

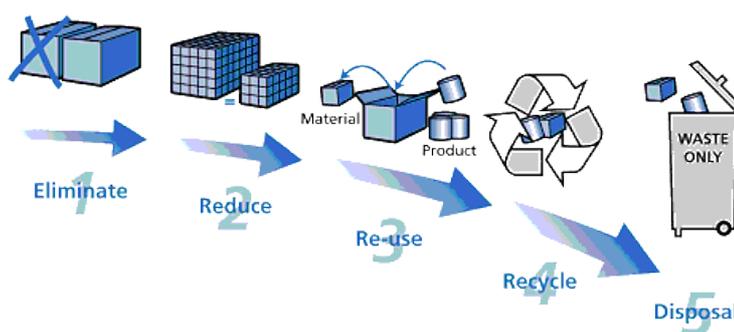
**Pre-emptive packaging: a symptom of our society.
Why the EU Packaging and Packaging Waste Directive may not be effective in eliminating packaging waste.**

Repeatedly in the news one hears about the amount of waste that packaging “produces”. Many times this is blamed on the retailer and simplistic solutions are put forward as to how this waste could be eliminated. Many of these solutions have not been studied sufficiently and ignore the practicalities and driving forces behind the design of packaging. The concept of “over-packaging” is at odds with the design principles taught to packaging technologists and designers.¹ Whilst there are many examples of apparent over-packaging, this essay will take a look at the fundamental reasons underlying the trend, and will expose why just stating in an EU directive that the packaging must be reduced will not work, without changes to other fundamental values, laws and ideals.

This essay will examine the European Packaging and Packaging Waste directive (94/62/EC) (EPPWD) assertion that ‘the best means of preventing the creation of packaging waste is to reduce the overall volume of packaging’ [EU 1994]. It will look at some situations in society which predicate that drastic reduction in packaging may not be a realistic idea. The resulting legislation may not reduce the total landfill requirement, and lead to a situation where small local shopkeepers are put at further disadvantage to the major players.

The Hierarchy of Waste

To understand the EPPWD one must first look at the driving force behind it. This is known as the hierarchy of waste, first introduced into European waste policy in the European Union’s Waste Framework Directive of 1975. It worked on the principle that: “Waste that is not created in the first place does not need to be reused, recycled or disposed of, and is therefore the most environmentally desirable option.” [Dundee CC 2007]. It will be argued that the emphasis on reduction of waste when applied to packaging has been blinkered resulting in misapplication.



The waste problem

In 2002 the UK produced 28 million tonnes of municipal waste – 83% of which ended up in landfill. Municipal waste includes all waste under the control of local authorities or agents acting on their behalf, and around 60% of the municipal waste stream is

¹ The author has worked as Packaging Technologist with General Foods in Banbury; a cosmetic packaging designer/buyer with a private label cosmetics firm; and has designed a coffee packing line for Tanzania for an aid charity.

biodegradable.[FOE 2002] A UK Royal Commission on Environmental Pollution found that total packaging contributes only 1% of the total of all solid wastes. In developed countries food packaging represents 60% of all packaging [Northwood and Oakley-Hill, 1999] because of strict food packaging regulations. DEFRA figures estimate that 3%-6% of purchased food is discarded and food waste is 10-20% of the food consumed.

Often environmental issues seem far removed from people's ability to act. Most will never experience the rain forest for themselves, or see, first hand, the effects of the depletion of the ozone layer. They do not understand the effect of carbon dioxide and methane on the temperature of the earth's atmosphere, but an overflowing waste bin, or a discarded metal can rattling as it rolls down the road is within their realm of experience.

Cathy Lauzon² [1992], writing in "Packaging and the Environment" stated that 'in terms of everyday experience [packaging] is one of the most conspicuous and tangible areas of environmental concern... For the consumer, when it comes to throwing packaging away, it represents an area where there really is an opportunity to do something to help.'

Is the EPPWD's focus on recycling and reuse a way of getting the public feel that they are doing their bit, making a difference, when the benefit is insignificant? DEFRA statistics show that packaging contributes only 18% of household waste which represents about 3% -by weight and volume – of landfill waste. Just 3% of a household's annual energy use is taken up by packaging. The recycling industry is aimed at an energy saving for a household's whole year's packaging equivalent to driving one less mile a day³ [INCPEN 2006].

Why it would be unwise to eliminate all packaging.

According to WHO in countries where there is no packaging 30% of food is wasted⁴. The applicability of this to the UK is borne out in a study ERM which compared apples sold loose with four apples "overpackaged" in a shrink wrapped tray. It showed that there was 27% more waste, used packaging and bruised unsaleable apples from tree to consumer from those sold loose⁵. [INCPEN 2006].

From Defra's "field to plate" figures (figure 1), in the event of using no packaging, if this 30% wastage were applied to all foodstuffs, the waste would be 30% of agriculture, manufacturing, and industrial transport energy: 46 TWh of wasted energy⁶ (over 3 times the UK generation output from all renewable sources in 2004) [DTI 2005].

² Packaging Technology Director of Lewis Moberly

³ This saving can easily be wiped out by having to drive to the bottle bank or recycling centre.

⁴ A World Health Organisation study has shown that without good packaging food wastage in the less developed regions of the world can reach between 30 and 50% while with good packaging it is rarely more than 2-3%. Source [Institute of Food Science and Technology <http://www.ifst.org/site/cms/contentviewarticle.asp?article=227#name3>]

⁵ This is additional to the 10-20% of food wasted after it has been purchased.

⁶ 30% x 49% x 315TWh

Food energy use from “field to plate”: 2004

United Kingdom

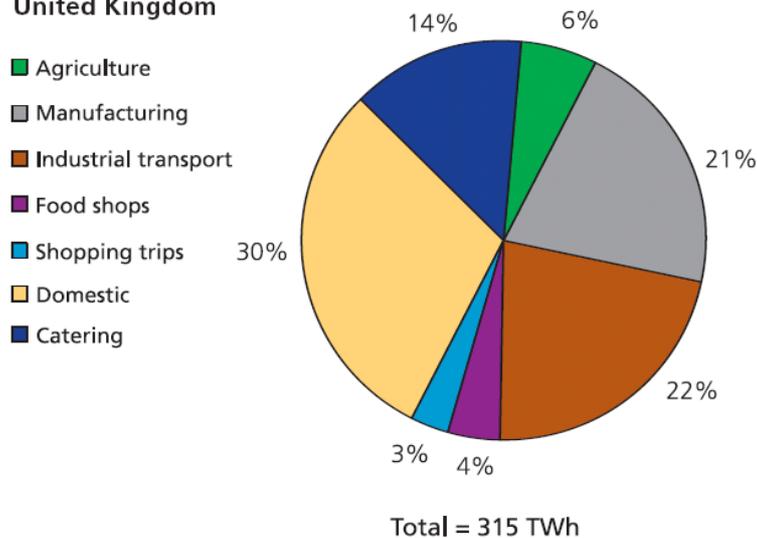


Figure 1

Source Defra

Packaging design criteria are to economically balance the amount of wastage of the product against the cost of the packaging materials, and reduce the shipping costs. Arnold Black⁷ stated “packaging is largely present to protect its contents, so reducing transport packaging often leads to more product damage. If packaging waste is reduced but other waste is dramatically increased, there is little environmental or economic incentive to take this route” [West 2006]

Ten times more energy goes into the production of the food and goods it contains than into the packaging itself [INCPEN 2006]. Any increase in damage to the contents would result in a 10 fold energy waste over that invested in the packaging. It is not therefore economically or environmentally beneficial to eliminate packaging completely.

There is of course some deliberate over-packaging, and a lot of packaging is used as a marketing tool. When packaging is used as an integral part of the final consumer concept (e.g. Easter Eggs, “high status foods”, Christmas Hampers, Gift Boxes, or cosmetics) it becomes economically viable to design in “over packaging”. In these cases people buy into the dream. As the PR company Pierce Mattie put it:

“... what really is the harm in admitting that we are swayed by beautiful design? We purchase beauty products in order to add more beauty to our own lives. Surely the packaging of a product is part and parcel of the overall visceral experience”.

⁷ Network director of the Resource Efficiency Knowledge Transfer Network quoted in *tcetoday*

Packaging has several roles⁸:

Protect and preserve the product in a fit condition from the point of production to consumption

- To carry information, legal and otherwise, to assist consumers in their choice of product (see appendix 4 for labelling requirements)
- Present the product to the consumer in the most convenient form.
- Contribute to the efficient and safe use of the product.
- Stimulate product and manufacturer recognition.
- Ensure optimum distribution costs.
- Minimise the possible negative impact on the environment of the goods, through uncontrolled leakage or spillage, as well as of the final disposal of the packaging materials.

New Problems – new packaging challenges: Pre-emptive Packaging.

In our current society we need to add

- Prevent theft
- Reduce the risk of compensation claims by customers by preventing them from mishandling or misusing the product.
- Reduce the risk of bio-terrorism

These threats are growing in importance, and are driving the necessity for packaging.

Retail theft.

According to the National Survey of Retail Crime and Security from the Centre for Retail Research, approximately 70% of losses from theft from shops were due to theft by customers and staff. This amounted to around 17% of retail profits. In the 2000 British Retail Consortium survey the total cost of theft amounted to £1.2bn.

Only 40.5% of thieves were apprehended by the police. The reasons given in 80% of instances were to do with inefficiencies in the justice system. (see Appendix 2)

This lack of prosecution as a deterrent to retail theft leads to a number of instances of what is often described as “over packaging”. For instance the plastic clamshells which encase several of the expensive LED torches and similar on sale in the CAT shop are designed so that 1) the customer can see the product and labelling 2) the package cannot be concealed in a pocket, and 3) the packaging cannot easily be removed and the torch concealed in a pocket. This design feature leads inevitably to the complaint that you need scissors to open them. They are designed thus because it is economical to do so – to prevent retail theft.

Compensation Culture⁹

⁸ Taken from amalgamation of roles stated by the authors in Packaging and the Environment [Pira/Packaging Week 1992]

According to the Actuarial profession the cost of personal injury claims, and associated legal costs, have escalated by double-digit inflation for more than a decade,[CCCResp 2005] and the ball-park “cost of compensation” is roughly £10b per year, over 1% of GDP, and is set to continue rising at over 10% per year [Lowe 2002].

Manufacturers can no longer take for granted that a customer can be assumed to use common sense when using their product, nor that the law will protect them if the customer is stupid. The packing must help to mitigate this risk by preventing the handling of heavy loads e.g. making it impossible for a single person to pick up a over-heavy load (see textbox below for an example), or by making it difficult to use too much of a product through dosage caps or blister packaging, so substantiating evidence of user negligence or deliberate misuse.

Packaging enforcing good handling practices –
Panasonic KXP4451 Printer

The design of a cardboard box containing a Panasonic KXP4451 printer purchased by the author whilst working as a Computer Consultant is a good example of what appears to be over packaging being so designed for good reasons.

“The maximum weight or force required by one man to move or operate equipment safely is 30kg. If the weight or force required is greater than that, then two men will be required up to a maximum weight of 60kg.”

UK MANUAL HANDLING AND LIFTING REGULATIONS
(<http://www.thorworld.co.uk/regulations.htm>)

The weight of the printer was over 30kg . The outer carton was made to be such a volume as to make it impossible for one person to easily lift it. The design enforced the UK Manual Handling Guidelines so reducing the chances of someone suing Panasonic for not preventing them lifting too heavy a weight alone. This necessitated a lot of air and hence a lot of moulded polystyrene packaging to bulk up the volume. This “over packaging” prevented Panasonic from a charge of negligence had the author injured himself attempting to lift the unit alone.

Bio-terrorism

Another current threat which affects packaging of foodstuff is that of Bio-terrorism [WHO 2002], whether it be aimed at destroying the reputation of global brands such as in the Snickers Bar poisoning in Australia [DNC 2005], a random attack such as the Tylenol murders in 1982¹⁰, or the scenario of holding the authorities to ransom by the threat to kill hundreds of people.

⁹ “The desire of individuals to sue somebody, having suffered as a result of something which could have been avoided if the sued body had done their job properly.” [Lowe 2002]

¹⁰ Seven people died of cyanide poisoning between 29 September and 1 October 1982, all after having taken Tylenol deliberately contaminated with cyanide whilst on the shop shelf. This led to the introduction of tamper evident seals on many pharmaceuticals and foodstuffs.
<http://www.answers.com/topic/1982-chicago-tylenol-murders>

There are no requirements under foodlaw for packaging to be tamper evident. However European Commission General Food Law Regulation 178/2002 requires that food should not be unsafe for consumption. Tamper proof packaging helps meet this requirement but implementation would be a decision for the businesses concerned [Flint 2007]. Removing packaging could be taken as being against the regulations holding the manufacturer open to prosecution should an event occur.

Precautionary enhanced packaging is a symptom of our consumer based society, the rise in leniency towards retail theft, and the increase in our litigious culture.

Has the EPPWD been beneficial to the environment?

There have been beneficial environmental effects. Of 56.3 million tonnes of packaging waste in 2001, 34.6 million tonnes was diverted from landfill of which 30.7 million tonnes was recycled. All packaging recovery and recycling has saved roughly 10 million tonnes of oil equivalent and 25 million tonnes of CO₂ equivalent. However, much of this could not be attributed to the EPPWD as it was covered by pre-existing local legislation. [Ecolas 2006 p65].

It has been recognised that “*little information on the costs and benefits of packaging and packaging waste management was available*” [EUC 2006] when the EU Directive was adopted in 1994. This is a curious admission as cost/benefit analysis has been part of packaging design since the 1960s. In the EPPWD amendment 2004/12/EC there has now been a realisation that packaging is necessary, and the focus has been towards how to make the waste easier to process, by making it more recyclable, reusable or incinerateable.

Belatedly it was accepted that prevention of waste was more complicated than was thought:

“Prevention not only influences the entire life cycle of packaging from raw material extraction to disposal, but also the life cycle of the packaged products. Any more substantial changes in volumes of packaging placed on the market can only be achieved through changes in production, consumption and distribution patterns. This is reflected in the limited success of all prevention measures undertaken so far.” [EUC 2006]

Has EPPWD facilitated sustainable communities or facilitated Tescoisation?

There has been an environmentally positive move towards using reusable transit and display packaging by the retailing giants such as Tesco and Boots [see Appendix 6]. To facilitate this there needed to be a rationalisation in the distribution system. This has led to the building of stores out of town, where large warehousing can be built, and hence accelerated the growth of out-of-town retail parks. Warehouse to store costs to the retailer are reduced, but at the cost of increases in the number of car journeys being made to shops.¹¹

¹¹ Tesco actually recognise the environmental benefits of local shopping quoting a 4% decrease in car use and a 9% increase in travel to their shops on foot and bicycle when they open a Tesco Express store. [Tesco 2006]

With a desire to move to sustainable communities¹² with local shops the problem of packaging waste will only get worse as the requirement to package for multiple types and sizes of transportation to accommodate the smaller retailers becomes necessary again.¹³

Three of the four main supermarket chains have created their own packaging recovery centres. By recovering packaging waste at recycling centres or distribution centres, the larger grocery retailers can meet a large part of their obligations.

Smaller retailers do not enjoy the same benefits. If they generate more than 50 tonnes of packaging waste, they have to join a compliance scheme. They cannot gain the benefits of transit packaging recovery as these are gained by the wholesaler and distributor. Tesco, Safeway and the other chains also maximise vehicle utilisation by carrying packaging including trays and other re-usable, recycled material, to and from their suppliers [Fernie & Hart 2001].

Wholesalers have to deliver small loads to many small shops. It is claimed that it is impracticable to recover packaging waste from these shops for hygiene and cost reasons [Fernie & Hart 2001]. Greenpeace (2002) propose that there is a way to make it economical to recover the waste even in these situations, and propose increasing recycling and recovery by treating “waste” as a resource, either as a raw material or as a fuel, from which the manufacturer and retailer can reclaim some financial return.

Tesco have been very adept at exploiting their distribution systems, from manufacturer to their shops. To achieve this they coerce¹⁴ their suppliers to adhere to their packaging standards, using their reusable packs. This is to the detriment of the wholesalers upon whom independent retailers rely who do not have access to these designs and have to rely on the secondary packaging lines at the manufacturer and not the primary lines “reserved” for the big four.

Conclusion

Packaging makes a valuable contribution to human life. Without packaging, due to 30% food wastage, we would be unable to sustain the population growth that has occurred. It is a necessary evil which must be recognised and treated accordingly

Despite being only 1% of the solid waste/landfill problem, end use packaging has been targeted because it is a very visible medium on which environmentalists can focus their message. There is a real move towards reducing the environmental impact of the packaging cycle, driven by consumer perception and by legislation fuelled by EPPWD. However there are increasing hazards of theft, bio-terrorism and litigation, created by the ineffectiveness of our legal systems, which limit the economic benefits to retailers, and hence their willingness to be proactive in reducing levels of packaging as far as environmentalists would like.

¹² As indicated by the Sustainable Communities Bill 2006

¹³ The hazards from the lateral shunts experienced by packages during rail transit, are different to the vertical and vibration shocks experienced during road transport, which are again of a different type to the shocks experienced during manual or mechanical loading and unloading. The potential damage in a well packed and stacked 42 ton palletised trailer are significantly reduced over those of a loose stacked local delivery van.

¹⁴ The word “coerce” is used based on the experience of the author when working for suppliers of multinationals, and is not believed to be too strong a term for the pressure applied to manufacturers if they want to sell their goods through the large retail outlets.

There have to be changes in society to reduce the level of shoplifting; to decrease the moves towards the litigious society; and improve the transport infrastructure, removing the need for pre-emptive precautionary packaging.

Overall despite being flawed initially, the EPPWD has motivated research into reducing packaging waste. Momentum behind “reduce, recycle, reuse” will continue to grow and ingenious economical packaging solutions will be found.

Further Research

As with most things green the solutions are never black or white. Whatever actions one takes in one area have unintended consequences in others¹⁵. The EPPWD derived regulations have been exploited by the main retail chains who can use their purchasing muscle to gain further advantage over the small independent retailers, producing less sustainable communities now dependent on Tesco etc brand “convenience” stores. That elimination of packaging waste benefits the larger retailer over the smaller is one of these consequences and one that must be researched and addressed further if sustainable communities are to become a reality.

Packaging is a symptom of our consumer society. More research needs to be conducted into the underlying issues causing this problem and solutions to them.

The “polluter pays” principle is flawed and needs revising so that it looks at the whole picture of what pollution is saved by the generation of some other form of waste. The Greenpeace “Zero Waste” policy looks in an alternative way at “waste” as a potential “resource”, which is a valuable way forward and deserving of further research.

The European Packaging and Packaging Waste Directive was flawed when it was drafted because little was researched on the cost and environmental benefits of packaging. Even when it was revised in January 2004 [2004/12/EC] there was still no cost/benefit assessment of the whole waste cycle. The movement towards encouraging packaging recycling and reuse is in the correct direction, accepting the inevitability of packaging and dealing with its consequences and how to reduce the end result. More research is being carried out now into the cost benefits and waste mitigation methods (such as bio-degradable film) but more needs to be directed at primary product waste savings.

Limitations

There is very little recently published literature available on environmental packaging. The main books being written around 1995. Many developments have been made since then but not published.

¹⁵ See <http://www.econlib.org/library/Enc/UnintendedConsequences.html> for discussion

Appendix 1

From Defra – The Environment in your Pocket 2006

Estimated total annual waste arisings, by sector

United Kingdom

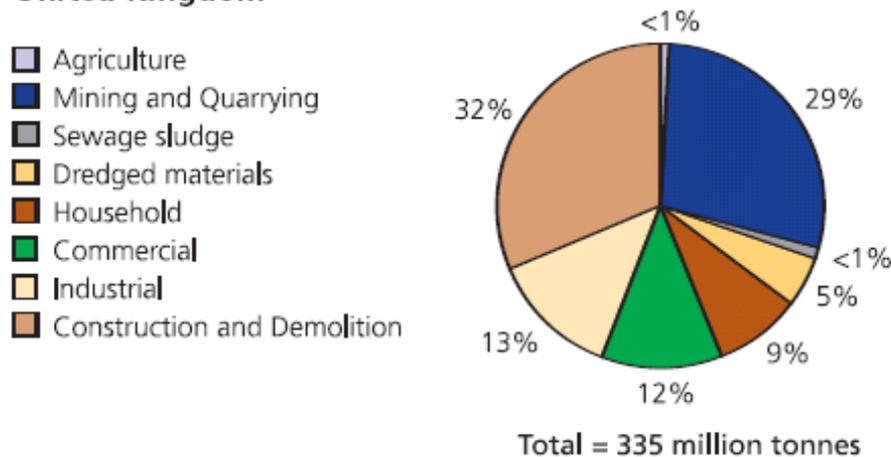


Figure 2

In 2004 the UK produced about 335 million tonnes of waste. The chart above shows the estimated proportion produced by each sector.

This includes nearly 100 million tonnes of minerals waste from mining and quarrying, which is not currently subject to control under the EU Waste Framework Directive.

It also includes around 220 million tonnes of controlled wastes from households, commerce and industry (including construction and demolition wastes). Household wastes represent about 9 per cent of total arisings.

Waste from the agriculture sector represents less than 1 per cent of total arisings. This waste excludes manure or straw and will come under the same legislative controls as other wastes in 2006.

Estimates shown in the chart are mainly based on data for the period 2004, although estimates for sewage sludge relate to 2005 and the figure for construction and demolition waste relates to 2002/03.

Construction and demolition waste includes excavated soil and miscellaneous materials as well as hard materials, such as brick, concrete and road planings.

Waste from the agriculture sector excludes manure or straw and will come under the same legislative controls as other forms of waste later in 2006.

Manure and slurry when spread at the place of production, for the benefit of agriculture, will not be considered waste under the new controls.

Estimates for end of life vehicles have been included in the commercial and household sectors and figures on end of life ships have been included in the commercial sector.

Appendix 2

UK Retail Crime Survey 2000

The National Survey of Retail Crime and Security From the Centre for Retail Research.

Percentage of losses caused by:

	Small retailers	Multiples	Large Multiples
Employees	20%	29%	36%
Customers	54%	47%	37%
Vendors	10%	8%	10%
Administration	16%	16%	17%
	100%	100%	100%

The surveyed retailers only handed 40.5% of thieves they apprehended to the police. The reasons given for why so few were handed over were:

Factors Explaining the Non-reporting of Customer Thieves

Take up too much staff time (particularly in owner operated stores)	24.5%
Did not want to prosecute elderly, juveniles or mentally ill	23.6%
Low success rate in courts	19.7%
Fines/Penalties not a deterrent	18.5%
Low prosecution rate by the Crown Prosecution Service	17.2%
Only report the worst offenders	12.9%
Afraid of bad publicity	9.0%

British Retail Consortium 2000 RESULTS

Crime	£ millions	Crime	£ millions
Customer theft	£746	Burglary	£26
Staff theft	£426	Criminal Damage	£10
Fraud	£54	Arson	£3
Other	£147	Robbery/snatch	£4
		Terrorism	£2
Subtotal	£1418	Subtotal	£45
			£626
Loss prevention costs			
		£2044	
TOTAL CRIME COSTS			
Shrink % sales		0.91%	

Average loss per incident

- 1 • Employee theft average loss per incident was £320 in 1999.
- 2 • Customer theft average loss per incident was £42.

Appendix 3

Some Developments in Retail Packaging Waste Reduction

Tesco in 2000 introduced the use of reusable green crates for transporting and displaying fruit and vegetables. These replaced cardboard boxes. They are reusable so eliminating waste. However it is still frowned upon at the till to turn up with, for instance, six loose apples to be weighed, having not used one of the plastic bags provided.

In 2004 Tesco also introduced degradable plastic carrier bags which break down in 60 days with no harmful residue. They estimate that 719 million degradable carrier bags have since been used by customers, which means that the equivalent of 6,035 tonnes of non-degradable plastic has been offset. They also through their Clubcard Greenpoint scheme encourage the use of a customers own bags, or reused bags. [Tesco 2005]

Boots have been working on their packaging reduction measures.

According to their CSR report, in 2006 Boots introduced 16 double-deck trailers into its fleet, which saved 1.2 million kilometres - and 719 tonnes of carbon dioxide - in just six months.

Around 80% of all goods supplied Boots stores is now delivered without any transit packaging - most of it having been stripped off at the warehouses and distribution centres, making recovery and recycling operations even more effective

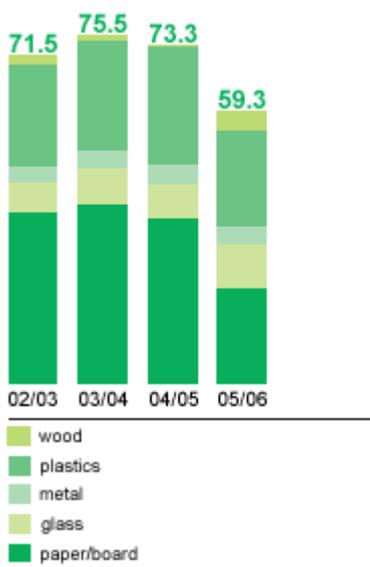
Boots have reduced the amount of packaging per single items sold. When you consider the range of produce sold by Boots – from lipstick, medicines through CDs and DVDs to electrical goods, this is a reasonable reflection of what can be done across the market.

Packaging supplied per single

	2002/03	2003/04	2004/05	2005/06
Paper/board grammes per single	36.89	38.87	35.61	20.70
Glass grammes per single	6.78	7.78	7.48	9.34
Metal grammes per single	3.18	3.80	4.43	4.00
Plastics grammes per single	22.00	23.66	25.39	20.67
Wood grammes per single	2.56	1.34	0.31	4.50
Other grammes per single	0.05	0.08	0.06	0.07
Total grammes per single	71.46	75.53	73.28	59.28

Packaging supplied per retail product (single)

grammes per single



ASDA recently announced it would stop sending waste to landfill by 2010 by increasing recycling from its stores. [West 2006]

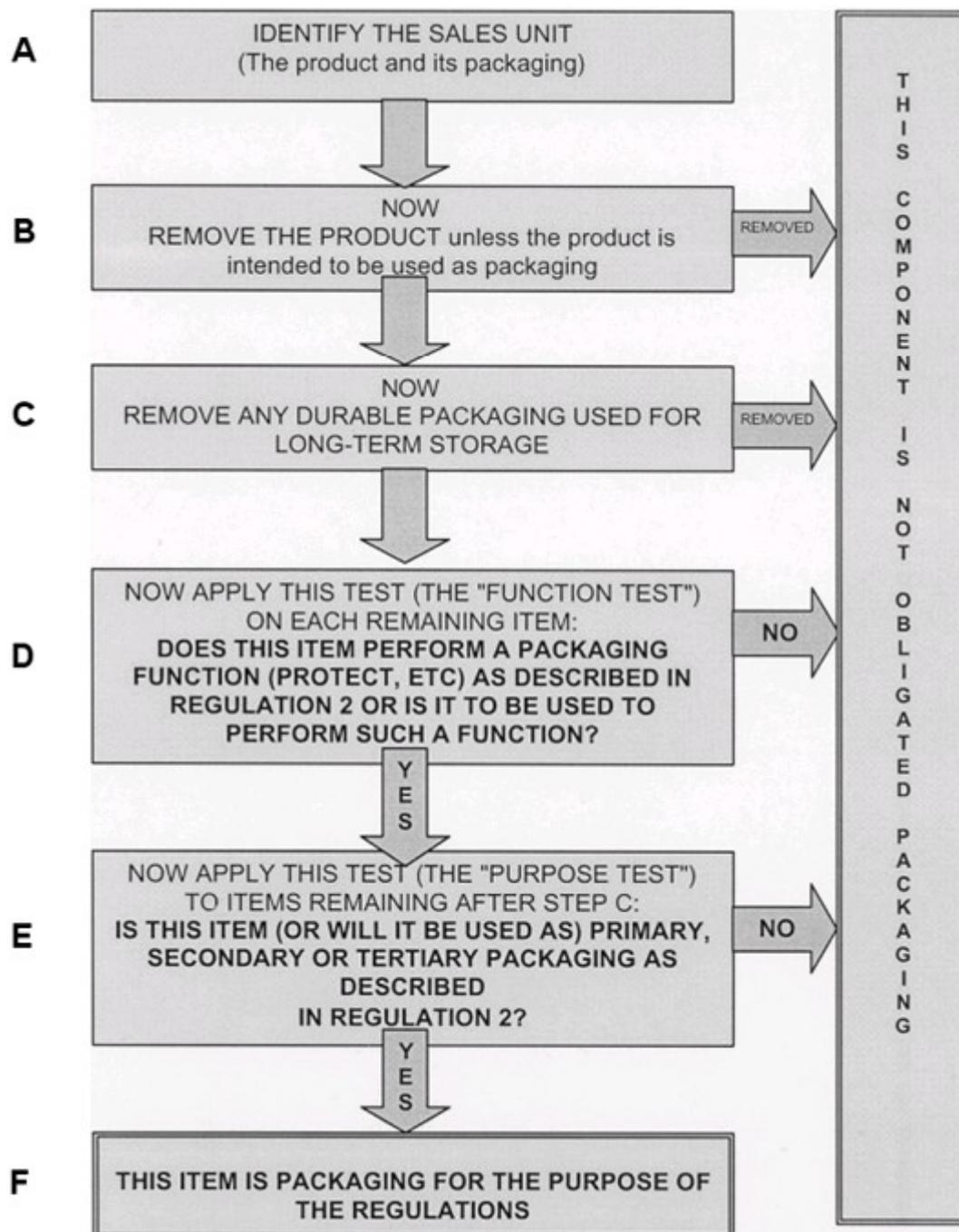
Sainsbury's is to sell around 500 of its own-brand products in compostable packaging, saving 3550 tonnes of plastic a year. [West 2006]

WRAP through its Retail Innovation Fund promotes research and development projects into the design, prototyping and piloting of new packaging materials and products that will contribute to a reduction in household waste. These include trials of lightweight glass bottles and jars; a packaging minimisation standard for organic produce; and reusable packaging for Argos.

There has been a lot of work recently on bio-degradable plastic films based on corn-starch instead of oil. [Davis & Song 2006]. This is proving very promising, although in the longer term there will be a clash of interests with biomass, bio-fuel and food production due to limitations in the availability of agricultural land.

Appendix 4

What Packaging is considered as obligated packaging under the EU Directive ?



Source www.biffpack.co.uk/guidenotes.php

Appendix 5

What are the labelling requirements for food packaging.

The law requires certain information to be given on all pre-packed foods to ensure that the consumer is protected and informed. The guidelines are laid down by the [EU](#).

Look at the can of peas below. These are the items on the label that are required by law.

- manufacturer's name and contact details
- name of the product
- description of the product
- weight (NB - some foods are exempt, for example bread)
- ingredients (listed in descending order of weight)
- cooking/heating instructions
- storage instructions
- best-before date



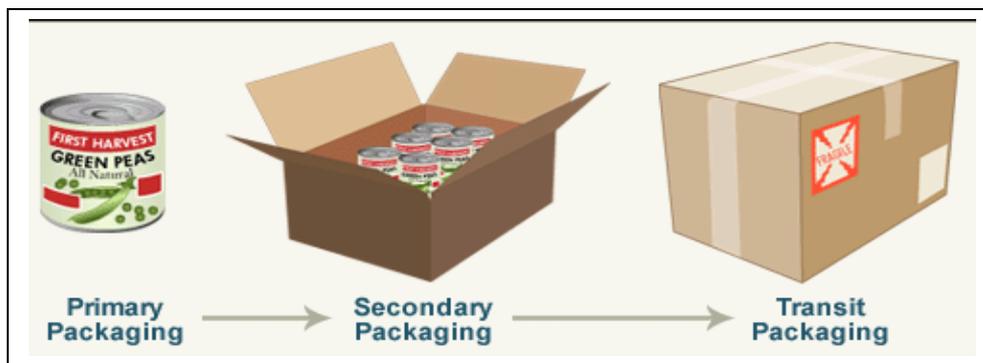
Source BBC Website bbc.co.uk

Appendix 6

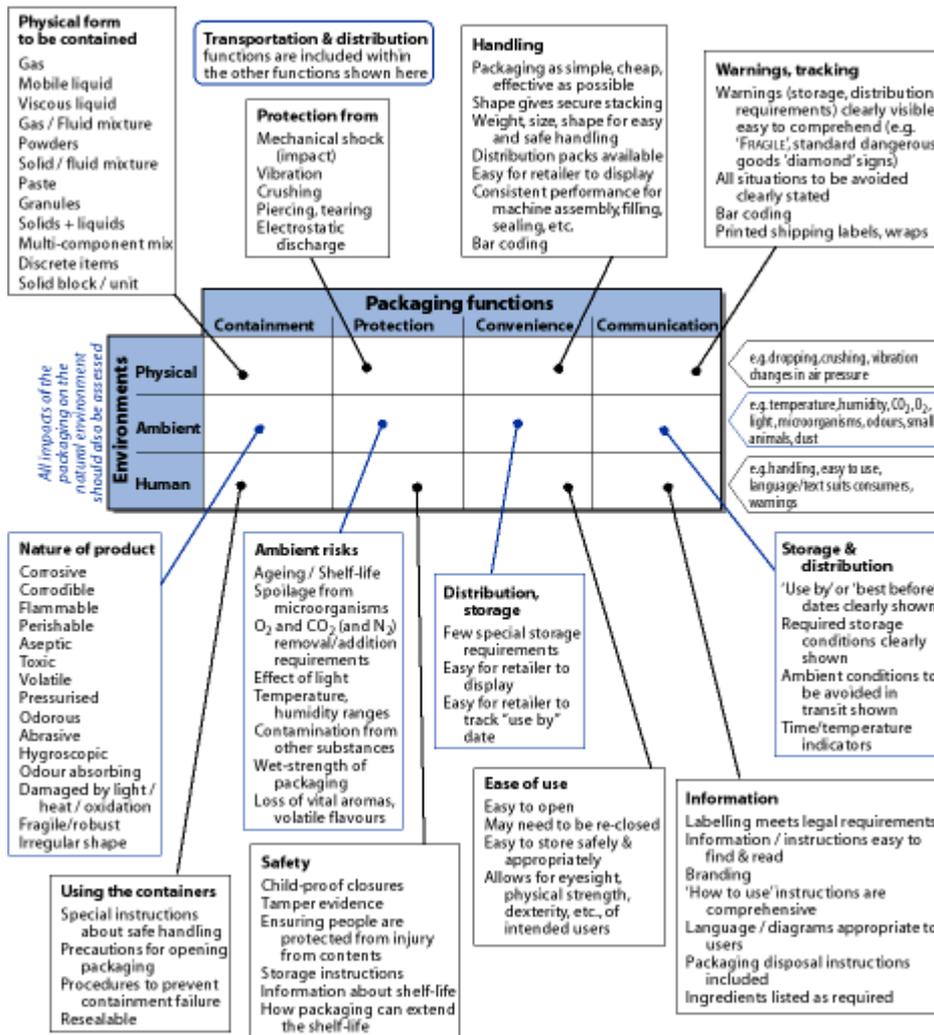
Packaging's Roles:

Packaging broadly falls into 3 categories

- *Primary or consumer packaging*, - normally in contact with the goods and taken home by consumers.
- *Secondary packaging*, - larger packaging such as boxes, used to carry quantities of primary packaged goods.
- *Tertiary packaging*, - packaging that is used to assist transport of large quantities of goods, such as wooden pallets and plastic wrapping.



Packaging functions and environments grid – complete



Source http://www.pac-it.org.nz/images/booklet/Functionenvironment_grid2.gif

The following items are not legal requirements, but are nevertheless good practice and often included on packaging:

- illustration of product
- price
- nutritional values of the product
- customer guarantee
- the batch-code and bar-code numbers
- opening instructions

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