Quantifying the social benefits of the fair-trade designation of coffee using Social Hotspot Database

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Abstract

Quantifying sustainability is a difficult but necessary task to improve our environmental, economic, and social surroundings. This paper describes an investigation into the use of the Social Hotspot Database (SHDB) to determine the true value of fair-trade certification. The analysis has been carried out on two coffee systems produced in Colombia and consumed in Spain: i) a low-cost generic (GC) and ii) a high-quality organic fair trade certified (FTC). Risk levels in the SHDB for the cultivation sector in Colombia were adjusted to reflect compliance with fair-trade criteria. Surprisingly, the results showed that the social risks per functional unit (FU) (1 kg) of the FTC were significantly higher than FTC. This incongruence is caused by the fact that the lower risk values associated with the fair-trade designation are largely offset by its significantly higher economic cost. This is so even though these costs are dedicated to mitigating the risks that are then penalized by the same expenditure (e.g., low salaries, poverty). A solution to this artifact may be to conceive the fair-trade coffee as a multifunctional system and apply an economic allocation approach to evaluate separately its functions as beverage and as a contributor to social wellbeing.

Keywords: PSIA, Social LCA, SHDB, Colombia, coffee

1. Introduction

Fair trade is an alternative form of trade promoted by non-governmental organizations (NGOs), the United Nations (UN), and other social movements (ecologists). The aim is to promote a voluntary and fair commercial relationship between producers and consumers. Thus, products labelled as fair trade are assumed to be produced and commercialized in a way that protects workers' rights, reduce poverty, and enable sustainable development for farmers, workers, their families, and their communities [1]. The scheme is run by the Fairtrade Labeling Organization International (FLO), a non-profit multi-stakeholder association that defines a code of conduct (i.e., premium, and stable prices, contract stability, worker participation, environmental responsibility, etc.) and certifies its compliance through an auditing system. The most popular fair-trade labelled product is coffee, the second most traded commodity worldwide, only behind oil. In social terms, the coffee industry employed in 2016 more than 20 million people in 55 countries, mostly in developing countries [2].

On the other hand, there is a growing interest in the social sustainability domain to move from storytelling to quantification [3–5]. To support this type of analyses, generic databases and modelling tools have been developed [5]. These contain information of social indicators for regions and economic sectors around the world, which allow to identify hotspots in the supply chain of products and services. One of the most widely utilized databases of this kind is the Social Hotspot Database (SHDB) [6].

2. Methodology

2.1. Objective definition

The main objective of this investigation is to evaluate the potential of using the SHDB to quantitatively determine the social benefits associated with the fair-trade certification, identify shortcomings, and propose solutions.

2.2. Scope definition

2.2.1. System description

Two types of packed arabica coffee beans produced in southwest Colombia and commercialized in Spain were evaluated i) a low-cost generic coffee (GC); and ii) a high-quality organic and fair trade certified (FTC) coffee. The former one is produced and traded using standard procedures while the latter is produced by an association of women coffee growers that receives two premiums corresponding to the fair trade and the organic labels. Its quality needs are also reflected in higher costs of other intermediate processes.

As shown in **Error! Reference source not found.**, the life cycle of these two products extends across two countries: Colombia and Spain. The analysis has been carried out using a cradle-to-gate approach covering from the cultivation stage, first processing and export in Colombia, to the transport, second processing, marketing, and

distribution to the catering and hospitality sectors in Spain. The final consumption stage has been left outside the system boundaries despite the fact that, owing to its high added value, it could incorporate high social risks.

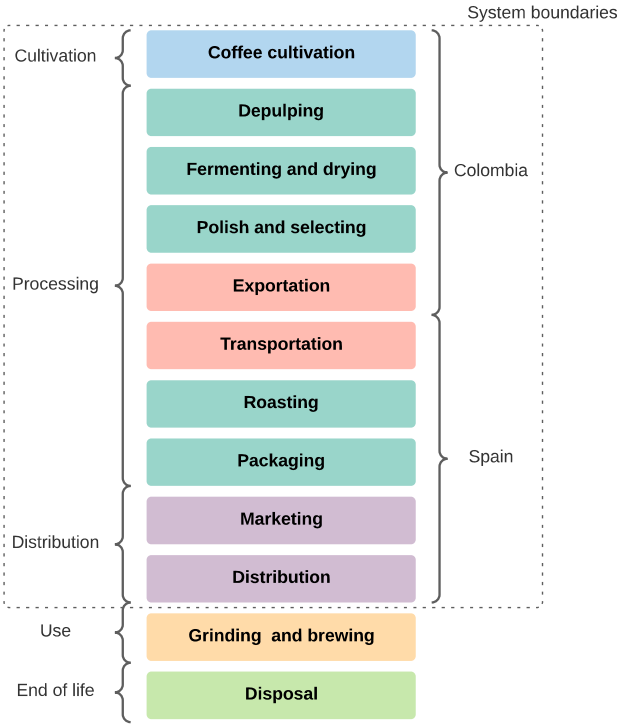


Figure 1 Life cycle diagram, system boundaries, and geographical distribution of the two coffee systems

2.2.2. Functional Unit

The functional unit (FU) considered for the analysis of both systems is 1 kg of roasted coffee beans, equivalent to approximately 74 cups of coffee.

2.2.3. Economic inventory

Error! Reference source not found. describes the added value distribution of the coffee systems. The total cost of the generic coffee is 11.69 €/kg of which only 12% resides in the cultivation stage. Most of the profit margin in this product resides in the second processing (roasting) (33.9%) and marketing (36.0%) stages that occur in Spain.

In contrast, the fair-trade coffee has a significantly higher market price (23.83 €/kg), most of which resides in the cultivation stage (30.4%) due primarily to the premiums paid by traders in compliance with fair-trade certification. Even though the cost per unit of mass of second processing (5.84 € vs 3.98€) and marketing (6.2€ vs 4.2 €) stages are comparatively higher than in the generic coffee (due to the higher quality standards applied), the contribution of these stages to the market price of the final product is significantly lower.

2.3. Social hotspot assessment

The analysis was conducted using the 2021 version of SHDB database and using the economic inventory described in **Error! Reference source not found.**. The original dataset for cultivation in Colombia (Crops nec/COL U) was modified to model the indicators risk

Table 1 Economic description of the value chain of the generic (GC) and the fair trade (FTC) coffees

Stages	Country	CG		FTC	
		EUR	% retail price	EUR	% retail price
Cultivation	Colombia	1.43	12.00	7.24	30.40
First processing		0.06	0.70	0.28	1.20
Exportation		0.15	1.40	0.96	4.00
Trasportation	Spain	0.06	0.70	0.16	0.70
Second processing		3.98	33.90	5.84	24.50
Marketing		4.23	36.00	6.20	26.00
Distribution		0.71	6.00	0.96	4.00
Taxes		1.07	9.20	2.19	9.20
	Total %	11.69	100.00	23.83	100.00

levels according to the information contained in the "Public List of Compliance Criteria - Small producer organizations" (NSF Checklist SPO 7.31 ES-ES) produced by FLOCERT, the certification body for fair trade[7]. The methodological decision was to modify only those indicators that were directly affected by the compliance criteria.

Only 41 out of the 154 indicators described in the SHDB were modified, while the other 115 were left unchanged. The risk level selected for each indicator (VH, HR, MR, LR) in the fair-trade cultivation dataset was determined considering the "risk level assessment rules" published by SHDB and the expected consequences of the compliance, according to our expert judgement, which in some cases was not perfectly objective.

The construction and analysis of the life cycle coffee models was carried out using SimaPro v9.1.1 and the impact assessment methodology "Social Hotspot 2019 Subcat & Cat Method w Damages". An exchange rate of 1.2229 U$/€ (European Central Bank) and a general national inflation rate for Spain (2011-2021) of 9.7% (Spain's National Statistics Institute - INE) were used.

3. Results and discussion

Error! Reference source not found. illustrates the social risks associated with the life cycles of the low-cost generic coffee (right) and organic fair-trade premium coffee. Surprisingly, the results show that the aggregated social risk of the organic fair-trade coffee (608 mrheq/kg) is significantly higher than the low-cost (188 mrheq/kg). In both cases, the largest contribution comes from the cultivation stage (89.1 mrheq in the conventional compared to 382.5 in the fair-trade coffee), followed by the export (Co) and roasting (Sp) stages.

Error! Reference source not found. shows that the Governance is the category generating most of the social risks in both coffee systems, followed by Health and Safety and Human Rights. However, the contribution of Labor Rights and Decent Work, which is the social category most directly affected by the fair-trade designation is comparatively lower.

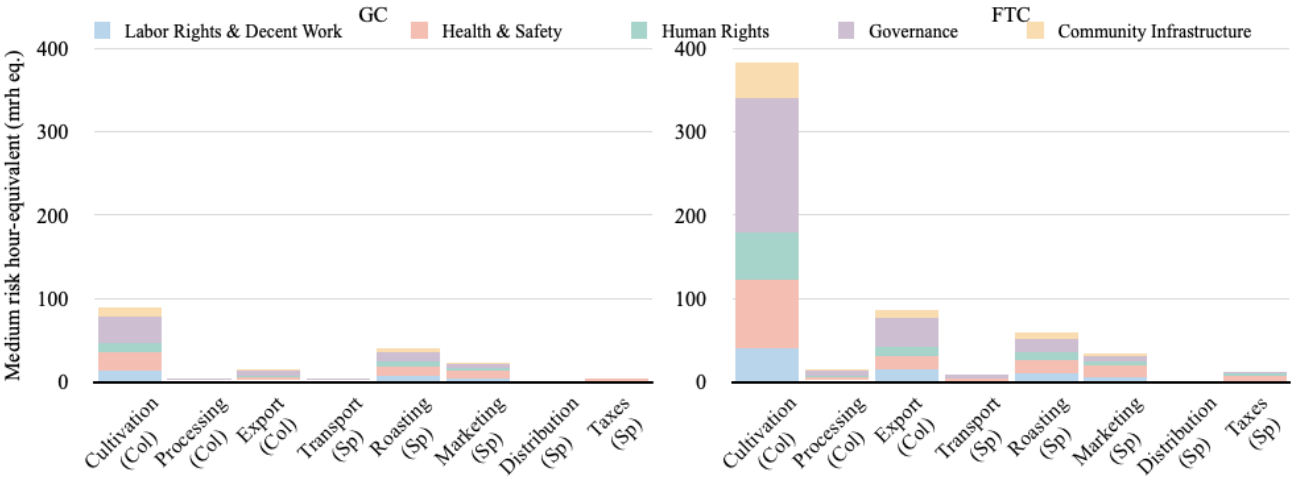
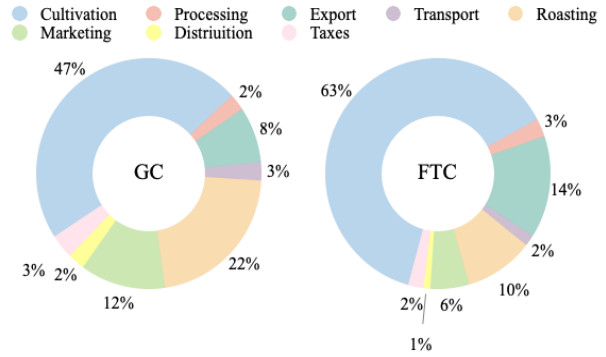


Figure 2 characterized social risks associated with the value chain of the low-cost generic (left) and the organic fair-trade coffees.

Additionally, *Figure 3* shows that cultivation is the life cycle stage contributing the most to the social risks of the two coffee systems, and that this contribution is significantly higher in fair-trade (63 %) than in the generic coffee (47 %). It may also be calculated in geographical terms that the social risks generated in Colombia increase



from 60% of the total in the generic coffee to 81.4% in the organic fair-trade system.

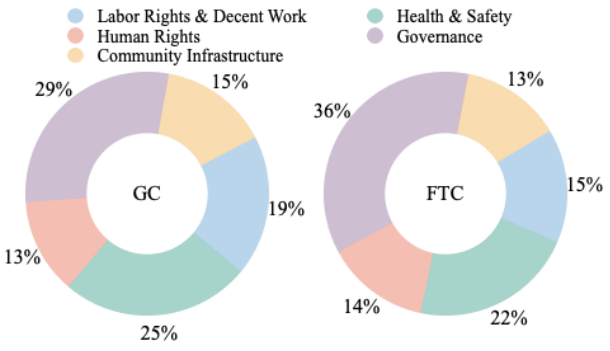


Figure 3 Contribution of life cycle stages (top) and social categories to the social risks of the generic (GC) and fair-trade (FTC) coffee systems.

At this point it is necessary to assess whether these results are real or the result of a methodological artefact. It becomes apparent that the actual increase in commercial activity is dedicated to improving social conditions and should therefore not be penalized. However, the higher cost of the fair-trade coffee offsets the lower risk values assigned to the indicators describing the cultivation stage.

This is so for different reasons. First, because of the limited number of indicators affected directly by the fair-trade compliance criteria (only 41 out of the 154 indicators used by SHDB). One solution to this would be to modify the risk level of a higher number of indicators in the cultivation process, considering also those affected indirectly by the fair-trade designation. This would reduce the overall social risk of the cultivation system per monetary unit, alleviating the alleged social burdens of the sustainable coffee.

Another option could be to alter the values arbitrarily assigned to each risk level by the SHDB methodology (VH = 10; HR = 5; MR = 1; LR = 0.1). Increasing the spread would increase the weight of the risk level of the process to the detriment of the economic value of the product.

Another option could be to model both products using a monetary value as functional unit (e.g., 1 U$). However, this decision appears to be at odds with the core principles of life cycle assessment (LCA) methodology, since this monetary unit would generate less functionality in the more expensive product. Still, to better evaluate this option, **Error! Reference source not found.** illustrates a comparative analysis of the social risks generated by 1 U$ spent on the conventional cultivation sector in Colombia (Crops nec/COL U) and on the same dataset adapted to the fair-trade compliance criteria.

The results identify the social benefits of the fair-trade initiative in several of the social subcategories considered in SHDB (e.g., poverty, child labor, forced labor, freedom of association, unemployment, discrimination and injuries and fatalities). However, these benefits are be observed in other subcategories regulated by indicators that are not directly affected by the designation (e.g., corruption, high conflict zone, legal system, communicable diseases, access to hospital beds) or in indicators where the cultivation organization has no control (e.g., country administration, net migration rate, % of population that is indigenous, etc.).

While the proposals discussed above would alleviate the magnitude of the artefact, the reality is that none of them provide a solution to the flawed fact that the SHDB

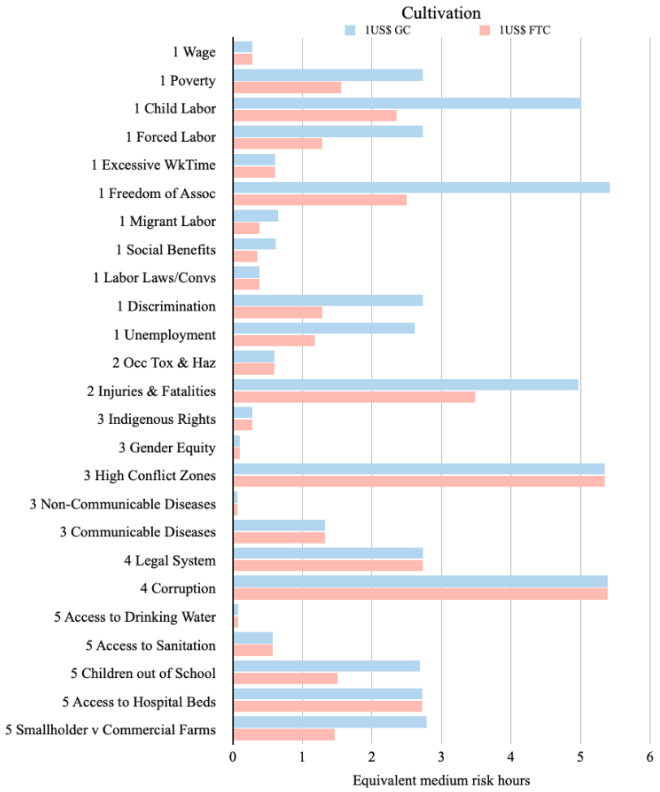


Figure 4 Social risks per 1 U$ spent in the cultivation sector in Colombia (Crops nec/COL U) and that adapted to the conditions of the fair-trade designation.

methodology assigns a social risk to costs devoted exclusively to improving the social conditions of the product (e.g., worker's remuneration, poverty).

To address core of this issue, the authors propose that the analyst needs to consider the multifunctional nature of the fair-trade product and apply an economic allocation approach. One of the functions should be related to the capacity of the fair-trade system to improve the social conditions of the producers. Once stripped from this additional function and associated cost, the sustainable product is ready to be compared against any unifunctional system of similar characteristics using the SHDB methodology.

Applying this rational to the comparative analysis of the generic and the fair-trade coffee, it would be first necessary differentiate its two distinctive functions in the latter: first, the one associated with it being a beverage, which should be allocated with same cost as the standard coffee; and second, the function of contributing to the social welfare of the producers, which should be allocated the cost associated with the fair-trade designation. In this particular case where the fair-trade coffee is also of higher quality due to its organic designation, a third function could be incorporated relating to its superior sensory properties. This extra function is not provided by the generic product and could be allocated an extra cost. This methodological proposal will be tested in ensuing investigations.

4. Conclusions

- The potential of using generic databases to quantify the social benefits of the fair-trade designation has been tested using coffee as a case study. The procedure involved modifying the risk values assigned by the SHDB to the indicators of the sector affected directly by the designation (cultivation). Although this was carried out considering the compliance criteria published by the fair-trade certifier and the "risk level assessment rules" published by the SHDB, this step incorporates a high level of uncertainty.

- Applying this strategy straightaway is flawed because the extra costs dedicated to improving the social conditions of the coffee producers are registered in the method as a social burden. Hence, these higher costs offset the benefits caused by the reduced risk values, resulting in higher overall social burdens in the fair-trade product.

- A solution to this problem would involve applying a multifunctional and economic allocation approach to the sustainable coffee system. This requires considering not only its role as a beverage but also as a contributor to the social welfare of the producer and allocating the economic costs accordingly.

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