



*Workable solutions to help you make the difference*

# Indian Plastics Industry ~ Vision 2012

**Leverage Plastic**  
*A report by CRISIL*



*Indian Centre for Plastics in the Environment*



**PLASTINDIA FOUNDATION®**

Sponsored by:

***Indian Centre for Plastics in the Environment  
(ICPE)***

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## Section 1

# Introduction

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**Plastic** has derived demand. It is indispensable for every aspect of contemporary life.

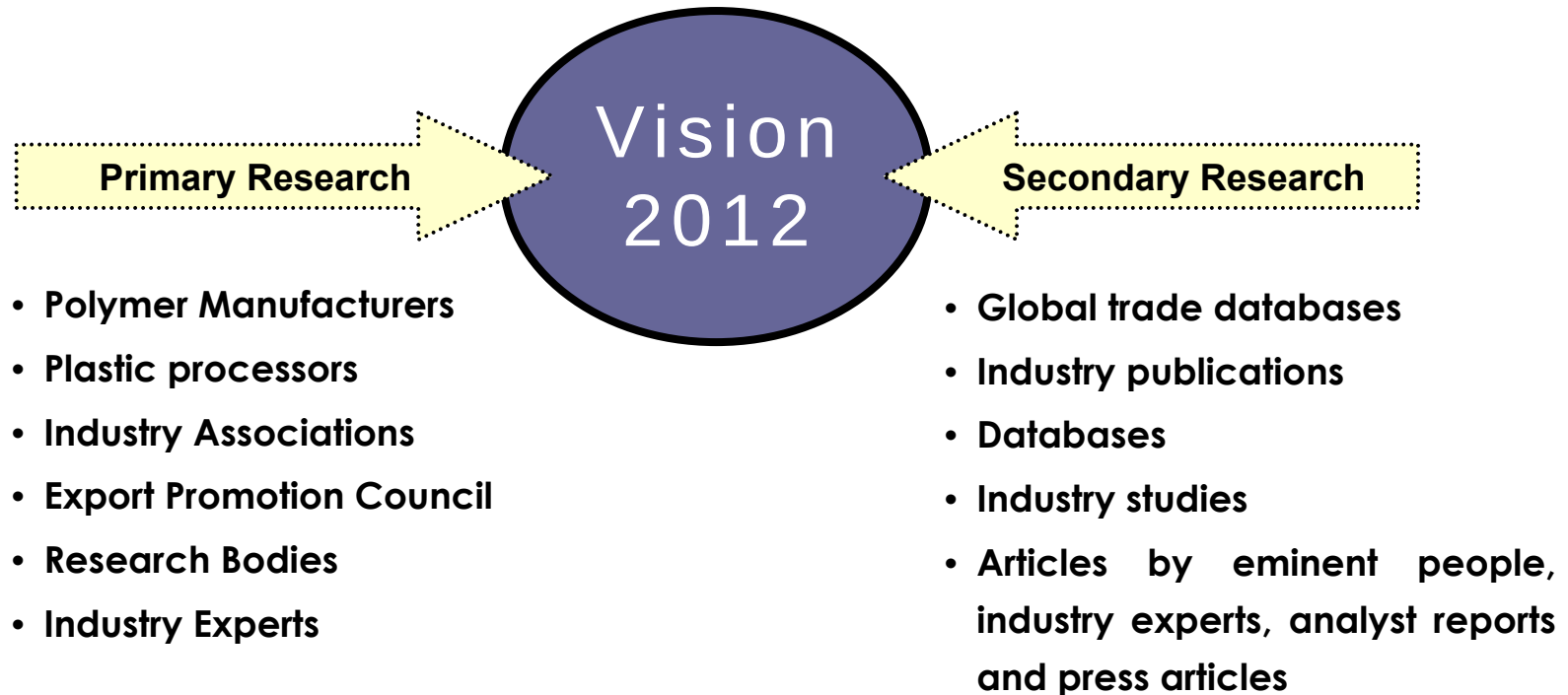
India has not capitalised on **Plastic**. Our per capita consumption is amongst the lowest in the world. The Industry faces few key impediments that have restrained its growth.

What is required is an active and concerted effort by all stakeholders of the industry to bring it on track and to benefit from the wonder material called **Plastic !**

*It is with this backdrop that the **PlastIndia Foundation** invited **CRISIL Infrastructure Advisory** to:*

- *Assess the competitiveness of Indian Plastics industry,*
- *Identify opportunities for Plastics in India by way of a vision for the year 2012, and*
- *Suggest a roadmap for various stakeholders to achieve the vision*

# CRISIL has adopted an intensive approach involving multiple stakeholders...

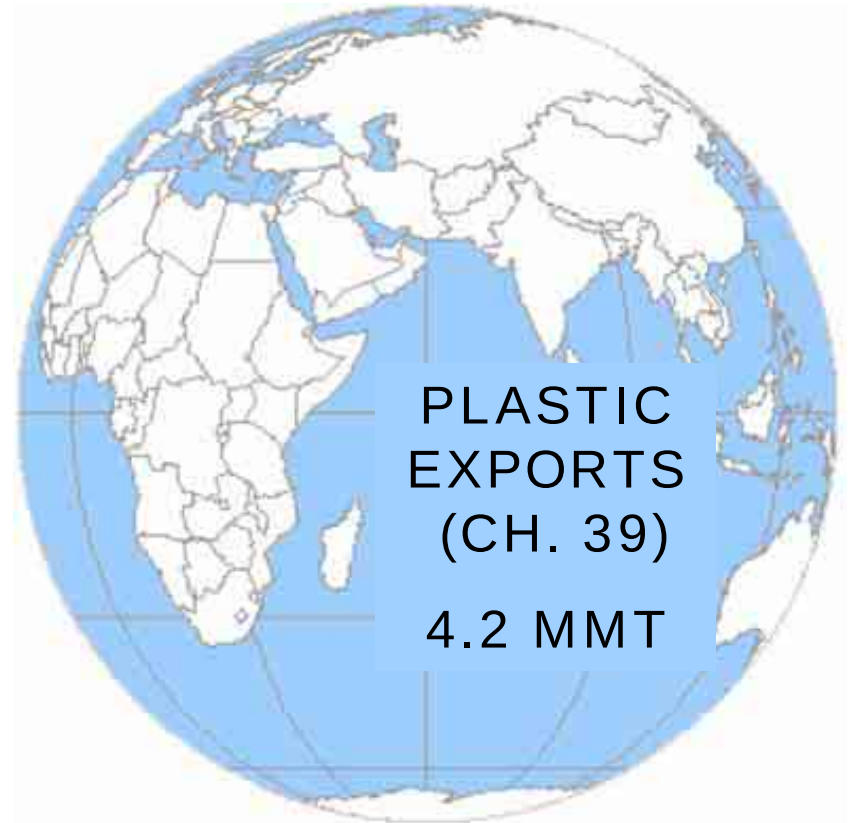
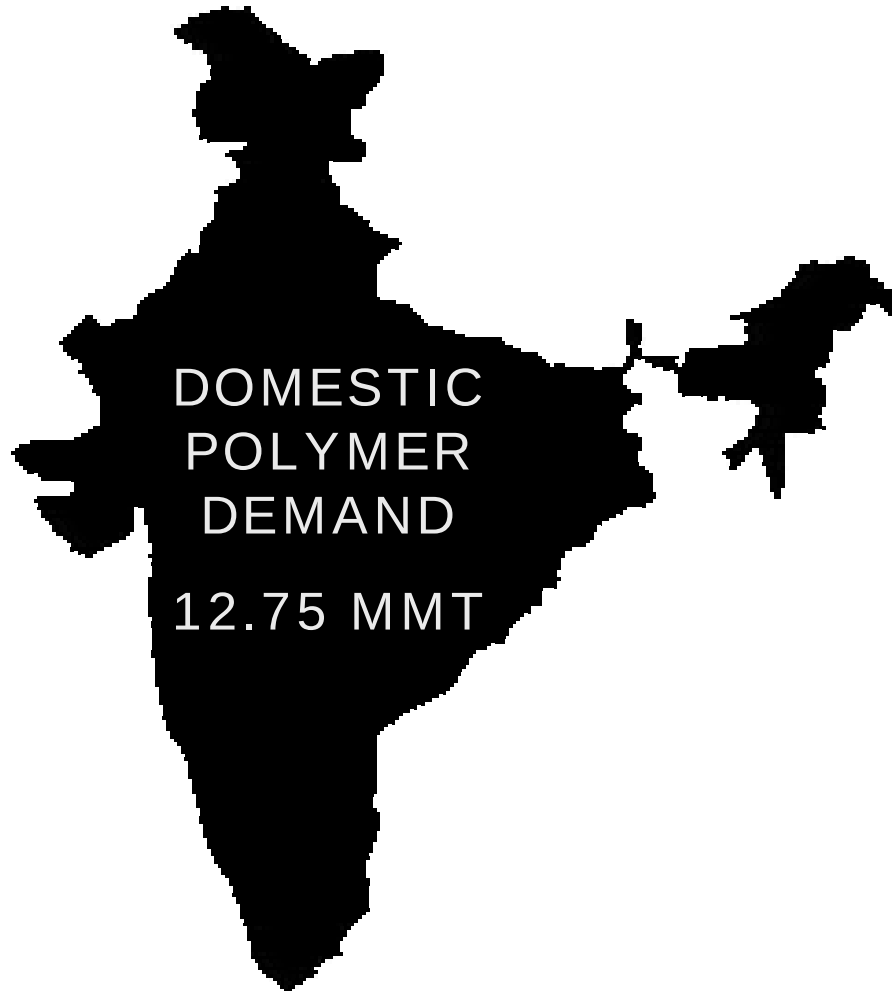


***Our report thus captures aspirations of the Indian Plastics Industry***

## Section 2

# Plastics Vision 2012 - The Opportunity & Benefits

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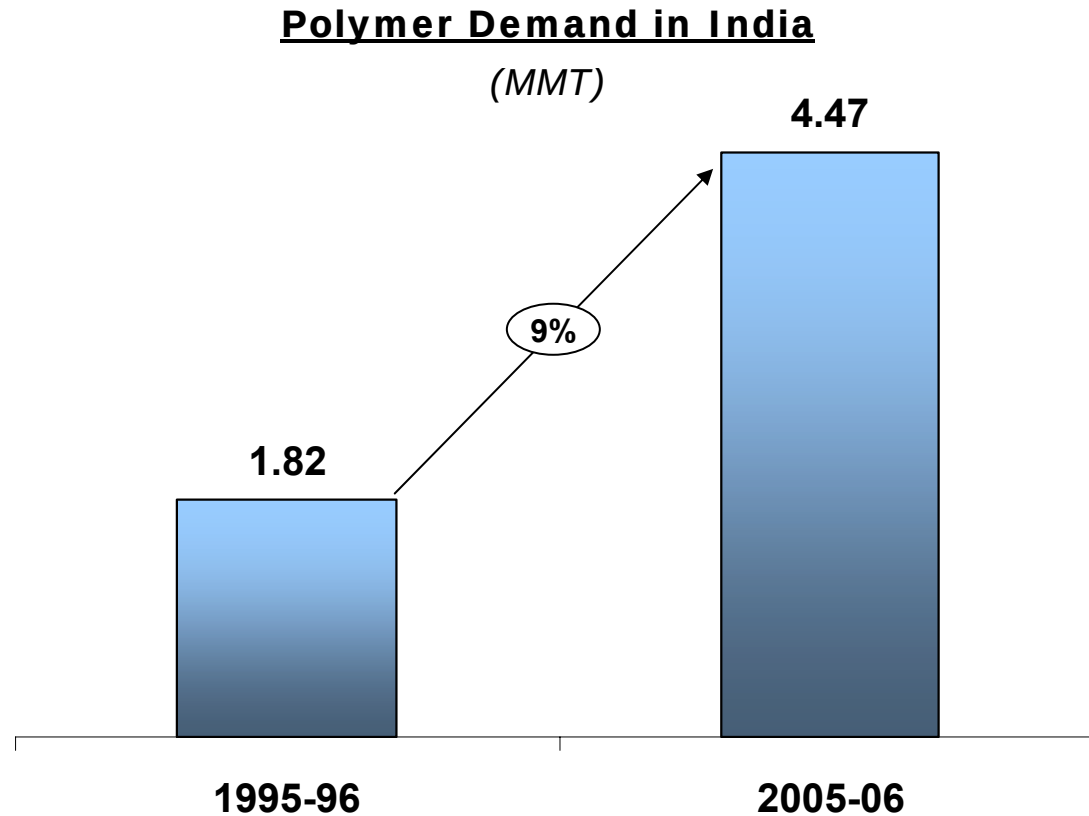




# Domestic Demand by 2012...



# Domestic demand growing at 9% has reached 4.47 MMT in 2005



Source: CRISIL Research, CRISIL Analysis

***With GDP in the same period growing at 6.3%, the Plastics industry has grown 1.5 times GDP***

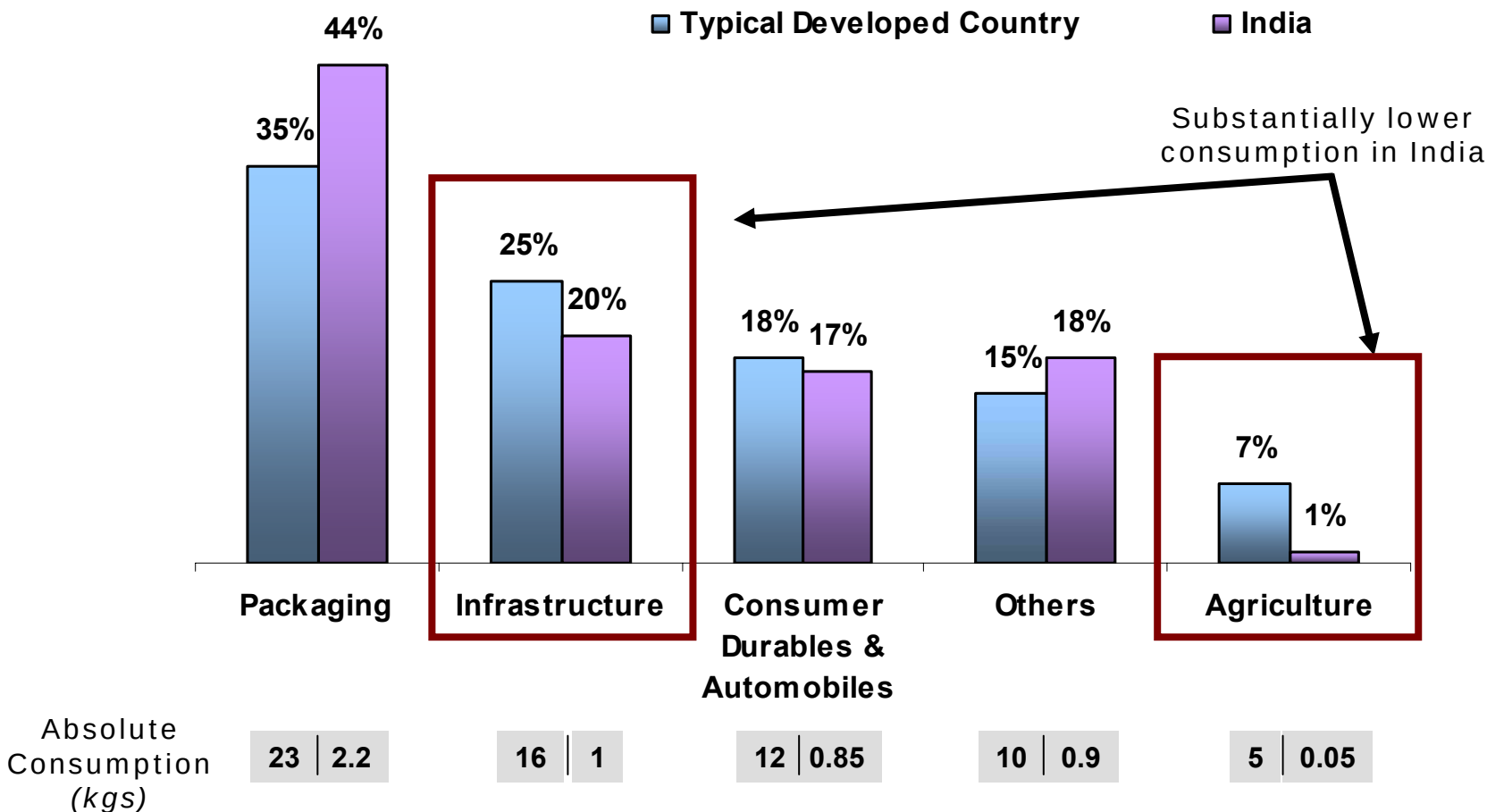
# India's per capita consumption is however just one-fifth of the world average

## Per Capita Polymer Consumption



# Plastic underutilized in critical sectors in India

## Polymer Demand by Application



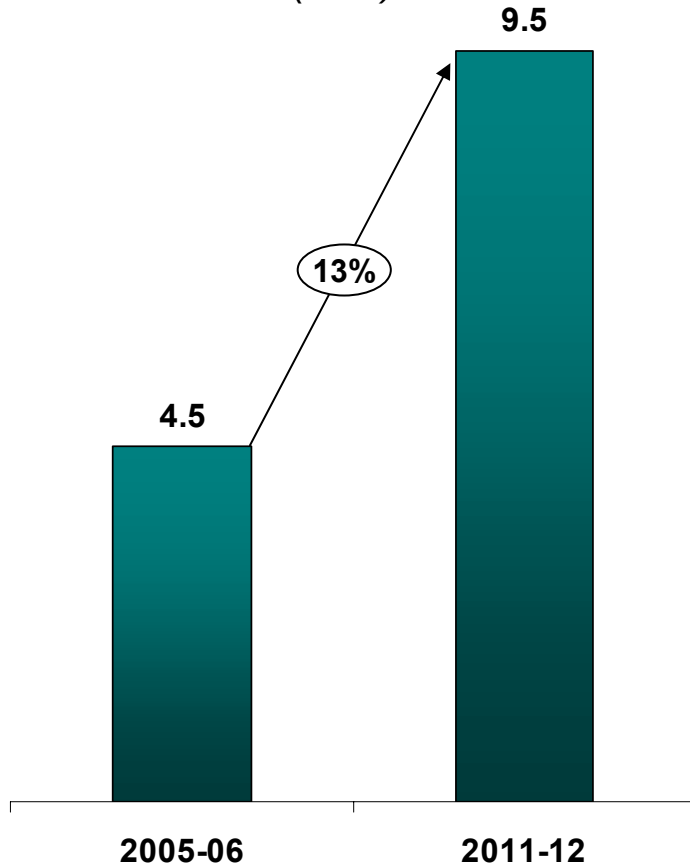
Source: CRISIL Research., Waste Online

***India holds immense potential for use of plastic in Agriculture and Infrastructure***

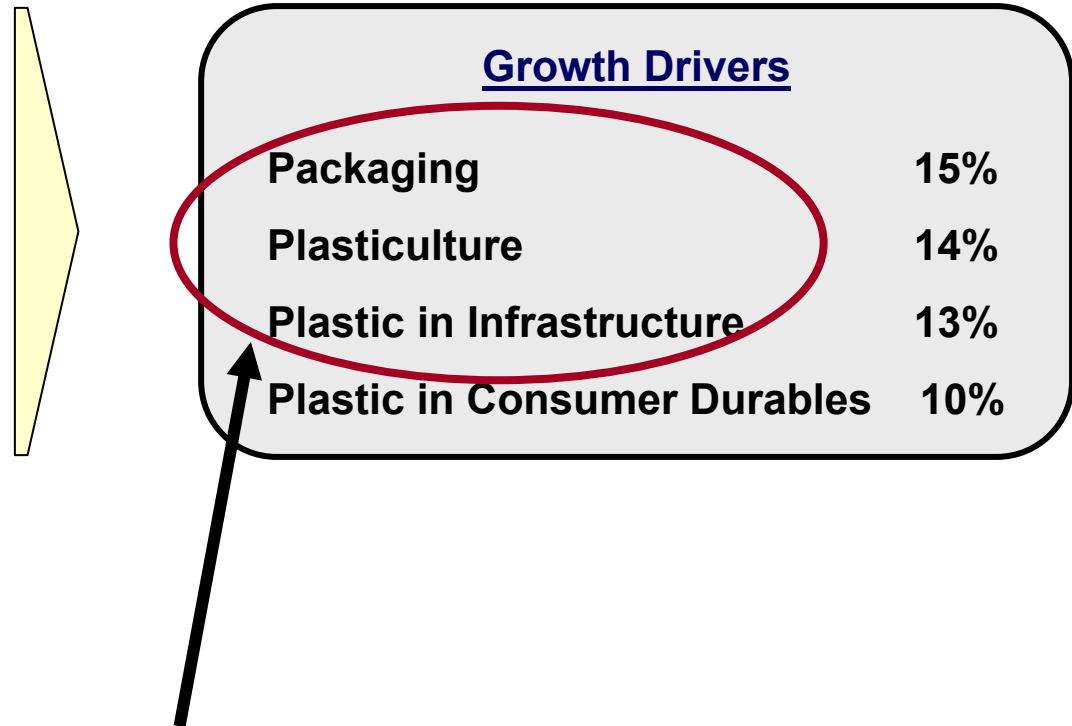
# With GDP to grow at 9%\*, ceteris paribus domestic demand expected to reach 9.5 MMT by 2012

Polymer Demand in India  
(MMT)

Status Quo



Source: CRISIL Research, CRISIL Analysis

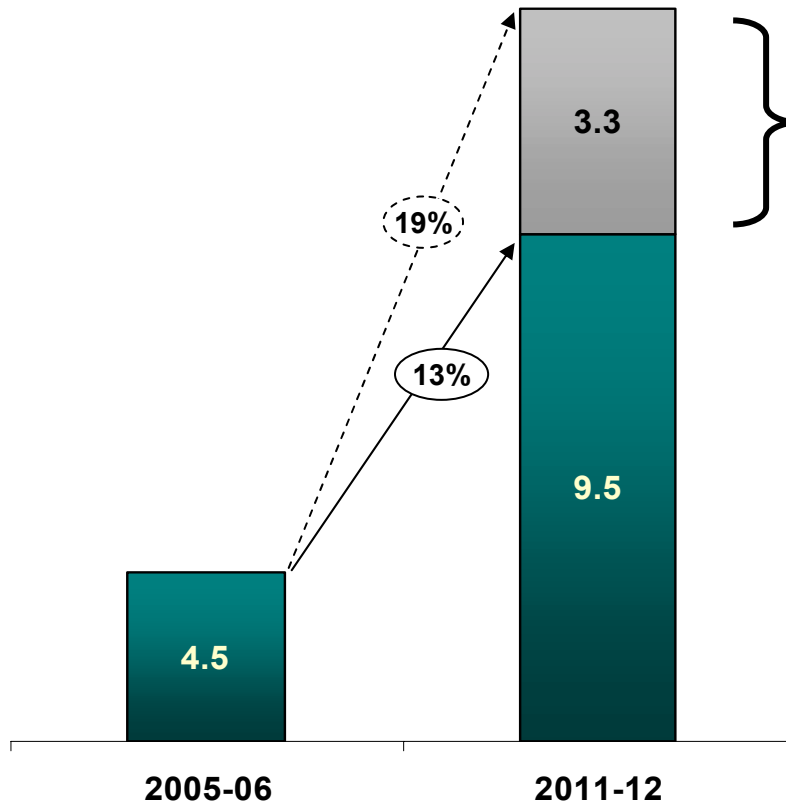


***Policy enablers in these sectors  
can drive plastic demand further...***

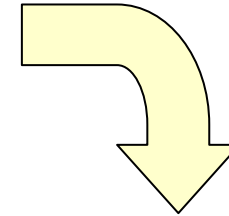
# However, Vision 2012 envisages boosting demand to 12.75 MT

## Polymer Demand in India (MMT)

Vision 2012



*This excess demand will be driven by :*



### Growth Drivers

|                            |                |     |
|----------------------------|----------------|-----|
| Packaging                  | <del>15%</del> | 22% |
| Plasticulture              | <del>14%</del> | 59% |
| Plastics in Infrastructure | <del>13%</del> | 19% |

Source: CRISIL Research, CRISIL Analysis

***Why should Government of India provide policy enablers to promote these applications ?***

# Plasticulture, Infrastructure and Packaging provide significant benefits...



## Plasticulture

### *Key Uses*

- Irrigation
- Mulch Films
- Green houses



## Packaging

### *Key Uses*

- Processed Food
- Agricultural Produce



## Infrastructure

### *Key Uses*

- Pipes
- Power & Telecom cables
- Geo-synthetics

# Plasticulture & Plastic Packaging



## Plasticulture

### *Key Uses*

- Irrigation
- Mulch Films
- Green houses



## Packaging

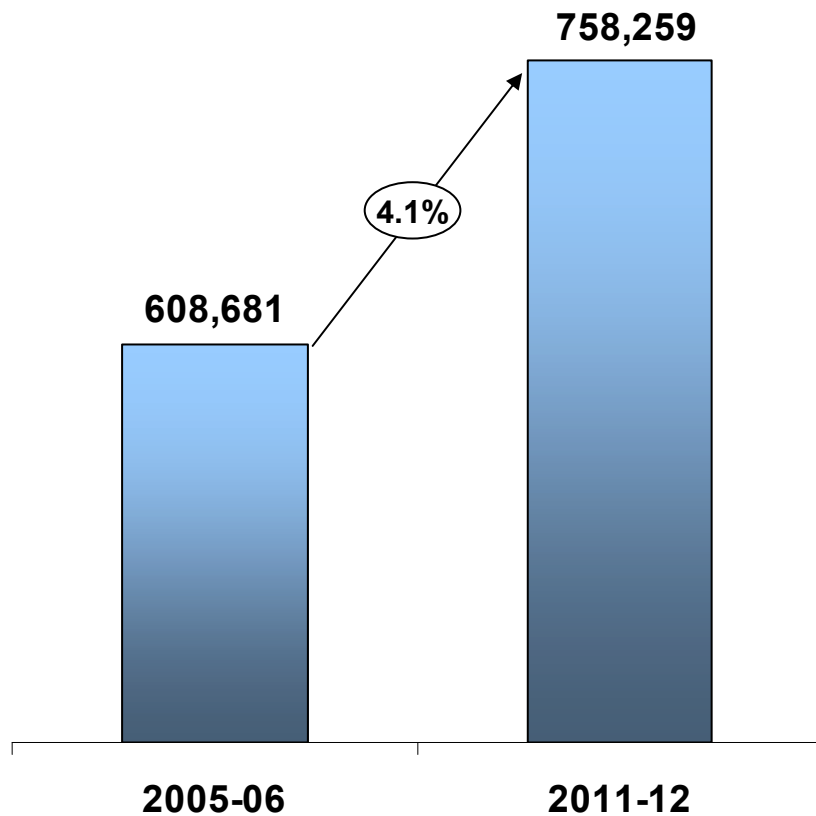
### *Key Uses*

- Processed Food
- Agricultural Produce



# India has an ambitious growth target of 4.1% in agriculture

## Agriculture GDP (Rs. crore)



**4.1% growth implies a  
Rs. 1,50,000 crore  
increase in Agriculture GDP**

*Where will this  
growth come  
from ?*

# Driving agriculture growth requires concurrent demand and supply side interventions...

STRENGTHEN FOOD  
PROCESSING SECTOR



Demand  
Interventions

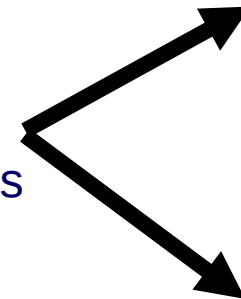


Grow Food Processing  
Industry

DRIVE AGRICULTURAL  
GROWTH



Supply  
Interventions

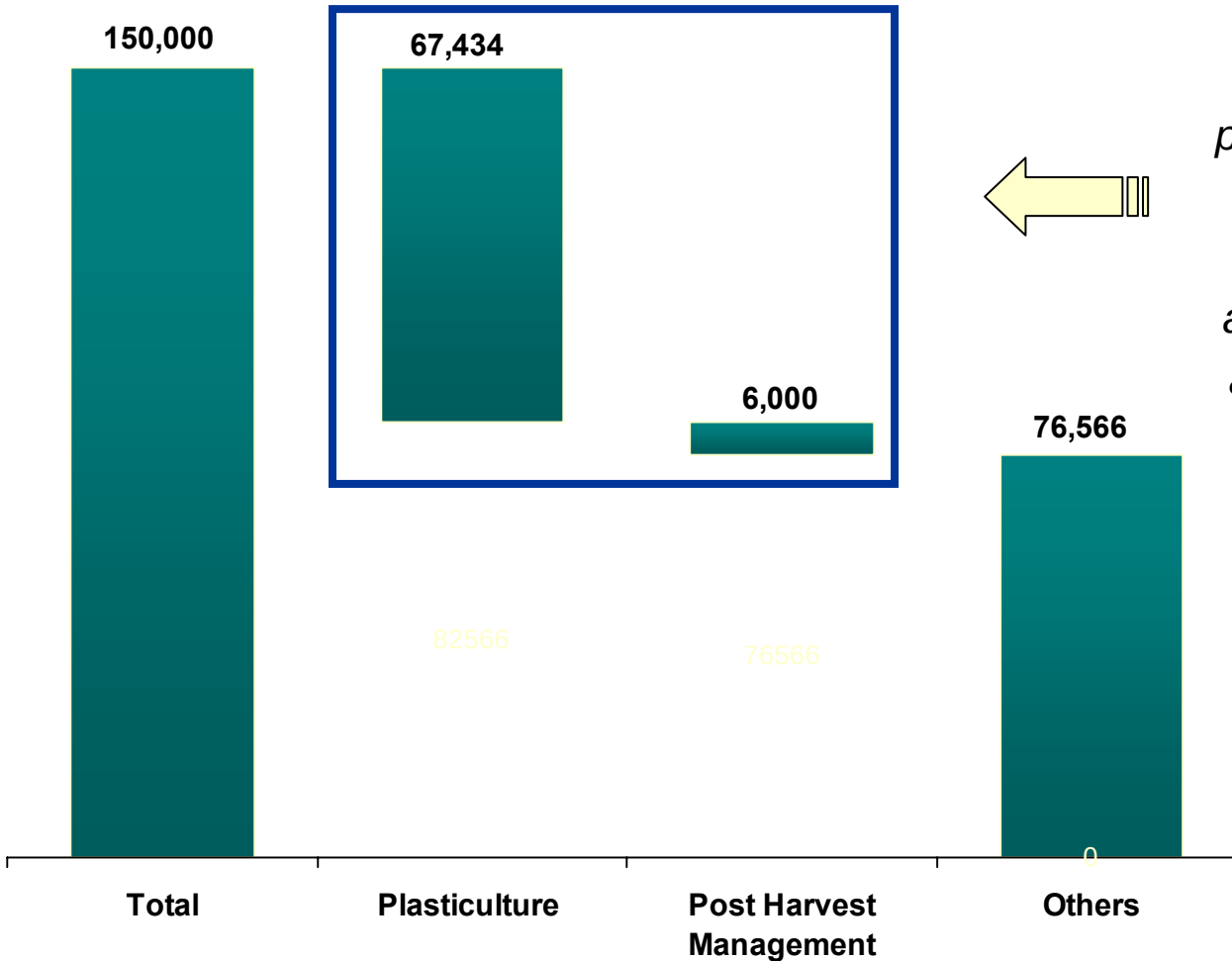


Improve Agricultural  
Productivity

Reduce Post Harvest  
Losses

# Rapid adoption of Plastic applications alone can provide 50% of the intended targets in Agriculture

## Agriculture – GDP Growth Requirement (Rs. crore)



*Greater utilization of plastics can drive growth of the food processing industry, improve agricultural productivity, and reduce post harvest losses*

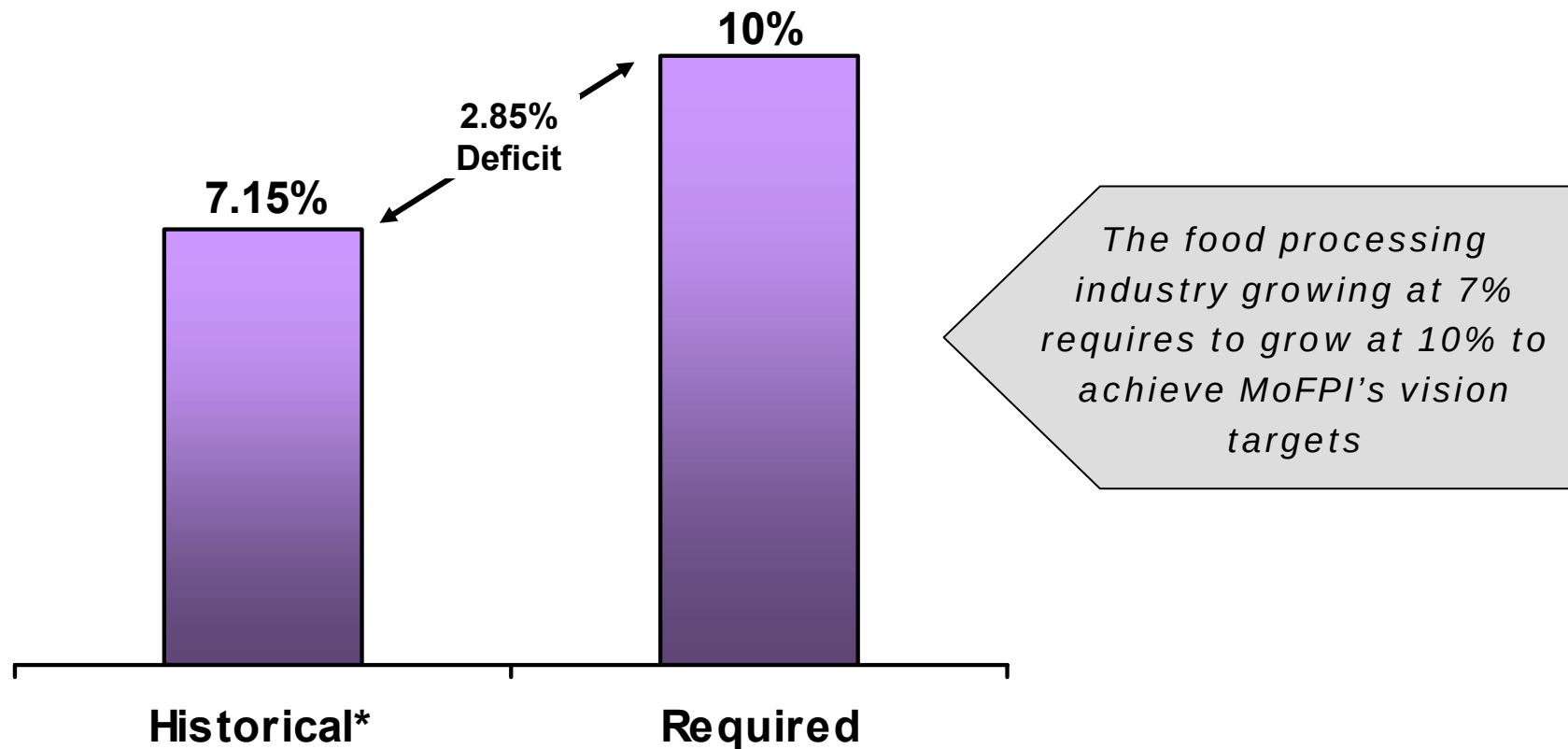
## **Demand Side Interventions**

***“Since the food processing industry creates jobs, demand for agri raw materials, leads to diversification and commercialisation of agriculture, enhancing the incomes of farmers and creating surpluses for export of agro foods. The broad-based development of the food processing industry will improve both the social and physical infrastructure of rural India”***

***– Hindu Business Line dated 2<sup>nd</sup> February 2004***

# Food processing industry has a growth deficit of ~3%

## Processed Food Industry (Growth Rate)



\* Note: Historical data is for the period 1999-2004

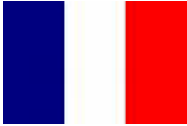
Source: Latest Ministry of Food Processing Annual Report 2005-06

# India spends a significant proportion of its income on food

*Lower per capita income and higher share of food in consumption basket, indicates higher price sensitivity for India*

## **Share of Food in Total Income**

*(% of Per capita income)*

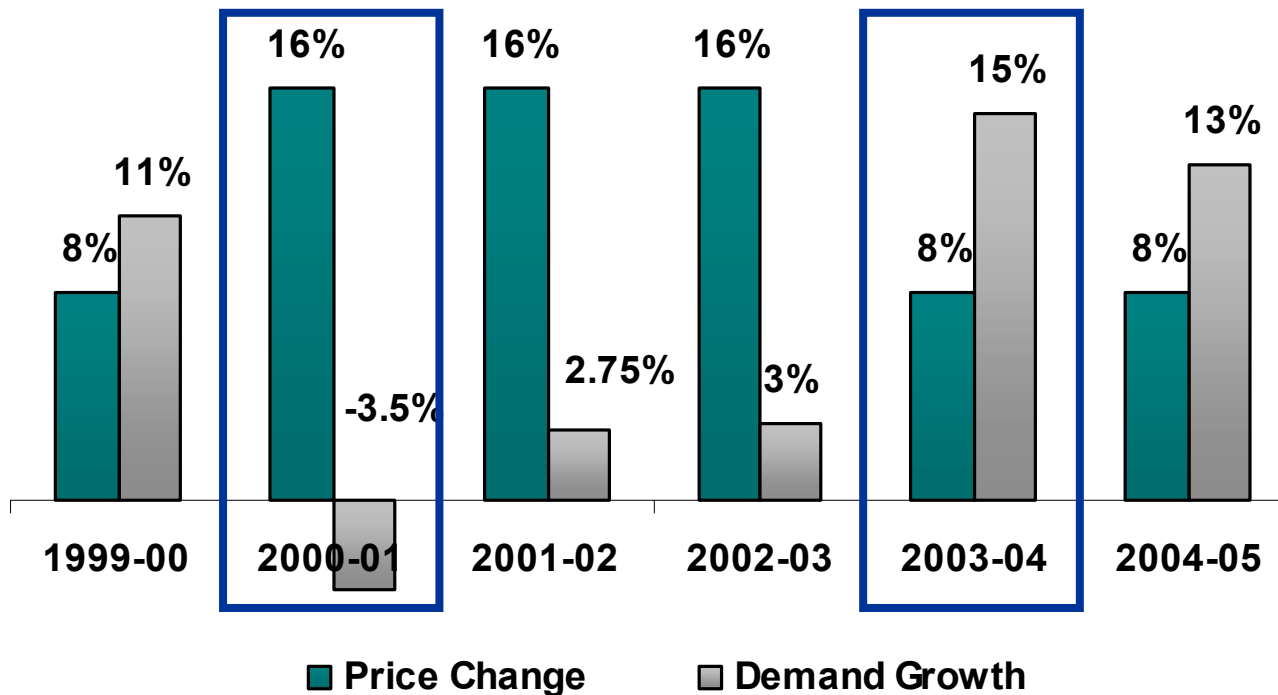
|                                                                                     |          |      |
|-------------------------------------------------------------------------------------|----------|------|
|    | USA      | 9.7% |
|    | France   | 22%  |
|   | Thailand | 23%  |
|  | India    | 53%  |

Source: Ministry of Food Processing Industries Vision, World Bank

# Processed foods are price elastic...

## Impact of Price Changes on Biscuit Growth Rates

Illustrative



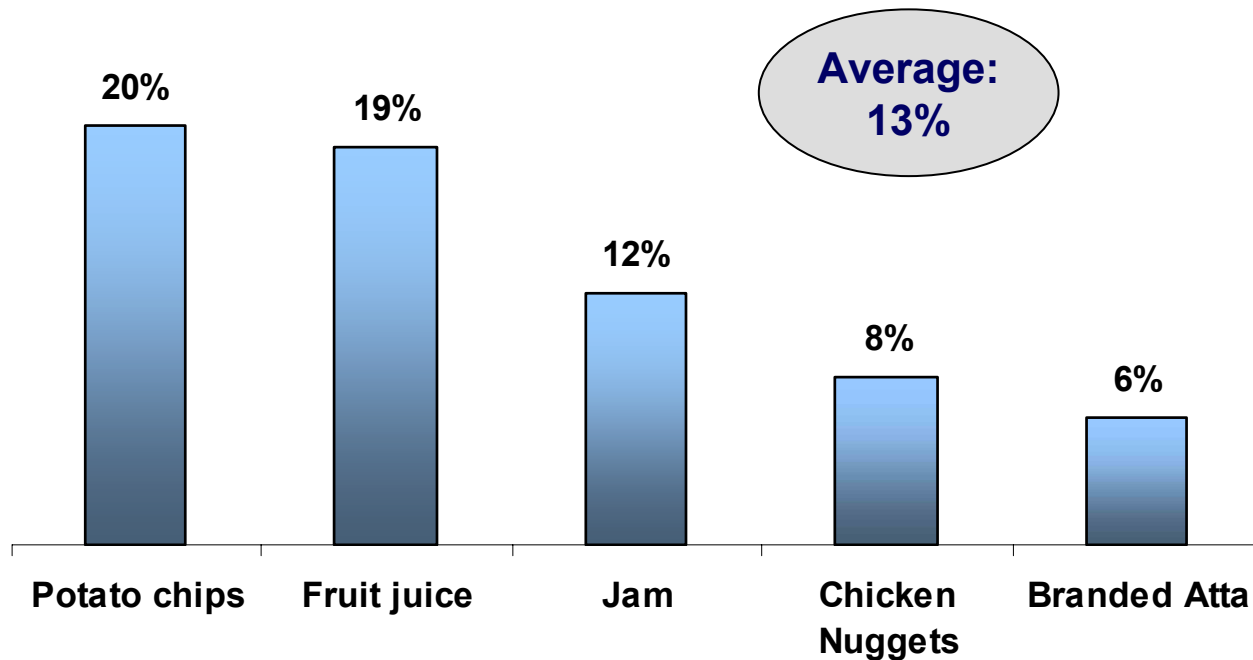
*A 1% fall in price\*  
led to a 2% increase  
in demand for  
biscuits and vice-  
versa*

*Note: The change in price was on account of a change in excise duty from 8% to 16% and back to 8%*

*Source: Federation of Biscuit Manufacturers Association of India, FICCI*

# Packaging forms 13% of the retail price of processed foods...

## Packaging as % of Retail Price

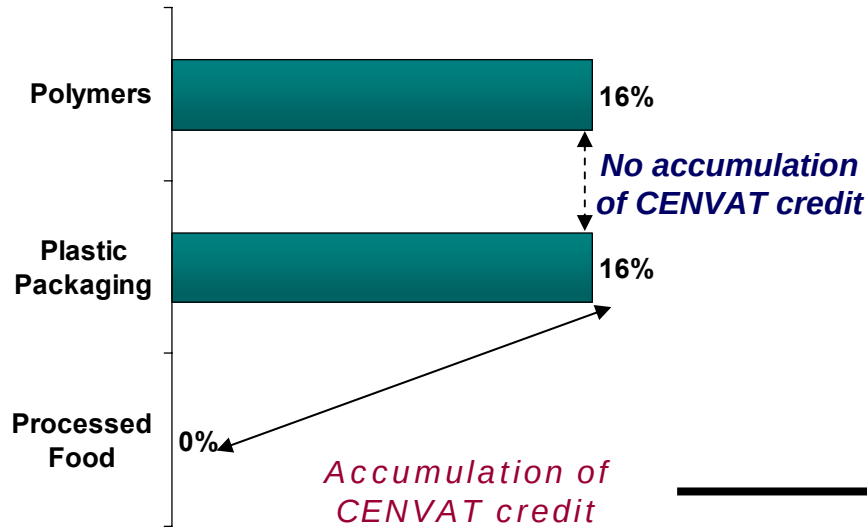


Source: MOFPI's Vision

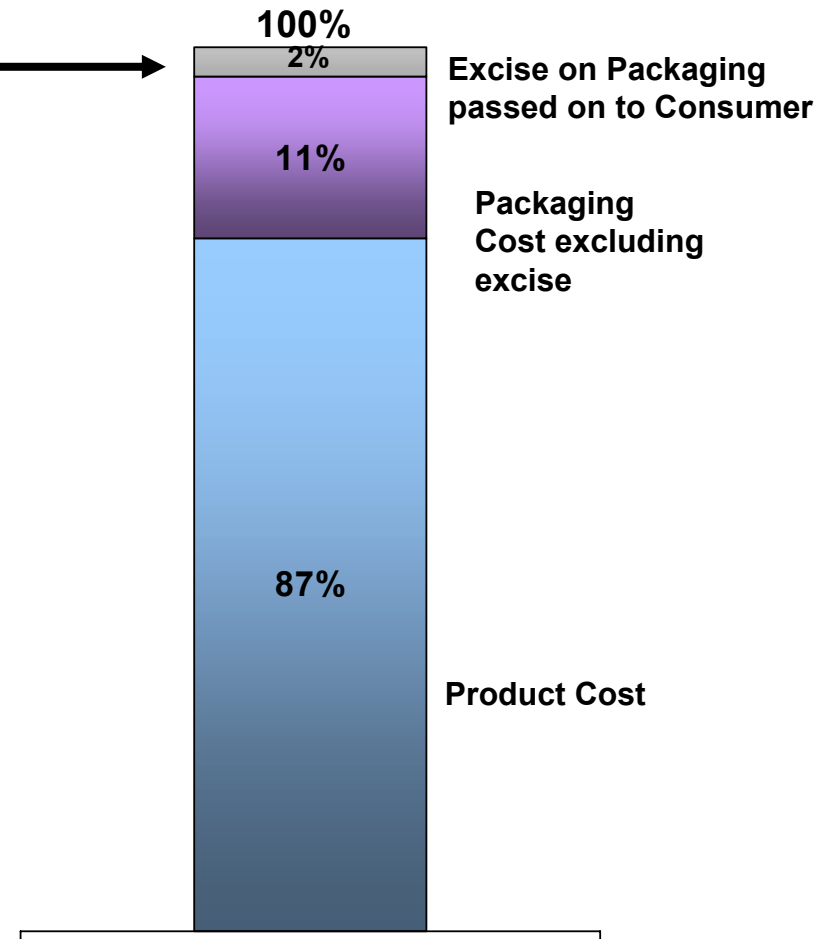


# Accumulation of CENVAT credit in the processed food value chain is an unnecessary burden on consumers

*Packaging material like plastic is subject to 16% excise but processed foods are generally excise exempt products...*



## Cost Break-up of a Typical Processed Food Product



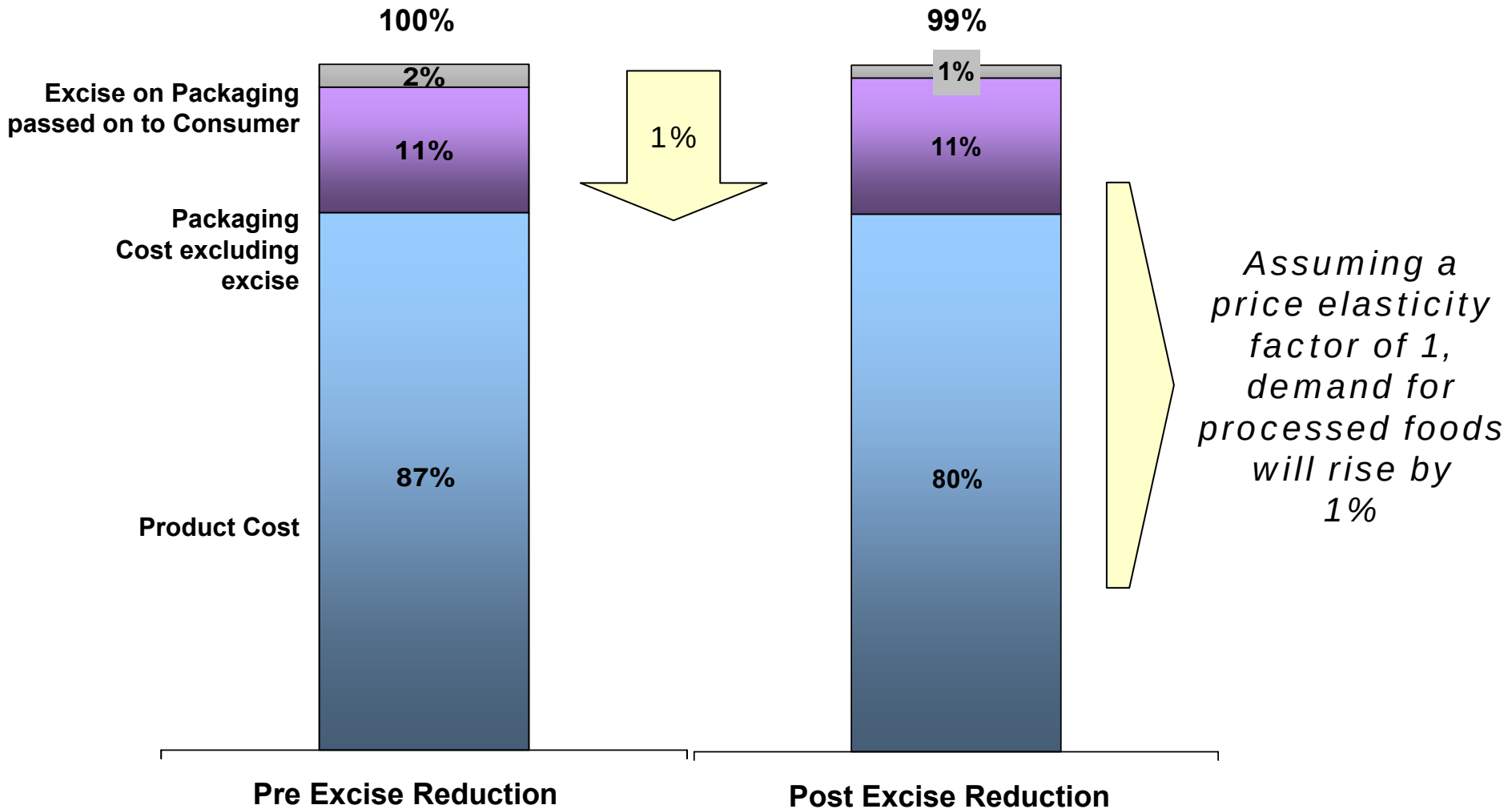
***“In order to promote the consumption of processed foods, there should be zero excise duty on packaging material”***

***- Ministry of Food Processing Industries' Vision Statement***

Source: CRISIL Analysis, MOFPI's Vision

# A 50% cut in duty rates will reduce packaging costs and boost processed food demand

## Cost Impact of a Excise Reduction



# Excise reduction will contribute Rs. 1,000 crores to India's GDP

## Estimate of Impact of Packaging on Agriculture GDP

(Rs. crore)

| PARTICULARS                                  | 2005-06            | 2011-12            |
|----------------------------------------------|--------------------|--------------------|
| <b>Processed Food Sales</b>                  | <b>546,483</b>     | <b>967,293</b>     |
| Less: Margin @ 60%                           | 327,890            | 580,376            |
| <b>Ex-Factory Cost</b>                       | <b>218,593</b>     | <b>386,917</b>     |
| Value Addition                               | 22%                | 30%                |
| Less: Processing Value addition              | 48,401             | 116,253            |
| <b>Raw Material Cost / Agriculture Sales</b> | <b>170,192 (A)</b> | <b>270,664 (B)</b> |
| Incremental Sales Growth (B-A)               | 100,472            |                    |
| <b>Packaging Impact @ 1%</b>                 | <b>1,005</b>       |                    |

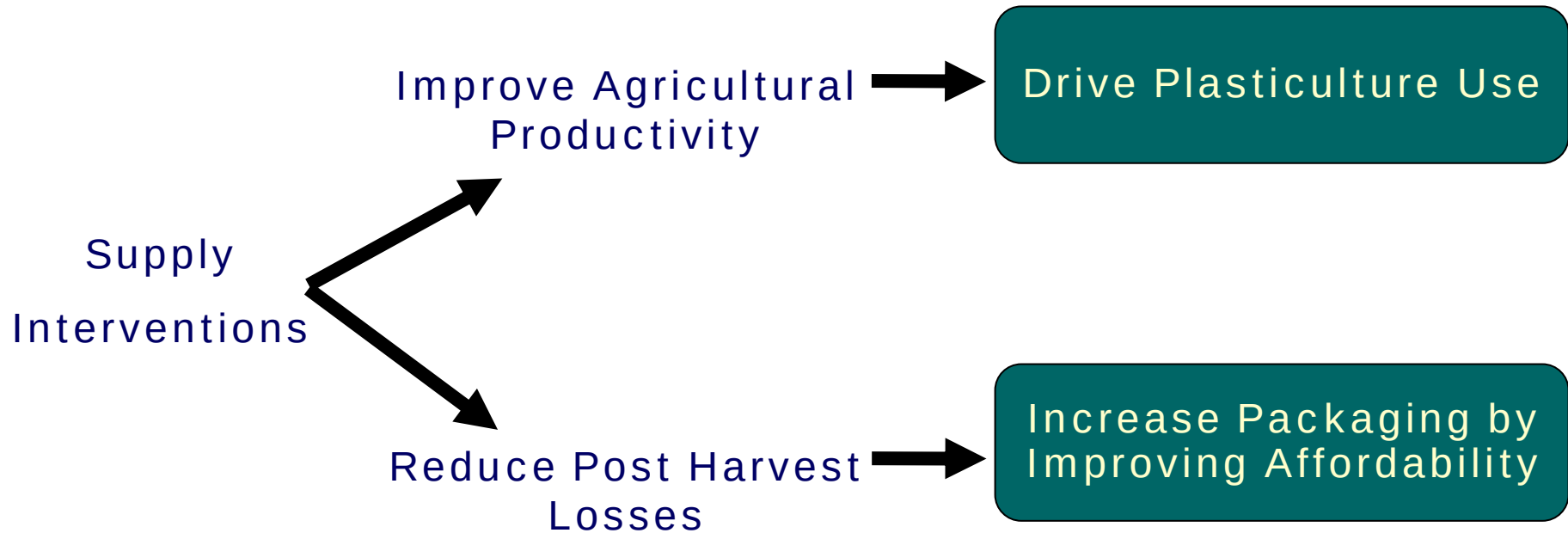
Source: MOFPI's Vision, CRISIL Analysis

Note: Refer to Annexure for an explanation on methodology

## **Supply Side Interventions**

***“Growth in agriculture has been less than 2 percent since middle of 1990s...agriculture as whole is in crisis”***

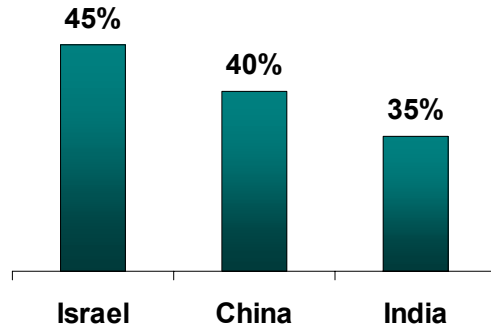
***– Prime Minister Dr. Manmohan Singh***



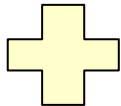
# Agricultural growth presently faces several obstacles

## Area Under Irrigation

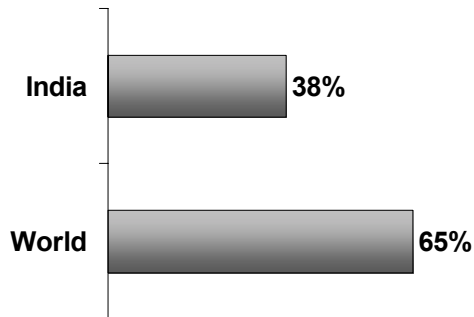
(As A % Cropland)



Source: Earth trends



## Water Use Efficiency



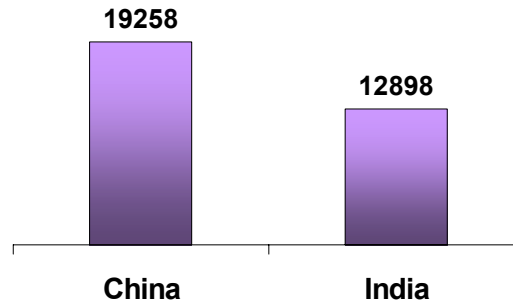
Source: Task Force on Drip Irrigation: Some Issues for Deliberation – A. Narayanamoorthy

Note: Water Use Efficiency is measured in terms of water consumed to produce one unit (kg or quintal) of crop output

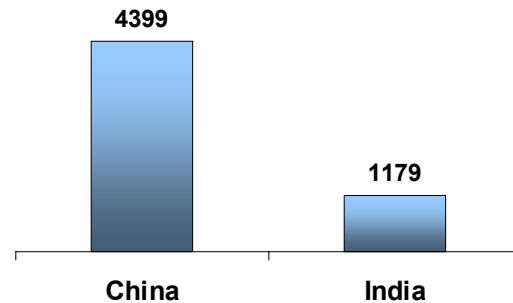
## Productivity

(kg./hectare)

### Vegetables



### Coarse Grain



Source: Ministry of Food Processing Industries Vision

***Low productivity and poor water use efficiency are some of the challenges that Indian agriculture faces***

# Plasticulture can overcome these obstacles



Irrigation



Green Houses



Mulching



Low Tunnels



Canal Lining

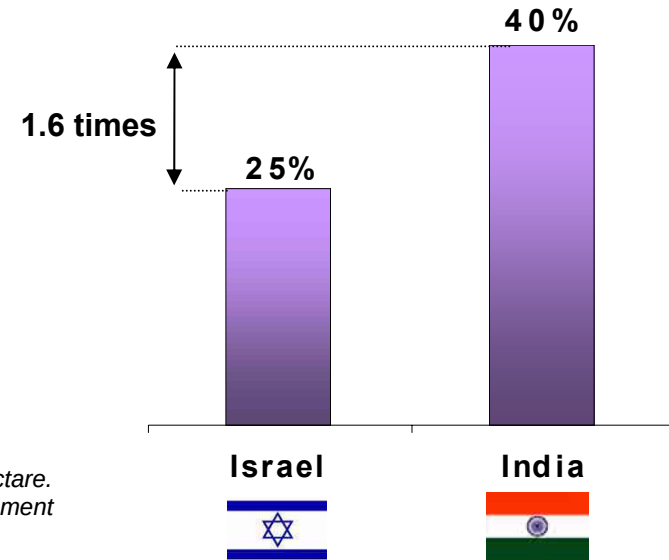


- ⇒ Yield improvement
- ⇒ Water savings
- ⇒ Prevention of weeds growth
- ⇒ Soil conservation
- ⇒ Protection against adverse climatic conditions
- ⇒ Fertiliser savings

# High cost is restricting use of plasticulture applications

***“The initial cost of establishing a Micro Irrigation System is high, hence generally out of reach of resource poor farmers”***  
– Taskforce on Micro Irrigation

## Proportion of Drip Irrigation System Cost to Farmer's Income



Source: IndiaStat, Centre for Agricultural Economic Research – Israel, CRISIL Analysis

Note: A Drip Irrigation system has been assumed to cost approximately Rs. 40,000 per hectare.  
The figure of 40% has been estimated post subsidy by the Central and State Government

## Mulch Films



***“Availability of plastic films at reasonable cost is a limiting factor”***  
– Report of the Working Group on Horticultural Development, Planning Commission, Govt. of India

## Greenhouses

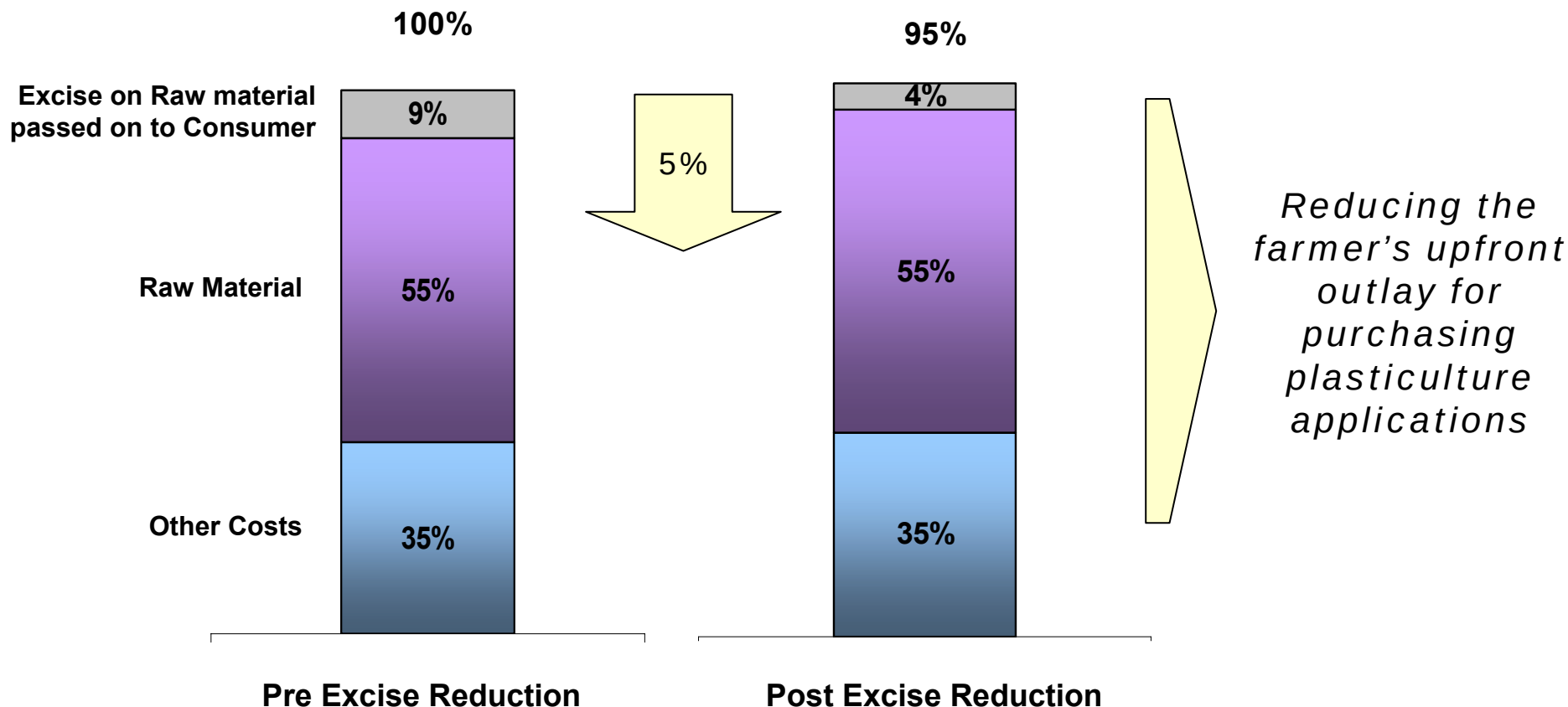


***“ The constraint in adoption of green houses is high initial investments”***  
– Report of the Working Group on Horticultural Development, Planning Commission, Govt. of India



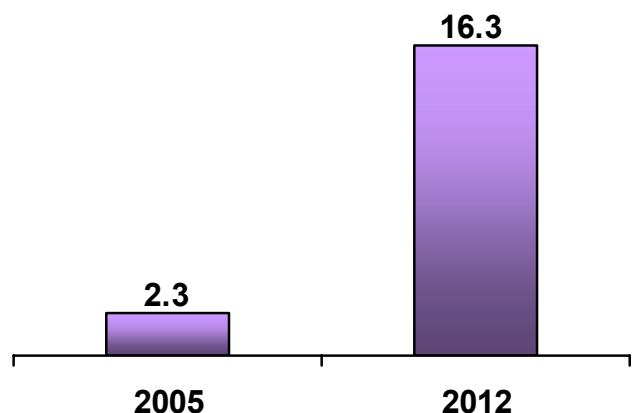
# Reducing excise on polymers to 8% will cut costs and boost demand for plasticulture applications

## Cost Break-up of a Micro Irrigation System Manufacturer

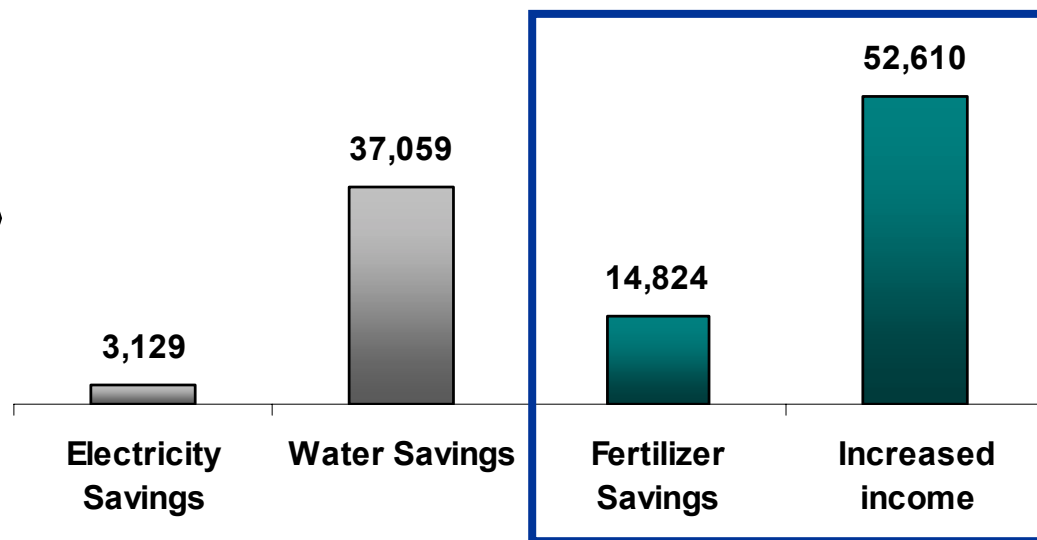


# Micro Irrigation can boost Agriculture GDP by Rs. 67,000 crores

**Target for Area Under Micro Irrigation**  
(Million Hectares)



**Micro Irrigation Benefits till 2012**  
(Rs. crore)



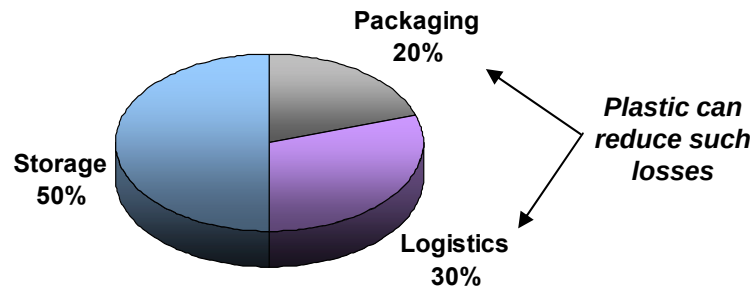
Source: IndiaStat & Task force on Micro Irrigation

*These will result in a direct impact on Agri-GDP through increased farmer income*

# Use of plastics in post harvest management can boost the Agriculture GDP by Rs. 6000 crores

## Post Harvest Losses

(Rs. 30,000 crores)



Plastic can  
reduce such  
losses

*Reducing cost of plastic applications such as plastic crates and promoting use of leno bags can curtail such losses*

Source: IIM-B study, CRISIL Analysis

*Plastic leno bags are ideal for storing vegetables that need cold storages and regular fumigation*



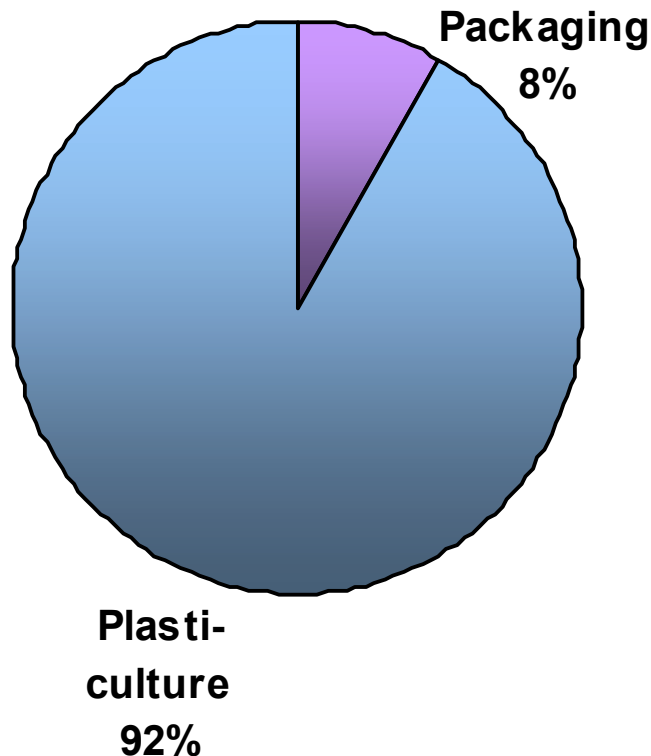
*Plastic crates prevent post harvest spoilage of agriculture produce*

# Rs.73,000 crores of Agri-GDP will be contributed by Plasticulture and Packaging

## Summary

### Contribution of Plasticulture and Packaging

(Rs.73,000 crores)



*Improving productivity  
and post harvest  
management crucial for  
boosting Agriculture  
GDP*

Source: CRISIL Analysis



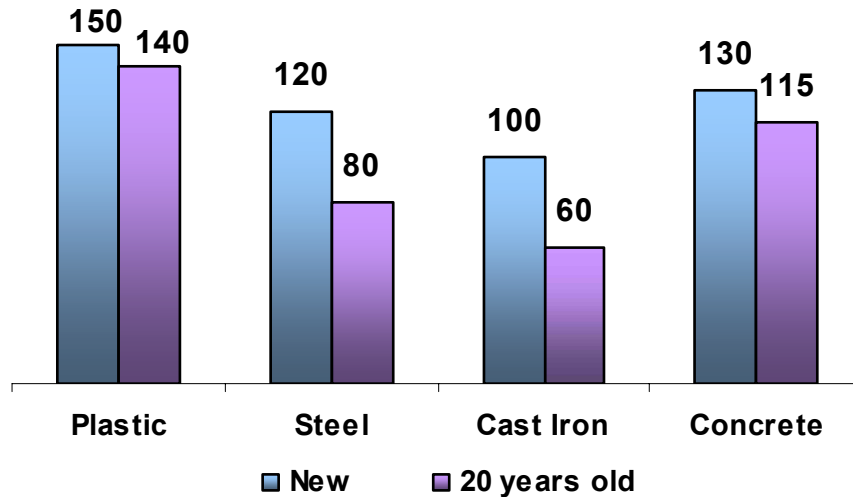
## Infrastructure

### *Key Uses*

- Pipes
- Cables
- Geo-synthetics

# Can plastic replace conventional materials for piping systems ?

## Comparison of Different Pipes for Power Use Efficiency



*Compared to plastic, other materials have higher frictional losses resulting in more power required for pumping*

Source: Professor R.P. Singh, IIT Kharagpur

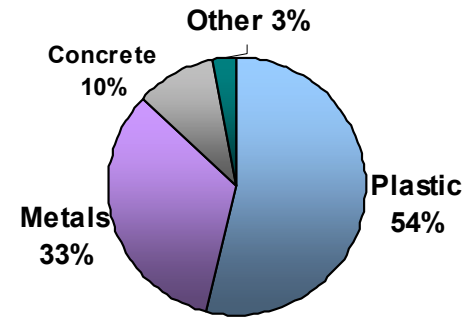
- ⇒ Chemical degradation is not observed in PVC pipes
  - PVC pipes offer a projected life span of >100 years without any loss in strength
- ⇒ PVC pipes are lighter and therefore easier and cheaper to install
  - The light weight reduces transportation cost
  - Heavy machinery requirements and onsite handling requirements are reduced

***Plastic is clearly superior for piping systems***

# World over, plastic is the preferred material for pipes

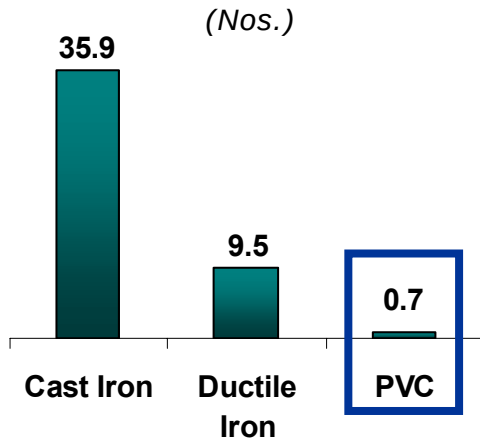
*London and Shanghai are modifying their existing water distribution system with plastic pipes*

## Material used for Pipes in Europe



Source: Micael Raynoud, BP Solvay

## Breaks in Every 100 Km. Of Pipes in Service



Source: Vinyl Institute

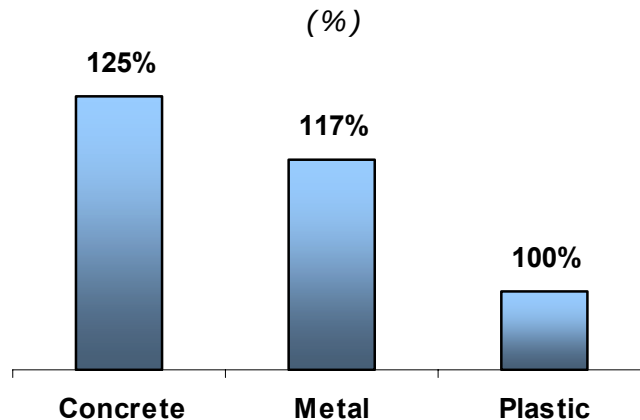
- **Pipe breakage is the biggest cost for water distribution utilities**
- **The US Environment Protection Agency estimates the US would need to invest \$138 billion to repair water transportation infrastructure**

**China has encouraged use of plastic pipes – By 2010, amongst newly built, revamped or expanded projects, 80% of drainage pipes, 70% of storm-water drain pipes, 30% of urban sewage pipes, 80% of water supply, 60% of urban gas pipes shall adopt plastics.**

Source: ET Polymers, April-May 2006

# Government needs to promote use of plastic pipes

## Cost of Plastic versus Other Piping Systems



*The material cost of plastics is lower than concrete and corrugated metal*

Source: Europipes

- Despite the successful implementation of plastics in piping internationally, there is low usage of plastic pipes in India
  - ➔ The Municipal boards of Chennai and Hyderabad did not use plastic pipes to prevent leakage from corroded metal till the World Bank was involved.
- The Government has targeted to provide access to 87% India's urban population to piped water in by 2017
  - ➔ This will involve an investment of Rs. 85,000 crore (Source: World Bank)
  - ➔ Use of plastics in achieving this target can reduce the upfront investment requirement by 20%

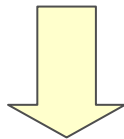


# Power & Telecom sectors require substantial investment

## Power

***The Indian Power sector will require an investment of Rs. 2.5 lakh crores in the Transmission and Distribution Sector by 2012***

*Source: Edelweiss Capital*

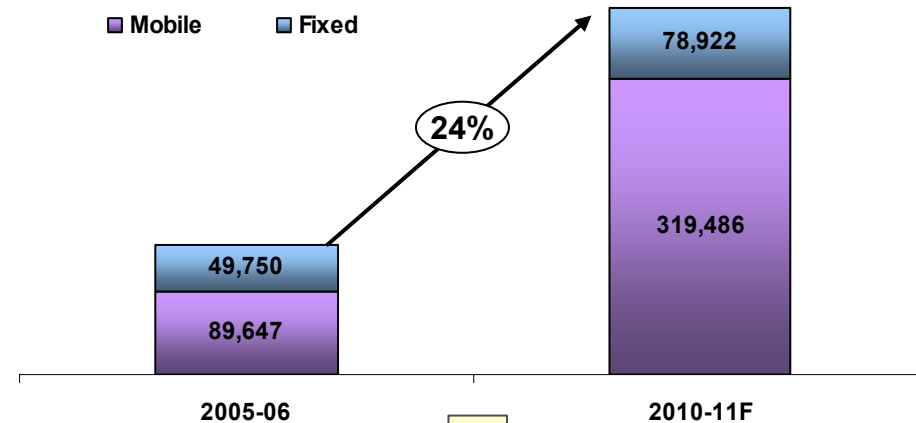


***This entails an investment of Rs. 60,000 crores in power cables***

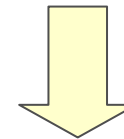
## Telecom

**A 23.5% increase in the telecom subscriber base will drive demand for telecom cables**

■ Mobile ■ Fixed



*Source: CRISIL Research*



***This will require 1.39 crore kilometers of Optical Fiber Cables to be laid***

***Plastic contributes to 25% of the cost of these investments. Reducing the cost of plastic will make the investments more attractive in these crucial sectors***

# Use of Geo-synthetics needs to be made mandatory

***Geo-synthetics, are flexible polymeric sheets that are applied either to the soil surface or between materials in civil engineering applications.***



## **Benefits**

- Geo-synthetics act as filters between soil and drainage gravel, preventing soil particles from being carried away by the filtered water.
- They prevent the mixing of two materials, such as soft sub-grade with a clean base aggregate.
- Soil movement can be reduced by the confinement and reinforcing action of geo-synthetics, which absorb part of the stress
- The permeability of geo-synthetics allows them to act as drains.

***However in India there is no mandatory use of geo-synthetics***



***The Expert Committee on Technical Textiles has recommended mandatory use of geo textiles for road construction***



***“Several new materials of road construction are also emerging such as polymer modified bitumen, geo-synthetics etc. that would need to be encouraged depending upon the cost effectiveness”***

*– Draft National Road Transport Policy, Ministry of Shipping, Road Transport & Highways, Govt. of India*

# High cost of plastic products are denying India the benefits of potential growth

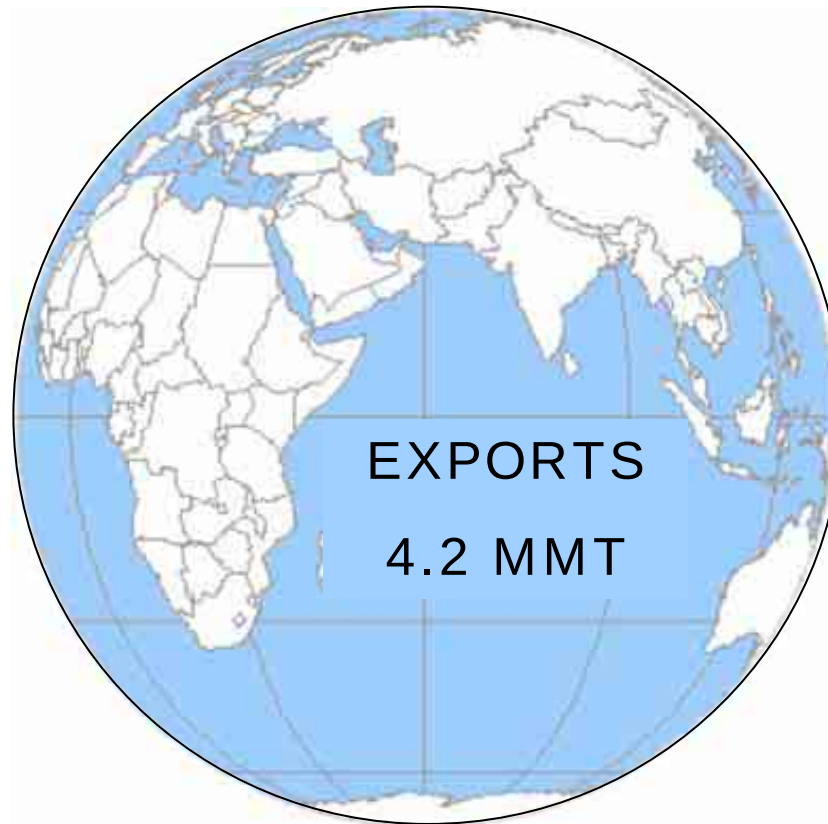
## Summary

### Key Observations

- Despite numerous benefits Plasticulture has not taken off in India due to significant initial investment
- India loses significant amount of agricultural produce due to weak post harvest management
- High packaging cost has restricted Processed food industry growth in India
- India has to invest heavily to broad-base the telecom and power infrastructure
- Plastic pipes and geo-synthetics have not been adopted in India despite documented benefits

### Vision 2012 Action Agenda

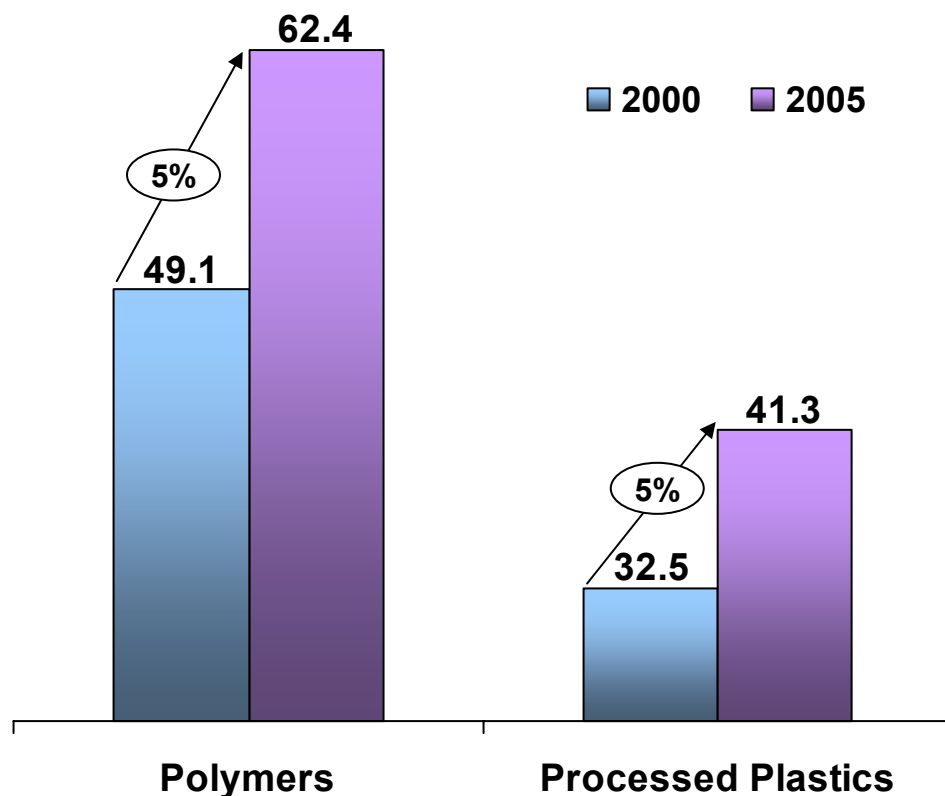
- Plastic needs to be promoted as a superior packaging material for food products and piping systems.
- Cost of Plastic needs to be lowered to promote end-use applications such as plasticulture, packaging and infrastructure.



# World Plastics trade growing at a steady 5%

## World Plastic Exports (Chapter 39)

(MMT)



## Growth Drivers

- Outsourcing of processing activities to low cost destinations
- Recognition of plastic as a low cost energy efficient material
- Rapid growth in end user industries like retail and automobiles

Source: UN Stats, CRISIL Research, CRISIL Analysis

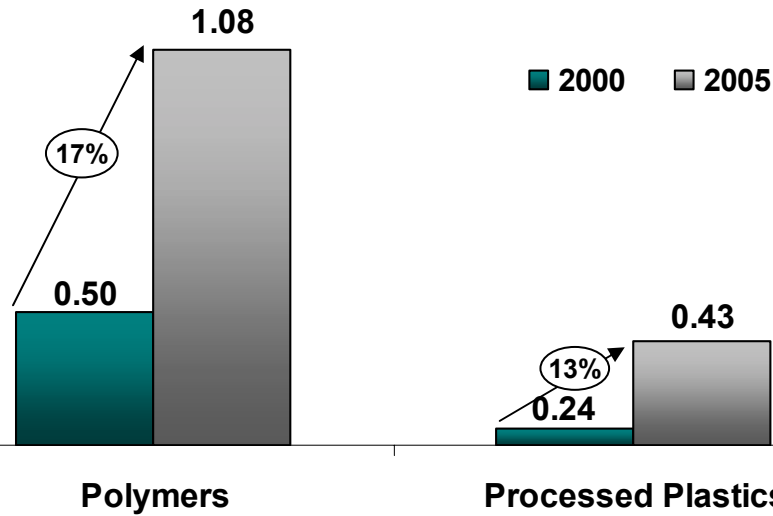
# India's plastic exports have increased faster than the world average

## India's Export Destinations (Chapter 39) – 2005

(% Share of India's exports)

### India's Plastic Exports (Chapter 39) - 2005

(MMT)



Source: DGFT, CRISIL Analysis

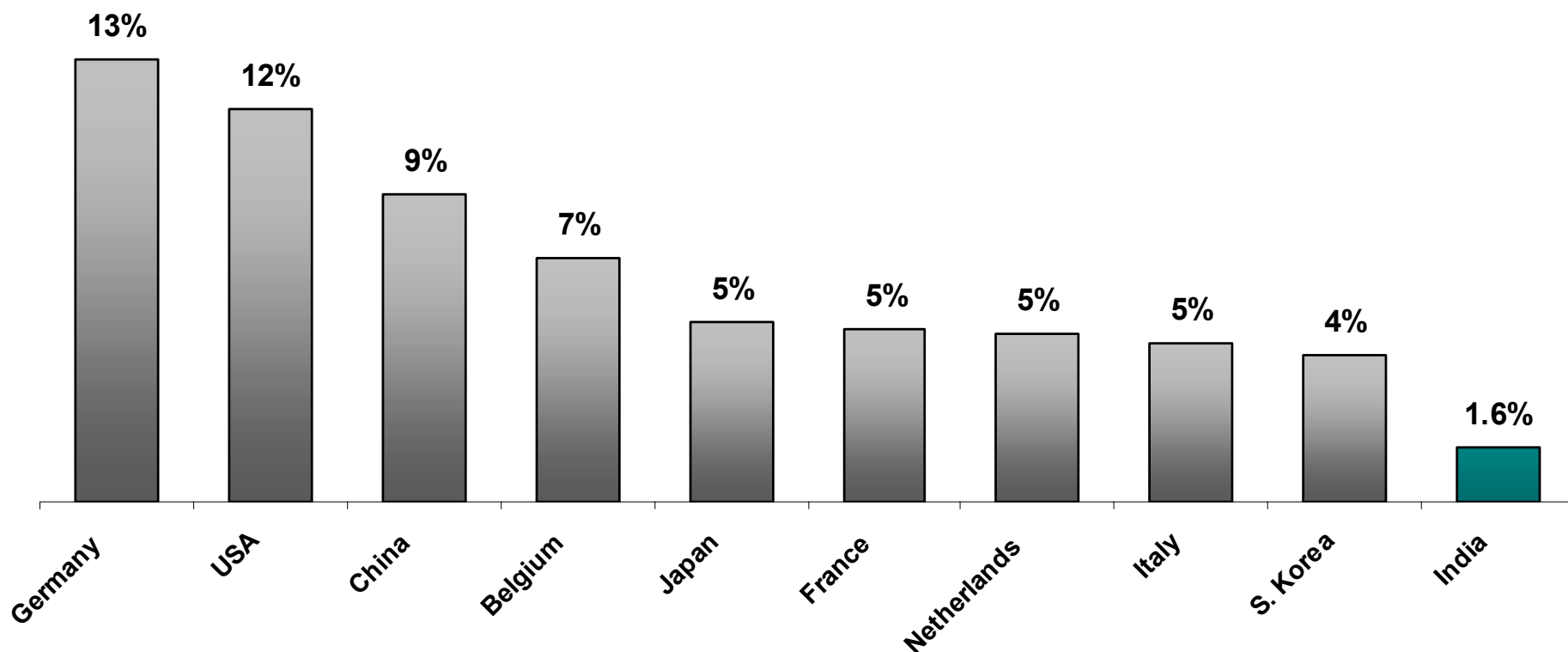
| Country                                                                               |              | % Share |
|---------------------------------------------------------------------------------------|--------------|---------|
|    | USA          | 13.2%   |
|    | China        | 12.67%  |
|    | UAE          | 7.07%   |
|    | UK           | 3.96%   |
|    | Turkey       | 2.87%   |
|    | Italy        | 2.38%   |
|    | Saudi Arabia | 2.34%   |
|   | Israel       | 2.25%   |
|  | Hong Kong    | 2.20%   |
|  | Pakistan     | 2.08%   |

Source: UN Stats, CRISIL Analysis

# India has a negligible share in world exports

## Share in World Exports (Chapter 39) - 2005

~ 103.65 MMT



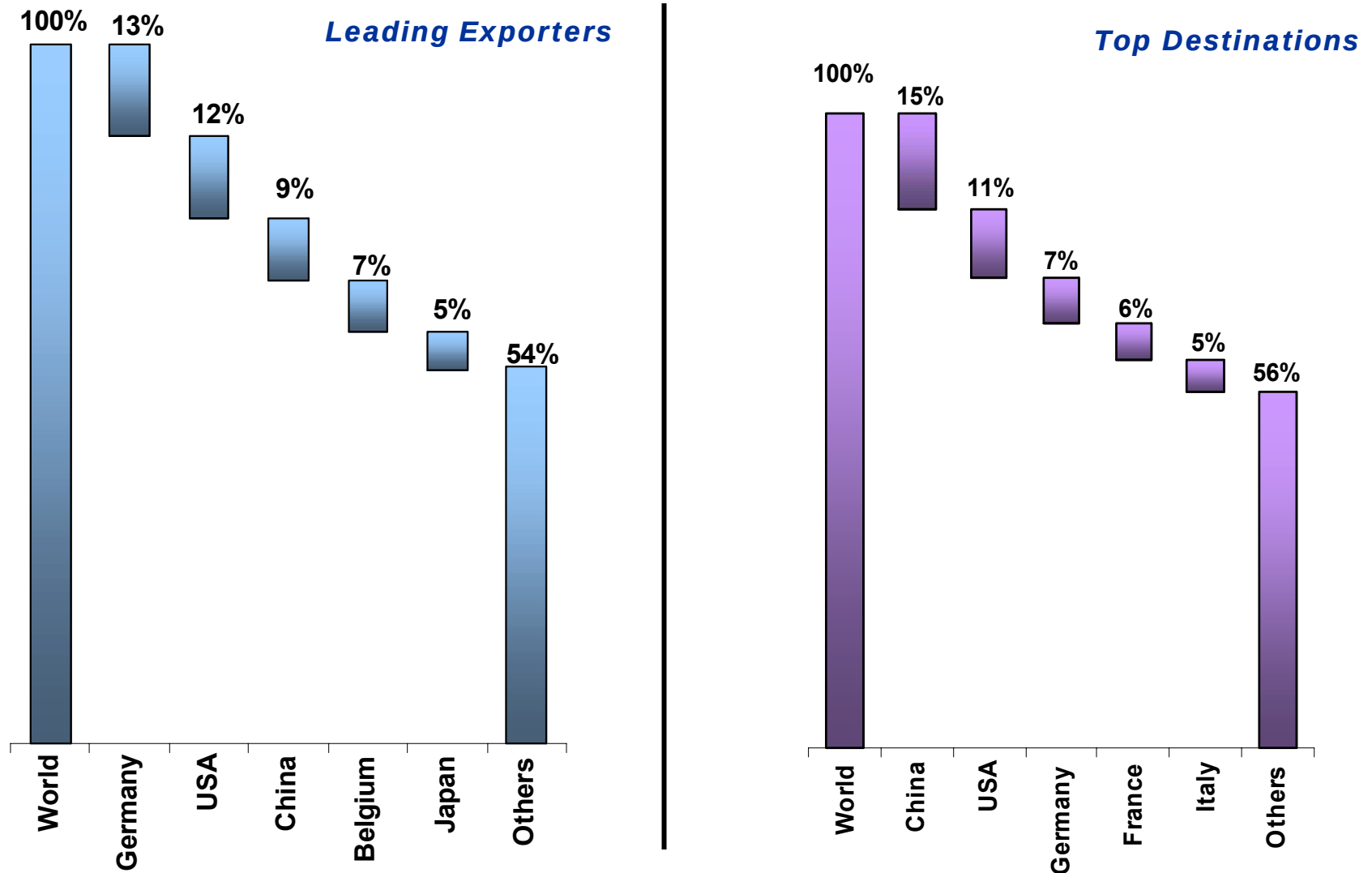
Source: DGFT, UN Stats, CRISIL Analysis

Note: China includes Hong Kong

# Germany, USA and China control World Plastic trade

## World Plastic Trade (Chapter 39) – 2004-05

~ 103.7 MMT



Source: UN Stats, CRISIL Analysis

Note: China includes Hong Kong

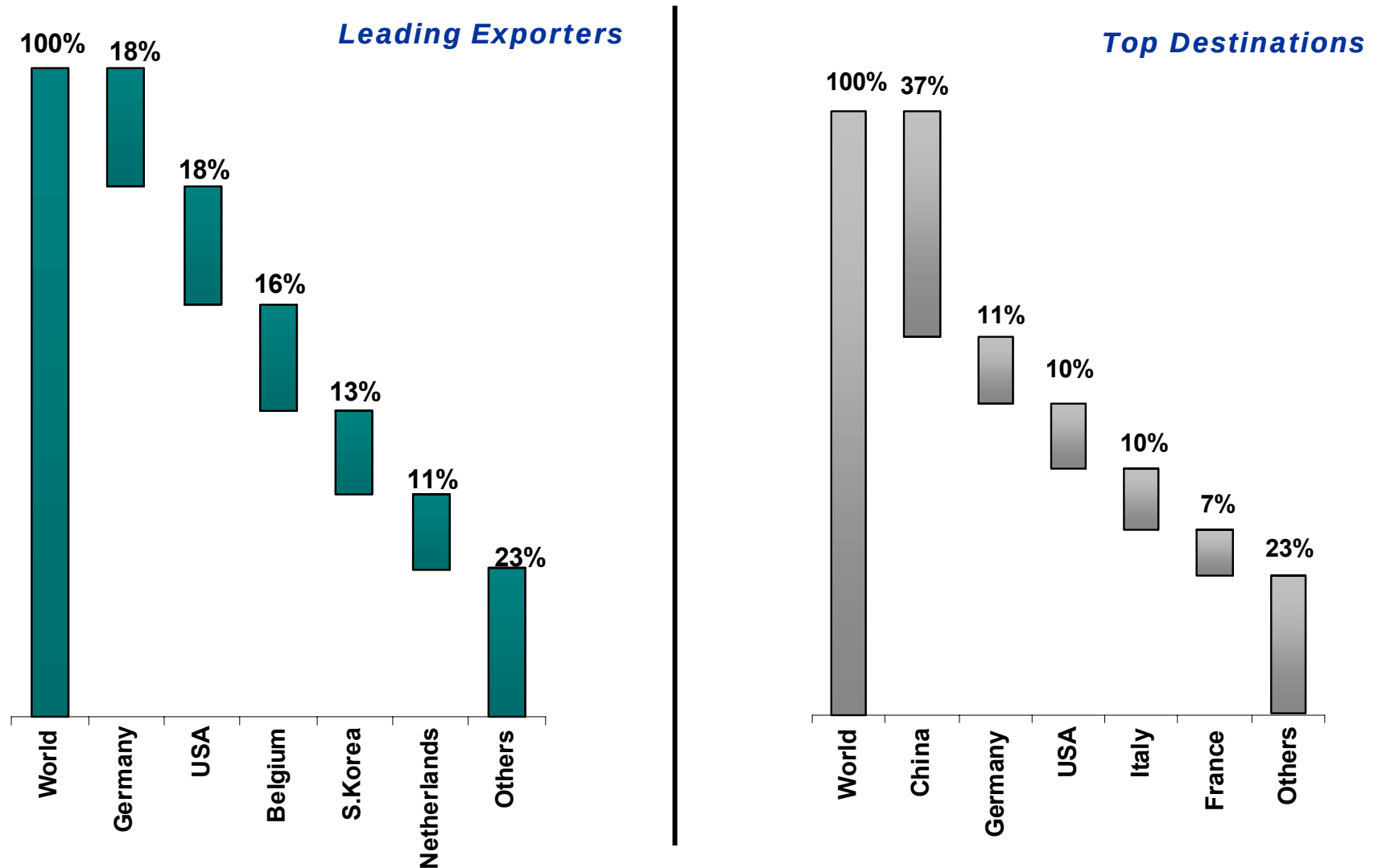
Intra EU trade is 54.4 MMT



# Polymer trade – China imports 37% of global volumes

## World Polymer Trade – 2004-05

~ 62.4 MMT



Source: UN Stats, CRISIL Analysis

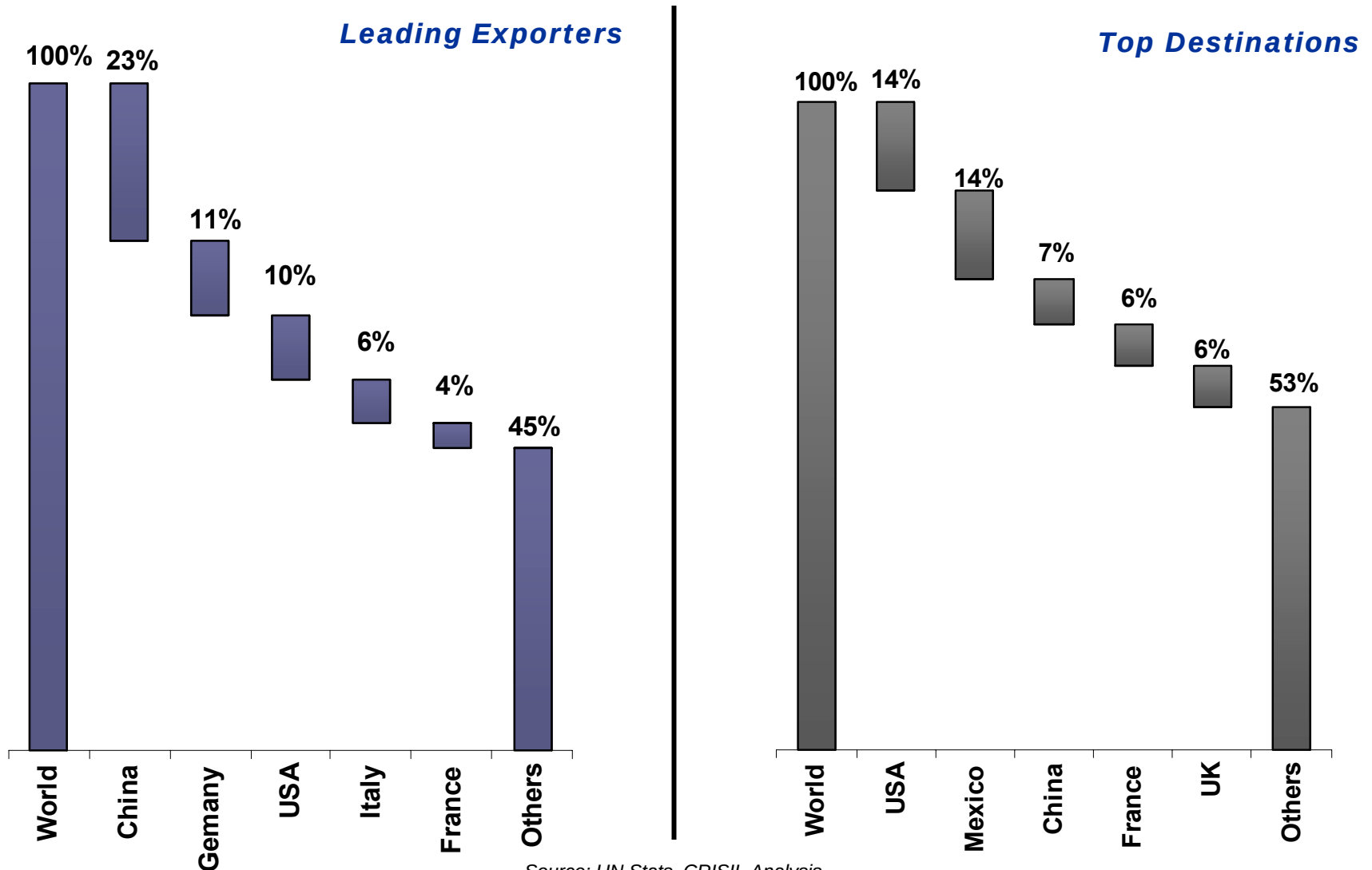
Note: China includes Hong Kong

Intra EU trade is 35.9 MMT

# China dominates world trade in processed plastic

## World Processed Plastics Trade – 2004-05

~ 41.3 MMT



Source: UN Stats, CRISIL Analysis

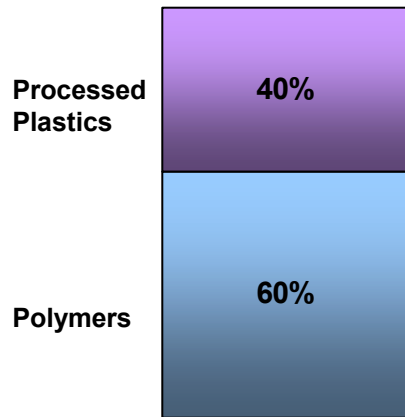
Note: China includes Hong Kong

Intra EU trade is 18.5 MMT

# India's trade basket is skewed towards polymers

## World Exports (Chapter 39)

~ 81.48 MMT

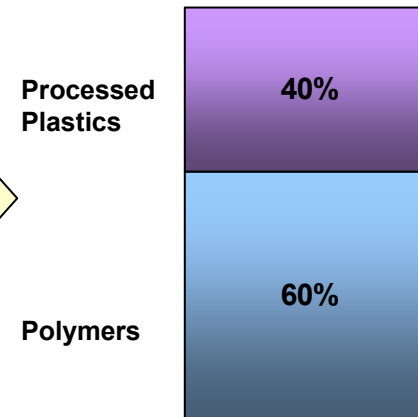


2000

*Composition of world trade has remained constant*

## World Exports (Chapter 39)

~ 103.65 MMT



2005

## CAGR

(2000-05)

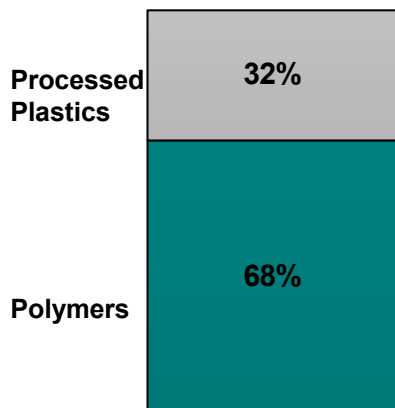
5%

5%

Source: DGFT, UN Stats, CRISIL Analysis

## India Exports (Chapter 39)

~ 0.74 MMT

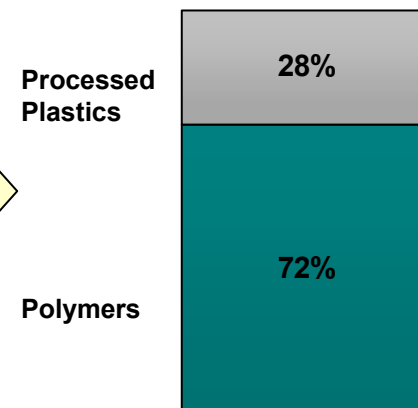


2000

*As a strong, growing economy, India should focus on higher value processed plastic exports rather than polymers*

## India Exports (Chapter 39)

~ 1.5 MMT



2005

## CAGR

(2000-05)

13%

17%

Source: DGFT, UN Stats, CRISIL Analysis

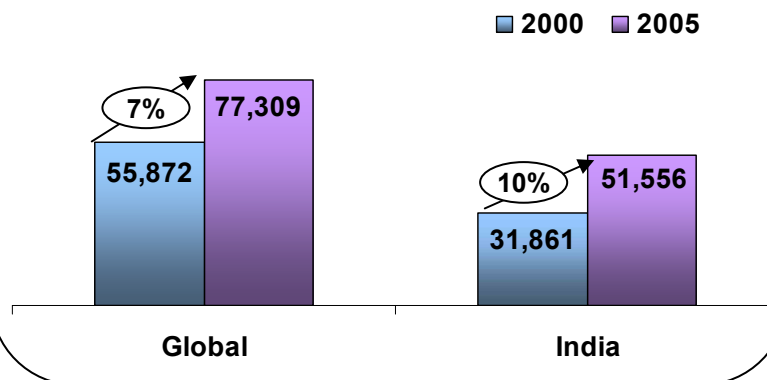
# Export realisations indicate India's weakness in processed plastics

*India's realisations are rising faster than global realisations...*

## POLYMERS

### Polymer Export Realisations

(Rs. per tonne)



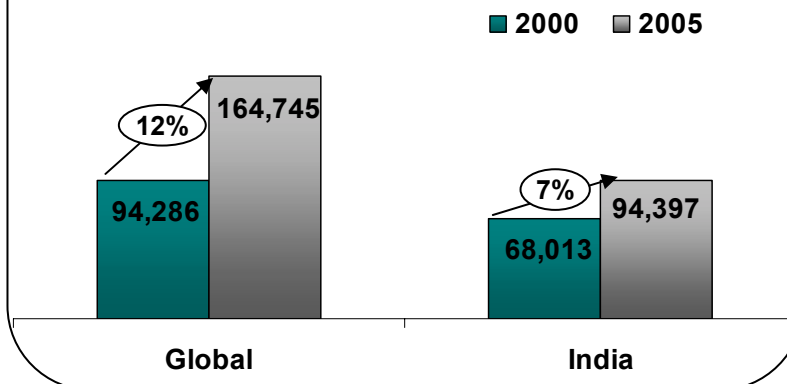
Source: DGFT, UN Stats, CRISIL Analysis

*Global realisations rising at a faster rate compared to India...*

## PROCESSED PLASTICS

### Processed Plastics Export Realisations

(Rs. per tonne)



Source: DGFT, UN Stats, CRISIL Analysis

*Does this imply that India is lagging in processed plastic exports ?*

*We have grouped products under Chapter 39 (HS Codes) into Polymers and Processed Plastics. Thereafter within each of these categories, we have made groups based on average export realisations in global trade. The details of products under each category are provided in Annexure.*

## POLYMERS



### Low Value

i.e. Export Realisations < \$2 per kg



### Moderate Value

i.e. Export Realisations < \$4 per kg



### High Value

i.e. Export Realisations > \$4 per kg

## PROCESSED PLASTICS



### Low Value

i.e. Export Realisations < \$3 per kg



### Moderate Value

i.e. Export Realisations < \$6 per kg



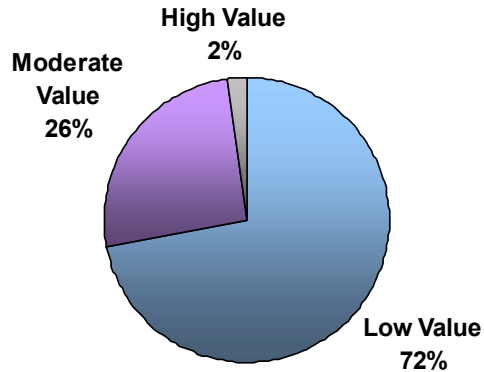
### High Value

i.e. Export Realisations > \$6 per kg

# World polymer trade is focussed on value-added products

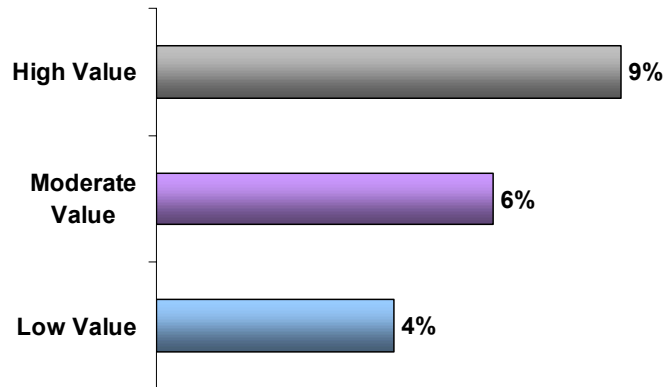
## World Polymer Exports (2005)

~62.40 MMT



## World Polymer Exports

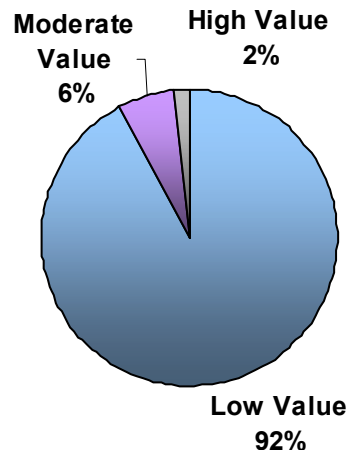
(5-year CAGR)



Source: UN Stats, CRISIL Analysis

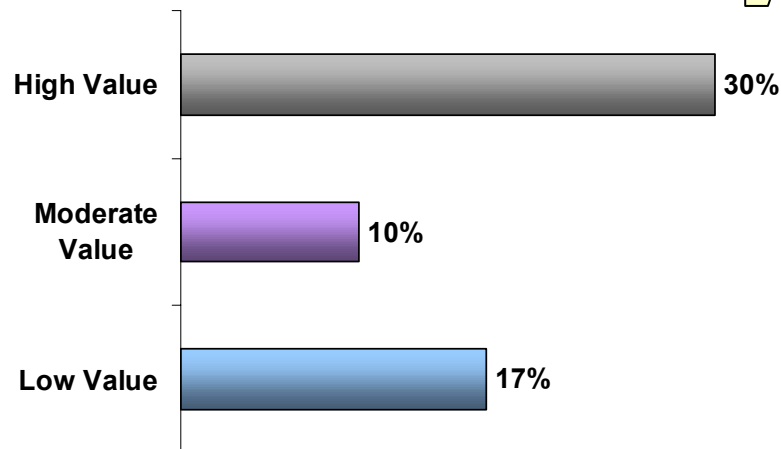
## India Polymer Exports (2005)

~1.08 MMT



## India Polymer Exports

(5-year CAGR)



Source: DGFT, CRISIL Analysis

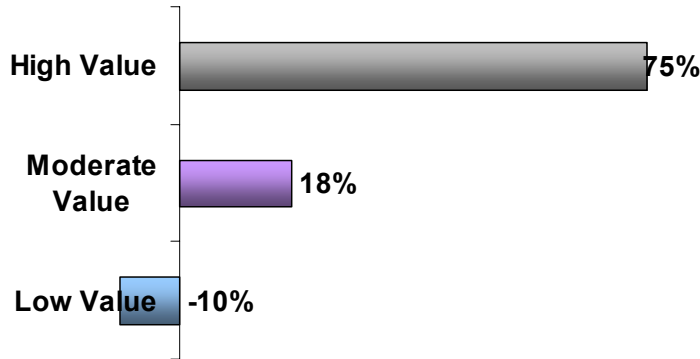
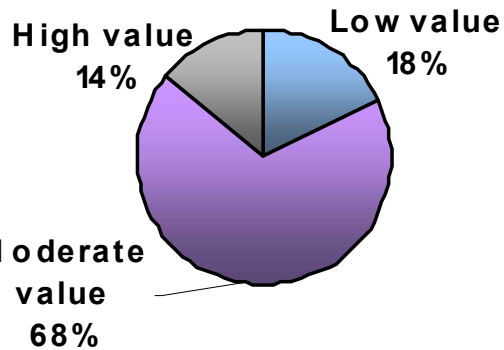
*With the high value segment growing rapidly, India's polymer exports are on track*

# World trade in processed plastics is dominated by higher value items

**World Processed Plastic Exports**  
(2005-06) ~ 31.32 MMT



**World Processed Plastics Exports**  
(5-year CAGR)

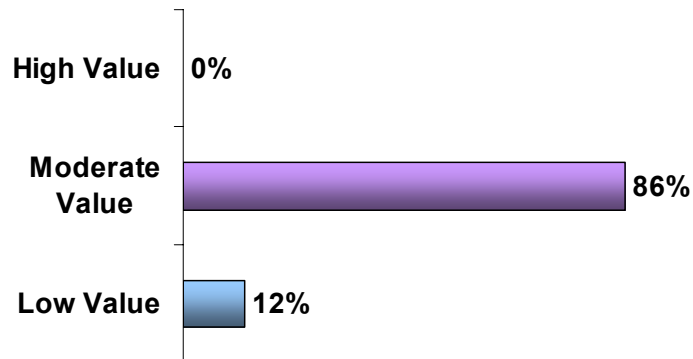
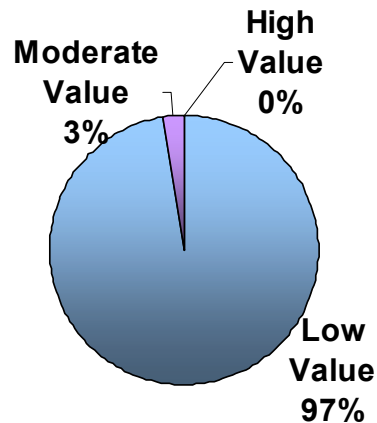


Source: UN Stats, CRISIL Analysis

**India Processed Plastic Exports**  
(2005-06) ~ 0.43 MMT



**India Processed Plastic Exports**  
(5-year CAGR)



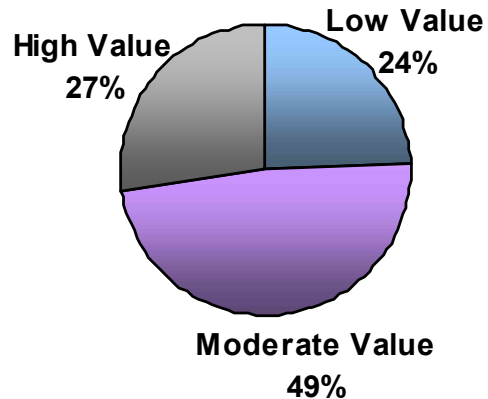
*India has no presence in the high value segment...we are in a precarious state*

Source: DGFT, CRISIL Analysis

# India's import volumes thus reflect value added processed plastic products

## India Processed Plastic Imports

(2005-06) ~ 0.19 MMT



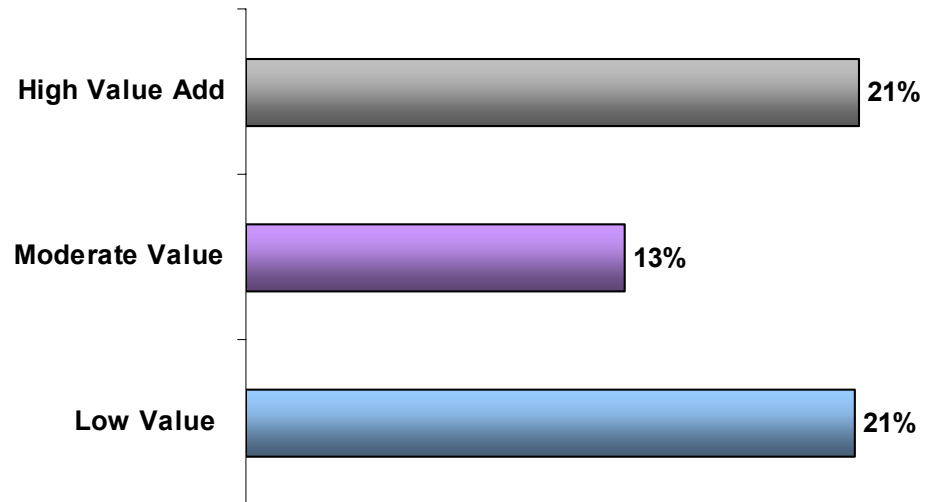
Source: DGFT, CRISIL Analysis

*75% of India's imports are in the moderate and high value category*

*With imports in higher value products growing rapidly, India needs to upgrade its industry to meet domestic demand*

## India Processed Plastic Imports

(5-year CAGR)



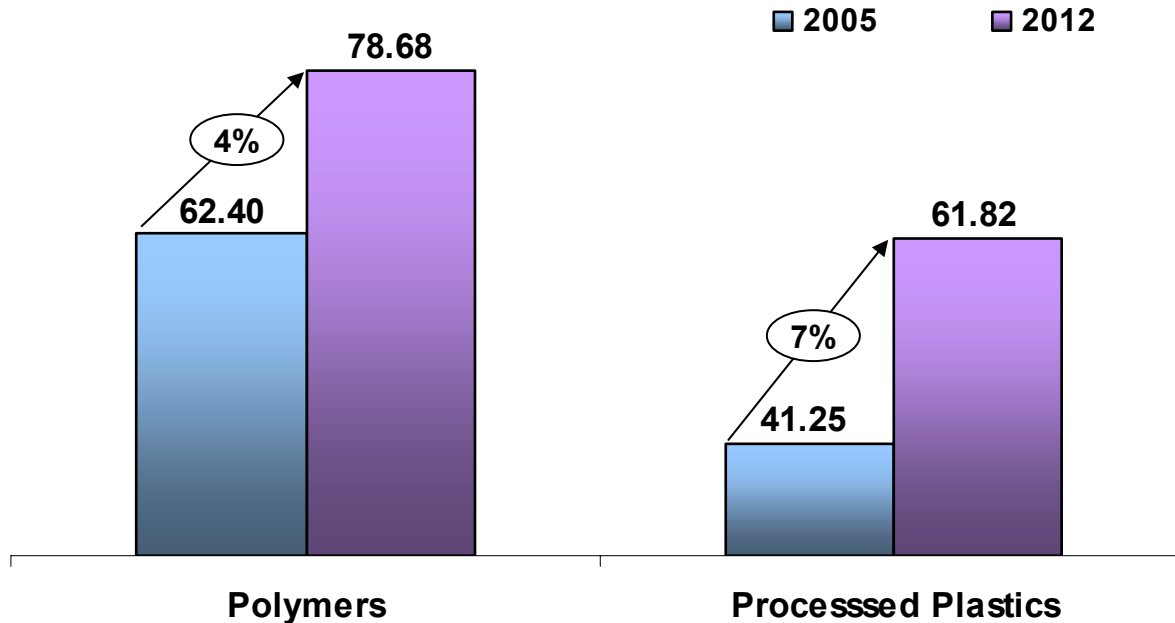
Source: DGFT, CRISIL Analysis



# World trade opportunity to be 140 MMT by 2012

## World Exports (Chapter 39)

(MMT)



*Polymer exports  
expected to reduce in  
favour of processed  
plastic products*

Source: DGFT, UN Stats, CRISIL Analysis

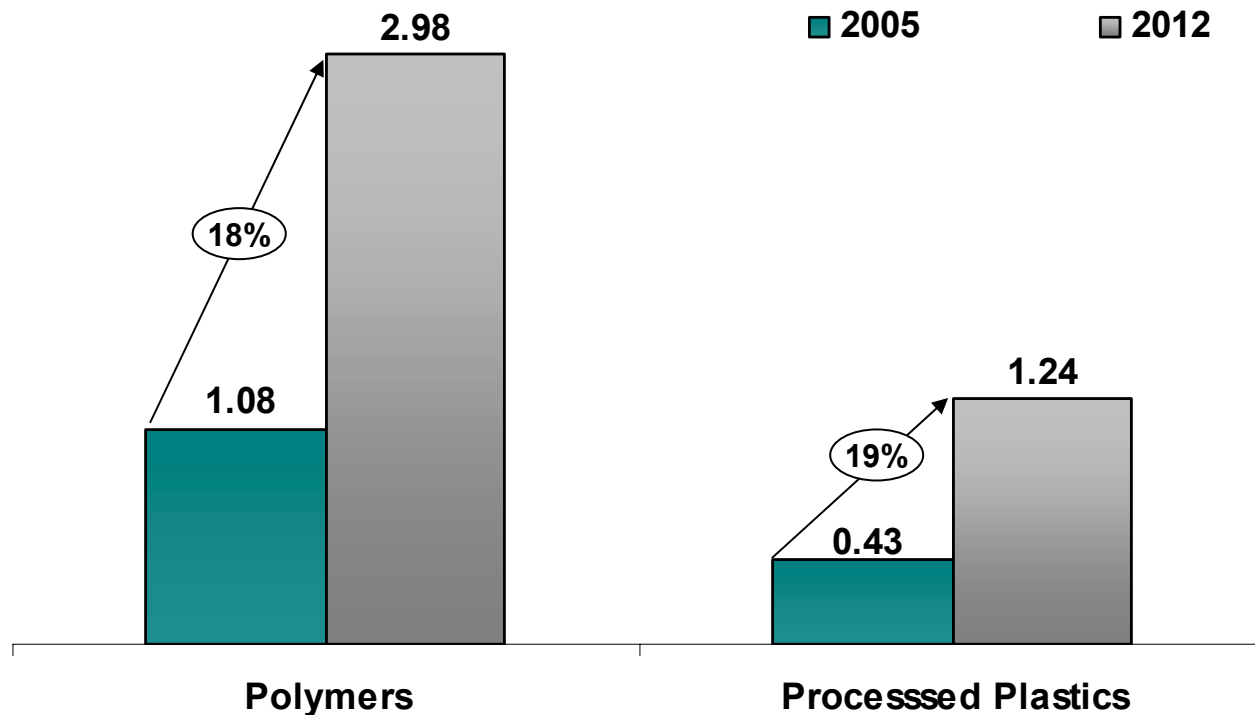
## Growth Drivers

- Upstream Polymer facilities shifting to resource-rich locations such as the Middle-East
- Substitution of traditional materials by plastic

# India's vision should be to double its share of world exports to 3% of global trade volumes by 2012

## India's Exports (Chapter 39)

(MMT)



*India will need to focus on downstream processed plastics to achieve this vision*

Source: DGFT, CRISIL Analysis

## Summary

### Key Observations

- World trade in Plastics at 140 MMT by 2012 is a lucrative opportunity for India
- India, with a 1.5% share in world export volumes today is not in a position to capture this opportunity
- India's increased focus on polymers as against processed plastics is contrary to global trade flows
- Within processed plastics, India has negligible exports that too in low value products, where as the maximum growth potential is in higher value products

### Vision 2012 Action Agenda

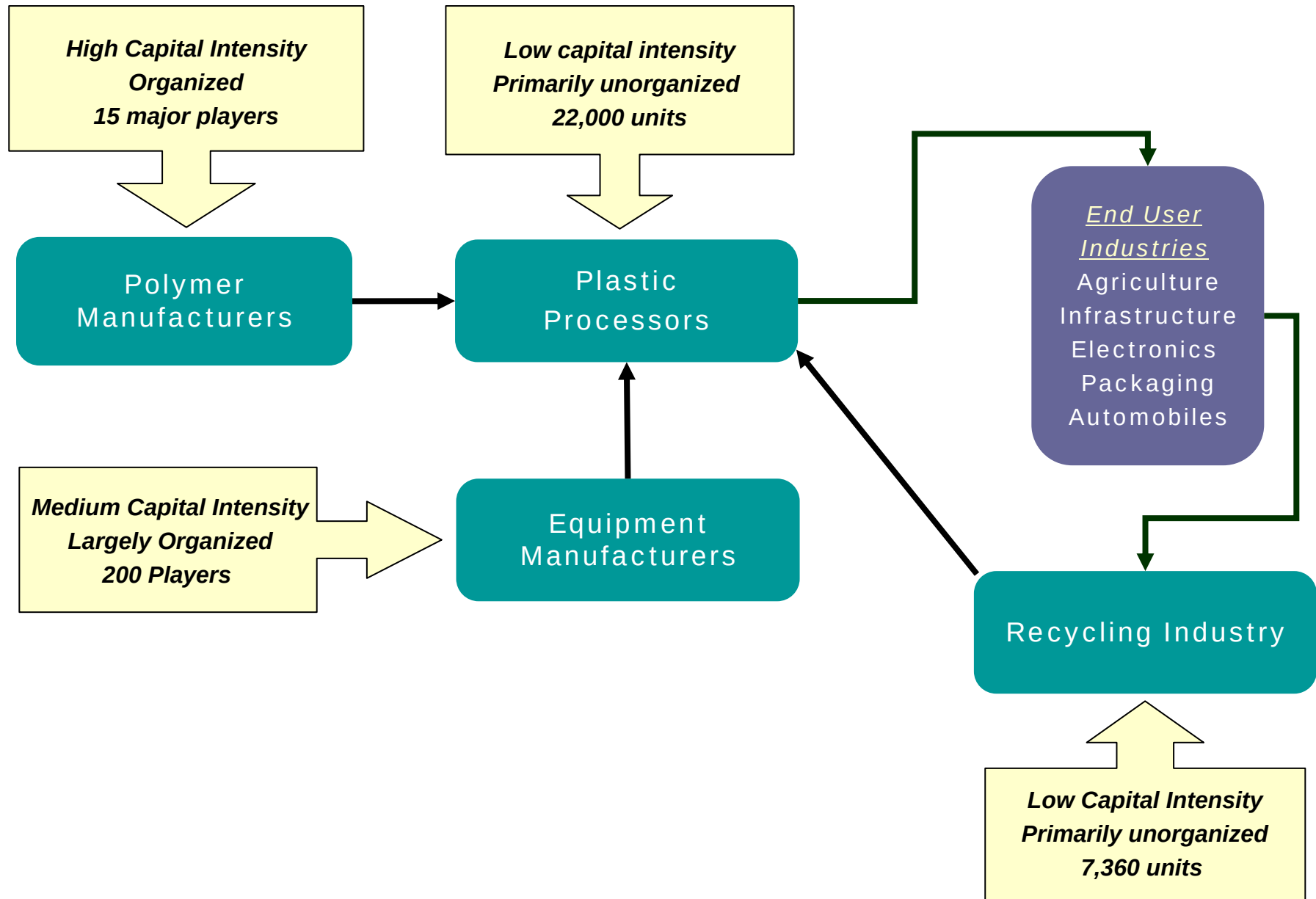
- India should aim at doubling its share in world exports by 2012
- Build the domestic processed plastic industry to target the export opportunity

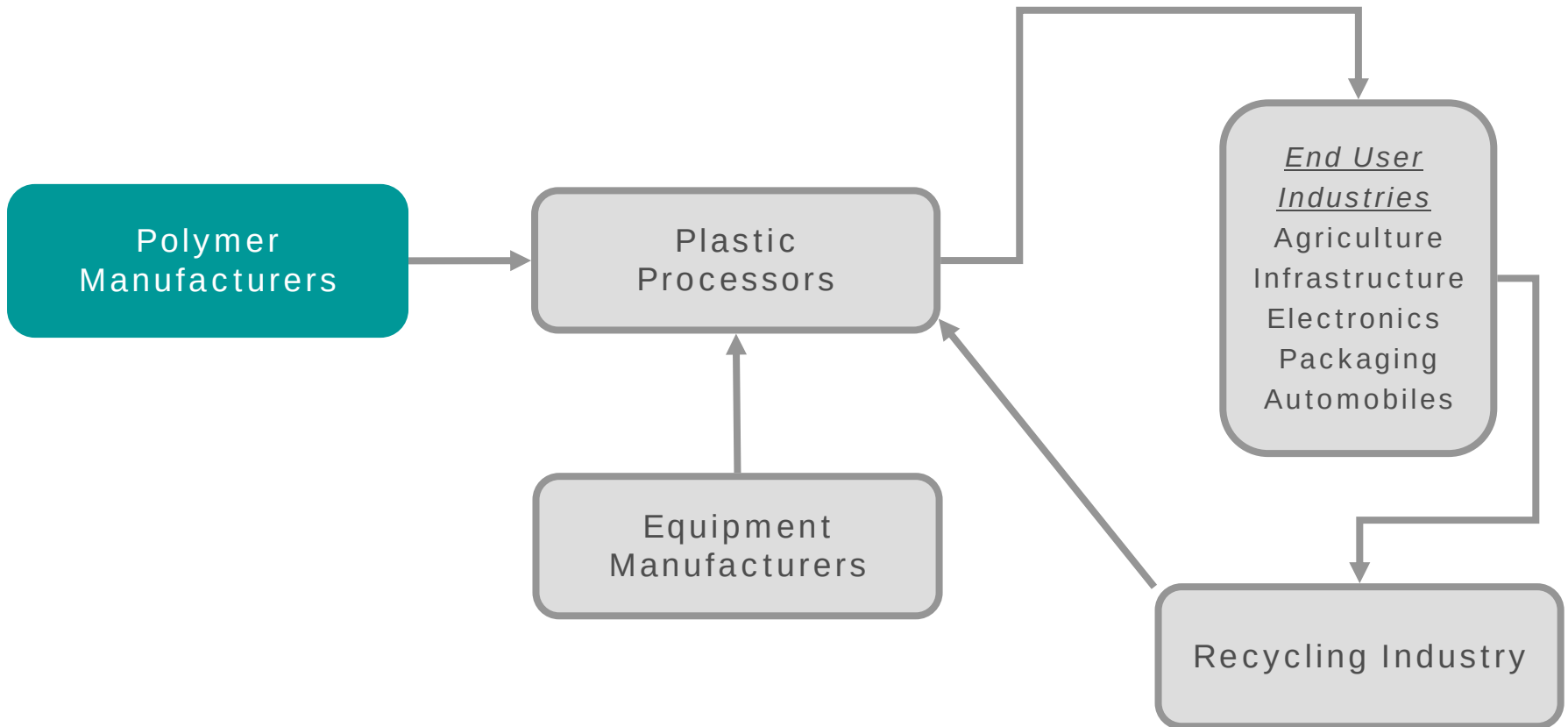
## Section 3

# **The Indian Plastics Industry - Overview & Diagnosis**

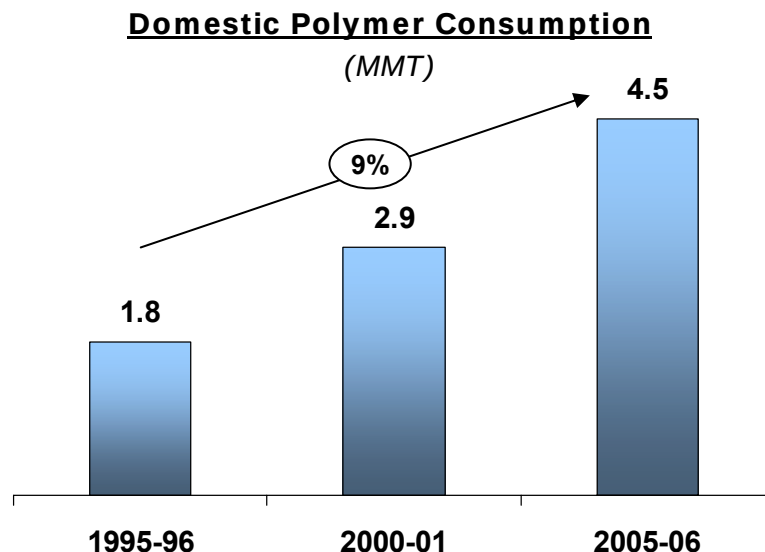
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# Structure of the Plastic Industry





# Domestic Polymer consumption growing at 1.5 times GDP



*Packaging has been the key demand driver for polymer consumption in India*

Source: CRISIL Research

## **Global v/s India Polymer Consumption Pattern - 2005** (% of Total Consumption)

*Consumption pattern in India differs from that of the world due to the Indian lifestyle and evolution of Indian polymer industry*

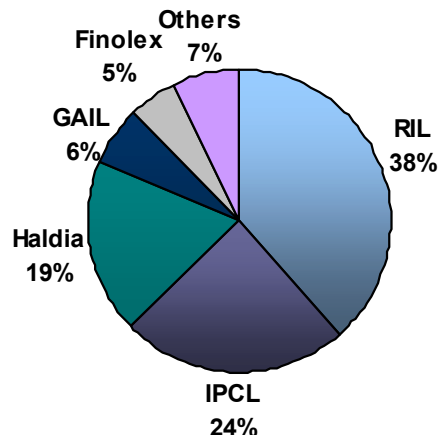
| Polymer | World | India |
|---------|-------|-------|
| HDPE    | 19%   | 20%   |
| LDPE    | 12%   | 5%    |
| LLDPE   | 12%   | 12%   |
| PP      | 28%   | 33%   |
| PS      | 8%    | 5%    |
| PVC     | 21%   | 25%   |

Source: CRISIL Research

# Polymer capacities in India concentrated... expected to double by 2012

## Polymer Capacities by Producer (2005-06)

~ 5.01 MMT



Source: CRISIL Research

*The Polymer industry in India is characterised by the presence of large organised players*

*Competition in the sector is intense and likely to increase with the entry of ONGC and IOC*

Source: CRISIL Research

Note: ONGC expected to setup capacities for HDPE, LLDPE, PP and SBR at Dahej in Gujarat by mid 2010. Data on capacities not available in the public domain

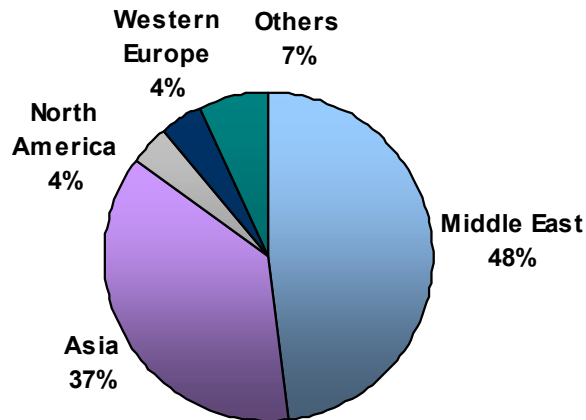
| Polymer      | 2005             | 2012             | Growth      |
|--------------|------------------|------------------|-------------|
| HDPE         | 1,077,500        | 1,877,500        | 74%         |
| LDPE         | 200,000          | 205,000          | 2%          |
| LLDPE        | 545,000          | 955,000          | 75%         |
| PP           | 1,735,000        | 4,180,000        | 141%        |
| PS           | 336,000          | 450,000          | 34%         |
| PVC          | 859,000          | 1,236,000        | 44%         |
| Others       | 177,000          | 570,000          | 222%        |
| <b>TOTAL</b> | <b>4,929,500</b> | <b>9,473,500</b> | <b>92 %</b> |



# With commissioning of capacities in the Middle East, Indian suppliers under severe threat from imports

## Incremental Capacity by 2010

(MMT)

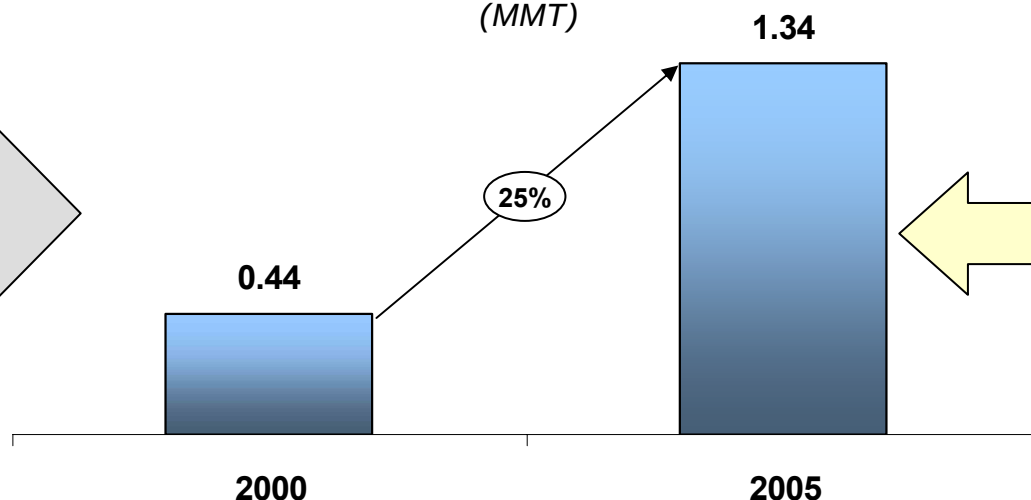


*The rise of the Middle East in the global petrochemical industry is on account of its feedstock advantage of low cost natural gas*

Source: CRISIL Research

## India's Polymer Imports

(MMT)



*With import duty on polymers amongst the lowest in the world @ 5%, India has already witnessed a substantial increase in imports*

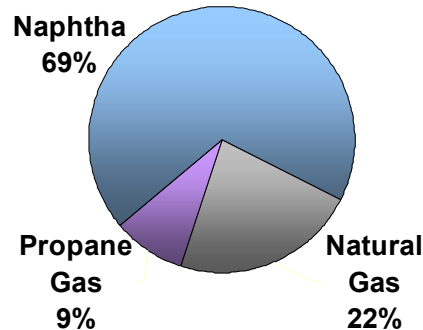
*Middle East already supplies 13% of India's imports*

Source: UN Stats

# Naphtha is the principal feedstock for Polymers in India

## Domestic Cracker Feedstock (2005-06)

~ 6.19 MMT



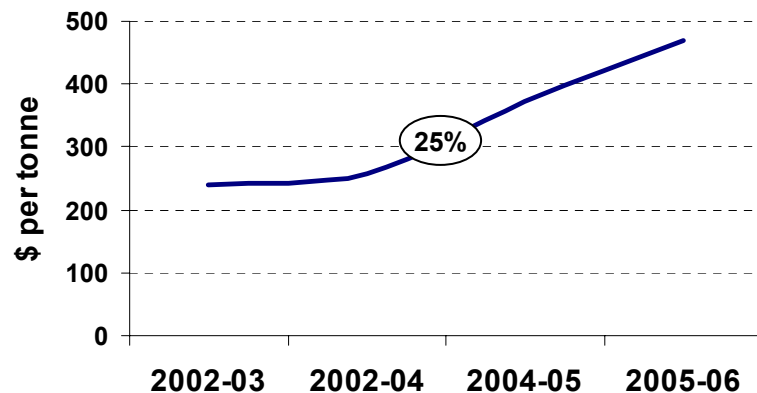
*Resource rich Middle East enjoys a cost advantage... it uses natural gas which is priced at 1/6<sup>th</sup> the price of equivalent products in the international market*

Source: CRISIL Research

## Naphtha prices have surged over the past 4 years...

### Average Naphtha Prices

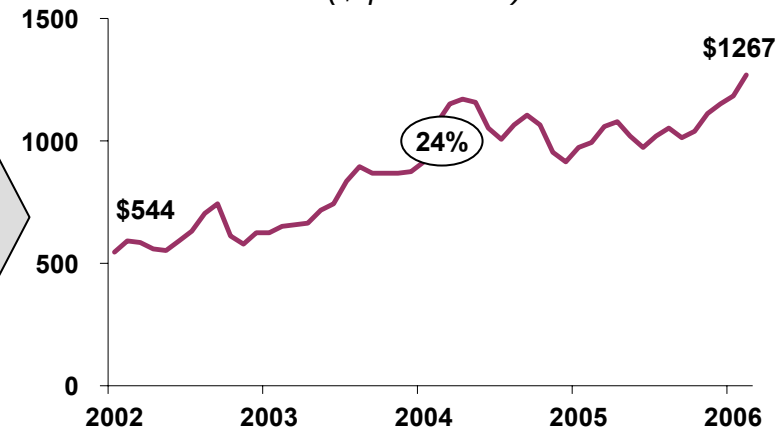
(\$ per tonne)



*Rising Naphtha prices have driven polymer prices upwards*

### Average Polymer Prices

(\$ per tonne)



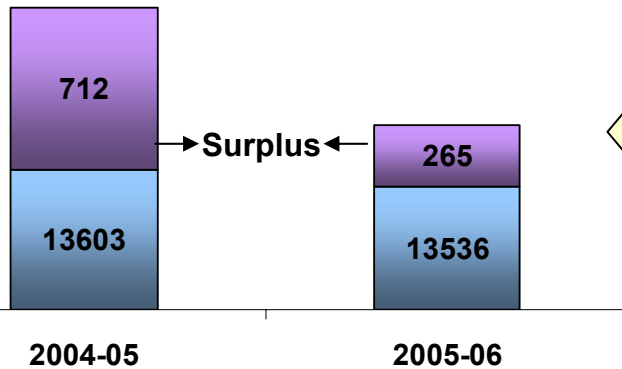
Source: Infraline

Source: Platts CFR Prices

# Despite a surplus in domestic supply, India imports Naphtha

## Domestic Demand & Supply of Naphtha

(` 000 tonnes)

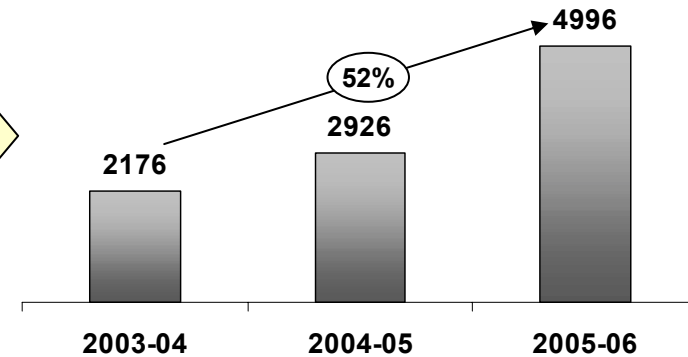


■ Domestic Demand ■ Surplus

*With Import duty on crude oil at 5% and on Naphtha at 0%, Naphtha suppliers encouraged to export*

## Naphtha Exports

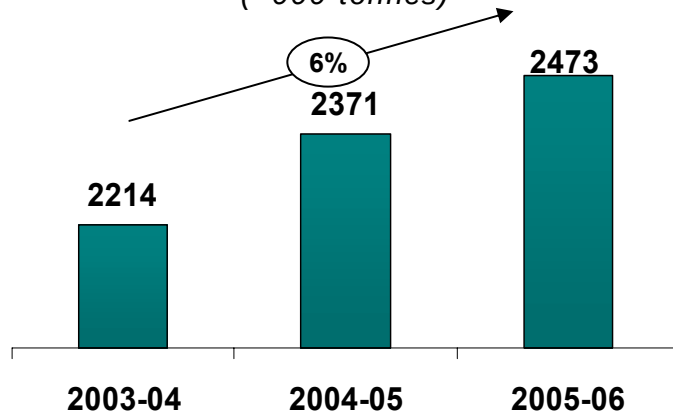
(` 000 tonnes)



Source: Ministry of Petroleum & Natural Gas, CRISIL Research

## Naphtha Imports

(` 000 tonnes)



*With Naphtha surplus expected to reach 5 MMT by 2012, India needs to promote downstream processing of Naphtha by reducing import duty on crude oil*

# The Indian polymer sector provides a strong backbone for the Plastics Industry in India

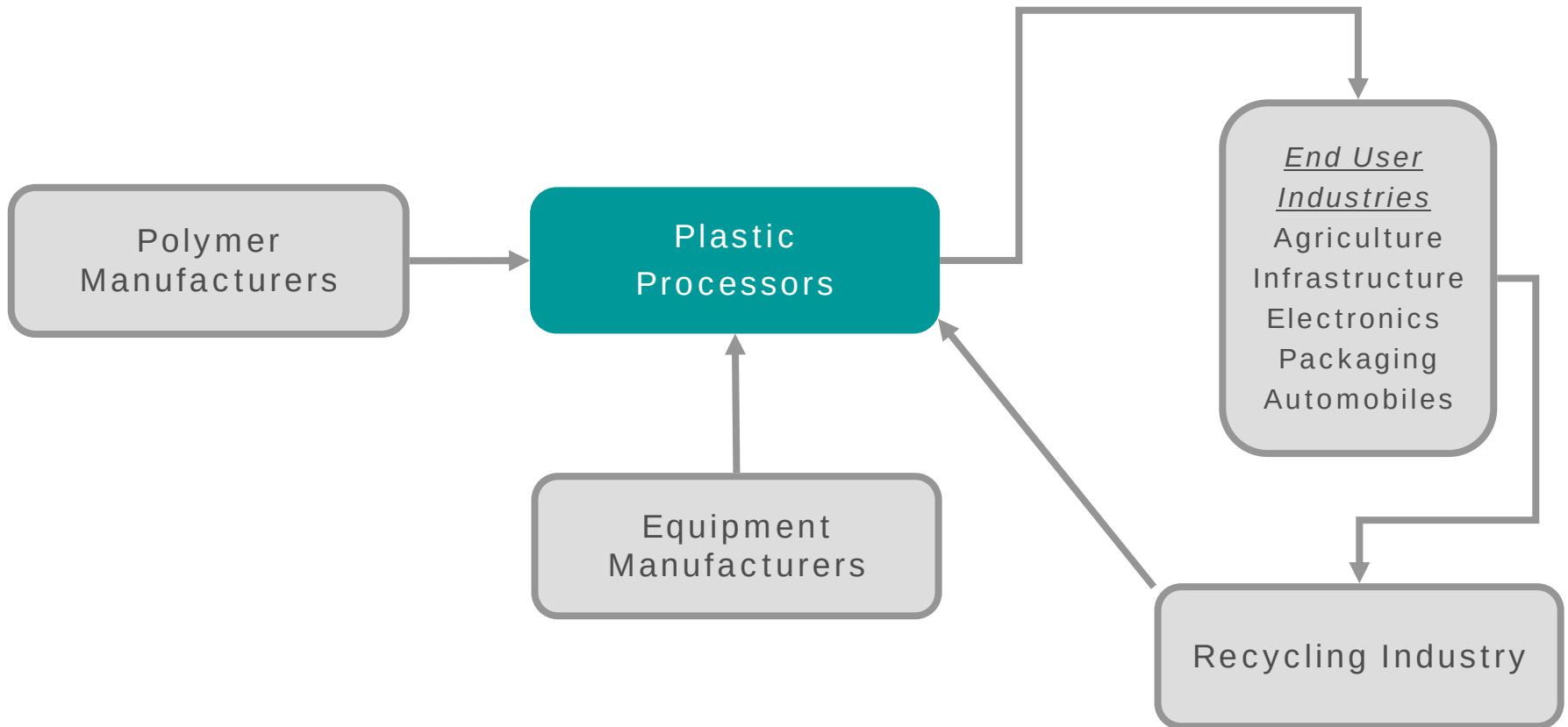
## Summary

### Key Observations

- India has a strong base in polymer manufacturing with the presence of large organised players
- With polymer capacities on the rise, the industry is gearing up to meet Plastic demand
- There exists an inverted import duty structure between crude oil and naphtha
- Feedstock prices have risen significantly which has resulted in polymer prices increasing consistently
- Polymer imports based on capacities coming up in the Middle East would pose a threat to Indian polymer companies

### Vision 2012 Action Agenda

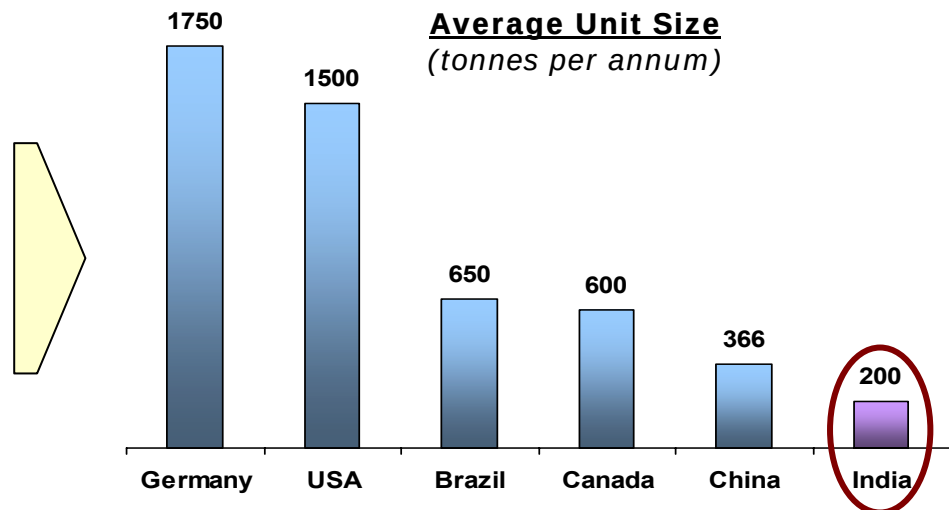
- The inverted import duty structure between crude oil and naphtha needs correction



# The SSI policy has resulted in fragmentation and small capacities in the processing segment

*With 22,000 units in the processing segment, India does not enjoy economies of scale...*

- ⇒ SSI units are industrial undertakings in which the investment in plant and machinery does not exceed **Rs. 5 crore (For Plastic and other industries)**
- ⇒ Presently **52 plastic related products out of a total 326 i.e. 16%** are reserved exclusively for manufacture by SSIs. These range from household products, pipes, packaging material, etc.
- ⇒ **40 out of the 52 reserved items** are injection moulding products which are potentially high value products
- ⇒ Since 1997 only **14 out of 538** items de-reserved have been plastic products



Source: China Plastics Processing Industry Association, Industry Publication

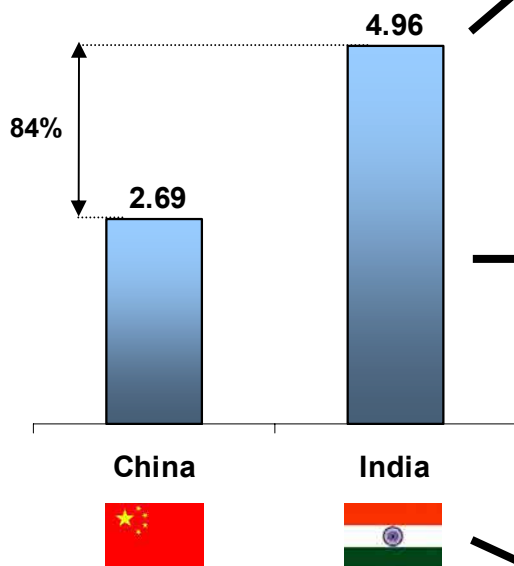
## SSI Policy Impact

- ❑ Since SSI units need to have capital investments below Rs. 5 crore to avail benefits, there is an incentive for them to remain small
- ❑ The unorganized sector accounts for **70%** of the industry turnover
- ❑ Average turnover an unit is only **Rs. 1.25 crores** per unit
- ❑ **97%** of India's processed plastic exports constitute low value products

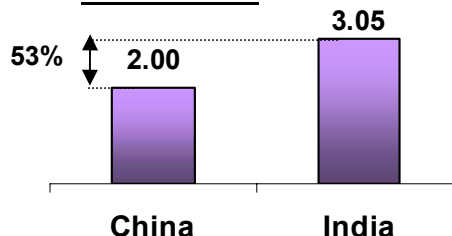
Note: A detailed list of plastic products reserved for the SSI sector is provided in Annexure

# The cost structure of Indian plastic products is uncompetitive

**Cost of a PET Bottle - 2005**  
(Rs.)

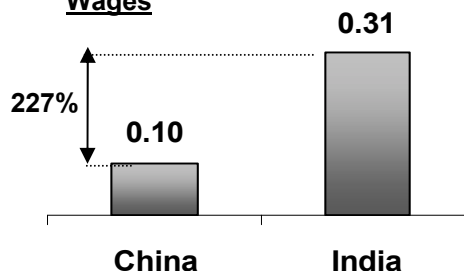


**Raw Materials**



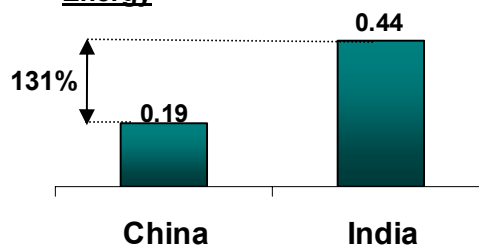
*India has 31% build-up in raw materials cost due to indirect taxes*

**Wages**



*Although labour cost in absolute terms may be lower in India, we lose out on account of lower productivity and obsolete machinery*

**Energy**



*Power costs in India are high due to the cross subsidization policy towards agriculture and erratic power supply*

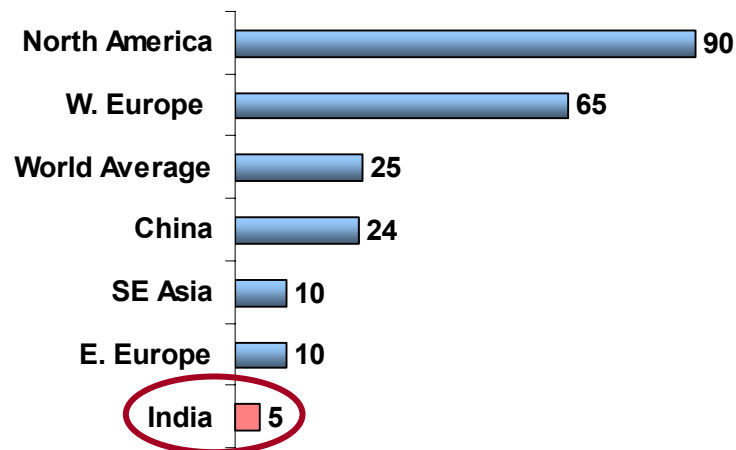
**China clearly has an advantage of scale – while the Chinese company manufactures 1 billion bottles the Indian company manufactures only 200 million bottles**

# High cost has resulted in a inadequate demand and low share in world trade

*India has amongst the lowest per capita consumption in the world*

## Per Capita Plastics Consumption

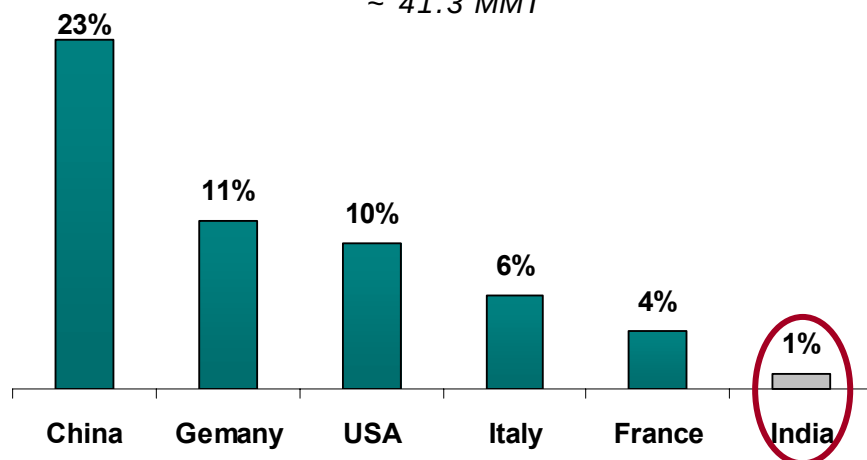
(kgs)



Source: PlastIndia

## Share in Global Processed Plastic Exports (2005)

~ 41.3 MMT



*India is practically non-existent in the world processed plastic trade markets*

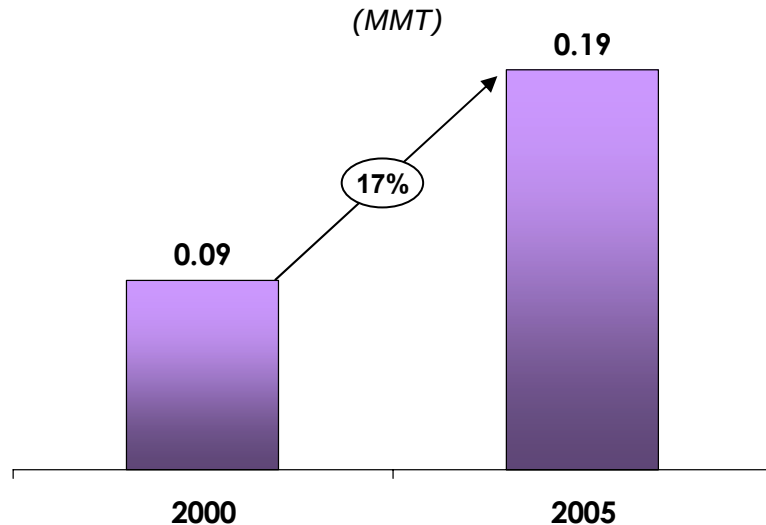
Source: UN Stats, DGFT

Note: China includes Hong Kong



# We also see substantial increase in plastic imports...

## India's Processed Plastic Imports



Source: DGFT

*Rapidly rising imports of processed plastic are not an encouraging sign for India*

*China is by far the largest and fastest growing exporter of processed plastic to India*

## Processed Plastic Exports to India

(MMT)

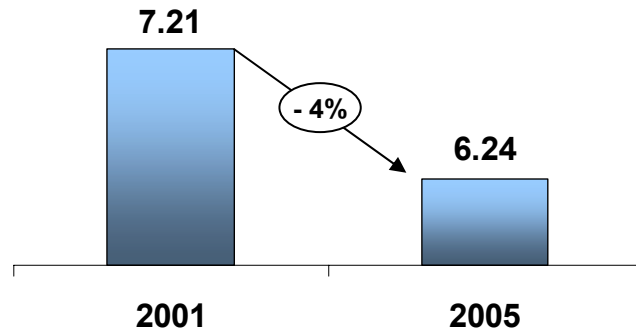
| Country                                                                               |          | % Share | Y-o-Y Growth |
|---------------------------------------------------------------------------------------|----------|---------|--------------|
|   | China    | 16%     | 71%          |
|  | USA      | 12%     | 34%          |
|  | S. Korea | 8%      | 48%          |
|  | Germany  | 8%      | 28%          |
|  | Japan    | 6%      | 19%          |

Source: DGFT

# Inadequate demand and low scale has a detrimental impact on capital productivity

## Return on Capital Employed

(OPBIT / Capital Employed)



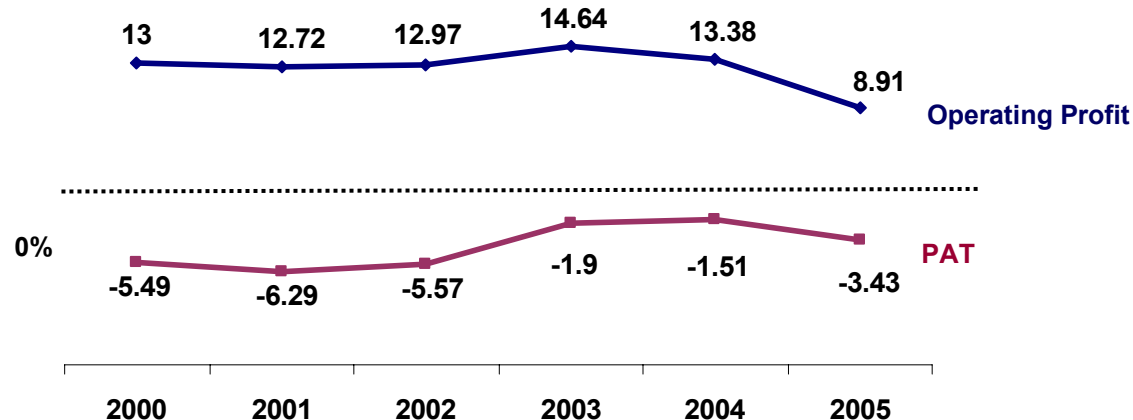
*With capacity utilisation at 65%, the processing industry has witnessed a drop in capital productivity*

Source: CMIE's Prowess Database

## Processing sector has reported losses for the past 5 years...

### Processing Sector Profitability

(% of Net Sales)



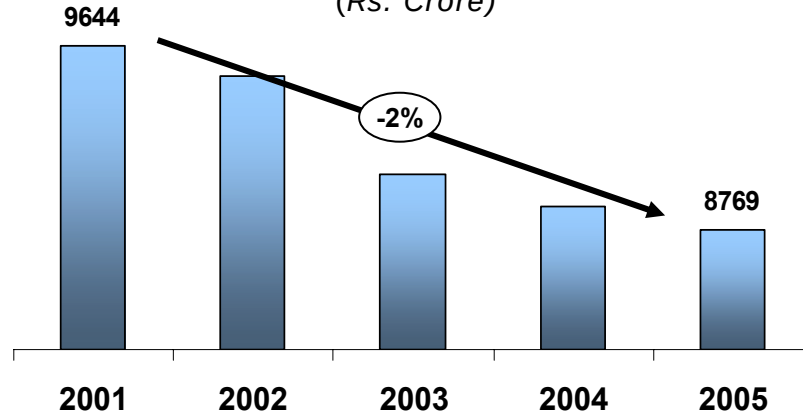
Source: CMIE's Prowess Database

Note: Operating profit and PAT data for all the companies covered by Prowess is provided in Annexure

# Unattractive returns have resulted in declining capital employed in the sector

## Processing Sector Capital Employed

(Rs. Crore)



*The unorganised processing segment has limited access to the capital markets*

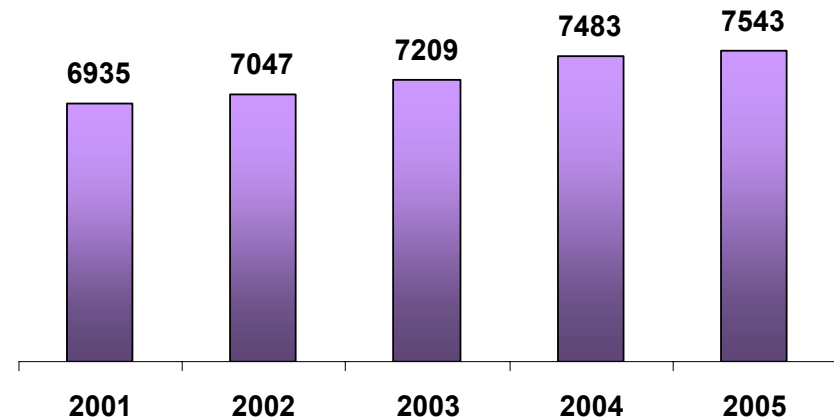
Source: CMIE's Prowess Database

# Inadequate capital employed affects the investment capacity of the industry

*Investments in plant and machinery are restricted to maintenance capital*

## Gross Value of Plant & Machinery

(Rs. Crore)

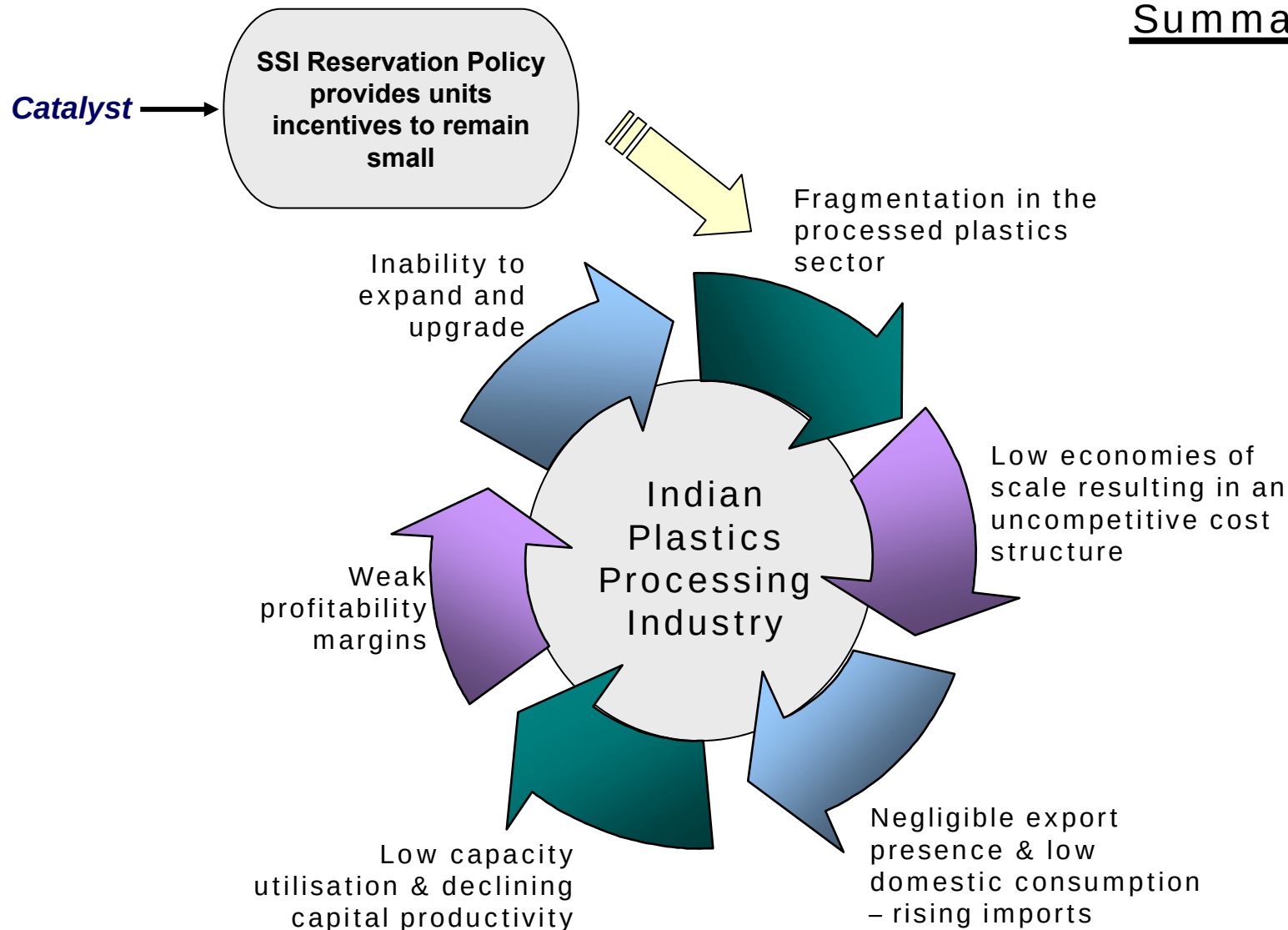


Source: CMIE's Prowess Database

Note: All financial data is based on a sample of 226 plastic processing companies covered in CMIE's Prowess Database

# The sector remains focussed on survival...aspirations to grow are limited

## Summary

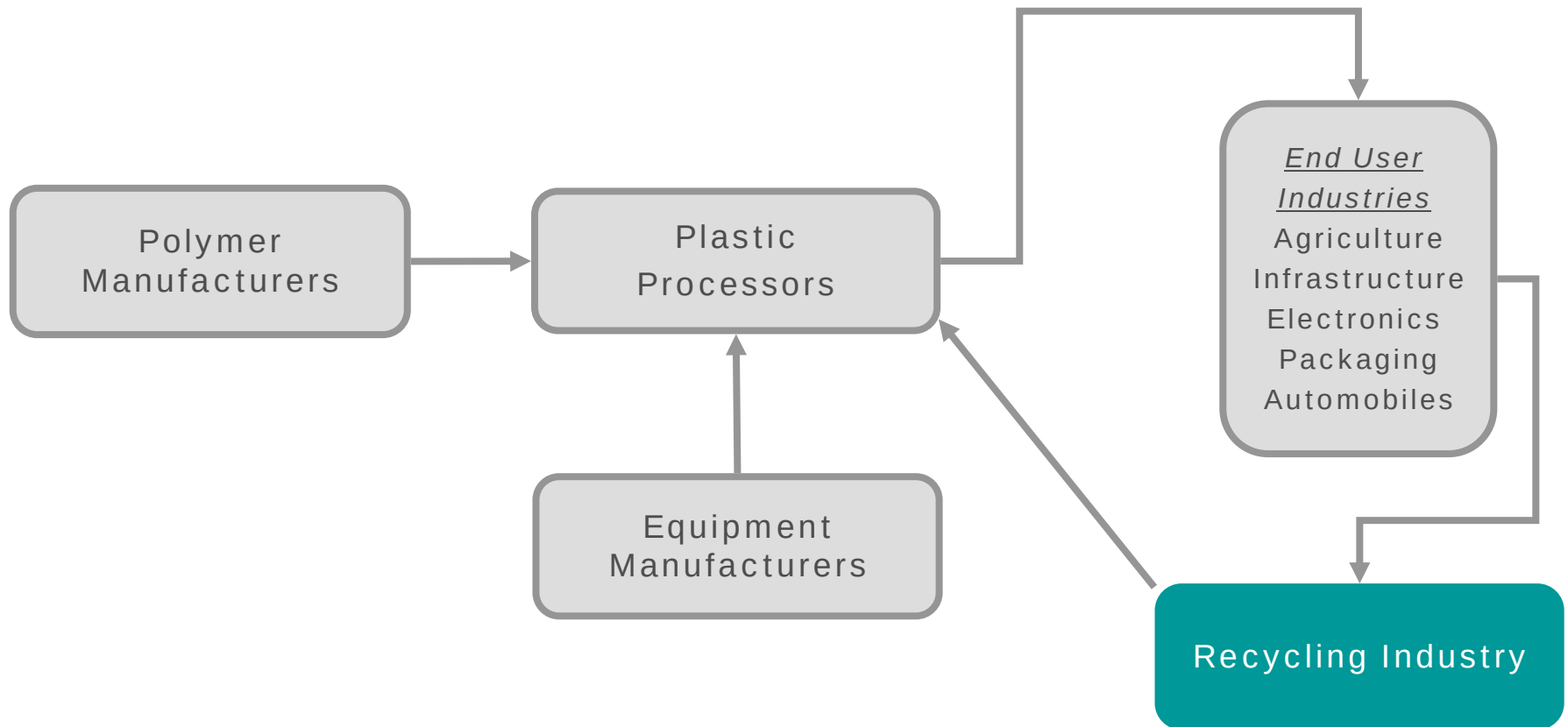


# The Plastic Processing sector is the weak link in the Plastics chain... it needs to be strengthened

## Summary

### Vision 2012 Action Agenda

- The Processing sector needs to *consolidate* to reap economies of scale and become competitive.
- Processing facilities should be *modernised* to enable manufacturing of higher value added products
- There must be a concerted effort to improve *labour productivity*
- The Industry should *“think big”* to look at exports as a lucrative opportunity



# Plastic is perceived to be a pollutant... ... Recycling proves us wrong



## *Plastic Recycling – An Industry by itself in India*

### Industry Snapshot

- 7360 units
- A Rs. 9200 crore industry
- Provides employment to 3.5 million people

### IMPACT

**India Recycles 60%  
of its plastic –  
highest in the world (20%)\***



**Plastic recycled into  
non-critical items of  
daily use**

**Waste Plastic  
Generates fuel**



**1 MT of waste plastic  
generates approximately  
1 tonne fuel\***

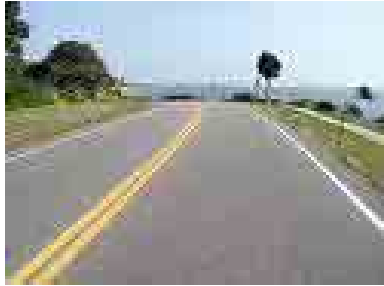
**Reduces Infrastructure  
Cost**



**Reduces road construction  
cost by 6%**

*Unlike other countries, Recycling in India is driven by  
economics rather than legislation*

# Plastic waste has application in road construction



*Waste plastic can be blended with Bitumen to improve its binding properties; moreover this leads to **savings of 5-10% per kilometre** in the cost of bitumen.*

## Benefits of the Waste Plastic-Bitumen blend

- Ability to withstand higher temperature
- Increased load carrying capacity
- Penetration of water is less resulting in resistance to pot hole formation
- 10% of bitumen otherwise required is saved in case of the blend
- Helps in the recycling of plastic since the alternative would be disposal of plastic by way of land filling and incineration



BENNETT, COLEMAN & CO LTD

# THE ECONOMIC TIMES

\* TUESDAY 14 NOVEMBER 2006 | MUMBAI |

## Surat may get plastic road

Melvyn Thomas  
SURAT

EVER imagined zooming on a plastic road? Could be a reality soon, if Surat's civic body has its way. Surat Municipal Corporation (SMC) is seriously considering the proposal submitted by Hindustan Prefab (HPL), a government enterprise, for laying a road using plastic waste.

"It's a new concept for us. We are seriously considering the proposal," says VD Patel, city engineer with SMC. The company is likely to furnish details about costs soon.

In the next few days, SMC would identify a 5-km stretch in the city to carry out the pilot project.

Plastic waste in the form of used plastic carrybags, disposable cups and PET bottles will act as an important ingredient in laying the road. "When mixed with hot bitumen, plastics melt to form an oily coat over the aggregate and the mixture is laid on the road surface like a normal tar road," said an engineer. Shredded plastic waste acts as a strong 'binding agent' for tar, making the asphalt last long and mixing plastic with bitumen increases the ability to withstand high temperatures, say sources.

# Plastic is energy efficient...

## AUTOMOBILES



*Replacement of metals  
by plastic improves  
vehicle mileage...  
Petrol consumption  
reduced by 750 litres  
over vehicle life*

*Source: The Automotive Research  
Association of India*

*Rs. 42,000 crore worth fuel  
savings over the lifespan of  
cars introduced till 2012 in  
India*

*Source: CRISIL Analysis*

*Plastic reduces CO2  
emissions by 50 MMT  
per year for the  
automobile sector  
globally*

*Source: The Automotive Research  
Association of India*

## CONSUMER DURABLES



*Plastics save 53  
billion/kwh or Rs.15,900  
crores annually in  
consumer durables*

*Source: Prof. R .P. Singh, IIT  
Kharagpur*

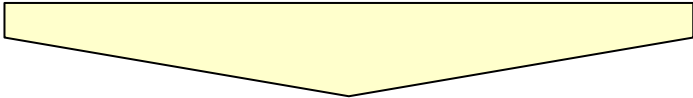
## CAUSES

### **Absence of standards**

- ⇒ Certifications establishing product quality
- ⇒ Standards for suitability of recycled plastic for manufacturing plastic products

### **Ineffectual Waste Management**

- ⇒ Residential & commercial establishments do not separately dispose waste and dry waste
- ⇒ Concerted effort not made by the authorities to increase awareness of the importance of separating waste



### **Impact**

- ⇒ *Poor quality products*
- ⇒ *Perceived as environmentally harmful material*

## Summary

### Key Observations

- India has a strong recycling industry but there is an absence of sufficient legislation and compliance to maintain quality standards
- There is a common perception that plastic is not environmentally friendly
- Lack of awareness about the energy saving property of plastic

### Vision 2012 Action Agenda

- Plastic needs to be positioned as an environmentally friendly product with its energy saving property highlighted
- Quality standards need to be laid down for the recycling sector in India and compliance should be ensured
- Plastic products should be labelled according to the virgin or recycled polymer that they use

## Section 4



# **The China Story**

## **- How has China nurtured its industry**

---

# Plastic processing is an “encouraged industry” in China

*China perceives Plastic to be resource saving and environmentally friendly*

## ***Infrastructural Incentives***

- ***Subsidized land costs***
- ***Subsidized Power costs***
  - ***China – \$ 0.05/kwh***
  - ***India – \$ 0.07/kwh***
- ***Plastic cities***
  - ***China – Cluster development to improve competitiveness***

## ***Financial Incentives***

- ***Preferential Tax Policies***
  - ***China – 15% to 24%***
  - ***India – 33%***
- ***Subsidized Financing:***
  - ***China – 5.5% to 6%***
  - ***India – 11%***
- ***Indirect Tax and Import Duty exemption***

*Source: The document is a compilation from various industry sources as well as Government sources. The websites referred are:*

- 1) <http://english.gov.cn>
- 2) <http://www1.cei.gov.cn/ce/index/report/cep7/guid2004.htm>
- 3) <http://english.mofcom.gov.cn/>

# China has multiple incentives to promote plastic processing

The Chinese government provides the following incentives:

→ **Preferential Tax policies**

→ Low rates of corporate tax enables companies to enjoy greater profitability

→ **Import tariff Rebates**

→ Reduces capital outlays and encourages modernization of facilities

→ **17% VAT exemptions**

→ Lowers cost and in turn boosts demand of finished products

→ **Bank financing at preferential rates**

→ This has facilitated the rapid expansion of the capital intensive Plastic processing industry

→ Working capital loans are provided at 5.58% with 10% concession possible on a case to case basis

→ Term loans are available at provided 5.5-6% for companies with good credit rating

*The Chinese Government incentives are scale neutral  
- Consequently Chinese manufacturers are motivated to increase scale to drive profitability*

# World class infrastructure and policy support have created a world beating combination

## Plastic Cities / SEZs

- The Chinese government has set-up 6-7 plastic cities:
  - ➔ Results in concentration of the industry and other stakeholders
  - ➔ Promotes cluster development initiatives
    - ➔ Assists units to bid and successfully execute large orders in consortiums
    - ➔ Improves overall industry competitiveness
- The provincial governments also promote encouraged industries:
  - ➔ Each province boasts of SEZs, FTZs, industrial parks that provide world class infrastructure
  - ➔ These zones attract desirable investments by providing subsidized land leases and power

## Regulatory Support

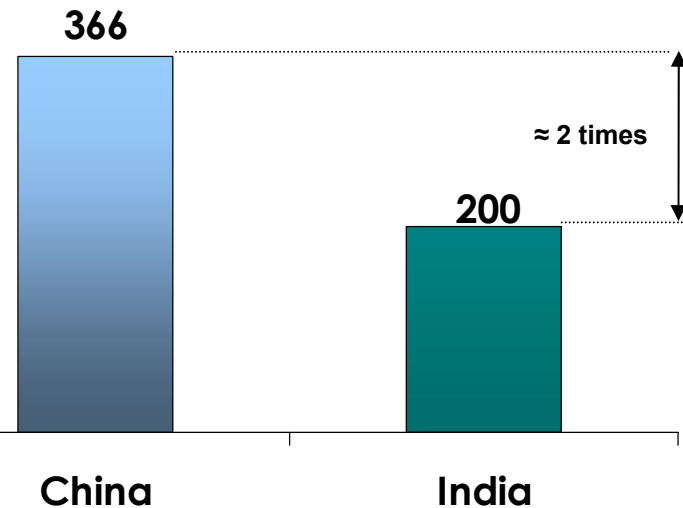
- The Chinese Government has issued policies encouraging the use of plastic in the construction and infrastructure sectors



# China versus India- The impact of a focused strategy

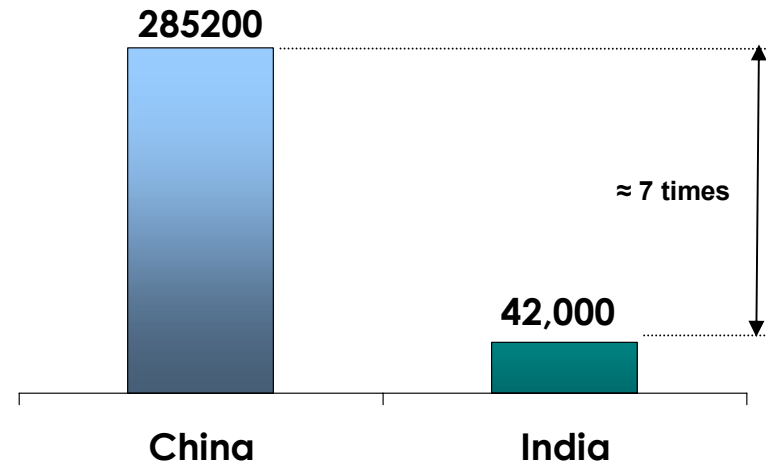
## Average Processing Unit Size (2005)

(MT per annum)



## Industry Turnover (2005)

(Rs. Crore)

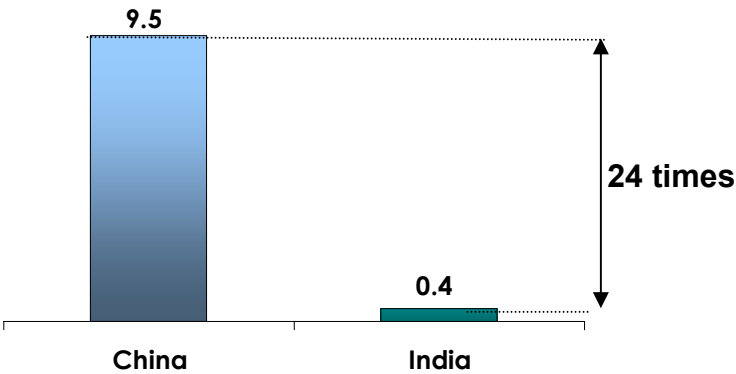


Source: China Plastics Processing Industry Association, CRISIL Analysis

***The Chinese plastics processing industry is beyond India's reach & has grown at 15.5% CAGR***

# China is a threat to India in the domestic & exports market

**Processed Plastic Exports (2005)**  
(MMT)

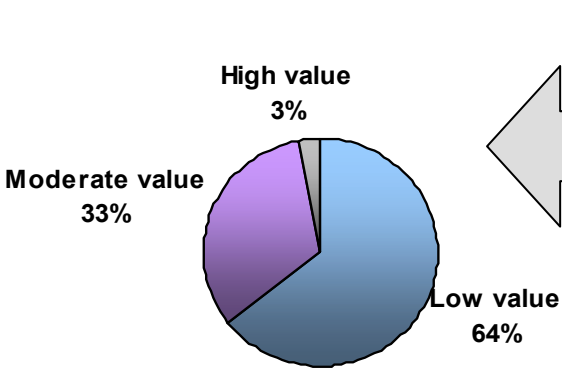


*China is the largest exporter of processed plastic products to India and the world*

Source: UN Stats, CRISIL Analysis  
Note: China includes Hong Kong

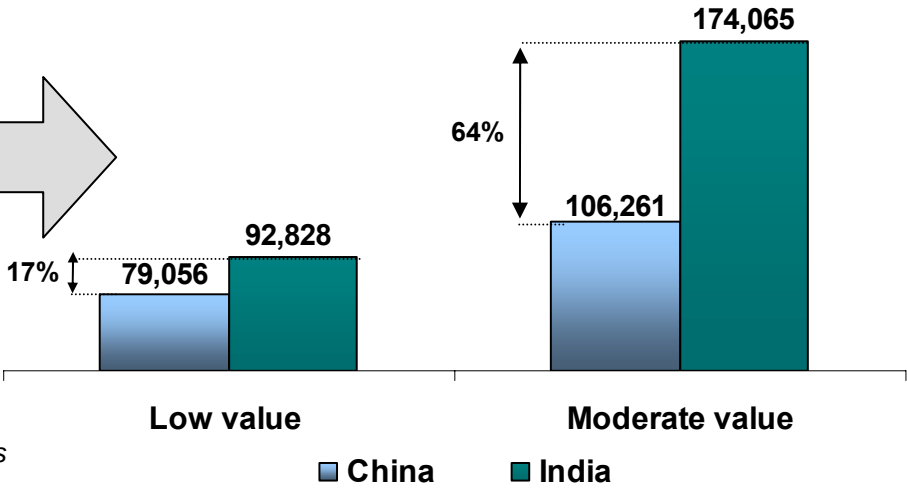
## China's exports are price competitive vis-à-vis India

**China's Processed Plastic Exports**  
(2005) ~ 9.5 MMT



Like India, China's is focused on the low value segment and its export realisations are lower than India

**Export Realisations (2005)**  
(Rs. crore per MMT)



Source: UN Stats, CRISIL Analysis  
Note: China includes Hong Kong

## Section 5

# Achieving Vision 2012 - Roadmap for Stakeholders

---

# SWOT Analysis of Indian plastics industry

## STRENGTHS

- Strong base in polymers
- Low cost labour
- High percentage of recycled plastic

## WEAKNESSES

- Low scale of production
- High cost of plastic for end-use applications
- Low labour productivity
- Obsolete machinery
- Poor industry image
- Industry not focussed on exports

- Rising crude oil prices
- Threat of polymer imports from the Middle East
- Strong processing industries in neighboring countries which could lead to imports
- Environmental concerns with Plastic packaging leading to replacement by substitutes

## THREATS

## OPPORTUNITIES

- Opportunity on account of plasticulture which is at a nascent stage in India
- Opportunity to tap higher value processed plastic exports where India has no presence
- Potential demand by growth of sun-rise industries such as Retail

# Action Agenda for Stakeholders

| Focus Area                                     | Government                                                                                                                                                                                                                                 | Association                                                                                                                                                                                                                                                              | Industry                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b><i>Consolidate and enhance Capacity</i></b> | <ol style="list-style-type: none"> <li>1) De-reserve articles of plastic reserved for the SSI sector in a phased manner</li> <li>2) Explore options of creating Plastic SEZs / clusters around polymer manufacturing facilities</li> </ol> | <ol style="list-style-type: none"> <li>1) Encourage consolidation among small scale players through:                         <ol style="list-style-type: none"> <li>a) Cluster development initiatives</li> <li>b) Consortium buying arrangements</li> </ol> </li> </ol> | <ol style="list-style-type: none"> <li>1) Large and medium size firms can pursue options such as mergers, acquisitions and JVs to increase capacity and reap economies of scale</li> <li>2) Small size firms can explore options such as producer companies, trading corporations to consolidate and become competitive.</li> </ol> |

# Action Agenda for Stakeholders

| Focus Area                                                | Government                                                                                                         | Association                                                                                                                                                                   | Industry                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b><i>Upgrade facilities and improve productivity</i></b> | <ol style="list-style-type: none"> <li>1) Enable technology upgradation by providing interest subsidies</li> </ol> | <ol style="list-style-type: none"> <li>1) Develop programs to improve worker productivity</li> <li>2) Promote collaboration between domestic and foreign companies</li> </ol> | <ol style="list-style-type: none"> <li>1) Invest in upstream and downstream capacities to meet domestic and export demand</li> <li>2) Modernize processing facilities to manufacture higher value added products</li> <li>3) Enter into JVs and technology sharing agreements with foreign companies</li> <li>4) Explore production outsourcing options</li> <li>5) Focus on training workers to enhance productivity</li> </ol> |

# Action Agenda for Stakeholders

| Focus Area                                                          | Government                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Association                                                                                                                       | Industry                                                                                                                                                                                    |
|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b><i>Increase utilisation of critical plastic applications</i></b> | <ol style="list-style-type: none"> <li>1) Reduce excise from 16% to 8% on Polymers and Plastics to:                         <ol style="list-style-type: none"> <li>a) Cut costs of processed foods by 1%                                 <ol style="list-style-type: none"> <li>I) Boost demand for processed foods by 1%</li> <li>II) Assist in achieving MoFPI's vision target</li> </ol> </li> <li>b) Cut costs on plasticulture applications by 4%                                 <ol style="list-style-type: none"> <li>I) Decrease farmer's upfront investment in plasticulture applications</li> </ol> </li> </ol> </li> <li>2) Correct the inverted duty structure between crude oil and naphtha</li> <li>3) Mandate the use of geo-synthetics for road construction</li> <li>4) Promote use of plastics in piping applications</li> </ol> | <ol style="list-style-type: none"> <li>1) Create / increase awareness among potential users of the benefits of plastic</li> </ol> | <ol style="list-style-type: none"> <li>1) Invest in R&amp;D to develop new applications</li> <li>2) Create / increase awareness among potential users of the benefits of plastic</li> </ol> |

| Focus Area                                                           | Government                                                                                                                                                                                                                                                                                                                                                          | Association                                                                                                                                                                                                                        | Industry                                                                                                   |
|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| <b><i>Promote an environmentally conscious image of plastics</i></b> | <ol style="list-style-type: none"> <li>1) Municipal corporations should:                         <ol style="list-style-type: none"> <li>a) Implement dry and wet garbage separation scheme</li> <li>b) Utilize waste plastics for use in roads, fuel production, etc</li> <li>c) Prepare standards for virgin and recycled plastics products</li> </ol> </li> </ol> | <ol style="list-style-type: none"> <li>1) Work with the industry to increase compliance with environment norms</li> <li>2) Develop advertisement campaigns to position plastics as an environmentally friendly material</li> </ol> | <ol style="list-style-type: none"> <li>1) Ensure compliance with government /industry standards</li> </ol> |



## Section 6

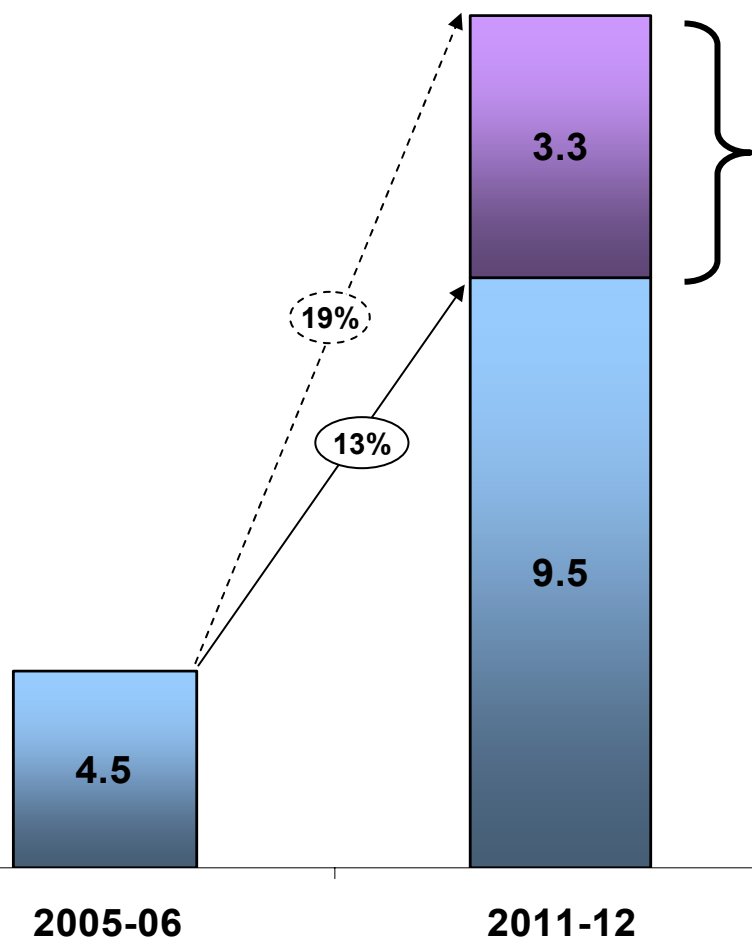
# Conclusion

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# India must pursue Vision 2012...

## Polymer Demand in India

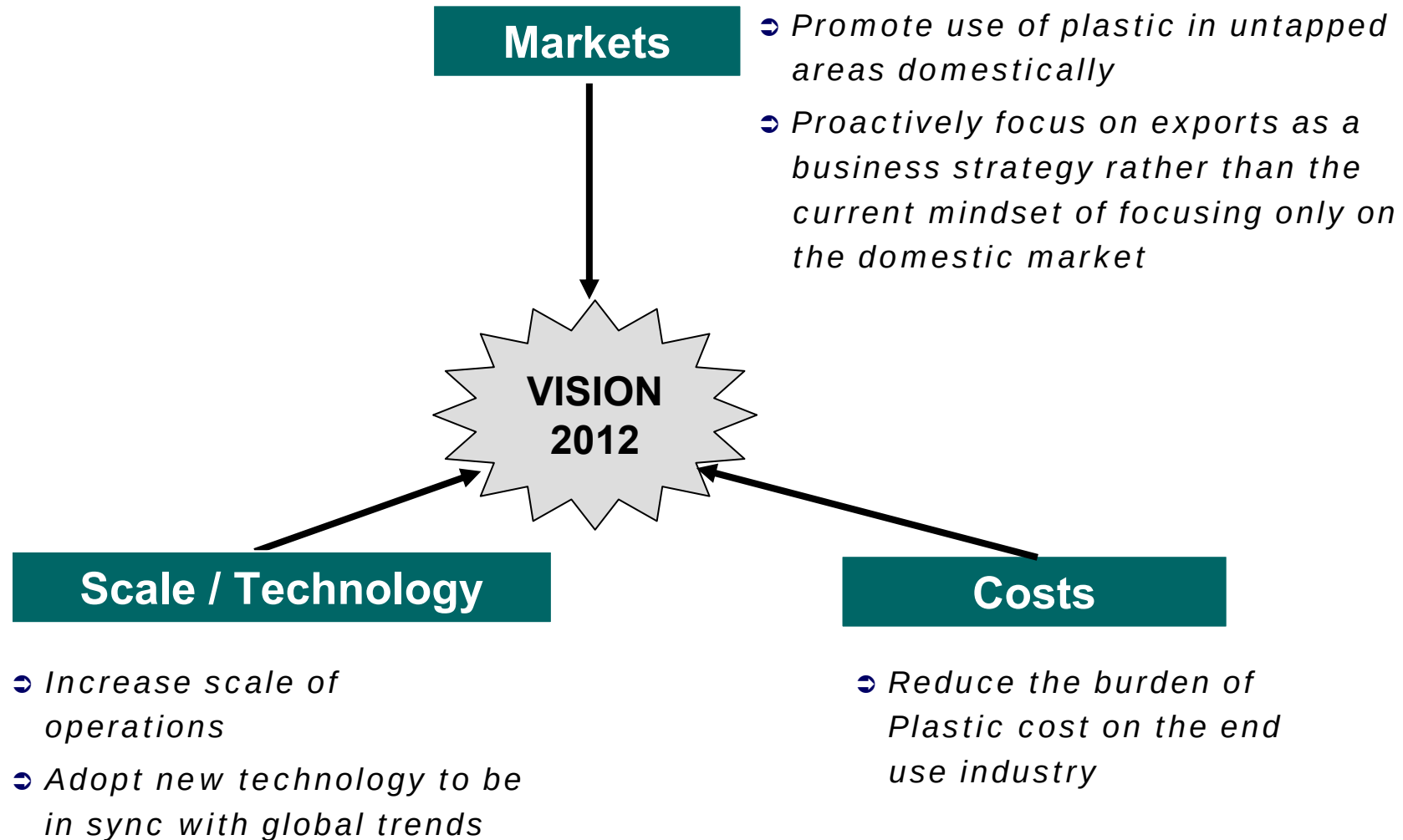
(MMT)



This incremental consumption will have a far reaching impact on sectors critical for India's growth:

- Agriculture
- Infrastructure
- Retail

# To succeed, the Industry needs to gain control over...



## Section 7

## **Annexure**

---

| Polymer Manufacturers |                                                 |
|-----------------------|-------------------------------------------------|
| 1                     | Gujarat State Fertilisers and Chemicals Limited |
| 2                     | Haldia Petrochemicals Limited                   |
| 3                     | Reliance Industries Limited                     |

| Plastic Processors |                                               |
|--------------------|-----------------------------------------------|
| 1                  | Garware Polyester Limited                     |
| 2                  | Jain Irrigation Systems Limited               |
| 3                  | Leading Luggage Manufacturer                  |
| 4                  | Nilkamal Plastics Limited                     |
| 5                  | Prince Plastics International Private Limited |
| 6                  | The Paper Products Limited                    |
| 7                  | The Supreme Industries Limited                |
| 8                  | Welset Plast Extrusions Private Limited       |

## Associations

| Associations |                                                        |
|--------------|--------------------------------------------------------|
| 1            | All India Flat Tape Manufacturers Association (AIFTMA) |
| 2            | All India Plastic Industries Association (AIPIA)       |
| 3            | Indian Centre for Plastics in the Environment (ICPE)   |
| 4            | PlastIndia Foundation                                  |
| 5            | The Plastics Exports Promotion Council (Plexconcil)    |

## Development Institutes

| Development Institutes |                                                                               |
|------------------------|-------------------------------------------------------------------------------|
| 1                      | Agricultural and Processed Food Products Export Development Authority (APEDA) |
| 2                      | Central Institute of Plastics Engineering and Technology (CIPET)              |
| 3                      | Indian Institute of Packaging (IIP)                                           |
| 4                      | National Committee on the Plasticulture Applications in Horticulture (NCPAH)  |

## Others

| Others |                                                                             |
|--------|-----------------------------------------------------------------------------|
| 1      | Consulate General of Israel - Mumbai                                        |
| 2      | Mr. D. S. Jhala – Dev Salt Works                                            |
| 3      | Mr. A. Narayanmoorthy – Reader, Gokhale Institute of Politics and Economics |

# List of Abbreviations

|        |                                           |
|--------|-------------------------------------------|
| ABS    | Acrylonitrile Butadiene Styrene           |
| CAGR   | Compounded Annual Growth Rate             |
| CENVAT | Central Value Added Tax                   |
| CMIE   | Centre for Monitoring the Indian Economy  |
| DGFT   | Directorate General of Foreign Trade      |
| EU     | European Union                            |
| FTZ    | Free Trade Zone                           |
| GDP    | Gross Domestic Product                    |
| GoI    | Government of India                       |
| HDPE   | High Density Polyethylene                 |
| HS     | Harmonised System                         |
| IOC    | Indian Oil Corporation                    |
| IPCL   | Indian Petrochemicals Corporation Limited |
| JV     | Joint Venture                             |
| LDPE   | Low Density Polyethylene                  |
| LLDPE  | Linear Low Density Polyethylene           |

|       |                                            |
|-------|--------------------------------------------|
| MMT   | Million Metric Tonnes                      |
| MoFPI | Ministry of Food Processing Industries     |
| MW    | Mega Watts                                 |
| OPBIT | Operating Profit Before Interest and Taxes |
| PAT   | Profit After Tax                           |
| PBR   | Poly Butadiene Rubber                      |
| PP    | Polypropylene                              |
| PS    | Polystyrene                                |
| PVC   | Poly Vinyl Chloride                        |
| RIL   | Reliance Industries Limited                |
| SBR   | Styrene Butadiene Rubber                   |
| SEZ   | Special Economic Zone                      |
| SSI   | Small Scale Industry                       |
| TUFS  | Technology Upgradation Fund Scheme         |
| VAT   | Value Added Tax                            |

## POLYMERS

## H. S. CODES



### Low Value

i.e. Export Realisations < \$2 per kg

390110, 390120, 390130, 390190, 390210, 390220,  
390230, 390290, 390311, 390319, 390320, 390330,  
390390, 390410, 390421, 390422, 390440, 390512,  
390521, 390750, 390760, 390910, 390920, 391110



### Moderate Value

i.e. Export Realisations < \$4 per kg

390430, 390450, 390490, 390519, 390529, 390530,  
390610, 390690, 390710, 390720, 390730, 390740,  
390791, 390799, 390810, 390890, 390930, 390940,  
390950, 391190, 391211, 391212, 391220, 391231



### High Value

i.e. Export Realisations > \$4 per kg

390469, 390461, 390591, 390599, 391000, 391239,  
391290, 391310, 391390, 391400



## PROCESSED PLASTICS

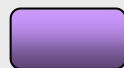
## H.S. CODES



### Low Value

i.e. Export Realisations < \$3 per kg

391620, 391723, 391810, 391890, 392010, 392020,  
392030, 392043, 392049, 392093, 392112, 392310,  
392321, 392410, 392490, 392530, 392610, 392620,  
392640



### Moderate Value

i.e. Export Realisations < \$6 per kg

391610, 391690, 391721, 391722, 391729, 391731,  
391732, 391733, 391739, 391910, 392051, 392059,  
392062, 392063, 392071, 392072, 392091, 392092,  
392094, 392111, 392113, 392114, 392119, 392190,  
392210, 392220, 392329, 392330, 392340, 392350,  
392390, 392510, 392520, 392590, 392690



### High Value

i.e. Export Realisations > \$6 per kg

391710, 391740, 391990, 392061, 392069, 392073,  
392079, 392099, 392290, 392630

# Items reserved for manufacture in the SSI sector

## PLASTIC PRODUCTS

| Product Code | Name of Product                                                                                                                                                                                                                         |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 301201       | Full PVC footwear chappals, sandals & shoes                                                                                                                                                                                             |
| 303201       | Acrylic sheets                                                                                                                                                                                                                          |
| 303303       | Fibre Glass reinforced plastic products other than the following:<br>(a) SMC & DMC and its mouldings<br>(b) Continuous Filament Winding (Pipes above 600 mm diameter)<br>(c) Pultruded products<br>(d) FRP sheets by continuous process |
| 30330402     | Hessian, paper and cloth to polyethylene laminations-Straight and sandwiched by extrusion coating process except paper to polyethylene laminations for integrated packing                                                               |
| 303402       | H.D. Polyethylene Mono Filament (Except for captive use for rope manufacturers)                                                                                                                                                         |
| 303403       | Polypropylene Mono Filament (Except for captive use for rope manufactures)                                                                                                                                                              |
| 30350101     | Polyethylene Films with thickness less than 0.10 mm except co-extruded film cross linked                                                                                                                                                |
| 30350102     | Products of polyethylene films as coloured printed films & bags                                                                                                                                                                         |
| 303601       | Spectacle frames by fabrication or by injection moulding                                                                                                                                                                                |
| 303702       | Polypropylene tubular films (except biaxially oriented)                                                                                                                                                                                 |
| 30370301     | Industrial items from engineering Plastics material by fabrication process only                                                                                                                                                         |
| 303705       | Polypropylene box strapping                                                                                                                                                                                                             |
| 30370601     | Polyethylene and PVC flexible hoses (except wire braided hoses)                                                                                                                                                                         |

Source: Ministry of Small Scale Industries Website.

Note: This is as per the list as on May 2006

# Items reserved for manufacture in the SSI sector

## INJECTION MOULDING THERMO – PLASTIC PRODUCTS

| Product Code | Name of Product           |
|--------------|---------------------------|
| 303707       | 1. Handles                |
| 303802       | 2. Soap cases             |
| 303804       | 3. Buckets                |
| 303808       | 4. Cups                   |
| 303810       | 5. Lunch boxes            |
| 303812       | 6. Water jugs             |
| 303816       | 7. Saucers                |
| 303818       | 8. Tumblers               |
| 30382200     | 8A. Plastic Cane          |
| 303831       | 9. Bins for various sizes |
| 303832       | 10. Washing bowls         |
| 303833       | 11. Salad baskets         |
| 303834       | 12. Dust pans and bins    |
| 303835       | 13. Hair brushes          |
| 303836       | 14. Umbrella frames       |
| 303837       | 15. Hinged hair pins      |
| 303838       | 16. Babies bath tubs      |
| 303839       | 17. Mugs                  |

| Product Code | Name of Product                                                                         |
|--------------|-----------------------------------------------------------------------------------------|
| 303840       | 18. Plates and dishes                                                                   |
| 303841       | 19. Salt containers                                                                     |
| 303843       | 21. Pencil boxes                                                                        |
| 303844       | 22. Coffee pots                                                                         |
| 303845       | 23. Coffee pot covers                                                                   |
| 303846       | 24. Table calendar stands                                                               |
| 303847       | 25. Office table tray                                                                   |
| 303848       | 26. Waste paper baskets                                                                 |
| 30390102     | Flexible polyurethane foam products                                                     |
| 303902       | Polystyrene foam products (except slabs for expandable polystyrene beads manufacturers) |
| 303903       | Plastic buttons                                                                         |
|              | Fabricated plastic products as follows:-                                                |
| 30390401     | 1. Advertising novelties                                                                |
| 30390402     | 2. Desk calendar                                                                        |
| 30390403     | 3. Pen stand                                                                            |
| 30390405     | 5. Decorative and Industrial fixtures                                                   |
| 30390406     | 6. Street lights                                                                        |
| 30390407     | 7. Corridor lights                                                                      |

Source: Ministry of Small Scale Industries Website.

Note: This is as per the list as on May 2006

## INJECTION MOULDING THERMO – PLASTIC PRODUCTS

| Product Code | Name of Product                                                                                     |
|--------------|-----------------------------------------------------------------------------------------------------|
| 30390408     | 8. Passage lights                                                                                   |
| 30390409     | 9. Building models (Prototype)                                                                      |
| 30390410     | 10. Machine model (Prototype)                                                                       |
| 303909       | Plastic combs                                                                                       |
| 30391201     | PVC Pipes including conduits – Up to 110 mm diameter                                                |
| 30393501     | Fittings for PVC pipes including conduits up to 110 mm diameter                                     |
| 303913       | Zip fasteners - Non metallic (Except in the case of integrated plants manufacturing all components. |
| 30390501     | Compression moulded plastic products excluding decorative and industrial laminates                  |
| 303916       | Plastic rain coats                                                                                  |
| 303926       | Flash light torch cases-plastic                                                                     |
| 303927       | Polyester sheets                                                                                    |
| 303928       | Other thermo welded plastic product such as:                                                        |
| 30392801     | 1. Shopping bags                                                                                    |
| 30392802     | 2. Diaries                                                                                          |
| 30392803     | 3. File cover                                                                                       |
| 30392804     | 4. Badges/Folders                                                                                   |
| 30392805     | 5. Advertising materials                                                                            |
| 30392806     | 6. Wallets                                                                                          |

Source: Ministry of Small Scale Industries Website.

Note: This is as per the list as on May 2006

# Items reserved for manufacture in the SSI sector

## INJECTION MOULDING THERMO – PLASTIC PRODUCTS

| Product Code | Name of Product                                           |
|--------------|-----------------------------------------------------------|
| 30392807     | 7. Passport covers                                        |
| 30392808     | 8. Tool kit covers                                        |
| 30392810     | 10. Industrial packing for calculations, Microphones etc. |
| 30392811     | 11. Inside assembly of brief cases                        |
| 30392812     | 12. Key chains                                            |
| 30392813     | 13. Identity cards and visiting cards                     |
| 30392814     | 14. Albums                                                |
| 30392815     | 15. Textile welding for garments                          |
| 31303962     | Toilet seats                                              |
| 303963       | Toilet lids                                               |
| 303964       | Letter/Words                                              |

# Profitability Data

| Company Name                | PBDIT (%) | Net Profit (%) |
|-----------------------------|-----------|----------------|
| Acrysil Ltd.                | 17.88     | 3.24           |
| Aditya Polymers Ltd.        | 0         | -22.08         |
| Akar Laminators Ltd.        | -15.21    | -33.11         |
| Alfa Ica (India) Ltd.       | 7.14      | 1.47           |
| Amradeep Industries Ltd.    | 6.78      | -11.86         |
| Arcee Industries Ltd.       | 2.02      | -0.53          |
| Arham Plastics Ltd.         | 14.6      | 3.45           |
| Aristocrat Luggage Ltd.     | 8.14      | 3.65           |
| Arrow Coated Products Ltd.  | 6.66      | 2.48           |
| Ashish Polyplast Ltd.       | 4.41      | 0.55           |
| Ashok Polymers Ltd.         | 8.34      | 1.93           |
| Axel Polymers Ltd.          | 6.24      | 0.47           |
| Axiom Impex Intl. Ltd.      | 8.18      | 7.18           |
| Ayepee Lamitubes Ltd.       | 1073.33   | -53.33         |
| Bajaj Steel Inds. Ltd.      | 4.43      | 0.57           |
| Bakelite Hylam Ltd.         | -18.3     | -29.01         |
| Balmer Lawrie-Van Leer Ltd. | 12.21     | 4.53           |
| Bericap India Pvt. Ltd.     | 9.78      | -10.11         |
| Bhagyanagar Wood Plast Ltd. | 5.75      | 1.51           |
| Bhor Industries Ltd.        | -900      | -1386.36       |
| Biopac India Corpn. Ltd.    | 6.84      | -23.69         |
| Bisleri Gujarat Ltd.        | 36.73     | 7.65           |
| Bloom Dekor Ltd.            | 3.2       | -4.08          |

| Company Name                     | PBDIT (%) | Net Profit (%) |
|----------------------------------|-----------|----------------|
| Bluplast Industries Ltd.         | 7.22      | 3.44           |
| Bonanza Biotech Ltd.             | -29.17    | -125           |
| Bright Brothers Ltd.             | 7.97      | -1.45          |
| C G-P P I Adhesive Products Ltd. | 20.71     | 10.7           |
| Caprihans India Ltd.             | 6.86      | 2.99           |
| Ceejay Finance Ltd.              | 2447.06   | 576.47         |
| Century Laminating Co. Ltd.      | 7.64      | 2              |
| Cosmo Films Ltd.                 | 12.84     | 1.96           |
| Deccan Polypacks Ltd.            | 6.11      | 1.98           |
| Deco-Mica Ltd.                   | 3.17      | 0.14           |
| Duropack Ltd.                    | -30.67    | -210.67        |
| Dutron Polymers Ltd.             | 7.64      | 1.69           |
| E P C Industrie Ltd.             | -7.7      | -27.64         |
| Eastern Synpacks Ltd.            | -3.74     | -16.98         |
| Ecoplast Ltd.                    | 5.49      | -0.29          |
| Elpro Packaging Ltd.             | 4.96      | 4.96           |
| Essel Propack Ltd.               | 34.94     | 15.36          |
| Ester Industries Ltd.            | 0.74      | -8.22          |
| Fancy Fittings Ltd.              | 20.09     | 12.79          |
| Fenoplast Ltd.                   | 6.76      | 0.85           |
| Fiberweb (India) Ltd.            | 11.6      | 0.72           |
| Fine Plast Polymers Ltd.         | -32.35    | -307.35        |
| Flex Industries Ltd.             | 11.06     | 2.7            |

# Profitability Data

| Company Name                   | PBDIT (%) | PAT (%) |
|--------------------------------|-----------|---------|
| Galore Prints Inds. Ltd.       | -9.97     | -33.93  |
| Ganpati Plastfab Ltd.          | 8.22      | 1.39    |
| Garware Polyester Ltd.         | 9.56      | -0.09   |
| Gilt Pack Ltd.                 | -11.45    | -68.38  |
| Golden Laminates Ltd.          | 10.08     | 2.2     |
| Gopala Polyplast Ltd.          | 5.97      | 0.78    |
| Gothi Plascon (India) Ltd.     | -5.3      | -13.58  |
| Greenfield Corp Ltd.           | 7.22      | -2.06   |
| Gujarat Craft Inds. Ltd.       | 3.91      | 0.73    |
| Gujarat Raffia Inds. Ltd.      | -5.77     | -10.92  |
| Gujarat Synthwood Ltd.         | -4500     | -15100  |
| Gujarat Toolroom Ltd.          | -9.09     | -118.18 |
| Gwalior Industries India Ltd.  | -9.84     | -39.12  |
| Hindustan Adhesives Ltd.       | 5.44      | -4.76   |
| Hitech Plast Ltd.              | 17.32     | 6.34    |
| Hitkari Industries Ltd.        | 5.94      | 0.4     |
| Infra Industries Ltd.          | 1.62      | -4.68   |
| Innocorp Ltd.                  | 13.62     | 8.25    |
| Innovative Tech Pack Ltd.      | 1.01      | -36.69  |
| Integrated Thermoplastics Ltd. | 2.31      | 0.5     |
| International Conveyors Ltd.   | 10.35     | 5.34    |
| J M G Corporation Ltd.         | -11.36    | -87.5   |
| Jain Irrigation Systems Ltd.   | 10.26     | 1.92    |

| Company Name                      | PBDIT (%) | PAT (%)   |
|-----------------------------------|-----------|-----------|
| Jalpac India Ltd.                 | 2.67      | -7.36     |
| Jauss Polymers Ltd.               | 22.62     | -37.7     |
| Jayavant Products Ltd.            | 98.91     | 91.3      |
| Jayshree Polytex Ltd.             | 12.68     | 4.39      |
| Jhaveri Flexo India Ltd.          | 8.77      | 1.19      |
| Jindal Poly Films Ltd.            | 8.97      | 2.66      |
| Jolly Plastic Inds. Ltd.          | -11.71    | -16.67    |
| Jumbo Bag Ltd.                    | 10.72     | 2.23      |
| K B Steel Ltd.                    | 33.33     | 33.33     |
| K G Petrochem Ltd.                | 16.65     | 3.24      |
| Kanoria Plaschem Ltd.             | 15.85     | -4.43     |
| Kanpur Plastipack Ltd.            | 4.43      | 0.67      |
| Karnavati Alfa International Ltd. | 31.38     | 17.86     |
| Karur K C P Packagings Ltd.       | 10.82     | 2.12      |
| Kemp & Co. Ltd.                   | 7.2       | -25.19    |
| Kemrock Industries & Exports Ltd. | 25.12     | 7.86      |
| Kisan Extrusions Ltd.             | 5.74      | 1.35      |
| Kisan Irrigations Ltd.            | 5.02      | 1.58      |
| Kisan Mouldings Ltd.              | 10.61     | 3.29      |
| Kosha Cubidor Containers Ltd.     | -30       | -80       |
| Krishna Filaments Ltd.            | -8678.57  | -37635.71 |
| Krishna Vinyls Ltd.               | -2.42     | -55.77    |
| Kunststoffe Industries Ltd.       | -218.34   | -1139.05  |

# Profitability Data

| Company Name                                  | PBDIT (%) | PAT (%) |
|-----------------------------------------------|-----------|---------|
| Kuwer Industries Ltd.                         | 8.62      | 2.39    |
| M P Polypropylene Ltd.                        | -14.49    | -33.04  |
| M T Z Polyfilms Ltd.                          | 8.45      | -1.97   |
| Machino Plastics Ltd.                         | 20.85     | 1.08    |
| Maniyar Plast Ltd.                            | -17.79    | -96.92  |
| Manjushree Extrusions Ltd.                    | 12.29     | 2.12    |
| Maple Industries (Laminates) Ltd.             | -100      | -128.57 |
| Marvel Industries Ltd.                        | -8.4      | -40.08  |
| Marvel Vinyls Ltd.                            | 3.18      | 0.59    |
| Max India Ltd.                                | 11.08     | -0.76   |
| Merino Panel Products Ltd.                    | 8.11      | 1.67    |
| Mewar Polytex Ltd.                            | 7.92      | 1.53    |
| Midland Plastics Ltd.                         | 6.3       | 0.41    |
| Milton Plastics Ltd.                          | -7.01     | -63.66  |
| Mold-Tek Technologies Ltd.                    | 9.82      | 4.73    |
| Monalisa Infotech Ltd.                        | 17.04     | 6.61    |
| Morgan Industries Ltd.                        | 10.69     | 2.57    |
| Movilex Irrigation Ltd.                       | -19.61    | -61.99  |
| Multi-Flex Lami-Print Ltd.                    | 10.79     | 1.59    |
| Naman Plastic Processor Ltd.                  | 6.78      | 2.02    |
| Narendra Polyprints Ltd.                      | -0.21     | -0.57   |
| Narmada Macplast Drip Irrigation Systems Ltd. | 5.45      | -32.73  |
| Natco Polyplast Ltd.                          | 4.86      | -9.41   |

| Company Name                      | PBDIT (%) | PAT (%)  |
|-----------------------------------|-----------|----------|
| Natco Polyplast Ltd.              | 4.86      | -9.41    |
| National Flask Inds. Ltd.         | -1020.23  | -1538.15 |
| National Plastic Inds. Ltd.       | 2.69      | -5.89    |
| Neo Sack Ltd.                     | 8.36      | 3.5      |
| Nilkamal Ltd.                     | 7.85      | 1.12     |
| Numech Emballage Ltd.             | 7.14      | -4.76    |
| Ocean Agro (India) Ltd.           | 11.17     | -0.62    |
| Orient Press Ltd.                 | -1.58     | -15.91   |
| P E T Fibres Ltd.                 | 25.46     | 19.83    |
| Pankaj Polymers Ltd.              | 4.89      | 0.12     |
| Paper Products Ltd.               | 12.22     | 4.49     |
| Paradise Plastics Enterprise Ltd. | 7.47      | 1.71     |
| Pasumai Irrigations Ltd.          | -11.71    | -54.15   |
| Peacock Industries Ltd.           | -0.93     | -13.49   |
| Pearl Polymers Ltd.               | 11.15     | 1.65     |
| Pet Plastics Ltd.                 | 5.46      | 5.32     |
| Pioneer Polyfeb Ltd.              | 13.01     | -1.92    |
| Pithampur Poly Products Ltd.      | 3.01      | -16.6    |
| Pololight Industries Ltd.         | 3.01      | -40.58   |
| Polycon International Ltd.        | 10.49     | -0.24    |
| Polynova Industries Ltd.          | 4.94      | 0.95     |
| Polyplex Corporation Ltd.         | 9.36      | -1.51    |
| Premier Polyfilm Ltd.             | 2.79      | -2.12    |



# Profitability Data

| Company Name                      | PBDIT (%) | PAT (%) |
|-----------------------------------|-----------|---------|
| Premier Vinyl Flooring Ltd.       | -8.46     | -43.88  |
| Prestige Hm-Polycontainers Ltd.   | -21.15    | -33.28  |
| Prima Plastics Ltd.               | 5.87      | -0.17   |
| Profitcore Pipes Ltd.             | -1.66     | -6.62   |
| Promact Plastics Ltd.             | 12.07     | 2.92    |
| R T Packaging Ltd.                | -13.83    | -46.14  |
| Rabha Plastics Ltd.               | -2.93     | -26.78  |
| Radha Madhav Corpn. Ltd.          | 12.82     | 7.12    |
| Radiant Rotogravure Ltd.          | -30.9     | -65.14  |
| Raj Packaging Inds. Ltd.          | 7.88      | 3.05    |
| Rajasthan Synthetic Inds. Ltd.    | 13.54     | 5.76    |
| Ras Extrusions Ltd.               | -5.13     | -13.52  |
| Ras Propack Lamipack Ltd.         | 2.64      | -65.83  |
| Rishi Packers Ltd.                | 8.29      | 0.49    |
| Roplas (India) Ltd.               | -376.69   | -393.87 |
| Royal Cushion Vinyl Products Ltd. | -15.98    | -77.34  |
| Rungta Irrigation Ltd.            | 10.5      | -0.41   |
| Rupal Laminates Ltd.              | 10.42     | 3.59    |
| S P L Techno Chem Ltd.            | 14.11     | 9.92    |
| Safari Industries (India) Ltd.    | 5.42      | -0.65   |
| Sah Polymers Ltd.                 | 10.43     | 5.73    |
| Salguti Industries Ltd.           | 3.27      | 0.44    |
| Shaily Engineering Plastics Ltd.  | 16.75     | 4.16    |

| Company Name                               | PBDIT (%) | PAT (%) |
|--------------------------------------------|-----------|---------|
| Shankar Packagings Ltd.                    | 13.29     | 5.57    |
| Sharp Industries Ltd.                      | 18.44     | 6.46    |
| Shivalik Agro Poly Products Ltd.           | 11.61     | 4.5     |
| Shree Rama Multi-Tech Ltd.                 | 14.59     | -37.34  |
| Shri Jagdamba Polymers Ltd.                | 4.1       | -3.81   |
| Shripet Cybertech Systems Ltd.             | 0.92      | -14.8   |
| Siro Plast Ltd.                            | 8.3       | 2.52    |
| Skip Plastics Ltd.                         | -5.78     | -25.84  |
| Sonal Adhesives Ltd.                       | 6.46      | 3.53    |
| Soni Rubber Products Ltd.                  | 6.48      | 0.93    |
| Sturdy Industries Ltd.                     | 4.22      | 0.52    |
| Sunrise Containers Ltd.                    | 17.81     | 10.24   |
| Supreme Industries Ltd.                    | 8.97      | 1.96    |
| Swadeshi Industries & Leasing Ltd.         | -19.8     | -25.74  |
| Synthetic Moulders Ltd.                    | 1.81      | -2.53   |
| T P I India Ltd.                           | -3.46     | -316.26 |
| Tainwala Chemicals & Plastics (India) Ltd. | 17.6      | 9.99    |
| Tainwala Polycontainers Ltd.               | 8.64      | 2.49    |
| Terra Films Pvt. Ltd.                      | 10.25     | 0.35    |
| Texel Industries Ltd.                      | 2.28      | -7.5    |
| Texplast Industries Ltd.                   | 0.38      | -20.82  |
| Tokyo Plast International Ltd.             | 13.8      | 0.07    |
| Uma Petro Products India Ltd.              | -28       | -76     |

# Profitability Data

| Company Name                          | PBDIT (%) | PAT (%) |
|---------------------------------------|-----------|---------|
| Uma Polymers Ltd.                     | 9.07      | 2.29    |
| Union Quality Plastics Ltd.           | -2.36     | -19.06  |
| Uniplas India Ltd.                    | -10862.5  | -27975  |
| Uniproducs (India) Ltd.               | 12.08     | 3.03    |
| Ushma Polymers Ltd.                   | 2.13      | -72.34  |
| V I P Industries Ltd.                 | 7.94      | 0.62    |
| Vallabh Poly-Plast International Ltd. | -25.25    | -28.28  |
| Venlon Enterprises Ltd.               | 4.06      | -3.1    |
| Venlon Metallising Pvt. Ltd.          | -118.92   | -578.38 |
| Victory Laminations Ltd.              | 5.99      | -21.58  |
| Vinyoflex Ltd.                        | 7.68      | 1.94    |
| Virgo Polymers (India) Ltd.           | 8.8       | 3.01    |
| Volplast Ltd.                         | 2.3       | 0.38    |
| W H Targett India Ltd.                | 30        | 0       |
| Wavin India Ltd.                      | -1600     | -1700   |
| Wilwayfort India Ltd.                 | 0.18      | -9.16   |
| Wim Plast Ltd.                        | 10.61     | 2.29    |
| Wopolin Plastics Ltd.                 | 1.01      | -5.56   |
| Xpro India Ltd.                       | 10.6      | -0.39   |

# Workings for Excise Impact on Agriculture GDP

## – Agriculture GDP Projection

- The Planning Commission has targeted 4.1% GDP growth for the agriculture sector
- The 2006-07 agriculture GDP (at current prices) is assumed to grow from Rs. 6,08,000 crore (2005-06 GDP) at 1.9% (historical CAGR) to Rs. 6,20,000 crore  
*(Source: RBI and CRISIL Analysis)*
- During the 2007-12 period, the agriculture GDP is assumed to increase at the Planning Commission's target growth rate (4.1%) to Rs. 7,58,000 crore
- The incremental increase required to achieve the planning commission target is approximately Rs. 1,50,000 crore

# Workings for Excise Impact on Agriculture GDP

## – Plasticulture

- The report of the Task force on Micro-irrigation provides an estimate of the benefits of increasing the area under micro-irrigation to 17 million hectares
  - ➔ The benefits are categorized and quantified into:
    - ➔ Income due to increased production
    - ➔ Fertilizer savings
    - ➔ Electricity savings
    - ➔ Water savings
- The agriculture sector's GDP is assumed to increase through achieving the 11<sup>th</sup> plan micro-irrigation target on account of:
  - ➔ Income due to increased production and
  - ➔ Fertilizer savings
- The benefits provided in the task force document are proportionately adjusted for achieving the Task Force target of 14 million hectares in the 11<sup>th</sup> plan (2007-12)

# Workings for Excise Impact on Agriculture GDP

## – Post harvest management

- India loses Rs.30,000 crores due to poor post harvest management.  
*(Source: Professors S. Raghunath and D. Ashok Indian Institute Management – Bangalore, Indian Agricultural Produce Distribution System-Towards an Integrated Agri Produce Flow)*
- The losses occur on account of:
  - ➔ Handling
  - ➔ Storage
  - ➔ Transportation
  - ➔ Packaging
- Our discussions the industry and packaging experts have revealed that conservatively 20% of these losses can be prevented through greater use of plastic crates and packaging in post harvest management

# Workings for Excise Impact on Agriculture GDP

## – Aggregate Impact

- The increase in the Agriculture sector GDP has been arrived at after aggregating the benefits arising on account of:
  - ➔ Irrigation
  - ➔ Post harvest management
- The incremental increase in the sector's GDP is compared with the target for the agriculture sector
  - ➔ This provides the growth rate of the increase in the agriculture GDP due to application of plastics



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