PLASTIC BAGS – POLICIES AND PRACTICES TO REDUCE CONSUMPTION

ASSESSING THE APPLICATION OF POLICIES TO LIGHTWEIGHT SINGLE USE POLYETHYLENE PLASTIC BAGS

2008 Update

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K Strange MSc MCIWM MSocE
M Strange BSc

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Residua Limited, Yellow Cottage, Draughton, Skipton, North Yorkshire BD23 6EA, UK
T: +44 (0) 1756 711 362 F: +44 (0) 1756 711 360 E: info@residua.com I: www.residua.com

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EXECUTIVE SUMMARY

This report considers the problems associated with the use of lightweight plastic bags, the type which is frequently given out at supermarkets. The plastic bag is ubiquitous and in many ways has become a symbol of our modern lifestyles.

Lightweight plastic bags offer many practical advantages, which of course is the reason for their success in supplanting alternative shopping containers. Primarily, they are very light, weighing only a few grams (g). This means that even a large number of bags do not represent a mass flow which is significant, in comparison with many other waste streams. 200 million bags may only weigh 1,000 tonnes. These bags are frequently neglected, with recycling rates seldom exceeding a few per cent, and a small (but significant) fraction littering the roadside and amenity spaces.

There are opposing views on the environmental effects of plastic bag consumption; on the one hand is the view that bags are at worst a nuisance, while others maintain that they represent a serious environmental and amenity hazard. There are also contradictory views within administrations, with some local and national authorities being highly concerned to see solutions implemented without delay, while others regard the issue as trivial and unimportant.

In those countries and municipalities where there is little concern, little is done. Elsewhere there are examples of effective action at all levels. The available tools can focus on the provision of information, infrastructure, legal and economic instruments, and each has a particular application, depending on local circumstances and the level of administration at which the policy initiative takes place.

Outside Europe draconian bans of plastic bags have been used, though this may seem a step too far in Europe where this level of market intrusion would appear to be unjustified.

The power of economic instruments to change behaviour is undeniable. Whether these can be agreed on a voluntary basis between the stakeholders (Government, the retail supply chain and local authorities), or whether mandatory instruments are called for (to encourage industry or to discourage free-riders) will vary from country to country. If a policy decision is taken to significantly reduce the flow of plastic shopping bags into landfill and litter, then the following actions are effective:

- ending the practice of free bags in supermarkets
- ensuring that alternative, reusable bags are available in supermarkets
- providing collection systems for plastic bags, both through in-store facilities and also integrated within household dry recyclable schemes
- driving forward local communications and information campaigns to raise consumer awareness of the issue, associated problems and solutions
- using any revenue from a levy or charge system to fund litter clean-up projects or relevant research

It is important to establish clear policy goals before embarking on a campaign to control plastic bag use in society. If the goal is to attack the bag because it serves as proxy for much of modern unsustainable lifestyles then sociological and cultural tools will be relevant, to work for the broader interests of sustainable consumption and production. If littering is the problem to be addressed, then producer responsibility schemes can help. If the concerns are based on the persistence of these bags in landfills and in the countryside, then standards and codes to encourage biodegradable bags may be a worthwhile route to pursue.

In order to establish policy goals it is essential first to understand the scale of the problem. Auditing the flow of materials which become waste plastic bags is a very helpful first step.

INTRODUCTION

WHAT IS A PLASTIC SHOPPING BAG?

A satisfactory working definition is that cited by Nolan-ITU (2002):

> *"a polymer carry bag provided or utilised at the retail point of sale for carrying and transporting retail goods. This includes all plastic retail carry bags, but excludes produce bags used in-store, dry cleaning bags, garbage bags and other primary product packaging".*

Plastic shopping bags are popular with consumers and retailers as they are functional (able to carry 1,000 times their own mass), light, strong, cheap, and a hygienic way to transport food and other products. Industry favours their use because they are cheap, portable, easily stored and transported, and serve as prominent advertisement. The modern high density polyethylene (HDPE) bag weighs 2 - 8 g, while the average supermarket bags weigh 5 - 7 g.

Shoppers have enthusiastically embraced the use of plastic bags because they are free, they work well and they can be re-used at home. Some shoppers have been increasingly turned towards reusable alternatives, citing environmental, amenity or economic grounds. Campaigners and local authorities oppose the plastic bag, on the grounds of sustainable consumption, consumerism, littering and producer responsibility. Most national administrations do not pursue national policies to control the use of plastic bags. However, some do and these are described in this report. The main reasons for the disproportionate level of interest in this product stream can be attributed to the facts that they are disposable, often free, visually intrusive, persistent, frequently excluded from recycling schemes and of public interest.

The arguments for and against the plastic bag have been made vehemently. Australian consultants Nolan-ITU (2002) have summarised the situation on life cycle grounds as:

- there is significant potential to reduce life cycle environmental impacts of plastic bag use in the form of resource consumption, energy, greenhouse gas emissions and litter
- a substantial shift to more durable reusable bags would deliver environmental gains over the full life cycle of the bags
- heavy duty reusable plastic bags with a long usable life were found to achieve the greatest environmental benefits
- little or negative gain was found to be derived from the shift from single use bags to other single use bags such as biodegradable bags and paper bags, with potential litter gains offset by negative resource use, energy and greenhouse outcomes

On this last point, Allen Consulting Group (2006) are said by the Australian Productivity Commission (2006) to have calculated that greenhouse gases created in producing a paper bag are around five times greater than those from producing a plastic bag.

Plastic bags – the pros & cons

Advocates of a levy on plastic bags cite the main benefits as being reduced littering, reduced use of resources and energy, lower pollutant emissions and increased public awareness of environmental issues. Opponents argue that lightweight plastic carrier bags are hygienic, convenient and durable, that they are often reused for other purposes, that they form only a small part of the litter stream and that they have a lower overall environmental impact than paper bags. They also claim that a levy would impact unfairly on poorer households and would lead to job losses in… (from reduced plastic bag manufacturing and importing).

AEA Technology, 2005

EVOLUTION OF THE LIGHTWEIGHT SUPERMARKET PLASTIC BAG

The first use of plastics for lightweight bags started in the 1950s. The US Film & Bag Federation (FBF, 2006) notes that by 1958 polyethylene bags were starting to compete with paper alternatives in dry-cleaning laundries.

Within a decade plastic bags were used for almost one-third of bread packaging. By the mid-1970s US retailing giants such as Sears, J.C. Penney, Montgomery Ward, Jordan Marsh, Allied, Federated and Hills had switched to plastic merchandise bags, and were being introduced as an alternative to paper sacks.

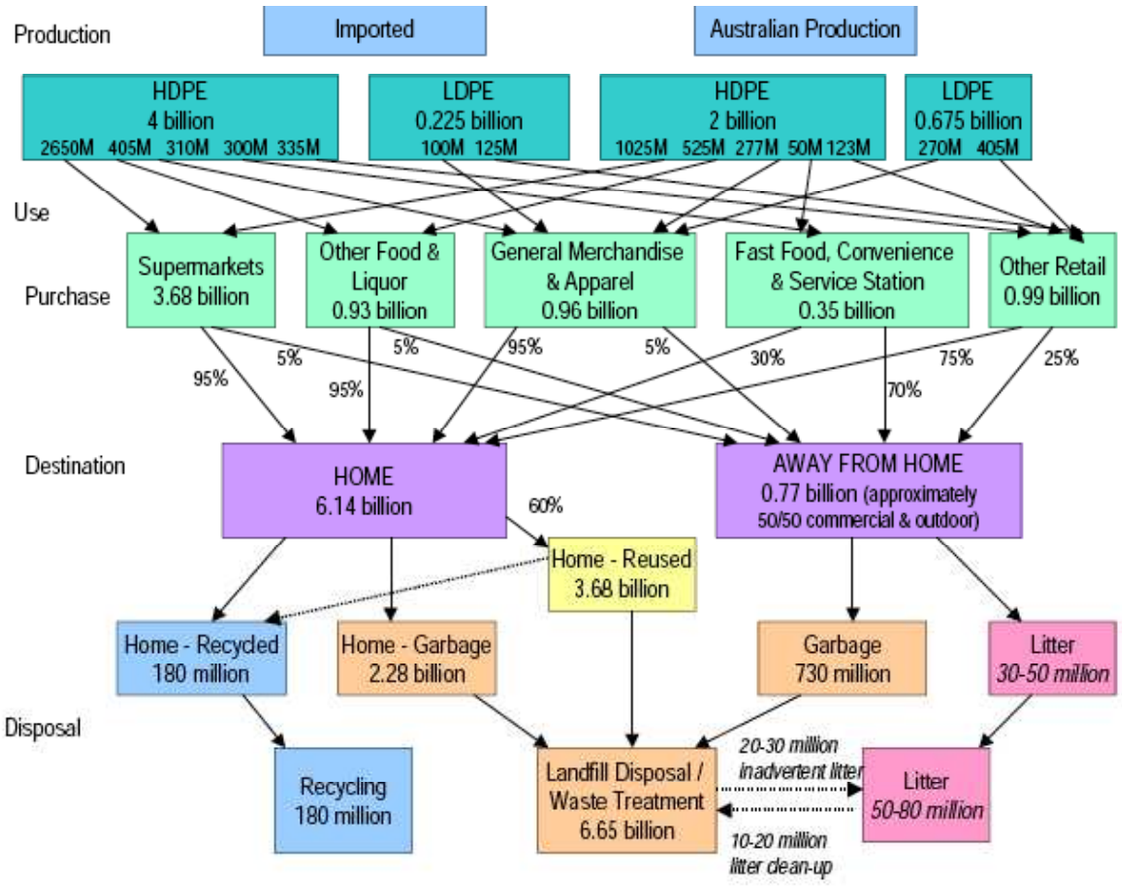
In 1990, consumer plastic bag recycling began through a US supermarket collection-site network, and within two years nearly half of American supermarkets had made available in-store collection schemes for recycling plastic bags. By 1996, four of five grocery bags used were plastic.

TYPICAL PLASTIC BAG FLOWS THROUGH SOCIETY

Although circumstances vary widely from country to country, perhaps the most comprehensive suite of measurements have been undertaken in Australia.

Figure 1 demonstrates the main flows, which are into the home and, from there, to landfill. A small but significant proportion of those arising away from home end up as litter.

Figure 1 – Summary of plastic bag flows in Australia



Source: Nolan-ITU (2002).

CONTROLLING PLASTIC BAGS – THE TOOLBOX OF INSTRUMENTS

There are four classes of instruments to change behaviour, these are through the use of *information*, *infrastructure*, *legal* and *economic* tools, as follows:

TABLE 1. Available tools for change

Class	Policy tool	Applicability
Information	Education & campaigns (use of bags and littering)	National, regional & local
	Promoting Reusable Bags	National, regional & local
	Encourage retailers to adopt Codes of Practice	National, regional & local
Infrastructure	Kerbside recycling of plastic shopping bags	Local
	Biodegradable bags	Local
Legal	Ban on plastic bags	National & regional
Economic	Impose a mandatory charge system	National & regional
	Agree a voluntary charge system	National & regional

Each of these tools can be most effectively applied at different levels of administration.

BIODEGRADABLE OR CONVENTIONAL PLASTICS BAGS?

There is an enthusiasm in many quarters for seeing conventional plastic bags replaced with biodegradable plastic ones. This is partly due to a growing perception that biodegradability is a more environmentally benign characteristic than non-biodegradability. The Australian Government's Productivity Commission (2006) concluded that such a substitution would be unlikely to reduce the rate that bags are discarded as litter, and could lead "to worse environmental, social and financial outcomes". The Productivity Commission justified this on the following grounds:

- a conventional littered bag remains intact and is more recoverable, while a biodegradable bag fragments – hampering recovery and presenting hazards to wildlife
- more biodegradable bags in circulation will increase the mass landfilled, with implications for emissions
- retailers will be ill-qualified to assess the relevant standards of biodegradability, leading to misleading claims

The issue of biodegradability is perhaps more significant in the case of rubbish bags than the supermarket bags. A US study found that plastic trash bags comprised one per cent and plastic film comprised 2.3 per cent of the waste stream (CIWM, 2004).

The California Integrated Waste Management Board (CIWMB, 2007) studied the degradation rates and performance of compostable plastics that can be used in rigid packaging plastic containers, trash bags, film liners, and food service products. Compostable plastic materials could be very economical for organisations and institutions that service a controlled population, eg hospitals, correctional facilities, schools, and cruise lines. The cost of disposal of waste at these locations can be offset by the use of compostable plastics, which have a compost nutrient value. Compostable plastics can benefit compost operators by having an organic nutrient source that does not have the bacteria problems of food waste. The same cheerful conclusions do not necessarily apply to plastic bags.

Tesco, Britain's biggest supermarket chain, announced plans (Tesco, 2006) to make its plastic bags degradable from September 2006. In response to customer demand, Tesco said it was seeking to spruce up its socially responsible, green image. As such the four billion carrier bags handed out at its 2,000 stores nationwide every year will be made degradable

Soon after, the UK Composting Association (2006) criticised Tesco's announcement believing it led to confusion in the media and Parliament, where the bags were incorrectly described as biodegradable, when they were actually degradable.

Plastic bags - degradable vs biodegradable?

A view from the UK Composting Association

The bags to be introduced by Tesco are made from polythene into which a catalyst has been introduced to trigger early stage breakdown of the polymer. Complete degradation takes some time as illustrated by another major retailer that already uses such material, namely The Co-op. This company has printed the following statement on its carrier bags: "This plastic is 100% degradable but you can still reuse it. From date of manufacture the plastic will start to degrade in 18 months time. The whole process will take about 3 years. See bottom of bag for date of manufacture".

The term 'degradable' is not defined in legislation in the UK or the European Union, nor are there clauses in legislation that specify degradation performance in a specific environment, such as the soil or a composting process. However, there is a European Standard for biodegradable packaging (carrier bags are classified as packaging).

Biodegradable packaging BS EN 13432: "Packaging. Requirements for packaging recoverable through composting and biodegradation. Test scheme and evaluation criteria for the final acceptance of packaging" is widely accepted in Europe as the standard that packaging must comply with to be described as 'biodegradable'. This standard is compatible with the American Standard ASTM D6400 and both the EU and American systems make a clear distinction between 'Biodegradable' materials that undergo degradation by biological processes to yield CO2 and water and 'Degradable', often referred to as 'Oxo-degradable', materials that involve a multi-stage process using a chemical additive to initiate degradation.

In the UK, one final criterion required of plastics claiming to be 'Compostable' is that the resultant compost should meet the quality standards set out in the British Standards Institution's 'Publicly Available Specification for Composted Materials' (PAS100:2005). This requires that any packaging inputted to a composting process complies with one of the relevant standards, BS EN 13432 or ASTM D6400.

Waste management options

Degradable plastics offer no advantage over conventional plastic in terms of waste management. They are unsuitable for composting or anaerobic digestion and have a similar calorific value if disposed of in an 'energy from waste' plant. In the most likely waste disposal route, namely landfill, the lack of sunlight and oxygen, both requirements to stimulate breakdown of degradable materials, means that the plastic is unlikely to disintegrate much more rapidly than conventional plastics. It is, therefore, difficult to see what environmental benefits the introduction of these degradable bags will bring.

Specific information on degradable polyethylene bags is available at the website of the industry association European Bioplastics:

http://www.european-bioplastics.org/index.php?id=162

Source: UK Composting Association (2006)

What is oxo-biodegradable plastic?

A view from Symphony Environmental Technologies

Symphony's d2w(R) oxo-biodegradable technology produces plastic which degrades by a process of OXO-degradation, initiated by an additive. The process involves little or no additional cost, as products can be made with the same machinery and workforce as conventional plastic products. During their useful life they are just as thin, strong, and durable as ordinary plastic.

The plastic does not just fragment, but is consumed by bacteria after the additive has reduced the molecular weight, and it is therefore "biodegradable." This process continues until the material has biodegraded to nothing more than CO2, water, and humus, and it does not leave fragments of petro-polymers in the soil.

Eco-toxicity tests demonstrate that oxo-biodegradable plastic produces no immediate, or cumulative, adverse effects on the soil, whether from the material itself or from pro-degradants, plasticisers, surfactants, pigments, metal salts or lubricants. D2w(R) does not contain "heavy metals."

The UK Food Standards Agency's Expert Group on Vitamins and Minerals has carried out a risk assessment on trace elements and has shown that most of the metal salts used in oxo-biodegradable plastics are trace-elements necessary for healthy plant and human growth. Unlike PVC, the polymers from which oxo-biodegradable plastics are made do not contain organo-chlorine. Nor do they contain PCBs, nor do they emit methane or nitrous oxide, even under anaerobic conditions.

The time taken for d2w(R) products to degrade can be 'programmed' at the time of manufacture and can be a few months or a few years. Exposure to sunlight accelerates degradation, but the process of oxo-bio-degradation, once initiated, continues even in the absence of light, so long as air is present. Products can be vacuum-packed for delivery and will not degrade in the absence of air until needed for use.

Oxo-biodegradable plastics are currently made from a by-product of oil refining, and oil is of course a finite resource, but this by-product arises because the world needs fuels for engines, and would arise whether or not the by-product were used to make plastic goods. Unless the oil is left under the ground, carbon dioxide will inevitably be released, but until other fuels and lubricants have been developed for engines, it makes good environmental sense to use the by-product, instead of wasting it by "flare-off" at the refinery and using scarce agricultural resources to make plastics.

D2w(R) has been certified safe for long-term contact with any food type at temperatures up to 40 degrees C, and oxo-biodegradable products are being supplied by the UK's leading supermarkets, Tesco and the Co-op.

Oxo-biodegradable plastic also has useful applications in agriculture. For many years farmers and growers have used plastic sheets to protect their crops but after the crop has been harvested many thousands of square kilometres of dirty plastic have to be removed and disposed of. This is a very expensive process, and creates huge quantities of contaminated waste. Oxo-biodegradable plastic sheets can however be programmed at manufacture to degrade soon after the harvest. The fragments can then be ploughed into the soil where they complete the biodegradation process and become a source of carbon for next year's plants. Symphony has trials ongoing with a new additive specially formulated for this purpose.

Source: Symphony (2007)

Industry fights back

The conventional plastics industry has responded to this perceived challenge from bio-plastics in a number of ways, not least by mounting public relations campaigns. An illustrative example is seen in the case of the US Film & Bag Federation (FBF, 2007), tackling an initiative by the city of San Francisco's Board of Supervisors, approving legislation to ban non-compostable plastic bags at large supermarkets.

Under the legislation, retail establishments will have the option of using compostable bags or recyclable paper bags. The San Francisco legislation ignited a wave of national media activity targeting the industry. The FBF, closely aligned with the Progressive Bag Alliance, worked to educate the media and address this issue on industry's behalf. "We explained that San Francisco did not ban plastic bags," said FBF Executive Director Donna Dempsey. "Rather, they mandated that the type of plastic bag used in grocery stores be compostable plastic rather than recyclable plastic. We raised serious concerns about recycling stream contamination, the extremely high costs and the lack of commercial availability of these bags."

Other FBF messages imparted included the fact that the most effective way to keep plastic bags out of landfills and streets is through proper use, reuse and recycling, and that plastic bags use far less energy to manufacture than paper bags.

The media outreach appeared to have worked in many cases, including an editorial in USA Today (2007) with the headline, "Plastic-bag ban full of holes. San Francisco's scheme sounds good, until you hear the costs." After listing the negative consequences that the legislation will cause, the editorial concludes: "Public education campaigns about littering and recycling can help more than ineffective bans on products that are used every day by billions of people worldwide."

A 2007 review by US consultants ULS Report concluded that banning plastic bags from retail stores will probably not produce the intended results, and in the case of greenhouse gas

generation, may actually harm the environment. The study was carried out after the city of San Francisco banned plastic bags in an effort to reduce environmental impacts and litter.

The research was in large part commissioned and/or reviewed and published by the US EPA and its French and Swiss governmental counterparts. The authors points out a number of "rather ironical" facts:

- although they are made from natural gas or oil, plastic bags actually consume less fossil fuels during their lifetime than do compostable plastic and paper bags. (compostable plastic bags use more material than traditional plastic bags, and it takes significant fossil fuel energy to convert trees into paper)
- Plastic bags generate 60% less greenhouse gas emissions than do paper bags. And because composting creates carbon dioxide, a greenhouse gas, the plastic sacks generate 79% fewer greenhouse gas emissions than do paper bags after the latter are composted!
- The best environmental choice is a reusable bag, as long as you actually reuse (or recycle) it.
- Cigarette butts, chewing gum, and candy wrappers account for about 97% of all litter. Paper and plastic bags are generally a very small part of the total.

NATIONAL APPROACHES TO SHOPPING BAG MANAGEMENT - EUROPE

AUSTRIA

Currently, there are no policies or taxation schemes in place concerning the use of lightweight carrier bags. However, reusable textile bags are occasionally bought in and are distributed free of charge to residents. Although the waste minimisation programme has not focused on the topic of plastic bags specifically, it will be running a campaign this year regarding 'Clever Shopping' and the issue of plastic bags will most certainly be raised.

According to the City's Environment Department (M48, 2006) plastic carrier bags do not 'visibly' pollute Austria and do not pose a 'litter' problem in Vienna. According to the authorities in Vienna plastic bags fall under the category of service packaging.

BELARUS

The *Foundation for the Realization of Ideas* organised a street action in the centre of Minsk against the incineration of plastic waste and a proposal to build a new incinerator near Minsk. The group distributed paper bags with a phrase "choose NO plastic", with basic information describing dangers of plastic waste incineration and alternative solutions.

All bags were made by volunteers of FRI from old newspapers and magazines, printed on environmentally-friendly paper. They also organised a consultation with the community members on different waste issues.

BELGIUM

A draft plan for a tax on almost all forms of packaging was trimmed down to a levy on some specific types (EndsEuropeDaily, 2007[2]). From July 1, 2007 plastic bags would be taxed at EUR3.0/kg.

In 2004, Belgian ministers of the environment accepted a proposal by the retail industry to reduce the use of thin carrier bags by 20 to 25 per cent by 2006, and to double the use of reusable carrier bags. Supermarket approaches included charging for thin plastic bags, promoting reusable bags and crates.

One of the most comprehensive surveys of plastic bag use was carried out in the Walloon region of Belgium by the Centre for Research and Information for Consumers' Organisations (CRIOC, 2005). A report from CRIOC (*Courses et emballages: 7 ans de perception des emballages en Wallonie 1999 – 2005)* set out to measure consumer behaviour concerning supermarket plastic and other types of packaging system, in the context of socio-demographics and type of shop.

One important element is the enthusiasm with which the shops encourage alternatives. Where they make a significant effort to promote reusable bags or other schemes (boxes, caddies etc) and run promotional campaigns, there is a much higher uptake by customers.

Between 1999 and 2005 the proportion of customers claiming to use disposable bags fell from 89 per cent to 53 per cent, while those claiming to use reusable bags rose from 26 per cent to 43 per cent. CRIOC concluded that despite a lessening in popularity, supermarket customers in Wallonia remain attached to disposable plastic bags, more so than across Belgium as a whole (53 per cent in Wallonia, 37 per cent in Belgium).

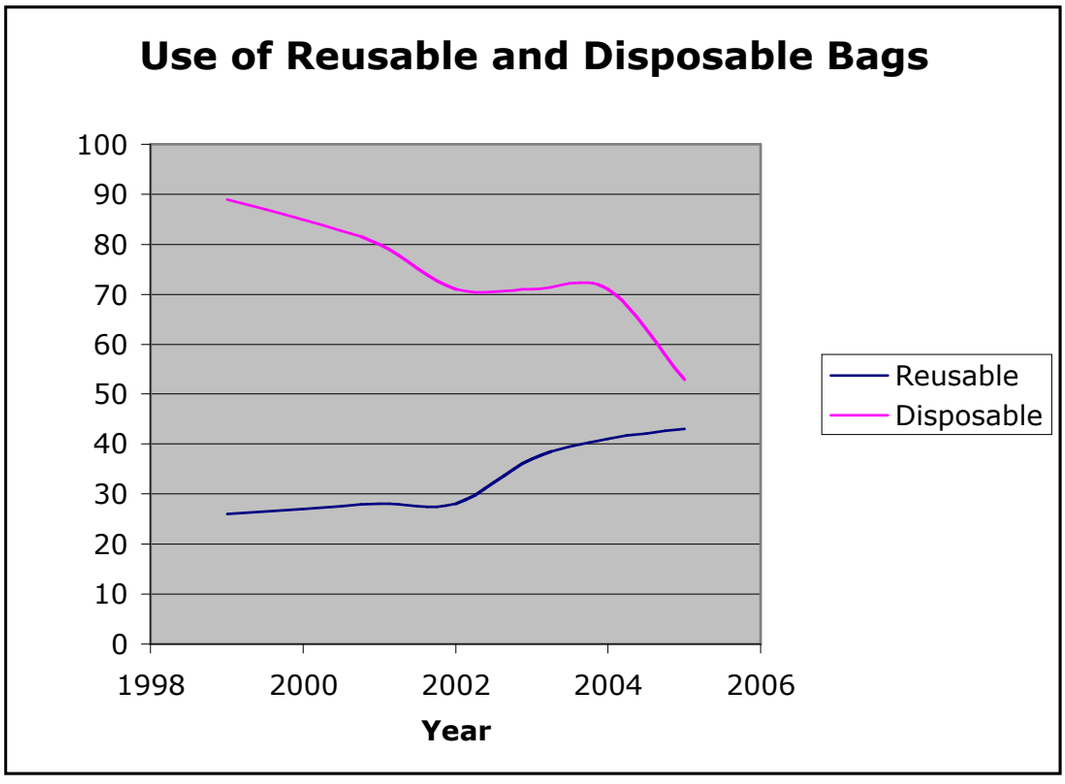
Socio-demographic factors include:

- the type of shop
- whether or not shopping is undertaken on foot

- the age of the shopper

Quite simply, where shops do not give away disposable bags, shoppers make alternative arrangements.

Figure 2 below shows encouraging signs for supporters of reusable bags in Wallonia.



SOURCE: CRIOC (2005)

Supermarket action in Belgium

In 2004, Fedis (the Belgian retail sector body) undertook a campaign to reduce by a quarter the amount of disposable carrier bags issued. "We are making progress, but we need the support of the regions, as previously agreed, in organising campaigns to encourage consumers to change their behaviour", declared Fedis when releasing recent statistics.

Each chain has their own policy. Stores like Aldi, Lidl and Colruyt never issue these bags to customers. During the last year, Carrefour has introduced the same measures in its 56 hyper-markets. A Carrefour spokesman declared "We promote canvas or reusable bags". Previously Carrefour issued 14 million disposable bags each year, a figure which has fallen to all but zero.

GB chain is developing alternatives such as bags for bicycles, trolleys etc. For a decade Delhaize has encouraged reusable bags, compensating customers with loyalty card points. According to Delhaize's spokesperson, the number of bags used fell by 17 per cent during 2005. IKEA no longer issues free plastic disposable bags. Their use fell by 71 per cent (from 3.5 million to 925,000), between 2003 and 2004.

Source: La Libre Belgique 2006

From 1 July 2007 customers were no longer be able to pick up free plastic bags for their shopping at Delhaize supermarkets in Belgium. Expatica (2007) reported that the supermarket chain is opting instead to offer reusable alternatives based on renewable resources. Delhaize will be charging EUR0.05 per bag and claim that the changeover will save 720 tonnes of plastic a year.

BOSNIA HERZEGOVINA

BH citizens do not have to pay for their plastic bags in shops and markets despite plastic bags posing litter problems. The bags are said to pose an eyesore travelling along the Neretva river.

A project undertaken by the Centre of Environmentally Sustainable Development, *Say NO to plastic bags*, is financed by Ministry of physical planning and environmental protection of Sarajevo Canton. The project aimed to decrease the use of plastic bags by increasing the use of reusable, cloth bags. Various promotional material was produced, leaflets and brochures etc and a website devoted to the campaign was also set up. BH citizens also had the opportunity to voice their opinions and talk to campaign leaders at various stands set up around the city. The month-long project was carried out in October 2003 and following its success was repeated in May 2004.

CZECH REPUBLIC

There are currently no national, regional or local regulations specific to the handling of plastic bags in the Czech Republic.

Czech packaging legislation has no special regulations focused on this packaging item. Within the area of packaging legislation Czech Act No. 477/2001 Coll. on packaging, which generally establishes obligations for persons, who place packaging or packaged products on the market or in circulation in the Czech Republic. The main obligation on these persons is to ensure the takeback and recovery of their packaging, which also applies to carrier bags.

However, according to Czech Ecolabelling Agency the majority of bags are used by residents as garbage bags or are recycled with the other household-plastics. Supermarkets have the option on how to distribute their bags, some of the supermarkets, particularly the large companies such as Tesco and Carrefour, give them to the consumer automatically, some only give them away on demand whilst others charge. Plastic bags cost EUR0.035 - 0.20. Paper bags are always – when available - more expensive (typically EUR0.35). Residents will often take their own boxes, crates or bags to those supermarkets that do charge.

The Czech Ecolabelling Agency (2006) are currently preparing the criteria for a new product group for awarding the ecolabel which will include biodegradable shopping bags. The agency confirms that there is no data available on the statistics relating to plastic bags in Czech Republic.

DENMARK

As part of a larger packaging tax introduced in 1994, Denmark (Denmark, 2001) has a "green" tax on plastic bags encouraging the use of reusable bags. Under the *Consolidated Act on taxes on certain types of packaging, bags, disposable tableware and PVC foils*, the tax per kg is:

- for bags made of paper DKK 10
- for bags made of plastic DKK 22

However, the tax is paid by retailers when they purchase bags, rather than by shoppers. This has shown less dramatic results than the Irish PlasTax, which charges consumers directly for each bag used. Still, the surcharge on plastic bags has decreased their use by 66 per cent.

Denmark employs a general waste tax that has proven to be very successful. The waste tax is differentiated so that it is most expensive to landfill waste, cheaper to incinerate it and tax exempt to recycle it. The Environment Minister was asked, in February 2000, whether the 1993 tax had achieved the desired environmental effect.

The EPA concluded that before the law's implementation, it had expected to tax around one billion bags (ca 75 per cent plastic and 25 per cent paper). The weight was assumed to be 25 g for a standard plastic bag and 55g for a standard paper bag. Total consumption of materials was thus: 18,750 t plastic and 13,750 t paper. In 1999 there were 7,750 t plastic and 700 t paper used for bags. This suggests that 1999 experienced around 70 per cent less material (of paper and plastic) used to produce bags.

The EPA confirmed that the shops do not often give bags away free of charge. Moreover, they often use different sizes of bags - related to the size of the product packed. It apparently remains difficult to judge if the tax has had the desired effect on the customers' behaviour in the supermarkets.

There has been a technology development in the production of plastic bags - bags are now thinner and therefore lighter. In addition, plastic bags may be produced in HDPE rather than LDPE, making it possible to produce very light bags (down to 10 g). The result is that the tax on the individual bag is less than set up in the law. The stimulus for the costumer not to buy bags has therefore grown less. The calculation of the number of bags before the tax is uncertain. The total estimation is that the use of bags has fallen after introduction of the tax between 20 - 65 per cent. The estimation is uncertain, because the bags have grown lighter since the tax was introduced.

Christensen (2006) reports that the bag tax paid to the government was as follows.

TABLE 3. Danish bag tax revenues to Government

Year	Revenue (billion DKK)
1994	129.6
1995	162.2
1996	156.1
1997	159.9
1998	171.3
1999	177.4

FINLAND

In Finland, supermarkets pay a levy on the number of plastic bags used. Plastics shopping bags have not been an issue in Finland since the 1990s, when they introduced dry/wet sorting, where households could use two-colour plastic bags in order to sort and separate biowaste and energy fraction.

Reversible waste bags are issued to householders, who can choose to have them with a coloured surface on the outside, and the combustible contents (including all plastics except PVC) are sent for energy recovery. When reversed, the bags are black and can then be used for biowaste. All bags are co-collected and separated optically at the automatic sorting centres. Biowaste bags are ripped open and bags sieved from compostable fraction.

All plastics were then turned into standardised energy fractions (REF I, II & III). This approach worked while sorting plants could sell the energy fraction as fuel to power plants. However, since January 2006, the EU waste incineration directive classifies power plants using feedstock as waste incinerators. Consequently, most power plants in Finland are reverting to coal, peat or other non-waste fuel.

In 1999, a plastic bag ecotax was examined by three Finnish Ministries, but did not deem the measure beneficial for society. All Finnish shopping bags are in any case charged at EUR0.15 – 0.50 in shops - and the bags are often made of recycled plastics. The plastic bags industry provides more than 100 jobs.

FRANCE

An amendment in 2005 to part of a law on agricultural products (intended to make the agricultural sector more ecologically responsible) was finally approved by the French Senate and Parliament on December 22, 2005. This means that it will not be permissible to give away or to sell non-biodegradable lightweight bags at supermarket exits (*sacs sortie de caisse*) by 2010. PlasticsEurope France (2006) reports that heavier reusable and recyclable bags will be allowed under these circumstances, as will the small bags used in supermarkets to wrap individual products such as fish, cheese etc. Branded bags from other shops will also not need to be biodegradable.

The next stage of policy-making in France is an obligation upon the Government to pass during 2006 a *décret d'application* - an instrument giving substance to the amendment; specifying in detail what will and will not be permitted. This is set to cause further problems because it is alleged that the French initiatives conflicts with the terms of the EU Directive on packaging and packaging wastes. The French décret d'application must be submitted to the European Commission, and this is likely to provide opponents to this measure with a further opportunity to protest, this time to the Commission and on the grounds that the Packaging Directive forbids Members States from taking measures against waste streams which are regulated under, and in compliance with, the Directive.

PLASTIC BAGS IN FRANCE

- Plastic bags are used within 20 minutes, but take 400 years to degrade
- Each year in France 17 billion plastic bags are distributed (80,000 t)
- 120 million bags pa end up littering the coastline
- In 2004 12 billion lightweight supermarket bags were issued (15 billion in 2003)
- Per capita arisings = 2 kg pa plastic bags

The policy is to encourage the use of biodegradable bags. Manufactured in starch, these bags will also be available derived from tomatoes, potatoes and hemp (Actu-environnement, 2006). Following the Government's amendment, ADEME has clarified that "a reusable shopping bag is an overall better solution, from a strictly environmental viewpoint, to a disposable bag" - agreeing with the conclusions of a working group on shopping bags organised by the Ministry of Ecology and Sustainable Development. The policy goals remain in France to:

- reduce the number of disposable plastic bags, whatever they are made of
- change the behaviour of the public

Ecology Minister Nelly Olin set a new objective to reduce during 2006, the number of supermarket bags issued to half that of 2003. ADEME notes that simply moving to biodegradable bags is not synonymous with the total absence of environmental impacts.

The French Association for Citizens' Eco-consumption (CLCV) remains critical of the policy initiative. They consider that the proliferation of the supermarket bags must be resolved urgently. Underlining the fact that biodegradability is not a total solution, the Association lobbies for proper standards. One solution advanced by industry was the NEOSAC, composed mainly of PE it did not conform to French Standard 13432 on biodegradability and was strongly opposed by a number of critical groups.

The French Ecology Party expressed satisfaction at a new policy initiative said to be aimed at developing new agricultural products - the opportunity will be presented to manufacture biodegradable bags made of starch and maize. The industry (La Fédération de la Plasturgie) has called for a total re-negotiation of the amendment, observing that the sector employs 36,000 people in France. They argue that amendment should be supported by an analysis to assess its conformity with European legislation, claiming that it "is not certain that it is possible to ban a type of packaging simply because it is not biodegradable, when in fact it is recoverable".

A survey by WWF (April 2005) found that 83 per cent of French people support the total banning of disposable supermarket bags.

French Government agency Ademe has carried out and coordinated a number of relevant LCA studies. One such study (Ademe, 2005a), executed by Ecobilan PriceWaterhouseCoopers for supermarket chain Carrefour, drew some interesting conclusions.

Plastic shopping bags study for Carrefour

The study compared the environmental impacts of four types of bag – measured against service delivery of 9,000 litres of purchases (the type annual volume of a shopper's purchases).

The comparison was undertaken in the context of France's residual household waste management system; 51 per cent landfill and 49 per cent incineration. The study concluded that:

- Following a certain number of reuse trips, the PE shopping bag always performed better than the disposable bags studied
- With five or more trips, the PE bags outperformed the others in all categories of impact, even for the emissions of dioxins

Compared to PE disposable bags the paper bag is preferable in terms of littering, is equivalent in terms of non-renewable energy consumption and in the formation of photo-chemical oxides. The paper bag consumes three times as much water and yields 80 – 90 per cent more greenhouse gases and acid gases.

Compared to PE disposable bags the biodegradable bag is preferable in terms of littering and the formation of photo-chemical oxides. The biodegradable bag is equivalent for three indicators and is much worse for the emissions of greenhouse gases and acid gases. It is 11 times worse in terms of eutrophication.

In general terms the PE plastic shopping bag does well against its paper and biodegradable rivals, except with regard to littering, which is the principle weakness of this bag (especially in beach areas).

To test the robustness of the observations above, the study considered several scenarios:

- Reuse of disposable PE bags for rubbish
- Recycling 30 per cent of PE bags
- Single reuse of paper bags
- Different waste management options for used bags (landfill only, incineration with and without energy recovery).

Evaluation of these scenarios confirmed that the conclusions which apply in France would also be relevant in other countries.

Reference: ADEME (2005a)

GERMANY

The German EPA (Umweltbundesamt, UBA) reports that there is no special regulation, since plastic bags are viewed as sales packagings and so are regulated by the German Packaging Waste Ordinance, based on the EU Packaging and Packaging Waste Directive.

German policy-makers started a public discussion on lightweight carrier bags versus paper carrier bags and reusable shopping nets or bags more than 15 years ago, Most shops ended the free distribution of plastic bags, and started to ask customers to pay 15-20 Pfennig per bag (today EUR0.08-0.15 per bag). Most shopping centres now offer two different sizes of PE bags and an additionally cotton bags, that are a little bit more expensive. Shops for clothes, electronic equipment and other more valuable goods still give the bags free of cost.

Germany has reached the 60 per cent recycling quota for plastic packagings. The recycling quota for lightweight carrier bags is a little higher than generally for packaging waste because PE bags are normally given to the Dual Systems if not used several times for shopping and other purposes; they are easily sorted and said not to cause significant problems for materials recycling.

The UBA declared (2006) that there unlikely to be any local schemes and campaigns aimed at these materials. This would seem to be unnecessary, because all regions and cities have their

separate collection systems for packagings organised by the DSD and their sub-contractors. In summary, in Germany lightweight carrier bags used to be a waste and litter problem before 1991, but this was been solved by the German Packaging Waste Ordinance.

Aldi, Netto & Plus are large chains of supermarkets in Germany, they all charge for check-out bags of their own accord without any government legislation in place; they have done for several years.

Plastic bags are not banned and there is no mandatory charge, deposit or tax on it in Germany. Plastic bags are a regular product, which have been sold at the cash desk in the supermarket or shop for many years. They cost around EUR0.05 to 0.20, depending on the application (for freezing bags the price could be higher). According to PlasticsEurope, Germany (2006) plastic bags - which are regarded as service packaging - underlie the German Packaging Ordinance, which very recently has been revised so that the requirements of the European PPW Directive is implemented in Germany since January 7, 2006.

The Packaging Ordinance has to be regarded in the context of the German Economy Cycle and Waste Law. This law defines the producer responsibility in article 22. Under this, the Packaging Ordinance regulates the so called dual systems, which run the waste management. There are no other regional laws for these bags. In Germany, all plastic bags are licensed - the vast majority under the dual system of DSD and, thus carry the green dot label. For some use areas such as textiles or shoes there are different solutions in practice. Here, other dual system companies like Interseroh, Landbell etc. are also in place.

The official statistics of the Federal Statistical Agency gives 150,000 tons for the production of bags made of polyethylene (PE) in the year 2004 in Germany. These bags are packaging, postal, carrier, household bags and sacks, freezing bags, fresh-keeping bags and drinking bags etc. Carrier bags made of PE (incl. postal and packaging bags) alone were around 75,000 tons in 2004.

GREECE

In Greece 10 billion plastic bags are distributed every year. Retailers seem willing to charge their customers for plastic bags. The idea of the re-usable bag has been presented but there are currently no laws in place at the moment.

HUNGARY

In Hungary, most stores are said to expect customers to have their own bags. Supermarkets will sell sturdy medium-sized plastic bags (tashka) for about 25 cents.

ICELAND

In Iceland there is no national regional or local regulation in place regarding the distribution, disposal and recycling of plastic bags, but of course the packaging directive (and its update) applies. Plastic carrier bags are seen as packaging in Iceland.

There is a levy on lightweight plastic carrier bags, one must pay only IKR 15 (EUR0.20) for each. Around 16 million bags were sold in 2004 (on a population of around 300,000). The levy is used for many projects, mostly with an environmental connection.

Iceland – a perverse effect of the plastic bag levy

An unwanted perverse effect of the levy is that people may be inclined to "buy one extra", for the sake of the environment.

Plastic packaging (as with all packaging) carries also a recycling fee, according to regulation 1024/2005 on recycling fees. This fee must be paid upon importation.

IRELAND

Approximately 1.2 billion plastic shopping bags were provided to residents free of charge (around 325 bags per person pa) before the Irish Government introduced the EUR0.15 per bag tax in March 2002. The Irish EPA (2004) reports that the levy resulted in a 90 per cent reduction in plastic bag consumption, where shops reported handing out about 277 million fewer bags than normal and raised EUR3.45 million in its first three months. The levy now yields EUR19m in revenue each year towards the Environment Fund. The revenue is being used for environmental purposes and to mitigate the damage that had already been caused by the plastic bags.

The programme, which aims to reduce waste and litter, is being closely watched by other countries, with authorities in Britain and the US expressing interest in copying it. On the first anniversary of the introduction of the Plastic Bag Levy, the Environment Minister declared "The environmental levy on plastic bags, which was introduced this time last year, has had a dramatic impact on our consumption of plastic bags and on the problem of visual litter. Quite apart from the immediate objective of cutting down our consumption of disposable plastic bags, it has been very effective in raising awareness of waste management issues and the part each one of us can play in reducing the amount of waste we produce."

Retailers who fail to implement the Levy Regulations correctly are liable on summary conviction to a fine not exceeding EUR 1,905 or to imprisonment for up to 12 months, or both or, on conviction on indictment, to a maximum fine of EUR 12.7million, or to imprisonment for up to 10 years, or both. A system of daily fines applies where an offence continues to be committed after conviction ie up to EUR 254 per day for a summary conviction, or up to EUR 127,000 for conviction on indictment. Ireland's Environment Minister Martin Cullen noted that "The reduction in the use of disposable plastic shopping bags has been immediate, and the positive visual impact on the environment is plain to see."

Rudden (2005) reported that:

- the restrictions changed peoples attitude to litter in general and reduced the level of litter found in streets and hedgerows thus protecting the environment. It reduced the impact the bags had on wildlife (ingestion, plastic degradation in streams etc.).
- bags are a by-product of oil, a finite fossil fuel therefore the levy helps conservation of resources. In the long term, the levy will save householders' money because the reduction in litter will mean less taxes will need to be paid to 'clean up'.

However, the Australian Government's Productivity Commission (Productivity Commission, 2006) reviewed the Irish situation and cited evidence (TES Consulting Engineers) which it said indicated that "claimed litter reduction appears exaggerated".

The plastic bag levy which came into effect on 4th March 2002 had an immediate effect on consumer behaviour with plastic bag per capita usage decreasing overnight from an estimated 328 bags to just 21. This had an immediate benefit to our environment - with a decrease in excess of 95% in plastic bag litter. Surveys indicated that up to 90% of shoppers used long-life bags in 2003, compared with 36% in 1999.

The Irish Department of the Environment (2007) noted that the primary purpose of the plastic bag levy is to reduce the consumption of disposable plastic bags by influencing consumer behaviour, and that the levy has been an outstanding success. The fall in the consumption of plastic bags has been considerable with the reduction being estimated at over 90 per cent.

However, in 2007, statistics indicated that the per capita consumption of plastic bags had started to increase again, rising to 31 in . Consequently, the environmental levy on plastic shopping bags was increased from 15c to 22c per bag from July 1, 2007.

Litter arising from plastic bags (per cent)	
Prior to Levy	5.00
December 2002	0.32
August 2003	0.25
August 2004	0.22
August 2005	0.22

ITALY

In February 1987, the Mayor of Lombardy, Italy, issued a directive prohibiting merchants from providing customers with any "*non-biodegradable bags or other containers in which to carry away their purchases, or to sell or otherwise distribute plastic bags, with the exception of those intended for the disposal of rubbish*".

Generally, high street shops give away plastic bags, whereas supermarkets charge a small fee. The plastic shopping bag problem is somewhat mitigated in Italy by the simple expedient that supermarkets charge 5 cents each for them. The charge encouraged less use of disposable plastic bags and more recycling.

Case study – CRIAC O COOPITALIA (I)

A packaging waste prevention campaign in eight supermarkets to address packaging achieved a reduction in the number of plastic bags of around 200,000.

Source: ACR+/AICA Working Group on packaging waste prevention and communication: Milano, Italy (March 20, 2006)

LUXEMBOURG

A joint effort has been made to reduce the use of one-way plastic bags. The government is working alongside Luxembourg Retailers Association and Valorlux to help promote the use of reusable bags.

Journal de l'environnement (JDLE, 2006) reported that from February 1, 2006, the Luxembourg Environment Minister reached a voluntary accord with Valorlux (the non-profit packaging recovery agency) for the period 2006 – 2008, to reduce the quantity of lightweight plastic bags in circulation.

The agreement also proposes a reusable bag. Around 750 tonnes pa of one-way disposable bags are consumed in Luxembourg. Since the signing of the first accord (January 2004), some 600,000 eco-sacs have been sold. The signators to the agreement expect to see a 38 per cent increase in the use of reusable bags.

MALTA

According to Malta's Ministry for Rural Affairs and the Environment (MRAE, 2006) plastic carrier bags taxes were introduced under three categories:

- *biodegradable* where no eco-contribution is paid
- *degradable* where an eco-contribution of 6 Malta cents per bag is paid
- *plastic bags* where an eco-contribution of 7 Malta cents per bag is paid

The government published figures on the drop in use of plastic bags since the legislation was introduced. Since the regulations on plastic bags were introduced, a decrease of 5 million plastic units was registered in the first five months of 2005. Thus by the end of the year the country would have saved 20 million plastic units, and the consumption of plastic bags be reduced by 40 per cent.

Malta's bag tax criticised in the press

There has been some criticism in the press. The *Times of Malta* reported that the tax caused *"a stampede of housewives snapping up free shopping bags duly distributed by the Environment Ministry to a number of points of sale. The cloth bags were in vogue for a month or two. Supermarkets put a 10c charge on plastic bags to encourage their use and discourage people from using plastic bags. Today, a year later, you would never know this initiative had taken place. The Hessian bags supplied by…the ministry seem to have been relegated to storing winter bedspreads by the housewives. Supermarkets became sheepish about charging for plastic bags. They began undercutting each other until the charge fizzled out completely. As another January rolls by we are up to our necks in plastic bags once more*".

The Maltese eco-tax had a positive impact on the environment. In two years, the number of plastic bags has been reduced by 25 million. And yet, reports Malta Today (2006), the environmental tax has failed to encourage the use of biodegradable plastic bags, the only bags which can be turned into compost, and which remain largely absent from Malta's shops.

The sharpest drop in the number of plastic bags was registered between 2004 and 2005 when the amount of plastic bags fell by 22.5 million. Statistics from the National Statistics Office indicated a further reduction of over 2.5 million in 2006, an indication that the environment ministry's drive to shift over to canvas bags was successful. But despite being tax-free, biodegradable bags remain hard to find. That is because they are more expensive to produce than degradable bags. And because the current tax regime is not incentivising their use, consumers have shifted to degradable plastic bags but not towards biodegradable bags.

THE NETHERLANDS

There are no specific regulations regarding plastic 'carrier' bags in supermarkets in the Netherlands. However, supermarkets in the Netherlands do not give away any carrier bags free of charge. Clients are required to pay approximately EUR0.20 for thick plastic bags if they want to carry products home from the supermarket. Accordingly, the carrier bag is not considered to be a packaging placed on the market by the supermarket, but as a product that is sold to a customer.

Plastic bags do not fall under the producer responsibility obligations of the supermarket in the packaging and packaging waste legislation in the Netherlands. There is no specific taxation scheme for plastic carrier bags in supermarkets.

In the early 1990s the Dutch Ministry for the Environment concluded a packaging covenant with industry. One of the measures included in that covenant was an agreement by the supermarkets to stop giving away plastic carrier bags for free as from July 1991. This was implemented. When the first covenant expired this agreement did not come back into the second packaging covenant, which was concluded in 1997. However, the supermarkets did not change their policy and to date they do not give any plastic carrier bags out for free.

There is no quantitative evidence of any costs or benefits of this type of action in the Netherlands. Plastic bags end up in MSW and go mainly to energy recovery. It is not considered as an area for which specific action is required.

PORTUGAL

AMALGA in Portugal do not have any policy regarding plastic bags, and estimate a production of 1,345 tpa (8.6 per cent of total residual waste, a figure which seems high). AMALGA have no campaigns against these bags which are regarded as conventional packaging? This is seen locally as a problem because of the quantities produced, but is not a priority.

In Portugal the country's largest retail group, Sonae, has adopted Symphony's d2w(R) plastic carrier bags (Symphony, 2007), and other major users include Marriott, Royal Caribbean Cruise Lines, BUPA, News International, Pizza Hut, KFC, and Walmart. Oxo-biodegradable plastic is ideal for frozen food packaging, as it can be kept for extended periods at low

temperature, and will quickly degrade when it becomes a waste product at normal temperatures.

RUSSIA

This section does not describe the situation concerning lightweight supermarket bag use in general, but cites one example – which is to illustrate how industry can view the humble plastic bag as an important and cost-effective communications tool.

Supermarket bags in Russia – Bringing home the bacon

The US Meat Export Federation (2006) reports that Russian consumers, like many Europeans, are charged for each bag. Because of this, the humble plastic shopping bag is recycled in the most obvious way: it is reused to carry lunches, books, papers, office supplies and school notebooks and rarely trashed until it is full of holes or in shreds.

The Russian use and reuse of plastic bags make them a very potent form of advertising since the recipients of plastic bags bearing the US pork logo carry them to every conceivable place consumers venture or congregate. Because of the value placed on plastic bags by consumers, large-scale gifts of plastic bags are a successful part of USMEF's ongoing strategy to increase the use of US pork by Russian processors and retailers. USMEF gave plastic bags to a group of local meat processing plants and three retailers, which sell US pork. USMEF provided 57,000 plastic bags to the retailers.

An added bonus to the retailer is that while the US pork logo is featured on one side of the bag, the retailer's logo is on the other. USMEF and the US pork industry are proud of their product, but many Russians are convinced that only domestic pork is truly of high quality. The co-branding of US pork with Russian retailers well-known to their customers assists in breaking down this belief. USMEF completed a similar promotion in December 2001, distributing 170,000 plastic bags to four plants in Moscow and four plants and one distributor in St. Petersburg. These companies passed on the bags to their customers at more than 1,200 outlets. The success of this public relations campaign inspired USMEF to repeat it.

SPAIN

Spain's Environment Minister has drawn attention to the application of a tax for the use of plastic carrier bags, stating that it would help increase the number of plastics being recycled. Following this, the Chief of the Environment Department in Catalonia has also suggested a possible tax for the use of plastic bags.

In February 2007, Spain published a new national waste plan (EndsEuropeDaily, 2007), recommending measures and objectives for dealing with 13 separate categories of waste up to 2015. Ambitious targets for 2015 included a 20 per cent reduction in per capita urban waste generation and a 70 per cent reduction in non-biodegradable plastic bags.

SWITZERLAND

Plastic bags are not considered to be a problem in Switzerland, and the majority of shoppers bring their own reusable bags. Switzerland requires supermarkets to charge CHF0.15 to 0.20 per bag, but smaller bags are free to consumers. All recovered plastic bags (collected with residual waste in pre-paid garbage bags; 35 L for CHF2-3) are incinerated with energy recovery.

UNITED KINGDOM

Research in 2000 indicated that UK consumers used eight billion plastic carrier bags per year. Some local authorities have complained about the presence of plastic bags in the collected recyclables. Early in 2006 one council complained that the bags cause chaos as they clog up the region's major recycling plant.

District councils had started to ask people not to put plastic carrier bags in their dry recyclable bins. Originally, people were told they could set out their bags for collection, and the change of policy on disposing of them has caused some confusion.

Plastic bags clog up the machinery at the recycling plant, causing endless delays and rising costs. The bags could be a health and safety hazard if they are tied up and contain rubbish in them. It slows down the sorting process as every bag has to be emptied before it can be sorted. District councils have now suggested that people use bags to wrap up cooked food to put in their residual waste bins, or return them to supermarkets for reuse or recycling.

Plastic bags present in whales

An autopsy by the Cotentin Cetaceans Study Group and the University of Caen analysed the stomach contents of a whale stranded on a beach in Normandy, and found nearly a kilogram of plastic bags and packaging. They found one plastic and foil crisp bag and two supermarket plastic bags - all from the UK, seven coloured dustbin bag fragments, seven transparent bags and one food container.

http://www.defra.gov.uk/environment/water/marine/uk/stateofsea/chartprogress-1.pdf

A number of food retailers have taken up the cause. "Bag for life" and "penny back" schemes have been introduced by some of the large supermarket chains, encouraging consumers to consider the benefits of reusable bags as an alternative to plastic bags. The less plastic bags that are sold will lead to fewer polluting the environment.

Retailers are voluntarily introducing campaigns to help reduce the number of plastic carrier bags in circulation:

- In 2002 the Co-op (2002) supermarket introduced Britain's first 100 per cent degradable plastic bag in an attempt to reduce landfill waste. Now in 2006, all of its bags are made from a new petro-chemical based material that degrades almost completely in three years, leaving carbon dioxide, water, and a small amount of mineralisation in the soil.
- In 2002 Dixons changed the design of their carrier bags reducing the amount of material used per bag, saving 262 tons of plastic annually.
- In September 2005 the department stores, John Lewis introduced 100 per cent reusable biodegradable bags manufactured from jute at a charge to the customers. Employees of the store are advised to issue bags sensibly when required.
- Lidl's UK stores have a surcharge of 5 pence per lightweight carrier bag.
- In September 2005 Woolworths was charging customers 1p per carrier bag. The money raised was donated to Woolworths charity Kids First.
- Supermarkets in Britain usually provide easily accessible recycling stations.

The Government declared it has no plans for a plastic bag tax. However, researchers have found the majority of British shoppers are in favour of paying for plastic bags - almost 63 per cent support the idea of paying GBP0.10 for their carrier bags, compared with just 27 per cent who are opposed. However, in 2007 there were media reports that the Prime Minister was considering action on plastic bags. Sky News (2007) reported that in his first major speech on the environment as Prime Minister, Gordon Brown announced that the Government would convene a forum of supermarkets to discuss how to reduce the use of disposable plastic bags. "I am convinced," he said, "that we can eliminate single-use disposable bags altogether in favour of long-lasting and more sustainable alternatives."

In 2005, the Waste & Resources Action Programme (WRAP, 2005) published a report to investigate the potential of the 'Bag for Life' (B4L) scheme, to reduce significantly the 8 billion free carrier bags given away by UK retailers each year. Plastic carrier bags are widely seen as an environmental problem: the inefficient 'single use' of free carrier bags and the visible problem of litter and associated environmental affects.

The growth in the use of plastic bags demonstrates how deeply they have become embedded in consumer expectation and behaviour. UK consumption of plastic carrier bags is estimated at between 60,000 - 90,000 tpa which accounts for 3.5 - 5.3 per cent of total plastics used in packaging. WRAP is looking to identify mechanisms that might encourage consumers to

change their behaviour and use a B4L instead of free carrier bags. There is some evidence that encouraging people to use a B4L does prompt a reduction in the use of free plastic bags.

Case study – B&Q, UK

The UK's largest home improvement retailer, B&Q, announced in December 2005 (B&Q, 2005) that it will charge more customers GBP0.05 per plastic bag, in a bid to encourage them to do without or to re-use their old bags which will reduce environmental pollution.

Proceeds from the charge are to be given to Keep Britain Tidy to help reduce the impact of the unnecessary waste created by millions of plastic bags that otherwise end up on our streets or in landfill. This pilot will be introduced in the North East of England following a successful trial in Scotland. If successful, B&Q plans to roll the charge out across the UK. At B&Q stores across the UK, over 70 million carrier bags pa are given to customers. In Scotland B&Q reduced the number of carrier bags it gives out by 82 per cent. B&Q's customer research conducted in Scotland revealed that about 73 per cent of people think the scheme is a *very good* or a *good* idea, 12 per cent are neutral, 11 per cent think it is a bad idea and only 1.8 per cent think it is a very bad idea.

By charging their customers, B&Q is reminding the public that plastic is a valuable resource". In research conducted as part of the pilot scheme, B&Q surveyed more than 1,000 people, almost half of whom admitted that they have more than 20 plastic carrier bags stored in drawers at home. In addition, one in 10 respondents admitted to having up to 80 plastic carrier bags stored at home, yet only 10 per cent of respondents recycled a quarter of them. Almost half said they felt guilty about not re-using more of their plastic carrier bags and almost 80 per cent said that they were annoyed by plastic carrier bags littering their neighbourhoods.

Survey results for the North East of England found that 72 per cent of people are annoyed by plastic carrier bags littering their local neighbourhood and 90 per cent stash carrier bags in a drawer or cupboard at home. Most have up to 20 bags stored at home, but 61 per cent feel guilty about not re-using more plastic carrier bags.

A voluntary pilot programme initiated by Durham County Council achieved significant increases in the sales of B4L and gained the support of local retailers. Significantly, for most, the term 'bag for life' is synonymous with the bags which can be bought at supermarket checkouts. Barriers to greater re-use of B4Ls include:

- feeling that it is somehow not the done thing to use a B4L bought in one supermarket chain in another chain's outlet
- not wanting to look 'cheap' using a branded supermarket B4L in other stores
- unwillingness to put new clothes, etc. into a bag previously used for food shopping, especially vegetables or other wet food.

The conclusions from this contemporary study are given in **Appendix I.**

Case Study – UK town of Hebden Bridge, England

Sunday 24 June, 2007 saw Hebden Bridge's first step to go plastic bag free.

The town square will return to its textile roots as people get the chance to make their own reusable shopping bags. Between 11am and 3pm people will be able to make use of sewing machines in the square to run up their own shopping bags. "This is a great way to raise the town's profile and to get involved with making a difference to our environment." said Nader Fekri the mayor of Hebden Royd Council.

Hebden Bridge traders and residents are rising to the challenge to abandon plastic bags. Already, 25 of the town's 100 shops have shunned plastic bags. Maskills the butchers, Valley Stores, Holts the grocers, Studio Seven Art Supplies and Lamberts the printers are amongst the many well established Hebden businesses that are keen to go plasticbagfree. The town intends to send a bag to every household with a leaflet explaining the reasons for ending the use of plastic bags in the town, and a Hebden Bridge bag will be on sale by the autumn.

Hot on the heels of Modbury in Devon, Britain's first plastic bag free town, Hebden Bridge is lining up to be the largest town in Europe that is plasticbagfree.

Source: Hebden Bridge Web (2007)

Following the examples of the UK towns of Modbury and Hebden Bridge (see case study above), London is the first major city in UK to explore a ban. In 2007, London Councils proposed to introduce a London-wide ban, or levy, on throw away shopping bags as part of their plans for legislative changes. London Councils asked Londoners what they thought in a public consultation. An extensive list of industry, environmental and government bodies were also contacted directly.

Ninety per cent of Londoners called for action on throw away shopping bags. The majority of respondents - just under 60 per cent - asked London Councils to lobby for a ban on plastic throw away shopping bags in the capital. A sizeable proportion of those favouring a ban indicated that they would be happy with a levy as a pragmatic way forward.

The results of the consultation were considered by London Councils' Leaders' Committee on November 13, 2007. The Chairman of this Committee introduced the report by asking members whether they favoured a ban on plastic shopping bags and, if they did, whether a separate bill was necessary to achieve the ban. The Chairman concluded that a ban was supported. He pointed out that retailers could sell bags and if they did he hoped they would be biodegradable and that any money raised would go into an environmental fund. He said that with the agreement of Leaders' Committee to a ban, the issue was now a matter for Parliament.

SCOTLAND

Approximately one billion plastic bags are given away free every year in Scotland. A Liberal Democrat Member of the Scottish Parliament Mike Pringle has proposed a bill similar to that in Ireland, proposing to charge GBP0.10 pence per bag. However, EndsEuropeDaily (2006) reported that the proposed law was withdrawn after the parliament's environment committee said it would produce "no clear environmental benefits".

UK industry body the UK Carrier Bag Consortium said the move proved that plastic bags were the best environmental option "provided we encourage more people to re-use and recycle them". In Spring 2004, Edinburgh's IKEA store started charging GBP0.05 for its lightweight plastic bags and bag use fell by 3 million bags pa - equating to a 95 per cent reduction in plastic bags. Sales of HDPE reusable 'bags for life' increased.

In October 2004, B&Q in Scotland undertook a trial of charging customers 5p per plastic bag. The money raised from the charge (less VAT) went to Keep Scotland Beautiful who use it for anti-litter promotional campaigns in Scotland. Demand for plastic bags in B&Q Scotland stores fell by 85 per cent.

WALES

In Wales, the devolved Welsh Assembly Government was considering a ban on plastic bags in 2007. The Western Mail (2007) reported that the Welsh Government puts green issue at forefront of its new powers. The move, possibly by March 2008, could be the first under high-profile new law making powers. It is claimed to rank alongside the smoking ban as one of the boldest pieces of legislation introduced by the Assembly Government.

Sustainability Minister Jane Davidson gave the clearest signal yet that the plastic bag, used in their millions by supermarket shoppers across the nation, could be consigned to the recycling bin forever when these new powers are transferred. The Minister told parliamentarians, "A levy on plastic bags could be looked at….. An Assembly spokeswoman said the request for more powers would "not give powers to raise a levy on plastic bags". But it would allow the Assembly to consider a ban on plastic bags. "There is currently a voluntary agreement in place for a 25% reduction in the environmental impact of plastic bags and if that were not effective further measures could be considered."

NATIONAL APPROACHES TO SHOPPING BAG MANAGEMENT - AFRICA

BOTSWANA

A ban on the use of plastic bags was due to take effect in Botswana in February 2007, forcing shoppers to either provide their own bags or pay for the new-style thicker recyclable bags. Wildlife, environment and tourism minister Mr Kitso Mokaila said in an interview that the new law aims to protect the environment, reported Botswana Press Agency (BOPA).

Plastic waste is the most visible and a major concern because it has environmental implications and there is need for us to manage the problem, he said. Negotiations started some years ago to phase out the thin vest-type plastic, and Mr Mokaila said this was due to the fact that the issue was taken from his ministry as it was seen to be a manufacturing trade issue.

Consultation between government and stakeholders including business organisations and environmental groups started six years ago, and in 2003 a paper containing recommendations was handed to the Sectoral High Level Consultative Council of the Ministry of Environment, Wildlife and Tourism. One of the recommendations was that government should ban the production, importation and use of thin plastic bags with a thickness of 10-20 micrometres; these should be replaced with thicker and bigger carrier bags of 60 micrometre minimum thickness that could be re-used. It also states that government should make it mandatory for manufacturers of thicker plastic bags to use locally produced materials that can be recycled and ensure that they have a recycling programme in place.

The government should encourage the use of re-useable cloth bags and baskets and recyclable paper bags. It should introduce a policy that would require the manufacturers, importers, distributors and retailers to have environmental policies for proper management of waste arising from plastics.

KENYA

Many steps have been taken in Africa to reduce the number of plastic bags being distributed, Kenya has been particularly active in this policy area. The United Nations Environment Programme (UNEP, 2005) considered the topic of plastics bags as part of a broader review of economic instruments in Kenya.

According to industry estimates, about 4,000 tonnes of flexibles are produced monthly in the country, with an estimated 2000 tonnes going into the waste stream. About half of the flexibles produced in the country are less than 15 microns in thickness. For instance, the plastic bread bags are between 6 and 7 microns. It is these thin plastic bags that are most prone to inadvertent littering.

The level of recycling and reuse of post-consumption flexibles is very low, with only four Kenyan firms involved in the activity. Recycling has not been widely practised. With the exception of some paper bags, there are not many alternatives to plastic shopping bags in the country.

Shopping bags made from natural products are available but are hardly used because of the easy and free availability of plastic shopping bags in market outlets and the low price at which the plastic bags are sold in outdoor markets. Report findings have indicated that at least eight million plastic bags are now being handed out every month at supermarkets in Kenya alone.

The report proposed an environmental policy package for Kenya comprising seven instruments to manage plastic bag waste, to be introduced gradually over a two to three year period:

1. A ban on plastic shopping bags that are less than 30 microns in thickness
2. Consumer awareness and anti-littering campaign

3. Promotion of voluntary schemes such as a national code of practice for retailers
4. A plastic bag levy collected from suppliers
5. Support for development of environmentally-friendly alternative bags
6. Support for development of an effective plastic bags recycling system
7. Support for development of a managed disposal system to cater for the plastic bags that will enter the waste stream irrespective of the measures taken.

The key economic instrument proposed in the package is the plastic bag levy, from which the funds raised would be earmarked to support development of environmentally-friendly alternative bags, an effective plastic bags recycling system and a well-managed disposal system. Positive effects are expected to be seen in job creation in alternative environmentally friendly industries (cotton or sisal) and in recycling and waste disposal activities.

A comparative analysis of the two options of either collecting the levy directly from shoppers at the retail outlets or from the suppliers for Nairobi indicates that it is more cost-effective to collect the levy from suppliers.

There are a few suppliers to collect the levy from and the Kenya Revenue Authority (KRA) has the capacity to do so at a modest collection fee. A pilot project to implement the policy package and an institutional structure and other modalities to manage the project is proposed.

In Kenya's 2007 national budget (Treasury, 2007), the Finance Minister announced that partly to protect the environment from further degradation, he proposed to impose an excise duty of 120% on plastic bags. He further proposed to impose a ban on very thin plastic bags. These measures are expected to encourage industry players to devise environmentally friendlier bags for shoppers.

A cross section of Kenyans supported the move saying it would force manufacturers change to biodegradable bags.

"Countries like Rwanda have already banned the use of plastic bags," says Kairo Thuo, a tax expert with Deloitte Company. "In Kigali, incoming passengers are required to deposit their plastic bags at the airport and purchase jute bags."

Finance minister, Mr Amos Kimunya, in his Budget speech slapped a 120 per cent excise duty on plastics saying it is aimed at protecting the environment from further degradation.

The minister also proposed to impose a ban on very thin plastic bags as part of strategic measures expected to encourage industry players to device environmental friendly bags.

The view of Kenya's plastics industry

East African Standard (Nairobi) reported that Kenya Association of Manufacturers (KAM) says the 120 per cent duty imposed on plastic bags would render thousands of people jobless." The Government intention seems to be an imposition of a ban on the use of flimsy bags and further to dissuade the general use of plastic bags," said KAM in a statement.

"From the industry, this is an unfortunate move that should be rescinded immediately."

The manufacturing sector umbrella body said the 120 per cent excise duty imposed by Finance minister, Mr Amos Kimunya, during his Budget speech on Thursday more than doubles the cost of plastics. KAM says the natural substitute to plastics is paper which also poses an environmental threat resulting from the decimation of forests. The Government has already banned logging of trees, shifting most packaging industries from paper to plastics.

The statement says the tax had gone against the spirit of ongoing consultations between the private sector and Government on resolving the issue.

"A standard has already been developed and agreed upon and that phases out production of flimsies and sets the minimum bag thickness at 20 microns," says KAM. "The move will definitely add to the cost of doing business, which negates the minister's pledge to reduce the

cost of doing business."

Meanwhile, Nakumatt Holdings will launch re-usable carrier bags following the introduction of 120 per cent excise duty on plastic bags by the Government. The supermarket chain said the re-usable bags will be available in its outlets by next week.

The firm's Operations Director, Mr Thiagarajan Ramamurthy said the bags will be available to shoppers for free but will thereafter be replaced at a fee after they wear out.

Nakumatt currently uses more than 50 million degradable plastic bags for packaging following its shift from non-biodegradable plastic bags in 2005.

"Besides the carrier bags we are working on a range of other solutions aimed at ensuring our operations are sustainable,' he said in a statement.

"our obligations is to commit us to operate in an environmentally sustainable manner and the introduction of these re-usable bags is a deliberate attempt to significantly cut on plastic packaging," Ramamurthy said.

An interesting transition from single use plastics to single use bioplastics, to reusable plastics in a couple of years, apparently impelled by an economic instrument. Kenya's largest supermarket retailer, Nakumatt Holdings, planned to launch a reusable carrier bag, following a Government move to levy 120 per cent excise duty on plastics in the Budget. Business Daily Africa (2007) reported that the new re-usable carrier bag to be available at all 18 Nakumatt stores will reduce plastic packaging. According to Nakumatt's Operations Director, Thiagarajan Ramamurthy, the carriers will be durable and reusable and available to shoppers for free at first. But he added that consumers would later be charged a "nominal fee" for replacements.

Nakumatt currently uses more than 50 million biodegradable plastic bags a year. The company shifted away from the less eco-friendly non-biodegradable plastic bags in 2005. The introduction of the new bags is part of a bid by the supermarket chain to move shoppers towards using a single, re-usable bag, rather than the conventional plastic types.

NIGER

Rather than banning the production or distribution of plastic bags, the government of Niger has adopted a less strict approach and buys used plastic bags for 25 CFA francs, (about US$0.03) per kg. The bags are then used to repair crumbling roads, or are compressed using new ceramic mould technology and transformed into bricks.

REPUBLIC OF SOUTH AFRICA

The South African Department of Environmental Affairs and Tourism (DEAT, 2005) 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, believing that this has contributed greatly to the problem. It was in this light that the DEAT proposed new plastic bag regulations under Section 24 of the Environmental Conservation Act (73/1998), published in the Government Gazette of 19 May 2000. The aim of these regulations was to restrict the production of non-reusable plastic shopping bags and to promote re-use and recycling.

The research study was restricted to vest type carrier bags (VCBs), 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.

In May 2004 – almost exactly a year after the introduction of the Plastic Bag Regulations - National Treasury (2004) announced a compulsory levy that will be charged on plastic bags. This was set at 3c per bag (R2.13/kg). A proportion of the revenues collected through the levy are used to establish the *Buyisa-e-Bag* Section 21 Company - a joint venture between Government, labour and the private sector and is the mechanism through which the creation of SMMEs, new jobs and training in the sector will occur.

"This agreement provided for: a minimum thickness of plastic shopping bags; disclosure and transparency with regard to the cost of these bags; stipulated the type and amount of ink to be used on the bags; agreed on the need to promote a market in recycled materials; provided for a levy on plastic bags; prevented the importation of non-compliant bags and committed itself to promoting the aims of the Proudly South African Campaign.

According to RSA Eagle Bulletin (2007), the levy collected R41.2 million for the 2004/5 financial year and R61.3 million in the 2005/6 financial year.

The use of thicker bags combined with charging for them has made it clear that plastic waste has a price and a value. Consumer awareness of both the costs of plastic bags and the positive environmental impact of reuse has been greatly increased. In addition Customs and Excise now ensure compliance of imported bags with the set standard of a minimum 24-micron weight per bag

RWANDA

Rwanda has banned plastics less than 100 microns thick and backed this up with public awareness campaigns. According to an environment minister the Government is taking this environmental issue quite seriously and a number of supermarkets have been closed for flouting the ban and it has been reported that plastic-bag users in the streets are being stopped by the police.

TANZANIA

In a move designed to curb further environmental degradation, Tanzania has banned the use of thin plastic bags, reports the *Tanzanian Mail & Guardian Online.* In an address to the nation, Vice-President Ali Sheni blamed the East Africa nation's deteriorating environment on destructive and unchecked human activity. "Human activities such as reckless tree felling, use of plastic bags, uncontrolled cattle grazing, invasion of reserved forest areas and mountains are some of the causes of extensive environmental degradation," Sheni said.

In addition, he urged industrialists to shift from manufacturing plastic shopping bags to paper bags and banned the production and use of thin plastic bags.

"The manufacturing, importing, buying and use of plastic bags of 30 and 65 microns thickness is now prohibited," he said.

NATIONAL APPROACHES TO SHOPPING BAG MANAGEMENT – MIDDLE EAST

JORDAN

Jordan Times (2007) reports that the Ministry of Environment signed an agreement with the Jordan Environment Society (JES) to implement a comprehensive awareness programme aimed at reducing the use of plastics and encouraging the segregation of waste materials.

Meanwhile, the ministry's spokesperson, Isa Shboul, underlined the negative impact of plastics on the environment. He suggested using paper bags instead of plastics, adding that it had proved to be an environment-friendly alternative.

Irani said the ministry is keen on increasing cooperation with civil society institutions to preserve the country's resources and raise people's awareness on environment-related issues. He said several awareness campaigns will be implemented soon in cooperation with the country's environment societies to curb the use of plastic materials and encourage segregating solid wastes.

NATIONAL APPROACHES TO SHOPPING BAG MANAGEMENT - AMERICAS

USA - SAN FRANCISCO, CALIFORNIA

Every year, 50 million bags are handed out by supermarkets in San Francisco, 90 per cent of which are plastic and the remainder, paper. In January 2005 a report stated that the San Francisco Commission on the Environment was expected to press for regulations requiring supermarkets to charge customers for bags. The levy was intended to reduce the number of unnecessary bags in circulation and provide funds to combat the environmental impacts caused by them. The City estimated that the reduction of 10 million bags would have kept 95 tons of plastic out of the waste stream.

The Commission – estimating disposal costs for the city, recommended setting the levy at US$0.17 per bag, whether plastic or paper. This was derived on the basis shown in Table 4, below:

TABLE 4 – San Francisco proposed levy: cost justification

Activity	Activity cost (US$ million pa)	Cost per bag (US$ per bag)
Recycling and compost contamination - removal of bags from the recycling and composting streams, clearing machinery jams, and contamination of recycled and composted materials	1.09	0.022
Collection and disposal	3.6	0.072
Street cleaning - removing bags from city streets	2.6	0.052
Future landfill liability - potential remediation and processing costs of bags in city landfills	1.2	0.024
Total	**8.49**	**0.17**

However, the City's Environment Department reached an agreement with supermarket operators not to impose the charge, but to reach the bag reduction through several other means such as placing recycling kiosks, selling reusable bags, educating employees, displaying information about recycling programmes, etc. The store operators will contribute some funds for a joint education programme. According to CalRecovery (2006), no other cities in the US have placed a fee on grocery bags.

In California, Wal-Mart Stores, Inc (Wal-Mart, 2005), introduced a scheme in January 2005 the 'Kids Recycling Challenge'. The Kids Recycling Challenge is a plastic bag recycling program that not only raises money for the schools but also makes school children more environmentally aware in over 400 schools across California. The students are required to bring plastic bags into their schools for recycling, the school will be awarded US$5.00 for each 60-gallon bag that is filled and taken into a local Wal-Mart store. The programme ends in April 2006 when the 3 schools that have brought in the most collection bags will be awarded cash grants from US$500 - 1,500. In addition, the winning school will receive an environment-based assembly. Already the challenge has been a great success, more than 104.5 tons of plastic bags have been recycled and over US$116,000 was earned by the Wal-Mart Foundation.

Another Californian supermarket chain - Save Mart (2005) run a similar scheme in collaboration with Enviro-Bag. School children collect plastic bags for raising funds for the school, in 2004 390,000 plastic bags were recaptured. An environmental group, Californians Against Waste aimed to have a plastic bag tax of US$0.15 cents used by supermarkets state-wide by 2006.

In March 2007, the Board of Supervisors of the City of San Francisco passed an ordinance effectively banning (after July 1) the use of plastic grocery bags at supermarkets and large pharmacies. The Board's objective was to stop environmental degradation and reduce litter, and its solution was to legislate the replacement of traditional plastic bags with reusable bags or bags made from paper or compostable plastic. The Sacramento Bee (2007) reports that under legislation - Assembly Bill 2449 - and signed into law by Gov. Arnold Schwarzenegger last year, supermarkets, pharmacies and other major retail outlets must provide recycling bins to make it easier for customers to recycle their bags.

Many California supermarkets and retailers - including Safeway, Raley's, Ralphs, Whole Foods supermarkets and Wal-Mart - have already made plastic-bag recycling bins available in anticipation of the new law.

The effort is being hailed by plastic-bag manufacturers, who say the recycling effort is reducing a glut of bags and providing a reservoir of plastic to remanufacture into other products. For example, recycled bags are melded with wood shavings to make weather-resistant lumber products.

Under the law, California will require supermarkets, pharmacies and other stores using plastic bags to make the recycling bins available if the stores have more than 10,000 square feet of retail space and $2 million or more in annual sales.

The legislation, however, doesn't require consumers to recycle their plastic bags. Nor does it pay them for recycling. Once plastic grocery bags were touted as an alternative to paper bags and the destruction of trees needed to produce them. But the bags, which don't decompose in landfills, are piling up. Amid complaints over the garbage they create, the San Francisco Board of Supervisors in March voted to ban the use of non-biodegradable plastic bags from supermarkets and other large retailers.

"When the industry moved from predominately paper bags to plastic bags, it was thought that it was saving paper materials and trees," said Margo Brown, chairwoman of the California Integrated Waste Management Board, which regulates state recycling and garbage collection programs. "But it has resulted in a huge litter problem throughout the state and uncontrollable debris that just blows in the wind at landfills, at beaches and roadsides."

The state agency is encouraging consumers to use reusable products, such as canvas bags, for trips to the grocery store.

Case Study - Minnesota, USA – Its in the bag campaign

Customer pressure for action on plastic bags led to a collaboration between local grocery stores, the Minnesota Wastewise organisation – a non-profit organisation linked to the Chamber of Commerce.

Merrick Inc collects, sorts and bales the plastics, while Trex Company buys all the material collected. Merrick is a job creation non-profit social services company which employs adults with learning difficulties. Customers drop off their bags at local grocery stores; there are around 100 stores within a 50 km radius. Shopping bags are mixed with the retailers own shrink and stretch wrap films, which are collected by Merricks and taken to the treatment facility.

There, crews sort the bags and remove any significant contaminants. The plastics are baled (each bales weighing 1,300 – 1,500 pounds). Since October 2003 the project has processed 1.7 million pounds of bags and film; equivalent to 76 million bags (enough to make 272,000 square feet of 5/4 inch decking material. Grocers pay a fee for each collection, which helps to fund the scheme. The sale of materials covers most of the costs of collection, sorting an baling – sponsors such as Minnesota Wastewise also make a contribution.

Jon Crea, Merrick Inc North American Plastics Recycling Conference, Orlando, Florida, USA (February 14-15, 2006).

Case study – Rhode Island, USA - Plastic Bags a Blight on Rhode Island Landscape

(March 11, 2005) – One million Rhode Islanders use 192 million plastic grocery bags a year, according to results of a survey by the Rhode Island Resource Recovery Corporation (RIRRC). That is a massive amount of plastic – driven in part by retailers who fail to offer the option of paper bags at checkout – and it has sparked a costly litter problem at the state's primary landfill. "Plastic bag litter is a significant problem at the Central Landfill and elsewhere in the state. Plastic bag clean-up costs have reached $1 million annually, and we are determined to address the issue proactively," said Sherry G. Mulhearn, RIRRC's executive director. Empty plastic bags often fill with air, take flight and pollute surrounding trees, waterways and neighbourhoods. Bags that are buried in the Central Landfill occupy valuable space, while paper bags are easily recycled through the state's recycling program. As a partial solution, RIRRC plans to educate the public about the problem and encourage consumers who choose plastic to tie the bags in a knot before disposal. "We understand why many Rhode Islanders and retailers prefer plastic bags," continued Mulhearn. "We want all parties, retailers and consumers, to be responsible also for their proper disposal."

On March 2005, the Corporation began an advertising campaign to encourage Rhode Islanders to tie their plastic bags in knots. RIRRC's survey found that half of all Rhode Islanders used only plastic bags, 45 percent use both paper and plastic, and five percent opt for paper bags only. Survey participants reported that they are asked about their bag preference less than half the time they shop (44 per cent).
A majority of those surveyed, 53 per cent, report that they prefer plastic to paper. Another 23 per cent prefer paper only, and 24 per cent prefer both equally or have no preference. Respondents said they choose plastic bags because of their convenience. Of the individuals surveyed, 69 percent said they choose plastic bags because the handles make them easy to carry, and they can hold a large number of bags at one time. Additionally, respondents reported that they choose plastic because they reuse the bags. Thirty-eight percent of respondents said that they reuse plastic bags for lining small trash cans and other needs.

Using figures reported by respondents about the number of plastic grocery bags they use on average per month, RIRRC estimates that the state's average monthly consumption is approximately 16 million plastic bags or 192 million bags annually.

CANADA

Recyc-Quebec, the provincial agency that promotes recycling reported that each year Quebecers use between 1.4 billion and 2.7 billion plastic bags. Johanne Riverin of Recyc-Quebec mentioned that the majority of plastic bags are only used for approximately 20 minutes before being disposed of, despite the fact they can be recycled in nearly two-thirds of the province's municipalities - including Montreal.

The Montreal Gazette reported (2006) that the Metro Inc. grocery store chain took a small step toward solving the province's plastic-bag problem when it started selling C$1 reusable and recyclable bags (made from recycled material), that can hold as many items as three plastic bags.

During 2007, a number of Canadian jurisdictions enacted policies to limit or outright ban the use of plastic bags. On May 14, the District of Tofino (Canada.com, 2007) on the Island of Vancouver voted to enact a ban on plastic bags. However, the ban will be voluntary, and residents and businesses will be asked, but not required, to comply. More recently, the Quebec town of Huntingdon became the first Quebec municipality to go plastic bag free - at store check-out counters, at least - and the transition was surprisingly painless, merchants say.

Canada.com (2008) reports that the Huntingdon bylaw means no retail outlet can distribute plastic bags, no advertiser can deliver fliers in plastic bags, and residents are not even supposed to line their garbage bins with green plastic bags. The bylaw is part of a broader programme, championed by Mayor Stéphane Gendron, to reduce waste at landfill sites. The plan includes a town-run recycling plant, a new "eco-centre" serving the town and surrounding region and, eventually, a composting facility with curbside compost collection for residents. While stores can still sell products wrapped or bagged or boxed in all manner of wasteful plastic packaging, banning plastic bags is a start, the mayor says.

The Province of Ontario also announced a voluntary programme to encourage retailers and consumers to reduce plastic bag usage. Working in partnership with the Recycling Council of Ontario, retail businesses will develop a programme that includes incentive systems, public

awareness programs, and employee training. The province aims to cut bag usage in half by 2012 – currently Ontarians use seven million plastic bags every day.

CanWest News Service (2007) reports that Ontario's environment minister called on Ontarians to voluntarily reduce their plastic bag use by 50 per cent over the next five years even as critics dismiss the provincial goal as an ineffective public-relations ploy.

Central to the government plan is a deal struck with the plastics, retail and grocery industries whereby companies have agreed to reduce plastic bag use by 50 per cent or one billion bags over the next five years. Retailers have also committed to "considering" in-store recycling depots for the bags and pilot projects are being set up to determine how to get consumers to convert to reusable bags.

Ontarians use an estimated 80 plastic bags per second - about seven million per day. Tammy Smitham, director of communications for A&P Canada, said the company sees reusable bags and recycling as the best solution to plastic bag proliferation. In addition to selling more than 500,000 reusable bags to date, A&P stores in 2006 recycled about 60 billion used plastic bags through their drop-off recycle depots. A proposal to put a 25 or 30 cent tax on plastic bags is expected to go to Toronto city council this fall.

BRAZIL

In Brazil more than twenty cities are said (Symphony, 2007) to have issued a direction that the city authorities and all their suppliers use only oxo-biodegradable plastic for their packaging, bags, and refuse sacks.

NATIONAL APPROACHES TO SHOPPING BAG MANAGEMENT - AUSTRALASIA

AUSTRALIA

Australia's Department of Environment reported that, in 2002, 6.9 billion plastic bags are used each year, equivalent to 326 per person – and approximately 0.7 per cent or around 50 million pa end up as litter. Australia is undertaking a number of strategies to reduce the number of plastic bags produced, distributed and recycled. Following a number of initiatives, the number of bags used fell to 4.77 billion in 2004.

Retail sector	**Bag consumption (billions)**	
	2002	**2005**
Supermarkets	3.64	2.14
Other retailers	2.31	1.78
Total	5.95	3.92
Source: EPHC, 2007 (p16)		

One weekend in August 2004 the federal government encouraged consumers to take part in a *48-hour Plastic Bag Famine*, plastic bags were banned for the weekend. The Australian State of Victoria (Victoria, 2005) condemned this move as hypocrisy – calling instead for a full ban.

The Environment Protection and Heritage Council (EPHC) [ie the Council of Commonwealth (federal), State and Territory ministers for the environment (and heritage)] agreed a code of practice for the reduction and management of plastic shopping bags with the Australian Retailers Association (representing the major supermarkets). The code is a voluntary agreement.

However the Council has made it plain that they would like to see greater progress made with regard to the phasing out of plastic shopping bags, and to that end have requested officials to consider regulatory options that could be applied if progress under the voluntary scheme continues to be unacceptable to the ministers – see the most recent communiqué (http://www.ephc.gov.au/news.html#communique_oct_05).

There has been considerable discussion in the Council on a charge for plastic bags (as in the Republic of Ireland) eg an excise, a tax or a levy. Whilst this seems semantic, the situation is bedevilled by the federal nature of the Australian Constitution - whereby only the Commonwealth can impose an excise, and both levels of government can impose taxes and levies – however each level of government would prefer that the other level impose any such tax or levy!

The management of plastic bags has been a national environment ministerial council (the Environment Protection and Heritage Council) agenda item since 2002. The Australian Retailers Association developed a national voluntary agreement - *Code of Practice for the Management of Plastic Bags* in response. Ministers agreed to the Code at their August 2003 meeting. The Association has facilitated the implementation of the Code among retailers regardless of whether the retailers were its members.

The Code set a number of targets:

- 25 per cent reduction in plastic bags issued by the end of 2004
- 50 per cent reduction in plastic bags issued by the end of 2005
- 30 per cent increase in the recycling rate of plastic bags (in-store)
- 75 per cent reduction in bag litter by the end 2005

As the Code expired on December 31, 2005 government officials have been negotiating with industry a draft Phase-Out Agreement that could take The Code's place. The Government

communiqué (October 2005) indicated that any subsequent voluntary agreement is subject to retailers meeting the Code's final target (a 50 per cent reduction in December 2005, based on the 2002 baseline).

Australian Minister for the Environment and Heritage, Senator Ian Campbell, said the Australian Retailers' Association mid-2005 report showed that lightweight plastic bag use in the three and a half years to June 30, 2005 had been cut by more than one billion bags – or 33.8 per cent.

The Code splits bag-using businesses into two groups.

- ***Group One*** – this includes the major and smaller supermarket chains and independent supermarkets sponsored by wholesalers or run under banner groups. These signatories need to provide audited results showing reduction and recycling levels. They should provide significant funding towards the industry communications campaign as well as to changing operations to support the Code initiatives.
- ***Group Two*** – this includes all other businesses using lightweight HDPE bags. Signatories are strongly encouraged to purchase a Clean Up Australia retailer kit (AUS$45), comprising: a guide on how to refuse, reduce, reuse and recycle; staff training materials, and; in-store promotional items to generate action.

The Association had been providing six monthly progress reports, and these are available from the Commonwealth's Department of the Environment & Heritage website (www.deh.gov.au/settlements/waste/plastic-bags/index.html).

The signatories also committed to working alongside the Australian plastics and recycling industries in order to extend the targeted rates of plastic bag elimination. The government also wants to encourage the use of multiple use bags by making them more widely available and providing comprehensive information on such bags as well as providing customers with easily accessible recycling stations in all major supermarkets.

The ARA took the view that if the targets are not achieved, it would be highly likely that a ban or tax of 25 cents per plastic bag will be applied. ARA considered that such a tax would cost consumers millions of dollars and cause serious administrative and operational inefficiencies for retailers, and is likely to require system changes similar to those required to implement GST.

The Australian Government seems cautious with the results so far. Australian Minister for the Environment and Heritage Senator Campbell (Campbell, 2005) reported in October 2005 that "Figures to the end of June showed a reduction of around one billion bags or almost 34 per cent, this is a very good result, but the last half of the year will be a real test to reach 50 per cent. I am heartened by the supermarkets' commitment to make it". Since challenging the retailers to voluntarily reduce the annual figure of 6.9 billion bags being used the Environment Ministry is now considering mandatory measures.

Coles Bay in Tasmania was the first Australian town to completely ban the use of plastic bags and provide residents with alternative reusable bags. Since April 2003, all retail outlets in Coles Bay, including both supermarkets, have banned plastic check-out shopping bags. All residents were issued with five calico bags, and on Anzac Day 2003 retailers stopped issuing plastic bags, offering reusable paper bags (AUS$0.25) or calico bags (AUS$2.50). In the first twelve months, this initiative prevented the use of 350,000 plastic check-out bags. As a result, Coles Bay was awarded the Environmental Excellence Award by the Tasmanian Government. Huskisson, Kangaroo Valley and Oyster Bay are just a few of the communities in the Australian State of New South Wales (NSW) that have followed in the footsteps of Coles Bay and banned plastic bags.

South Australia's State Government claims to be taking the lead nationally, in making progressive steps to abolish the single-use plastic bags by the end of 2008 and replacing them with reusable green bags. The State Government provided 39 councils state wide with AUS$700,000 to promote their plastic bag free state. In July 2005, the Environment Protection and Heritage Council (EPHC), a Council of all of Australia's Environment Ministers,

agreed to phase out lightweight (single use) plastic shopping bags by the end of 2008. South Australia's environment minister, the Hon John Hill, stated that South Australia will, if necessary, legislate to ensure that the phase out occurs by that date.

In October 2005, the EPHC (EPHC, 2005) issued a communiqué calling for retailers, and in particular major supermarket retailers, to do more to reduce their plastic bag usage, after a report by the Australian Retailers Association (ARA) on the Code of Practice for the Management of Plastic Carry Bags indicated lower than anticipated progress towards the 50 per cent reduction target by the end of the year. Ministers acknowledged that the current reduction of 34 per cent is a good achievement, but said a substantially increased effort is needed in the next two months if retailers are to meet the 50 per cent target by Christmas. The ARA report detailed reductions in the use of single-use lightweight plastic carry bags by signatories to the Code of Practice for the Management of Plastic Bags in the period January to June 2005. Ministers reiterated the importance of meeting the 50 per cent target in the Code, which is essential for the Council to support the proposed agreement to phase out plastic bags by the end of 2008.

In June 2006 (EPHC, 2006), EPHC reaffirmed its conclusion that lightweight, single use plastic bags should be phased out by the end of 2008. As a consequence, EPHC sought advice on regulatory and other scenarios that might achieve the objective of reducing the impact of plastic bags on the environment, including nationally consistent regulatory scenarios of a ban, a mandatory retailer's charge, an advanced disposal fee and a government levy. Specifically, the objective of government action, if deemed necessary, would be to address the negative impact of plastic bag litter on the community and the Australian environment. Action would address the externalities caused by the impact of using plastic carry bags, which are currently not borne directly by those responsible for creating the plastic bag litter. These externalities include:

- the impact of plastic bag litter on amenity
- the impact of plastic bag litter on wildlife
- the costs created by plastic bag litter in waste management.

The RIS concluded that if the value of non-quantified benefits (such as the social benefit of phasing out plastic bags) is determined to be sufficient to justify regulatory action, a mandatory charge or a ban on plastic bags implemented at state level in a nationally consistent manner, appear to be the most appropriate regulatory options. These provide mechanisms that can be implemented with less administrative complexity than others. They can also provide substantial reductions in plastic bag distribution and hence litter.

More than 20 Councils, schools and major retail precincts, including the Adelaide Central Market and Centro Colonnades, have taken advantage of funding assistance from Zero Waste SA. Yankalilla was one of the first local councils to aim for a 'plastic bag free' area. The Kangaroo Island Council joined Yankalilla in accepting the State Government's challenge to rid the environment of plastic bags. The towns of Robe and Port MacDonnell in the south east of the state have also agreed to go 'plastic bag free' and other towns are looking to achieve the same.

EHPC notes that here is no national legislation specifically aimed at plastic bags. However, under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), the Australian Environment Minister is empowered to list a key threatening process and recommend that a threat abatement plan be developed. A process can be listed as a key threatening process if it causes:

- a native species or ecological community to become eligible for adding to a threatened list (other than conservation dependent)
- an already listed threatened species or threatened ecological community to become more endangered
- adverse affects to two or more listed threatened species or threatened ecological communities.

In 2003, the Threatened Species Scientific Committee advised the Government that harmful debris was affecting Australia's marine wildlife, including protected species of birds, turtles and marine mammals. The harmful debris was defined as land-sourced plastic garbage, fishing gear from recreational and commercial fishing, and ship sourced, solid non-biodegradable floating materials disposed of at sea. Plastic debris was further defined as bags, bottles, strapping bands, sheeting, synthetic ropes, synthetic fishing nets, floats, fibreglass, piping, insulation, paints and adhesives. Subsequently, the Government listed 'Injury and fatality to vertebrate marine life caused by ingestion of, or entanglement in, harmful marine debris' as a Key Threatening Process and after broad consultation, it was agreed to develop a Threat Abatement Plan which focused on all plastics and other types of debris from domestic or international sources that may cause harm to vertebrate marine wildlife.

A Threat Abatement Plan is currently being drafted which has a range of objectives including to contribute to the long-term prevention of the incidence of marine debris that is harmful to threatened marine wildlife. This covers a range of marine debris including plastic bags.

The state of Victoria (Victoria, 2006) has amended its Environment Protection Act 1970 to enable the Victorian Government to require retailers who choose to supply plastic bags to charge a minimum fee to consumers receiving those bags. This legislation is intended to commence in 2009, if plastic bags are not phased out through voluntary measures by then.

BANGLADESH

Bags that are not disposed of in the correct manner block the drainage system, hence the fact that these bags have been totally banned. They have been since it was discovered in March 2002 that lightweight plastic bags were the culprits of the floods in 1988 and 1998.

CHINA

Lianhua and Hualian, the two largest supermarket chains in **Shanghai**, use about 1 million plastic shopping bags each day, most of which are reused as containers for domestic waste after serving their purpose as a 'carrier' bag or they end up in landfills or blowing around the city as litter.

Nonggongshang and Carrefour are both supermarkets that have launched short-term campaigns since 2000, offering free recyclable paper or cotton bags to raise people's environmental protection awareness and to protect the environment from the damage polythene bags can cause. Unfortunately, the high cost of recyclable bags has made it hard to keep the ball rolling. However, since 2004 a selection of supermarkets in Shanghai, China's largest city, charge shoppers for plastic bags in an attempt to reduce waste. The bag fees are part of a three year campaign to clean up pollution.

In order to reduce the tonnage of plastic bags disposed of to landfill, the **Hong Kong** Government launched a trial in 2002, with a view to recycling some of the 700 tonnes of plastic bags disposed of every day. Simultaneously, a number of shops have introduced schemes which support the elimination of plastic bag use.

In May 2007 the Hong Kong Environmental Protection Department (Hong Kong EPD, 2007) proposed an environmental levy on plastic shopping bags, with a view to seeking comments and support from the stakeholders and the public. The EPD declared that the territory faces an imminent and serious waste problem. Among these wastes, more than 23 million plastic shopping bags are disposed of to landfills per day. This translates into more than three plastic shopping bags per person per day.

Under the scheme, EPD proposes a phased approach with the banning of free distribution of plastic shopping bags at chain or large supermarkets, convenience stores and personal healthy and beauty stores and the introduction of an environmental levy of 50 cents on each plastic shopping bag at these retail outlets in the first phase. While a voluntary agreement on plastic bag reduction and the "No Plastic Bag Day" campaign had significantly increased public awareness, the actual impact on plastic shopping bag reduction was rather limited.

A public opinion survey conducted in 2006 showed that almost 90 per cent of the respondents believed there was scope to reduce the use of plastic shopping bags in their daily life, while more than 85% of respondents said that they would reduce the use of plastic shopping bags if an environmental levy of 50 cents was imposed.

The EPD considered that a levy of 50 cents would strike a right balance between public acceptance and effective disincentive and would encourage the customers to think twice before asking for a plastic shopping bag, or to bring their own bags at all time. The EPD estimated that the proposed 50 cents levy will reduce about 1 billion plastic shopping bags, or about 50% of plastic shopping bags at the retailers covered by the scheme.

EPD sought support from the Legislative Council's Panel on Environmental Affairs and the Advisory Council on the Environment on the proposal, and solicit views from the stakeholders and the public.

INDIA

The Indian Ministry of Environment and Forests (MoEF, 2005) issued the 'Recycled Plastics Manufacture and Usage Rules, 1999' under the Environment (Protection) Act, 1986 on September 2, 1999. The salient features of the Rules are:

- no carry bags having less than 20-micron (20-m equivalent to 0.2 mm) thickness, can be manufactured, stored, sold and/or used
- carry bags made from recycled plastic would have to be coloured, specially marked and should not be used for carrying foodstuff
- the recycling procedure should strictly follow the Bureau of Indian Standards specifications
- carry bags manufactured from virgin granules should either be transparent or white.

MoEF, through an amendment of the above ('Recycled Plastics Manufacture and Usage (Amendment) Rules, 2003') imposed further restrictions on the use of plastic carry bags prohibiting the manufacture, storage, distribution and use of plastic carry bags whose dimensions are less than 8 inches X 12 inches (20 X 30 cm). The Rules came into effect on June 17, 2003. It was clarified that the minimum weight for 50 carry bags made of virgin or recycled plastics should be taken to be 105 g (plus or minus 5 per cent variation) and the carry bags of larger sizes shall be of proportionate increase in weight.

The West Bengal Pollution Control Board (WBPCB), in exercise of the powers conferred by section 33A of the Water (Prevention and Control of Pollution) Act, 1974 and by section 31A of the Air (Prevention and Control of Pollution) Act, 1981, imposed a blanket ban on the manufacture, sale and use of plastic carry bags with effect from September 15, 2001 in the certain ecologically sensitive areas of the state. This direction was extended in 2003, 2004 and 2005. During 2004-2005, penal action has been taken against 191 units. Also the use of plastic carry bags, cups and containers less than four inches in height and 40 microns in thickness was banned in all government buildings. This order came into force on March 4, 2004. In August 2003 the northern state of Himachal Pradesh has implemented a total ban on plastic bags - in this Indian state plastic bags caused floods and were also widely blamed for killing foraging cows. The legislation includes the banning of the production, storage, use, sale and distribution of polythene bags. Penalties for those manufacturers and stores who do not comply with the ban are severe - they include up to seven years in jail or a fine of up to 100,000 Rupees.

The law is based on legislation passed by the national parliament, but Himachal Pradesh is the first state to have implemented it. In September 2005, similar laws were put in place to ban bags in Mumbai, western Indian state of Maharashtra, Sikkim, Goa, Kerala and Karnatak states. The ban was prompted by the indiscriminate use of plastic bags, which blocked sewage and drainage systems during record monsoon rains. As a result, flooding and landslides killed more than 1,000 people in the state.

Case study - Couple in India turn waste bags into fashion

A couple in India have found a solution to the problem of plastic bags littering the streets of the country's capital, Delhi - by turning them into fashionable handbags. BBC Online reports that Anita and Shaleb Ahuja employ people in the slum areas of the city to collect the bags, which are a major problem throughout the country - often ending up polluting the environment, littering streets and blocking drains. The discarded bags are washed and sorted before being turned into plastic sheets, which are then refashioned into the handbags. "We were already into waste management, and we were getting a lot of plastic waste," Mrs Ahuja told BBC World Service's Outlook programme. "That's when we decided to try and find a solution to this big problem." Mrs Ahuja and her husband established a non-governmental organisation called Conserve to launch their idea, using their life savings to set it up.

The plastic is stitched into brightly coloured handbags Plastic bags are such a problem in India that one state, Himachal Pradesh, has even banned them outright. In Delhi, however, Conserve employs rag pickers to scour the city's waste dumps. Some women snip at the handles of the bags to make them into sheets; others wash them in water and detergent and hang them on a clothes line. These are then moulded together into single sheets of thick, durable plastic, and stitched into bright, colourful handbags. Mrs Ahuja said the idea came by accident, when a friend making fabric bags asked for a few sheets of the plastic, and designed the first bag. "I showed it to my friends, and they liked it very much," she said. "That was the time that it struck me that it had potential."

It has now become a highly successful enterprise, employing 300 people and with a turnover of around US$150,000. "Lots of women come to me and say they also want to work here," said Gita Pande, one of the Conserve workers. "I don't want to travel out of a slum to work I feel safe here, so I don't mind working here. I'm also doing something that's useful. Polythene bags clog our drains. Cows eat them and get choked. By making them into bags, they get used, and unemployed people get jobs. I feel it's good for the municipality as well, because we are taking the garbage off the streets, and they don't have to clean them." The Ahujas are now trying to convince the Indian Ministry of Culture to recognise what they are doing as a craft. However, Mr Ahuja explained that they are not having much success. "They say that if it's not 500 years old, it's not a craft," he said. "It is absolutely frustrating."

Source: BBC Online February 23, 2006

Kerala state bans plastic carry bags below 50 microns

In view of the increasing cases of epidemics and their environmental problems, the Government of Kerala decided to ban the production, storing, consumption, distribution and transportation of plastic bottles, carry bags and cups below 50 microns.

The powers to implement the ban will rest with the district collector, police officials, sales tax officials, pollution control board and local self Government officials. Those who violate the concerned rule will have to pay a fine of Rs. 1 lakh, and imprisonment up to five years or both as per the Environment (Protection) Rules.

Plastic bags choke drains in Kolkata

Kolkata [formerly Calcutta] Municipal Corporation (KMC) has found management of waste plastic bags a persistent problem for the city as civic authorities have no system of collecting plastic waste. The state has formed a Plastic Management Committee (PMC) and plastic bags thinner than 40 microns or smaller than 12 by 16 inch have been banned.

JAPAN

Councils under the Economy, Trade and Industry Ministry and the Environment Ministry approved a draft final report proposing that shoppers be charged for plastic or paper bags distributed at supermarkets and other stores, officials of the ministries said. The guideline would require retailers such as supermarkets, department stores and convenience stores to set numerical targets to reduce the number of bags distributed at their stores, the officials said, adding the ministries want retailers to start charging shoppers for bags in fiscal 2007.

Retailers will be able to set the plastic-bag prices on their own. Prices are likely to be range between 5 to 10 yen per bag. Japan's Ministry of the Environment released an interim report on how to revise the Package Recycling System in a meeting of the Waste Management and Recycling Committee of the Central Environment Council in June 2005. As a concrete measure to control waste generation, the report found it important to stop stores from giving customers bags free of charge.

Some 30 billion bags a year were being given away. Instead the ministry wants to encourage people to bring their own bags when shopping. As it stands, the current law cannot be used to charge for plastic bags, so efforts must continue to find ways to recycle plastic bags. Retailers will receive warnings or have their names publicised if they fail to reduce the number of plastic shopping bags through such measures as charging customers for the service, according to the government's final draft report on the issue. (Asahi Shimbun, 2006).

Under the government's plan to revise the Containers and Packaging Recycling Law, retailers, such as supermarket operators, will be required to submit a report on their efforts to reduce the number of shopping bags, which are increasingly becoming an environmental hazard, according to officials.

The Japan Department Stores Association opposes charging customers for their paper bags. "Paper bags are an important advertising medium for stores. Our brand image could be damaged by charging for the bags," the association said. Major convenience store operator Lawson, Inc. plans to keep handing out free bags. "We try to reduce the use of plastic shopping bags by having our store clerks ask customers if they really need bags. We can reduce use of plastic bags without charging for them," a Lawson official said.

Measures to reduce costs shouldered by local governments for collecting trash also were included in the final draft. The cost of recycling separated garbage is to be paid by users and manufacturers of the packaging and containers a year in advance. Money saved by reducing these costs would be refunded to the users and manufacturers. Under the new system, half of the unused cost would be refunded to local governments. This is intended to encourage them to cut costs, such as by reducing waste, which would further promote the movement. The total refund to companies and local government is estimated at several billion yen per year.

Local governments decide whether to collect recyclable separated garbage. The number of local governments that collect PET bottles for recycling grew from 631 in fiscal 1997 to 2,796 in fiscal 2004. However, the nationwide cost of recycling has risen every year, topping 300 billion yen in fiscal 2003.

Efforts by local governments to reduce costs should raise the number of local governments that collect recyclable garbage separately and give momentum to the recycling movement. Under the draft revision, the maximum penalty for those who fail to pay the recycling cost is expected to be raised from the current 500,000 yen.

If the reduction in a retailer's report is insufficient, the government will issue a warning to improve the situation, or disclose the retailer's name to the public. Some experts say a charge of 5 yen a bag would make a meaningful difference. The draft report was compiled by the Industrial Structure Council commissioned by the Ministry of Economy, Trade and Industry, and the Central Environmental Council under the Environment Ministry, in a joint panel meeting. After gathering public opinions, the two ministries intend to submit a bill to revise the recycling law to the current Diet session and implement the revision in fiscal 2007, the officials said.

Municipal governments have been asking the central government to reduce their financial burden in sorting and collecting discarded containers and packaging materials, saying the total cost for such efforts reaches 300 billion yen a year. Currently, business operators, including retail store operators and food makers, pay fees to recycle plastic materials they have used. Any money left over after the recycling process is paid back to the business operators.

But the draft report says that the half of the money now returned to business operators should go to the municipal governments.

The Consumer Co-operative Kobe (Co-op Kobe) and Kobe City in Hyogo Prefecture, Japan, concluded an agreement on December 27, 2006, to cooperate with each other to reduce plastic bag use. Japan for Sustainability (2007) reports that this is part of efforts to reduce and recycle waste in the city in partnership with citizens, businesses and governments, with the aim of making Kobe a fashionable, environment-conscious city. This is the first agreement

of its kind in Japan between a business and one of the nation's 15 largest cities, known as ordinance-designated cities.

Since 1978 Co-op Kobe has been promoting a "My Bag" campaign that encourages shoppers to bring their own bags, and in 1995 it started charging five yen (about 4 U. S. cents) for each plastic bag it offers. Furthermore, replacing the current charge collecting method that asks customers who receive plastic bags to voluntarily put the charge in a box at the shop, the store will begin to collect it at check-out counters in June 2007, in line with the nation's Revised Law for Promotion of Sorted Collection and Recycling of Containers and Packaging that will come into effect in April of the same year. In this way, the co-op aims to increase the percentage of shoppers who bring their own shopping bags from the current 72 percent to more than 90 percent. The collected charge will continue to be used for community activities such as environmental preservation.

Kobe City plans to conclude similar agreements with other businesses engaged in reducing plastic bag use in the city, and calls for citizens' understanding and cooperation. By this means, the city aims to attain its object of reducing the volume of plastic bag waste by 25 percent by fiscal 2015 as stipulated in the city's master plan on general waste disposal.

Major retailers have begun to make efforts to reduce the use of plastic shopping bags, through such measures as charging for the bags, discounting the price of the purchase if customers do not use a bag or by distributing free, reusable shopping bags.

But, reports the Daily Yomiuri (2007), retailers still worry that placing burdens on customers or making things inconvenient for them may drive shoppers away. The measures also hurt makers of plastic shopping bags. Ito-Yokado Co.'s Wakabadai store in Yokohama began an experiment in May, charging 5 yen for a bag. On average, only 7-8 percent of customers refuse bags at Ito-Yokado stores, prompting the company to try charging for bags. Aeon Co., which has already begun efforts to cut back on bags, started charging for bags as an experiment at its Jusco Higashiyama-Nijo store in Kyoto from January. Aeon said if such a system is not introduced company-wide, the number of the bags it uses is expected to reach 1.68 billion annually by fiscal 2010. Aeon plans to have about half of all its 390 stores, charge for bags, which it says could cut the number of bags to 840 million.

At the Higashiyama-Nijo store, the percentage of customers bringing their own shopping bags jumped to more than 80 percent, from 22 percent, after the charge went into effect.

Convenience stores, however, are cautious about charging for plastic bags. Unlike supermarket shoppers, many customers make unplanned stops at convenience stores, and plastic shopping bags are needed, for example, when buying a warmed bento meal. Convenience store chain Ministop Co. began giving 1 yen discounts at the cash register for customers who decline bags. Lawson Inc. produced 100,000 reusable shopping bags suitable for carrying bento boxed meals and plastic bottles, and is distributing them for free.

The main reason retailers are suddenly so adamant about reducing plastic bags is that the revised Containers and Packaging Recycling Law went into full effect in April. Under the law, retailers above a certain scale are obligated to report to the government during April and June next year on their efforts to reduce the use of plastic bags.

Supermarket Summit Inc's Suginami Ward, Tokyo, store said the sales of heavy goods, such as rice and pet foods have dropped since it started charging for the bags in January.

The movement also is hurting makers of plastic shopping bags. According to the Japan Polyolefin Film Industry Trade Association, which plastic bag makers are a part of, shipments of bags in March dropped 13.7 percent from the same month last year, and marked the seventh consecutive month that the shipment has been below the same month a year before.

Plastic bags cost money. For stores, the choice of reducing the use of bags and charging for them will lead to cost reductions and profit increases. Supermarket chain Seiyu Ltd. used about 600 million bags at its 392 stores in 2006. The cost per bag is a little less than 2 yen, meaning the total yearly expense for plastic bags by the retailer is over 1 billion yen.

Retailers are trying to win over customers in the fight against plastic bag use. Aeon plans to use the revenue from charging for bags to promote recycling and environmental protection activities in cooperation with local governments.

Seiyu will give a discount of 2 yen, almost the same as the price the store pays for the bag at the cash register, from June 14. It also will sell reusable polyethylene shopping bags for 20 yen each. If the reusable bags break, the stores will replace them for free.

MALAYSIA

According to PlasticsEurope (2006, B) there is little information available for plastic bags consumption in Malaysia. There are some campaigns in favour of biodegradable bags, run by NGOs, with some calls to ban plastic bags made in Parliament. There are no levies in place, the Malaysian government did consider this economic instrument when drafting the national waste management bill (expected to be finalised by 2007).

There are no national plastic bag recycling schemes but reusable "eco-bags" are widely available.

NEW ZEALAND

It has been reported that NZ uses approximately 800 million plastic bags each year. There are a number of organisations introducing campaigns to develop positive alternatives to plastic bags and raising awareness within local communities:

- The Green Bag Foundation (a consortium of organisations, including the Zero Waste Trust) is importing the 'Green Bag' into New Zealand to provide a more environmentally friendly, alternative to plastic bags for consumers
- Christchurch, South Island has a campaign, 'Say No to Plastic Bags' that has raised interest throughout New Zealand. Two women have been working with the local supermarkets and the City Council to raise awareness of the issues associated with plastic bags and encourage supermarkets to stock alternatives to plastic bags.
- In April 2004 Christchurch City Council initiated a scheme where plastic shopping bags were collected from the kerbside as part of their recycling collection.
- The 'Great Plastic Bag Mail-In' is a campaign encouraging New Zealander's to mail a clean, flat and folded plastic bag to Environment Minister, Hon. Marian Hobbs. The campaign urges the Ministry for the Environment to take an active role in reducing the number of plastic bags used within New Zealand.
- Once collected, the bags are sorted at the Recovered Material Foundation paper depot and packed into bales. The bales are sent to Range Industries, Christchurch which has devised a process called thermo-fusion™ that turns the bags into durable plastic planks suitable for boxing, pallets and fence posts. One bale can contain up to 25,000 bags and weigh around 800kg. At Range Industries, that bale makes up to 1000m of plastic planking (approx. 100mm x 18mm).

Plastics New Zealand (2007) has been encouraging consumers to "Make a Difference" by thinking before they take a single trip checkout bag. The joint Foodstuffs and Progressive Enterprises campaign launched in June 2007, asks consumers to reduce, reuse and recycle.

As signatories to the 2004 Packaging Accord, Plastics New Zealand supports the responsible use of plastic shopping bags. "To reach the target to reduce plastic bags by 20% will need the supermarkets to pack more goods into each bag and offer reusable alternatives. It will require consumers to remember to take their reusable shopping bags back to the supermarket each time they shop. The AC Neilson research shows that consumers find this hard to do" said Ket Bradshaw, Environmental Manager for Plastics NZ.

Plastics New Zealand maintains that plastic bags are an efficient and responsible packaging option. Consumers need to weigh up the pros and cons of the various options available to them.

The first priority is to REDUCE the amount of material placed into the environment and plastic wins there. The second priority is to REUSE the packaging. Plastics New Zealand research indicates that approximately 80% of the supermarket bags are reused. The AC Neilson research shows that two thirds of those surveyed use their supermarket bags for their rubbish and recycling, another 20% use them for kids things, nappy bags and dog droppings and the remainder for storage and as carrier bags. The third priority is to RECYCLE. The Plastics Industry has been working to increase the amount of all plastic packaging recycled in New Zealand and this currently stands at 21% of the total plastic packaging used. Plastics New Zealand is working with councils to widen the kerbside collections to include plastic shopping bags and other plastic packaging.

PAKISTAN

Resource Recycling (2007) reports that the City Nazim of Karachi, Pakistan has outlawed the sale or use of plastic bags less than 30 microns thick. The ban carries a penalty of three months in jail and/or a fine of US$825, and is being aggressively enforced. Over 70 people have reportedly been arrested in a week for selling the now-illegal bags.

TAIWAN

Single use plastic bags are so prevalent across Asia yet they have become something of a novelty in this island nation, since the country's Environmental Protection Administration (EPA) implemented tough restrictions - large fines against businesses that give away plastic bags.

Current laws in Taiwan stipulate that plastic bags offered to customers must not be less than 0.06 mm thick and must not be given to consumers for free. New plastic bags cost NT$1 apiece. Since the final phase of the three-stage restrictions took effect in January 2003 EPA officials reported the use of plastic shopping bags has been cut by 69 per cent nationwide.

The Legislative Yuan recently approved a proposal to cut them from the original range of US$1,800 to US$9,000 to between US$35 and US$180 per offence giving the environment ministries reason to be concerned that the Taiwan government may be trashing a good programme by drastically reducing the fines.

The restrictions, by the EPA, aimed to reduce plastic waste and targeted six major groups - department stores and shopping malls, mega-retail stores, supermarkets, convenience store chains, restaurant chains, and smaller eating and drinking establishments. However, He Shun-chin, director of the Department of Waste Management under the EPA said that the rule restricting small eateries from handing out plastic bags will be cancelled in March 2006 as the measure has resulted in an increase of plastic bags by an average of 5,000 tonnes per year. Despite the fact that the restrictions were to be lifted for these stores, the administration aims to enforce the reuse and recycling of plastic bags. The administration will also start "experimentally" recycling plastic bags starting in May, and it hopes to officially establish a plastic bag recycling policy in January of 2008.

A public/opinion poll carried out by the EPA showed that 80 percent of consumers still support the plastics restrictions, even though a full one-third of residents admit they find the restrictions inconvenient.

Some small shops flout the law and still do provide free bags, and about 20 percent of shoppers still buy one-time use bags. But waste has been scaled far back from before the ban, when it was estimated that Taiwan used 2.5 plastic bags per day per person – the equivalent to 20 billion bags a year.

CONCLUSIONS

Lightweight plastic bags offer many practical advantages, which of course is the reason for their success in supplanting alternatives. Primarily, they are very light, weighing only a few grammes. This means that even a very large number of bags do not represent a mass flow of resources which is significant in comparison with many other waste streams. 200 million bags may only weigh 1,000 tonnes. Clearly, a local authority with say one million residents consuming 300 bags pa will be faced with a stream of 300 million bags, weighing perhaps 1,500 – 2,000 tonnes (cf 1-2 Mt of municipal waste).

In the case of Australia which has carried out the most detailed study of plastic bag flows, it is clear that most of these bags (60 per cent) are taken home rather than elsewhere (40 per cent). From the home, one third quickly become waste and are landfilled, while more than half enjoy some form of reuse (before then being landfilled). These bags enjoy a poor recycling rate, less than 3 per cent. Virtually all bags which are not taken home are landfilled, except for a small proportion (less than 1 per cent) which becomes an often visible stream of litter.

The issue of lightweight plastic bags is highly polarised, in two dimensions. There are diametrically opposing views on the environmental aspects of plastic bag consumption; on the one hand the view that bags are at worst a nuisance, and on the other that they represent a serious environmental and amenity hazard. There are also opposing views within different administrations; with some local and national authorities highly concerned to see solutions implemented without delay, and others who regard the issue as unimportant.

In those countries and municipalities where there is little concern, little is done. Elsewhere there are many examples of effective action at all levels. The available tools can focus on the provision of information, infrastructure, legal and economic instruments, and each has a particular application, depending on local circumstances and the level of administration at which the policy initiative takes place. Outside Europe draconian bans of plastic bags have been used, though this may well be a step too far in Europe where this level of market intrusion would appear to be unjustified. The power of economic instruments to change behaviour is undeniable. Whether these can be agreed on a voluntary basis between the stakeholders (Government, the retail supply chain and local authorities), or whether mandatory instruments are called for (to encourage industry or to discourage free-riders) will vary from country to country.

If a policy decision is taken to significantly reduce the flow of plastic shopping bags into landfill and litter, then the following actions are shown to be effective:

- ending the practice of free bags in supermarkets
- ensuring that alternative, reusable bags are available in supermarkets
- providing a collection system for plastic bags, both through in-store facilities and also integrated within household dry recyclable schemes
- driving forward local communications and information campaigns to raise consumer awareness of the issue, associated problems and appropriate solutions
- using any revenue from a levy or charge to fund litter clean-up or relevant research

It is important to establish clear policy goals before embarking on a campaign to control plastic bag use in society. If the goal is to attack the bag because it serves as proxy for much of modern unsustainable lifestyles then sociological and cultural tools will be relevant, to work for the broader interests of sustainable consumption and production. If littering is the problem to be addressed, then producer responsibility schemes can help. If the concerns are based on the persistence of these bags in landfills and in the countryside, then standards and codes to encourage biodegradable bags may be a worthwhile route to pursue. In order to establish policy goals it is essential first to understand the scale of the problem. Auditing the flow of materials which become waste plastic bags is a very helpful first step.

LIGHTWEIGHT SUPERMARKET PLASTIC BAGS – OVERVIEW OF POLICY ISSUES

Country	Plastic bags consumed per year?	Are there 'plastic bag' campaigns?	Are plastic bags banned?	Levy on plastic bags?	Customers required to pay for plastic bags?	National recycling schemes for plastic bags?	Reusable 'eco' bags available?
America	San Francisco – 45 million bags	California – Schools 'Kids Recycling Challenge'	Yes, from July 2007 for larger outlets	No	California - Yes San Fran - Yes	At-store recycling in most large grocery stores	Yes
Australia	6.9 billion bags	Yes	In a number of communities in Tasmania & NSW South Australia plan ban by end 2008	Some planned	Usually	Yes-instore depots	Yes
Austria	NA	Plastic bags will be a topic in a campaign 'Clever Shopping'	No	No	No	No	Yes
Bangladesh	NA	Yes	Yes	NA	NA	No	Yes
Belarus	NA	Yes	No	No	NA	No	NA
Belgium	NA	Yes	No	Packaging levy at EUR3/kg	Often	No	Yes
Bosnia & Herzegovina	NA	'Yes - Say No To Plastic Bags'	No	No	No	No	Yes
Botswana	NA	Some	<20 microns (2007)	No	No	No	Some
Brazil	NA	Some for biobags	No	No	No	No	Some
Canada	1.4 – 2.7 billion bags in Quebec	Ontario Govt called for voluntary 50% reduction in use within 5 years	No	No	No	No	Yes
China	Large supermarkets use approx 362 million bags	Yes - Free cotton bag give away & 3 year 'clean up'	No	Hong Kong has proposed a levy of 50 cents.	Shanghai Supermarkets - Yes	No	Yes
Czech Republic	NA	Ecolabelling	No	No	In some supermarkets	No	Yes
Denmark	750,000	NA	No	Yes Green Tax – Retailer pays DKK22/kg	Usually	No	Yes

Country	Plastic bags consumed per year?	Are there 'plastic bag' campaigns?	Are plastic bags banned?	Levy on plastic bags?	Customers required to pay for plastic bags?	National recycling schemes for plastic bags?	Reusable 'eco' bags available?
Finland	NA	No	No	Yes	Yes EUR0.15 – 0.50		Yes
France	17 billion bags (80,000 t)	Yes	Possibly, if non-biodegradable by 2010	No	NA	No	Yes
Germany	150,000 t (all plastic bags – not just supermarket)	Yes	No	No	Yes – in all large supermarkets EUR0.05 – 0.20	DSD	Yes
Greece	10 billion bags	Yes	No	No	Usually	No	Yes
Hungary	NA	NA	No	No	Yes – large bags in supermarkets	No	NA
Iceland	16 million (2004)	Yes	No	Yes (EUR0.2/bag)	Yes	No	Yes
India	NA	Yes	Yes less than 20 microns. Often not implemented. But Kerala has banned bags <50 microns and Kolkata banned bags < 40 microns	No	NA	No	Yes
Iceland	16 million (2004)	Yes	No	Yes (EUR0.2/bag)	Yes	No	Yes
Ireland	1.2 billion bags pre-tax, <0.2 billion after	Yes	No	Yes – PlasTax	Yes	No	Yes
Italy	NA	Yes	No	No	Yes – EUR0.05	No	Yes
Japan	30 billion bags	Yes	No	No – planned for 2007 (Y5-10 per bag)	No	Yes	Yes
Jordan	NA	Yes	No	No	No	No	Some
Kenya	4,000 tonnes flexibles	Yes	Yes <30 microns	Yes	Yes	In planning	Yes
Luxembourg	NA	Yes	No	No	NA	No	Yes
Malaysia	NA	Yes	No	No	No	No	Some

Country	Plastic bags consumed per year?	Are there 'plastic bag' campaigns?	Are plastic bags banned?	Levy on plastic bags?	Customers required to pay for plastic bags?	National recycling schemes for plastic bags?	Reusable 'eco' bags available?
Malta	**25 million bags**	**Yes**	**No**	**Yes - EcoTax Biobags = 0 cents Degradable = 6 cents Plastic = 7 cents**	**Yes**	**No**	**Yes**
New Zealand	**800 million bags**	**Yes - Regional & National**	**No**	**No**	**NA**	**No**	**Yes**
Niger	**NA**	**Yes**	**No. Used bags bought by Government for road construction and brick-making**	**No**	**No**	**No**	**Yes**
Pakistan	**NA**	**Some**	**<30 microns**	**No**	**No**	**No**	**Some**
Portugal	**NA**	**No**	**No**	**No**	**No**	**No**	**Some**
Republic of South Africa	**NA**	**Yes**	**Yes <24 microns**	**Yes (>24 microns) R2.13/kg**	**Yes**	**No**	**Yes**
Russia	**NA**	**No**	**No**	**No**	**No**	**No**	**Some**
Rwanda	**NA**	**Yes**	**Yes >100 microns**	**No**	**NA**	**No**	**Yes**
Scotland	**1 billion bags**	**Yes**	**No**	**No – under consideration**	**Yes – increasingly**	**No**	**Yes**
Spain	**NA**	**NA**	**No**	**No**	**No**	**No**	**Yes**
Switzerland	**NA**	**Yes**	**No**	**No**	**Yes – Supermarkets (CHF0.15 – 0.20)**	**No**	**Yes**
Taiwan	**20 billion bags**	**Yes**	**<60 microns**	**Yes**	**Yes**	**Planned**	**Yes**
Tanzania	**NA**	**No**	**35 – 60 microns**	**No**	**No**	**No**	**No**
The Netherlands	**NA**	**Yes**	**No**	**No**	**Yes – EUR0.20 for thick bags**	**No**	**Yes**
UK	**8 billion bags**	**Yes 'Bag for Life' 'Penny Back'**	**No, but increasingly communities seek local voluntary bans**	**No**	**Yes - increasingly**	**No – except in-store depots**	**Yes**

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APPENDIX 1 – SCOTTISH EXECUTIVE STUDY

ENVIRONMENT GROUP RESEARCH REPORT PROPOSED PLASTIC BAG LEVY - Extended Impact Assessment 2005 Research Summary 2005/06 (ISBN: 0-7559-2687-0)

Published by the Scottish Executive, August, 2005

The Scottish Executive commissioned a study from AEA Technology Environment (AEAT 2005), to address the likely impacts of such a levy and variants of it on:

- the environment
- consumers
- business
- waste
- local authorities.

Advocates of a levy on plastic bags cite the main benefits as being reduced littering (land and sea), reduced use of resources and energy, lower pollutant emissions and increased public awareness of environmental issues. Opponents argue that lightweight plastic carrier bags are hygienic, convenient and durable, that they are often reused for other purposes, that they form only a small part of the litter stream and that they have a lower overall environmental impact than paper bags. They also claim that a levy would impact unfairly on poorer households and would lead to job losses in Scotland (from reduced plastic bag manufacturing and importing).

The study considered these, and other arguments, for and against a levy, quantifying the probable effects wherever possible. It considered a range of different scenarios:

- Scenario 0: no levy, i.e. business as usual.
- Scenario 1A: a levy of GBP0.10 on plastic but not paper bags, covering all businesses (as proposed in the Bill).
- Scenario 1B: a levy of GBP0.10 on plastic but not paper bags, covering all businesses except small and medium sized enterprises (SMEs) and charities.
- Scenario 2A: a levy of GBP0.10 on plastic and paper bags, covering all businesses.
- Scenario 2B: a levy of GBP0.10 on plastic and paper bags, covering all businesses except SMEs and charities.

The study did not make a judgement on whether, on balance, such a levy should be introduced, but provides evidence on the main effects expected under each of the four levy scenarios.

Overall effects

A levy would cause a set of interacting effects. The study is predicated on evidence that a levy would stimulate a switch away from use of plastic bags (by typically 90%). If only plastic bags were to be levied (scenarios 1A and 1B), then studies and experience elsewhere suggest that there would be some shift in bag usage to paper bags (which have worse environmental impacts). This study is based on this experience of behaviour change.

In each of the areas considered - *environment*, *consumers*, *business*, *waste* and *local authorities* - there would therefore be a complicated set of effects, described below.

Environment

The environmental impact of each of the four levy scenarios was assessed using 8 indicators, including energy, water, waste and litter. In all four levy scenarios, consumption of non-renewable energy, atmospheric acidification and formation of ground level ozone and the risk of litter would be considerably less than the current situation. In scenarios 2A and 2B, where the levy is applied to paper bags as well as plastic bags, these environmental benefits increase.

In addition there are reduced impacts in terms of consumption of water, emissions of greenhouse gases and eutrophication of water bodies. This is because paper bags have a higher environmental impact in these categories relative to plastic bags.

Consumers

Consumers act to reduce the financial impact by switching away from use of carrier bags. This limits the detrimental financial impact for consumers to a maximum of GBP10 per person pa. Consumers would pay the levy itself overtly, on levied bags they continue to use. The total cost was calculated from the amount of levy paid for carrier bags, the relative hidden costs of plastic and paper bags 1, the costs of buying additional heavyweight plastic carrier bags (so-called 'bags for life'), the costs of buying additional bin liners, and additional VAT. The cost to the consumer also depends on whether or not certain costs are passed on to the consumer by the retailer.

This leads to a wide range of estimated costs to consumers, depending on assumptions. In Scenarios 1A and 1B (no levy on paper bags) these range from GBP7.41 to 10.58 per year. In Scenarios 2A and 2B (levy on paper bags as well) the range is from GBP2.50 to 6.11 per year. Including paper bags in the levy would therefore reduce the financial burden. Indeed this has a bigger effect on the range than whether or not SMEs are included. These estimates should be compared with average household expenditure in Scotland, at GBP365 per week.

Business

The impacts would be positive for food retailers, and detrimental for non-food retailers and other businesses such as plastic bag manufacturers.
After taking set-up and administrative costs into account, the food retail industry would benefit from net cost savings from the proposed bag levy. Savings would result from having to buy far fewer plastic carrier bags (now usually given away for free 2), while sales of 'bags for life' and bin liners would increase.

However, this would not be the case for non-food retailers (e.g. clothing), as experiences in the Republic of Ireland following the introduction of the so-called PlasTax has seen a more pronounced shift to paper bags in these stores. In terms of systems needed to comply with the proposed levy, larger retailers are expected to find this easier, having computerised systems and greater resource available. Smaller retailers may well not have computerised systems and the levy would thus represent a greater burden.

There are an estimated 15-20 manufacturers, importers and distributors of plastic carrier bags in Scotland, most of which are SMEs. All will be affected by the proposed levy. It is believed that the imposition of a plastic bag levy in Scotland would lead to job losses, as it is considered unlikely that plants that currently manufacture plastic carrier bags would switch to alternative products (eg production of bin liners).

Losses have been estimated at between 300 to 700 direct jobs, with further indirect jobs being affected.

Waste

Under scenarios 1A and 1B waste increases due to a switch from plastic to paper bags. When paper bags are included in the levy (e.g. scenario 2A or 2B), waste arisings fall. The greatest increase, 5,409 tonnes, is for scenario 1A, while the greatest decrease, 4,993 tonnes, is for scenario 2A. These should be compared against total household waste arisings of 2,094,872 tonnes pa [SEPA], a 0.26% increase and a 0.24% decrease respectively. In all scenarios litter reduces, but plastic bags are only a small percentage of reported litter.

In all four levy scenarios, the total number of carrier bags (lightweight and heavyweight plastic and paper) used in Scotland per year would decline as a result of the levy. However, if paper carrier bags are not subject to the levy (as in scenarios 1A and 1B), the total tonnage of all carrier bags used and requiring disposal actually increases by 5,409 tonnes for scenario 1A (the proposed levy). Scenario 2A (including paper in the levy) would yield the greatest reduction in the tonnage of waste relative to current levels (a reduction of 4,993 tonnes per year).

For comparison, in 2002/03 household waste in Scotland was 2,094,872 tonnes [SEPA] and 5,409 tonnes extra represents a 0.26% increase, whilst a 4,993 tonnes less equates to a 0.24% decrease. This analysis suggests some potential for an increase in solid waste generation for scenarios that favour a switch to paper bags. This is due to different assumptions about the relative weight of plastic and paper bags, and the fact that the LCA looks at solid waste impacts throughout the bag life cycle rather than just the end-of-life disposal phase.

Local authorities

There will be set-up costs and on-going costs to administer the levy. In general the revenue from the levy is expected to cover the on-going administration costs. However there are important differences between the on-going costs and revenues between local authorities. For example smaller authorities could receive lower revenues without a proportional reduction in administration costs.

Preliminary estimates suggest that the application of the levy to all businesses could cost Scottish local authorities, collectively, about GBP3-4 million to set up and GBP3.5 million per year to manage. This would reduce to GBP1.5-2.5 million to set up and GBP1.75 million per year to manage if the levy was applied selectively, i.e. based on retailer size or function.

These costs could be more than offset by revenues from the levy estimated at GBP7.75 million per year for all businesses and GBP5.5 million per year if applied selectively. However, smaller local authorities could receive lower revenues without a proportional reduction in administrative costs.

The Convention of Scottish Local Authorities (CoSLA) has reservations about the duty of collection falling to the local authorities and its concerns regarding the magnitude and potential administrative costs of the Levy, which they believe needs a full investigation.

Alternatives to the levy

In addition to the assessment of the impacts of the levy scenarios, the study examined the details of alternatives to the levy. The Carrier Bag Consortium (CBC) has developed a draft voluntary code to develop waste reduction and reuse initiatives and to continue product engineering to make further savings in the production, transportation and

storage of plastic carrier bags. A voluntary approach has already been adopted in Australia, where use of carrier bags fell by 20.4% between 2002 and 2004.

Conclusions

This brief study has assessed the main impacts of the proposed levy and a number of variants to the levy. A levy would cause a set of interacting effects.

The study is predicated on evidence that a levy would stimulate a significant switch away from use of plastic bags. In each of the areas considered - environment, consumers, business, waste and local authorities - there would therefore be a complicated set of effects, but in summary:

- Environmental impacts were assessed by examining how the levy would change eight environmental indicators. Our analysis suggests that there would be environmental benefits in some indicators, depending on what consumers decide to use in place of plastic bags e.g. not using a bag at all or using a different type of bag e.g. paper bags or bags for life. The environmental benefits are greater if paper bags are included in the levy. A sensitivity analysis was used to test how the results change under different assumptions. This shows that levy scenarios that increase use of paper bags, are more sensitive to key assumptions than levy scenarios that do not. Including SMEs in the levy accentuates the impacts. The environmental benefits are modest when compared to total environmental impacts from other activities in Scotland.
- Consumers will pay the levy directly. Experience from Ireland shows that consumers switch to other forms of bags or reduce use of bags, reducing the financial impact on consumers.
- This leads to a wide range of estimated costs to the consumers, depending on assumptions. For the levy as proposed the estimated cost per consumer is GBP10.58 per year. If paper bags are included in the levy and SME outlets are excluded, this is estimated to fall to GBP2.50 per year. This compares to average household expenditure of GBP365 per week.
- In terms of waste, plastic bags waste would reduce, but paper bags waste is expected to increase. It is estimated that the levy as proposed could increase waste by 5,409 tonnes pa, however this is equivalent to a 0.26% increase in total household waste. Including paper bags in the levy would reduce waste by about 4,993 tonnes pa, a 0.24% decrease.
- The impacts on business vary from sector to sector. Food retailers are likely to see net benefits, through lower costs for the purchase of plastic bags. Non food retailers are likely to see costs increase as purchases of paper bags will increase. Manufacturers of plastic bags will see reductions in business with the potential loss of 300 to 700 direct jobs.
- For local authorities there will be costs for the set up and on-going administration of the levy. In total these are estimated at GBP3-4 million and GBP3.5 million pa respectively. These costs will be offset by income from the levy estimated at GBP7.75 million pa. CoSLA has reservations about the potential costs, which they believe needs a full investigation.

APPENDIX II – DEFRA-WRAP STUDY

WASTE AND RESOURCES ACTION PROGRAMME Carrier Bag Usage And Attitudes Benchmark and Target Market Study Research Findings March 2005

The Department for the Environment, Food and Rural Affairs (DEFRA), the Scottish Executive and the Welsh Assembly Government have asked the Waste and Resources Action Programme (WRAP) to investigate the potential of the 'Bag for Life' (B4L) scheme.

The scheme was designed to reduce significantly the 8 billion free carrier bags given away by UK retailers each year. Plastic carrier bags are widely seen as an environmental problem: the inefficient 'single use' of free carrier bags and the visible problem of litter and associated environmental affects.

The growth in the use of plastic bags demonstrates how deeply they have become embedded in consumer expectation and behaviour. UK consumption of plastic carrier bags is estimated at between 60,000-90,000 tonnes per annum which accounts for 3.5-5.3 per cent of total plastics used in packaging.

In order to address the plastic bag problem, WRAP is looking to identify mechanisms that might encourage consumers to change their behaviour and use a B4L instead of free carrier bags. There is some evidence that encouraging people to use a B4L does prompt a reduction in the use of free plastic bags. A voluntary pilot programme initiated by Durham County Council achieved significant increases in the sales of B4L and gained the support of local retailers.

Through its Retailer Initiative, WRAP is already working with retailers to reduce resource use and household waste production. The B4L is one element of this over-arching initiative. Retailers have supported and actively promoted the idea of a national B4L scheme based on initiatives operated by major supermarket chains such as Tesco, Sainsbury and M&S.

WRAP believes that the engagement of retailers in a nationwide scheme can make a significant difference to consumer behaviour encouraging both reduction in the consumption of carrier bags and the promotion of re-use. In order to achieve a long term shift in consumer behaviour, the initiative would need to align itself with retailers' brand values and consumers' desires and expectations.

The findings of this research indicate that the term 'single use bags' is something of a misnomer. Only one or two respondents claim that they discard these bags after only one use. The overwhelming majority claim to re-use these bags for a variety of other purposes including rubbish disposal, carrying sports kit, etc. Some are taking surplus bags back to supermarket recycling banks.

As single use bags are freely available in supermarkets and there is little or no evidence of checkout staff seeking to limit the amount customers use, few see much need to re-use these bags when food/grocery shopping.

However, there is some feeling that should supermarkets start charging for single use bags (c.f. Aldi, Lidl) this might make them think again. With the exception of the planned, regular weekly food/grocery shop, most other shopping, especially from the High Street, is fairly impromptu and impulse.

In the High Street, single use bags are usually offered at checkout, and most accept these with their purchases. For clothes purchase, especially from more fashionable, expensive outlets, customers expect stores to provide a bag for a variety of reasons, e.g.:

- it says they shop at prestige outlets
- it is a reinforcement of the pleasure of buying the item it is proof of purchase when leaving the store
- it is easier to return items in the original packaging.

There are hints that unwillingness to risk challenge or attract attention is sometimes given as a reason for not re-using bags when shopping.

There are indications that neither the 'bag for life' concept nor the idea that supermarkets would replace a B4L free of charge when worn out has, as yet, really registered with the majority of respondents.

Only a minority have bought a B4L. Whilst some did so for environmental reasons, others bought because they needed a stronger/larger bag at the time. That having been said, regular re-usage of a B4L is not universal. More commonly, a B4L is re-used if and when respondents remember to do so.

Significantly, for most, the term 'bag for life' is synonymous with the bags which can be bought at supermarket checkouts.

Barriers to greater re-use of B4Ls include:

- feeling that it is somehow not the done thing to use a B4L bought in one supermarket chain in another chain's outlet
- not wanting to look 'cheap' using a branded supermarket B4L in other stores
- unwillingness to put new clothes, etc. into a bag previously used for food shopping, especially vegetables or other wet food.

Apart from the minority who have bought a B4L, awareness of the availability of B4Ls in supermarkets is fairly low. There seems to be little evidence of checkout staff actively promoting B4Ls. In terms of alternative B4L products:

- heavy gauge plastic is seen as appropriate and more durable than paper
- there is some support for fabric/textile bags
- design on the bag needs to be fairly neutral to widen appeal to acceptability to both men and women and across the different age groups.

However, it should be appreciated that the dominant use of single use bags has encouraged other kinds of re-usable bags to be seen as old fashioned, for older people, especially women. Thus trolleys, string bags, square canvas bags, etc. are perceived by many as 'not for me', regardless of their functionality. Whilst some allowance must be made for a degree of posturing, this sensitivity demonstrated that the design and appearance of bags is likely to impact on take-up of the B4L concept.

In order to overcome these hurdles, promotion of B4L will not only need to raise awareness. It will also need to address the imagery and associations of re-usable bags. Consumers will need to be fully educated about the existence of B4L and informed how and why they represent a practical and effective means of addressing the environmental problems of single use bags. They will also need to be persuaded to use B4L as a matter of habit. There are indications that, currently, retailers/supermarkets are not really

promoting B4Ls and that more could be done to raise customers' awareness of the B4L option.

Other ways retailers could encourage consumers to get into the B4L habit might include:

- charging for single use bags
- offering loyalty points for re-using B4ls
- donations to a (local) charity for re-using B4Ls
- money off for B4L usage

More generally, we believe that a co-ordinated marketing approach is required:

- a communications strategy needs to be developed which would involve educating and motivating consumers
- supermarkets/retailers need to be encouraged to give greater priority to promoting B4Ls and their regular usage.

Ideally, a mass media advertising campaign operating both in the national media and at point of sale would help to kick start the shift towards increased usage of B4L.

That having been said, we suspect that, given the current association of B4Ls with food/grocery shopping, any build up of B4L usage would need to start in the supermarkets. In time, and with education, consumers should become more aware and accustomed to re-using bags beyond the supermarket context.