24) FOOD PACKAGING WASTES AND ENVIRONMENTAL IMPACTS

1. INTRODUCTION

The rise in environmental consciousness in recent decades has included a focus on household waste. It is not the most urgent of the problems we face, but it may be the most immediately accessible. Global climate change, the destruction of the rain forests, and disasters such as Chernobyl and Bhopal are far away and hard for an individual to influence; but garbage disposal happens again and again, right at home under our personal control. Those who seek to act on their environmental concerns, therefore, often find it easiest to begin with the problems of solid waste. When a 1990 Gallup poll asked people in the United States what they had done in connection with environmental problems, 80% to 85% answered that they or their households had participated in various aspects of recycling; no other significant steps had been taken by a majority of respondents Packaging has come to symbolize the issue of waste. It represents roughly one-third of municipal waste in the United States. It has expanded rapidly in recent times; most adults today remember growing up in a world that used much less packaging. Perhaps most important of all, packaging feels wasteful: used once and then promptly discarded, it seems like only an ephemeral presence in our lives as it rushes from factory to landfill. Yet packaging remains ubiquitous; it is impossible to imagine an urban, industrial society functioning without it. Since the first packages were created well over 10,000 years ago, packaging has served many important purposes: To contain. To carry. To protect. To preserve. To make a product look so enticing that it simply must be bought. Modern packaging has made life easier in many ways: food preparation and storage, longer shelf life for products, frozen foods, processed foods, takeout foods. Unfortunately, such convenience has come at an environmental price.

2. SOURCES

3.2m tonnes of the 26m tonnes of the household waste produced annually is packaging. 150m tonnes of packaging waste come from industry and commerce each year. To achieve a change towards more sustainable packaging, it's not just the packaging that requires alterations but also our lifestyles and habits of consumption.

People in the US throw away 2.5m plastic bottles every hour and less than 3% are recycled. In the UK: of the 15m plastic bottles used every day, much less than 3% gets recycled. Less than 1% of the billions of plastic bags used each year are recycled and the majority are used only once. European law wants us to recover 50% of all our packaging and to recycle 25%.

3. WHY WE NEED PACKAGING?

Most of the things we use at home and at work are produced somewhere else so that they have to travel to get to us. Consumers benefit from packages because they protect products as they travel, whether fast food or refrigerators, no matter how far they have to go. A well-designed package is attractive and appealing to consumers, and inspires confidence of product safety. In addition,

A. Packaging provides a physical barrier between a product and the external environment thereby ensuring hygiene and reducing the risk of product wastage due to contamination.
B. Some forms of packaging prolong the life of food.

C. Some packaging is also needed for safe and efficient transportation.
D. Packaging is also used to provide customers with information and instructions, for which there are some legal requirements.

4. TYPES

The most common types of material used for packaging are paper, fiberboard, plastic, glass, steel and aluminum.

A. Paper: One of the most widely used packaging materials, particularly corrugated cardboard used for transport packaging. The current recycling rate for paper and board packaging waste is 49%.
B. Glass: is the most common form of packaging waste. Glass can be returned and re-used or recycled easily and a well-established recovery and recycling system exists in the UK. The first bottle-bank in the UK appeared in 1977 and today there are over 20,000. Six billion glass containers are used annually in the UK and the recycling rate is 22%.
C. Aluminum: is used in many packaging applications such as beverage cans, foils and laminates. It has a high value as a scrap metal with prices ranging from 650-750 pounds per tonne and can be recycled economically. Of the estimated 5 billion aluminum cans consumed in the UK in 1996, 31% were recycled.
D. Steel: is a widely used packaging material for food, paint and beverage as well as aerosols. Recycling steel brings significant resource and energy savings. The current recycling rate for steel cans is 16%.
E. Plastic: offers several advantages over other packaging materials in its sturdiness and low weight. Even though plastic can be recycled there is a lack of facilities in the UK. The current recycling rate for plastic in the UK is 5%, with the remainder either land filled or incinerated.
F. Mixed materials: packaging can sometimes have the benefits of being more resource and energy efficient than single material packaging, but combining materials makes recycling difficult. Recycling these materials is hindered by the lack of facilities and technology necessary to separate materials to avoid contamination. Mixed materials packaging can be reprocessed into other products such as floor coverings, shoe soles and car mats, incinerated to produce energy, or land filled.

5. ENVIRONMENTAL IMPACTS

Choice of packaging type is made on the basis of a series of trade-offs between many factors, particularly between the amount of packaging and likely product wastage. Consumers are increasingly willing to buy concentrated products in lightweight refill packs for dilution at home.

Does the package thickness matter?

Packaging materials differ in thickness. The thinner the packaging material, the less landfill space it will take up. Thin plastics can be very strong. Some manufacturers have addressed the packaging dilemma by switching to strong, thin materials for wrapping such items as disposable diapers and dinner napkins. However, the use of thinner plastics in food packaging can reduce safety and protection from contaminants, punctures, and tampering.

Why are packages layered?

Sometimes two or three materials are combined or laminated together to keep foods safe and fresh. However, commingled materials are difficult to recycle. For example, drink boxes have six layers of polyethylene, foil, and paper. Each layer is necessary to preserve the drink. Another food wrap that currently can't be recycled is foil-backed sandwich wrap that helps keep a sandwich warm.

Are plastic food containers recyclable?

Plastic food containers cannot be recycled to make new food containers for sanitation reasons. But plastics used in the food industry can be recycled for other uses if they can be separated easily. For example, recycled PET plastic is used for carpet backing, fiberfill for sleeping bags or ski jackets, fiberglass tubs and shower stalls, paintbrush and appliance handles, floor tiles, and more. Recycled HDPE plastic is used for such things as trashcans, flowerpots, traffic cones, and plastic "lumber" for park benches, railroad ties, boat docks, and fences. Polystyrene can be recycled, but systems for doing this are not well established.

Rigid plastic containers must be identified by code numbers to assist in sorting for recycling:

#1.= PET (polyethylene terephthalate),
#2 = HDPE (high density polyethylene),
#3 = PVC (polyvinyl chloride),
#4 = LDPE (low density polyethylene),
#5 = P/P (polypropylene),
#6 = P/S (polystyrene),
#7 = other, including multi-layer.

What about disposable cups and sandwich boxes?

Polystyrene foam has been used for fast-food packaging (sandwich "clam shells") and hot drink cups because it is lightweight, sanitary, recyclable, and insulates to keep foods hot while being cool to touch. Most polystyrene foam food-service products have never contained chlorofluorocarbons (CFCs) that have been associated with the depletion of the ozone layer.

Paper cups also are lightweight and sanitary. But they don't insulate as well as polystyrene foam cups. When the beverages are hot, paper cups get too hot to hold. They need a micro-thin plastic lining (LDPE coating) so they won't soak through, making the paper non-recyclable. Also, you've probably noticed that they cost more than polystyrene foam.

Whether plastic or paper, food packaging usually is not recycled. Although polystyrene can be Washed and reprocessed for uses other than food containers, this practice has not yet proved economically profitable for widespread adoption. Both paper and plastic can be burned for energy recovery. The heavier weight LDPE-coated paperboard gives 31 percent more heat energy compared to the lighter weight polystyrene.

What about degradable plastic packages?

Degradable plastic packages decompose over time from exposure to light, hydrolysis, biological organisms such as fungi or bacteria, or some combination of environmental factors.

Currently, degradable plastics are used in such non-food items as garbage bags and disposable diapers. A food package must be a sufficient barrier to prevent contamination from the surrounding environment during the intended shelf life of the product. Also, the degradation or decomposition process must not release toxic products that could migrate into the food, making it unsafe. Standards for measuring acceptability of degradable plastics for use in the food industry currently are in development, and must be approved by the Food and Drug Administration.

What happens in the landfill?

Few materials degrade in modern landfills. Even naturally biodegradable products may not degrade in today's landfill because of the lack of air and moisture that bacteria need to thrive. Consequently, many packaging materials would be recognizable if dug up from a landfill 20 years in the future.

Is composting the answer?

Experimental programs are underway to demonstrate that packaging materials can be safely composted and used as a soil conditioner. In Des Moines, Iowa, cereal boxes, table scraps, and orange juice cartons are mixed with sewage sludge to produce a soil conditioner that can be used with soil and fertilizer to improve plant growth.

6. SOLUTIONS

Although no packaging is the best choice of all, it is not always practical. The need for any packaging should be evaluated in the research, design and marketing stages of a product. The goal should always be to reduce unnecessary packaging. The bulk delivery of solids and liquids to food industries and bulk retail sales from bins (including hardware products, produce, housewares, toys and other items) eliminate unnecessary packaging. Where the need for packaging exists, packaging should follow the 3R's hierarchy.

The 3R's packaging hierarchy does not include all possible options. To measure full environmental and/or economic impacts packaging must be subject to an agreed upon reputable and independent environmental life cycle analysis model as well as national testing protocols.

REDUCE: The First R *Minimal Packaging*

Reduce is the most important of the 3R's. Packaging should be reduced prior to the manufacturing stage, by designing and marketing products for the first "R". This means reducing the number of layers, materials and toxins at source.

In general order of hierarchy, reduction occurs by:

I. Using less packaging and by meeting all or most of the 3R's hierarchy, including reuse and recycle
II. Minimizing the number of materials used
III. Minimizing the weight and volume of materials used
IV. Employing bulk delivery systems
V. Product concentration resulting in smaller packages

VI. Using fewer toxic chemicals in the product and its packaging
VII. Utilizing modes of shipping requiring less packaging and use of repairable pallets by manufacturers
VIII. Using multi-layered, multi-material packaging. However, this usually makes the product non-recyclable (i.e.: composites, laminates)

RE-USE: The Second R *Reusable Packaging*

Reuse is second in importance. Packaging should be designed to be reusable, refillable, returnable and durable to the greatest extent possible.

In general order of hierarchy, reuse is achieved by:

I. Reusing/refilling commercially and redistributing refilled products
II. Refilling by the consumer through dispensing systems at retail outlets
III. Reusing containers which have been standardized to assist in reuse applications
IV. Refilling via a second package (i.e.: smaller, concentrated containers or larger family-size packages)
V. Reusing in the home - INFREQUENTLY purchased, durable and distinctive containers (i.e.: teddy bear peanut butter jars that can later be used as cookie or candy jars)
VI. Reusing in the home - FREQUENTLY purchased containers (i.e.: margarine tubs)

RECYCLE: The Third R *Recycle Packaging*

Recycle is third in importance. Packaging should be designed to be recyclable and/or made with recycled content.

A package or packaging material is considered to be "recyclable" if there is a widely available and economically viable collection, processing and marketing system for the product/material. In general order of hierarchy, packaging may be recycled in the following ways:

I. **Recycling over and over back into its original packaging type** (also known as primary or "closed loop" recycling
II. **Recycling back into another recyclable, useful package/marketable product** (also known as secondary recycling)
III. **Recycling back into another non-recyclable product** (also known as "open loop" or tertiary recycling). Examples include:
IV. Durable and marketable goods such as synthetic carpet
V. "Cascaded" (delayed disposal), short-lived or single use marketable items such as seeding flowerpots
VI. Recycling into "show piece" product that is not marketable in quantity such as park benches made from disposable diapers