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Social Indicators of LPB - Liquid Packaging Board Production from a Life Cycle Perspective

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Abstract

Despite sustainability needing to be analyzed through the integration of environmental, economic and social aspects, almost always only the first aspect is considered. The objective of the present article is to show partial results of a life cycle assessment study of the production of Liquid Packaging Board - LPB, concerning social aspects. The LCA study was carried out for Klabin, the biggest producer, exporter and recycler of paper in Brazil, with 17 industrial plants in Brazil and one in Argentina. The scope of this study includes data from the forest up to the rolls of finished carton leaving the production line ready for shipment, considering a cradle-to-gate approach. Social indicators based on qualification levels proposed by UNESCO (United Nations Education Science and Culture Organization) and income levels according to IBGE (Brazilian Institute of Geography and Statistics) were proposed. It was observed that 9 seconds of human labor was required to produce 1 kg of Liquid packaging Board in 2008. The level of professional and educational qualification of the employees was rather high, with 4% of the employees holding a post-graduate degree (M.Sc. or PhD.) and only 7% having just primary level education. The income-distribution profile shows that 94% of the employees receive more than double the monthly minimum salary, which is a factor of great significance in a country where 55% of the population receives less than this. It is very important that sustainability of products and processes should also be analyzed by their social contribution besides environmental aspects.

Keywords: *life cycle assessment, social indicators, packaging, beverage container*

1 Introduction

Klabin has long been committed to running its business in a sustainable manner and is concerned with the environmental impact of its products. Klabin is the biggest producer, exporter and recycler of paper in Brazil, with 17 industrial plants in Brazil and one in Argentina. Self-sufficient in wood, it has 224,000 hectares of planted forests and 187,000 hectares of preserved native woodlands, and has been certified by the FSC - Forest Stewardship Council - since 1998.

Liquid Packaging Board (LPB) represented 38% of total volume of products manufactured in 2008 in the Telêmaco Borba plant. LPB is mainly used to produce aseptic containers for beverage cartons. In general, it is combined with other materials such as polyethylene to provide waterproofing and aluminum to

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aggregate light and oxygen barriers. The laminate of Liquid Packaging Board / polyethylene / aluminum is used to produce aseptic packages mainly used for milk and juices, resulting in shelf stable products for over 6 months.

A recent life cycle study was carried out for LPB showing that the increase in technological efficiency achieved by the company over the past ten years has reduced the environmental impact of LPB production. Significant reductions were observed in energy, water, wood and land use consumptions, mainly as a result of the introduction of high-yield CTMP (chemi-thermomechanical pulp), along with the increased overall efficiency of the production process (Mourad et al, 2010).

The integration of environmental, economic and social aspects has been a well accepted principle of Agenda 21 since 1992 as a guideline for sustainable development (Agenda 21, 1992). However, there are very few examples where the social aspects have been quantified.

The objective of the present work is to characterize the social profile of Klabin employees to produce LPB in order to create an historical measure that can be analyzed together with the environmental impact.

2 Methodology

This study was structured in accordance with the guidelines and requirements for conducting life cycle assessment studies set forth in ISO Standard 14040 – “*Environmental management – Life cycle assessment – Principles and framework*” (ISO, 2006).

All the inputs and outputs were correlated to a functional unit that consisted of 1000 kg of LPB. Social indicators relative to the quality of human labor were incorporated into this project. Based on the qualification levels proposed by UNESCO in its publication ISCED - *International Standard Classification of Education* (UNESCO, 1997) issued in the 1970s and the educational levels in Brazil, the following levels were defined for the purpose of this study:

Level	ISCED description	Adopted in this project
A	Master science degree or higher. Graduate with some experience.	Post-graduate (Master Science degree and/or PhD)
B	Graduate.	University level
C	Technical school. Large work experience in the field of specialization.	Secondary level
D	Trained workers with partial secondary education. Medium and long-term training. Secondary education completed.	Basic or primary education complete or incomplete
E	Little work experience. Primary education to incomplete secondary education.	

In Brazil, there is a monthly minimum salary by law which is the equivalent of US\$ 320 or US\$ 2 per hour based on a 40 hour week (MTE, 2011).

In addition to their school level, the income level of Klabin employees was also quantified based on the demographic survey conducted in the year 2000 (IBGE, 2009) and classified into the following income ranges:

Income ranges (based on one Brazilian monthly minimum salary)	
IBGE	Adopted in this project
Up to ¼ Between ¼ and ½ Between ½ and 1 Between 1 and 2	Up to 2
Between 2 and 3	Between 2 and 3
Between 3 and 5	Between 3 and 5
Between 5 and 10	Between 5 and 10
Between 10 and 15 Between 15 and 20 Between 20 and 30 More than 30	More than 10

These educational and income-related qualifications were correlated to the amount (in seconds) of human labor required to produce LPB. It was considered that each Klabin worker puts in 40 hours per week for 49 weeks per year and that each employee is entitled to three weeks vacation per year.

3 Results and discussion

Table 1 shows the social indicators taken into account in the life cycle inventory of Liquid Packaging Board manufactured in 2008.

Table 1. Social indicators considered in the Life Cycle Inventory of LPB manufactured by Klabin for the year of 2008. Functional unit: 1000 kg LPB.

Parameter	Amount of human labor (seconds)
Schooling level	
• Post-graduation	370
• University level	962
• Secondary level	6669
• Primary	634
Income range	
• Up to 2 minimum salaries	557
• Between 2 and 3 minimum salaries	3871
• Between 3 and 5 minimum salaries	2761
• Between 5 and 10 minimum salaries	1021
• More than 10 minimum salaries	426
Total	8636

The interrelationships between production processes and the jobs associated with these processes are issues of great importance. Recently, social indicators have been introduced so that products and services can be gradually associated with the levels of employment generated. These indicators will be highly valuable to evaluate the social role of the companies involved.

The findings of the study show that in 2008, 9 seconds of human labor were necessary to produce 1 kg LPB paperboard.

It is noteworthy that the level of professional and educational qualification of the employees in this sector of industry is rather high (Figure 14): 4% of the employees hold a post-graduate

degree (M.Sc. or Ph.D.), whereas the percentage of workers with only primary education was low: 7% in 2008.

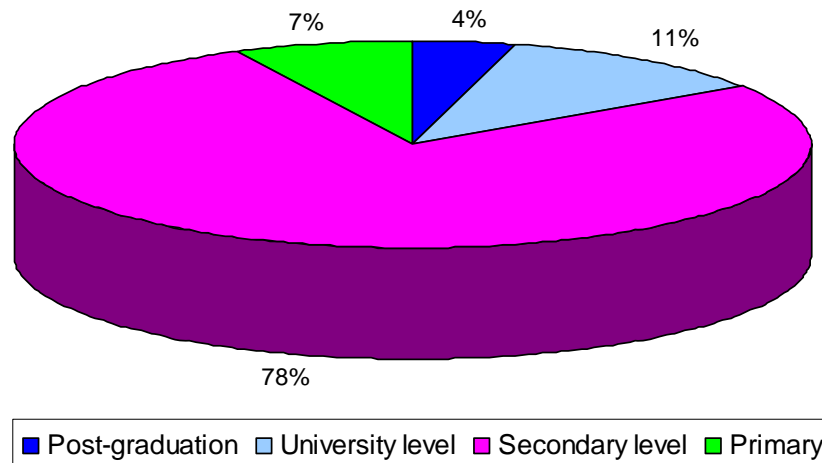


Figure 1. Schooling profile of Klabin employees involved in the production of LPB.

It is also important to know the income-level distribution of the employees. Figure 2 shows that 94% receive more than 2 monthly minimum salaries. When the distribution of salaries within the company is compared to the distribution of income of the economically active population in Brazil (2000 Survey, Figure 3) one can see that the income levels of Klabin employees are well above the national average. In Brazil, 55% of the economically active population receives up to 2 monthly minimum salaries.

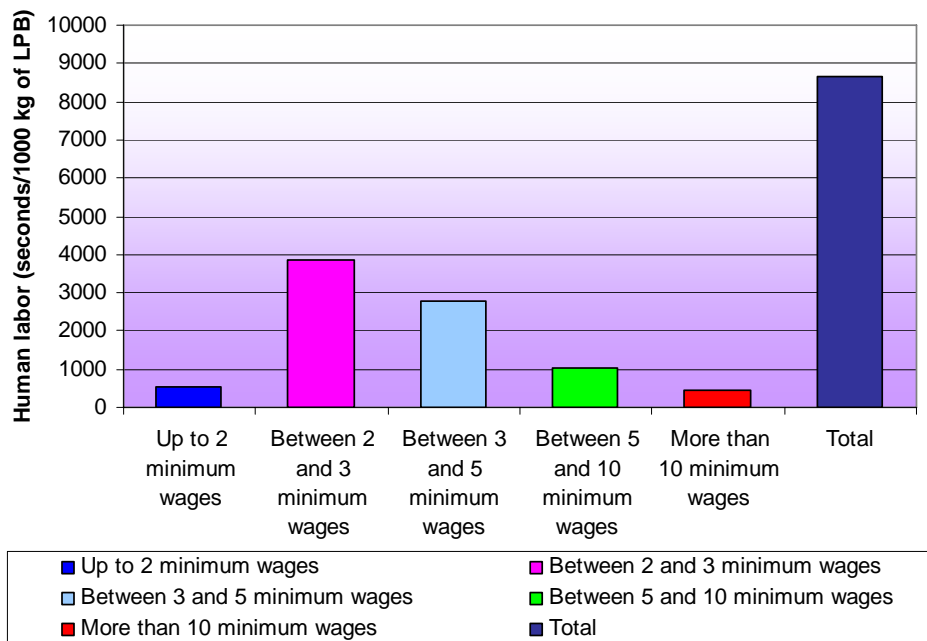


Figure 2. Profile of the average monthly income of the Klabin workers involved in the production of LPB.

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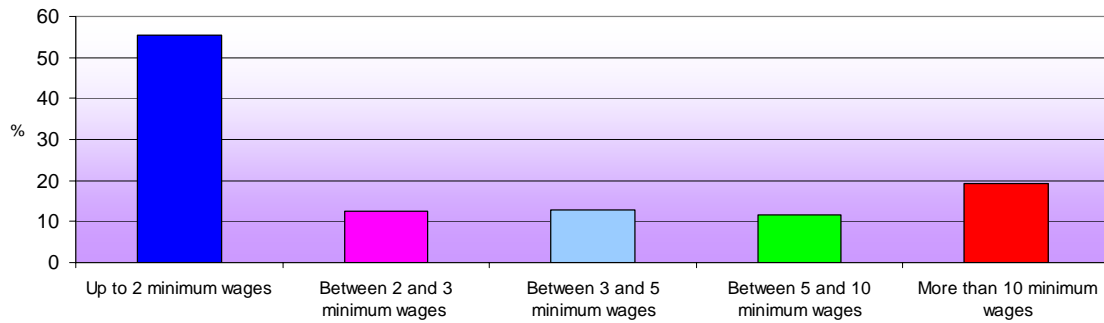


Figure 3. Profile of the average monthly income of the Brazilian population.

4 Conclusions

With regard to the social indicators, it was observed that:

- 9 seconds of human labor are required to produce 1 kg of Liquid Packaging Board in 2008. The level of professional and educational qualification of the employees is rather high, with 4% of the employees holding a post-graduate degree (M.Sc. or Ph.D.) and only 7% having only primary level education.
- The income-distribution profile shows that 94% of the employees receive more than two monthly minimum salaries, which is a factor of great significance in a country where 55% of the population receive up to two monthly minimum salaries.

The authors believe that it is of extreme importance that social indicators should be incorporated in sustainability discussions, because the quality of a person's life is crucial to achieve more elevated levels of sustainability. Environmental awareness is more easily achieved for persons that have their basic requirements satisfied such as food and shelter. Political decisions concerning industrial sectors must consider the number and quality of jobs created by them.

5 References

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