True cost of food as a lever to transform the Swiss food system

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Executive summary

Food systems have substantial environmental, social, and health impacts that are not reflected in the cost of food. The current political context, both domestically and internationally, have identified True Cost Accounting for Food (TCAF) as a means to drive the transformation of food systems. In this paper, we explore TCAF as a tool to move toward a more sustainable, resilient, and inclusive Swiss food system and answer some of its challenges. First, we identify these challenges and what we know so far regarding TCAF. We subsequently outline the prospects and hurdles of TCAF in Switzerland, as well as the proposed paths forward, as identified by a varied group of stakeholders during an event which took place in October 2022. Finally, we propose several avenues to progress towards a trial implementation of TCAF in Switzerland.

Key takeaways

- It is estimated that CHF 37.4 billion is spent every year on food in Switzerland. The estimated **external costs are at least twice this amount**, with health externalities weighing the most. Even if these costs are hidden from the market, they are incurred by our planet and societies, through e.g. public health costs and natural resources depletion.
- The initial responses from Swiss food system stakeholders gathered during an E4S Action Lab indicated a strong potential and interest in a true cost approach, but also highlighted the challenges, notably the public acceptability of higher food prices.
- Potential implementation pathways involve providing true cost information throughout food value chains. To start, collective restaurants and farm markets offer the opportunity to assess the impact of this information on the behaviour of market agents.
- By internalising the external costs into the cost of food (true pricing), TCAF offers the means to achieve a better allocation of resources by reshaping and aligning incentives along food value chains from farmers to consumers.
- Food systems are facing interrelated challenges that need to be addressed systematically. TCAF allows moving from a sectoral to a more systemic approach to food systems recognising feedback loops and understanding the causal relationships between policy incentives and their impacts.

1. Introduction

Food and agriculture systems need to transform if they are to fulfil their role in providing safe and nutritious food for all while addressing environmental, social, health, and economic challenges. Nowadays, the production and consumption of food have the greatest environmental impact among different industries[1]. The social implications are increasingly recognised as major problems hindering their sustainability, ranging from the underpayment and lack of recognition of workers[2] to the high public health costs of non-communicable diseases linked to unhealthy diets[3]. In Switzerland, agriculture and food policies are largely disconnected from environmental, social, and health policies, which explains why policymakers have not yet addressed food systems' sustainability in their complexity.

In this paper, we draw up a first exploration of True Cost Accounting for Food (TCAF) as a tool to move towards a more sustainable, resilient, and inclusive Swiss food system and answer some of its challenges. TCAF refers to methodologies measuring the environmental, social, and health impacts of food systems in monetary terms. The true cost of food allows moving from a sectoral approach to a more systemic approach to food systems, addressing their interrelated challenges and aligning several incentives from farmers to consumers. It has recently received increased attention at the national level, through different policy documents, and at the international level through the United Nations Food Systems Summit and the State of Food Security and Nutrition in the World (SOFI) reports.

So far, we have gathered initial feedback from Swiss food system stakeholders on the true cost of food to address sustainability issues. Thanks to a first multi-stakeholder event (hereafter "Action Lab"), we identified opportunities and barriers as well as implementation pathways for TCAF. These initial reactions confirmed the strong potential but also the challenges posed by a true cost approach for the transition of the Swiss food system.

In this paper, we first draw a picture of the Swiss food system and its current challenges. Then, we introduce what we learnt so far regarding TCAF and summarise the results of the discussions held at the Action Lab with key stakeholders from the Swiss food system. Finally, we reflect on avenues for implementation i.e., how we could put in practice the true cost of food in Switzerland.

2. A look into the Swiss food system and its pitfalls

50% of food is imported

28% of national ecological footprint

74% of ecological impacts are abroad

The Swiss food system is understood here as embedding all the actors and activities from production to consumption and disposal of food within and outside borders. About half of the food is imported, which implies that most of the social and environmental impacts are offshored[4,5]. It is estimated that up to 74% of the environmental impacts of the country's food consumption (including beverages and tobacco) take place abroad[6]. Food consumption and domestic and foreign production are responsible for 28% of the national ecological footprint through e.g. deforestation, or unsustainable use of resources (e.g. soil, water), ahead of housing (24%) and mobility (12%)[7].

42% of adults are overweight

The population consumes twice the recommended amount of salty and sweet snacks; four times the recommended amount of animal fats; three times the recommended amount of meat; and 86% of the population eat too little fruit and vegetables[8]. Nearly half (42%) of the adult population is overweight, among which 11% is obese, which is one of the main risk factors for non-communicable diseases[9,10]. These latter represent 80% of the Swiss health system cost, in other terms CHF 51.7 billion[9].

Agriculture employs about 100'000 people (full-time equivalent, without indirect employment) and accounts for 0.6% of the national GDP[11]. The Confederation supports the sector with CHF 3.7 billion annually through subsidies[12]. From an environmental perspective, the impact of financial

support to agricultural practices is assessed as partially detrimental to certain aspects of biodiversity conservation[13]. Agriculture is a driver of soil scarcity[14], punctual contamination of water bodies[15], and biodiversity losses[16]. From a social perspective, heavy workload, lack of recognition and financial pressure still characterise employment in agriculture[2,17]. Male farmers display higher risks of suicide compared to the average population[17].

Heavy workload, lack of recognition and financial pressure for farmers

Trade and international food industry

Switzerland is a key player at the international level, both on the trading scene and in the food industry: 30 to 53% of international trade in agricultural products takes place in Switzerland[18]. This sets the country in a key position on the international food systems scene and provides an opportunity to be at the forefront of sustainable food systems innovation.

It is estimated that CHF 37.4 billion is spent every year on food in Switzerland (see Figure 1). The generated cost in terms of negative impacts is almost twice this amount, and it is most probably underestimated[20].

Consequently, the Swiss food system offers significant room for improvement in terms of sustainability. Not only is it costly in terms of health, but it also damages the natural resources within and beyond borders and fails to provide decent working conditions for all. The Confederation recently issued various policy documents[18,21], which emphasise true cost accounting (TCA) as a way to tackle the different issues faced by Swiss society.

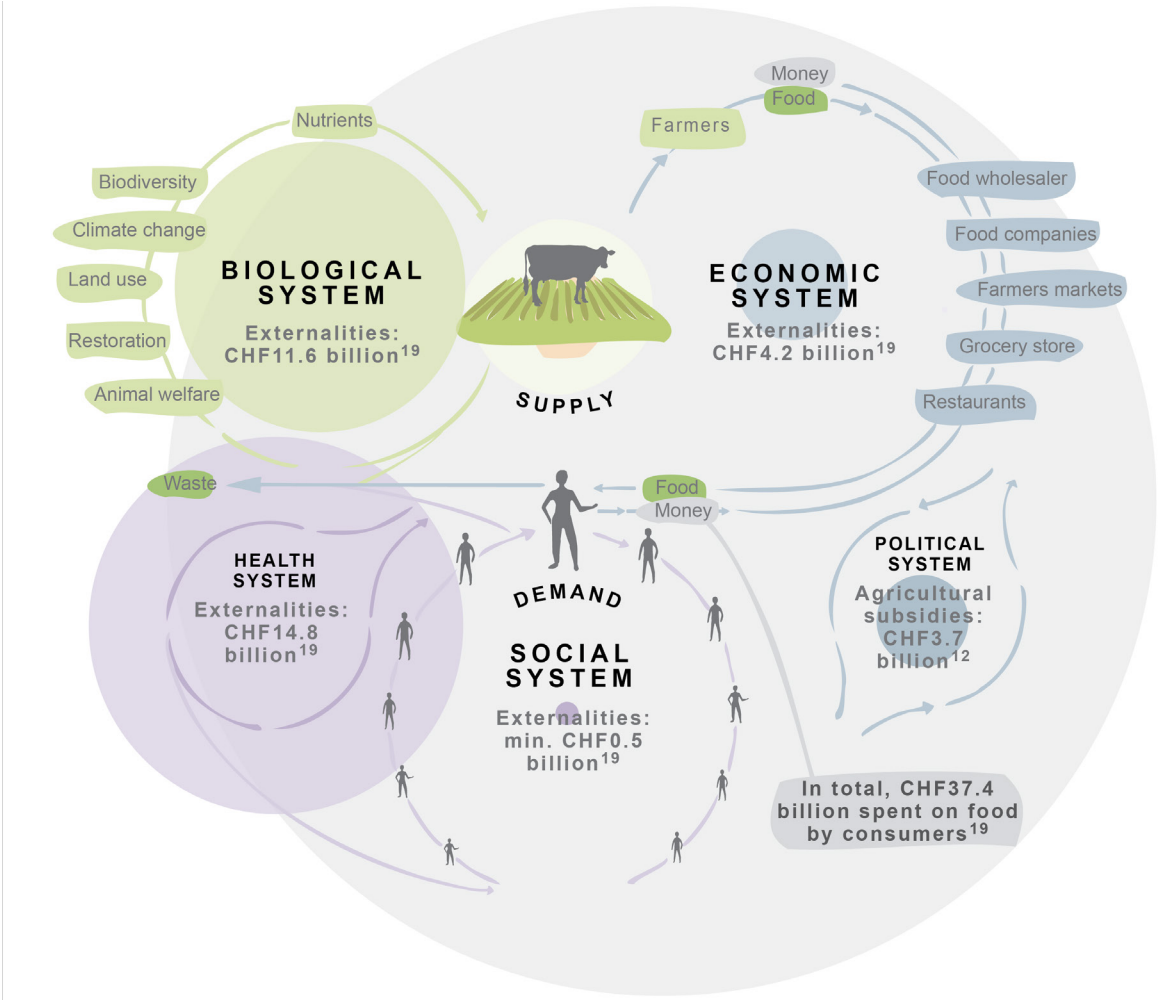

Figure 1: Mapping with key numbers of the Swiss food system. Coloured circles' size is proportional to the amount of money they represent. Design based on the Nourish Initiative food systems mapping (2020)[19] with numbers based on Perotti (2020)[20]. It is worth noting that few data were found on the social system externalities leading to a probable underestimation.

3. True Cost Accounting for Food (TCAF): A solution to address Swiss food systems pitfalls

3.1 An introduction to TCAF

The fact that many costs (and benefits) of food systems are not taken into consideration by the market (i.e. externalities) has beenv identified as a major cause of their unsustainability[22]. **Externalities** can refer to environmental problems (air or soil pollution, biodiversity loss), social issues (unpaid or underpaid labour), health concerns (diseases linked to unhealthy diets), and so on. These unconsidered costs lead to distorted incentives for market players towards cheap but negative impact products, preventing societies from achieving their full potential[3].

Unsustainable and unhealthy food is often more affordable to consumers and more profitable for producers. Nevertheless, it usually has high indirect costs in terms of environmental damages and health consequences for society[3]. Even if these costs are hidden from the market, they are incurred by our planet and societies. Preliminary research estimates that food systems globally cost around three folds the market value of food, with health externalities weighing the most[3].

TCAF is a capital-based assessment of the impacts that food systems have on nature, society, and health[23]. **The true cost of food** refers to the monetary estimation of externalities along the different categories (environmental, social, health or sometimes natural, human, social, produced capital). For example, for each ton of CO^2 equivalent per year, one of the environmental externalities generated by this system is calculated by multiplying it by the cost of compensating the same amount of emission through ecological remediation and carbon absorption or technical carbon capture. The true cost of food can also be calculated at other functional units or levels according to needs (e.g. product, organisation, system, geographic unit[23,24].

So far, TCAF has been used mostly for corporate accounting purposes. Even if there are efforts for harmonising approaches, there is no consensual scientific framework for calculating the true cost of food so far[24]. Overall, TCAF does not aim at providing the measurement of all existing external costs but rather focuses on the most impactful ones[25]. The illusion of completeness and precision in measuring externalities and estimating their monetary value should not undermine the potential of the true cost in transforming food systems.

The literature behind TCAF uses the term ***true cost*** for measuring the monetary value of externalities, and the term ***true price*** for adding up or subtract these costs to the consumer price[22]. True pricing consists in setting a price on a product according to its true cost, in other terms internalising the hidden costs in its final price[i]. Nature Food (2020)[26] praised academia to address the gap in research on the operationalisation of true pricing for food through exploratory research. Since then, only two studies draw a picture of the implications, opportunities, and barriers of true pricing, mainly from a theoretical perspective[22,25].

In practice, we found **two concrete initiatives** which proposed true prices to consumers. The first one is a collaboration between researchers from the University of Augsburg, who calculated the true cost of food, and the supermarket Penny in Germany, who agreed to display two price tags for certain food items[27]. One tag in red shows the **retail price** and one tag in green shows the **true cost**, i.e. accounting for the monetary value of environmental externalities (including nitrogen fertilisers, greenhouse gases, energy, and land use). For conventional minced meat the true cost was estimated three times higher than the retail price, while for organic minced meat, the true cost was two times higher than the retail price. For dairy, fruits, and vegetables there are also important differences between retail prices and real costs, but of lower magnitude. The true cost was displayed as an information and not as the price charged. This experience however did not investigate whether the

[i]Economic theory establishes the clear difference between costs and prices. The cost consists in the monetary value of an input used in production. Costs are borne by the different actors involved in the chain of production from farmers to retailers. If externalities are considered hidden costs of production, then their monetary value could be estimated and accounted for as costs. The price is the amount of money that the consumer needs to pay to obtain a given good and is the result of the equilibrium between supply and demand. Price equals input costs plus margins and is borne by the final consumer.

consumers changed their food choices in response to this new information.

Another example comes from Amsterdam, where a grocery shop partnered with a non-profit organisation called True Price which defined one of the existing TCAF methodologies[28]. As in the previous example, the grocery shop tagged both the **retail price** and the **true price** (including the monetary value of carbon emissions, worker underpayment, and water and land use). In this case, however, customers had the choice of paying the **true price**, the collected money being redistributed by the grocery to causes aiming at reducing environmental and social externalities. Even if there is not yet a buy-in from policymakers, the founders of True Price hope that by making visible the hidden costs, companies, and consumers will adopt more sustainable behaviours. The owner of the grocery shop which sells organically grown products says that "the cheapness (of products in regular supermarkets) is an illusion" since if you incorporate the true prices, then the organically grown products will be cheaper than conventionally-grown ones.

For both examples, there are several remaining questions to be investigated by behavioural scientists, namely how customers react to different simultaneous price tags and whether true cost signalling is more efficient in changing consumption patterns than labelling or other nudging strategies.

3.2 Testing the pulse of Swiss food system stakeholders

In October 2022, E4S together with the Integrative Food and Nutrition Center from EPFL, and the Institute of Geography and Sustainability from UNIL, hosted **an Action Lab[ii] on the True Cost of Food in Switzerland**. Farmers' unions, federal offices and policymakers, consumer representatives, retail companies, and food industry start-ups were represented. The purpose of this gathering was to test the pulse of how the stakeholders perceive the potential of the true cost of food in Switzerland. All participants were considered both knowledge holders and recipients, which allowed rich and open discussions leading to the onset of a common vision for TCAF in Switzerland[iii]. Following short presentations on the TCAF concept, the audience was asked to identify the opportunities and strengths, the barriers and threats, and finally, propose ways for going forward (see Figure 2). Overall, the high level of engagement from the audience and the outcomes of the discussions confirmed the relevance and timeliness of this initiative.

Most participants agreed that the TCAF is a **powerful tool** for communication since it provides a comprehensive perspective on a wide array of food system externalities and monetary metrics are in general easily understood. It has been depicted as an opportunity to reflect on food systems transformation pathways and create a change in our value system; to create **coherent policies** related to food systems; and to create **incentives** for food systems stakeholders to reduce their negative impacts. In addition, the **political context is favourable**: several recent Swiss policies mention TCAF as a way forward (Future Orientation of Agricultural Policies, 2022[29]; Draft Climate Strategy, 2022[30]) and there is strong international support from the UN Food and Agriculture Organisation (FAO).

Among the **barriers** to TCAF implementation, participants mentioned the complexity of the methodology; the risk of losing credibility due to the lack of complete and precise data on value chains regarding environmental, social, and health externalities; the existence of several other tools measuring food systems impacts, thus the risk of reinventing the wheel. **Acceptability of higher general prices** might be the most important threat to the implementation of TCAF, which raises the need for broad public support. The difficulty of addressing pricing mechanisms, through taxes and subsidies, and the political nature of the TCAF add to the complexity of the issue. Finally,

[ii] Action Labs are Enterprise for Society (E4S) multi-stakeholder platforms that bring together leading actors from academia, industry, and government to determine a joint vision and commonly agreed action plan in key areas for contributing to the transition towards a more sustainable, resilient and inclusive economy.

[iii] The meeting was conducted under Chatham House Rule: "When a meeting, or part thereof, is held under the Chatham House Rule, participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed."

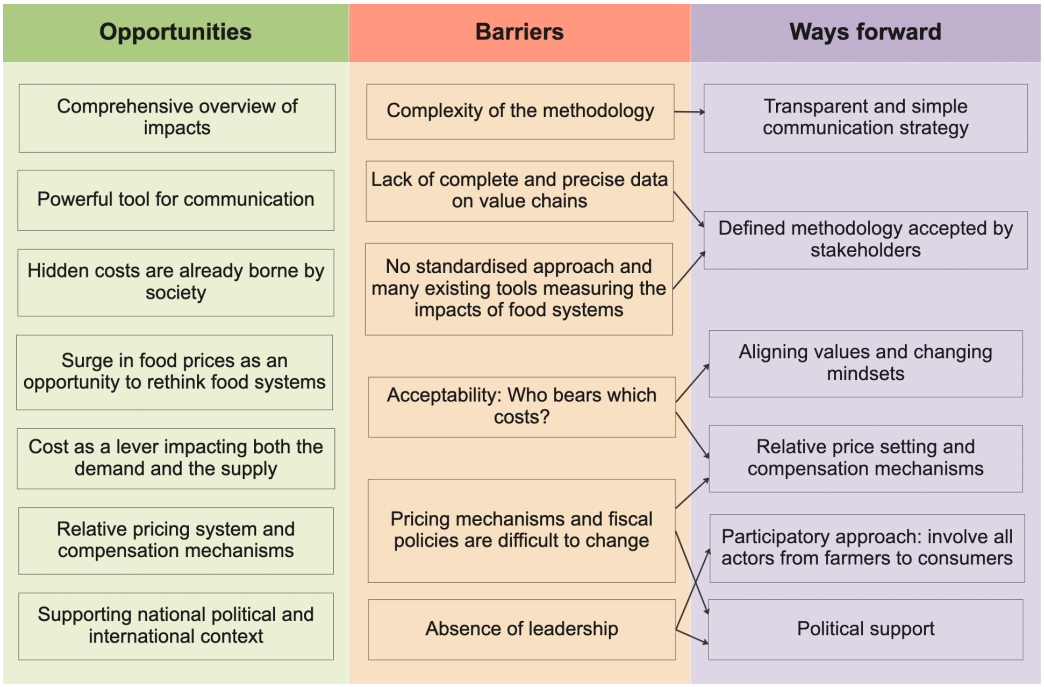

Figure 2: Summary of the True Cost of Food Action Lab results

participants identified the **absence of leadership** and responsibility for the implementation of TCAF as a challenge, especially given that a systemic approach is needed. The fact that no institution has taken the initiative to develop and implement a harmonised approach to TCAF was mentioned as a risk of dispersion of efforts. The question of which institution should take the lead and bear the cost of such an initiative was raised.

As for the **implementation pathways**, different ideas came out from the discussions, such as the importance of communicating in a simple and transparent way to the general public to raise awareness and get their support; setting up a comprehensive methodology by making use of the existing tools and data access limitations; aligning values and changing mindsets, by reversing, for example, the logic of quantity over quality; imagining the TCAF implementation through relative prices and compensation mechanisms (e.g. a combination of taxes and subsidies) by considering the fair redistribution of costs across food value chains. It was stressed that a key factor for implementing the TCAF is having the buy-in and working hand in hand with all key actors from farmers to retailers including NGOs. Given the urgency for acting, low-hanging fruits need to be identified and harvested.

4. Avenues for implementing the true cost of food in Switzerland

Scientific research can provide important elements to correct the current situation and bring the actors of the Swiss food system to take concrete actions and conduct business in a more sustainable way. Below, we present some framework conditions that we believe are necessary for a successful and effective implementation of TCAF in Switzerland.

First, there is a need to **establish a TCAF methodology** that is transparent and reliable, and which the different actors in the food system can discuss in confidence. This means discussing and confronting opinions of different knowledge holders and choosing the most relevant set of indicators possible.

The **indicators must be based on solid data**, some collected in partnership with the public sector, which holds large amount of statistical data (particularly on the agricultural sector), some collected at source, from the private sector, in compliance with clear and respected anonymity clauses, so as not to breach the principles of fair competition. Data on value chains from agricultural inputs to the processing of food waste should be made easily accessible. Actors in the food system should in turn make conscious and responsible use of it.

A wide and heterogeneous audience should be able to access and visualise the data in a user-friendly way on a secure and trustworthy platform. One way to achieve this could be to develop online applications that calculate the true cost of food per food group and per item purchased, as some already do for nutritional value and environmental impact (e.g. Eco-, Nutri- and GHG-scores on Beelong or Yuka apps). Beyond the individual level, a broader approach such as the 2050 Calculators[31,32], i.e., scientific models combined with user-friendly web interfaces, could be developed to explore and calculate the true cost of the food and agriculture system, but at the societal level. These approaches would help to address the necessary and complementary need for information, scientific background, dissemination, and transparency.

Once the methodology and data access are put in place, we would be able to calculate the true price by food categories and items. We are aware that while some externalities are already indirectly borne by society through the health costs or environmental remediation, others are externalised to future generations (resource depletion, GHG emissions) or not borne at all in our current systems (unpaid or underpaid labour). **Internalising the true cost of food would thus result in a general increase in prices, which leads to the question of who would pay for what part of this true cost.** Undoubtedly, the food that one decides to buy depends on one's income. In 2019, Swiss consumers spent, on average, 6.6% of their revenues on food and non-alcoholic drinks and 4.7% on restaurant services including cafeterias and bars[33]. Even if these numbers are among the lowest in the world, in line with other high-income countries, there are wide disparities between the high-income and the low-income population. **Asking consumers to pay the true price of the entire food system would aggravate the inequalities by putting additional pressure on already vulnerable low-income groups**.

One option would be that along food supply chains, the entities who produce, transform, pack, transport, and sell food while harming the environment, causing social injustices, or putting human health at risk should pay the true cost of these externalities, namely under the **polluter pays principle**. Implementing this principle will require developing and validating a robust, or at least consensual, methodology for calculating the true cost of food, as the adoption of TCAF can both benefit and harm brands and products. Consequently, data collection and accuracy could be critical bottlenecks that call into question the acceptance of the accounting methodology and any associated policy framework. If the latter are successfully addressed, several courses of action could be explored and implemented.

In what follows, **we would like to propose potential implementation pathways or a mix of different mechanisms**, respecting the basic principle of affordability of environmentally friendly, fairly produced, and healthy diets in particular to vulnerable populations. As there is no data on the true costs at the product level in Switzerland and elsewhere, we take an exploratory approach here. At this early stage, we introduce potential implementation pathways that could be submitted for discussion to different stakeholders under the umbrella of a second Action Lab (to be organised in the following months).

The **first** pathway would be based on making true-cost evidence available to the intermediaries along the food value chain (i.e. middlemen, processors, and distributors of food), followed by analysing to which extent this information would influence their purchasing behaviour. The **second** relies on the reaction of decision-makers of public and private canteens and collective restaurants to this evidence, and the possible inclusion of true costs as purchasing criteria for the supply of the public or private canteens and restaurants. A **third** one would be to implement true prices at pilot farms that sell directly to consumers (short food value chains) and examine how this affects both production and consumption. At this level, we could also imagine introducing a full-range fair trade charter which would compensate for the production costs and farmers' remuneration, as well as the true costs. **Finally, the most ambitious pathway** could be to make use of the true cost for repurposing policies, which could limit or suppress certain production incentives (at any level of the food supply chains) affecting the sustainability of natural resources, animal or human health and social welfare. Different combinations of policy schemes could foster the

reduction of negative externalities and motivate businesses into adopting more sustainable, inclusive, and healthy practices in food production, transformation, and packaging.

In this context, **a major opportunity could be redirecting the already existing subsidies for financing initiatives** in line with TCAF. A true-costing and -pricing approach would reward producers who already attempt to minimise their external costs and provide incentives for the others to do the same. For example, a bonus-malus system could be introduced, rewarding (bonus) or penalising (malus) items purchased according to their true cost, following the example of the French regulation on charging for car registration according to emissions. Such a system would be characterised by a balanced budget but a relative shift in the prices of items, in this case to healthier and more sustainable food purchases.

We believe that these implementation pathways could take place at different levels and should ensure that food systems are shifting towards more sustainable ones leaving no one behind. As many authors stressed in related articles[22,25,34], **we believe that the road toward TCAF and true pricing should be accompanied by an inclusive multi-stakeholder process that addresses questions of values, power, justice, equity, and interests**. Notably, recognising the role of farmers and involving them in defining these implementation pathways is crucial.

5. Conclusion

Food systems are facing interrelated challenges that need to be addressed **systemically**. This implies overcoming a silo mindset, thus moving from a sectoral to a systemic approach and from linear-static to system-dynamic thinking. This also means recognising the feedback loops between the sustainability issues of food production and consumption, and understanding the causal relationships between policy incentives and their impacts on both market distortions and overuse of natural resources.

Our initial exploration suggests that the true cost of food could be a **holistic instrument** for the transformation of the Swiss food system, touching upon all actors from farmers to consumers. Through **further development of models and increased transparency of data,** we believe that it could be the means to getting a better allocation of resources, by incentivising actors to behave in a more sustainable way. In addition, it can be a powerful tool for **repurposing policymaking,** by aligning agriculture, environmental, social, and health policies.

Lastly, we concur with Nature Food (2020)[26] on the opportunity offered by the true cost for research to take a more protagonist role by exploring operationalisation pathways and guiding constructive debates. In this context, we have built an interdisciplinary research project together with faculties from UNIL, EPFL, HEG Fribourg, University of Bern and Bern University of Applied Sciences. The aim of this project is twofold: first, to develop a model calculating the true cost of food in Switzerland, accounting for all major food system's externalities; and second to explore potential implementation pathways together with the Swiss food system stakeholder community[iv]. We believe that this two-sided approach **could unlock a needed change in the way we produce and consume food towards more responsible choices with respect to the environment, health, and society**. Finally, the recent action plan report produced by the Swiss food scientists committee[35] and the citisen food assembly recommendations' document[36] mention the true cost as one of the pillars for the transformation of the Swiss food system. This establishes a **fertile ground** for TCAF in Switzerland, reinforcing the timeliness of our project.

[iv] This project will be launched in early 2024 upon confirmation of financing

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