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# The true price of chocolate?

**KEYWORDS:** value chain, cocoa, chocolate, price, true cost economics

**Abstract** Chocolate prices generally do not incorporate many of the environmental and social externalities, costs which are incurred as the main ingredients such as cocoa and sugar move from farms, to factories to consumers. Nor do prices reflect the benefits of non-conventional production and alternative modes of governing supply chains. Most costs occur at farm level, although manufacturing the ingredients and creating end products such as chocolate bars also brings with costs to nature and society. As corporate and consumer social responsibility has risen up business, political and social agendas, business cases are being made to change the status quo. Prices are starting to reflect economic as well as environmental and social costs. Identifying and agreeing how to measure both costs and benefits can aid decisions about who, where and how such externalities are borne.

## INTRODUCTION: WHAT'S IN A PRICE?

Prices are generally derived from market transactions, indicating the value of goods and services. A price can be seen as an 'objective' measure of value when markets are competitive, mirroring the values that individuals place on commodities. In reality however, not all products have a price, and if they do, different societal groups perceive value differently. Rudolf Steiner coined the concept of true price in 1905, seeing it as when a person receives, as counter-value for a product they have made, sufficient to satisfy their (and their dependants) whole needs, until they produce a like product (1). The more recent concept of true cost economics addresses the costs and/or benefits of externalities in pricing. Externalities can be direct or indirect to the environment and to people other than the consumer of that product. Often these externalities are hidden, leaving a footprint which has led to economic distortions and inefficiencies, causing and contributing to many of wicked global problems such as biodiversity loss, climate change, pollution, poverty and inequality (2). The assumption behind both true price and true cost is that if externalities are recognised, measured, monetized and internalized, both individuals and society can use the true price to decide if the benefits of such products outweigh the real, societal costs and benefits. Political and economic decisions can then be made about who bears such costs: the organisation providing such products, others in a supply chain, the consumer, and/or others in society. Interest in internalising environmental and social costs has led to renewed attention to true pricing and costs in the last five years illustrated by conferences (1), consultations (3) aiming to ignite change in policy, business and civil society (4) and a Dutch charitable foundation.

This article explores true costs and pricing using the example of chocolate. Cocoa is one of its main ingredients, derived

from the 'beans' (seeds) of the *Cocoa theobroma* tree, constituting 10 percent to 99 percent of the total product\*. Sugar comprises from 2 to 55 percent of chocolate, mostly obtained from *Saccharum* genus grasses. Other common ingredients include soy lecithin, flavours such vanilla, fruits and nuts, and in milk and white chocolate, milk products. The personal, societal and environmental impacts of chocolate have been prominently decried (5, 6, 7). This contrasts starkly with its status as a product relished, celebrated and worshipped for centuries. Grown in the tropics and subtropics, cocoa and sugar cane have been increasingly cultivated in the last three centuries. Consumption of both has grown dramatically, mainly in developed countries and increasingly in emerging economies. In 2012, around 4.08 million tons of cocoa (8) and 175.2 million tons of cane sugar were produced (9). The global chocolate industry was worth \$83.2 billion in 2010 (10).

## METHODS

A literature review on true prices and true costs was supplemented with primary data from interviews cocoa farmers and traders in Indonesia, Cameroon, Ghana and Ivory Coast from 2010 to 2014; an interview with chocolate manufacturer Tony's Chocolonely in November 2014; and a life cycle assessment based on literature\*\* and interviews with organisations active in the chain in 2013.

## CONCEPTS

To frame true costs, the value chain concept is used. A value (market, supply or commodity) chain concerns the activities involved creating a product from raw material, through

processing and production to delivery to final consumers and ultimately disposal (11). It includes farm level production (i.e. harvesting, primary ingredient processing), transport, and final product manufacture (including processing, design, packaging, marketing, distribution and supporting services) and can range from a local to global level. Such activities may be conducted by different people and organisations, termed stakeholders, such as farmers, labourers, traders, manufacturers, retailers and service providers. Chains and products embody multiple relations of value – often explicitly economic but also social and environmental, strongly influenced by culture (12, 13). Sustainability is a core aspect in chains based on natural resources (14). Life cycle assessment is a method to assess ecological and human impacts connected with the complete life cycle (creation, use, end-of-life) of products, processes and activities (15).

## RESULTS AND DISCUSSION

### What does a bar of chocolate cost?

Based on a 200g milk chocolate bar costing €2, cocoa comprises around 10 percent of total costs; sugar 1 percent; milk products 6 percent; production, packaging and marketing and profits around 78 percent and tax 6 percent. A different way of looking at costs is to examine the proportion each stakeholder in the chain obtains. Farmers obtain a share of around 3.5 to 6.5 percent, processors and manufacturers 51 percent, advertising 6.5 percent and retailers 28 percent, and transporters around 4 percent (16, 17). However, the real costs tell a different story. Table 1 indicates the main economic, environmental and social costs in the chocolate chain, based on the main ingredients. Although data is imperfect and sometimes lacking, an initial attempt to value the real cost of a typical 200g 70 percent pure chocolate bar in 2012 indicated that 70 percent are economic costs, 7 percent environmental and 23 percent social costs (18).

### Who bears the costs?

The life cycle assessment of chocolate summarised in Table 1 highlights that around 60 to 70 percent of impacts in the chain occur at farm level. As smallholder cocoa farmers and sugarcane workers are generally living on or under standard poverty levels in developing countries (19), these impacts are often borne by those who can least afford to carry additional externalities. In contrast, trading, manufacturing and retail activities are dominated by Fortune 500 listed multinationals (Nestlé, ADM, Mondelez International, Hershey,

Value chain segment	Impact vector	Impacts	Significance
Farm and primary processing	Animal welfare	Animal welfare	High
		Animal feed productivity	High
	Environmental	Environmental impacts of farm practices (air, soil and water pollution due to farm inputs, wastes and emissions)	High
		Sustainability of ingredient sourcing	High
		Land conversion, deforestation and degradation	High
		Inefficient and unsustainable land, water, energy and materials use	High
	Social	Health and safety of labourers and communities	High
		Labourer's and communities right's (decent work, respect for children's and workers' rights, respect for traditional land use and tenure)	High
		Social impacts of farm and trading practices (payment under living wage, forced labour, unfair business practices)	High
	Economic	Cultivation and primary processing costs	Low
Transport	Environmental	Energy use, emissions and effluents (air, soil and water pollution from manufacturing)	Medium
	Economic	Transport costs	High
Manufacture	Environmental	Emissions and effluents (air, soil and water pollution from manufacturing)	Low
		Materials use and sustainability of packaging	Medium
		Energy consumption - chocolate manufacturing	High
		Energy consumption - processing ingredients	High
	Social	Worker health and safety	High
		Community health and safety	Low
Economic	Ingredient processing and chocolate product manufacturing	High	
Retail	Social	Health and safety of workers	Low
	Environmental	Emissions and effluents (air, soil and water pollution from manufacturing)	Low
	Economic	Retailing costs	High
Use and disposal	Social	Consumer health – consumption	Low
	Environmental	Emissions and effluents (air, soil and water pollution from packaging waste)	Low
	Economic	Waste disposal costs	Low

Table 1. Social and environmental impacts along the chocolate value chain.

Unilever, Woolworths, Royal Ahold) and some of the largest public (Barry Callebaut,) and private companies in the world (Mars, Cargill, Olam). In 2012, four companies had around 20 percent of the manufacturing volume and four dominated 40 percent of grinding and trading (6).

### An additional complication: variable supply, growing demand and fickle prices

Cocoa and sugar are subject to considerable fluctuations in supply. Annual global production and quality are seasonal and strongly affected by the weather, pests and diseases. Longer term, structural impacts on supply include farmer interest, the enabling environment and infrastructure available to farmers and grinders, farm age, productivity, substitute materials and demand for processed products. Violent conflicts, natural and political disasters have also had unpredictable effects on supply. Both chains have historically responded strongly to market price signals, albeit with longer time lags in the cocoa chain. Steadily increasing demand for chocolate has raised - so far unfounded (20) - fears of a shortage of cocoa. Likely supply deficits in the next years are expected to be cushioned by stocks. Rising demand is forecasted for both the raw material and chocolate in developing countries which is also anticipated to further accelerate production increases. Fuelled by the differing interests of some stakeholders, demand-supply balance discussions and subsequent price fluctuations have overshadowed the true cost and benefit debate.

### Comparing values over time

Measuring economic costs using transaction values (i.e. prices and quantities) is only possible if comparable products are compared over time. This time-bound perspective is important, as chocolate has changed from a luxury

to affordable, widely available, heavily branded and differentiated product in the last forty years (21). Farming methods have changed too: sugar cane, a perennial crop is now often replanted every two to three years. However cocoa trees, which can be harvested for 40 to 100 years, continue to be mainly traditionally, manually farmed on a small scale. Capturing such changes are vital to measure social impacts over time, using indicators such as living wage (22) and consumption (23), and environmental impacts, such as deforestation and degradation caused by farming (24).

heavily on investment costs, the proportion of "premium" payments paid to farmers and their cooperatives, and the cost of farm work (31), (which is linked to decent wages, and the use of forced and child labour). Both structural investment in sustainably enhancing productivity, social infrastructure and higher buying prices are needed to counter underpayment and create a living wage (18, 32). An example of a non-conventional approach to internalise costs by a small manufacturer has been to collaborate more closely with suppliers, adopt voluntary standards such as Fairtrade and UTZ, combined with an increased premium payments above conventional prices to farmers of 6 percent and a 31 percent to cooperatives; and additional activities addressing the highest rated impacts.

This resulted in reducing environmental and social costs by 9 percent and 32 percent respectively. Although this resulted in around 21 percent higher economic costs, the total true price is 19 percent lower than for a conventional bar of chocolate (18). The underlying preventative philosophy is that it is better and cheaper to invest in preventing negative impacts, than paying for mitigation afterwards.



### Reducing externalities – the undesirable costs

Experiments to internalise externalities include economy-wide and commodity specific pricing reforms, market based instruments such as "green" taxes, tradeable pollution and emissions permits, ecosystem services markets, such as carbon and water, voluntary sustainability standards, increased transparency and changed chain governance mechanisms. The Abidjan Declaration by 29 stakeholders in the chocolate chain (25) effectively publically acknowledged costs, and seeks ways to make these visible. Chain-focused, multi-stakeholder initiatives and public private partnerships are taking place across the sector, and in high chocolate consuming countries such as The Netherlands, Switzerland and Germany. These are driven by changes in chain structure and networks; increasingly differentiated consumer products; realization of the limits of lone corporate and public sector activities; and the geographically changing nature of demand and producers – as farmers and workers shy away from producing the key ingredients (26). It's increasingly realized that voluntary certification schemes alone are insufficient to overcome all externalities (27). Also by the recognition that although farmers and their cooperatives are likely to benefit from certification over time periods of up to six years, some types of farmers are less likely to benefit. A significant proportion of the costs of certification are carried by farmers and cooperatives (28, 30). For investments by farmer groups and farmers in certification to be financially viable, average production per farmer needs to be in the range from 1.12 to 2.77 tons per farmer, a level which most West African farmers do not achieve and which has been difficult to measure. Benefits depend

### CONCLUSIONS

Despite inaccuracies and missing data, evidence indicates that the price of popular consumer luxury products such as chocolate does not include many of the environmental and social costs incurred during the farm-to-mouth cycle. Nor do prices reflect the benefits of non-conventional production and chain governance. While most externalities occur at farm level, processing and transport also create costs. With responsible consumption and corporate social responsibility high on business, political and social agendas, business cases are being made to change the status quo. These show how imperative it is that prices reflect not both economic, environmental and social costs. A consensus needs to be developed with all stakeholders in the value chain from farmer to consumer to clearly identify and define these costs and benefits, and the acceptability of who and where both costs and benefits are borne. This requires refining the methods of measuring these costs and making costs in different countries and chocolate products comparable. Maybe chocolate could then really be considered as "food of the gods", as the Greek name for cocoa indicates, rather than the Mexican Aztec term xocolātl "bitter water".

### ACKNOWLEDGEMENTS

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## ANNEX 1: LITERATURE REVIEW

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\*Regulations specify the minimum amount of cocoa (also known as cacao) and its derivative products such as chocolate liquor, cocoa butter and cocoa powder in chocolate products and their labelling as such. The US Food and Drug Administration requires milk chocolate to contain at least 10 percent cocoa, bittersweet chocolate at least 35 to 84 percent and bitter chocolate 85 to 99 percent. The European Union Directive 2000/36/EC states that chocolate products must contain not less than 35 percent total dry cocoa solids, 18 percent cocoa butter, 14 percent of dry non-fat cocoa solids and that other vegetable fats may be added.

\*\*Full list provided in Annex 1.