

protections and by many policies that make them vulnerable to exploitation (Wilde, 2018). International borders are permeable for people, but the fate of undocumented immigrants who enter North America or Europe in search of work puts them at particular risk; the threat of deportation robs them of what small opportunities they have to organize and collectively bargain.

In the pursuit of the lowest cost of production for globally traded commodities, global food companies tend to source from countries where the cost of labor is least expensive, all other things being equal. The resulting terms of employment of the agricultural workforce, under such conditions, is hardly acceptable, with respect to wages, hours of work, and health and safety. Yet such terms of employment are essentially a “necessary ingredient” of cheap food. A caveat that will need to be addressed, in exploring how measures to introduce TCA might capture the costs of externalities, is that the international nature of the global food system allows burdens to be shifted almost imperceptibly along the food value chain. Within food value chains, assigning costs for negative externalities could fall heavily on farming communities, the agricultural labor force, and low-income consumers. Equally, attributing benefits for positive externalities might rarely accrue to the less powerful actors in food value chains—again, farming communities and the agricultural labor force, unless policy exists to assign equitable allocations. The challenge to do so is even greater with the international trade in foodstuffs and thus the need for international policy development. It is unfortunate, but the reality is that trade rules negotiated internationally strongly lack in negative externalities. WTO trade rules favor the lowest-cost producers and refuse to consider how such costs are reduced. In critical rulings, national or local governments have been prevented from taking measures that internalize external costs or restrict trade when imported goods fail to internalize costs. This feeds a race to the bottom instead of the desired “harmonization upward” of environmental standards and practices (Wise, 2019).

As nation-states position themselves with respect to international markets, all countries must decide what they want to import and what they want to produce domestically. To decide to commit to domestic food production inevitably affects international markets, as does the decision to import affects domestic markets. The application of TCA to food policy could be a helpful way to define these “virtual borders” and to understand what the actual costs and trade-offs are that they are dealing with.

Box 13.1 Beyond GDP: Multidimensional Indicators of Well-Being

Amanda Jekums

Gross Domestic Product (GDP) has long been the standard metric for assessing the national economic prosperity and societal progress of countries around the globe. However, its basis in extractive and damaging practices, coupled with increasing rates of pervasive social injustice and income inequality, demonstrates that GDP is an inadequate and inaccurate measure

of individual living standards and collective well-being. Over the past 25 years, income inequality among Organisation for Economic Co-operation and Development countries has increased seven times over. The average income of the richest 10% of the population is now nine times that of the poorest 10% (2019). Clearly the benefits of GDP growth are not reaching everyone.

Given its limitations, countries and citizens around the world are rejecting GDP as the sole measure of success. Similar to the aims of True Cost Accounting to identify metrics that go well beyond single and linear measures of success, the examples provided below illustrate creative examples of how countries are moving beyond GDP towards multidimensional indicators of well-being.

In 2008 Bhutan formally adopted a new policy principle to promote conditions that will enable the pursuit of Gross National Happiness (GNH) (Kingdom of Bhutan, 2008). The multidimensional concept of GNH takes a systems approach, which measures nine domains of GNH: psychological well-being, health, time use, education, cultural diversity and resilience, good governance, community vitality, ecological diversity, resilience, and living standards. The practice allows governments to incorporate this information in decisions on policies and projects and enables targeted responses to specific situations or causes of unhappiness. The process has also encouraged public citizens and private entities alike to think more holistically (Ura *et al.*, 2012).

Vanuatu is a small island country in the southwestern Pacific Ocean. As the world's most at-risk country for natural disasters (Bündnis Entwicklung Hilft, 2019), it is not surprising that their highest level policy framework is composed of indicators directly linked to the United Nations' Sustainable Development Goal. Launched in 2016, the Vanuatu 2030 People's Plan focuses on 15 priority policy objectives: happy and healthy people, an inclusive and equitable society, sustainable land management and food production, conservation and biodiversity, climate resilience, supportive infrastructures, and strong economic and employment opportunities (Department of Strategic Policy, Planning and Aid Coordination, 2017). Collecting data on novel social indicators present a challenge, but progress has been positive, particularly in connecting their national vision for well-being and sustainability to action on the ground in villages and urban centres across the country (Government of The Republic of Vanuatu, 2018).

Most recently, New Zealand introduced its first well-being focused budget in 2019 (New Zealand Treasury, 2019a). The framework measures similar domains as Bhutan's GHN and the Vanuatu 2030 People's Plan, which are categorized under four capitals: financial and physical, human, natural, and social. The data is collected in an online Living Standard Framework (LSF) Dashboard (New Zealand Treasury, 2019b), which informs Ministers on priorities for improving well-being. It is also open to the public in an effort to promote transparency and civic engagement. One of the LSF indicators measures

trust in government institutions. Recent research has attributed New Zealand's success in eliminating the coronavirus to a high trust in authorities (Wilson, 2020), demonstrating the importance of measuring alternative indicators of societal progress and using the data to improve well-being.

Economic wealth and social well-being are both derived from capital stocks—natural, social, human, and produced—and these capitals must be used and managed in ways that ensure that they maintain their value over time. Single measures of success like GDP (and yield per acre in agriculture, for example) promote growth at all costs, ignoring the diversity of inputs and compounding negative impacts. Despite challenges related to defining appropriate indicators, collecting data, and reporting on these holistic well-being frameworks, they illustrate—in a profoundly hopeful way—the opportunity to move beyond GDP as the dominant economic measure. By focusing more broadly, these enterprising countries are using alternative indicators of success to reveal transformational pathways towards sustainable and equitable societal progress.

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International Entry Points

Building on the rationales identified above for an international agenda on TCA in food and agriculture, mention has been made in a number of policy venues and documents negotiated and adopted on an international level.

The first of these is the CFS's High Level Panel of Experts report (High Level Panel of Experts on Food Security and Nutrition, 2019), on "Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition," as adopted by the Steering Committee of the HLPE and presented at the October 2019 meeting of the intergovernmental body. The report, in its summary, made the following points:

It is clear that market forces, left to themselves, are unlikely to result in transitions towards [sustainable food systems] SFSs. This is because there are **many externalities associated with production, processing and distribution of food that are not priced and because the power exerted from the increasingly concentrated agri-food input and retail sector often works against addressing these externalities** (para 29).

A considerable inertia, manifest in public policies, corporate structures, education systems, consumer habits and investment in research, favors the currently dominant model of agriculture and food systems, representing a series of lock-ins. **In the dominant model, environmental and social externalities are not properly considered and, therefore, not appropriately factored into decisions influencing the development of food systems. To overcome this inertia and challenge the status quo....** (para 30).

Key changes in agriculture and food policies that could contribute to transitions towards SFSs for FSN include: putting greater emphasis on health and nutritional benefits; **implementation of true cost accounting**; [inter alia]. (para 32).

In its recommendations the report urged that:

States and IGOs, in collaboration with academic institutions, civil society and the private sector, should: (inter alia) recognize **the importance of true cost accounting for negative as well as positive externalities in food systems and take steps to effectively implement it where appropriate**; (Recommendation 5)

Secondly, the 194 member nations of the FAO, two associate members, and the European Union adopted a strategy on biodiversity mainstreaming across agricultural sectors in December 2019 (Food and Agriculture Organization of the United Nations, 2020). The logic behind this strategy has been a recognition of the spiraling declines of biodiversity for agricultural reasons, on the one

hand (Díaz *et al.*, 2020), and of the critical dependence of sustainable agriculture on biodiversity and ecosystem services on the other (Food and Agriculture Organization of the United Nations, 2020). The strategy, as adopted, calls for:

Support provided to Members, at their request, to enhance their capacity to mainstream biodiversity (Outcome 1), [specifically to]

Provide advice on options to internalize the positive and negative economic, environmental and social impacts (externalities) of different agriculture and food systems (Activity 1.10); and

Advocate the recognition of the role of biodiversity for food security and nutrition (Outcome 3), [specifically to]

Raise awareness of stakeholders along the value chain of the positive and negative environmental and social impacts (externalities) of the different agriculture and food systems (Activity 3.2).

Other entry points looming on the horizon are the development of “Systems of Environmental–Economic Accounting (SEEA)”; is a framework for national accounting to go beyond GDP by integrating economic and environmental data (<https://seea.un.org>), together with other work on developing global TCA standards for the private sector, as described in this volume. The Sustainable Development Goals (www.un.org/sustainabledevelopment/sustainable-development-goals/) speak directly to the need to bring a far broader perspective than GDP, along the lines of TCA, into statistics, planning, and development, through at least two targets:

15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts.

17.19 By 2030, build on existing initiatives to develop measurements of progress on sustainable development that complement gross domestic product, and support statistical capacity-building in developing countries.

We are woefully behind on the first target and have much work to do on both. The UN Food Systems Summit (www.un.org/sustainabledevelopment/food-systems-summit-2021) to be convened by the Secretary-General in autumn 2021 (www.un.org/sustainabledevelopment/food-systems-summit-2021/) is a historic opportunity for food system transformation. However, it would only be able to meet its goal to drive this transformation if it genuinely embraces TCA in food and agriculture.

National governments have many multilateral venues available to explore and develop true cost policies in food and agriculture. Significantly, both the UN Convention on Biological Diversity and the UN Framework Convention on Climate Change (UNFCCC), in recent decisions (such as mainstreaming biodiversity into sectors including agriculture, CBD/COP/DEC/XIII/3; UNFCCC’s decision 4/CP.23 on the “Koronivia joint work on agriculture”)

have turned increasingly to focus on the role of food and agriculture in both biodiversity loss and climate change. Their related bodies have issued recent reports and assessments underscoring the dependences and linkages between ecosystem services, biodiversity, climate change adaptation and mitigation and productive lands (Intergovernmental Panel on Climate Change, 2019; Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, 2019). All of these reports seek policies that can stem the tide of ecosystem degradation and build regenerative systems, for which TCA holds great potential as a mechanism to change the dynamic. National commitments under these conventions (National Biodiversity Strategies and Action Plans for the Convention on Biological Diversity and the National Determined Contributions of the UNFCCC) are key areas where national policies can be presented. However, as the *Global Biodiversity Outlook 5* has summarized after a ten-year period of implementation of an agreed global goal: “None of the Aichi Biodiversity Targets will be fully met, in turn threatening the achievement of the Sustainable Development Goals and undermining efforts to address climate change.” (Global Biodiversity Outlook 5, 2020, pp. 2). This is the second time that a set of ten-year global biodiversity goals have failed to have been met. The question needs to be addressed as to what lessons can and must be learned from the implementation failure of global targets; simply agreeing on general global targets without a clear implementation strategy and a sound monitoring mechanism will not solve the problem.

True cost policies in food and agriculture—if implemented at the level of companies and national governments and used for the monitoring of the flows of values of the different capitals—have the potential to shed light on progress or failure of implementation of such agreements. This requires the engagement and buy-in of multiple stakeholders through inclusive processes and the development of an agreed system of standard reporting beyond productive capital. TCA should not be seen as another attempt to hide the real costs of our lifestyle—“greenwashing” unsustainable production—but to display all positive and negative externalities of production and consumption. So far, the aforementioned processes have not adopted a rigorous TCA but have continued to work on new global goals. Experience made so far with two decades of global biodiversity goals without an appropriate monitoring and reporting framework provides a clear message: There is no real progress without changing the economic drivers of unsustainable production and consumption.

One of the most respected governance structures is the Committee on World Food Security (CFS), a foremost inclusive, international, and intergovernmental platform. In addition to government representatives, all stakeholders from civil society, academia, and the private sector can channel their inputs and are actively engaged in the discussions. CFS is widely recognized also among the UN organizations and could be followed by national governments (and by the Food Systems Summit) as an inclusive model. The high-quality, neutral, science-based CFS HLPE Reports and the CFS “products” (adopted by consensus, after a multi-stakeholder policy convergence process)

could be excellent tools for governments for the elaboration and design of their integrated, systemic food policies. In particular, negotiations on Voluntary Guidelines on Food Systems and Nutrition and on Agroecology Policy Recommendations are ongoing and highly relevant to TCA in agriculture and food; TCA should be both guiding and driving principles of CFS discussions and Summit preparations as well.

Concrete steps on national governance levels that can realize the reforms needed would include:

- Trade reform that allows environmental and other true-cost considerations to inform and shape trade agreements;
- Elimination of policies that promote forms of agriculture and food production with high negative externalities; and
- Recognition of healthy and nutritious food as a human right, secured through income equity; and
- Based on TCA, elaboration of policy incentives (positive and negative) to orient all stakeholders (including smallholder farmers and private multi-nationals) to opt for the appropriate decisions

Many key actors in the intergovernmental processes, national governments, and the private sector can promote, incorporate, and respect new investment guidelines that account for positive and negative externalities in Food and Agriculture.

Thus, the door is open on both international and national levels, for advancing on the concept and application of TCA in food and agriculture, reinforced by the work of the UNEP's The Economics of Biodiversity and Ecosystem Services to develop and refine approaches, frameworks and tools for the agri-food sector (<http://teebweb.org/agrifood/>). Projects are also currently underway to fully integrate TCA in the standard accounts of private sector to ensure that all capitals involved in the food systems can be reported and assessed (<https://tca2f.org/reports/>) and (<https://futureoffood.org/wp-content/uploads/2020/07/TCA-Inventory-Report.pdf>).

Note

- 1 For example, Bayer states that "By the middle of the century, the demand for agricultural products will be 50 percent higher on average than in 2013. An increase of 112 percent is forecast for the Sub-Saharan Africa and South Asia regions" (Bayer, 2017). Available at: www.bayer.com/en/the-future-of-agriculture-and-food.aspx.

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Section 5

Through the Value Chain

The 21st Century has seen the rise of B Corp corporations (an incorporation status created in 2006 by B Lab), through which a company legally commits to a requirement that it take into account the impact of its decisions on workers, customers, suppliers, community, and the environment. B Corp companies further commit to standards of social and environmental performance, transparency, and accountability. In this regard, it is a significant departure from the prevailing for-profit model of incorporation, which has only one leg on its stool, in that it solely requires a return of shareholder value in monetary terms. The B Corp represents a fundamental shift in business orientation that embraces responsibility toward people and planet (in addition to profit) that True Cost Accounting in food seeks to have permeate throughout society, thus creating a more balanced, three-legged stool. There are now over 3,500 B Corps globally (<https://bcorporation.net>), including the well-known brands Patagonia, Ben & Jerry's, and 17 of Danone's subsidiaries (Danone, 2020).

In addition to B Corp proliferation, the concept of sustainability appears to be, thankfully, writ large across the global business landscape. A number of large brands in the food business sector have set carbon emissions targets, including Horizon Organic (which aims to be the first "carbon positive" dairy company) and Danone, which set a carbon emissions target about a decade ago on its entire value chain, approximately 60% of which is related to agriculture. In 2019 at the United Nations Climate Action Week 87 multinational companies (with a combined market capitalization of over \$2.3 trillion and annual direct emissions equivalent to 73 coal-fired power plants) set targets to align their value chains to limit global temperature rise to 1.5°C and reaching net-zero by no later than 2050.

However, Hank Cardello, Director of the Food Policy Center at the Hudson Institute, sees the food industry sustainability pledges in this way:

While the food industry claims to be attuned to the consumer, its risk aversion means it makes major changes only when it's forced, as the pandemic has shown. When food companies don't see a crisis, 'innovation' amounts to line extensions and retro, iconic boxes...Simply being slavish

to CSR [Corporate Social Responsibility] reporting no longer goes far enough. Last year, 90% of companies on the S&P 500 Index published sustainability reports. CSR reporting is no longer a differentiator; it is a minimum ante to be relevant in today's consumer and business climate.

(Cardello, 2020)

There might be more health- and sustainability-driven innovations in the food sector than immediately meets most eyes. The outdoor clothing company Patagonia has launched a food line called Patagonia Provisions which produces and sells packaged food produced in a farming method characterized as “regenerative agriculture,” and has partnered with seven other companies in creating the Regenerative Organic Certification, which will certify farming practices that produce “healthier soils, higher animal welfare, and fairness for farmers and workers.” The certification is designed to boost market share, such as the brand benefit provided by the United States Department of Agriculture Organic seal. As we saw in Chapter 7, the market share for organic is growing, aided by its accessible branding and growing consumer awareness of its better true cost ratio, in that it is of more benefit to the environment.

The two chapters that follow here are but a few highlights of the evolution of the food business sector in the direction of incorporating sustainability and equity into corporate bottom lines. In the more specific framing of emergent True Cost Accounting (TCA) in financial and investment decision-making in food, this upcoming section offers a valuable case study focus on a fundamental lever of business decision-making: financial risk.

In Chapter 14, the authors offer four case studies reflecting, first, a corporate perspective on assessing the True Cost of various regional and global supply chains; second, a bank's experience with TCA; third, insights into True Cost considerations from an insurance sector view; and finally, the experience of a financial auditor. These cases illustrate “proof of concept” for TCA in the private sector, leading companies willing to differentiate themselves through their interest in understanding and addressing their externalities

Chapter 15 addresses the question of how investment and creative finance can support healthy and equitable food systems shifts, pointing out the need for a common metrics framework and aligned accounting standards to measure impact, so that investors and companies can “de-risk” the financial viability of their investments and scale with a meaningful range of sustainability metrics in their balance sheets. The authors provide three case studies to demonstrate how values-conscious investment companies have balanced risk and impact in their portfolios.

These case studies are valuable as illustrative insights into a larger picture of how multiple actors in private enterprise are acting with the sense of purpose needed to influence the large gears of commerce on this fragile planet.

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14 The Business of TCA

Assessing Risks and Dependencies Along the Supply Chain

*Tobias Bandel, Jan Köpper, Laura Mervelskemper,
Christopher Bonnet and Arno Scheepens*

Introduction

Climate change, resource scarcity, consumer awareness, and new regulations trigger practice changes in global supply chains regarding environmental and social aspects. These better practices go along with additional costs, which, based on current accounting schemes, could negatively impact the economic performance of companies. This causes a dilemma for the private sector: while trying to comply with these new requirements, the companies get financially punished as the higher costs for sustainable measures reduce their profits. True Cost Accounting (TCA) can be used to show the benefits of better practices at the company or supply chain levels, not only using sustainability language but in tangible financial terms. This chapter presents the experience of different actors from the corporate and financial sectors in applying TCA. The first case study offers a corporate perspective on assessing the True Cost of various regional and global supply chains, the second case study discusses a bank's experience with TCA, the third case study provides insights into the True Cost considerations from an insurance sector view, and the fourth case study shares the experience of a financial auditor.

A key finding from all case studies is that a true cost assessment across entire supply chains is possible, allowing for an assessment that crosses private and financial sector initiatives, integrating sustainable performance into financial market requirements. However, although data and models to assess the true cost of ecological or natural capital aspects already exist, there is still a substantial need for further research regarding social and human capital aspects such as health. The following four case studies demonstrate how TCA is a valuable tool for agri-food companies, banks, insurances, and financial auditors.

Case Study 1: Assessing the True Cost of Various Regional and Global Supply Chains

What are the true costs of food production, and what can be done to reduce these externalities to society? How can we quantify and monetize better farming practices to show that sustainably produced food costs society and taxpayers

less? These questions arose in 2014 when various companies had identified financial and reputational exposure and started to assess their true cost profile. The initial motivation to conduct true cost assessments was based purely on pioneering entrepreneurial spirit, trying to secure and further develop their future business cases by minimizing current and future risks.

In November 2019 Boston Consulting Group (BCG) published a report (Boston Consulting Group, 2019) about how to secure the future of German agriculture. The key finding was that today's German agricultural system causes externalities—that is, costs to the society and the environment, amounting to €90 billion. This is in addition to another €10 billion of subsidies and other direct payments, which are currently borne by society, in the form of taxpayers. This €100 billion only covers externalities related to climate, air, water, soil, livestock, and ecosystem services from the German agricultural sector. Social aspects are not covered. The study assumed that more sustainable production would reduce the costs to society. At the same time, Christian Heller, CEO of the Value Balancing Alliance presented to the European Business and Nature Summit in Madrid on how today's costs to society will become costs to businesses over time (Heller, 2019).

The cumulative experience of conducting true cost assessments with the following companies are included in this case study: Alnatura, Bauck, Demeter, Eosta, GLS Bank, Haciendas Bio, Hipp, Lebensbaum, Martin Bauer, Rapunzel, Tradin, Triodos, and Weleda. The assessments analyzed products and supply chains covering a variety of agricultural products from different origins worldwide and were conducted by Soil & More Impacts (SMI), in some cases in collaboration with EY. The focus was to assess the impact on natural capital aspects (biodiversity, climate, soil and water) (Natural Capital Coalition, 2016). Selected social and human capital aspects were analyzed as well. The intention of these pilot assessments was not only to generate true cost value but also to test the model for its applicability and scalability to global complex supply chains.

Priority was given to primary data available through existing audits such as organic, Fairtrade, Rainforest/UTZ, or financial accounts. To maximize the comparability and acceptance in the food and agricultural market, commonly used impact assessment models, reference values and monetization factors were used such as the Cool Farm Tool (Hillier et al., 2011), the RUSLE (Revised Universal Soil Loss Equation) (Renard, 1997), Aqueduct maps (Gassert et al., 2014), ClimWat (Muñoz and Grieser, 2006), CropWat (Smith, 1992), the DALY (Disability-adjusted life year) concept (Homedes, 1996) and EcoMatters (van Maurik et al., 2016). In most cases, the assessed supply chains were benchmarked against the common practice in the region, a baseline, or an improved scenario.

The overall finding was that despite the fact that TCA is a rather young and developing science, the most commonly used approaches, assumptions, and models seem to be good and detailed enough to generate meaningful results, identifying and highlighting strengths and weaknesses, costs and benefits of the different products and supply chains.

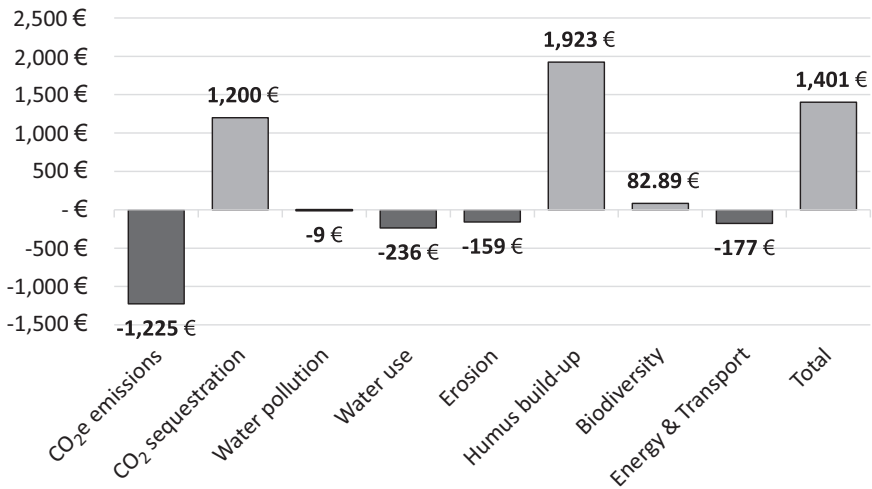


Figure 14.1 Calculated external costs in €/hectare for an organic farm in Germany.

The following figures show selected results from true cost assessments of the participating companies.

Figure 14.1 shows the true cost assessment of a cereal- and vegetable-producing German organic farm. The external cost due to CO₂ emissions was nearly offset by the amount of CO₂ sequestered. The major benefit of this farm was generated due to humus (soil) build-up. Overall, that farm created an external benefit of €1,401/hectare. This is a weighted average across the entire crop rotation which could be broken down to external costs and benefits per kilogram of product, factoring in the yield. From a scientific and modelling perspective, one of the key learnings was that the entire crop rotation of a farm needs to be assessed in order to identify the real external costs or benefits of a farming system.

Figure 14.2 shows the true cost result in €/hectare of an intensively managed vegetable farm which generates external costs of €702/hectare. Figure 14.3 illustrates the same farm after implementing some better practices such as intercropping and improved compost management, resulting in a reduction of the external costs to €106/hectare.

As the currently prevailing standard accounting and economic valuation systems do not consider these positive or negative externalities, there is no direct financial incentive for better practices, which leads to distorted markets and false accounting. Therefore, apart from the necessity of political interventions, it is required that the financial market institutions start considering these externalities by including them in credit ratings, insurance policies, annual accounts, and company valuations. In order to foster this process, Soil & More Impacts and TMG Thinktank for Sustainability started an initiative together

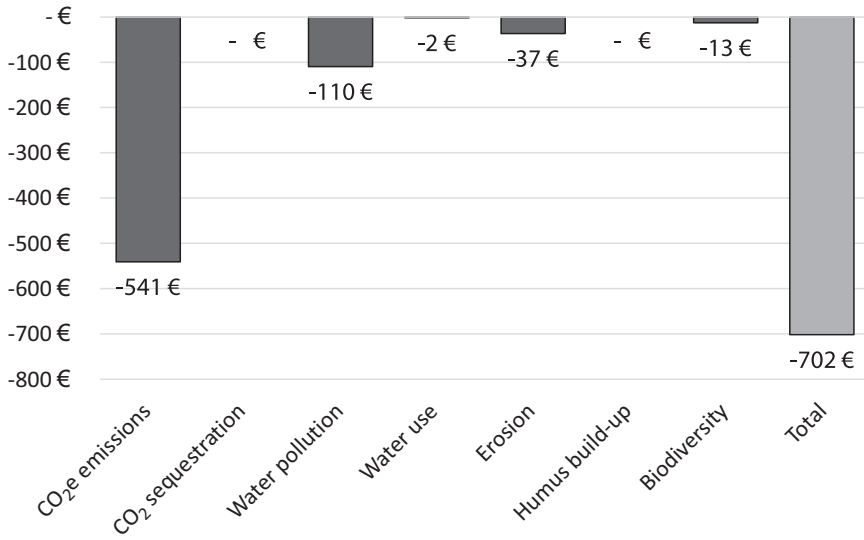


Figure 14.2 Calculated external baseline costs in €/hectare for an intensively managed vegetable farm in Germany.

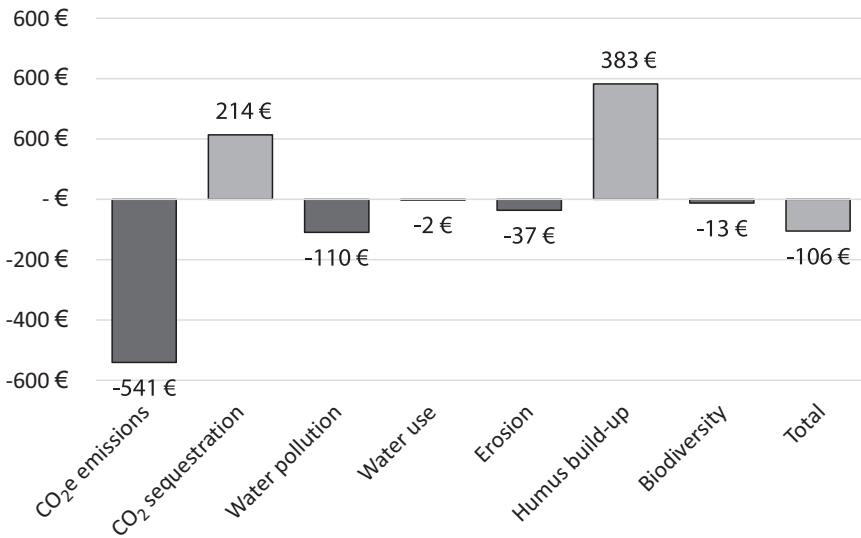


Figure 14.3 Calculated external scenario costs in €/hectare for an intensively managed vegetable farm in Germany.

with EY and some market-leading companies to develop guidelines on how to include both positive and negative externalities in annual reports as a basis to generate financial incentives for better farming practices.

Case Study 2: True Cost Accounting at GLS Bank

Founded in 1974 in Bochum Germany, GLS Bank is the first social-environmental bank globally, with a specific focus on financing the basic needs of people in line with regenerative environmental practices. Taking these two focal points as the core of all business activities of GLS Bank, economic sustainability is the logical consequence instead of the key imperative of doing business. To date, GLS Bank has a staff of 700 employees and a balance sheet total of around €7 billion.

The need to drastically rethink the current patterns of economic systems along the lines of planetary boundaries, common goods, and social justice finally seems to be a common understanding by an increasing number of market participants, supervisory authorities, and citizens. In line with this, the European Union, Central Banks, and supervisors have been calling for a more proactive integration of sustainability-related risks and opportunities into business management and target setting. The predominant focus of these initiatives currently lies on climate-related issues, as the short-, medium-, and long-term impacts of this challenge are more tangible and have a (better) data basis. However, this is just the starting point for a wide-ranging revision of how sustainable business models need to be framed. The interplay between the buildup, use, and degradation of values, as well as their long-term relevance for business performance and socio-environmental sustainability needs to be put in focus.

With a view to understanding, translating, and managing sustainability-related risks and opportunities, economic actors in general and financial institutions in particular need to (re)define the parameters that (will) affect economic value.

As this viewpoint is accompanied by a great opportunity for greater consideration of sustainability aspects, GLS Bank has been engaging in a profound rethink of risk management and accounting. As the first German socio-environmental bank, its mission is to redefine capital as a means for positive societal change and using money to finance a variety of exclusively sustainable projects and businesses.

Accordingly, the bank defines the value of an economic activity or organization to lie far beyond financial capital as the core driver of short- to long-term value creation. Rather, value is created, sustained, and strengthened by mutual impacts on and across multiple capitals: human capital, social capital, natural capital, financial capital, intellectual capital, and production capital. These capitals and their interactions represent the true values that determine an organization's holistic value creation or degradation and therefore its future viability and competitiveness.

In this context, TCA represents a concrete methodology for a far more holistic view on value drivers by integrating quantified sustainability aspects into the well-known logic of financial accounting, following a similar understanding of the dependency of capitals: in times of globally scarce raw materials such as soil and water, it is of strategic importance not only for the agricultural

sector, but also for national economies as a whole, to take a close look at the availability and use of vital resources such as soil, water, and energy and, if necessary, to intervene with effective measures to secure these resources. Whether and at what price raw materials can be processed and traded in the future is determined based on the agricultural practices applied today. Those who take appropriate care of, for example, soil and water today will be able to offer agricultural products competitively and in line with planetary boundaries in the future. In turn, it can be argued that sustainable investments in multiple capitals lower economic risks.

GLS sees its mission to strive for a (more) sustainable future and to implement a more holistic view of sustainability-related risks and therefore engages in TCA. Considering the first aspect, the market-based approach of TCA monetizes harmful activity and financially rewards sustainable activity, thus making the conservation of resources financially attractive and leveraging sustainable behavior. Regarding the second aspect, the approach of TCA provides an opportunity to improve risk and opportunity management in the lending process. Former intangible or invisible risks and return potentials are given a monetary value and, as a result, can be considered when assessing the creditworthiness and credit default risk of a project or organization.

As a first pilot, GLS Bank and GLS Treuhand have applied the method of TCA together with Soil & More Impacts for three organic partner farms. The results show that the current agriculture practices generate high costs: while organic farms generate an average profit of around €720/hectare, the conventional comparable farms cause net costs averaging €3,670/hectare. These costs have so far been paid by society—either directly, for example through higher water treatment costs, or indirectly in terms of environmental damage. In the medium term at the latest, these costs will also return to the farmers and their land when assets like soil fertility are destroyed or political countermeasures are taken that will affect farmers. In the ongoing criticism of agriculture and the debate about the need for agricultural transformation, TCA reveals that organic agriculture provides valuable socio-environmental services and makes a beneficial contribution to society.

The application of TCA might not lead to a fundamental change in the granting of loans by GLS Bank. The bank instead aims to create a leverage effect that can be achieved when other banks without a normative view on sustainability act in the same way, realizing the financial risks of sustainability aspects and thus considering them when granting loans. In return, this can help to steer capital towards sustainable agriculture.

Although not all ecosystem services or capitals can nor should be (fully) monetized, the view of manifold impacts opens the playground for business decisions that are multidimensional with a high probability of identifying current and future risks and opportunities. Hence, TCA paves the way to understand and disclose social and ecosystem services that have tangible impacts on the viability of business models.

Case Study 3: The Research of Allianz in Assessing Natural Capital for Risk Management Solutions in the Insurance Sector

Allianz Global Corporate & Specialty (AGCS) is the Allianz Group's dedicated carrier for corporate and specialty insurance business. AGCS provides an insurance and risk consultancy across the whole spectrum of specialty, alternative risk transfer and corporate business. Their role as the leading corporate insurance company demands an in-depth awareness and understanding of the emerging sustainability-related trends that impact their clients and their operations. To do this, AGCS has built a dedicated team of experts in sustainability risks from an industrial insurance perspective.

AGCS supports its clients to identify and assess material risks along their value chain and identify and design risk management solutions in a collaborative manner. Environmental, social, and governance (ESG) factors are increasingly relevant in risk management, and the sustainable use of natural capital is one important element. By many scientific and macro-economic indicators, it is becoming increasingly evident that natural capital is being depleted at a far faster rate than the planet can replenish it, and with consequences that extend well beyond the direct effects on the environment. Consequently, businesses face new risks from the ongoing depletion of natural capital.

In 2018 AGCS published an exploratory report "Measuring And Managing Environmental Exposure: A Business Sector Analysis Of Natural Capital Risk" (Allianz, 2018b) outlining potential exposure to natural capital risks, based on an analysis of 2,500 companies across 12 industry sectors. The report compares and analyzes selected sectors and assigns each of them to one of three risk categories: danger zone (sectors where risks are generally greater than mitigation), middle zone (sectors where risks are roughly matched to mitigation), or safe haven (sectors that generally do not seem to face high risks and/or are reasonably well prepared for risk). According to the study, the following sectors have been assigned to the following risk categories:

- Danger zone: Oil and gas; mining; food and beverage; transportation
- Middle zone: Automotive, chemical, clothing, construction, manufacturing, pharmaceutical, and utilities
- Safe haven: Telecommunications

Natural capital risk assessment is expected to become increasingly important for corporates as numerous liability and business interruption cases have been revealed around the globe. These types of losses are expected to increase unless these risks are mitigated.

A significant number of companies have started to address natural capital risk in their enterprise risk management. Factoring natural capital costs into business decision-making can help companies to anticipate potential threats. For example, when opening a new plant, factors such as future water availability and the

emerging emissions regime should be considered. Natural capital risk exposure will become increasingly important, as it is expected that companies will have to actively disclose these risks to governmental agencies and investors as both risks and related management expectations evolve.

“With threats to the environment coming from many different areas, there will be no such thing as business as usual in future,” says Chris Bonnet, Head of ESG Business Services from Allianz and co-author of the report. “Companies need to understand, quantify and even monetize their dependence on natural capital and the impacts their operations have on it to ensure their organizations are resilient and future-proof.” More information about natural capital risk and the report insights can be found in Allianz (2018a).

Case Study 4: Natural Capital Inclusion for Sustainable Innovation and Risk Management: The Perspective of a Sustainable Industrial Design Engineer from EY Climate Change and Sustainability Services

Back in the 1930s the Hawthorne Works in Chicago had commissioned a study to look into worker productivity in the factory under varying conditions. Researchers saw that productivity increased with changes in light intensity. However, the workers fell back into lower productivity as soon as the study ended. The conclusion was drawn that the light intensity was not the cause for the increase in productivity, but rather the increased attention on individual workers and their performance.

Traditionally the attention of the financial sector with regards to the performance of companies has been on their financial/economic performance. In recent years, there has been a steady increase in attention to non-financial information, also in the financial sector. The realization that non-financial information is just as important, or perhaps even more important than financial information to evaluate the potential for long-term value creation of companies has spurred the disclosure of all kinds of different non-financial metrics and other performance indicators in sustainability reports, integrated annual reports, and sometimes even in financial statements.

According to the Global Investor survey conducted by EY in 2018, nearly all investors who responded to the survey (97%) say that they conduct an evaluation of non-financial disclosures; just 3% of respondents say they conduct little or no review. At the same time, investors' clients are increasingly asking about non-financial information and expecting it to be integrated into mandates. Furthermore, non-financial information plays an increasingly important role in the investment decision-making process, and nearly all respondents (96%) say that such information has played a pivotal role. In interviews, investors stressed the importance that sustainability disclosures play in determining appropriate market valuations. Therefore, companies should focus on ensuring that their non-financial information has the same level of scrutiny as financial information.

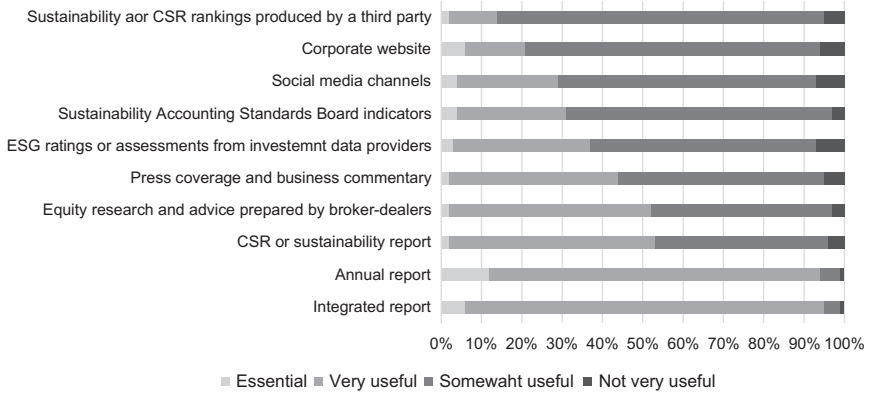


Figure 14.4 Survey results: How useful do you find the following sources of non-financial information when making an investment decision? (adapted from the Global Investor Survey, EY, 2018).

Investors are requesting broader and higher-quality non-financial information from companies, and seeking consistent, investment-grade information to support their decision-making. For investors, the most useful non-financial reports come from companies that understand material non-financial risks and opportunities which are most important to their industry and business model. Investors report that, governance aspects aside, the main non-financial factors in investment decision-making are related to supply chain, human rights, and climate change risks.

Respondents also say that non-financial information must be standardized to create a useful basis of comparison, to establish benchmarks and to mark trends. Investors say that national regulators are best suited (70%) to lead efforts to close the gap between investors’ need for non-financial information. In

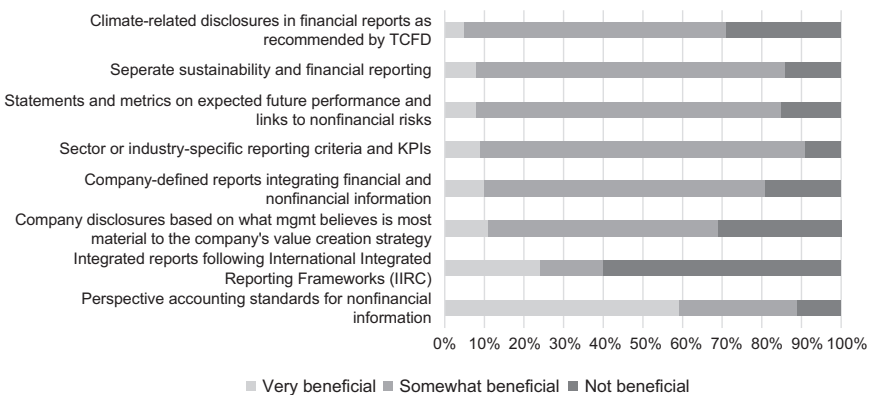


Figure 14.5 Survey results: How beneficial would each of the following reports or disclosures be to your investment decision-making? (adapted from the Global Investor Survey, EY, 2018).

addition, investors are looking for intelligent collaboration among themselves, regulators, and organizations such as trade groups and non-governmental organizations to establish appropriate and effective reporting standards.

In the agri-food sector, it is known that at least some material environmental (and social) impacts and dependencies (risks) occur at the farm level. Large national and multinational food and beverage companies rely on vast amounts of natural (and social) capital, such as agricultural land, biodiversity, healthy soils, etc. mainly through purchasing agricultural products from a large number of agricultural suppliers.

In order to identify, quantify, and eventually mitigate the associated impacts and risks associated with the environmental impacts and dependencies, large food and beverage product companies will need to obtain data on the non-financial performance of their supply chain in order to report reliably on their own non-financial performance. But most importantly, it is essential that this information is then also utilized to improve the non-financial performance, similar to what we are used to with financial performance information. Both for non-financial performance reporting as well as strategic decision-making, it is essential that the data that companies collect to use for these purposes is reliable. Obtaining assurance can provide the increased credibility and reliability of non-financial information, similar to financial information.

Business activities can lead to multiple different environmental impacts that can occur locally and/or globally and measuring these impacts is always complex. Scientific research and development have led to standardized methods for assessing impacts, but the way that they are applied often leaves room for “manipulation,” which can have a large effect on the identified non-financial risks and opportunities portrayed in the reporting of companies.

Given the previously discussed trends and developments, there is an emerging need for standardized TCA, which brings together the different environmental (and social) impacts into a single monetary unit, allowing for full integration with annual reports, integrated reports, as well as strategic decision-making for companies and investors to better balance their financial performance with their non-financial performance. Therefore the main need for the coming decade is to develop and align a sector-specific, highly automated, standardized method, approach and guidelines in order to eventually come to sector-specific reporting standards for non-financial information similar to the standards already available for financial reporting.

The real benefit of TCA is in “turning on the light” with regards to the required transition towards a sustainable society. The attention that the financial sector is giving to non-financial performance of assets spurs companies to think about their non-financial performance. The pilots that EY involved in the *True Cost: from Cost to Benefit* project confirmed that farms are open to supplying non-financial information to their clients if they are able to. By “turning on the light”, movement towards a more sustainable way of doing business is already visible. If we can manage to turn on the light on a larger scale, where standardization plays an essential role, we should be able to see a bigger movement towards more sustainable production and consumption.

Conclusion

These case studies showcase the versatility in application and use of TCA across different business players and emphasize the potential TCA has in becoming a relevant tool for assessing impacts and dependencies in the financial sector.

By using TCA for analyzing and evaluating the environmental impact of different agricultural management practices, agri-food companies can base their supply chain decisions on comparable and transparent results. Value-driven corporations like the GLS Bank can substantiate their mission and corresponding decisions with monetary figures of their impact. Insurance providers have realized that capital dependencies and impacts are highly interconnected, leading to immense natural capital risks that are barely considered in existing tools used by the financial and insurance industry. In addition, financial auditors like EY are increasingly acknowledging the need for a standardized way of assessing the long-term value and impact of companies to create a comprehensible basis for investors and other readers of annual reports. Even though TCA is a young field, it is built on existing scientific knowledge and can be further developed, standardized, and integrated into practical tools. With this, it can be a powerful lever for transformative change towards a new definition of value—based on capitals thinking—in the business world.

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15 Investing in the True Value of Sustainable Food Systems

Tim Crosby, Jennifer Astone and Rex Raimond

How can investment and creative finance support healthy and equitable food systems shifts? More donors, investors, and members of the finance community are seeking integrated, holistic methods to assess investments. Social enterprises are also looking to demonstrate the value add of their impact. Recently, the Transformational Investing in Food Systems Initiative (TIFS Initiative) (www.tifsinitiative.org) adapted The Economics of Ecosystems and Biodiversity for Agriculture and Food's True Cost Accounting Framework (TEEB for Agriculture & Food) (<http://teeb-web.org/agrifood/>) into a tool for investors and entrepreneurs and have piloted the application of the tool. This chapter examines the strengths and weaknesses of such a tool for impact investing for food systems transformation and offers early case studies of how entrepreneurs and fund managers are looking to support equitable, agroecological food systems.

- Sistema Bio designs, builds, and sells patented biodigesters to small-scale farmers in Mexico, Nicaragua, Colombia, Kenya, and India. The biodigesters convert cow manure into energy and fertilizer, saving farmers money while protecting groundwater and improving soil health.
- Community Markets for Conservation (COMACO) works with 81 community cooperatives in Zambia to provide incentives for biodiversity conservation, support 188,500 small-scale farmers, apply climate smart agriculture, and run a business to manufacture and sell healthy foods.
- Root Capital is a non-profit social investment fund that invests in businesses that collect, aggregate, process, and market crops for rural farmers in Latin America, sub-Saharan Africa, and Southeast Asia.

Each case demonstrates a business model or investment approach that aims to create positive outcomes across Natural, Social, Human, and Produced Capital. They provide insight about how an applied TCA framework can be a helpful tool to shift how investment decisions are made.

A True Cost and Value Approach to Investing

Investing towards personal and ethical values has been promoted since ancient times (CNote, 2019), while values-aligned investing in North America got started in the 1960s social and political movements boycotting companies involved in the Vietnam War. Today, sustainable investing has expanded into Socially Responsible Investing,

Environmental and Social Governance screening, the Global Reporting Initiative, Impact Investing, and most recently Blended and Integrated Capital Investing (RSF Social Finance, n.d.). By 2018 \$30 trillion was invested globally with considerations of ethics, social and environmental values (Global Sustainable Investment Alliance, 2019). Data show that funds aligned with sustainable investing better estimate the true value of the underlying assets and their future values and are also outperforming many of their peers (Mooney, 2002).

While the field of sustainable investing has exploded, the ability to qualify and quantify the positive non-financial impact of an investment has not been standardized. However, the hunger for a global set of standards is witnessed by the way investors and fund managers quickly adopted the United Nations (UN) Sustainable Development Goals (SDGs). While the 17 SDGs include a total of 247 indicators, they contain scant guidance on what data sets are valid and standardized. In order to scale sustainable investing, investors and companies need a common approach and shared metrics to measure impact, and have these approaches and metrics align with accounting standards.

Prior innovations in investing have worked within the structure of Generally Accepted Accounting Principles (GAAP) and International Financial Reporting Standards (IFRS). With pressure from investors and associations like the Sustainability Accounting Standards Board (www.sasb.org), GAAP has begun implementing revisions that allow hitherto undervalued accounting items to be included in formal reporting requirements.

Investors, especially asset managers, are demanding more. They want to know that their impact is measurable and that those measurements are linked to overarching frameworks like the SDGs. By aligning investment criteria with True Cost Accounting (TCA), there is an opportunity to account for underlying material costs not currently captured in GAAP and IFRS as well as align values-based investment interests with needed accounting standard revisions. This should better connect the front-end decision-making of where to invest with the reporting of outcomes from that investment.

Opportunities for True Value Investing in Aligned Food Enterprises

Food systems transformation is central to the agenda for achieving a more just and sustainable world (Global Alliance for the Future of Food, 2020). Given food systems' undeniable links to climate change, migration, zoonotic disease, biodiversity loss, structural inequality, and public health—the myriad global emergencies that people currently face—transformation of these systems has emerged as a global priority.

Despite the rising voice for systems change, institutional investors, governments, philanthropists, and private sector companies seek enterprise or fund level success, not always system success. They generally seek to reduce their exposure to risks that they perceive as significant (e.g., financial loss, climate change, natural resource degradation, social inequality, food insecurity, or rising costs of health-care), and might have divergent mandates (e.g., capital preservation, generating

income and profit, and/or creating public goods). The need is to address these issues and mandates together in a more holistic approach to investing.

Investors—individuals, asset managers, and institutions—are being asked at an ever-increasing rate to prove the impact of their investments beyond financial returns. Social entrepreneurs are learning how to demonstrate the social and environmental value of their business to investors and donors. These needs require harmonizing multiple priorities, risk mitigation, and return expectations with the metrics to show positive outcomes for food producers, food workers, natural systems as well as consumer and community health. The biggest hurdles for the needed innovations in investment practices involve redefining risk, reward, efficiency, and scale to become more systems-focused, internalizing those considerations into decision-making structures, and agreeing on missing impact metrics. These innovations must overcome the current biased metrics for food systems investors that primarily reward two dimensions: increasing productivity and profit, a reductionist approach to food production.

Enter the United Nations Environment Program's TEEBAgriFood initiative which delineates costs and values across four types of "Capitals": Natural, Human, Social, and Produced. This holistic framework is being applied to create tools for business to develop comprehensive profit and loss reports that integrate value added or lost (e.g., I360X, True Price/Impact Institute, Harvard Impact Weighted Accounts, Common Land), explore the creation of new accounting standards (e.g., Sustainable Accounting Standards Board), and help agri-food companies to measure and manage their impacts, dependencies, and risks, and unlock new opportunities (e.g., World Business Council on Sustainable Development and Capitals Coalition). In the long run, these efforts can assist investors in identifying companies that are performing financially and creating better environmental and social benefits than their peers. To help diverse investors work together more effectively, an investing approach that incorporates the TEEBAgriFood framework analysis can elucidate and organize the anticipated negative and positive outcomes of a given enterprise's activities before an investment is made, while leveraging the framework's focus on the accounting sector.

Applying TCA Rapid Assessments

The Transformational Investing in Food Systems (TIFS) initiative has identified the need for practical decision-making tools that holistically identify the social and environmental impacts of enterprises. TIFS is piloting two TCA Rapid Assessment tools: one to assess impacts of social enterprises and one for investment funds (prototypes are being tested and will be made available publicly).

The goal of these TCA tools is to help investors and entrepreneurs assess enterprises' impacts on Natural, Human, Social, and Produced Capital stocks of food systems. The TCA tools are a set of questions that make each of the four Capitals visible to an investor and those seeking investment. The TCA tools pose outcome-oriented questions related to the four Capitals for consideration during normal due diligence processes; for example, "Does this investment increase or decrease Pollination? Does this project improve or reduce Community Wellbeing?" TIFS advances these tools as

one lever to influence up-front investment decisions and back-end reporting and helps entrepreneurs to make a case in the absence of robust public policy that prices externalities. This converges with ongoing efforts to harmonize impact strategies, metrics, and data, as well as efforts to create new accounting standards and profit and loss reports.

Just as the development of financial analysis methods has enhanced investors' capacity to predict and improve financial returns, systematic impact analysis—both before and after investment—is in high demand and still needs work. The following examples highlight funds and enterprises that aim to achieve system-level impact. These established enterprises and investment funds used our first version of the TCA tools to track changes in Capital from a systems perspective. The following cases agreed to be engaged in this process. They are illustrative examples involving two enterprises and one fund that are leaders in their fields. The analysis and synthesis that follow incorporate feedback from almost 30 interviews with investors, fund managers, enterprises, and other experts, and a comparative review of major impact management and measurement frameworks. The results of the case examples, interviews, and review of the field of impact investing have informed the tool and the ensuing analysis.

Sistema Bio

Sistema Bio (<https://sistema.bio>) designs, builds, and sells patented biodigesters to small-scale farmers to convert manure into energy and fertilizer. Their low-cost, modular biodigesters save farmers money while protecting groundwater and improving soil health. Since 2010 Sistema Bio has installed over 11,000 units in Mexico, Nicaragua, Colombia, Kenya, and India.

The company measures tons of CO₂e mitigated, tons of treated waste, biogas produced, trees saved, and hectares per year enhanced with biofertilizer. It does not measure the benefits of avoided deforestation, time saved, or money saved.

Beneficial Returns (www.beneficialreturns.com) is an impact investment debt fund that provided a loan for Sistema Bio to purchase trucks to strengthen their infrastructure and follow up on their customers. Beneficial Returns uses its own internal assessment tool to evaluate a business's ability to contribute to the environment and community well-being while running a profitable enterprise. In a financial innovation to recognize impact and financial health, Beneficial Returns waives borrowers' final payment if they exceed a predetermined impact target and make their other payments on time. This innovation incentivizes continued attention to impact over maximizing profits during growth, which is a challenge faced for small and growing social enterprises.

Sistema Bio finances its enterprise with grants, equity, and debt. To reach smallholder farmers outside tight (highly controlled or coordinated) value chains, Sistema Bio must pilot its model to market, sell, and monitor the biodigesters in rural environments with weak infrastructure and limited farmers' awareness of the benefits of biodigesters, yet great opportunity for adding value. While Sistema Bio could be more profitable if it sold only to larger farmers closer to commercial hubs,

it decided to run its for-profit enterprise to reach underserved communities. It envisions financial sustainability with high social impact and enhanced soil health.

TCA Rapid Assessment

In each of the four capitals, Sistema Bio scores well on select services; for example, in Natural Capital, provision and regulating services of air and water were key. In Human Capital, improving farmer livelihood is front and center. The tool underscores the value of Sistema Bio's addition to Social Capital by educating farmers about the biodigester technology and income benefits associated with using bio-fertilizers for soil health, adding new dimensions because the current questions are focused on "workers" and do not explicitly include customers and other community members. In Produced Capital, recognizing that Sistema Bio works in loose (less controlled) value chains reinforces the value-addition of their business model.

Beneficial Returns as a fund manager found the TCA framework useful to compare one borrower with another, and as a common framework for team members to evaluate an investment opportunity.

Community Markets for Conservation (COMACO)

A Zambian public good, non-profit company since 2009, **Community Markets for Conservation (COMACO)** (<https://itswild.org>) works with 81 community cooperatives in the Luangwa Valley to provide incentives for biodiversity conservation, training, and support services to 188,500 small-scale farmers. This includes agroforestry, organic composting, minimum tillage, crop rotation, and water conservation strategies. They also run a business to manufacture and sell 17 different healthy, pesticide-free, organic, value-added foodstuffs under the brand *It's Wild!* Products including peanut butter, rice, wild honey, wild mushrooms, dried mango, a soy-based high protein snack, and breakfast cereal, among others.

Their landscape-level conservation approach works on four levels to: 1) engage farmers and former wildlife poachers via cooperatives; 2) ensure food security and improve nutrition; 3) increase individual income through processing and marketing of surplus crops and sustainably harvested wild foods; and 4) enhance biodiversity through payments rewarding collective Conservation Pledges, conservation area set-asides, and soil enhancement practices.

COMACO tracks impact through measuring crop productivity, income, participation, and engagement. Maize yields have improved two to three-fold, on average, and annual incomes for farmers have increased 450% from \$79 in 2001 to \$393 in 2019. Women represent 52% of farmers, and 76 former poachers now guard crops in elephant-friendly ways. They recently placed some 29,800 beehives in the community conservation areas.

Most important is how they achieve these impacts by ensuring food security. COMACO will not buy a farmer's production if she does not produce a surplus above what the family needs for its own consumption, but she will still get a cash payment in recognition of commitment to the community conservation district.

COMACO started with research grants examining the linkages between wildlife poaching, hunger, and food aid to ensure farm families' food security. COMACO asked farmers to sign a Conservation Pledge to reduce wildlife poaching. Today, grants finance training services and expansion strategies, while the food processing business sustains itself from sales in Zambia's major retail stores as well as in schools and hospitals. Carbon sales on international markets contribute to the payments for conservation. COMACO runs two distinct entities side-by-side (non-governmental organization and public good company) in order to separate their respective funding income and expenditures and accomplish their interrelated goals.

TCA Rapid Assessment

COMACO scores well on all four Natural, Human, Social and Produced Capitals. Their emphasis on increasing Human and Social Capital is particularly strong, with Social Capital as their greatest asset. Since they invest heavily in Human and Social Capital and return all profits within loose supply chains connected to farmer cooperatives, they experience capital constraints in terms of sourcing more investment to expand their approach to other regions.

The model is based on a conservation pledge that is only valid if an entire village signs on, increasing impact by its collective design. Increased pay for crop production is linked to: meeting household food security, adoption of organic farming techniques for increased food production, and the absence of poaching and forest threats. By linking adoption of improved farming techniques to enhanced household nutrition and income, using a lead farmer approach with farmer-to-farmer training as well as a cooperative economic model, COMACO puts farmer ownership at the heart of the work, an intentional strategy that reinforces linkages between different kinds of capital.

COMACO found that having the four areas of capital in one analysis was a helpful way to communicate the impact of the entire enterprise. Despite this, they worry that if a prospective investor only had the tool, they would not be able to weave together the complex self-reinforcing work strands into a meaningful story. A key to success for them is to understand what is working for communities. To what degree is young talent retained in rural areas? To what degree do women participate? How is the enterprise stimulating the environment around it in a way that further engages the communities? The feedback from COMACO points to the importance of expanding the tool to help investors consider how the outcomes in the Four Capitals impact the overall food and agricultural system in which it operates.

Root Capital

Founded in 1999, **Root Capital** (www.rootcapital.org) is a non-profit social investment fund growing prosperity for rural farmers in Latin America, Sub-Saharan Africa, and Southeast Asia by investing in the businesses that collect, aggregate, process, and market their crops. These businesses provide farmers with fertilizer, better seed varieties, and training on agricultural methods; connect farmers to international

markets where their crops fetch a better price; and help farmers to achieve higher and more stable incomes. Root Capital links farmers to markets for sustainably produced goods (or “green markets”), provides assistance on sustainable farm practices, and promotes climate change mitigation and adaptation. Root Capital focuses on companies working with smallholder farmers in formalized, consolidated markets in tight value chains (Rural and Agricultural Finance Learning Labs, n.d.) with clear standards and specific contractual obligations, mostly involving high-value crops (e.g., coffee and cocoa cooperatives).

Through the first quarter of 2020 Root Capital provided financing to 726 businesses working with over 1.5 million smallholder farmers, including some half-a-million women. The businesses Root Capital reached paid nearly \$5 billion directly to producers. Through on-site training, centralized workshops, and remote engagements, Root Capital has also trained 1,517 enterprises on strategic, financial, and operational skills (Root Capital, 2020).

In order to fulfill its high-impact mission, Root relies on a blend of creative investment capital, philanthropy, and guarantees. For its loan portfolio, Root Capital has solicited investment capital from over 200 institutional, public, and private investors, raising both concessional capital with a small return on investment (ranging from 0.5–2.5%) and patient, subordinated debt through a notes program. Root Capital also raises philanthropic equity that stays on the lending balance sheet to cover write-offs, as well as loan guarantees, which enable Root Capital to expand to new geographies and value chains. Finally, Root Capital raises grants for operational and non-lending programs, such as impact measurement, technical assistance, and training to agri-businesses, and building the impact investing field.

Root Capital focuses on increasing access to finance for agricultural enterprises that are locked out of traditional financial markets. Here, Root Capital uses the concept of financial “additionality” or of “investor contribution,” which refers to the agri-business’s ability to obtain a similar loan—a loan of similar size, for the same purpose, with similar collateral, and for a similar rate and fee—from another source, such as a commercial bank. Investors and enterprises that are working—and sharing power—with people and communities who are systematically shut out of financial systems are more likely to contribute to systems transformation.

TCA Rapid Assessment

Root Capital scores well in all four Capitals of the TEEB AgriFood framework. Root provides loans and training to agribusinesses who in turn promote sustainable farming practices that enhance Natural Capital, including soil and water quality, and improve ecosystem services. Root Capital’s loans improve Human Capital by improving smallholder farmers’ working conditions and incomes. The companies they invest in improve employee wellbeing, working conditions, skills and training, and provide employment security. Root Capital contributes to increasing Social Capital by strengthening ties between the agribusiness and their farmer suppliers. Root Capital increases Produced Capital by, for instance, strengthening farmer engagement in supply chains, and building financial infrastructure where none exists.

Root Capital seeks to first and foremost improve the prosperity of rural communities by partnering with agricultural enterprises that increase farmer incomes, create jobs, and contribute to ecosystem health. Root Capital applies a negative screen for egregious practices (e.g., child labor) and then applies a positive impact screen that enables Root to invest in enterprises that are higher risk, more challenging and highly additional and balance those investments with more stable and profitable loans.

Balancing risk and impact in a portfolio

Root Capital has been a pioneer in developing quantitative impact due diligence tools and facilitating investors' movement towards integrating impact into financial decision making. As part of its loan due diligence process, Root Capital compares each loan's prospective social and environmental impact to its risk-adjusted, expected financial returns to ensure that the portfolio effectively balances financial return and expected impact. Root Capital uses this method to improve their decisions around capital allocation and portfolio goal setting (McCreless, 2017; Impact Frontiers Collaboration, 2020).

Analysis

We found that the language of the TCA tool does not always resonate with the investors and entrepreneurs whom we interviewed. In particular, many

Table 15.1 Comparison of Four Capitals Across Different Enterprises

	<i>Natural Capital</i>	<i>Human Capital</i>	<i>Social Capital</i>	<i>Produced Capital</i>
Sistema Bio	Greenhouse gas emissions, food waste, biodiversity loss, provisioning (bio-inputs), soil enhancement	Farmer income and knowledge	Community wellbeing	Units produced, repayments, synthetic inputs
COMACO	Biodiversity loss, nutrient cycling/soil enhancement practices	Farmer well-being, farmer health/consumer health	Food security, social cooperation/cooperatives, collective values	Crop productivity, income, marketing
Root Capital	Provisioning (bio-inputs), soil quality, water quality, ecosystem services	Worker well-being, working conditions	Collective knowledge, training, supply chain relationships	Income, market access, financial infrastructure

This table provides a summary of these three entities' impacts in the four Capitals: Natural, Human, Social, and Produced. As the table shows, the use of the four Capitals enables comparison of their relative strengths as an enterprise or fund.

organizations are working to improve the lives of farmers, their families, and their communities, including their health and well-being. The use of “worker” as the sole term to describe impacts within Human Capital limits the way investors and entrepreneurs understand who is engaged in the “work.” Also, the limited exploration of health outcomes such as nutrient density as a result of enhanced soil health, biodiverse local diets, or culturally relevant diets that reflect local practices in the Human and Social Capital section misses key outcomes.

Although the three examples—and many social enterprises—score in all four Capitals, the interactions among the four Capitals differ significantly in local, regional, and global food systems contexts. The TCA tools provide a starting point to explore the interrelationships between impacts in the four Capitals, but should be expanded to more deeply consider systems-level outcomes.

Systems transformation requires important—and difficult—work to strengthen Social Capital. We found that the current Rapid Assessment, while it incorporates questions related to social networks, shared norms, and collective knowledge and values, offers a limited view of Social Capital. For instance, it does not capture important and complex power dynamics between people, within and among communities, and between people and institutions. Finding opportunities for transformative change in local economics and social relationships is part of the genius of these enterprises and funds. These opportunities spring from a complex mix of social knowledge, innovative approaches, the creation or enhancement of markets, creative finance, and other factors which result from strong place-based knowledge, mutual respect, and community relationships.

Understanding the impacts and outcomes of enterprises and investment funds on complex systems requires consideration across Capitals, including the interrelationships, interactions, and trade-offs across the Capitals. Future versions of the Rapid Assessment tools should create opportunities to explore potential and real transformational effects of investments in the food and agricultural sectors.

Synthesis

The TIFS initiative is developing practical tools that inform investment decisions by holistically considering the human, social, and environmental impacts of enterprises. In writing this chapter, we wanted to test how the TCA tool had additive value for investors and entrepreneurs working to transform food systems. As described above, the cases illustrate how they have combined diverse sources of capital to meet their missions and tailored ways of measuring their outcomes that traverse the four capitals in the model. Our early analysis reveals a mixed outcome for the true cost accounting framework underlying our Assessment tools. In order for the TCA tool to be more relevant for those in the investing and social entrepreneur community interested in transforming food systems, we will need to modify the TCA tool beyond its current form. Below, we outline three high-level considerations for continuing our work with the tools to make it more effectively benefit investors and entrepreneurs seeking systems transformation.

Comprehensive and Standard Frameworks Enable Insights: As demonstrated by the cases, the four Capitals framework enables a comprehensive look at

how an enterprise or a fund incorporates each element: Natural, Human, Social, and Produced. Often, when enterprises or funds present themselves, they focus on one or two capitals without acknowledging the relevance of or their impact in the other areas. All of the interviewees noted that the four Capitals approach enabled them to be more inclusive in their self-assessment inventory. Several scored well on multiple dimensions of the four Capitals providing yet another point of comparison. For this reason, the TCA framework helps to build the case for both a comprehensive and a standardized framework that incorporates all four Capitals.

Discrete Metrics Downplay Holistic Analysis: Evaluating the four Capitals through a series of discrete metrics, by necessity, requires the simplification of complex relationships and feedback loops between factors that enable a social enterprise or investment to return value to the community and/or farmer. Our Rapid Assessment adaptation did not examine the interrelationships between catalytic elements in the cases, hiding a critical dimension of the analysis. In each of the cases, the enterprise/fund worked hard to incorporate elements within Produced and Social capital that would enable increases in the Natural and Human capital elements. Holistic analysis pays attention to the whole picture including the interrelationships and feedback loops between the four Capitals.

Transformational Nature of Enterprise/Fund: One of the key reasons for the creation of the TCA framework's four Capital approach is to highlight the extractive nature of an economic system that primarily values only Produced Capital. For enterprises and funds, this remains a critical challenge as they are attempting to create increases within the four Capitals while also being financially positive in contexts of historic and ongoing extraction of people, cultures, and nature, in areas of limited infrastructure, and ongoing political and economic power asymmetries. All of the cases add value through training, infrastructure, knowledge exchange, and engaging with farming communities, each of which requires time, new relationships, and investment—yet another hurdle for profitability. The cases remind us that food system transformation requires asking the uncomfortable question of: how should the profits from enterprises be distributed, and to whom? The TCA framework points to these issues and—with necessary improvements—can inform the development of tools that help investors, fund managers, entrepreneurs, and communities to give equal consideration to the four Capitals.

Conclusion

Frameworks like True Cost Accounting start to make concrete the mantra “what gets measured gets managed” to include non-financial attributes that do not yet have standardized and accepted measurements for return. In the future, tools such as integrated profit and loss statements can create standard approaches to measure companies' performance across the four Capitals. For examples of frameworks for integrated profit and loss statements, see Harvard University Impact Weighted Accounts Project (Harvard Business School, n.d.) and the Impact Institute (Impact Institute, n.d.). This is slow and deliberate work that requires different voices and competing interests to work together. However, investors and entrepreneurs need better tools now to make informed decisions and are not waiting for new

accounting agreements. They need and want systems-based tools that inform them about how to place investments and demonstrate the value of their businesses that simultaneously address multiple outcomes and drive towards the transformation required for our food system to meet the synergistic needs of humans and the environment.

The TIFS Community understands the urgency of this work and is organizing partners to develop tools, information, and strategies to address the needs of investors and entrepreneurs to track the systemic and transformational outcomes of their work and the types of financing required for such change.

We offer our tools, community, and values in an effort to influence and persuade the broader field of impact investing to envision the real costs of finance and what it will take to change how those decisions are made. By engaging with investors and entrepreneurs who are making hard choices, doing the real work, and being innovative, we believe that our collective actions can influence capital flows toward those that are truly transforming food systems.

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Section 6

To the Table

Everyone eats, and there is tremendous power in the choices made by consumers. The three chapters in this section offer perspectives on mobilizing consumer knowledge and power as an important part of food systems transformation. How can True Cost Accounting (TCA) help consumers to make different choices? The authors in this section address three thorny issues in food systems: comparing foods created through different production practices; giving fair value to labor; and setting true prices.

In Chapter 16, Kathleen Merrigan uses TCA as an assessment framework to ask questions about new ways of producing meat and meat alternatives. If we are to meet our climate targets, then we need to eat less and better meat. But what does that mean in a practical sense, and how do we evaluate alternatives? Merrigan demonstrates how a TCA assessment can help us to ask new questions and balance key considerations. Here, TCA and the four capitals are used as a guide to thinking systemically and in an integrated way. For the issue of meat alternatives, Merrigan raises important questions about the ecological impacts of different meat production practices (not all are the same) and alternative meat products, their ingredients and health impacts, as well as impacts on livelihoods, bringing nuance to these debates.

Except for Chapter 5 (The Hidden Costs of Industrial Food Systems), there are very few contributions to this volume that address food sector labor, despite its global significance; this is a gap that needs filling. The SARS-Coronavirus-2 disease (COVID-19) pandemic has exposed the incredible precariousness of labor across the food system—from field to factory to table—and in Chapter 17 Saru Jayaraman and Julia Sebastian delve into the “true costs” of labor in restaurants in the USA. This chapter connects the historical legacy of slavery to low-wage work service sector work for workers of color and women in the food system. This structural racism and the associated structural inequities have been laid bare by the pandemic, resulting in skyrocketing unemployment rates and food insecurity. Although the authors focus on the true cost of dining out in restaurants, these structural inequities are worth examining across the food system.

Adrian de Groot Ruiz tells the story of the True Price Store in Amsterdam in Chapter 18. In the store, consumers are asked to reflect on the true price of

common products like coffee, milk, apples, and chocolate. Are you willing to pay the true price and/or make a more sustainable choice? What happens when this information is laid bare for consumers? De Groot Ruiz leaves us with four calls to action: transparency (about the true price); transformation (changing production practices to reduce negative impacts); transaction (remediate external costs); and taxation (making sustainable products less expensive by taxing negative externalities).

These chapters speak to the potential of mobilizing consumers in a movement for true cost and true price. When considered together in this section, (“To the Table”), we see the potential for engaging consumers in important discussions about the true costs of their food choices, for building power across and between workers and eaters, and increasing awareness of citizens to demand change across our food systems.

16 Trade-Offs

Comparing Meat and the Alternatives

Kathleen A. Merrigan

In 2019 Impossible Foods won a United Nations Global Climate Action Award for production of a plant-based “climate-positive burger” (United Nations Framework Convention on Climate Change, 2019).

The Rise of Faux Meat

The case “against” animal meat is compelling. Overconsumption has been connected to heart disease, cancer, and obesity, among other health concerns. Several countries issue dietary guidance that advises reduced meat consumption, particularly red meat, with the Netherlands going so far as to advise its citizens to limit meat consumption to 500 grams per week, of which no more than 300 grams should be red meat (Kromhout *et al.*, 2016). Just as the human health implications of eating beef, pork, and chicken vary, so too do the implications of various production regimes that produce those foods. For example, a grass-fed beef operation produces, on a per cow basis, far less methane than a grain-fed beef operation; use of antibiotics varies by species (e.g., in the USA in 2018, 42% of medically important antibiotics were used in cattle, 39% in swine, and 4% in chicken) (US Food and Drug Administration Center for Veterinary Medicine, 2019). Despite many real differences that exist, altogether global meat consumption and production add up to alarming impacts on human and planetary health. And as bad as things are, they are projected to get worse. The dietary transition now underway, brought on by rising Gross Domestic Product and urbanization, is expected to result in increased global meat consumption and a corresponding 80% increase of greenhouse gas (GHG) emission from animal agriculture by 2050, among other life threatening impacts (Tilman and Clark, 2014). Given the valid concerns about meat, it is not surprising to see emergence of faux meat which expands choices for vegetarians/vegans and provides options for meat eaters.

What is Faux Meat?

The term “faux meat” describes a category of products that range from plant-based and other non-meat alternatives to laboratory produced cellular meat and is a logical extension of the historical usage of “faux fur” and “faux leather,”

both terms describing non-animal-based alternatives that came into vogue in response to consumer demand.

Start-up companies are introducing a range of faux meat products that are gaining market traction in the USA, Europe, Australia, New Zealand, Canada, Israel, and increasingly in Russia and China. While this trend has not significantly impacted overall meat consumption in the developed countries where they are sold (e.g., per capita meat consumption in the USA in 2018 was 221.1 lbs.)—an increase for the fifth year in a row—and was projected to rise to 222.6 lbs. in 2020 prior to the coronavirus disease (COVID-19) pandemic (Food and Agricultural Policy Research Institution, 2020)—consumer interest in faux meat is growing. So too is the range of product offerings. To provide a glimpse of this emerging market, this chapter considers the spectrum of faux meat burgers that range from traditional plant-based burgers (e.g., Beyond Meat) to those genetically engineered to mimic the taste of meat (e.g., Impossible Foods) to cellular options not yet commercially available (e.g., Memphis Meats).

We begin with a brief description of faux meat burgers by category. Plant-based faux meat burgers have been in the market for many years, and the ingredients vary. Plant-based burgers have mostly been made of soy, with several companies choosing to use and label products as made from non-genetically modified organism (GMO) soy protein. In addition, wheat, chickpeas, black beans, mushroom, and pea protein are commonly used, as are, to a lesser extent, jackfruit, oats, algae, and seaweed. As a highly processed food, the plant-based Beyond Meat burger has a total of 18 ingredients, including 380 mg of sodium.

A more recent development is using genetic engineering to create a heme-enriched faux meat as represented by the Impossible Burger, a first in class product with significant intellectual property behind its processes. (As mentioned, it was recognized by the United Nations with a Global Climate Action Award). The Impossible Burger is a highly processed food with a total of 17 ingredients, including 370 mg of sodium. The distinguishing attribute in this category of faux meat is the introduction of heme—the molecule that gives blood its red color and which is abundant in animal muscle, creating the taste that we associate with meat. Heme also exists in plants, particularly legumes. Impossible Foods has succeeded in deriving heme from leghemoglobin—the protein found in nodules attached to the roots of soybeans which is extracted through a process using genetically engineered yeast.

Cellular meat (also known as clean meat, in vitro meat, lab-grown meat, or cultured meat) is still under development, although cell cultures have been used for a long time to produce food enzymes (e.g., microbial rennet for cheese-making), food ingredients (e.g., monosodium glutamate [MSG]), vitamins (e.g., B12) as well as flavors and fermented foods and beverages (Stephens *et al.*, 2018). The first lab-grown burger was developed in the Netherlands in 2013, at a cost of €220,000; in the USA, Memphis Meats, founded in 2015, has attracted significant venture capital and is finding ways to reduce the cost of producing cellular meat, but it is far from commercially viable. The high cost mostly stems from the use of fetal bovine serum (FBS) which is extracted from cow fetuses and then mixed with growth-inducing proteins, with companies

keeping the exact composition of their serum processes secret (Reynolds, 2018). Companies are racing to find ways to forgo use of FBS; Just Inc. has developed a method to grow cultured chicken meat without FBS, but there are no announcements yet about red meat. Because it is extremely difficult to develop cellular meat that mimics complex muscle meat, like steak, expectations are that the first commercialized products will be meat fillers/ingredients and likely burgers. An interesting twist may be 3D food printing: cultured cells (along with added flavor, vitamins, and iron) are the ingredients and a 3D printing technology merges fat and tissue to produce a cut of meat that mimics what consumers see in grocery stores. In 2018 Novameat succeeded in printing an entirely plant-based steak through this method (Shieber, 2019).

Together with start-ups, big business is engaged across the spectrum of faux meat innovation. The venture arm of the iconic chicken giant, Tyson Foods, has invested in Beyond Meat, Memphis Meats, and Future Meat Technologies. According to CB Insights, Tyson is looking to pivot from being solely a meat producer to also having plant protein brands (CB Insights, 2020). Cargill has invested in Memphis Meats. Fast food giants Burger King and White Castle are serving the Impossible Burger; McDonald's is testing Beyond Meat burgers in Canada and Nestlé's Awesome Burger in Germany; Unilever has acquired the Vegetarian Butcher; Starbucks has added meat alternatives to its breakfast menu; and Sysco Corp is introducing the soy based Simply Burger.

The US Plant Based Food Association (a trade group representing nearly 200 plant-based food companies) estimates that the US plant-based meat category in 2019 was worth \$939+ million, with 2019 sales up by 18% overall, and the driver for this market—refrigerated plant-based meat—was up by 63% (Plant Based Foods Association, 2020). This is compared with a 2.7% growth rate in the conventional meat category during the same period (Plant Based Foods Association, 2020). Overall, the association claims that in 2019 plant-based meat accounts for 2% of retail packaged meat sales in the USA. The faux meat trend is also reaching into Asia. In 2017 China announced a \$300 million deal to import cellular lab-grown meat from three Israeli-based companies as part of a larger plan to decrease the country's meat consumption by 50% (CB Insights, 2020).

Exploring the True Cost of Faux Meat

Comparing “real” meat with faux meat is complicated (Santo et al., 2020; Ritchie et al., 2018, Smetana et al., 2015). First, the faux meat industry is nascent, with much room for innovation, so today's analysis of the subsector might not prove true tomorrow. For example, pea protein costs are high because once the protein is extracted, there is significant unused byproduct, but this could change. Second, the wide range of current livestock practices means that there is a corresponding wide range of true costs for the various kinds of operations. For example, we can expect the true cost of a rotational grazing beef operation to vary considerably from a beef confined animal feeding operation (CAFO). Third, while animal agriculture is not new, it too is innovating. The potential to feed cattle seaweed (to reduce methane

emissions) and insects (to replace forages grown with pesticides) are just two examples under development. Undertaking a full True Cost Accounting (TCA) of faux meat is beyond the scope of this chapter, as such an effort will require transdisciplinary teams tackling time-consuming and complicated research that pairs and analyzes specific faux meat products and production processes to various kinds of meat products and production regimes. But it should be done, and there are clear advantages to doing so now before the faux meat industry takes hold, for better or worse.

This chapter is intended to illuminate the potential impacts of a shift, of any magnitude, from animal agriculture to faux meat production and consumption. To simplify potential considerations and identify, at a very high level, major issues for consideration by the four capitals, the following discussion focuses on beef and faux meat substitutes for beef. Similarly, comparisons could be made between livestock and faux chicken, faux pork, and faux seafood, all of which are either on the market or expected soon.

Natural Capital

The 2019 International Panel on Climate Change (IPCC) Special Report attributes 21–37% of total GHG emission to the overall food system (International Panel on Climate Change, 2019), with greater precision in the attribution to crop and livestock production, estimated as 9–14% within the overall food system total (Mbow *et al.*, 2019). Methane from ruminants is of greatest concern, and for this reason, beef and dairy CAFO operations have an especially high contribution. As stated above, there is a need to differentiate costs between the dominant production method of feedlots with various kinds of grass-fed operations, as GHG impacts will vary. A report by the Land Stewardship Project finds that shifting 25% of ruminants to well-managed grazing operations and 25% of cropland to perennial cover, diverse rotations, and cover crops could offset US GHG emissions by as much as 9% (Boody, 2020).

There is an absence of serious critique of plant-based burger ingredients. For crops used in plant-based meat as well as cattle feed, common use of pesticides and nitrogen fertilizers, and their resulting pollution, must be factored in. It has been suggested that fertilizer that is used to support grain-fed animal agriculture generates nearly twice as much nitrous oxide for crops destined for direct human consumption owing to the double whammy of crop fertilization for animal feed and disposal of manure in concentrated livestock operations (Davidson, 2009).

Land use is a consideration for both faux meat and beef, and in some cases, the impact could be related, as much of cropland used to produce cattle feed is also used to produce the crops that become core ingredients in plant-based meat. Cellular meat does not require significant land, and as a result, it might be possible to repurpose land that is currently in production or let it lie fallow if cellular products become a significant source of protein. Yet 40% of global terrestrial land, because of lack of moisture, steepness, and/or heat, is best suited for animals that convert plant materials indigestible for humans into meat.

Water use is a factor in faux meat and beef. As with energy, embedded water needs to be assessed for each ingredient in faux meat and compared with embedded energy and water in beef produced in various production systems.

Produced Capital

Soil health promotion to sequester carbon is widely discussed as a potential strategy to combat climate change and reward farmers for environmental stewardship. For example, practices such as crop rotation, cover cropping, and adaptive paddock management contribute to healthier soils. A 2018 National Academy of Sciences report (The National Academies of Sciences Engineering Medicine, 2019) suggests the potential to remove 250 million metric tons of carbon dioxide per year in the USA alone. Researchers are devising methodologies to measure soil carbon while policy designers and farm advocates are debating market mechanisms to reward ecosystem services to financially reward regenerative agriculture. US-based Indigo Ag is signing up farmers to sell carbon credits; The Nature Conservancy raised \$20 million to set up a carbon marketplace. The production of soil carbon and related financial rewards may variously apply to plant-based and heme-infused faux meat (depending on cropping practices) as well as animals produced in regenerative systems.

Profits will be had by companies and shareholders of successful faux meat companies. However, faux meat products currently sell at a significantly higher retail price on a per-pound basis than beef and might be out of reach for many consumers in developed countries and out of sight in developing nations. Looking way into the future, if we consider the cost of faux meat made from cereal crops, such comparisons could shift: the IPCC projects that, based on several models, cereal prices could increase from between 1–29% in 2050 owing to climate change, which could greatly impact the cost.

Energy needs to produce cellular meat are huge—well beyond any other faux meats or beef production. This is even true when considering the embedded energy in feedstuffs for cattle, with the typical conversion rate of six pounds of grain to produce one pound of meat gain. Methane digesters are used by some livestock producers to dispose manure, capture methane, and sell energy to the electrical grid and/or power their operations.

Human Capital

Health factors must be evaluated. Consumption of faux “red” meat is generally comparable to beef in terms of calories and saturated fat, although it is somewhat higher in carbohydrates. While faux meat lacks many vitamins and minerals found in beef, because it is processed, many of these missing components can be, and are, added as ingredients. A significant health concern is sodium, with significantly higher sodium levels across the entire faux meat category compared with real meat with no sodium other than what might be added in cooking. As for beef, the biggest health concern comes from eating it

raw or undercooked, risking exposure to *E. Coli*, which makes people sick and, in worst cases, causes death. Of course, overconsumption of both faux meat and beef lead to other health impacts. In terms of production, faux meat does not entail the use of hormones and/or antibiotics (with the possible secondary impact on cow fetuses). Much of faux meat is made from row crops (e. g., soy, wheat), meaning that core ingredients are typically grown with synthetic pesticides and fertilizers (as pointed out in the Natural Capitals subsection above), which can end up in food and water and can have negative health impacts on the farm and beyond. Growing animal feed could cause similar negative impacts (e.g., corn, sorghum, alfalfa). Notably, GMO corn and soybeans are produced using glyphosate, classified by the World Health Organization as “probably carcinogenic to humans” (World Health Organization International Agency of Research on Cancer, 2017) and the subject of legal suits brought by pesticide applicators suffering from Non-Hodgkin Lymphoma disease (Baum Hedlund Aristei Goldman, 2020).

Employment shifts are likely if the faux meat market continues to grow. Smaller livestock operations are vulnerable and likely to shut down in declining markets (as seen in US dairy, which has lost market share to faux milk products (Sitzer, 2019)) and market consolidation is often accompanied by CAFO expansion and decreased competition. We can expect faux meat companies to be geographically concentrated, likely in peri-urban areas. This could contribute to the problem of declining opportunities in rural places and, certainly, a decline in the quality of life among independent farmers and ranchers, even if they are able to find jobs “in town.” Faux meat production will likely require employees with different skills (e. g., molecular engineering), and in some cases, these jobs might pay higher wages than farm and ranch work. Finally, and ironically, a shift to faux meat production could be viewed as a shift from farm to factory in the face of social push-back against factory farming.

Social Capital

Animal welfare is dramatically different between meat and faux meat. Although there is a wide range of livestock practices related to animal welfare, with some operations achieving recognition for humane care, some consumers nonetheless reject outright all livestock reared for human consumption. For such consumers, and in the many cases of operations that compromise animal welfare, plant-based and heme-infused faux meat is clearly superior. However, with the use of FBS, cellular meat remains tethered to traditional livestock systems with its reliance on extraction of bovine fetuses and, as such, will not satisfy all consumers.

Quality of religious life could be a factor. Kosher and Halal dietary law dictate animal slaughter requirements together with other rules related to what animals can be consumed and when. Most plant-based meat is consistent with Kosher and Halal rules, and the Impossible Burger has been certified as Kosher and Halal (Impossible Foods, n.d.). However, faux meat, particularly cellular forms, is challenging old frameworks, leaving religious leaders pondering how these new

technologies fit. Could there be a future for Kosher pork and shrimp? There is a possibility that faux meats could enhance food options for certain religious groups.

Governance of faux meat is murky. In the USA, for example, the meat industry is lobbying state legislatures to secure laws that prevent the term “meat” from appearing on faux meat labels. At the federal level, oversight of faux meat is shared by the US Food and Drug Administration and United States Department of Agriculture, with leaders of both institutions side-stepping contentious debates, creating regulatory uncertainty. To the extent that faux meat involves genetic manipulation of any sort, it is unclear whether and how such products would fit into regulatory frameworks for biotechnology across the globe. As the faux meat industry grows, it is reasonable to expect friction over governance within countries and between countries, with potential trade conflict emerging from different approaches to these novel products. This is not to suggest that the livestock sector is exempt from governance concerns (e.g., the years of wrangling in the CODEX Alimentarius Commission over use of ractopamine hydrochloride as an animal growth promoter (Farm and Dairy, 2012)), but the pathways for resolving issues is far clearer.

There are many associations—local, national, and international—that engage farmers and ranchers, providing them support and a sense of community and identity. Farm and ranch life can be isolating, particularly in remote areas, and associations and networks, together with related social activities (e.g., rodeos, livestock auctions) are critical to wellbeing and, often, business success. It is unlikely that such networks and associations will play a similarly significant role in the emerging faux meat industry, which will likely be concentrated in business centers and not contribute substantially to the quality of rural life.

Conclusion

While faux meat is an interesting development and holds promise, it is premature for faux meat champions to declare a sustainability victory. While not possible in this brief chapter, to ultimately declare which product(s) or category of “meat” is best, the goal has been to surface the kinds of questions that TCA would necessarily address and to build support for the kinds of analysis that provide data-infused insights currently absent from decision-making processes. Furthermore, this discussion has been focused on the developed world. A parallel discussion is necessary to consider the two-thirds of rural households globally, many of them poor and food insecure, whose well-being relies on livestock. It is time to apply TCA methodology to faux meat innovations to determine their true cost at a global scale across the four capitals, as identified by the TEEBAgriFood framework.

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17 Dining Out

The True Cost of Poor Wages

Saru Jayaraman and Julia Sebastian

Introduction and Background

One of the greatest misunderstood “true costs” of meals in restaurants is labor. This is largely because the service sector is one of few industries in which the majority of the labor cost is not reflected in the meal, but instead paid in tips. For an industry that is disproportionately composed of low wage workers, workers of color and women, the coronavirus disease (COVID-19) crisis and national uprising for racial justice has exposed the untenability of this system of compensation and, in general, the deep structural inequities of the service sector. Although the COVID-19 pandemic has created an acute reality of economic peril for restaurant workers, the current situation is simply a heightened reflection of the precarities that perpetually underlie the restaurant industry. Although this chapter shines a light on the situation facing US restaurant workers during the pandemic of 2020, it also points toward how ill-prepared the industry is to provide for the basic necessities of its workers in times of economic crisis.

Prior to the pandemic, there were more than 13 million restaurant workers and nearly 6 million tipped workers across the USA, including restaurant (who account for over 80% of tipped workers), car wash, nail salon, tech platform delivery, and other workers, according to the Bureau of Labor Statistics in 2019. The National Restaurant Association had long argued that, given customer tips, businesses should be able to pay their tipped employees a subminimum wage, today just \$2.13 an hour federally. A legacy of slavery, the subminimum wage for tipped workers today is also a gender equity issue. 70% of tipped workers are women, disproportionately women of color, who work in nail and hair salons and casual restaurants like IHOP and Denny’s, live in poverty at three times the rate of the rest of the US workforce, and suffer from the worst sexual harassment of any industry because they are forced to tolerate inappropriate customer behavior in order to feed their families in tips (“Tipped Over the Edge”, 2012). On top of this, research shows that workers of color earn less in tips than their white counterparts due to pervasive racial bias (Lynn *et al.*, 2008). Indeed, the voluntary nature of tips means that the true cost of labor is neither reflected in worker’s wage nor in the cost of the meal, but rather is paid based on the whims and biases of customers.

Seven states—California, Oregon, Washington, Arkansas, Minnesota, Nevada, and Montana—have rejected this legacy of slavery and instead pay One Fair Wage: a full minimum wage with tips on top. According to a National Restaurant Association industry report, these states have comparable or higher restaurant sales per capita, job growth among tipped workers and the restaurant industry overall, and tipping averages than the 43 states with lower wages for tipped workers. They also claim half the rate of sexual harassment in the restaurant industry (“The Glass Floor”, 2014).

The pandemic-induced economic collapse has affected few other industries more deeply than restaurants and food service. As mayors and governors across the country ordered shutdowns, and customers ceased dining out, restaurant owners shuttered their doors, and workers scrambled to join digital unemployment lines. Emerging national surveys of the restaurant sector show that four out of ten restaurants have closed their business, and the industry is predicting over \$240 billion in financial losses (“Industry Research”, 2020). By May 2020 the Bureau of Labor’s State Occupational Employment and Wage Estimates reported nearly 6 million lost jobs across all food services and drinking places. According to the US Private Sector Jobs Quality Index, however, nearly 10 million low wage jobs in the restaurant and bar industries are at risk due to the COVID-19 fall-out (“Statement from JQI”, 2020). Furthermore, it is workers of color and women, who disproportionately comprise the sector, who have been most acutely affected. The national unemployment rate for Black workers had risen to 16.7% from the outbreak, compared with 14.2% for white workers, according to the Bureau of Labor Statistics Current Population Survey. When we consider the impact on Black women particularly, the unemployment rate rises to 16.9% compared with only 12.8% for white men. Latina women, however, experienced the highest rate of unemployment, as nearly one in five are out of work (Gould, 2020).

It is the subminimum wage for tipped workers that has exacerbated the sheer destitution facing the millions of tipped workers who have lost their jobs during the COVID-19 crisis. During this unprecedented economic cliff, with unemployment rates surpassing those during the Great Depression, analysis conducted by the civil society organization One Fair Wage (founded by the author) shows that, on average, states are rejecting 44% of unemployment claims (“Locked out by Low Wages,” 2020). However, surveys of tipped workers from this same research reveals that this statistic is closer to 60% for tipped service workers. This higher denial rate is in large part because workers are being told that their subminimum wage plus tips is too little to meet minimum income thresholds to qualify for benefits. In other words, these workers are being penalized because their employers paid them too little. Even among those who are eligible, unemployment insurance is being calculated based on the subminimum wage plus tips, and generally, this is an under-evaluation of their tips.

Interviews with workers across the country are exposing the unjust intersection of subminimum wages, tipping, and the unemployment system. Charles

Almanza, a New York bartender and son of Nicaraguan immigrants, exemplifies the cruelty of getting caught in the unjust cross hairs of failed public policy. After the sudden closures of restaurants and nightclubs in New York, Charles filed for unemployment, only to discover that his W2 form stated that he had made only \$5,000 over the seven months that he worked for his previous employer. Even though Charles knew his pay checks excluded any base wage, instead forcing him to live entirely off of tips (a common situation in states like New York where employer wages are negligible compared with tips) Charles did not know that his boss was also underreporting his tips. As a consequence, after six weeks of waiting for his unemployment check, it amounted to less than \$300 a week. Charles's story is but one in a sea of emerging workers whose experiences have mobilized them to demand a more fair and dignified wage system. Millions of workers find themselves now unable to pay for rent, food for their children, or other bills. In fact, findings from One Fair Wage's research shows that 89% of nationally surveyed tipped workers report that they are either unable or unsure whether they can afford to make their rent or mortgage payment during this time. On top of this, 79% of surveyed service workers report being able to afford groceries for only up to two weeks or less. And now at a time when their family is most at risk, hundreds of thousands of tipped workers are being asked to return to work for the tipped workers' subminimum wage at a time when tips have dramatically declined—according to some employers, by as much as 75%.

Years of research demonstrating that workers of color earn less in tips owing to customer bias has now become painfully clear on a larger structural level—workers of color are disproportionately being denied unemployment insurance because they are more likely than white workers to have worked in casual restaurants where they received their tips in cash, and state unemployment insurance systems are automatically denying these workers because their incomes appear to be too low to meet the minimum threshold to qualify.

With tips drying up, workers are demanding a labor model in which the value of their labor is reflected in their wage, which would require employers and consumers to consider food service workers' labor like those of those of other workers—as part of the cost of the product, not as a separate, voluntary donation made by consumers.

Prior Initiatives for Change

Prior to the pandemic, a set of leading employers had worked voluntarily to move to One Fair Wage despite the fact that their state did not require it. These employers transitioned to a One Fair Wage compensation model through one of three ways.

First, these employers instituted a full minimum wage with tips on top and then shared tips among all non-management employees in the restaurant, allowing for a more equitable balance between back of house and front of house employees. Paying employees the full state minimum allows restaurant

owners to redistribute tips both to kitchen and front of house staff even if the kitchen does not have direct contact with the customer. This model is contrary to one in which tipped workers receive a subminimum wage and thus legally must retain all tips in order to offset their low wages. In 2018 we worked with United States Congress Members to pass a rider to the Congressional budget bill that allowed employers who pay the full minimum wage to all workers the opportunity to permit tips to be shared among kitchen staff as well. Tip sharing with dining room staff has been customary in the seven One Fair Wage states for decades; the practice creates greater equity and unity between kitchen and dining staff and allows for cross-training between positions, allowing greater flexibility for the owner and mobility for workers.

A second initiative pursued by employers has been to move to a full minimum wage with additional income in the form of a service charge, which is also shared among all non-management employees. Finally, the third pathway involved employers moving to an entirely gratuity-free model, incorporating all tips and gratuities into workers' wages and thus into the cost of the meal.

Several employers who have implemented or contemplated these changes have found that, in many cases, by incorporating the true cost of food service labor into the cost of a meal, consumers have opted to dine at another restaurant that continues with the subminimum wage labor model. Especially for restaurants that chose a gratuity free model and thus the highest menu prices, they found that consumers could not understand that the labor cost typically paid out as a tip was now being incorporated into the actual menu and was thus costing the consumer the same overall amount. The fact that other restaurants were not incorporating the true cost of the labor into the cost of the meal meant unfair competition. This occurs, of course, in the context where consumers remain undereducated about the true cost of labor and tipping, as well as the negative externalities of a subminimum wage model that is a legacy of slavery and a source of discrimination and harassment for millions of workers of color and women nationwide.

One of the major challenges has been demonstrating to employers a change in consumer understanding and increased consumer support for employers willing to change their practices. It has thus been historically challenging to convince more employers to move away from the subminimum wage for tipped workers without being able to demonstrate a change in consumer understanding.

The Pandemic as a Portal for Change

Now with the COVID-19 pandemic and uprisings for racial justice, there is an opportunity for workers and employers to transform their industry so that labor costs are better incorporated into the cost of a meal, and so that consumers are informed and willing to pay the true cost of food service labor. The moment has provided opportunities to pilot new solutions which have shown that we

can simultaneously support workers and ensure that responsible restaurant owners who care about their workers survive the crisis—and thus reshape the service sector, going forward. Significant economic and cultural shifts have brought a new set of restaurant owners who previously opposed or were hesitant about One Fair Wage forward, who are now showing willingness to commit to One Fair Wage and increased equity. For some, their eyes have been opened to the unsustainability of the system; for others, the moment has allowed them to break free from the confines of an old business model. Some are even working with us to design model restaurants.

Dan Simons, co-owner of the Farmers Restaurant Group, has seized upon the unimaginable shifts in the restaurant industry to work with One Fair Wage and its network of restaurants who lead in ethical labor practices.

Box 17.1

Before COVID-19, tipped employees at all nine full-service Founding Farmers' restaurant locations (based in Washington DC, Maryland, Virginia, and Pennsylvania) had been paid the subminimum wage for tipped workers in their state. However, the pandemic forced Simons to close dine-in service at all locations, resulting in the layoff of nearly 1,100 workers. The closures spurred Simons to build out a new market and grocery business model in addition to the restaurant take-out business. To operate his new business, Simons decided to rehire employees at the full minimum in each state.

As employees' positions changed from server to curbside deliverer, busser to grocery bagger, everyone became unified into a single team, all paid the same base wage. Simons is using a contribution from consumers that is similar to a gratuity charge and sharing it among all non-management employees on top of a full minimum wage. As he moves toward a full re-opening, Simons is testing a model that would include the previous menu price and a detailed break-down of the how the service charge will be used to cover employees costs such as for personal protective equipment (PPE), health insurance premiums, and additional employee benefits and safety supplies to address pandemic safety protocols. As Simons explains, "It's about building new compensation structures and new business models for the world we are in. For example, of course we need to provide employees PPE while certainly not making it a cost to the employee. Perhaps we can include both a fixed service charge and fixed COVID charge, which allows you to use that money as the business needs to protect our employees." Simons knows that it is critical to educate customers about what portion of the additional charge is going to pay a full living wage, to provide PPE or going to pay employee health insurance. He wants his customers to know the true cost of a meal and support the societal benefits that it brings to the essential service workers who are feeding us in times of crisis.

In this time of political opening, One Fair Wage has also partnered with state and local legislators to innovate new solutions towards simultaneously meeting the needs of workers, employers, and consumers. Based on conversations with restaurant leaders like Simons and others, we have developed a partnership with New York City and California governments to launch High Road Kitchens—a program in which restaurants provide meals on a sliding scale to low-wage workers, health care workers, and first responders, while also receiving financial support towards restaurant workers and responsible restaurant owners. Participating restaurants voluntarily commit to move to One Fair Wage and institute greater race and gender equity policies and practices by next year. In exchange for joining High Road Kitchens, restaurants will receive public and private dollars to re-hire their workers and re-purpose themselves as community kitchens to provide free meals to those who need them. The program is now likely to be replicated in Massachusetts and Michigan. Such a program seeks to provide both relief to struggling independent restaurant owners, free meals to workers and others in need, and most importantly, re-shaping the sector toward equity.

In this time of reflection of the impact of the pandemic and its impact on restaurant workers, it may be possible to leverage moments in which the greater public is gaining awareness of the true value of the workers who feed us in order to push forward more sustainable and equitable business practices. There is a new understanding among consumers about the “essential” nature of these workers and the ways in which these workers’ health and well-being is directly connected to consumer health and well-being. Indeed, networks of restaurants around the country are beginning to coalesce to educate consumers about the dual benefits of consumer and worker health. Good Works Austin (GWA) provides one such example as a collaborative of around 30 restaurants in Austin, Texas that has collectively designed and committed to a series of protocols for how to safely and ethically reopen after COVID-19. Dedicated to worker and consumer health and safety, all restaurants that abide by these guidelines will receive promotional materials, as well as be a certified member of the GWA network. This project works both to provide consumers with a safe dining alternative while also educating them about the real need for worker health and safety.

As a result of the national uprisings for racial equity, there is also a new appreciation of the need to end historical legacies of slavery and address structural racism in every facet of American society, including in the ways in which workers are paid and treated. Restaurants around the country are newly reaching out to One Fair Wage’s Restaurants Advancing Industry Standards in Employment (RAISE) network to receive coaching on how to transition to more racially equitable models around wage compensation models, as well as recruitment, hiring and promotions. It is incumbent upon consumers to support this shift as restaurants restructure their menu pricing to reflect the real cost of producing a meal. There is thus a moment of opportunity to build upon that new consumer awareness to educate consumers and engage them in supporting restaurants that are committed to change.

The pandemic and the global reckoning with race is both the gravest crisis in the service sector's history in the U.S. and also the greatest moment for transformation – for building power among workers and change among employers toward a sustainable future of equity and collective prosperity in which everyone understands and appreciates that the true cost of dining out must include the value of the skilled labor that produces and serves our meals.

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18 True Price Store

Guiding Consumers

Adrian de Groot Ruiz

Introduction

Currently, the production of food almost unavoidably involves hidden true costs such as climate change, biodiversity loss, and poverty. A kilogram (kg) of cocoa beans from West Africa, for example, is responsible for about 5kg of CO₂-eq emissions. In addition, farmers would need to receive \$3.00 extra per kg of cocoa to earn a living income (True Price, 2018a).

Imagine a store where people can make choices to rectify such damage. In the True Price Store, one can pay to take out the CO₂ emissions and counteract poverty. If one enters the store, which is actually located in one of Amsterdam's main shopping streets, one sees a coffee corner where one can order drinks, as well as a pyramid of blue crates featuring a diverse range of products, such as cider from the organic fruit cooperative Fruitmotor. On Saturdays, one can buy fresh bread from Bakery Van Vessem, which optimizes its recipe to minimize its environmental damage. The windows show the best sellers: colorful chocolate bars of Tony's Chocolonely, one of the largest Dutch chocolate brands, which has been managing its true costs (with slave-free cocoa) since 2013.

If True Costs are a Problem, True Prices are a Solution

The True Price Store was founded on three insights. The first is that true costs are a major societal challenge. Owing to the external costs of global production and consumption, our economic system greatly damages the natural, social, and human capital that underpin society. Climate change is perhaps the best-known externality, which, in economic terms alone, could reduce global Gross Domestic Product by a quarter by the end of the century (Network for Greening the Financial System, 2020). However, there are many other serious externalities. On the environmental side, for example, about a million species are currently threatened with extinction (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, 2019). On the social side, a fifth of the global working population and their families are (extremely or "moderately") poor, and in Africa the majority of workers live in poverty

(International Labour Office, 2019). Our current global economy enslaves more people for the sake of food production than most would realize (Hodal, 2019).

The external costs of the food system are estimated in the order of \$12 trillion per year (Nature Editorial, 2019). Up to 37% of global greenhouse-gas emissions can be attributed to the food system (Science Advice for Policy by European Academies, 2020), a majority of the global working poor are employed in agriculture (World Bank, 2020a) and over 70% of children forced into child labor are linked to food production (International Labour Organization, 2017b). While 690 million people were undernourished in 2019 (Food and Agriculture Organization of the United Nations, 2020), excessive fat and salt content in food leads annually to 11 million deaths and 255 million healthy life years lost (Global Burden of Disease 2017 Diet Collaborators, 2017).

The second insight is that, if true costs are the problem, true prices could well be our best chance at a solution. An economy with external costs ignores and at times even rewards damage to society: products that externalize costs to others are on the whole more profitable to the producer and cheaper to the consumer. True prices are prices that reflect the true costs: if a product has a true price, then the external costs are transparent, paid for, and repaired. As a result, with true prices there is no unresolved damage to people or the planet. True prices additionally remove the perverse incentive that bad products are cheaper than good products.

In fact, if all products had a true price, the global economy would arguably be sustainable. If no product imposes harm on workers, consumers, or the environment, then nature, at the macro-level, is conserved, the climate does not warm up, human and labor rights are respected, and every worker earns enough to give her and her family a good life.

Mission Impossible?

This sounds too good to be true. If true prices would solve so many of the world's problems, why has nobody done this before? In fact, true pricing is a form of pricing externalities that economists have long understood to be the solution to internalizing externalities. A group of British economists—Pigou, Sigdwick, and Marshall—formulated the concept of externalities and proposed to price them through corrective “Pigovian” taxes, a century ago (Pigou, 1920; Laffont, 2008).

In practice, however, it has proven to be a mission impossible for economists and policymakers to systematically price the externalities of products. For starters, establishing what these prices should be has proven elusive, owing to the difficulty of establishing “what is true” and the complexity of computing externalities. This is compounded by the typical, political view that saw pricing externalities as a tax hike that consumers would not be willing to pay. As a result, pricing externalities has been, until recently, an economists’ pipe dream.

True Price

The organization True Price was founded in 2012 on the belief that social and technological innovation made possible what was impossible a century ago. Its vision is that true pricing is the way to realize a sustainable global economy and its mission is to make it happen.

An important aim of the organization is to establish a global standard to determine true prices and advocate for true pricing. In True Price's theory of change, the most effective way to get businesses and governments to adopt true pricing is to lead by example. True Price has thus been working with businesses in food and agriculture from the start. It also holds that consumers and citizens need to be involved. So, as soon as sufficient businesses were on board, in 2019 True Price opened a store to bring true pricing to the consumer.

The store is a true pricing microcosm. Consumers who visit can see the true prices of various food products and pay for them, whereas the businesses who place their products in the store actively work to minimize the external costs of their products.

Roadmap

The remainder of this chapter will focus on three questions. First, *what* exactly is a true price and true pricing? Second, *why* try to realize true pricing if it has never worked before? And, finally, *how* can true pricing be implemented in practice?

What is True Pricing?

What is a True Price?

The true price of a product is the market price plus the *true price gap*. The true price gap consists of external costs or, colloquially, "hidden costs." More precisely, the true price gap is defined as the costs to remediate the harm resulting from the externalities of production and consumption that breach basic rights.¹ The true price gap reflects the costs of the actions that need to be taken to restore these harms. In the case of CO₂ emissions, it reflects the costs to take CO₂ out of the air; or, in the case of child labor, the costs to provide missed education to children, offer required medical and psychological support, and compensate children for the injustice suffered.

The bar of pure chocolate that can be bought in the True Price Store has a market price of \$3.12. The true price gap is \$0.99. This includes environmental costs like carbon emissions, deforestation, and pollution, as well as social costs like underpayment of farmers, child labor, and forced labor. The true price is thus \$4.11.

It is important to note that one cannot realize a true price by just increasing the price. The extra money needs to be used to repair the damages done.

Hence, a product only has a true price if no external costs occur, or if all external costs are repaired.

What is True Pricing?

Next, what is *true pricing* in practice? Is it calculating true prices? Or taxing them? Or is it the ideal state where all products have a true price?

True Price defines true pricing as taking action to transition to a sustainable economy with true prices through *transparency* about true prices, *transformation* of products to prevent external costs, *transactions* to pay and remediate external costs, *taxation* of external costs, and *taking out* unacceptable external costs by prohibition. Hence, true pricing is something one can do, right now, and aims to solve the problem of an unsustainable economy.

Why Try?

When True Price was founded in 2012, there was little support for it among experts, who considered it to be a mission impossible. The perceived barriers can be summarized by three objections: i) it is impossible to establish what is “true;” ii) externalities cannot be calculated; and iii) people will not want to pay higher prices. We will discuss each challenge and explain how social and technological innovation has allowed them to be overcome.

What is True?

The first key challenge is a question posed by philosophers and consumers alike when they first hear about true pricing: “but what is true?” They wonder how social and environmental effects are monetizable and whether *all* things can be monetized, including child labor and biodiversity. And beyond that, how is it possible to come to a single price if people value things differently? They ask how to trace the infinite number of consequences of production, and whether monetizing harmful actions like slavery enables their commodification and justifies them through the profit, or pleasure, that they enable.

Economists have traditionally tackled the pricing of externalities through *shadow prices*. They assume that the perfect *shadow price* should take the form of a tax that factors in all positive and negative externalities, perfectly balances all (internal and external) costs and leads to a market equilibrium that benefits all parties. This has its origin in nineteenth-century (British) utilitarian and naturalistic conceptions of society, which still underpin neoclassical economics. In this paradigm, market outcomes are believed to represent an almost natural equilibrium of market forces that, ideally, should maximize the sum of the utility experienced by all individuals.

Calculating this perfect shadow price runs into all the aforementioned problems and has proven elusive for over a century. True Price found a solution:

find truth in the rights of people. A price is considered true if, in producing and consuming a product, all basic rights are respected.

This *rights-based approach* builds on the social innovation represented by the postwar consensus that the social order should be based on universal rights. After the Second World War, a global understanding that people have human rights grew. The United Nations subsequently began to recognize labor and environmental rights and the twenty-first century saw the recognition of the responsibility of market players to respect rights (United Nations, 2011). The set of universal rights is evolving, its interpretation varies per country, and adherence to them is highly imperfect. Still, universal rights have become a global consensus: all countries have come to adopt the Universal Declaration of Human Rights, just as all adopted the 2030 Agenda outlining the Sustainable Development Goals (United Nations General Assembly, 2015).

True Price argues that the implications of globally accepted rights and responsibilities are that, if market players cause negative externalities that breach a human right, they have the responsibility to remediate this harm. As a result, it is not necessary to measure all positive and negative externalities to calculate the true price. Nor does the true price gap reflect the intrinsic value of damages, such as child labor or climate change or an “exchange rate” to off-set these harms. Rather, the true price specifies what buyers ought to pay if they want to meet their responsibilities toward their fellow people in the marketplace.

Based on above principles, True Price developed a framework to establish true prices (True Price Foundation, 2020a). This framework has been successfully applied to calculate the true price of the food products found in the Store.

Too Complex to Compute and Account

The second barrier to establishing true prices is the theoretical complexity of computing externalities and accounting for them in practice. This has first been made possible by relatively recent theoretical advances in scientific fields such as environmental and ecological economics and environmental and social life cycle analysis, resulting in a new True Cost Accounting discipline. For example, a recent United Nations–The Economics of Ecosystems and Biodiversity study represented a milestone in the economic analysis of ecosystem services and biodiversity but only began in 2007.

Accounting for externalities in practice has been made possible by the recent information revolution. The cost of storing, communicating, and processing information has dramatically declined, unlocking data at an unprecedented rate. This makes it possible to gather, account, aggregate, and verify the necessary data. Whereas accounting for externalities is still immature, it was either impossible or prohibitively expensive just two decades ago.

At a modest scale, the businesses that provide products in the True Price are current examples of the possibility of computing and accounting true prices using the latest information.

Too Expensive

The final perceived barrier is that consumers and voters will be reluctant to support true pricing, as it increases their cost of living, albeit to the detriment of others, such as poor farmers or future generations.

In the end, this is an empirical question. The latest science suggests an increasing willingness on the part of consumers to participate in true cost purchasing. The selfishness of people is a fundamental tenet of classical economics, but based on armchair speculation. Actual research conducted by behavioral economists in this century suggests that the majority of individuals are willing to sacrifice material wealth for the sake of others, if others do so as well (Fehr and Fischbacher, 2003). Recent research suggests that 37%–54% of consumers are willing to pay more for sustainable food (PwC, 2019), for example. Anecdotal evidence from the True Price Store suggests that a majority of customers are willing to pay the true price, including the many unsuspecting customers—like tourists—who come to buy cool chocolate bars and have never heard of true prices.

Even if many people would not accept higher prices, this is not a show-stopper. A strong argument can be made that true prices can drop significantly. Preventing externalities is typically much cheaper than remediation. Currently, there is no pressure to reduce unknown true costs. True pricing would unleash the power of markets to decrease external costs by leveraging innovation, competition, and entrepreneurship. Finally, if governments are smart, they will tax external costs and decrease the price of sustainable and healthy food with the revenues.

The picture above shows a pyramid of blue crates in the True Price Shop in February 2020. Each crate contains a product for which the true price is known or will soon be known. In white the retail price is shown—the price at which the product is typically sold for in stores. In blue, the true price of the product is shown. For example, one crate contains bananas that typically costs 1.52 per kilogram and reveals that their true price is €1.86. Another crate contains a pair of jeans with a typical retail price of €40 and a true price of €73. True Price aims to place such blue crates with true priced products in stores and restaurants of other organizations as part of the “blue crate movement.”

How?

The previous sections presented the case that true prices are an effective and feasible solution to external costs. This leaves the question: *how* can true pricing be implemented? True Price envisions a five-step implementation (True Price Foundation, 2019):

- 1 The provision of *Transparency* about true prices of products by businesses and the use of this transparency by consumers.
- 2 The *Transformation* of production by businesses to prevent external costs.



Figure 18.1 True Price Store display

- 3 The *Transaction* by consumers to pay for repairing external costs that cannot be prevented.
- 4 The *Taxation* of external costs and the subsidization of sustainable food by governments to incentivize businesses to produce sustainable products and enable consumers to buy them.
- 5 The *Taking out* of externalities by regulation where it is feasible and remediation is undesirable.

These '5Ts' have a logical order. In practice they can occur in parallel or in different order.

Transparency

The starting point is transparency. This requires producers to compute and disclose their true prices, providing consumers and other buyers with the information needed to make sustainable decisions. Transparency also provides the information required for the other steps.

True prices are computed in five phases. In the *scoping phase*, all relevant processes of a product's lifecycle are determined, together with relevant negative externalities per process. In the *measurement phase*, the externalities are quantified, providing footprints like tons of hectares of land used or full-time equivalent hours of child labor. Measurement requires data collection. Ideally all data is primary data, collected at all the production sites across the globe. In practice, one has to work with a combination of primary data, estimates from product-specific lifecycle models, and data from macroeconomic input-output models. In the *monetization phase*, the footprints are monetized by estimating the remediation costs, using local factors where possible. In the *aggregation phase*, all remediation costs are summed to come to the true price gap. Finally, in the *validation phase*, results are validated.

Consider a pure chocolate bar of Tony Chocolonely's. It was the first company to calculate their true price and supply bars in the Store. The key parts of its lifecycle are farmers growing cocoa beans, chocolate processors using beans to make cocoa liquor and butter, sugar plantations, and the chocolate factory making the bars. Other parts include the production of lecithin, aluminum, and paper, as well as transportation and retail.

Tony's was founded with the mission to create a slave-free chocolate sector. To maximize its impact on the sector, Tony's built a value chain that others can emulate. Therefore, it sources cocoa from smallholder farmers in Ghana and Côte d'Ivoire, who produce the majority of the world's cocoa (Ceres, 2020). Similarly, Barry Callebaut, the world's largest chocolate processor, processes its beans. For each step, the potentially relevant external costs were established based on previous research.

Through its *bean to bar* program, Tony's knows the cooperatives that it sources from. This greatly facilitates the measurement phase, as primary research can be done on the main ingredient. Data from most other ingredients come from secondary sources. The analysis then results in footprints. For example, the total emissions per bar are 0.66 kgCO₂-eq.

Based on a monetization factor of \$0.13/kgCO₂-eq, this implies remediation costs of \$0.09 per bar. By similarly monetizing and aggregating all remediation costs, a true price gap of \$0.99 is established. \$0.95 of the remediation costs are related to cocoa cultivation and \$0.03 to sugar cultivation. The largest environmental costs are land use (10% of the gap), climate change (9%), and soil pollution (7%). The largest social costs were underearning of farmers and underpayment of workers (29%), child labor (14%), and harassment (10%).

The validation phase showed that the calculated results were justified, although at this stage footprints and remediation costs involve uncertainty.

After computing the true price, it can be shown to customers. Business clients can use this information to reduce the true price gap of the products that

they sell. Consumers can use it to be as sustainable as possible (select the product with the lowest true price gap) or otherwise search for products with a lower true price gap and affordable price.

Tony's, Van Vessem, and others show their true price in the True Price Store. As this is just one store, it is more significant that they use this information in their own communications. Because true prices are not widely available, brands typically provide a benchmark to give their consumers the context that they need. For example, Van Vessem uses this information to show consumers that its bread is twice as sustainable as the average bread in the Netherlands (True Price, 2018b).

Transformation

The second step is the *transformation* of production to realize (more) sustainable products. By changing the product, the ingredients and the ways of production, businesses can reduce their true costs.

For example, Van Vessem—a baker with seven stores—uses its data on true prices to develop recipes that lower the true price gap of its bread (*ibid.*).

Tony's also uses true price data to inform its interventions. When Tony's first calculated its true prices, the external costs of their cocoa were around \$9.30 per kilogram (True Price, 2018a). On the one hand, that was better than the \$16.60 of external costs of the average cocoa from Western Africa. On the other hand, it was not fully sustainable. It took various steps, including calculating the price that farmers would need to receive to realize a living income, better monitoring of child and forced labor, and measuring their carbon footprint. Later, Tony's started to pay above the market price to close the living income gap. Tony's managed to reduce its external costs from \$9.30 in 2013 to \$5.30 in 2018 (*ibid.*). To be able to pay farmers more, it needed to increase its price and explained this to consumers. Despite this, Tony's has been commercially successful, becoming one of the largest chocolate brands in Dutch supermarkets, surpassing traditional chocolate giants.

Transaction

The third step is *transaction*. In the short run, it is impossible for consumers (and businesses) to only purchase products without external costs, as these simply do not exist. Hence, to meet their responsibility, buyers need to be given the opportunity to pay the true price and remediate harms in the best way possible. Remediation is just starting to become available. It requires the availability of organizations that provide remediation in a highly reliable and effective manner.

Currently, remediation for two externalities can be provided in the Store. Hence, consumers can currently see the true price, but pay a “truer price.” The externality with most remediation providers is climate change. In the True Price Store, consumers can pay to remediate the carbon emissions from their products. This is provided to a company that plants forests in deserts and provides real-time data on trees planted. Consumers can also pay to remediate underpayment to workers. However, owing to the difficulty of reaching individual workers in the value chain, at the

moment this is given to a non-governmental organization that gives verifiable direct payments to people living in poverty. While an imperfect implementation of true pricing, the Store is working on a better system with the businesses involved.

Taxation

The fourth step is *taxation*. Transparency, transformation, and transaction enable market participants to buy and sell sustainable food if they want to. In addition, they create an incentive for businesses to make products more sustainable. Still, they do not resolve the perverse incentive that less sustainable food is cheaper than more sustainable food. Nor do they alleviate the problem that for low-income families it can be a real problem to pay more for food. This means that taxation is an important step in true pricing: governments can make value-added tax proportional to the true price gap by, for example, making more sustainable products cheaper and less sustainable products more expensive. This closes the incentive and affordability problems.

Taking-Out

The final step is governments *taking out* products that have unacceptable external costs. For various externalities, remediation is a perfectly acceptable manner to deal with external costs, and taxation is a suitable form of government intervention. For example, for CO₂ it does not matter whether it is avoided or taken out of the air quickly. Other externalities, such as forced labor, ought to be prevented. Hence, in such cases the prohibition of these externalities forms the final step of true pricing.

In practice, prohibitions are problematic. First, they often exist but are not enforced effectively. Second, governments have no jurisdiction to prohibit or enforce prohibition in other countries. Third, consumers and businesses have no way at all to prohibit or enforce prohibitions. Hence, until there is an effectively enforced global prohibition, transformation, transaction, and taxation are needed for such externalities.

Conclusion

Currently, it is possible to calculate the true price of a product and show it to consumers. Various businesses are applying it and there is a store where consumers can see and pay the true price. All these things were inconceivable less than a decade ago. This means that pricing externalities is no longer a pipe dream. However, optimism is still required to see true pricing taking over the global economy. The fact that there is at least one store where prices are a bit truer, however, could warrant a healthy dose of such optimism.

Note

- 1 An important question is if animals and nature are included in social and environmental rights held by humans or if they have rights in themselves.

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Conclusion

Mobilizing the Power and Potential of True Cost Accounting

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There is an increasing public and scientific debate about the potential for True Cost Accounting (TCA) and the need for TCA to play an important role in the policies and decisions of all agri-food system stakeholders, including those of governments, businesses, communities, and every citizen. In recent decades, the recognition of the need for a new and encompassing accounting system that takes into account the hidden environmental costs of production has started to change the economic thinking far beyond conservation circles. The appreciation of the negative (and sometimes positive) impacts of production on the environment has become common, together with the recognition that economic reporting does not adequately consider the impacts of activities on the natural resource base, or on social wellbeing and human health. However, there is a wide gap between the multitude of colorful Corporate Social Responsibilities reports and actual company impacts on natural, human, and social resources, precisely because the mainstream international standards of economic accounting and reporting exclude externalities. With the current awareness of the true (or full) costs of economic activities, it is time to go beyond discussion and design of TCA approaches and move towards implementation. A range of opportunities is explored in this chapter, as well as likely challenges.

From a theory of change perspective, much is being done by the TCA community of practice, but less attention is paid to who needs to do what differently for TCA to succeed. Scientific and methodological breakthroughs will keep emerging and offering new opportunities to improve TCA measurements. However, tangible effects on policy and decision-making are essentially related to socio-political processes. It is only through social processes that lead to a consensus on an agreed set of processes and overall framework that trust will be built for making choices that establish sustainable food systems. Thus, it is the mobilization of governments and multi-stakeholder community networks that will be crucial to the effective realization of TCA's potential.

True Cost Accounting (TCA) cannot be a panacea, and nor can TCA advocates assume that wide adoption of the process will magically change the current way of doing business and making policy. As highlighted through advancing the United Nations (UN) Sustainable Development Goals (SDGs), mindsets and institutional structures are far from the trumpeted integrated,

transdisciplinary approaches that cut across all human and natural spheres. Moving towards holistic approaches is not easy, but it is encouraging to see that TCA has already heightened public awareness on food system externalities. TCA is an important tool to advance a global transition to sustainable food systems, but each societal actor has a role to play in making change happen.

Where We Came From and Are Going To

TCA has successfully changed mindsets. The Food and Agriculture Organization of the United Nations launch of the Food Wastage Footprint in 2014 marked a sudden shift in public awareness about the environmental and social impacts of food loss and waste. The mantra “if food wastage was a country, it would represent the third largest emitting country in the world” went global within days. For the first time, food system externalities were quantified, and people woke-up to reality. It did not really matter if the emissions were 3.5 Gt or 4.4 Gt of CO₂ equivalents per year (depending on the year of the dataset used), or which emission factor or carbon price was used to quantify the social cost of carbon at \$394 billion per year. The huge hidden costs of food wastage were made visible. Donor funds, which were scarce for investment in reducing post-harvest losses, rapidly became available, thanks to allocations made by environmental (rather than agricultural) budgets.

Similarly, efforts to quantify the climate impacts of agricultural practices that accelerate soil erosion have opened new dialogue about the need for public support and market mechanisms to support soil-enhancing practices. Nowadays, the link between food and agriculture systems, climate change, antibiotic resistance, and noncommunicable diseases is clear to all, even if the interaction pathways are not fully established. Looking back, it can confidently be stated that TCA has played a significant role in changing political debates and public mindsets, beyond the dollar values that one can assign to individual TCA assessments.

Gross Domestic Product (GDP) for successful economies. The scientific effort and political debate to define the “true costs” of food must be placed within the successful measurement of the economy that perceives annual GDP growth as the world’s most powerful statistical indicator (Lepenies, 2016). GDP is not only the measure of a country’s economic output; it also is understood to describe, in a single number, the success of the overall development of a country. GDP is not a general law of nature expressed in statistical calculations, but rather the result of a long process of attempts to measure the economic reality of a country and express it as a single statistical indicator. As such, GDP is a “social construct” created by people and accepted by society. GDP measures the total economic output of a country based on monetary values; the fact that the value of goods and services is based only on their market value automatically excludes whatever has no market value. Thus, the value of biodiversity and fertile soils, which have no market price, do not influence GDP, at least in the short run. TCA, however, by considering natural, social, human, and produced capitals involved in food and agriculture systems (The Economics

of Ecosystems and Biodiversity, 2018), provides a social construct that reconsiders the basic concept of how all countries in the world measure their development. Adopting and implementing TCA for food and agriculture systems is therefore bound to change the overarching perception of economic success and its actual expression in annual GDP growth.

TCA is a tool. Experts are continuing to refine TCA approaches by structuring accounts and assigning values that speak to the wonderful complexity of issues and relationships that constitute our lives. The nascent TCA toolbox is currently in an adolescent stage, actively exploring possible futures and confident in its genuine capacity to change the world. However, any tool, even the most mature and well developed one, is a lifeless instrument unless people engage in using it. The ultimate responsibility for responding to the implications highlighted by using the tool rests with the user. Thus, the social and political process surrounding TCA's development and implementation, as well as actors' accountability, are of crucial importance for a transparent and effective food system transformation.

Towards informed decision-making. While acknowledging the unavoidable gap between scientific evidence and policy processes, TCA seeks to provide evidence for decision-makers to consciously manage complexity. Complexity is defined as a network of multiple interacting factors and unknowns that cannot be addressed in a piecemeal approach. TCA's broad lens aims to offer a high-resolution snapshot of our agri-food ecosystems, by giving a meaningful place to the variety of mineral, plant, animal, human, and produced goods and services, and hence providing a richer picture of the dynamic canvas of life. Developing this richer picture also supports better recognition and understanding of clouds on the horizon that indicate unknowns, risks, or patterns that deserve attention. By providing a clear picture, policymakers, investors, producers, and communities can better evaluate what to support (or not) for the future of food. When TCA is eventually embedded in standard reporting systems of enterprises, measuring and valuing all positive and negative externalities will provide a very different picture of the interaction of businesses with nature, society, and individuals. Currently, several frameworks try to capture the complex reality of a defined eco-agri-food system; an inventory of methodological frameworks, resources, databases, and case studies provides an overview of where we stand today (Bandel *et al.*, 2020).

Where Do We Stand?

The richness of material that this book has drawn together under the banner of TCA is impressive. The richness speaks to the desire for new and more encompassing approaches to assessing and analyzing food systems; to the breadth of the skills and experience that can and must be applied; and to the momentum that is building for change. This chapter draws out some key insights from considering the chapters as a reflection, on the part of the authors, of the status of TCA. It provides suggestions for taking TCA forward

so that it can positively influence the sustainability of our food systems around the world.

Seven insights emerge from stepping back and considering the book chapters as a whole.

Complex systems. The first is that there are many “pieces” in the TCA puzzle. Joining together material on the health consequences of diets, with the need for the conservation of natural resources, the growing of crops and breeding livestock, the supply chain risks of major food conglomerates, and the precarious nature of work of those employed in the processing and dining sector is both magnificent and overwhelming. How can these all possibly be fit together by a long-standing systems thinker, let alone a short-term financial analyst, a policy specialist, a politician, a farmer, or a voter? There thus remains a significant challenge to demonstrate how all of the pieces that legitimately fall under the TCA banner can be brought together, such that food and agricultural systems can be assessed holistically and results can be presented in simple terms.

System boundaries and responsibilities. Second, food supply chain boundaries extend very far, upstream and downstream, with sustainability impacts on the environment and communities that become less visible as the spatial coverage increases. Studies have so far set TCA assessment boundaries according to data, resources, and time available for individual projects. Excluding or including a geographic impact area yields results that are bound to remain incomplete and potentially unfair to affected populations. While, ideally, TCA assessments should set boundaries within the realm of control or influence of financial and operating policies and practices, the “system” impacts are often planetary. This interconnectedness points to the need for a greater understanding of the responsibilities and accountabilities of all societal actors, at community, national, and international scales. Furthermore, it calls for the development of meaningful legal and institutional frameworks that are conducive to TCA implementation and adoption.

Incorporating the social dimension. Third, notwithstanding the broad coverage of topics in this book, there are important areas poorly reflected in the chapters that should, ideally, be the heart of the conversation. These include social capital, particularly in terms of individual and culturally important connections, and the wider suite of ecosystem services beyond the inputs to food production on which farm management and related supply chains can have significant influence. This is not to say that these topics are not mentioned across the chapters, but rather that these distinctly “non-market” aspects of food systems do not appear to receive the level of discussion that most people supportive of TCA would agree is needed. Social issues are difficult to quantify, and creating science-based targets for worker welfare or racial justice is not value-free. However, addressing deeply rooted systemic inequalities requires particular efforts to measure and communicate: 2020 is a turning point, and we need to completely rethink how we approach social issues.

Risks and thresholds. Fourth, and building on the previous point, because of the common interest in using TCA to “amend the bottom line” and move

away from financial profit as the sole measure of success, there is a tendency to focus on applying standard economic pricing approaches in a more holistic way. Put differently, a general flavor of the chapters is how to adjust or extend current marginal pricing approaches to production decisions and applying standard approaches to the pricing of externalities. For many, this is a general understanding of the intent of TCA. However, what is missing in this application is a broader appreciation of systemic and non-marginal risks and the extent to which we are approaching, or passing, ecological or societal thresholds. While in theory, prices should rise in order to reflect scarcity, history reveals that humanity regularly ignores any such signals or finds substitutes. Moreover, when there are no prices for non-marketed goods that are present in the prevailing institutional framing (i.e., there are externalities) there will be no price signals. In this context, the importance of applying other aspects of economic theory (and accounting) around wealth and balance sheets becomes fundamental. Understanding risks and thresholds in terms of the available natural, produced, human, and social capital is a central thesis of the UN Environment TEEBAgriFood framework. This is not a perspective that is well developed in the chapters. What is required is a stronger focus on the stocks of capitals themselves and their condition/quality, in addition to consideration of the benefits (or loss of benefits) associated with their use. A focus on stocks of capital directly facilitates measurement of thresholds and non-linearities and provides a basis for establishing informed targets and benchmarks. TCA on its own cannot determine the target thresholds, but it can structure the discussion. However, to do so, TCA requires not only a profit and loss statement but also a rich and comprehensive balance sheet.

Post COVID-19 narrative. Fifth, while only one paper tackles the challenges raised by the coronavirus disease (COVID-19), there is an opportunity for TCA to contribute further to the discussion in this space. Of course, the challenges facing agriculture and food systems have been both long-standing and will, unfortunately, continue to be faced beyond (hopefully) the time horizon in which solutions to the COVID-19 can be found. In that sense, the contexts for the papers are commonly focused on long standing environmental, social, and health challenges that are attributable to our current food systems. Nonetheless, it is also clear that COVID-19 has starkly highlighted many systemic concerns, but the policy responses have often been framed as choices between health and economics rather than in terms of integrated solutions. Indeed, COVID-19 has fueled two contrasting narratives: the need for local, resilient food production and the need for more international food trade in times of social distancing and lockdowns. Seen through a TCA lens, poor food and agricultural practices (e.g., deforestation, confined animals, wet markets) can be held responsible for the global pandemic. Perhaps this points to a key challenge for implementing TCA. If TCA approaches had been standard practice, then we might have readily reached shared conclusions about preventing and dealing with the global and immediate impacts of the pandemic in different parts of the world, rather than battling between the economic and health-

focused solutions. TCA could provide advice on future health risks by assessing growing externalities, such as antibiotic resistances coming from the (over-)use of pharmaceuticals in industrialized livestock systems. We are more than capable, at least theoretically, of dealing with the complexity of balancing these objectives, but reaching that point will require a paradigm shift.

Government role. Sixth, if a paradigm shift is required and it needs to happen globally, the collected papers suggest that this will be either at local scale—farmers, True Price shops, communities—or from international processes. Both are undoubtedly required, but there is little discussion of the role of national governments in driving change. Perhaps it is failure at this level that motivates the search for solutions at other scales, but it seems difficult to imagine a pathway to the implementation of holistic food and agricultural systems that does not also involve the active engagement of national level jurisdictions. Undoubtedly, a prerequisite for national government-level TCA action is the standardization and harmonization of language, definitions, methods, and tools around TCA. While a few chapters speak to this—particularly Chapter 4 on methods and frameworks—the chapters as a whole reveal quite broad and relatively loose understandings of TCA. This is excellent for building a community but will be insufficient if large-scale adoption of TCA is the ambition. One possible pathway to greater government engagement is through substitution of TCA for cost-benefit analysis, as argued in Chapter 12 (“Embedding TCA Within US Regulatory Decision-Making”). To do so, it is necessary to understand the inner workings of governments in order to strategically embed TCA within existing processes. Among the many compelling arguments for national government adoption of TCA, two ideas seem particularly important. Given that governments are responsible for public goods, TCA would provide not only information on the value of these public goods but also make flows visible, leading to a different perception of public goods, the investments needed to maintain these goods, and the benefits that are derived from those investments. Second, the potential to introduce TCA into the taxation system to trigger a reconceptualization of the definition of assets could have far-reaching consequences.

Tool versus process. Finally, speaking to the ambition of TCA, many of the chapters point to the need to define success, that is, the purpose of establishing sustainable food systems. Chapter 15 (“Investing in the True Value of Sustainable Food Systems”) notes that in considering TCA approaches, it inevitably leads to questioning fundamental choices and goals of business, society, and government. The UN SDGs provide a powerful basis for making these choices at farm, community, national, and global levels, but a challenge remains to establish TCA as the tool of choice to evaluate progress towards these goals. The chapters reveal clearly that TCA can be applied—this is a tremendous step forward. However, as Chapter 1 (“From Practice to Policy: New Metrics for the 21st Century”) highlights, TCA is a technical tool—developing and implementing the process around using it must be the next focus.

Where Can We Go (and How Do We Get There)?

Communities, including food and agricultural practitioners and civil society organizations, have advanced scattered but widely diffused efforts for internalizing environmental and social externalities in market goods, such as witnessed by the organic agriculture and fair trade standards. A coalition of what so far has been considered an alternative movement, including environmental and human rights non-governmental organizations (NGOs), is starting to consolidate with initiatives such as Organic 3.0 (International Federation of Organic Agriculture Movement, 2016). Considering decades of practices with environmental and social Key Performance Indicators (KPIs) and the heightened awareness that any thematic focus is unlikely to succeed alone, a community of the willing is needed to identify and develop common TCA-KPIs, based on what can be achieved while keeping producers in business. In line with their respective mandates, NGOs already facilitate agri-food producers' recognition of externalities; this is evident in compliance with organic standards that reveal farmers' unintended environmental impacts. Most importantly, a push from the field and farming communities is the only way to blend important traditional knowledge of agri-ecosystems, the richness of communities' culture, and potential government regulation for TCA. The Global Alliance for the Future of Food Community of Practice for TCA has started to pool expertise to advance TCA, but it needs to extend its partnerships with farmer organizations, producer associations, standard-setting owners, and government representatives.

Businesses, including private companies, investors, and insurers, have been progressing fairly well with the idea of TCA, as a means to hedge against risk, as seen by the numerous initiatives of the Capitals Coalition (<https://capitalscoalition.org/>). In fact, in the face of supply disruption, companies have been leading change with Integrated Profit and Loss accounting. Tangible financial terms are being integrated in annual accounts and company valuations, as well as in credit ratings and insurance policies. Increasingly, due diligence tools are crafted to improve investors' decisions around capital allocation and portfolio goal setting. However, history teaches us that unless harmonized accounting standards are developed, TCA will follow the same fate as sustainability reporting where, depending on individual benchmark setting, all businesses will soon be flaunting successful operations in various shades of green. For TCA not to become a greenwashing highway, it must be integrated within a new accounting standard, together with the integration of clear thresholds within financial balance sheets. The Capitals Coalition, which united in January 2020 the Natural Capital Coalition and the Social & Human Capital Coalition, is a major effort of global collaboration of over 350 businesses and accountancies to bring nature and people into the heart of business decisions. Building on the Natural Capital Protocol, and on the Social and Human Capital Protocol, a variety of guidance documents (e.g., Biodiversity Guidance, September 2020) are being developed as companion decision-making frameworks. In addition, a

small group of European food companies is taking the first steps to measure all capitals in their respective companies, with a view to implement integrated reporting guidelines for the production and consumption of food. This initiative, called “True Cost – From Costs to Benefits in Food and Farming” (<http://tca2f.org/>) (TMG and Soil & More Impacts, 2020) aims to provide standardized guidance to make hidden costs and benefits visible along the entire value chain, providing a complete picture of the interaction of a company with people, society, and the environment. The US Sustainable Accounting Standards Board has been developing standards for the food and beverage sector that consider key issues and accounting metrics including environment, social capital, human capital, business model and innovation, and leadership and governance. The provisional Agricultural Products Sustainability Accounting Standard published in June 2015 (Sustainability Accounting Standards Board, 2015) could be joined, for instance, by the Capitals Coalition, TCA2F, and others, and collectively taken forward to reflect issues of global concern and consequent harmonious application for the whole business community. With a common baseline, internal and external reporting of companies and risk assessments would allow decisions-makers to create and develop long-term value, instead of focusing on short-term profits.

Governments have so far been virtually absent from the TCA landscape. Although they have agreed on the SDGs for national development, moving towards the Goals remains trapped within old-fashioned institutional structures. As demonstrated by the organic agriculture sector prior to the establishment of organic regulations, markets alone cannot trigger or scale-up change; worldwide, consumers’ demand for organic products largely exceeds supply, owing to a lack of policies for supporting organic producers. Most importantly, the public good can only be guaranteed by government rules and enforcement. Indeed, COVID-19 has pushed governments back into the center of the arena for the security of humanity. With contributions from civil society and businesses, governments need to advance TCA on three fronts:

- Establishing the legal framework for a TCA standard, such as is done for corporate accounting standards, in order to secure a fair playing field for all, prevent fraudulent practices, and reduce the cost of supporting multiple approaches.
- Adopting TCA as an administrative process for the elaboration of policy incentives (positive and negative), that orient all stakeholders (smallholder farmers, private multinationals and line ministries) to opt for the appropriate decisions. In particular, TCA should substitute the classical cost-benefit analysis to ensure that, to the greatest extent possible, distortion can be resolved once the externalities are evaluated, and the true-cost of various actions are transparent to policymakers; and
- TCA implies actions far broader than the food and agriculture system *per se*. With the current state of affairs, power and inequity are two obstacles to progress. Currently, cheap food policies are used as social safety nets.

Further, and most importantly, the power exerted from the highly concentrated agri-food input and retail sector often works against addressing externalities. In this context, regulations requiring TCA might work to dis-incentivize natural and human resources exploitation while, at the same time, opening the pathway for adopting alternative competition and anti-trust policies to address the agricultural input-machinery-insurance and food market oligopolies.

Inter-governmental institutions, including the UN system, Bretton Woods institutions, CGIAR research institutions and regional commissions, have been developing and practicing TCA, including: the World Bank project on mainstreaming Wealth Accounting and the Valuation of Ecosystem Services (WAVES) in national economies; the “beyond GDP” UN System of Environmental-Economic Accounting framework (United Nations *et al.*, 2014) that standardizes and classifies countries’ statistics and accounts for environmental data; and the UN Environment TEEBAgriFood framework for better understanding, managing, and valuing the impacts of food and agriculture systems. Inter-governmental institutions are precious entry points for governments in order to progress along three main fronts:

- To explore the implications of TCA and eventually develop a TCA Index that would complement—and eventually replace—Gross Domestic Product (GDP) or Human Development Index (HDI). In fact, GDP is a post-World Wars index focused on reconstruction and economic production capacity. The 1990 United Nations Development Programme’s HDI better reflects well-being by considering health, education, and living standards. In our globalized era of climate change and pandemics, we need an index that better reflects our modern issues, in particular one that encompasses environmental thresholds. Chapter One “From Practice to Policy: New Metrics for the 21st Century” introduces such a TCA Index, as a means to simplify complexity for decision-making, while moving away from actual monetization. It is interesting to note that SDG 17.19 hints to such an index: “*by 2030, build on existing initiatives to develop measurements of progress on sustainable development that complement gross domestic product, and support statistical capacity-building in developing countries.*”
- Through the UN statistical system, adopt universally accepted concepts and definitions for data across all dimensions of sustainability. Common data standards can form the basis for the development of a universal TCA standard and establishing relevant sustainability thresholds. This is the reality for economic measurement and has been for decades. The theory is in place for the other dimensions but it needs the institutional process in order to be driven forward.
- In the longer term, TCA practice and implementation could assist countries negotiating trade reforms that assess national stock flows through international trade, with trade rules accounting for virtual water, virtual

land, virtual pollution, and unsuitable labor conditions. The World Trade Organization (WTO) trade rules favor the lowest cost, that strongly lock-in negative externalities within national boundaries. Although the WTO allows countries to adopt trade measures regulating “product characteristics or their related Production and Processing Methods,” this concept remains controversial from a conceptual and policy point of view. Currently, the free flow of capital and labor flattens countries’ comparative advantage and we are witnessing a race to the bottom towards the lowest production cost possible. Thus far, the trade of certified organic products has been facilitated by the existence of international standards, as requested by Sanitary and Phytosanitary Measures (the SPS Agreement), because environmental requirements (e.g., no pesticides) are perceived as health and safety requirements. This highlights the importance of an eventual common international TCA reference standard. This could follow the blueprint of the European Union Organic Regulation that is in line with the international standard laid out by the Codex Alimentarius Guidelines; provides the basis for individual country regulations and conformity assessment procedures; and is open enough to private standards that may be more stringent than the national rule (e.g., Soil Association, Demeter).

Clearly, the different stakeholder group initiatives ought to progress in harmony. The current push from the base is changing the narrative in an effective way. Networks are forming but they need to link up with other networks and scale-up their efforts. Suppliers, clients, employees, companies, investors, communities, governments, and conservationists will have different scopes for TCA assessments, but the agreement of all parties on the TCA baseline is crucial.

This book reveals the extent to which TCA has, and can continue, to drive a broadening of mindsets in achieving the sustainability of our food and agricultural systems. This chapter has highlighted areas where more can be done and areas where increased collaboration is required. Fundamentally, the opportunities that exist for TCA are immense. The chance to build on changing mindsets is real and action is needed now. TCA’s history proves its potential; its future can drive us towards sustainable solutions.

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