ISSN 1679 8171
Brazilian Journal of Operations & Production Management

FROM USING COOKING OIL TO SOAP: THE ROLE OF THE STAKEHOLDERS TO IMPLEMENT A REVERSE LOGISTIC PROGRAM

Carla Pasa Gómez[a]; Ana Paula Correia Machado[a]

[a] **Federal University of Pernambuco** (UFPE), Brazil

Abstract

This paper analyzes the role of stakeholders in implementing a reverse logistics program in a Brazilian soap company from the sustainability perspective. Actions from consumers, the government and the company are presented according to the proposed program for collecting used cooking oil for soap production.

Keywords: reverse logistic, role of stakeholders, sustainability

INTRODUCTION

The relationship between production and consumption is increased when considering the existence of return flows in the supply chain, and is based on the fact that the return of waste can avoid inappropriate discharges and lower consume of virgin natural resources, because in many cases they can be replaced entirely or partly by those from the reverse logistics.

To define the term, the Reverse Logistics Executive Council considers that the new type of logistics involves planned activities, **such as:** implementation and control the flow of information, raw materials, products in process and finished, the consumer point and origin point, efficiently and effectively, with the purpose to recapture the value or furnish adequate available (Rogers and Tibben-Lembke, 1999).

This new configuration supports the idea that the end of the production process and the responsibility of the organization, does not end in delivering the product to the consumer. It demonstrates the existence of a continuity to reenter the original waste in production process or other that providing use (Pauli, 1996; Hawken *et al*., 1999) showing that the discharge is not the only purpose for the product and should only be done if there is no longer any way to reuse.

This is not, however, result only from changes in the behavior of the producer, but rather the joint actions of consumers, businesses, and government to enable and drive the adoption of more sustainable practices. Jackson (2007) affirms that stakeholders must act in such a way that the consumption process is directed to sustainable development.

From the reverse logistics perspective, the following hypothesis is formulated: What is the role of stakeholders to implemente a successful reverse logistics program?

To get the results we analyze the environmental program called “Clean World, Better Life”, developed by ASA Co. in Recife (Pernambuco, Brazil), which used cooking oil as raw material for the manufacturing of soap.

According to the Brazilian Association of Vegetable Oil Industries, the Brazilian’s production of soybean oil in 2011 was Seven thousand, three hundred forty-one million tons. Of this total 24% is exported, 31% used for the production of biodiesel and the largest portion, 44% of the total is destined for human consume. The numbers show the importance of studying the economic, social and environmental problems that it can cause.

Besides, the relevance of the study of reusing oil also gives the improper disposal and the causes and consequences of this action. Castellanelli *et al*. (2007) argue that a lack of knowledge of the population, this residue, which could be used as secondary raw material in production processes, is dumped into rivers, streams, sinks, toilets or next to regular trash causing contamination, clogging pipes and unnecessary increase in landfills.

It is estimated that about 70% of maintenance requests that the Pernambuco´s Sanitation Company (COMPESA) receives in the metropolitan area of Recife are related to the

ABEPRO
DOI: 10.7177/sg.2015.v10.n5.a7

Brazilian Journal of Operations & Production Management
Volume 12, Número 1, 2015, pp. 66-72
DOI: 10.14488/BJOPM.2015.v12.n1.a7

indiscriminate dumping of cooking oil in the sewage system, causing its obstruction due to the hardening of the fat in the pipes, generatingnot only economic cost to maintain the flow of the sewage system, but also environmental and social impacts, mainly caused by clogged networks that may cause floods in the city during the rainy season.

This is how the study of such cases helps to make us aware of the true use and sustainability of this product and think in the best way to practice the sustainability of the project, such as the reverse logistics of cooking oil.

To meet the objective of analyzing the role of the stakeholders for effectively implement the reverse logistics of the program "Clean World, Better Life", this article takes a qualitative and descriptive approach. We used case study as a research strategy using as instruments data collecting and bibliographical review. Also interviews and non-participant observation were coducted.

The stakeholders were identified based on the literature review and are configured in three groups: business (04 interviewees), government (03 interviewees) and consumers (29 interviewees) selected by accessibility and convenience. For the analysis of interviews, content analysis method was adopted.

THE ROLE OF STAKEHOLDERS FOR THE PROMOTION OF REVERSE LOGISTICS

The power of the stakeholders concerning environmental issues is associated with the adoption of environmental practices by organizations (Céspedes-Lorente *et al*., 2003), mainly to pressure, as pointed out by Alvarez-Gil *et al.*(2007) for the implementation of reverse logistics programs.

Authors such as UNEP (2001), Jackson and Michaelis (2003) and Mont *et* Plepys (2008) highlight consumers, governments and businesses as key actors to influence changes in consume patterns towards more sustainable.

As the first group, the consumers can say that they have the role of fundamental importance in the quest for sustainable consumption, because they have the option to buy or not certain product (UNEP, 2001; Kong*et al.*, 2002) and define how they will use it. Besides, they are also responsible for the most part by the disposal of the product and therefore should be educated and receive the necessary information so they can evaluate the options, risks and consider the collective well-being, including the future generations. Finally, they can put pressure on companies and even the government to develop laws and practices that will reduce social and environmental problems (OECD, 1994).

The government is considered by Jackson *et* Michaelis (2003) as the manager of the system, because according to them, the behaviors of their consumers to some extent are explainable and responsive to stimulus they received. In order to achieve necessary changes in consume patterns; government can adopt different instruments that can target the consumer awareness, and discourage or prohibit actions that affect the balance between the dimensions of sustainability by the organizations (Mont *et* Plepys, 2008).

Using social resources, government and even other stakeholders such as nongovernmental organizations (ONG's) and schools can promote initiatives in education and information campaigns, in order to promote in society the values of sustainable consumption and lifestyle that attend the individual needs affecting as little as possible the social environment(CNUMAD, 1992; Jackson *et* Michaelis, 2003). The government can also use economic resources, in the interest of encouraging a change in attitudes of the consumers and the producers.

Other way that the government can modify the business practices is developing laws that aim to protect natural resources, the prevention and control of pollution, the preservation of the environment in a general way, and also by the establishment of sustainable consumption patterns (Jackson *et* Michaelis, 2003; Mont e*t* Plepys, 2008).

On the other hand, the company, which is influenced by all of these actors, should demonstrate how to act and not just assimilate the recommendations and pressures from the stakeholders. In this direction Michaelis (2003) states that this stakeholder can contribute to sustainable consume in different ways, sharing sustainable values to direct the actions of social actors to sustainability, investing in new technologies and practices and modifying their consume practices, among others.

DATA PRESENTATION AND ANALYSIS

ASA Indústria e Alimentos Ltda. located in Recife, Pernambuco, Brazil, has six manufacturing units that are responsible for the manufacturing of cleaning products and personal care through many brands, among them the soap Bem-Te-Vi made from using cooking oil collected for the reverse logistics disposition strategies.

ASA sells its products throughout Brazil and exports part of its portfolio, which is currently approximately two hundred fifty items to countries in South America, Central America, Africa and Europe.

The company began in 2008 the program "World Clean, Better Life", a selective collection initiative designed to

Brazilian Journal of Operations & Production Management
Volume 12, Número 1, 2015, pp. 66-72
DOI: 10.14488/BJOPM.2015.v12.n1.a7

collect funds for the reconstruction of the Hospital Dom Pedro II. Although, the initial goal was of a social nature, later it was transformed in an environmental inititive aimed at the reduction othe negative impact of the waste (used oil) to the environment.

THE ROLE OF THE COMPANY: ASA

Technically, the program "World Clean Better Life" was the result of the company's R&D, which allowed the use of cooking oil as secondary raw material in the manufacture of soap, without affecting the quality. For that, it was necessary to include some steps in the manufacturing process of soap, as the purification of the oil collected, in order to make the residue itself to be used as input. To maximize these benefits and structuring the program, the company hired an environmental specialist. These investments demonstrate that the organization has exceeded one of the obstacles presented in the implementation of the reverse logistics by Ravi *et* Shankar (2005), lack of training and education, as were the dissemination of new practices to be adopted and the internal and external reinforcement of the importance of performing waste recovery.

From the beginning, the program was based on supporting the public awareness about the problems that the improper disposal of cooking oil may cause. In the first three years of the program's actions were accordingly more intensive and there was great concern and joint efforts to accomplish that goal.

For this reason, the ASA gave seminars and lectures in schools, universities, companies, government agencies, for supply professionals such as dieticians, as well as participated in fairs that served to give publicity to the program.Until today, the participation in events is a strategy adopted by the ASA to raise awareness the theme and to attract new suppliers.

In the third year, more technical actions were implemented and lectures on environmental education, legislation and waste management were given. The actions also included the management of waste oil (collection) of different events such as the Fair Exhibition of Animals, Crafts National Tradeshow and a carnival'sgastronomic arena. From the fourth year was the consolidation and continuity of actions initiated in the early years of the program.

Is important to mention that the program established by the ASA is an example of how business activity can be directed to sustainable development. That's because the program is able to bring together the economic, social and environmental concerns in a single activity. That is to say, that demonstrates congruence with studies of Elkington (2001) in view of the Triple Bottom Line.

That statement is justified by the fact that they are evidence of economic and financial viability necessary to maintain the program, to the preserved the environmental and the improvement to society by providing financial resources for the public hospital, when it is known that the situation of public hospitals in Brazil depends on the transfer of government resources.

In the program "Clean World, Better Life" the relationship between supplier-manufacturer is different from the traditional practice, because the ASA does not act in the role of buyer and not any company in the role of seller. The program suppliers give the cooking oil for free, motivated by the social benefits which indirectly will provide, such as the negative environmental impacts that will avoid, the legal obligation to dispose of waste properly, or by the socially and environmentally correct image that will convey.

According to Rogers and Tibben-Lembke (1999); Dowlatshahi (2000); REVLOG (2002); Ravi *et* Shankar (2005), these factors are drivers for the development of practices of reverse logistics. Thus, the first challenge of the program is to attract individuals or entities that may be willing to donatereused cooking oil.

After using the cooking oil, it must be deposited in the right place. For organizations or enterprises where the use of oil is held in significant quantities, it is placed directly on a special pot designated by the program. For smaller quantities, such as individuals homes or condos, the oil should be stored primarily in PET bottles and subsequently placed in the special pot that ASA provides for selective collection, being that the company does not collect directly in isolated residences (only condos and companies), because the volume supplied tends to be low and logistics infrastructure required for this is high. The pattern of behavior, in this case, is just used for the collected liquid; instead of accumulate the bottles in the place.

In general, the collection of containers, which is transported by company's particular transport systems and their replacement by others, is performed periodically, weekly, biweekly, monthly or bimonthly.

At the collecting point, an ASA representative delivers a certificate proving that the company is taking charge of the proper disposal, with the authorization of the State Environment Agency.

THE ROLE OF CONSUMERS

In order to understand the role of consumers, we interviewed homeowners participating in the program.

Asked how they learned about the program they reported that the initiative came from ASA employees living in the condos through informal conversations among residents

Brazilian Journal of Operations & Production Management
Volume 12, Número 1, 2015, pp. 66-72
DOI: 10.14488/BJOPM.2015.v12.n1.a7

were aware of the program and chose to request the service. Thus, two aspects should be highlighted.

The first refers to the fact that changing their own consumption practices, the company can influence their employees to develop environmental awareness and consume patterns more targeted to sustainability, as stated by Michaelis (2003). The other occurs as a result of the first and one realizes that even when it is not the ASA that comes into contact directly with organizations and presented the program, the knowledge and involvement of its employees play an important role in spreading and even attracting new adopters.

In search of information about consumer behavior, the homeowners also reported that they put the waste oil in some kind of container such as a plastic bottle, whose destiny is a special pot distributed by ASA.

So that is to say, that is important to consider the destination to be given to each product and the used materials at the end of its useful life. The residents are developing practices that can be considered as conscious and sustainable consumption, according to the views of Jackson (2007). Besides, the reports from the interviewees show that consumers' environmental awareness is great and should serve as a stimulus for planning and implementation of reverse logistics by organizations such affirms Tibben-Lembke and Rogers (1999); Dowlatshahi (2000); REVLOG (2002); Blumberg (2005); Ravi and Shankar (2005).

In another condo, some residents reported that routinely dismiss the waste oil by the sink drain or in the trash. However, they demonstrated the intention to contribute to the project and provided a suggestion for improvement, " It should be a domestic collector, a really small thing, a little bottle, to leave at each house of the condo", arguing that people do not always have a container to store the material at home.

The way that the residents of the three condos learned about collection and recycling of the cooking oil, was also different. Approximately 65% of residents interviewed stated that access to that information came from visual and written form (flyer, board information, company banner, the special pot), while (14%) indicated that they received information orally and around 54% of interviewers indicated they did not know about the meeting to communicate the new practice.

It should be noted that despite the efforts to publicate the information, the "subject" that actually performs the disposal of cooking oil may not have been reached, since, in many cases, the work is performed by a domestic employee.

Comparing the behavior of the interviewees before and after the program was installed, it can be said that this change of habit to some extent has been influenced by the adoption of the program in the condo where they live. Thus, it is seen that the spread of information on the subject and providing access to correct ways to allocate this or other domestic residue are relevant actions that can stimulate the adoption of the practice of reverse logistics and, more generally, sustainable consumption practices, as Michaelis (2003) states.

Regardless of how the program was implemented and released in condos, it is interesting to analyze the perception about the importance of recycling oil by the residents. Of the thirteen interviewees, seven associated the value of this practice to the environmental damage it can avoid, making the connection of reusing this waste with the environmental dimension mentioned by Elkington (2001) *et* Sachs (2008). Another interviewee endorse this list and says that they are facing a *"phase [of] change in the habits of the people [...] [and it] is essential at this time"* to improve the quality of life and the environment.

Of the remaining interviewees, a respondent stated that the importance was related to the reuse of waste for the production of other products, which may indicate environmental importance to prevent that this oil contaminates the environment, and also economically, by using waste as secondary raw material and lower cost. Another respondent, in turn, attributes the importance of maintaining the conduits uncovered. Finally, a respondent reported the importance of the oil collection campaign indicating the need for awareness of the correct way of disposal of the waste.

When we asked why the participation for the project is not better, the respondents were unanimous in relating this to the lack of information, indicating that it is a factor that negatively influences the participation and confirms the idea of Ravi *et* Shankar (2005) that the absence of knowledge on reverse logistics is an impediment to the development of it.

THE GOVERMENT´S ROLE

Different authors defined that the legal pressures are instigating the practice of reverse logistics, so it is necessary to analyze how the Brazilian legislation is dealing with the issue and what are the specific laws that deal with the used cooking oil.

At the federal level there are different laws and resolutions whose texts are related to reverse logistics, but none specifically deal with the reverse logistics of cooking oil.

Currently, the most important law dealing with the theme of reverse logistics is the number 12.305/2010 that brings in their text some instruments of the National Policies of Waste Solid such plans for solid waste that must be performed at the national level, state and local; scientific and technological research; and environmental education.

Brazilian Journal of Operations & Production Management
Volume 12, Número 1, 2015, pp. 66-72
DOI: 10.14488/BJOPM.2015.v12.n1.a7

It is important to highlight, that the cooking oil is not among between the products expressed in Article 33 of the law, whose members supply chain are required to design and implement reverse logistic systems, those who sell or use this oil can be based on the law to develop their practices in a sustainable way.

The sustainable consumption is associated primarily with the fifth and sixth paragraphs of Article 6. The first is about eco-efficiency, one of the practices listed by Michaelis (2003) which enables the achievement of these consumes.The last one, on the other hand, deals with the cooperation between government, business sector and other segments of the society, actors who should be involved in the management of waste according to the law and to the realization of CS, as indicated CNUMAD (1992) and Jackson (2007).

It is important to mention, that the law 12.305/10 not only shows a personality for guidance or punishment for members of supply chains, which must implement actions to prevent, reduce and properly dispose of solid waste.The law also stipulates some economic issues that can be used by the government to encourage the development and implementation of sustainable practices relating to solid waste.

This means that, according to National Policies of Waste Solid, the ASA could have their separated collection of oil financed by the government, because it is a project of reverse logistics that reuses waste frying oil. Article 44, in turn, presents the Union, the States, the Federal District and the municipalities thar may establish standards for the purpose of granting tax, financial or credit incentives to industries and institutions dedicated to reuse, treatment and recycling of solid waste produced in the country, confirming the possibility of the company studied achieve some sort of financial incentive to support and continue the project of reusing waste oil.

Still on the issue of financial incentives, it is possible to notice that some banks like the National Bank for Economic and Social Development and Northeast, provide funding lines and special credits for institutions to develop projects related to the environment, including processes of resource use or to avoid losses related to improper disposal of waste.

Thus, this option could be used by companies that have or intend to implement projects such as reverse logistics, as the collection and reuse of oil held by ASA, avoiding environmental damage.

According to the ex-supervisor of environmental managementin ASA - responsible for the initial structuring of the program “Clean World, Better Life” - the ASA did not use these types of financing because the institutions had not understood how this program works.The current management stated that did not need to purchase third-party resources because the program started small and such investment was not very high, because the physical infrastructure of the area of processing oil existed for another purpose and that it was necessary just a reorganization.

As negative point of the Brazilian tax law there is the fact that for products and raw materials derived from recycling and reuse they require the same rates as virgin materials, which implies a production with an equal cost or with little difference from products using virgin materials. In relation to this scenario, the practices of reverse logistics, which requires reorganization of the physical structure and processes, do not attract much attention of companies because it affirms the need to change the economic and legal incentives that shape the production and consume so that sustainability can be achieved (Michaelis, 2003).

However, they stress that it is not only through this function (regulation) that this stakeholder is related to reverse logistics of cooking oil, the Executive Branch, through its organs, also interacts with the program. The company of urban cleaning EMLURB, for example, established a partnership process with the ASA to include oil as material to be collected in the city of Recife (Pernambuco, Brazil). The manager of EMLURB said that this partnership occurs day-to-day and also at events such as the carnival. Thus, the partnership is not limited to collecting the oil in households, although this is the most common practice.

The partnership between the Pernambuco Company of Sanitation - COMPESA and ASA was established on the initiative of the former, who realized the opportunity to reduce the amount of oil that reaches the sewer pipes through which the company is responsible, to provide a place for the collection and proper disposal of oil. By adopting this strategy, COMPESA benefits the operation by reducing the resources needed for unblocking pipes, because the amount of oil disposed of improperly into the sewerage system, which needs the same repairs tends to decrease.

The production manager of COMPESA said that after the establishment of the partnership the first step was to raise awareness about the program. For this purpose, the company conducted a publicity campaign carried on the back of water bills that were distributed for a period of three months, reaching 1.6 million customers.

In 2011, COMPESA increased its share, which previously was limited to providing its customers access to the oil collectors located in thirteen centers in the Metropolitan Region of Recife, and started to register the condos that were interested in joining the group of oil suppliers.Although the ideas of the program can be used in the educational process of the population and generate the same change in behavior, in the view of the COMPESA representative of the importance of the program “Clean World, Better Life”is associated with environmental and economic-financial issues.

Brazilian Journal of Operations & Production Management
Volume 12, Número 1, 2015, pp. 66-72
DOI: 10.14488/BJOPM.2015.v12.n1.a7

Also in the view of the respondent, the economic and financial importance of the participation of COMPESA in the project is related to the operational issue since the sewer system is not prepared for certain wastes and especially oil, which does not dissolve and cause contamination and clogging of pipes. In the same way, highlights, that these obstructions cause damage not only in the operational and financial areas of the company, that needs to invest to clean the networks for which they have responsibility, but also for the population affected by the problems caused by the clogging sewer pipe (both pipes their own properties, such as flooding of public roads).

CONCLUSIONS

Differently than the reverse logistics literature expressed through authors like Rogers and Tibben-Lembke (1999), Dowlatshahi (2000), REVLOG (2002), Blumberg (2005), Ravi *et* Shankar (2005) the main driver that helped the development of the program was the social aspect. The intention was to revert part of the revenues with the return of waste oil and its reuse to restructure the Hospital Dom Pedro II and fund health services provided by IMIP.

The Environmental concern, announced by the authors as one of the key drivers of the practice, also contributed to the setting of the program "Clean World, Best Life". We have to say that the legal issue was not reported as a motivational complement, because according to ASA the principal legislation related to oil was published after the program had started. The economic aspect, on the contrary, was not mentioned by the ASA as motivating practice, which also highlighted the costs of program maintenance.

However, it is important to note that though the economic interest was not the initial motivation for the program, it is present since the company claims that its continuation would be compromised if generate losses for the organization, indicating the importance given to the economic aspect. Besides, if it were to use only the crude oil the cost would be approximately R$ 2.59, and R$ 3.10 per liter for soybean oil and babaçu. As the current cost of production per liter of waste oil is $ 0.12 for the company, the same benefits financially from the practice.

Other interesting aspect in the case study is that the practice of reverse logistics contradicts the assertion of authors as Rogers *et* Tibben-Lembke (1999) and Dowlatshahi (2000) because the legislation is not a driver capable of generating incentives for the adoption of the same, as pressures arising from the legislation tend to be effective only if there is supervision and that the completion of this procedure was not identified during the research.

Another aspect that had to be overcome for the reverse logistics program "Clean World, Better Life" could be made was the lack of knowledge of the population about the practice of reverse logistics and its benefits, and that was achieved through campaigns and partnerships program dissemination and awareness of the problems that the oil disposed of improperly can cause.Despite these efforts it is still necessary to invest in consumer awareness considering that many still resist accomplishing their role as stakeholders in the reverse logistics process of cooking oil.

Besides, the inhibiting factors of reverse flows such as technical issues, logistical aspects were also overcome.One of those issues identified was the amount of oil in small quantities and in different geographical locations that were gathering in her individual making the process impossible, which was overcome with the definition of collection points in local public agency and which is in accordance with the studies of Rogers *et* Tibben-Lembke (1999) pointing to different collection strategies.

With the program, the company ASA improved its institutional image, as was recognized in the business community as a company that directs its activities and actions for sustainability. The recognition came through the prize for environmental sustainability of the Federation of Industries of the State of Pernambuco in 2012.

The staff involved in the program also realized that the other employees of the organization are proud of the activities developed by them, who have praised the program and congratulated those who are directly related to their achievement.

BIBLIOGRAPHY

ÁLVAREZ-GIL, M. J.; BERRONE, P.; HUSILLOS, F. J.; LADO, N. (2007). Reverse logistics, stakeholders' influence, organizational slack, and managers's posture. *Journal of Business Research***.**n. 60, p. 463-473.

BLUMBERG, D. F**.** *Introduction to management of reverse logistics and closed loop supply chain process***.** Florida: CRC Press, 2005.

CASTELLANELLI, C.; MELLO, C. I.; RUPPENTHAL, J. E.; HOFFMANN, R. (2007) *Óleos comestíveis: o rótulo das embalagens como ferramenta informativa***.** In Anais: I Encontro de Sustentabilidade em Projeto do Vale do Itajaí.

CNUMAD – Conferência das Nações Unidas sobre Meio Ambiente e Desenvolvimento. *Agenda 21 Global*. 1992. Disponível em: <http://www.mma.gov.br/sitio/index.php?ido= conteudo.monta&idEstrutura=18&idConteudo=575&idMenu=9065

CÉSPEDES-LORENTE, J.; BURGOS-JIMÉNEZ, J. de; ÁLVAREZ-GIL, M. J. (2003). Stakeholders' environmental influence.An empirical analysis in the Spanish hotel industry.*Scandinavian Journal of Management***.** v. 19, p. 333-358.

Brazilian Journal of Operations & Production Management
Volume 12, Número 1, 2015, pp. 66-72
DOI: 10.14488/BJOPM.2015.v12.n1.a7

DOWLATSHAHI, S. (2000). Developing a Theory of Reverse Logistics.*Interfaces*. n. 30, p. 143-155. Maio-junho.

ELKINGTON, J. (2001). *Canibais com garfo e faca.*São Paulo: Makroon Books.

HAWKEN, P.; LOVINS, A.; LOVINS, H. (1999). *Natural Capitalism: creating the next industrial revolution. Little Brown – USA*. Disponível em: <http://www.natcap.org/>. Accessed on July 2010.

JACKSON, T. (2007). Sustainable Consumption. In: ATKINSON, G.; DIETZ, S.; NEUMAYER, E. (*editors). Handbook of Sustainable Development. Edward Elgar Publishing*.

JACKSON, T.; MICHAELIS, L. (2003). *Policies for Sustainable Consumption***.** Sustainable Development Commission.

KONG, N.; SALZMANN, O.; STEGER, U.; IONESCU-SMOERS, A. (2002).Movieng Business/Industry Towards Sustainable Consumption: The Role of NGOs. *European Management Journal***.**v. 20, n. 2, pg. 109–127.

MICHAELIS, L. (2003). The role of business in sustainable consumption. *Journal of Cleaner Production*, v.11, p. 915-921.

MONT, O.; PLEPYS, A. (2008). Sustainable consumption progress: should we be proud or alarmed?.*Journal of Cleaner Production***.** v. 16, n. 4, p. 531-537.

OECD - *Organisation for Economic Co-Operation and Development.* (1994). *Experts Seminar on Sustainable Consumption and Production Patterns.*Disponível em: <http://www.iisd.ca/consume/mit.htmlhttp://www.iisd.ca/consume/mit.html>. Accessed on May 2011.

PAULI, G. (1996). *Emissão zero*: *a busca de novos paradigmas*. O que os negócios podem oferecer à sociedade. Porto Alegre: EDIPUCRS.

RAVI, V.; SHANKAR, R. (2005). Analysis of interactions among the barriers of reverse logistics.*Technological Forecasting and Social Change*. n. 72, p. 1011–1029.

REVLOG. *The European Working group on Reverse Logistics*, 2002. Disponível em: <http://www.fbk.eur.nl/OZ/REVLOG/Introduction.htm>. Acessed on August 2010.

ROGERS, D. S.; TIBBEN-LEMBKE, R. S. (1999). *Going Backwards: Reverse Logistics Practice. University of Nevada, Reno – Center for Logistics Management*, p. 283. Disponível em: <http://www.rlec.org/reverse.pdf>. Acessed on August 2010.

SACHS, I. (2008). *Desenvolvimento includente, sustentável, sustentado*. Rio de Janeiro: Garamond,

UNEP - *United Nations Environment Programme.* (2001). *Consumption Opportunities: Strategies for change.* UNEP.