

EXECUTIVE SUMMARY

The Department of Environmental Affairs and Tourism (DEAT) has identified littering in general as a problem facing the South African environment, and has focused on the effect of indiscriminate dumping of thin plastic bags in, believing that this has contributed greatly to the problem. It is in this light that the DEAT has proposed new plastic bag regulations under Section 24 of the Environmental Conservation Act (73/1998), which were published in the Government Gazette of 19 May 2000. The aim of the regulations is to restrict the production of non-reusable plastic shopping bags and to promote re-use and recycling.

In order to quantify the socio-economic impact of the proposed regulations all constituencies of Nedlac's Trade and Industry Chamber agreed that joint research should be conducted in order to develop a shared understanding of the potential socio-economic impact of the proposed regulations.

The research study was restricted to vest type carrier bags (VCB's), which in layman's terms can be defined to be "thin plastic bags with handles, which are typically distributed in retail outlets". The reason for this restricted scope of research was two-fold. It firstly reflected the urgent need for an accurate and quantified impact assessment that can contribute to the process of finalising the regulation, and secondly focussed on the product that, relative to other forms of disposable consumer plastic, is significant both in terms of the volume of production and usage. The scope of research included an assessment of the impact of the regulations on potential substitute products such as paper and cloth bags.

Data was collected by means of structured interviews and completion of questionnaires within the following sectors:

- Polymer producers (2 companies, data obtained from both)
- Manufacturers of vest type carrier bags (42 companies, data obtained from 12 companies that represent 75% of VCB manufacturing)
- Worker representatives of manufacturers of VCB's
- Plastic recyclers (85 companies identified, of which two are currently recycling VCB's.)
- Pulp producers (2 companies identified, data obtained from both)
- Paper bag manufacturers (6 companies identified, data obtained from 3)
- Paper recyclers (4 companies identified, data obtained from 2)
- Cloth bag makers (3 companies identified, data obtained from 2)
- Retail industry (data obtained from representative sample of 390 small, medium and large retailers)
- Government (combined DEAT and DTI submission received)

Excluded from the direct data collection exercise were the distributors of VCB's as well as the consumers of VCB's. Information about these two groups was indirectly obtained from VCB manufacturers in the case of the distributors, and retailers in the case of consumers.

THE KEY CHARACTERISTICS OF THE RELEVANT PRODUCTS

The following products were relevant to the study:

Plastic VCB's

Although there is a wide range of bags made in different dimensions, the research indicated that the following types, in terms of dimensions, are predominant in use.

Type	Length (mm)	Width (mm)	Thickness (mm)	Weighted avg. thickness	Weighted avg. weight per bag (g)	Research sample of 34365 tonnes	
						Production (t)	% of total
Mini	440-460	320-330	9-15	11.8	3.11	2408	7%
Handi	460-480	360-380	14-17	14.02	4.35	5641	17%
Midi/Maxi	560-600	420-480	14-20	15.96	7.01	18491	55%
No data provided ¹					14.24	21%	

In terms of material characteristics these bags can be either printed, in which case they are manufactured from predominantly virgin High Density Polyethylene (HD-PE), unprinted but still manufactured from virgin material (for example clear bags), or "plain" in which case the bags have a high (40% upwards) recycle content. The recycled polymer used in plain bags is however not post consumer waste, but first generation in-house scrap. The "plain" bags are not printed on and of a lower quality than bags manufactured from virgin polymer.

The cost per 1000 bags varies greatly between high quality printed bags (weighted average of R 79 per 1000 bags) and "plain" bags (below R60 per 1000 bags).

Paper bags

The characteristics of the current paper carry bag used for retail purposes, called the "shopper" bag in the paper industry, is as follows:

Dimensions	Paper "Shopper" bag
Length (mm)	420
Width (mm)	305 x 165
Thickness (g/sq m)	80
Weight (kg/1000)	32.6
Carry capacity (kg)	4
Cost (R/1000 bags)	340

¹ The distribution of converters that did not supply detailed product data was very similar to those who did, namely a combination of large manufacturers that supply printed bags to the mass-retail industry and smaller manufacturers who supply plain or printed bags to smaller retailers. The weighted average of the available data is therefore used.

A key characteristic of this bag is that it does not have carry handles. The addition of handles will increase the price significantly

Life cycle of plastic bags compared to paper bags

The objective of the life cycle analysis was to provide life cycle inventory data from publicly available international data sources so as to compare the environmental impacts of the paper, plastic and cloth check out carrier bags lifecycles. No data was found for cloth check out carrier bags. Paper and cloth carrier bag data was found in the form of 'cradle-to-gate' and 'gate-to-gate' studies. Continuity through the value chain was not achieved therefore studies, which undertook complete product lifecycle comparisons, were sought out.

Two studies were considered, one comparing the environmental impact of the life cycles of checkout grocery bags in the United States and the other comparing the life cycles of 25kg distribution sacks in Europe. The first study argued strongly that the plastic checkout grocery bag had less environmental impact than the paper grocery bag across four environmental impact criteria, namely energy consumption, solid waste generation, atmospheric emissions and waterborne wastes. The second study argued in favour of the paper sack across nine impact criteria, namely primary energy consumption, abiotic resource depletion, global warming, acidification, nutrient enrichment, photochemical ozone formation, aquatic ecotoxicity, air emissions and water emissions.

It was noted that the comparison of these studies between each other and to the South African environment is not possible due to the internal variables of each project's scope, methodology and objectives and possible environmental and geographic differences between Europe, United States and South Africa. It is concluded that it would be erroneous to report on the life cycle impact of paper and plastic products in the South African context using international studies as a basis for comparison. In order to ascertain which product life cycle has the greatest environmental impact in South Africa would require an independent study to be commissioned locally.

Cloth bags

The use of cloth bags within the retail industry is non-existent, except for a minimal amount (150 000) that was manufactured as a niche product for one large retail group. Industry sources are of the opinion that very few of the bags have actually been sold.

It is estimated that the cost of a cloth bag substitute to the current plastic VCB will cost about R 6.99 per bag. This makes it prohibitively expensive to be even considered as a substitute product, even considering its durability, and excluded from the research.

Biodegradable plastic bags

Degradable polymer technology is in a state of relative infancy internationally. It is only within the last four years that the term biodegradable has been defined, by international standards authorities, to denote the complete degradation of inorganic constituents to H₂O, CO₂, methane and biomass. Photo-

degradation is a separate process and implies the minute fragmentation of plastics due to exposure to ultra violet light (usually sunlight).

Degradable plastics are created through the use of either additives to conventional polymers or the use of degradable polymers. It has been noted by the CSIR that production of degradable film is not yet feasible due to technical limitations of extrusion on conventional machinery. In addition the cost premium for degradable polymers is approximately 20% for additives and 150 – 300% for degradable polymers, as compared to conventional polymers. No evidence of the large-scale production of degradable vest type carrier bags has been found, however biodegradable checkout carrier bag trials were found.

As far as recycling is concerned no research-based evidence has been found to support polymer manufacturers claims that the degradation process is deactivated in normal recycling processes. In addition it has been noted that conventional landfills will benefit from the inherent stability and longevity of conventional plastic packaging. Photo-degradation as a result of exposure to sunlight, however, can be helpful for products used in rural and marine environments where litter is less likely to be cleared, but it will not make urban litter disappear within an acceptable time span or remove the social problems of litter.

Locally polymer manufacturers have confirmed that production of degradable polymers is unlikely in the short to medium term due to their commitment to the recycling industry and historic focus on conventional polymers (including HDPE, LDPE and LLDPE).

International industry experts argue that degradable plastics offer no real life cycle benefit primarily due to the smaller scale of production and the necessary transportation of additives and polymers to South Africa.

It is therefore argued that degradable polymers are not, yet, a feasible option in the South African context.