
Verina Ingram

VERINA INGRAM
LEI Wageningen UR, Alexanderveld 5, PO Box 29703, 2502 LS, Den Haag, The Netherlands

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 sub-tropics, 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).

Value chain segment	Impact vector	Impacts	Significance
Farm and primary processing	Animal welfare	Animal welfare	High
	Environmental	Animal feed productivity	High
		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 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.

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, 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).

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 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.

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

With thanks to the farmers and companies interviewed, and to Arjen Boekhold at Tony's Chocolonely for sharing information on their costs and benefits.

ANNEX 1: LITERATURE REVIEW

Allione, C., De Giorgi, C., Lerma, B., & Petrucelli, L. (2011, August). Sustainable food packaging: A case study of chocolate products. Paper presented at the 5th International Conference on Life Cycle Management: Towards Life Cycle Sustainability, Berlin, Germany. Retrieved from PORTO Publications Open Repository Torino.

Beckett, S. (Ed.). (2009). Industrial chocolate manufacture and use. 4th ed. United Kingdom: John Wiley and Sons.

Bolenz, S., Amtsberg, K., & Lipp, E. (2005). New concept for fast continous conching. European Food Research and Technology, 220(1), 47-54.

Bolenz, S., Manske, A., & Langer, M. (2014). Improvement of process parameters and evaluation of milk chocolates made by the new coarse conching process. European Food Research and Technology, Published Online. doi:10.1007/s00217-014-2165-4

Bradman, A., A. L. Salvatore, M. Boeniger, R. Castorina, J. Snyder, D. B. Barr, N. P. Jewell, G. Kavanagh-Baird, C. Striley and B. Eskenazi (2008). Community-based intervention to reduce pesticide exposure to farmworkers and potential take-home exposure to their families. Journal of Exposure Science and Environmental Epidemiology, 19(1), 79-89.

Bryan B.A., Barry S., & Marvanek S. (2009). Agricultural commodity mapping for land use change assessment and environmental management: an application in the Murray-Darling Basin, Australia, Journal of Land Use Science, 4:3, 131-155, DOI:10.1080/17474230802318722

Busser, S., & Jungbluth, N. (2009). LCA of chocolate packed in aluminum foil based packaging. ESU-Services Ltd. Uster, Switzerland. Retrieved from http://www.alufoil.org/tl_files/sustainability/ESU_-_Chocolate_2009_-_Exec_Sum.pdf

Büsser, S., & Jungbluth, N. (2009). The role of flexible packaging in the life cycle of coffee and butter. International Journal of Life Cycle Assessment, 14(SUPPL. 1), S80-S91.

Carpenter, J. E. (2010). Peer-reviewed surveys indicate positive impact of commercialized GM crops. Nature Biotechnology, 28, 319-321.

Castanheira, E. G., & Freire, F. M. (2011). Environmental performance of palm oil biodiesel: A life-cycle perspective. Paper presented at the Proceedings of the 2011 IEEE International Symposium on Sustainable Systems and Technology, ISSST 2011.

Cohen, M., Connon, C., & Silverstein, B. (2003). Safety in the food processing industry. Professional Safety, 48(11), 20. Retrieved from http://www.highbeam.com/doc/1P3-463423071.html

Cool Farm Institute. (2012). Retrieved from Cool Farm Tool: http://www.coolfarmtool.org/

Deloitte Development LLP. (2009). Lifecycle assessment: Where is it on your sustainability agenda? Retrieved from https://www.deloitte.com/assets/Dcom-UnitedStates/Local percent20Assets/Documents/us_es_LifecycleAssessment.pdf

Eskes, A. B., ed. (2011). Collaborative and participatory approaches to cocoa variety improvement. CFC Technical Paper No. 59, CFC/ICCO/Bioversity.

European Environment Agency. (1997). Life cycle assessment (LCA): A guide to approaches, experiences, and information sources. Environmental Issues Series, 6. Retrieved from file:///C:/Downloads/Issue-20report-20No-206.pdf

FAO. (2012). Global food losses and food waste. Food and Agriculture Organization of the United Nations.

Field to Market. (2013). Retrieved from Field to Market: The Alliance for Sustainable Agriculture: http://www.fieldtomarket.org/

Food and Agriculture Organization. (2013). Toolkit - Reducing the food wastage footprint. Natural Resources Management and Environment Department. Retrieved from http://www.fao.org/docrep/018/i3342e/i3342e.pdf

Food and Agriculture Organization. (2013). Toolkit - Reducing the food wastage footprint. Natural Resources Management and Environment Department. Retrieved from http://www.fao.org/docrep/018/i3342e/i3342e.pdf

German Engineering Federation (VDMA). (2009). Guideline: Energy efficiency in the confectionary industry. Technical Report developed by Working Group: Machines and Equipment in the Confectionary Industry.

Gunders, D. (2012). Wasted: How America is losing up to 40 percent of its food from farm to fork to landfill. Natural Resources Defense Council. Issues–Food and Agriculture. Retrieved from http://www.nrdc.org/food/files/wasted-food-IP.pdf

Health and Safety Executive. (2005). A recipe for safety: Occupational health and safety in food and drink manufacture. [Sudbury, Suffolk]: Great Britain Health and Safety Executive.

International Labour Organization. (2002). Agriculture; plantations; other rural sectors: Safety & Health - Sectoral Activities. Retrieved from http://www.ilo.org/global/industries-and-sectors/agriculture-plantations-other-rural-sectors/lang--en/index.htm

International Labour Organization. (2010). Code of practice on safety and health in agriculture. Retrieved from http://www.ilo.org/global/publications/books/WCMS_159457/lang--en/index.htm

Iowa State University. (2014). SoyBase and the soybean breeder's toolbox. Retrieved from http://soybase.org/

Jacobsen, S.-E., Sorenson, M., Pedersen, S. M., and Weiner, J. (2013). Feeding the world: Gentically modified crops versus agricultural biodiversity. Agronomy for Sustainable Development, 33(4), 651-662.

Lopata, A., & Jeebhay, M. (2013). Airborne seafood allergens as a cause of occupational allergy and asthma. Current Allergy and Asthma Reports, 13(3), 288-297. doi: 10.1007/s11882-013-0347-y

National Center for Genome Resources. (2014, March). Legume information system (LIS). Retrieved from http://comparative-legumes.org/

Ntiamoah, A., & Afrane, G. (2008). Environmental impacts of cocoa production and processing in Ghana: Life cycle assessment approach. Journal of Cleaner Production, 16(16), 1735-1740.

Nygren, J., & Antikainen, R. (2010). Use of life cycle assessment (LCA) in global companies. Reports of the Finnish Environment, 16, Helsinki, Finland. Retrieved from https://helda.helsinki.fi/bitstream/handle/10138/39723/SYKEre_16_2010.pdf?sequence=1

Plants for Human Health Institute. (2014). Genome database for vaccinium. Retrieved from http://www.vaccinium.org/

Ronald, P. (2011). Plant genetics, sustainable agriculture and global food security. Genetics, 188(1), 11-120.

The Peanut Foundation. (2014). PeanutBase. Retrieved from http://peanutbase.org/

U.S. Bureau of Labor Statistics. (2013a). Employer-reported workplace injuries and illnesses--2012: Key findings from the 2012 Survey of Occupational Injuries and Illnesses. U.S. Bureau of Labor Statistics. Retrieved from http://www.bls.gov/news.release/pdf/osh.pdf

United States Department of Agriculture, Agriculture Research Service. (2014). Cacao genome database. Retrieved from http://www.cacaogenomedb.org

United States Environmental Protection Agency. (2012, August 15). Life cycle assessment (LCA). Retrieved from Sustainable Technology http://www.epa.gov/nrmrl/std/lca/lca.html

University of Saskatchewan. (2010). KnowPulse - Pulse crop breeding & genetics. Retrieved from http://knowpulse2.usask.ca/portal/

Wang, L. (2009). Energy efficiency and management in food processing facilities. Boca Raton, FL: CRC Press.

Washington State University. (2014). Citrus genome database. Retrieved from http://www.citrusgenomedb.org/

World Cocoa Foundation. (2012). Cocoa market update (Technical Report). Retrieved from http://www.worldcocoafoundation.org/wp-content/uploads/Cocoa-Market-Update-as-of-3.20.2012.pdf

World Organisation for Animal Health. (2010). Introduction to the recommendations for animal welfare. Terrestrial animal health code. Retrieved from http://web.oie.int/eng/normes/mcode/en_chapitre_1.7.1.htm

REFERENCES AND NOTES

1. Goethe Annum. *True Price*. True Price – In Thought and Deed 2014 Retrieved 18 November 2014; http://economics.goetheanum.org/True-Price.5881.0.html.
2. Bebbington, J. and C. Larrinaga, *Accounting and sustainable development: an exploration.* Accounting, Organizations and Society, 2014. 39(6): p. 395–413.
3. True Price, *The Business Case for True Pricing Why you will benefit from measuring, monetizing and improving your impact*, in *Consultation draft*. 2014.
4. ITC, *The interplay of public and private standards literature review series on the Impacts of private standards – Part III*, *Technical Paper*. 2012, Interrnational Trade Centre: Geneva. p. 55.
5. Griek, L., J. Penikett, and E. Hougee, *Bitter Harvest: Child Labour in the Cocoa Supply Chain.* 2010.
6. Cocoa Barometer, *Cococa Barometer*. 2012, VOICE Network, Berne Declaration, FNV, Südwind, HIVOS, Oxfam Werldwinkels, Oxfam Novib, Solidaridad, Stop the Traffik: The Netherlands.
7. Oxfam International, *Behind the brands. Food justice and the ''Big 10'' food and beverage companies*, in *Oxfam Briefing Paper 166*. 2013. p. 52.
8. ICCO, *Cocoa year 2012/13.* ICCO Quarterly Bulletin of Cocoa Statistics, 2013. XXXIX(2): p. 1.
9. FAO, *Sugar. Markets and Summaries*, in *Food Outlook*. 2013: Rome. p. 1.
10. MarketsandMarkets, *Global Chocolate, Cocoa Beans, Lecithin, Sugar and Vanilla Market by Market Share, Trade, Prices, Geography Trend and Forecasts (2011-2016)*. 2013: Dallas.
11. Kaplinsky, R. and M. Morris, *A handbook for value chain research*. 2001, Ottawa, Canada: IDRC. 113.
12. Harilal, K.N., et al., *Power in Global Value Chains: Implications for Employment and Livelihoods in the cashew Nut Industry in India*, in *Summary Report*2006, International Institute for Environment and Development (IIED): London, UK.
13. Hughes, A., N. Wrigley, and M. Buttle, *Global production networks, ethical campaigning, and the embeddedness of responsible governance.* Journal of Economic Geography, 2008. 8(3): p. 345-367.
14. Wiersum, K.F., V.J. Ingram, and M.A.F. Ros-Tonen *Governing access to resources and markets in non-timber forest product chains*. Forest, Trees and Livelihoods., 2013. 23 DOI: http://dx.doi.org/10.1080/14728028.2013.868676.
15. Klöpffer, W. and M.A. Curran, *LCA Compendium - The Complete World of Life Cycle Assessment*. 2014, Dordrecht Heidelberg New York London: Springer.
16. Gilbert, C.L., *Value chain analysis and market power in commodity processing with application to the cocoa and coffee sectors.* Commodity market review, 2008: p. 5-34.
17. Oxfam International, *Towards a Sustainable Cocoa Chain:Power and possibilities within the cocoa and chocolate sector*, in *Oxfam Research Report*. 2009, Oxfam International: Abidjan. p. 24.
18. Tony's Chocolonely, *The True Price of Cocoa. Pilot* in *Final presentation*. 2013, Tony's Chocolonely & True Price Foundation: Amsterdam. p. 43.
19. Chan, M.-K. and B. Pound, *Final report: literature review of sustainability standards and their poverty impact*. 2009, DFID, NRI: London. p. 48.
20. ICCO. *Latest News From The ICCO. ICCO Statement on Reports of a Cocoa Supply Deficit in 2020* 2014 [cited 2014 21 November 2014]; Available from: http://www.icco.org/home/latest-news.html
21. Grivetti, L.E. and H.-Y. Shapiro, *Chocolate: history, culture, and heritage*. 2011: John Wiley & Sons.
22. Anker, R., *Estimating a living wage: A methodological review*. 2011: ILO.
23. Stiglitz, J., A. Sen, and J.-P. Fitoussi, *Report by the commission on the measurement of economic performance and social progress*. 2011, Centre de Recherche en économie de Sciences Po: Paris. p. 64.
24. Blaser, J. and C. Robledo, *Initial analysis on the mitigation potential in the forestry sector*, in *Prepared for the UNFCCC Secretariat* 2007, Intercooperation: Bern. p. 29.
25. ICCO, *Abidjan Cocoa Declaration*. 2012, World Cocoa Conference, Abidjan p. 2.
26. Barrientos, S. *Beyond Fair Trade: Why are Mainstream Chocolate Companies Pursuing Social and Economic Sustainability in Cocoa Sourcing*. in *Paper to ILO/IFC Better Work Conference*. 2011.
27. Ingram, V., Y. Waarts, L. Ge, S. van Vugt, L. Wegner, L. Puister-Jansen, F. Ruf and R. Tanoh *Impact of UTZ Certification of cocoa in Ivory Coast Assessment framework and baseline*. 2014, LEI Wageningen UR: Den Haag, The Netherlands.
28. KPMG, *Cocoa Certification A study on the costs, advantages and disadvantages of cocoa certification* 2012, The International Cocoa Organization (ICCO): The Netherlands. p. 99.
29. Akongo, G., *Community forests. Campo-Ma'an forest, Cameroon*, in *Sustainable management of tropical forests in Central Africa. In search of excellence.* 2003, FAO: Rome.
30. GBCG, Étude sur les coûts, les avantages et les désavantages de la certification du cacao (phase I). 2012, Global Business Consulting Group, ICCO: Abidjan.
31. Kuit, M. and Y. Waarts, *Small scale farmers and standards: Is there a business case? Costs and benefits of standard certification verification systems for small scale poroducers of cocoa, coffee, cotton, fruit and vegetable sectors*. 2014, CTA/LEI: Wageningen.
32. ISEAL Alliance, *A Shared Approach to a Living Wage*. 2013, ISEAL Alliance London.

*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.