



# POLICY BRIEF

## **THE TRUE COST OF FOOD**



Task Force 10  
**SUSTAINABLE ENERGY, WATER, AND FOOD  
SYSTEMS**

Authors

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# موجز السياسة تكلفة الغذاء الحقيقية

فريق العمل العاشر  
نُظُم الطاقة المستدامة والمياه والغذاء



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## ABSTRACT

Modern food systems, though fundamental to human life, impose heavy costs on the environment and public health. These costs transcend borders and generations, and thus require international governmental action. We call on the Group of 20 (G20) to lead action on addressing this problem in three ways: first, by issuing a mandate to international organizations to develop a harmonized approach to measure the social cost of food; second, by coordinating the international reform of current harmful policies, especially subsidies linked to the emission of greenhouse gases or a nutritionally imbalanced food supply, that contribute to costs; and finally, by setting an agenda to repurpose government resources that have been previously used toward creating harmful policies for reducing the costs remaining after the reform of current policies through beneficial measures. For instance, agricultural R&D for sustainability, payment for ecosystem services, and food safety initiatives.

تفرض النظم الغذائية الحديثة، على الرغم من كونها أساسية لحياة البشر، تكاليف وخسائر باهضة ومتراكمة على البيئة والصحة العامة لا يقتصر أثرها على نطاق جغرافي معين بل عابرة للحدود و متراكمة عبر الزمن، تتطلب هذه التكاليف تحركاً دولياً على مستوى الحكومات وفي هذا الموجز ندعو مجموعة العشرين إلى أخذ زمام المبادرة في معالجة هذه المشكلة عبر ٣ وسائل: أولاً- إصدار تفويض للمنظمات الدولية لوضع نهج منسّق من أجل قياس التكلفة الاجتماعية للغذاء. ثانياً- تنسيق الإصلاح الدولي للسياسات الحالية المُضرة، وبالأخص الدعم المرتبط بانبعاثات الغازات الدفيئة أو توريد الأطعمة غير المتوازنة غذائياً، والتي تساهم في تراكم التكاليف والخسائر. وأخيراً- وضع جدول أعمال من أجل إعادة توجيه الموارد الحكومية التي تم استخدامها في السابق لوضع سياسات مُضرة من أجل تخفيض التكاليف المتبقية بعد إصلاح السياسات الحالية عبر تدابير فعّالة كالبحث والتطوير الزراعي من أجل الاستدامة، و دفع تكاليف خدمات النظام البيئي، ومبادرات السلامة الغذائية. على سبيل الأمثلة.



## 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. As many as 2 billion people are affected by at least one form of malnutrition. Current practices and features of food systems cause significant damage to the environment and public health through social costs.<sup>1</sup> These costly practices and features can be found throughout the food system, in primary food production, processing, distribution, retail, 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 are generated by food systems and include water and air pollution, greenhouse gas emissions, overdrawn aquifers, biodiversity loss, zoonotic diseases,<sup>2</sup> antibiotic resistance, land degradation, and the rise of illnesses related to food consumption (e.g., diabetes) and production (e.g., exposure to chemical pesticides).<sup>3</sup> Social costs originate in market failures including incomplete information and missing markets, particularly, in negative externalities. The policy environment around the food system has a major influence on the social costs it generates through four drivers: what, how, how much, and where we produce.

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

To illustrate the variety and scale of costs, we compiled non-exhaustive estimates in the United States made by other researchers and arrived at a total of USD 833 billion (see Appendix 1). This is presented in Table 1. For comparison, the United States Department of Agriculture (USDA) estimated that the value added generated by the

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1. As 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 a case where, for example, 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.

2. For example, consumption of bushmeat and wet markets are suspected as factors that played a role in the origins of the Ebola outbreak, 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 2020).

3. 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.

## CHALLENGE

food system amounted to USD 1,053 billion (United States Department of Agriculture n.d.). This ratio of USD 1 of the food system GDP to USD 0.7 of hidden costs is close to the global estimates provided by the World Bank (Niewkoop 2019). The value of the global food system is estimated at USD 8 trillion while the additional cost is about USD 6.03 trillion (a ratio of 1:0.75). These estimates remain partial (not everything is included) and heterogenous in terms of assumptions (e.g., value of carbon) and methods (discount ratio, correction for double counting). Furthermore, they 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 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.** As 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 does not simply get pushed onto another country to bear, as may be the concern with, for example, agriculture and forest protection. Proposal 1 provides for the knowledge sharing that is necessary to promote a common language and vision among the G20 countries. Proposals 2 and 3 address policy reform.



## PROPOSALS

To address the true cost of the food challenge, we propose a leadership role for the G20 in mandating the measurement of the true cost of food, coordinating reforms 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. The former covers the elimination of policies that we may be better off without, that is, those that increase the gap between the price paid by the consumer at purchase and social cost. The latter covers 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 design and repurpose the current agricultural policies to ensure the triple wins in productivity, resilience, and environmental stability.

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

The G20 should provide a mandate to international organizations (e.g., FAO, OECD, IFPRI, UNEP, and 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 of food and to ensure that double counting is avoided. International organizations (IOs) should work on identifying a definition for cost (including social, fiscal, and environmental costs). They should invite international panels of experts such as the High Level Panel of Experts on Food Security and Nutrition (HLPE) and Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) for engagement.

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

Drawing up a definition is a prerequisite for measurement, which is a prerequisite for 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 enable comparison and analysis.

Measurement methodology may present challenges that the IOs will need to consider. It is necessary to examine market failures and understand their scale and nature. Wherever possible, social costs and benefits should be priced appropriately.

While thinking of the methodology used to measure the cost of food, it is important to differentiate between measurement at the producer and consumer levels, the latter being a source of consumption externalities. At the producer level, the difference between social cost and the price paid by the consumer at purchase is because of 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 are vast and disparate in terms of 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 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 lead time to make significant progress before the Food Systems Summit. Subsequently, the event can be an opportunity to create momentum and foster thought around the true cost measurement agenda.

**Proposal 2: The G20 should implement a coordinated set of policy reforms aimed at removing existing harmful policy incentives that increase the social cost of food.**

Following the mandate given to IOs in Proposal 1, IOs should identify key types of policies that contribute to the different “hidden” costs of food systems. Many existing types of policy have already been well established as harmful in the literature, even if they are not measured in a uniform manner. 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 a common language that can serve as a precondition for coordinating reform of these known harmful policies.

The G20 should identify and prioritize policy reforms that its members can implement domestically without having to rely on international coordination. It can identify areas of policy reform requiring coordinated action as well as platforms where plurilateral and multilateral reform can be discussed, such as in WTO negotiations. WTO disciplines—agreements among WTO members on the policies that are allowed in the context of measures that have international implications—can be a powerful

framework for limiting detrimental policies in a way that is fair. G20 countries can track the impacts of these policy reforms on redistribution and implement compensating policies if vulnerable stakeholder groups are negatively impacted. In some cases, such compensatory policies may be beneficial, as described in Proposal 3.

**Proposal 3: The G20 should propose a coordinated set of beneficial policies that repurpose 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 manner.**

Even if harmful policies are eliminated, there will be market failures that will increase the social cost of food. For example, the clearing of forest or peatland for food production will release greenhouse gases, a negative externality that will not show up in what the consumer pays. Beneficial policies can help account for these social costs. Such policies may include, for example, the adoption or strengthening of the enforcement of a forestry code, 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. These can be reallocated to beneficial policies (Proposal 3) to narrow the gap between price paid by the consumer at purchase and social cost.

Based on country experience and cross-country comparisons, IOs can identify good practices and the largest unaccounted-for costs and recommend types of reforms. The G20 should promote 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 should also adapt the Committee on World Food Security (CFS) Voluntary Guidelines on Food Systems and Nutrition to match the regulatory needs for their domestic food system.

The G20 positive policy reform agenda should be conducted in an open and transparent manner, by limiting cross-border externalities, and in a way that is consistent with international commitments such as those on labeling and WTO principles on Technical Barriers to Trade.



**Disclaimer**

This policy brief was developed and written by the authors and has undergone a peer review process. The views and opinions expressed in this policy brief are those of the authors and do not necessarily reflect the official policy or position of the authors' organizations or the T20 Secretariat.



## REFERENCES

Dobbs, Richard, Corinne Sawers, Fraser Thompson, James Manyika, Jonathan Woetzel, Peter Child, Sorcha McKenna, and Angela Spatharou. 2014. *Overcoming obesity: an initial economic analysis*. McKinsey Global Institute. Accessed August 26, 2020. [https://www.mckinsey.com/~media/McKinsey/Business%20Functions/Economic%20Studies%20TEMP/Our%20Insights/How%20the%20world%20could%20better%20fight%20obesity/MGI\\_Overcoming\\_obesity\\_Full\\_report.ashx](https://www.mckinsey.com/~media/McKinsey/Business%20Functions/Economic%20Studies%20TEMP/Our%20Insights/How%20the%20world%20could%20better%20fight%20obesity/MGI_Overcoming_obesity_Full_report.ashx).

Food and Agricultural Organization. n.d. "Food and Agricultural Data." Accessed March 30, 2020. <http://www.fao.org/faostat/en/#home>.

Global Panel on Agriculture and Food Systems for Nutrition. 2016. "The Cost of Malnutrition." Technical Brief No. 3, July 2016. <https://glopan.org/sites/default/files/pictures/CostOfMalnutrition.pdf>.

Greenfield, Patrick. 2020. "Ban wildlife markets to avert pandemics, says UN biodiversity chief." *The Guardian*, April 6, 2020. <https://www.theguardian.com/world/2020/apr/06/ban-live-animal-markets-pandemics-un-biodiversity-chief-age-of-extinction>.

Jaffee, Steven, Spencer Henson, Laurian Unnevehr, Delia Grace, and Emilie Cassou. 2018. *The Safe food Imperative*. Washington DC: The World Bank.

Lefferts, L. 2016. "Seeing Red: Time for Action on Food Dyes." Center for Science in the Public Interest. Accessed March 2019. <https://cspinet.org/sites/default/files/attachment/Seeing%20Red.pdf>.

Niewkoop, Martien Van. 2019. "Do the costs of the global food system outweigh its monetary value?" *World Bank Blogs*, June 19, 2019. <https://blogs.worldbank.org/voices/do-costs-global-food-system-outweigh-its-monetary-value>.

Ephraim, Nkonya, Alisher Mirzabaev, and Joachim von Braun. 2016. *Economics of Land Degradation and Improvement - A Global Assessment for Sustainable Development*. Washington, DC: IFPRI.

Pimentel, David and Michael Burgess. 2014. "Environmental and economic costs of the application of pesticides primarily in the United States." In *Integrated Pest Management*, edited by David Pimentel and Rajinder Peshin, 47–71. Dordrecht: Springer.

## REFERENCES

Sobota, Daniel J., Jana E. Compton, Michelle L. McCrackin, and Shweta Singh. 2015. "Cost of reactive nitrogen release from human activities to the environment in the United States." *Environmental Research Letters*, 10, no. 2: 025006.

United States Department of Agriculture. n.d. "What is agriculture's share of the overall US Economy?". <https://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail/?chartId=58270>.

World Bank. 2019. "World Development Indicators." Accessed March 30, 2020. <https://databank.worldbank.org/source/world-development-indicators>.



## APPENDIX 1

Annual Cost (USD billions)	Description	Stage	Impact Area
USD 663	Obesity including lost productivity because of disability and death, direct cost for healthcare, and direct investment to mitigate adverse impacts (Dobbs et al. 2014)	Consumption	Human Health
USD 157	Damages from the use of agricultural nitrogen including respiratory disease, GHG emissions, and loss of biodiversity (Sobota et al. 2015)	Production	Environment
USD 7	Environmental pesticide costs including bird deaths, pesticide resistance, crop loss, and groundwater contamination (Pimentel and Burgess 2014)	Production	Environment
USD 5	ADHD costs attributable to symptoms caused by food dyes (Lefferts 2016)	Consumption	Human Health
USD 1	Human health pesticide costs including medical treatment, lost work, and fatalities from acute poisoning, cancer, and chronic illnesses related to pesticides (Pimentel and Burgess 2014)	Production	Human Health

Table 1. **Some Estimated Annual Non-Price Costs of Food Production and Consumption in the US**  
Source: Authors' compilation. Annual cost was compiled using various base years, based on the assumptions and methodology of the source from which the estimate was taken. Not all sources clarified this detailed methodology. Thus, the publication year was used as a proxy for the base year. See corresponding citations in the list of references for more details on the sources.



## APPENDIX 2

Food System Problem	Annual Economic Costs (USD trillions)
2 billion people under- and malnourished (3 percent of 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 because of insufficient food safety	0.11
Economic loss because of land use and land cover change in terrestrial ecosystems (0.41 percent of 2018 global GDP)	0.33
25 percent of land degraded because of poor management practices (0.25 percent of 2018 global GDP)	0.20
13 percent global emissions from agriculture, other than from land use change (49.1 GT CO <sub>2</sub> at USD 40/ton)	0.27
Costs still to be accounted for	
Biodiversity loss other than losses because of land use change (e.g., loss of pollination services, degraded wetlands, etc.)	
Health costs because of 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>

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

Sources: Nieuwkoop (2019), based on Global Panel on Agriculture and Food Systems (2016), Jaffee et al. (2018), Nkonya et al. 2016, FAOSTAT (n.d.), and World Bank (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, we used percentages calculated by Nkonya et al. (2016) for 2007, for land degradation costs, and applied them to the 2018 global GDP estimates.



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