S-LCA: Preliminary results of Natura's cocoa soap bar

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Abstract Social Life Cycle Assessment (S-LCA) is a technique that allows the evaluation of positive and negative social impacts throughout the life cycle of a product. Due to the interest in sustainability issues, Natura, a cosmetic company in Brazil, is performing an S-LCA pilot project aiming at understanding the contribution of its social actions. The methodology used followed the Guidelines of S-LCA published by UNEP [1]. This paper describes the firt part of the study, including the goal and scope and data collection in one of the life cycle stages. All the processes took place in Brazil, nevertheless, in different regions of the country, including the Amazon area and the state of São Paulo. The study showed that there are already some data available in Natura's management systems and the evaluation of the cacao agricultural phase. Next steps will consist of collecting further data to evaluate the whole life cycle of the product.

1 Introduction

Social Life Cycle Assessment (S-LCA) is a technique that allows the evaluation of positive and negative social impacts throughout the life cycle of a product [1].
UNEP [1] has identified that there is lack of S-LCA case studies.
Due to the interest in sustainability issues, Natura, a cosmetic company in Brazil, is performing an S-LCA pilot project aiming understanding S-LCA technique to evaluate the contribution of its social actions.
Currently, most soap bars in the market are seen as commodities, but in the last few years, Natura has launched differentiated soap bars, under its Ekos brand. These soaps include specific ingredients of the Brazilian biodiversity, like cocoa butter, sourced from local communities, and produced in a sustainable way such as organic farming. Also, Natura has put in place a specific management system to ensure a sustainable sourcing and relationship with supplier, including a close

follow up of the developpment and crops, fair pricing, participation to local development, as well as a sharing of benefits associated with the products.
Therefore, the goal of the study is to assess the life cycle of a product that includes material from a small community, Natura's cocoa soap bar, one of the main product categories of the companie's portfolio.
In this paper it is presented the scope and preliminary results regarding one of the unit processes / companies involved in the production.

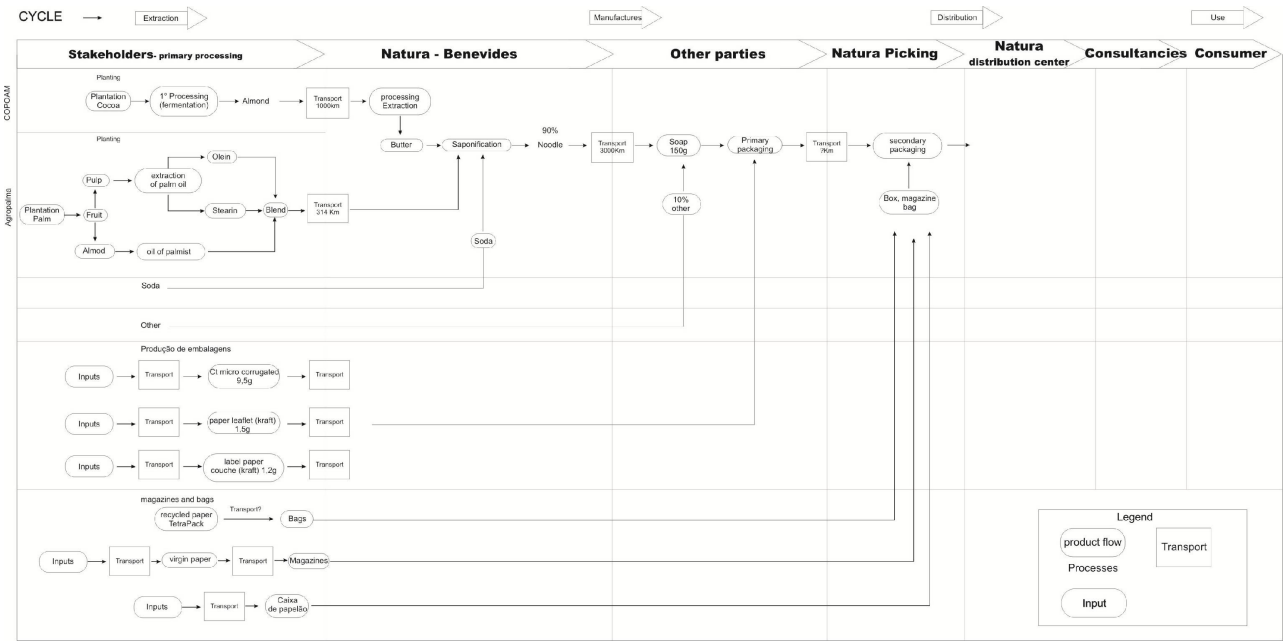
2 Functional unit and flow reference

The method used was based on the Guidelines of S-LCA published by UNEP [1] and the methodological sheets [2]. The functional unit chosen was to to assist in the removal of waste and to perfume a person for a year (one shower a day). According to a study in Nature, each 100 g of soap lasts on average 25 days [3], therefore, 150 g of soap, would last 37.5 days, which means 9.73 soaps per year. In this study, it was considered 10 bars of soap a year.
Additionally, the product must contain organic material, and the packaging should include recycled material. The producer should be recognized in the market, especially in regard to product quality and service offered. Because of the characteristics of the product, the acquisition costs may be higher than the popular products. The product should contain material coming from communities.
Therefore, the reference flow chosen was 10 bars of 150 g cocoa soap, as part of the production involves the extraction of cocoa oil by a local community, which is one of the social actions of the company.

3 Product system

In Figure 1 it is shown the initial product system of the life cycle of the cocoa soap, including the raw and auxiliary materials and the packaging. Data collected corresponded to the production of each raw and auxiliary materials and packaging of the soap. Energy and water for the process were not included. All processes occur mainly in Brazil, despite the fact that few establishments and consumers are abroad. Furthermore, the processes occurred in different regions of the country, including the Amazon area and the state of São Paulo.

Figure 1: Initial product system



During the screening phase, initial data were obtained from the suppliers, to define the boundaries of the supply product system, based on a social criteria. The data During the screening phase, initial data were obtained from the suppliers, to define the boundaries of the supply product system, based on a social criteria. The data included the number of workers involved directly in the process, the week working hours and the total production. Then the working hours were allocated according to the production designated to the reference flow.
Afterwards, it was estimated that each worker has a journey of 44 hours per week and that the number of weeks worked per year is 48 (excluding vacation), except in the cocoa harvesting, which varies along the year, in which it was considered a 6 months intensive work (each month with 4.5 weeks), although there is also maintainance during the remaing part of the year. Working hours was then obtained using equation 1:

$$W_h = \frac{W \cdot h \cdot n}{p} \tag{1}$$

Where: W_h is the working hours,
W, the number of workers,
p reflects the total production (mass),
h representes the hours/week and,
n, the number of weeks/year.

Working hours were multiplied by the consumption required for the functional unit, according to equation 2:

$$W_{F.U} = W_h \cdot c \tag{2}$$

Where: c is the consumption of each material, given by mass.

Later processes as picking, held at Natura, distribution, consultants and consumers will be included in the product system.

4 Inventory analysis

Several questionnaires for each impact subcategory were developed and they were compared with data that is already collected by several departments of the company, as Natura already evaluates the relationship with several stakeholders.

Thus, as far as possible, these questions were included in the questionnaire, instead of applying new ones.
An example is the QLICAR internal assessment system (Quality, Logistics, Innovation, Competitiveness, and Customer Relationship) a corporate supplier system developpedt in 2004 to ensure transparency and improve relationships between Natura and its suppliers.
Since then, the program holds an annual QLICAR Satisfaction Survey with the suppliers to evaluate the relationship between them and Natura.
To perform the triangulation of data from workers, the information should be collected in different sectors within and outside the company. Therefore, different questionnaires were developed.

5 Results

5.1 Goal and Scope Definition of the Cocoa Soap Bar

Production data and working hours were collected for each stage of production of soap, as shown in Table 1. Note that not all the companies involved provided the information requested and it was decided that if they do not even send these answers, they will not show any interest of the remaining information requested. As the pilot project aims to evaluate the application of the technique, no further contact was performed. The companies that answered represent 86% of the mass of the product.
Nevertheless, the information provided by the palm oil industry corresponded to the Natura consumption and the total workers involved in the production (industry and farm). Thus, we chose to use the data of the total production of palm oil, which amounted in 2010 to 130,000 t [3].
The soap bar production and the picking process (the latter in Natura) will be included in the study, therefore, the working hours information were not collected.
In the case of cocoa butter, due to unavailability of data on both the production and working hours, values were estimated as follows:

1) That the annual production amounted to 800 t [4], and;
2) In relation to working hours, it was assumed that:
   * there were three workers in each of the 150 families in the cooperative [5] and;

* the work period corresponding to 6 months throughout the year (crop + second crop, the CUP, check out other activities, considering that the cocoa gives the whole year).

As a result, it is observed in the last column of the table, the working hours per ton of raw material / product.

Table 1: Production and working hours in 2010

Raw material	Suppliers	Production [t/year]	[h/year]	[h/t]
i	A	130000	10091136	77,6
ii	B	100	422400	4224,0
iii	C	480	21120	44,0
iv	C	167,04	16896	101,1
v	C	144	16896	117,3
vi	D	1029	128128	124,5
vii	C	144	16896	117,3
ix	D	167,04	16896	101,1
x	E	6	25344	4224,0
xi	F	500000	42240	0,1
xii	G	6038	497564,6	82,4
xiii	G	6038	497564,6	82,4
xiv	H	274,27	208455,7	760,0

The percentage of the inputs (in weight) is shown in Figure 2. These data were applied in Equations 1 and 2 and then a cut-off criteria of 1% was used, which resulted in two raw materials to be included in the assessment: cocoa butter and palm butter (i and ii in Figure 2).

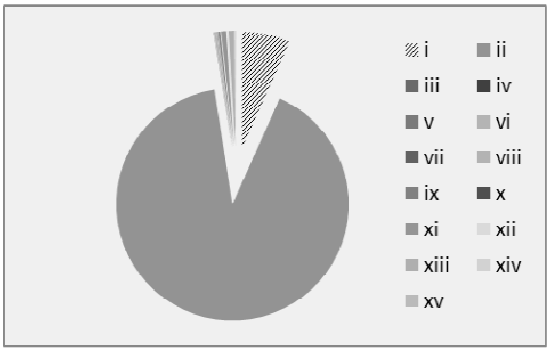


Figure 2: Inputs for Natura's cacao soap bar

5.2 Life Cycle Inventory of the Cocoa Soap Bar

At this stage of the project, only data related to the production of cocoa butter were obtained, from the agriculture (planting, cultural practices) to the first almond processing (drying).
This production is held by family farming in the Transamazon region.

5.3 Cocoa production in the Transamazon region

Agricultural activity in the Transamazon region began with the production of grains in the early 70s, which was converted to sugar cane plantation in 74 and cocoa in 76, as a result of the occupation plan of the Amazon. Due to good climatic conditions found for cocoa cultivation, the culture has been expanded since then. Currently 25% of cocoa produced in Brazil comes from one of the states of the region (Para), whose participation has been growing over Bahia.
According to CEPLAC [4] and the Foundation of Living Produce and Preserve [5 and 7] the cocoa-growing is more profitable and involves a higher number of workers than livestock production. In fact, while cocoa production needs of a family for every 5 ha, livestock demands just one person for every 200 head, which occupy 160 ha.

5.3.1 Organic cocoa production

To reduce environmental impacts and achieve a differentiated market for family farms, cooperatives of organic cocoa production were created in Pará. Currently around 120 properties are certified, which includes approximately 150 cooperators involving about 150 families of sharecroppers (meieiros).
The first unit process considered in the study is agricultural production. In Figure 2 it is shown the subprocesses. Farmers must take special care in relation to land use and especially deforestation, due to the fact that the farms are in the Amazon region.
The Brazilian Forest Code changed in 2001, reducing the amount of legal reserves (the minimum area of vegetation on the properties in the Amazon) from 50%, as established in 1965 to 80%. The old lands, therefore, are still facing the results of these changes, which are not beyond legal compliance. In 2010, however, though highly criticized by environmentalists, it was approved by a Special Project Board, in which it was forgiven the deforestation carried out until 2008 [8].

To be considered legal reserve, the presence of seven varieties of native species, in addition to cocoa, must be found in the land. As cocoa production demands some percentage of shadow, the transformation of pasture to cocoa production is a business opportunity in the region.

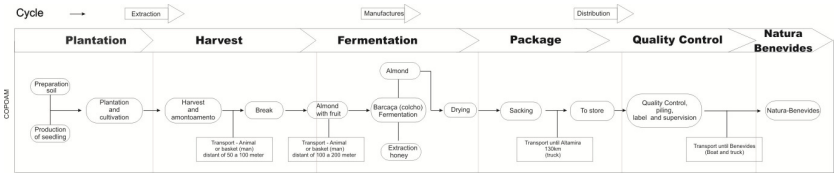


Figure 3: Flowchart of the organic cocoa agricultural production

5.3.2 Data collection

In 2005, the first organic cocoa cooperative was formed (COPOAM). Currently (2011) there are six cooperatives and two others are being formed. This study is covering only COPOAM. Chalk applied a survey in 2010 to evaluate the number of persons involved in the organic cocoa production in the region [4]. From the 120 certified farms in the six cooperatives, 95 responded. The resuls showed that the properties contain 150 members, involving 529 families, with 79 employees and sharecroppers (families). Furthermore, in 49 properties, there are day workers and in 45, none.

In each household leaves on average, 4.4 people [4], and in general, three of them work in the cocoa production [5].

Despite significant gains, there are still many demands, such especially in the early years of plantation culture, which needs to skim the planting area. Thus, FVPP (Foundation Live, Produce and Preserve) has been providing "cocoa-kit "(plastic to cover the transport boats, lawn mowers, covered barge) to facilitate the work. Each kit has a cost of about $ 5,000.00 and supports one family.

Natura has also contributed to the communities, not just customers, but also providing tarps to assist in the drying process. With this, the company not only contributes to the community but also ensures increased productivity and quality of inputs used in their products.

A characteristic of the organic cocoa beans production in the life cycle of the soap is the way of organizing farmers into cooperatives. This characteristic makes them, in some cases, both suppliers of Nature as well as workers, besides the participation of everyone in the local community. Therefore, these people contributed to the response of all three questionaires.

To be a cooperative, the area is going through a conversion process of traditional cocoa to organic cocoa, which takes three years. The elimination of chemical allows the certification of the producer and participation in the cooperative.

It was further observed that in many cases, laborers are not paid, with an informal working hours exchange among the farmers/sharecroppers.

In Table 2 it is presented a summary of the results obtained. Some positive impacts of the organic practices are the healthy conditions of the workers, the local community and the environment, as no pesticides are used.

As for freedom of association and collective bargaining, although present, it was identified that almost no worker is in the union, due to the fees.

On the other hand, the organic cocoa production still maintains some forbidden practices in the ILO and the Brazilian legislation. An example is the presence of child labour, despite the fact that, in all of the cases, the children are attending the school, even though in some cases, with difficulties (lack of proper transportation or school lunches). It is important to highlight that one of the interviewed persons mentioned that the elimination of child labour in other farms of the region resulted in children working with more dangerous activities. Therefore, an alternative way of eliminating child labour from these practices should include the possibility of transmitting traditional practices throughout the generations and occupying children with better activities.

Another aspect is that some of the unhealthy conditions are related to the region (for instance, some diseases as malariae, dengue) and also endangerous animals (jaguar, snakes and scorpions). To avoid the occurance of these diseases or accidents, it was identified that one of the owners recommend the use of adequate clothes and shoes, incentivate the vaccination and keep first aid kits in the farms.

As for the evaluation of the actors in the value chain, although the organic production still faces some social negative impacts, COPOAM is certified by Fair for Life [9], showing that the management and production practices achieve more than the minimum points required in 13 social and environmental aspects.

Table 2: Organic cocoa production evaluation [10]

Stakeholder	Impact Subcategory	Inventory
Workers	Freedom of association and collective bargaining	Free
	Working hours	Exceed law during some periods
	Child labour	There is occurance
	Forced labour	No occurance
	Fair salary	Non extra hours, meieiros
	Equal opportunities	Yes
	Health and safety	Occurance of accidents, training, equipment availability, but no records
	Social benefits and social security	No, as workers are not registered
Local community	Access to material resource	Few consumption of resources in the region
	Access to non-material resource	Not even for their consumption
	Displacement and Migration	Very few, the population density is low
	Cultural heritage	Respect
	Healthy and safe living conditions	Improving the healthy environment
	Indigenous rights	Former days (40 years ago) there were conflicts with indigenous people
	Community engagement	No sign
	Local workers	Just one imigration to work in a foundation: FVPP
Supply chain	Fair competition	Fair for life
	Social responsibility promotion	Promotion of organic products
	Supply relationship	Not applicable: own suppliers
	Respect to the intellectual property	Not applicable

The support of FVPP and CEPLAC to improve the productivity, quality, organic practices and market (with Natura and Zotter) resulted in positive aspects while compared the traditional practices as shown in Table 3. The same table shows that there is no situation in which organic cocoa production is worse than the former traditional practice.

Table 3: Comparison of organic and former traditional cocoa production

Stakeholder	Impact Subcategory	Organic / Traditional
Workers	Freedom of association and collective bargaining	
	Working hours	
	Child labour	
	Forced labour	
	Fair salary	
	Equal opportunities	
	Health and safety	
	Social benefits and social security	
Local community	Access to material resource	
	Access to non-material resource	
	Displacement and Migration	
	Cultural heritage	
	Healthy and safe living conditions	
	Indigenous rights	
	Community engagement	
	Local workers	
Supply chain	Fair competition	
	Social responsibility promotion	
	Supply relationship	
	Respect to the intellectual property	
	Organic practices equal traditional ones	
	Organic practices are better than traditional ones	
	Not applicable	

6 Final Remarks

The application of S-LCA in Natura's soap bar has shown that it is possible to identify the positive and negative impacts and compare the results using the technique. As Environmental LCA (E-LCA), S-LCA results should be presented with a transparent report in order to present the information that is behind the final evaluation.

Furthermore, the study showed that there are already some data available from the management of Natura. On the other hand, it was verified that a lot of information that is obtained is not necessary in an S-LCA, according to UNEP [1], although it could be used to develop other impact subcategories, following the S-LCA methodological sheets [2].

Further steps of the study includes: data collection of the remaining life cycle steps and evaluation of the impact subcategories.

7 Acknowledgement

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8 References

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