

## True Cost of Food

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Modern food systems, though fundamental to human life, generate heavy costs to the environment and public health. These costs transcend borders and generations; therefore, they require international governmental action. We call on the G20 to lead action on this problem by (1) issuing a mandate to international organizations to develop a harmonized approach to measure the social cost of food, (2) coordinating international reform of current harmful policies, especially subsidies linked to the emission of greenhouse gasses or a nutritionally imbalanced food supply, that contribute to costs, and (3) setting an agenda to repurpose government resources previously used on harmful policies for reducing the costs remaining after reform of current policies through beneficial policies, such as agricultural R&D for sustainability, payment for ecosystem services, and food safety initiatives.

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## Challenge

**Challenge.** Food systems are the foundation of all societies. The lives of 7.8 billion people depend on affordable and diversified food on a daily basis, but not everyone's needs are met. 2 billion people are affected by at least one form of malnutrition. In addition, current practices and features of food systems cause significant damage to the environment and to public health – social costs.<sup>[1]</sup> These costly practices and features can be found throughout a food system, in primary production, processing, distribution, retailing, and consumption. The price paid by the consumer at the time of purchase may not reflect the true cost of food to society, once we take this unintended damage into account.

**Social Costs.** Social costs generated by food systems include the pollution of water and air, greenhouse gas emissions, overdrawn aquifers, biodiversity loss, zoonotic diseases,<sup>[2]</sup> antibiotic resistance, land degradation, and the rise of health illnesses related to food consumption (e.g. diabetes) and food production (e.g. exposure to chemical pesticides).<sup>[3]</sup> The social costs have their origins in market failures including incomplete information and missing markets, in particular negative externalities. The policy environment around a food system has a large influence on the social costs it generates through four drivers: how much we produce, what we produce, how we produce, and where we produce.

Although social costs are not reflected in the price tag of food, society is paying in other ways, for example, through tax-funded environmental and health programs or reductions in crop yields due to climate variability. Some costs will only emerge in the future, as antibiotic-resistant bacteria emerge, fresh water becomes scarce, and other environmental or health costs surface.

To illustrate the variety and scale of costs, we compile in Table 1 non-exhaustive estimates in the United States made by other researchers, reaching a total of \$833 billion USD (see Appendix 1). For comparison, the USDA estimates \$1,053 billion dollars value added generated by

the food system.<sup>[4]</sup> This ratio of 1 dollar of food system GDP to 0.7 dollars of hidden costs is close to the global estimated provided by the World Bank<sup>[5]</sup>: the value of the global food system is estimated to be at \$8 trillion while the additional cost is about \$6.03 trillion (a 1:0.75 ratio). These estimates remain partial (not everything is included), heterogenous in terms of assumptions (e.g. value of carbon) and methods (discount ratio, correction for double counting), and do not always provide a proper categorization of the nature of the gap between social cost and the price paid by the consumer when they purchase the food. Still, they provide a surprising consensus: a very large share (40 percent) of the cost of the food system is not included in the price tag paid by the consumer.

**Need for Measurement.** Today, there is no harmonized approach to measure the true cost of food. Such an approach is necessary to enable cross-country discussion, comparison, and domestic policy reform. Proposal 1 in the following section addresses this need.

**Role of the G20.** Because social costs of food cross borders and generations, it is the responsibility of international governance to address them through policy. Air, water, biodiversity, effectiveness of antibiotics, and people's contributions to humanity enabled by their health are among the international and intergenerational public goods affected by our food systems. International coordination on many policies is important to ensure some fairness and that a problem doesn't simply get pushed to another country, as could be a concern with, for example, agriculture and forest protection. Proposal 1 provides the knowledge sharing necessary to promote a common language and vision among G20 countries. Proposals 2 and 3 address policy reform.

<sup>[1]</sup> Because the focus of this brief is on the reduction of the social costs of food systems, we do not discuss the true social *benefits* of food. Social benefits can include, for example, that children who are well-nourished have better developmental outcomes and contribute more to society as adults. Similarly, we do not focus heavily on equity/redistributive issues with food systems, such as social safety nets to prevent hunger.

<sup>[2]</sup> For example, consumption of bushmeat and wet markets are suspected factors in the origins of Ebola outbreaks, HIV/AIDS, and other diseases. Although it is premature to draw conclusions, a wet market may have been a factor in the origin of the current Covid-19 pandemic, contributing to a statement by the Acting Executive Secretary of the Secretariat of the Convention on Biological Diversity that policy measures may be necessary to mitigate the risk of future pandemics of zoonotic origin (Greenfield, Patrick. "Ban wildlife markets to avert pandemics, says UN biodiversity chief." *The Guardian*, 6 April 2020. <https://www.theguardian.com/world/2020/apr/06/ban-live-animal-markets-pandemics-un-biodiversity-chief-age-of-extinction>).

<sup>[3]</sup> As an example, obesity can easily be understood as a social cost in countries with public healthcare systems, where taxpayers collectively finance obesity-related health costs. Outside of socialized healthcare systems, the argument around obesity as a social cost is more complex.

<sup>[5]</sup> <https://blogs.worldbank.org/voices/do-costs-global-food-system-outweigh-its-monetary-value> based

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## Proposal

To address the true cost of food challenge, we propose a leadership role for the G20 in mandating measurement of the true cost of food, coordinating reform of harmful policies, and setting the agenda for the introduction of beneficial policies. Measurement and reform are proposed sequentially; the problem must be measured before priorities for reform can be determined. Reform is split into Proposals 2 and 3, with Proposal 2 covering elimination of policies that we would be better off without – those that increase the gap between the price paid by the consumer at purchase and social cost – and Proposal 3 covering the introduction or strengthening of beneficial policies that decrease this gap.

Having a clear understanding and measure of the true cost of food – being able to include all market failures – will help in the design and repurposing of current agricultural policies to ensure the triple wins: productivity, resilience, and environmental stability.

**Proposal 1: The G20 provides a mandate to International Organizations to develop an evidence-based, harmonized method to measure the true cost of food.**

The G20 gives a mandate to international organizations (FAO, OECD, IFPRI, UNEP, WHO) and the Meetings of Agricultural Chief Scientists of G20 States (MACS G20) to develop a consistent, evidence-based, and robust approach with a harmonized method to measure the true cost

G20 States (MACS-G20) to develop a consistent, evidence-based, and robust approach with a harmonized method to measure the true cost of food and ensure double counting is avoided. The international organizations (IOs) work on the definition of cost (including the social, fiscal, and environmental costs), inviting the engagement of international panels of experts such as the HLPE and IPBES.

The database on the measurement of the true cost of food should be publicly available to aid transparency and enable utilization by the scientific community.

Definition is a prerequisite to measurement, and measurement a prerequisite to understanding how policy can be improved. The true cost of food has also been referred to as the true price of food, true cost accounting, the hidden cost of food, the social cost of food, and the social price of food. It is important to have a properly defined concept and common terminology to make sure comparison and analysis is possible.

Measurement methodology will present many challenges that the IOs will need to consider. We must examine market failures and understand their scale and nature. Where possible, we should price the social costs and benefits.

When thinking about the methodology for measuring the cost of food, it is important to differentiate between measurement at the producer and consumer levels, the latter being the source of consumption externalities. At the producer level, the difference between social cost and the price paid by the consumer at purchase will come from taxes; support programs (e.g. subsidies); missing markets with non-priced inputs, including water, carbon, and soil (through carbon sequestration, soil health, and land degradation); and externalities, including ecosystem services and animal and human health.

Externalities in particular are vast and disparate by cause (e.g. transportation, pesticide use, food waste, obesity, and property values), food value chain product (e.g. cattle, potatoes, tomatoes), spatial origin (did the apple come from Chile or Japan?), and geographical scale (local or global).

The work done by the IOs in developing an approach for a harmonized measurement could be a central contribution to the United Nations Food System Summit in 2021. Providing the mandate to the IOs promptly can give them the lead time to make significant progress before the Food Systems Summit, so that the event can be an opportunity to create momentum and foster thought around the true cost measurement agenda.

**Proposal 2: The G20 proposes a coordinated set of policy reforms aimed to remove existing, harmful policy incentives that increase the social cost of food.**

Following the mandate given to IOs in Proposal 1, IOs identify key types of policy that contribute to the different "hidden" costs of food systems. Many existing types of policy have already been well-established as harmful by policy analysis literature, even if they are not measured in a uniform way. Such policies include tax rebates for fuel used on the farm, subsidies for chemical fertilizers, and agricultural subsidies for tobacco production. With the fulfillment of Proposal 1, national policymakers will have the common language that is a precondition for coordinating reform of these known harmful policies.

The G20 identifies and prioritizes policy reforms that G20 countries can implement domestically without the need for international coordination.

The G20 identifies areas of policy reform requiring coordinated actions. Potentially, it identifies platforms in which plurilateral or multilateral reform can be discussed, such as in WTO negotiations. Indeed, WTO disciplines could be a powerful framework in limiting detrimental policies.

G20 countries would track the redistributive impacts of these policy reforms and implement compensating policies if vulnerable stakeholder groups are negatively impacted. In some cases, such compensating policies may be beneficial policies as described in Proposal 3.

**Proposal 3: The G20 proposes a coordinated set of beneficial policies, repurposing money from the harmful policies removed in accordance with Proposal 2, to offset or reduce specific costs of the food system in a socially acceptable way.**

Even if harmful policies are eliminated, there will be market failures that increase the social cost of food. For example, the clearing of forest or peatland for food production releases greenhouse gasses, a negative externality that will not show up in what the consumer pays. Beneficial policies can help account for these social costs. Such policies could include, for example, the adoption of forestry code or strengthening of its enforcement, agricultural R&D to improve yield so that there is demand for cleared land, and payment for ecosystem services such as silvo-pastoral cattle systems.

The elimination of negative policies (Proposal 2) is expected to free up considerable financial resources for governments, which can be reallocated to beneficial policies (Proposal 3) to further narrow the gap between price paid by the consumer at purchase and social cost.

Based on country experience and cross-country comparisons, IOs identify good practices, identify the largest unaccounted-for costs, and recommend types of reforms.

The G20 promotes the implementation of positive policy reforms at the country level to reduce the gap between the price paid by the consumer at purchase and social cost.

The G20 countries adapt the CFS Voluntary Guidelines on Food Systems and Nutrition to their domestic food system regulation.

The G20 positive policy reform agenda is conducted in an open and transparent process, limiting cross-border externalities, and consistent with international commitments, such as those on labelling and WTO principles on Technical Barriers to Trade.

## APPENDIX

**Table 1: Some Estimated Annual Non-Price Costs of Food Production and Consumption in the U.S.**

Annual Cost (USD billions)	Description	Stage	Impact Area	\$663	Obesity
					<i>including lost productivity due to disability and death, direct cost for health care, and direct investment to mitigate</i> <sup>[1]</sup>
Consumption	Human Health	\$157	Damages from agricultural nitrogen use		
					<i>including respiratory disease, GHG emissions, and loss of biodiversity</i> <sup>[2]</sup>
Production	Environment	\$7	Environmental pesticide costs		
					<i>including bird deaths, pesticide resistance, crop loss, and groundwater contamination</i> <sup>[3]</sup>
Production	Environment	\$5	ADHD costs attributable to symptoms caused by food dyes <sup>[4]</sup>		
Consumption	Human Health	\$1	Human health pesticide costs		
					<i>including medical treatment, lost work from acute poisonings, and fatalities from acute poisonings, cancer, and chronic illnesses related to pesticides</i>
Production	Human Health				

Source: Authors' compilation. Billions of USD are from various base years.

<sup>[1]</sup> Dobbs, R., Sawers, C., Thompson, F., Manyika, J., Woetzel, J. R., Child, P., ... & Spatarou, A. (2014). *Overcoming obesity: an initial economic analysis*. McKinsey Global Institute. [MORE](#)

<sup>[2]</sup> Sobota, D. J., Compton, J. E., McCrackin, M. L., & Singh, S. (2015). Cost of reactive nitrogen release from human activities to the environment in the United States. *Environmental Research Letters*, 10(2), 025006.

<sup>[3]</sup> Pimentel, D., & Burgess, M. (2014). Environmental and economic costs of the application of pesticides primarily in the United States.

[4] Lefferts, L. (2016). *Seeing Red: Time for Action on Food Dyes*. M. F. Jacobson & L. MacCleery (Eds.). Washington, DC: Center for Science in the Public Interest. <https://cspinet.org/sites/default/files/attachment/Seeing%20Red.pdf>

**Table 2: The cost of the global food system (World Bank)**

Food System Problem	Annual Economic Costs (\$ trillions)	2 billion people under- and malnourished (3 percent 2018 global GDP)	2.43	2 billion people overweight and obese (2 percent of 2018 global GDP)
1.62	One third of agriculture production lost or wasted	1.07	Economic loss due to insufficient food safety	0.11
0.33	Economic loss due to land use and land cover change in terrestrial ecosystems (0.41 percent of 2018 global GDP)	0.20	25 percent of land degraded due to poor management practices (0.25 percent of 2018 global GDP)	0.27
0.20	13 percent global emissions from agriculture, other than from land use change (49.1 GT CO2 at \$ 40/ton)	0.27	Costs still to be accounted for	Biodiversity loss other than losses due to land use change (e.g., loss of pollination services, degraded wetlands, etc.)
			Health costs due to chemical and pesticide use, including from deteriorating water quality	Contribution to rising anti-microbial resistance and associated costs
	<b>Total costs</b>	<b>6.03</b>		

Sources: van Nieuwkoop (2019), <https://blogs.worldbank.org/voices/do-costs-global-food-system-outweigh-its-monetary-value> based on Global Panel on Agriculture and Food Systems for Nutrition: "The Cost of Malnutrition." Technical Brief No. 3, 2016; Jaffee, et al. 2018: "The Safe food Imperative." The World Bank, Washington, DC; Nkonya, et al. 2016: "Global cost of Land Degradation." In Economics of Land Degradation and Improvement, IFPRI, Washington, DC. FAOSTAT, FAO (accessed 2019) and World Development Indicators, World Bank (accessed 2019). Cost estimates for malnutrition are estimated using percent GDP lost calculated by FAO for 2010. These percentages are applied to 2018 global GDP data to arrive at reported economic costs. Similarly, land degradation costs use percentages calculated by Nkonya et al. (2016) for 2007 and apply them to 2018 global GDP estimates.

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## Existing Initiatives & Analysis