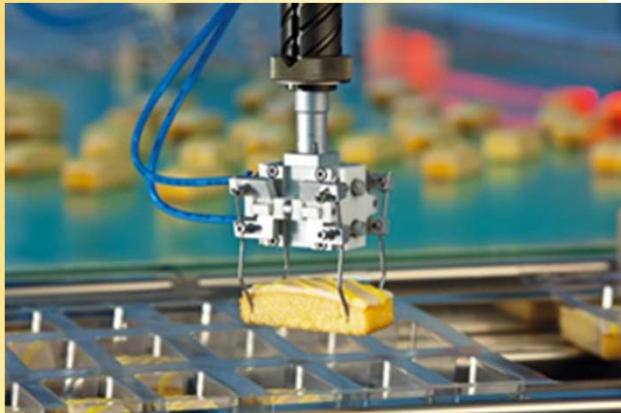


# **Plastic Packaging for Milk & Other Food Products**

**India**  
A market of  
1.3 Billion  
consumers



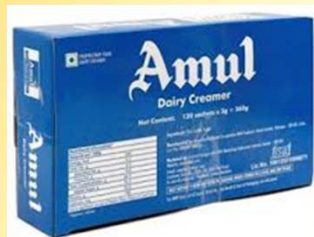
**India**  
Efficient  
packaging  
system to avoid  
losses & spoilage





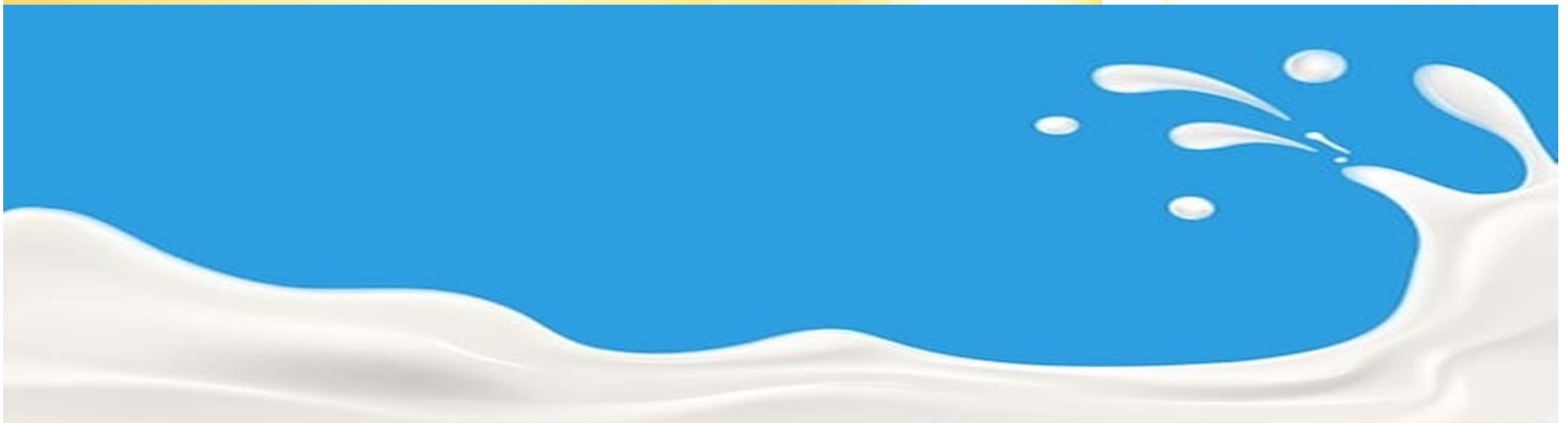
## India

Increased  
demand for  
smaller, portable  
& single use  
packages



# Indian dairy industry

- Total Dairy industry: 7.00 lakhs crores
- Pouch milk industry: 1.3 lakhs crores
- Poly film (Qty for milk): 1.5 Lakh MT
- Poly film value : 1600 Crores



# Consumer Milk Options..



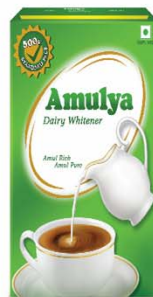
# Consumer Preference..

**In 2019...**



# Changing Consumer Preference..

**In 2025....**



**Dairy Whitener**

↑ 5%



**UHT Milk**

↑ 2%



**Condensed Milk**

↑ 1%



**Pouch Milk**

↑ 46%



**Loose Milk**

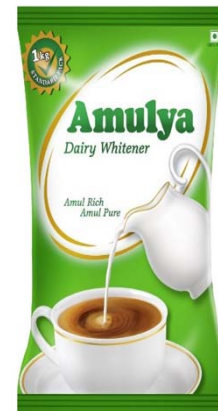
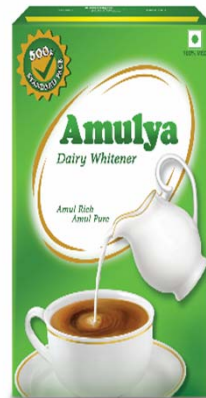
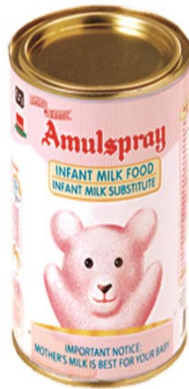
↓ 47%



**CUSTOMER**



# Packaging evolution Milk Powders



1970'  
S

Tin: 100%

1990'  
S

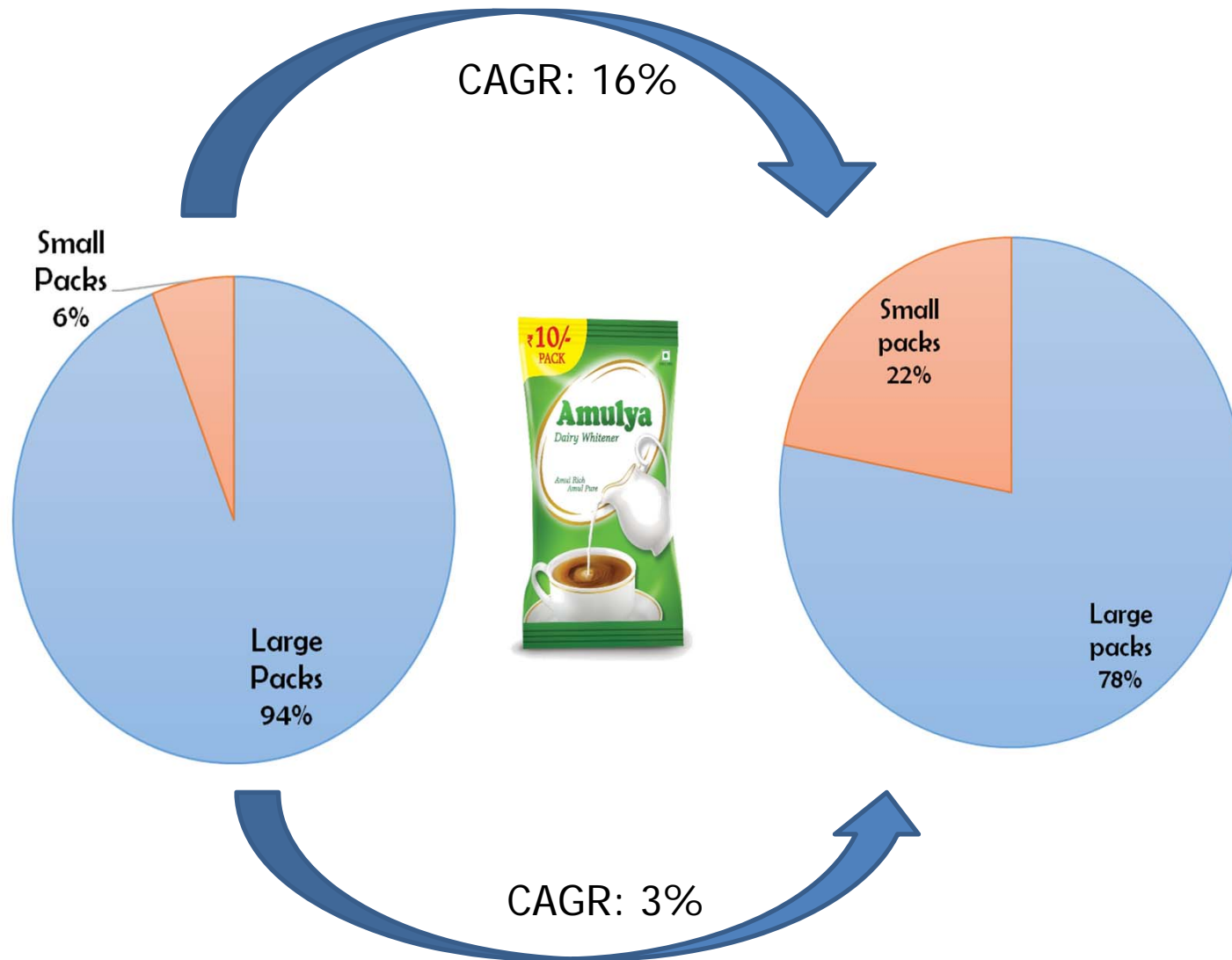
Tin: 75% | Line Carton: 25%

2000'  
S

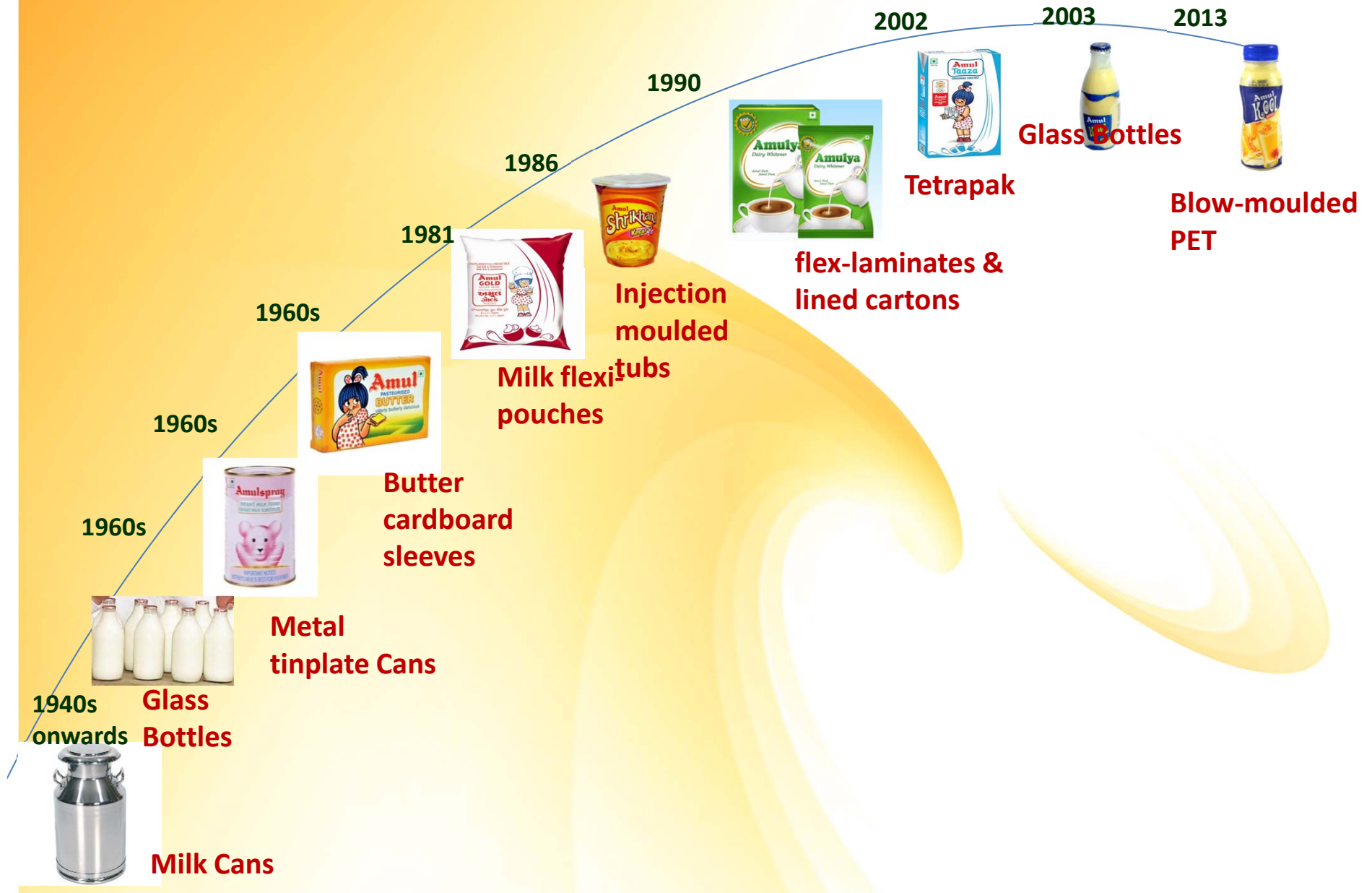
Tin: 7% | Line Carton: 16% | Flexi pack: 76%

Packaging with  
customer convenience  
Results in change in preferences

# Small Pack revolution Milk Powders



# Packaging Innovation time-line for milk products



# Packaging of Dairy & Food Products

- LDPE Film Pouch
- Laminates
- Metal Tins
- Pet Bottle
- HDPE Bottle/Jerry Cans
- Aseptic Packaging
- Glass Bottles
- Plastic Cups/Tubs

All packaging material used are **Recyclable**






# Plastic technologies in Milk Products

PLASTIC PROCESSING METHODS	PACKS	
EXTRUSION	 A white and red sachet of Amul Gold Milk. The sachet features the Amul logo, a cartoon girl in a red dress, and text in Hindi and English. It is labeled 'PASTEURISED FULL CREAM MILK'.	 A green sachet of Amulya Dairy Whitener. The sachet features the Amulya logo, a cartoon girl, and text in Hindi and English. It is labeled 'Amul Rich Amul Pure'.
INJECTION MOLDING	 A black and gold cup of Amul Crème Rich Caramel. The cup features the Amul logo, a cartoon girl, and text in Hindi and English. It is labeled 'Amul Crème Rich Caramel'.	 A white tub of Amul Butter. The tub features the Amul logo, a cartoon girl, and text in Hindi and English. It is labeled 'Amul PASTEURISED BUTTER utterly butterly delicious'.
BLOW MOLDING	 A green plastic bottle of Amul Kool. The bottle features the Amul logo, a cartoon girl, and text in Hindi and English. It is labeled 'Amul Kool'.	

# Keeping Packaging Cost Low

GHEE	COST OF PKGG.	MRP	PKGG. COST (% of MRP)
	Rs.17/Ltr.	445.00	3.8%
	Rs.15/Ltr.	445.00	3.4%
	Rs. 6/Ltr.	445.00	1.3%
	Rs. 2/Ltr.	430.00	0.5%

# Keeping Packaging Cost Low

Flavoured Milk	COST OF PKGG.	MRP	PKGG. COST (% of MRP)
	<b>Rs. 8.00/200ml</b>	<b>30</b>	<b>26.7%</b>
	<b>Rs.4/200ml</b>	<b>20</b>	<b>20.0%</b>
	<b>Rs.3/200ml</b>	<b>20</b>	<b>15.0%</b>

# Benefits of PET Milk Bottle

**Aseptic Sterilizer**



**Aseptic Sterile tank**



Revolutionized Milk Beverage Industry with Convenient, Affordable, Light-weight & Sterile product

**Air Conveyors**



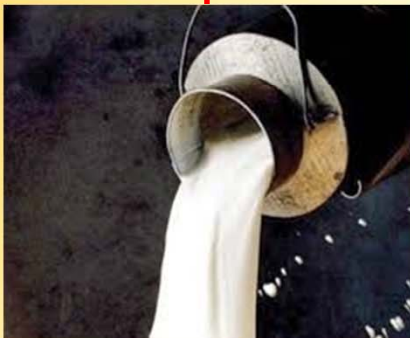
**Aseptic Filling unit**





# Packaging of Milk

- Milk is *highly perishable* and liquid in nature
- Requires a *container* at every stage of movement
- Development of containers suitable for various stages of Marketing and *distribution* due to their increased demand
- Logistics intensive due to *Daily Demand*.
- Requires *refrigerated storage*, hence bulk packs like other countries not possible in India.



# Milk Delivery Systems

# Packaging Milk : Options

- LDPE Film Pouch
- Pet/HDPE Bottle
- Aseptic Packaging
- Glass Bottles
- Automatic Vending Machine

**LDPE Film Pouch is the best option, Why?**

# Liquid Milk Packaging

For packing 6 Cr lit/day pouch milk selling in India





	Weight / Litre	Total Quantity/ Annum	Total Value/ Annum
Glass Bottle	650g	142 Lakh MT*	37000 Cr
PET Bottle	75g	16 Lakh MT	24000 Cr
HDPE Jerry Can	45g	10 Lakh MT	13000 Cr
LDPE Film Pouch	5g	1 Lakh MT	1600 Cr

\* More than total container glass industry in India

Alternate packaging material would have resulted in huge consumption of plastic (PET bottle or HDPE can for liquid milk) & equivalent generation of waste quantity



# Cost of Packaging of Milk

Liquid Milk	COST OF PKGG.	MRP	PKGG. COST (% of MRP)
	Rs.0.70/Ltr	42	1.7%
	Rs.2.75/Ltr	52	5.3%
	Rs. 5.50/Ltr	60	9.1%
	Rs. 7.50/Ltr	70	10.7%

# Economics of Pouch milk

Particulars	Price in Rs. Per liter of pouch milk	% of MRP
Consumer price	50.00	
Supply Chain margin	2.50	5.00%
Transportation of milk	1.00	2.00%
Packing cost	0.70	1.40%
Processing cost, Repair and maintenance cost	2.60	5.20%
Milk transportation from village level	0.50	1.00%
Power & Fuel	1.5	3.00%
Payment received by milk producer members	41.2	82.40%

Value chain of Fresh Milk Products is operating on very thin margin.  
Milk producer get back around 80% of consumer Rupee.



# Life Cycle of Milk Pouch





# Life Cycle of Milk Pouch





# Plastic : Boon or Bane ?

- Wonderful Innovation !  
*50% of Boeing Dreamliner is made of plastic.*
- High Strength to Weight ratio
- Less energy required to produce compared to other options
- Substantially reduce the amount of material required to pack & therefore less Waste generated
- Takes less space for storage & transportation; hence reduced transport cost & lower pollution
- Plastics are durable and reusable as well as recyclable.
- Plastic is cost effective.

# Plastic : Functionalities

1. Containment of any material/produce to store & carry easily
2. Protection : From dirt / Microbes / Oxygen / Moisture / Light / Extraneous matter
3. Consumer Convenience :
  - Can see the product.
  - Can be fabricated in various shapes (e.g odd shape) & sizes. Ideal for very large or very small pack.
  - Repeated opening with zippers
  - Evidence of tampering
  - Information on pack – easy to print
4. Versatility
  - Can be Used alone or in conjunction with other Polymer / Aluminium / Paper, etc

# Single Use Plastic ?

While the packaging material is

*Single Use;*

Plastic used for packing food products can be recycled & used again for food or non-food applications.

Single Use :

*"Can't be collected nor can be re-cycled"*

# Impact on Packaging Industry?

*Brand Owners, Retailers, Consumers*

- ✓ Promote large pack-sizes
- ✓ Thin-walling of packaging
- ✓ Alternatives of plastics for packaging
- ✓ Contain packaging material costs & thereby MRP

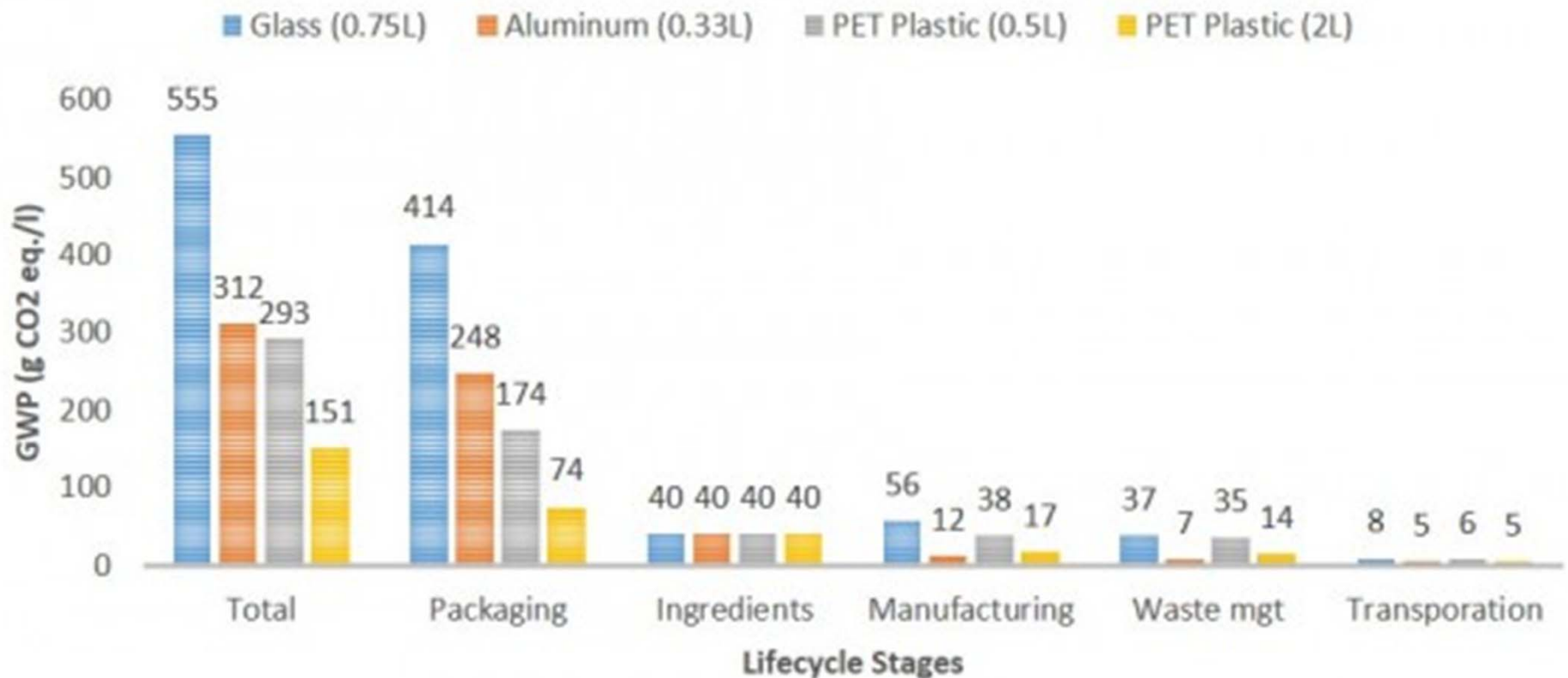
# Alternatives to Plastic?

- Paper : Weak in strength, Poor Functionality
- Glass : Lacks flexibility, Fragile, Heavy
- Metal : Costly, Heavy, Less flexible
- Bio-degradable plastic ?
  - Very Costly
  - Limited production
  - Poor functionality.



# Carbon Footprint Comparison

## GLOBAL WARMING POTENTIAL OF BEVERAGE BOTTLES



Courtesy of International Journal of Lifecycle Assessment, Jan 2013 Issue

# Alternatives : Impact

- Carbon foot-print of other options – from production to disposal- is even higher.
- Bio-degradable plastic ?
  - Made from Corn – Food for poor people OR Packaging ?

# Role of Stake Holders



- **Consumer**
- **Producer**
- **Government**

**What does  
the future  
hold for  
us?**



# Global Trend

- Consumer Needs & Expectations  
*Smaller & portable packages*
- Flexibility  
*Quick Change-overs*
- Innovations & efficiencies  
*Automation & Smart packaging to lower costs*
- Sustainability  
*Use of Biopolymers*



# Emerging Trends in Food Packaging

1. Single (Monomer) plastic for laminates for easy recyclability
2. Development on for Bio-degradable or Compostable plastic film for Milk Packaging
3. Option of Non-plastic film for packing of milk

## Strategies for future : Long-term

- Developing more functional packaging within given constraints
- Reduce Over-packaging
- Derive Sustainable solutions for third-world countries
- 100% recycling of single-use packaging.
- Alternate use of plastic waste: Road building, Cement Kiln fuel, etc.
- Bacteria to degrade plastics

# Strategies for future : Short-term

## Plastics Disposal

### 1. Land-filling

- Plastic is inert. No environmental problem.
- No significant methane production
- Low in volume & compressible

### 2. Combustion

- Has high energy values
- Burns cleanly & completely. Less residual Ash.
- Efficient conversion of trash to energy

### 3. Recycling

- Once recycled, can be used to make variety of products

## Strategies for future : Short-term

- Awareness of consumer
- Discipline at user level
- Promote Cleaning & Segregation of waste
- Promote & incentivize recycling
- Decentralization of collection & processing of waste : Co-operative Model ?
- Comprehensive regulation & mechanisms

# Time-line for India for proposed change ?

## *Points to Ponder before we conclude*

- Developed countries using plastics over 100 years. India started using it 50 years ago.
- An Indian consumes 11kg plastic every year and an average American 109 kg



# Khalaastic?



**Amul**  
**Bag it!**



[sodhi@amul.coop](mailto:sodhi@amul.coop)