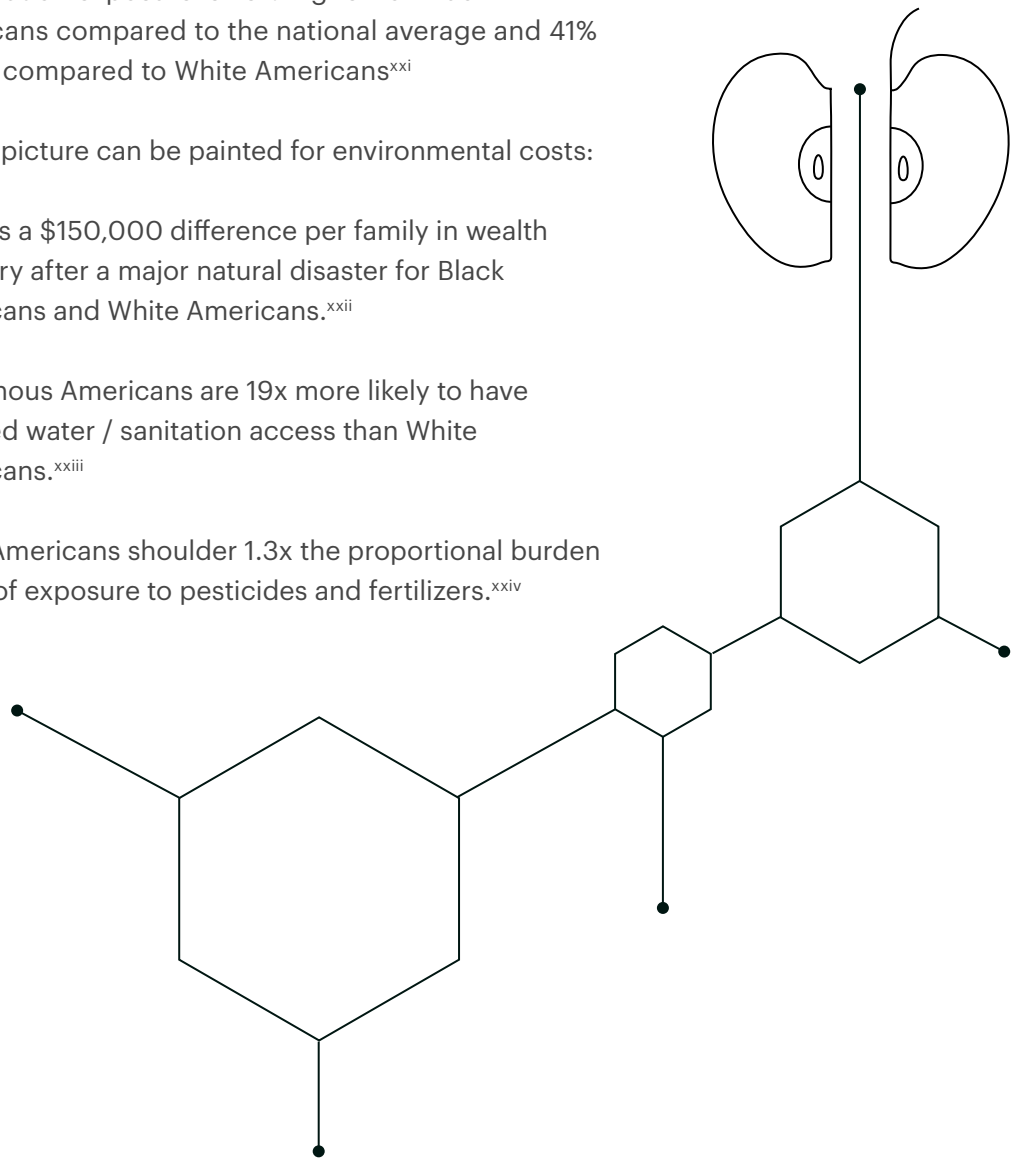
However, a host of published findings demonstrate that many of the costs identified in this report are disproportionately borne by communities of color.

This is most obvious for health-related costs, where we found a disproportionate impact for every health metric we studied on Black and Indigenous communities of color, from non-communicable diseases to food insecurity to the health impacts from pollution:

- Obesity is 1.2x more prevalent in Black Americans than the national average[xviii]
- Rates of diagnosed diabetes are 1.7x higher in Latinx Americans than White Americans, and 1.5x higher in Black Americans than White Americans[xix]
- Black households have 2.4x the prevalence of food insecurity than White households[xx]
- Air pollution exposure is 25% higher for Black Americans compared to the national average and 41% higher compared to White Americans[xxi]

A similar picture can be painted for environmental costs:

- There is a $150,000 difference per family in wealth recovery after a major natural disaster for Black Americans and White Americans.[xxii]
- Indigenous Americans are 19x more likely to have reduced water / sanitation access than White Americans.[xxiii]
- Black Americans shoulder 1.3x the proportional burden / cost of exposure to pesticides and fertilizers.[xxiv]



For costs linked to livelihood impacts, some of these costs are borne by taxpayers in terms of safety nets (e.g., public assistance for those living under poverty). However, a disproportionate amount is borne by the ~11 million producers and workers in the food system, the majority of whom are Black and Indigenous people of color, undocumented immigrants, and/or from communities that are marginalized and underserved:[xxv]

- Median hourly wage for persons of color is 22% lower than for White Americans.[xxvi]
- Latinx and Indigenous Americans have 2x the uninsured rate as the national average.[xxvii]
- Foreign-born Latinx workers experience 31% more lost workdays from injury compared to White workers.[xxviii]
- Subsidies have historically benefited White farmers more than farmers of color, as evidenced by the $2.3 billion in settlement for class action lawsuits in 1997 and 2010 filed on behalf of Black farmers for discriminatory practices in the USDA agricultural loan program.[xxix]

Much of the potential to improve—and fully account for—the social and racial inequities of the food system require the dismantling of systemic barriers and public policies specifically designed to prevent advancement.

For example, the federal minimum wage has remained at $7.25 per hour since 2009. Studies show that approximately 6 million workers would be lifted out of poverty if the minimum wage were raised to at least $10.10, and 60 percent of them would be people of color.[xxx]

The public sector has recently expanded efforts to deliver financial aid and other subsidies first to communities that have been under-represented and marginalized. This includes prioritizing Black and Indigenous people of color business owners for federal grants and loans across multiple agencies, including the USDA and Small Business Administration.

BUILDING A RESILIENT FOOD SYSTEM AND SUPPLY

The Covid-19 pandemic revealed in public and dramatic ways that the U.S. system is not optimized for resilience. The supply chain suffered significant disruptions, particularly as some producers were left with surplus products that they were unable to reroute from shuttered food service outlets to grocery stores or food pantries in need.

Food insecurity has skyrocketed during the pandemic, with more than 54 million Americans (one in six Americans), of which over 18 million are children, facing uncertainty around their next meal[xxxi]. Food banks were overwhelmed, and government benefits have been expanded to help meet demand.

At the same time, the supply chain has experienced extreme stress and further endangered workers. This was most evident in the consolidation of meat processing—12 plants produce over 50% of beef and another 12 produce over 50% of pork.

During the Covid-19 crisis this consolidation meant that when plants closed there was a meat supply shortage. At the same time, processing plants that continued to operate became transmission sites for the disease. Reports show approximately 300,000 excess cases of Covid-19 due to proximity to a livestock plant and approximately 5,000 deaths happened among workers in meat processing facilities—primarily immigrants, refugees, people of color, and those who lack other employment opportunities.[xxxii]

Food system resilience is under-prioritized compared to its true importance and cost, and there is more work to be done to understand how to address reduced resilience and its long-term costs to the food system.

3

A better understanding of these costs can set up the food system for success

In the world of management, there is a common refrain that to succeed, we must 'measure what matters'[xxxiii]. In the case of the food system, we must evolve our measurement frameworks to take into greater account the simultaneous crises of diet-related disease, climate change, and inequity.

In the absence of stronger and more holistic data, direction, and informed decision-making, food in the U.S. is not just a sunk cost but a sinking cost, sapping trillions of additional dollars a year from human health, environment and biodiversity, and societal issues.

By approaching food and the food system as an investment, and understanding its downstream returns, we have the potential to not only lower our true cost of food bill, but also transform the food system in a way that reduces costs and increases returns across the different systems and domains with which it intersects.

For example, by expanding access to healthy food for all Americans, through infrastructure investment, 'food is medicine' interventions integrated into health care delivery, business incentives, greater consumer education, strengthened federal nutrition assistance programs, and more active regulatory and labeling policy, we could reduce diet-related disease relatively quickly, improve individual and population health, and eliminate many of the health-related costs.

If diet-related disease prevalence rates were reduced to be comparable to countries such as Canada, health care costs could be reduced by close to $250 billion per year. Similarly, if the U.S. can reduce agriculture-specific emissions to comply with the 1.5C pathway, then close to $100 billion could be reduced in additional environmental costs. **This is the potential of true cost accounting.**

Fundamental shifts are required across the food system

While the changes required in the food system are complex and will require re-wiring the food system in fundamental ways, we are optimistic about the transition.

We are seeing some fundamental shifts in the food ecosystem that will make this transition easier:

- **Significant appetite to expand and modernize nutrition safety nets and better align government food procurement with a true cost approach.** The public sectors own direct food purchasing for nutrition and farmer assistance programs that amount to tens of billions of dollars per year. Federal, tribal, state, local, and territorial agencies are increasingly prioritizing health, equity, and sustainability targets in their food procurement that will help optimize for true cost.

- **Movement by governments to support marginalized communities, especially Black and Indigenous people of color and small producers.** This includes work to reverse the costs of years of discrimination through new local purchasing incentives and producer debt relief, and increased worker wages, and expanded health benefits.

- **Greater interest by governments to create incentives to address the human health impacts of the food system.** Efforts include policies to limit portion sizes of unhealthy foods and beverages; adding nutrition labels; and considering additional taxes on sugary drinks or other foods.

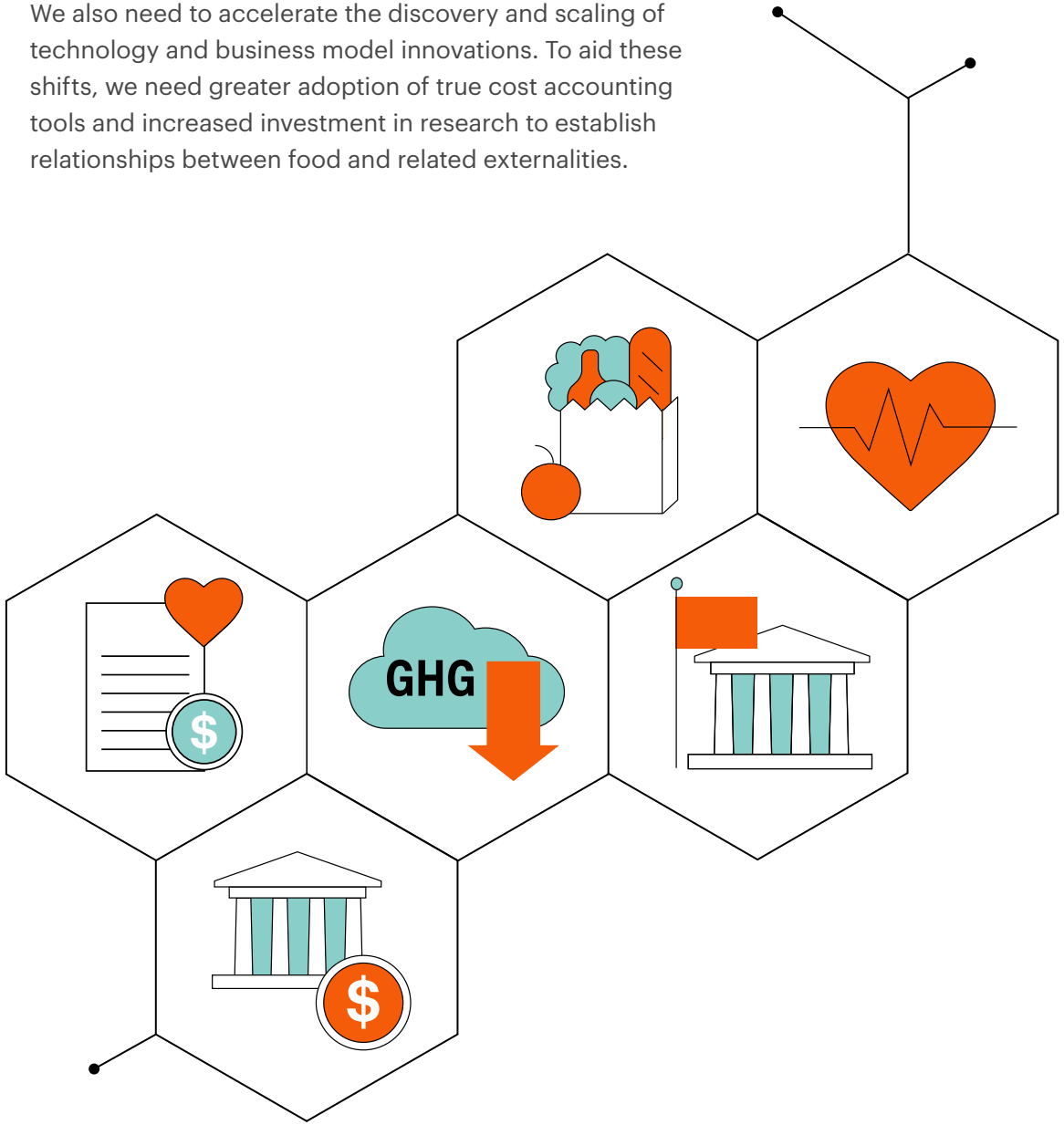
- **The private sector, including health care companies, are working to address the root causes of healthcare expenditures.** This includes investments in medically tailored meals, produce prescriptions, and food 'farmacies' that leverage healthcare dollars to support positive diet-related outcomes.

- **Acceleration in the development of new tools to reduce GHGs.** This includes new financial markets related to natural capital including carbon, water, soil nitrogen and biodiversity. Policy makers are introducing new subsidies or incentives for farmers and agriculture producers to encourage the adoption of regenerative practices including conservation tillage methods and planting cover crops to build carbon in the soil and prevent runoffs.

- **Financial investors are rewarding and incentivizing environmental stewardship of corporations.** Driven by their fiduciary responsibility and armed with a greater understanding of climate-related investment risks, they are also penalizing actors that are not making meaningful progress on reducing their environmental footprint.

- **Consumers are making different food choices, based on new information.** Today, consumer purchase decisions are not just influenced by taste, price, and convenience but also by factors such as health and wellness technologies, environmental sustainability, and personal values.

Many of these interventions are promising, but still relatively small in scope. For us to truly transform the food system we need public and private incentives at scale. We also need to accelerate the discovery and scaling of technology and business model innovations. To aid these shifts, we need greater adoption of true cost accounting tools and increased investment in research to establish relationships between food and related externalities.



As we prepared this report, we heard recommendations for a wide array of meaningful ways to reduce the true cost of food and optimize benefits, including product innovations, redesigning of public goods and safety nets, rethinking market and investor incentives, creating new markets, and influencing consumer demand. A searchable database of these possible innovations and interventions that could benefit from a TCA framework is available online. It is imperative that we find ways to apply a TCA framework to decision-making in every sector, and not just default to increasing the cost of available food, an approach that would reinforce the inequities currently present in the system, not change them.

Successful food system transformation will require a true cost approach

There is tremendous potential to get greater returns on our investment in food and use the food system as a conduit for improved climate, health, and equity outcomes. The current U.S. food system is undercutting the country's health and wealth across systems, sectors, issues, and communities. In addition to the $1.1 trillion spent per year by the U.S. on the purchasing of food, 'external' impacts of the food system add an additional $2.1 trillion to the food system bill.

With a total tab of at least $3.2 trillion a year, the true cost of food in the U.S. is nearly three times the expenditure on food per year, and that number will only grow.

The biggest unaccounted costs are from negative impacts on human health, worsening environmental degradation, and biodiversity loss. Cross-cutting all these impact areas, communities of color bear a disproportionate burden of the costs. Reducing these costs will help to address the vulnerability of these communities.

If left unaddressed, the true cost of food will continue to rise and negatively contribute to climate change, the prevalence of diet-related diseases, and growing inequity. But if we truly understand what the system is costing us both in actual and unrealized potential, we can use it to guide decision-making across each sector.

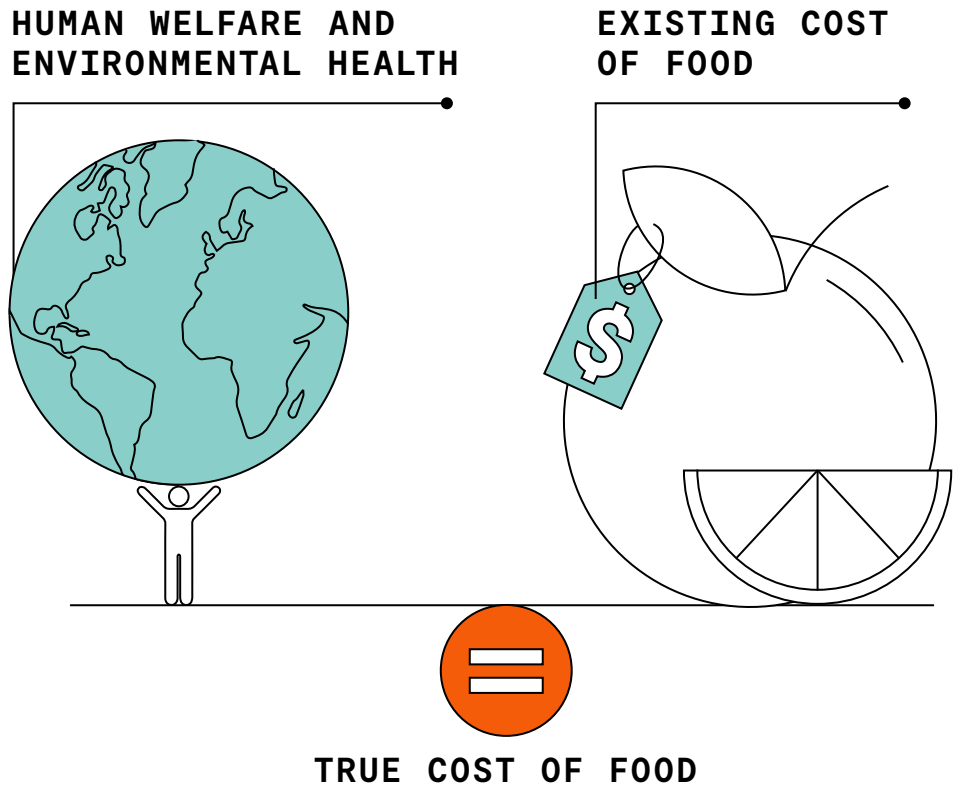
We need a formal integration of a true cost accounting framework into decision-making processes in public policy, private and public investments, and systems design. This will require additional research capacity, new investor frameworks, and a reassessment of scoring approaches for policy and legislation.

This report's initial application of true cost accounting across sectors has illuminated both the devastating costs and the immense potential for transformative change within the system. It is now time to act to ensure that our food system is recentered on promoting the health of people, the planet, and society. We need additional funding to help accelerate interventions across the sectors that have already adopted TCA in their design.

We have pointed to additional areas and innovations that could reduce the true cost of food. Many efforts are already underway and starting to address these systemic inequities and address the urgent need to rebalance the food system to prioritize human welfare and environmental health.

As stated throughout this report, however, many of these innovations and movements are siloed and lack consistent funding and other resources to help make the case to the private sector, producers, policy makers or consumers that they are driving change. There is more work to be done.

Through building momentum around these actions and leveraging the tools provided by true cost accounting, stakeholders across the system—from governments, to organizations, to companies, to coalitions, to individuals—have the power to catalyze the systems-level change needed to develop a truly nourishing, equitable, and sustainable food system in the United States.



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