

Study of Shopping Plastic and Paper Bags Effect on Environment- A Review

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Abstract—The present study explain the trend of utilization of plastic bags is increasing from time to time in spite of a good deal of awareness of the residents about the adverse effects of these products. In order to reduce the problems associated with plastic bag wastes, it is recommended to educate the public (1) not to use plastic bags, and (2) to use eco-friendly alternative materials (bags) made from clothes, natural fibers and paper. City level legislation is also highly recommended against indiscriminate use and disposal of plastic bag wastes as well as to end free distribution of plastic bags by retailers. In Chhattisgarh state plastic bags are banned from 1st jan2015 and legal issues are implemented here, but the secondary data shows that the plastic bags are less expensive than paper bags.

Keywords-Plastic Bags, Paper bags, environment, waste.

I. INTRODUCTION

Plastic bags are made from non-renewable resources, where the key ingredients are petroleum and natural gas. Polyethylene- High Density, Low Density, linear low-density polyethylene (LLDPE) are the raw materials widely used for the manufacture of plastic bags [1]. The shopping bags used by supermarkets are ideally produced out of LLDPE to get the desired thickness and glossy look. And if one needs very thin and gauzy bags then LDPE would be an ideal choice [2]. Plastic bags seem to be slender and light and hence are easy to carry. As per Raipur, Bhilai, Bhatapara and Rajnandgoan based plastic bags are cheap to produce and that they have occupied as high as 80 percent of the grocery and convenience in retail markets.

Accumulation of plastic bag wastes causes environmental pollution that can be manifested in number of ways. One of the problems is deterioration of natural beauty of an environment. Another common problem associated with these wastes is death of domestic and wild animals. This necessitates for proactive measures in order to safeguard animal species against extinction. Blockage of sewerage systems is becoming a common problem in different city in Chhattisgarh. [3]

Paper bags are made out of Pulpwood from trees, which is a renewable source. However, we get paper bags from felling of a tree which blemishes both plants and animals and also their production process engrosses energy created by coal or natural gas. The created pulp will be converted into a paper bag by different processes and machines after consuming tremendous amount of energy from fossil fuels, electricity, various chemicals, etc. [4].

The results of the substitution analysis in this paper are not intended to be used as the basis for comparative environmental claims or purchasing decisions for specific packaging products, but rather are intended to provide a snapshot of the energy and green house gas impacts of the current overall mix of plastic packaging in several categories, and the energy and green house gas impacts of the overall mix of alternative types of packaging that might be used as substitutes. While in this study examines packaging impacts using a life cycle approach, the study is limited to an assessment of energy and green house gas impacts and does not include an expanded set of environmental indicators.

II. MANUFACTURING PROCESS OF PLASTIC AND PAPER BAG

A. Production of plastic bags

Plastic bags are made from non-renewable resources, where the key ingredients are petroleum and natural gas. Polyethylene two types – High density polyethylene, Low density are the raw materials widely used for the manufacture of plastic bags.[5]

B. Production of paper bags

Paper bags, they are made out of Pulpwood from trees, which is a renewable source. However, we get paper bags by cutting of trees which on the other way blemishes both plants and animals. It is also produced by energy created by coal or natural gas. Thus created pulp will be converted into a paper bag by different processes and machines after consuming tremendous amounts of energy from fossil fuels, electricity, various chemicals, etc. [6].

III. METHOD OF LIFE CYCLE ASSESSMENT

A life-cycle assessment is an analytical tool which can help in understanding the environmental impacts from the state of acquisition of raw materials to final disposal [7]. LCA is an iterative process to evaluate the environmental burdens associated with a product, process or activity by identifying and quantifying energy and materials used and wastes released to the environment; to assess the impact of those energy and material uses and releases to the environment; and to identify and evaluate opportunities to effect environmental improvement [8]. The assessment includes the entire life cycle of the product, process or activity, encompassing extracting and processing raw materials; manufacturing, transportation and distribution; use, reuse, maintenance,

recycling and final disposal [9].According to ISO 14040 an LCA study essentially consists of four interconnected steps/phases [10]:

- Goal and scope definition
- Inventory analysis
- Impact Assessment
- Interpretation

IV. RESULTS AND DISCUSSION

In all the cases, the eco-impact values are lesser than those without usage and disposal options. When the comparison is made between the options from three countries under discussion, it can be seen that for plastic bags, the eco-impact values from India is less compared to other countries, which is due to the fact that the reuse option is most selected by Indians[11]. Table I and figures shown that the comparative look between without and with usage and disposal options in case of absence of recycling systems. Similar to previous options, in this option also, the eco-impact values are lesser than that of without usage and disposal options in all cases. The values for this category are given below in Table II.

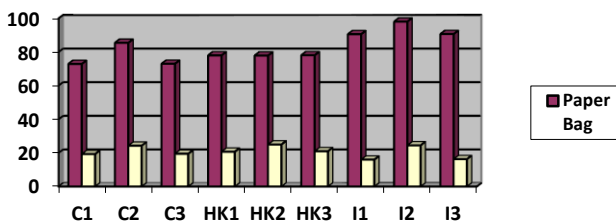


Fig.1 Possible options of plastic and paper bags

*C = China, HK = HongKong and I = India.

The above fig. shows the comparative study of use of plastic and paper bags across three countries. In China, C1=72.9, 19.3, C2=85.5, 24.3, C3=73.0, 19.5. In Hongkong, HK1=78.0, 20.7, HK2=77.9, 25.0, HK3=78.1, 21.0. While in India, the values are I1=90.6, 16.0, I2=98.1, 24.5, I3=90.7, 16.3 (Values of paper bags and plastic bags respectively).

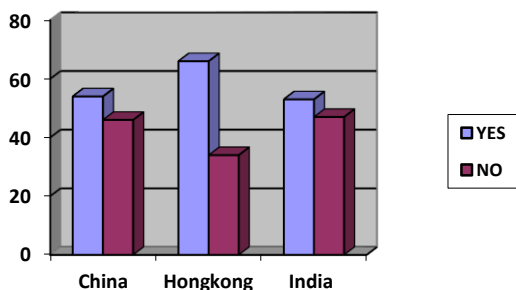


Fig.2 Recycling provision system

The above chart shows the comparison of Recycling Provision system across three countries.

V. CONCLUSION

In this study, an exploratory study was performed to analyze the life cycle impact assessment study of paper and plastic bags by plastic bags are found to be little better in terms of environmental impacts compared to paper bags. Using secondary data for LCI till manufacturing phase. As far as the end-of-life phase is concerned, it is mandatory to use real values rather than assumptions. Hence the consumer’s behavior and governmental policies are pivotal to plunge the environmental impacts made by these two bags. Though it is inevitable to accept certain environmental impacts until the manufacturing stage of these two bags; further reduction of environmental impact by means of reusing the bags until they attain the last point of life entirely lies in our hands. It is mandatory to preserve our living planet and we have no choice.

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TABLE I. COMPARATIVE STUDY OF PLASTIC AND PAPER BAGS [11].

Total points	Without usage and disposal criteria	China option-1 (C1)	China option-2 (C2)	China option-3 (C3)	Hong kong option-1 (HK1)	Hong kong option-2 (HK2)	Hong kong option-3 (HK3)	India option-1 (I1)	India option-2 (I2)	India option-3 (I3)
Paper bags	126	72.9	85.5	73.0	78.0	77.9	78.1	90.6	98.1	90.7
Plastic bags	36	19.3	24.3	19.5	20.7	25.0	21.0	16.0	24.5	16.3

TABLE II A SURVEY REPORT FOR THE PROVISION FOR RECYCLE SYSTEM [11]

Recycling provision System	China%	Hong Kong %	India%
Yes	54	66	53
No	46	34	47