SUSTAINABLE REUSE OF PAPER TO REDUCE LDPE DOMESTIC CONSUMPTION

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ABSTRACT: The paper proposes a new avenue to reduce the use of plastics in domestic household purpose for waste disposal and also brings up a novel way to reuse daily newspapers. The paper adds to the resilience of a society towards waste disposal handling.

KEYWORDS: LDPE, paper bags, reuse, carbon equivalent.

INTRODUCTION: The growing needs of urban life style produce more and more waste everyday. This leads to more newer approaches to waste management techniques. Urban local bodies collect household domestic waste and dump it in dumping yards. However, the polybags used in households to dispose the waste is a big concern of environmental pollution. The paper considers the domestic waste disposal means of LDPE polybags and discusses paperbags to replace these polybags.

LITERATURE SURVEY: The paid circulation of daily news papers in India is 107,000 thousands [1].LDPE is a thermoplastic polymer capable of multiple processings. The global demand forecast of LDPE is 24 percent till 2019[2].Any used paper could be converted into bio-degradable plastic through a series of laboratory experiments [3]. The share of paper in domestic waste is nearly forty percent [4]. This paper leads to sustainable development by a qualitatitive change in shifting to homemade paperbags instead of polythene bags[4].The paper is advantageous to the concept of emergy accounting- embodied energy[4].

METHODOLOGY: The paper utilizes the concepts of 'reduce' and 'reuse' in sustainability- to reduce the use of LDPE and to reuse paper. The household newspaper could be utilized to dispose household domestic waste to municipality in the form of paper bags. These paper bags could be made in the house itself. Table 1 discusses the dimensions of the bag and the number of three-ply paper bags that could manufactured from a daily newspaper. Thus, across the population sample of India, newspaper could be reused.

Hypothesis 1: In a household, re-use of daily news paper in the form of paper bags, could be to a limit of 27 percent before recycling.

Hypothesis 2: Household LDPE consumption could be reduced by 13.31 kg carbon equivalent annually

Parameter	**Value**
Indian Urban domestic waste per capita [5]	520-700 grams per day
Household waste Disposal means	Polythene bags
Plastic domestic waste [4]	30 percent
Recycle code of LDPE [4]	4
Recycle cost of polyethylene[6]	0.40 US dollars/kg
Dimensions of a newspaper[7]	24*30 inches
Bottom gusset bags (gusset=3inches)[8]	Width*length* (gusset+gauge)=6*9*3.002 =162.11 $inches^3$
Number of paper bags(3 ply) from a news paper dimension	(24*30)/(6*9*3.002)/3 =1.48
Average Number of pages in a daily newspaper	40

3 ply paper bags from a daily newspaper	40/1.48=27

Table 1: data of polybags and paperbags

Property	**LDPE**[12]	**Paper**[13]
Density/specific gravity	0.92-0.95	--
Mechanical load/ultimate strength	8-10 MPa	31kPa

Table 2: mechanical properties of ldpe and newspaper

Parameter	**Value**
Paper bag make[9]	Parallel line method
reuse of newspaper	27percent
Cost involved in paper bags	Nil
Per indian consumption of polybags[10]	11kg/year
Carbon emission in recycling polybags[11]	121 kg co2 eq/kg emission for 100 years
Annual Carbon emission in recycling polybags	121*11/100 = 13.31 kg Co2 eq

Table 3: calculation of LDPE carbon emission

CONCLUSION: The paper paves way for reuse of newspaper before recycling it. However, it also eases the way to collect paper for recycling at a single point of waste dumping station in an urban local body. This forms a logistics chain for paper recycling with almost little effort. It reduces the consumption of low density polythene (LDPE) in the form of polybags, in Indian households. However, in addition to it, this paper bag manufacture could be taught in schools to children so that the bags could be made in households. Thus, the paper bag makes way for a much more sustainable society and reduces carbon emissions in the manufacture of LDPE bags.

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