INDIA CHEM 2012

"Emerging India: Sustainable Growth of the Chemical Sector"

*Handbook on*

# Indian Chemical and Petrochemical Industry



-:Prepared by:-

TATA STRATEGIC MANAGEMENT GROUP

FICCI



TATA STRATEGIC MANAGEMENT GROUP

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# MESSAGE

के. जोस सिरियक
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Secretary



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26th September 2012

**MESSAGE**

The Indian Chemical Industry, besides playing a crucial role in meeting the daily needs of the common man, has supported nation building by significantly contributing to industrial and economic growth of the nation. The sector is a vital constituent of the Indian economy and the industry is currently passing through a phase of metamorphosis, from basic chemicals to fine and low volume specialty chemicals, by adopting latest nano and green technologies. This fast growing and vibrant industry is poised for further sustained growth, especially in view of the "eastern drift" of the manufacturing sector of the industry. Despite significant growth, the chemical industry needs focused attention on huge unrealized potential for further growth and development to bridge the gap between demand and supply, thereby enhancing per capita consumption in the country.

FICCI has commissioned "Tata Strategic Management Group (TSMG)" for formulating this paper. The Knowledge Paper provides a detailed picture of the various segments of the Indian chemical & petrochemical industry and a strategy for the long-term growth of this sector.

I am sure that the information contained in the knowledge paper will be very useful to all the stakeholders and will go a long way in achieving the objectives of "India Chem 2012".

(K. Jose Cyriac)

# MESSAGE

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## "MESSAGE"

The Indian Chemical industry is an integral component of the Indian economy. The industry has key linkages with several other downstream industries such as automotive, consumer durables, engineering, food processing, textile, paints etc. The industry produces and supplies more than 80000 products and is contributing significantly to Indian Economy.

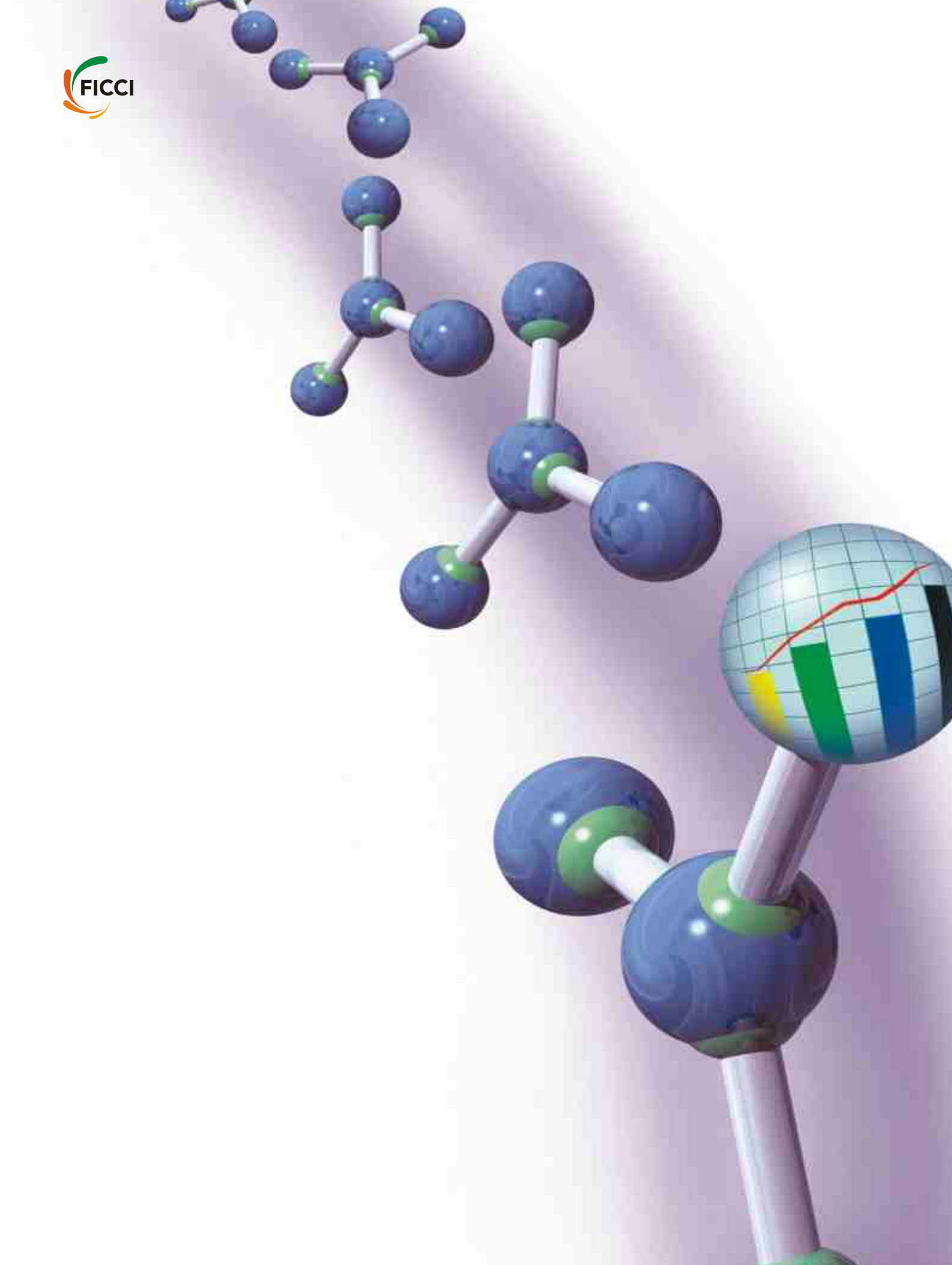
FICCI jointly with the Dept of Chemicals & Petrochemicals, Govt. of India is organizing India Chem 2012. I am happy to know that a Knowledge cum Strategy Paper covering this sector has been prepared. This Knowledge Paper provides a glimpse of status and opportunities in the sector. I am sure it will be found very useful by all stake holders.

(R. V. Kanoria)

New Delhi
19 September, 2012

Industry's Voice for Policy Change





# Executive Summary



# Executive Summary

Chemical industry is a capital as well as knowledge intensive industry. This industry plays a significant role in the global economic and social development. It is also a human resource intensive industry and hence generates lots of employment. Globally, more than 20 million people are expected to employ in this industry. The diversification within the chemical industry is huge and covers more than thousands of commercial products. Global chemical market size was estimated at $3.6 trillion in 2011 and is expected to grow at 4-5% per annum over the next decade to reach ~$5.8 trillion by 2021.

## CHEMICAL INDUSTRY CLASSIFICATION

TATA Strategic has classified the chemical industry into 4 key segments, based on a detailed analysis of various industry classifications followed by several domestic & international bodies. The key segments are:

1. **Chemical sector:** It includes basic organic chemicals (methanol, acetic acid etc.), basic inorganic chemicals (caustic soda, chlor alkali etc.) along with the specialty chemicals (colorants, water treatment etc.) and agrochemicals (pesticides etc.).
2. **Petrochemical sector:** Petrochemicals includes polymers, synthetic fibers, surfactants and elastomers.
3. **Fertilizers:** Include all types of N,P& K based fertilizers like Urea, DAP etc.
4. **Pharmaceuticals:** It includes formulations, APIs, biotechnology etc. *(however pharmaceutical section is not a part of this report)*

Of the three segments studied in detail, Indian chemical sector is the largest followed by fertilizers and then Petrochemicals. In terms of growth also, chemical sector is fastest growing closely followed by petrochemicals. Chemical sector high growth estimate is based on high growth potential of specialty chemicals (Specialty chemical is expected to grow at 13-17% p.a. over the next five years. The current recession period highlighted the vulnerability of specialty chemicals to economic cyclicality; however the segment registered a quick recovery with improving demand post 2010).

## INDIAN CHEMICAL INDUSTRY

India currently accounts for only 3.3 % of the total chemical market with a market size of ~$ 0.1 trillion in 2011. Indian chemical industry is also a much diversified industry with more than 70,000 commercial products. It accounted for ~13% of the gross value



added by the industry segment. It accounted for ~13% of the total India's export. Indian chemical sector is very crucial for the economic development of country.

Indian chemical industry comprises both small scale as well as large scale units. The large scale units are able to set up capital intensive projects with long gestation periods. While the fiscal incentives provided to small scale units earlier led to development of large number of small and medium enterprises (SME). It is also a significant employment generator. Over the last five years Indian chemical industry has started to evolve rapidly. With significant capacity additions coming into place, the focus has also been towards investments in R&D. India's competence in this knowledge intensive industry is increasing however still the tapped potential is very limited. The current low per capita consumption (~7 kgs for polymers in India as compared to world average of 25 kgs) suggests that the demand potential is also yet to be realized. Moreover India has a very strong outlook for the key end user industries (e.g. Packaging is expected to grow at ~17% p.a. over the next five years, Electronic is expected to grow at ~15% p.a. over the next five years, Construction and Automotive both sectors are expected to grow at ~14% p.a. over the next five years). Hence, going ahead the demand of chemical products is expected to surge strongly at 10-11 % p.a. over the next five years.

To meet this increasing demand either the local production will have to ramp up or the imports will have to go up. Indian Govt. has increased its focus towards domestic manufacturing with the intent of increasing the share of manufacturing in GDP from 16% to 25% by 2022. India Govt. has also planned some dedicated chemical and petrochemical regions through PCPIRs (there are four PCPIRs which have been approved till now i.e. Dahej, Vizag, Paradip and Cuddalore) to facilitate the cluster approach to enhance the competitiveness of domestic producers. However the progress of PCPIRs till date has not been so promising with the anchor tenants not able to do a timely project execution. All the PCPIRs have faced land acquisition issues and creation of adequate infrastructure has been a challenge. Feedstock availability and pricing is one of the most critical impediments for downstream capacity addition plans. PCPIRs should have ideally taken care of this factor. However, the allocation/ pricing of feedstock by anchor tenant to downstream industries are also contentious. All these have resulted in lower investments in capacity addition for downstream sectors than anticipated.

Competitiveness of local manufacturers is also marred due to lack of R&D capabilities, technology access, and talented human resources. The R&D intensity of Indian companies is limited till now. Though, the anticipation is that R&D investment for companies in India is expected to grow to 5-6% of their turnover making them more competitive. India is observing increasing tie ups of industry and academia which will facilitate the technology access further.



Innovation is a good way to ensure sustainability over a long term and address challenges occurring due to recession, cyclicality etc. Innovation is not only constrained to R&D but is applicable to the entire value chain. Innovations in market delivery, supply chain, go to market propositions etc. could help increase competitiveness. Indian manufacturers have been developing market access quite strongly with increased understanding of regional needs and more focus on brand development. Development of these assets will most certainly provide competitive advantage to domestic manufacturers.

## CONCLUSION

Strong end use industry demand is expected to boost demand of the chemical products. The focus of govt. is going to be on ensuring that this demand be met through domestic production. Strong outlook for chemical demand is likely to result in significant investment in capacity additions and hence import substitution.

However, increasing local production requires global competitiveness to withstand imports as well as for exports of surplus. Key success factors needed are feedstock cost & availability, value chain access, technology, capital investment, presence of strong local players as well as access to a rapidly growing large domestic market. Adoption of cluster approach can enhance the competitiveness of domestic manufacturing for both domestic and multinationals. To ensure sustained competitiveness gradual investments in R&D, innovation and skill development will also be required.

India is today seen as a growth market for many western companies. Domestic companies have built significant assets and have the opportunity to leverage them and will need to strengthen them further to withstand global competition. It could be worthwhile to explore partnerships, in select areas, for mutual beneficial development.



# Industry reports



# Chemical Sector



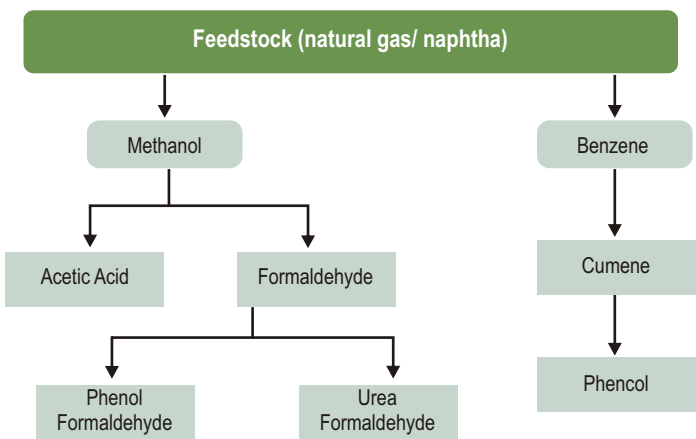
## a. Basic organic chemicals

### INTRODUCTION

Organic chemicals are a significant part of Indian chemicals industry. The chart below shows select major organic chemicals. Availability of natural gas for use as feedstock is a critical part of the entire production process. Formaldehyde and acetic acid are important methanol derivatives and are used in numerous industrial applications. Phenol is an aromatic compound and derived from Cumene, a benzene and propylene derivative.

**INDIAN ORGANIC CHEMICALS INDUSTRY**
**Industry Overview**

**Select organic chemicals**






Global production of organic chemicals was around 400 million tonnes during FY11. Major producers of organic chemicals are USA, Germany, U.K, Japan, China and India. Few Latin American countries, for example Brazil and Chile are increasing their presence in global organic chemicals market.

Six major chemicals produced in India are Methanol, Aniline, Alkyle Amines and its derivatives like Formaldehyde, Acetic Acid andPhenol,contributing to nearly 2/3rd of Indian basic organic chemical industry. The balance 1/3rd of the organic chemical consumption in the country is accounted for by other wide variety of chemicals.

Production of major organic chemicals has shown a significant decline due to large volume imports taking place from countries like China, resulting in low utilization rates of ~ 60%.

The demand for organic chemicals in India has been increasing at nearly 6.5% during this period and has reached the level of 2.8 million tonnes. The domestic supply has however grown at a slower pace resulting in gradual widening of demand supply gap which was primarily bridged through imports. Domestic production declined at ~6% per annum and imports grew at a rate of 17-19% between FY06 and FY11.

The key segments of the industry are methanol, formaldehyde, acetic acid, phenol, ethyl acetate and acetic anhydride.

### Production details of major organic chemicals in India

| No. | Organic Chemical | Production ('000 tons) | | | Share |
|---|---|---|---|---|---|
| | | F Y09 | F Y10 | F Y11 | in F Y11 |
| **1.** | Methanol | 238 | 331 | 370 | 28% |
| **2.** | Formaldehyde | 232 | 260 | 267 | 20% |
| **3.** | Acetic acid | 203 | 146 | 156 | 12% |
| **4.** | Phenol | 76 | 72 | 80 | 6% |
| **5.** | Others | 505 | 471 | 469 | 35% |
| **Total** | | **1, 254** | **1,280** | **1,342** | **100%** |

*Source: Dept. of Chemicals & Petrochemicals, CMIE*

## KEY SEGMENTS

### Methanol

Methanol, a very versatile chemical is primarily produced from natural gas or naphtha.

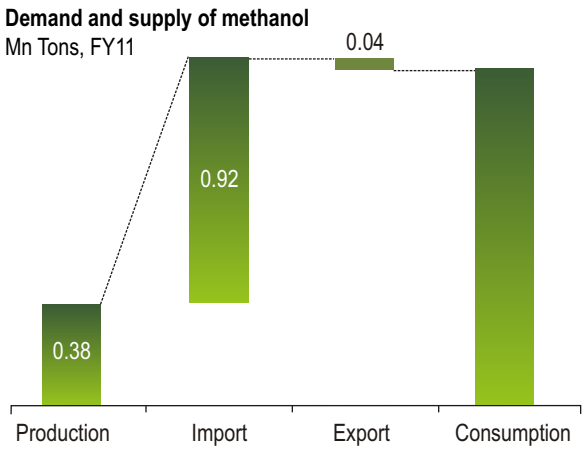
Demand for methanol has increased at a CAGR of 8% from 0.87 mmtpa in FY06 to 1.26 mmtpa in FY11. The domestic production of methanol is not sufficient to meet the



demand of methanol in India. As a result, in FY11, the net import of methanol was 0.92 mmtpa i.e. ~2.5 times the domestic production of 0.38 mmtpa. Import of methanol has increased at a high CAGR of 18% from 0.4 mmtpa in FY06 to 0.92 mmtpa in FY11.

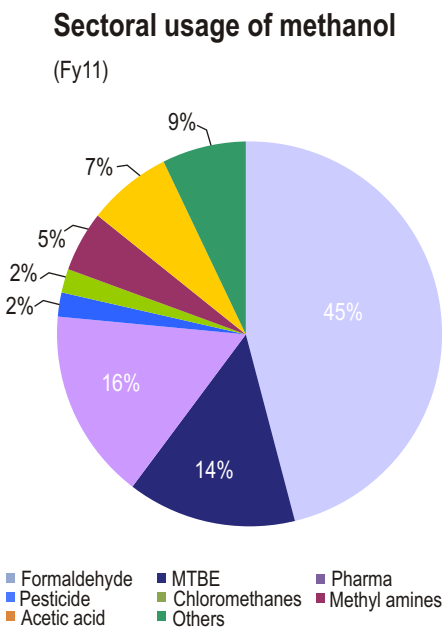
The two main end-user industries of methanol are chemicals and energy. In the chemicals industry, methanol is used mainly to manufacture formaldehyde, acetic acid, di-methyl terephthalate (DMT) and some solvents. In the energy industry, methanol goes into the manufacture of methyl tertiary butyl ether (MTBE), tertiary amyl methyl ether (TAME), di-methyl ether (DME) and bio-diesel among other chemicals. Methanol is also used for blending with petrol.






Over the years the usage pattern of methanol has remained same. Formaldehyde accounts for the largest share of methanol usage due to demand of formaldehyde from plastic and paints industries.

Domestic methanol production has increased by 13% in FY11, reflecting improvement in utilization rates by players such as Deepak Fertilizers& Petrochemicals Corporation Ltd (Deepak Fertilizers), Gujarat Narmada Valley Fertilizers Company Ltd (GNVFC) and Rashtriya Chemicals & Fertilizers Ltd (RCF).






### Acetic Acid

Acetic Acid is the main alcohol based chemical and is primarily used in the production of Vinyl Acetate Monomer (VAM), Purified Terephthalic Acid (PTA), Acetic Anhydride and Acetate Esters. The Acetic acid derivatives are applied in various industries as mentioned in table below:

| SN | Derivatives | Applications |
|---|---|---|
| 1. | Vinyl Acetate Monomer | Adhesives, textiles, paints and paper |
| 2. | Purified Terephthalic Acid (PTA) | PET bottle resins, films and polyester fiber |
| 3. | Acetic Anhydride | Cellulose Acetate which goes in cigarette filters and textile applications |
| 4. | Acetate Esters | Solvents in a wide variety of paints, inks and other coatings |

Demand for acetic acid has grown at a CAGR of 13% from 0.33 million tons in FY06 to 0.6 million tons in FY11. The demand growth has happened mainly due to increase usage by manufacturers of PTA which is the basic raw material for polyester & fiber and organic esters such as RIL and Vinyl Chemicals.

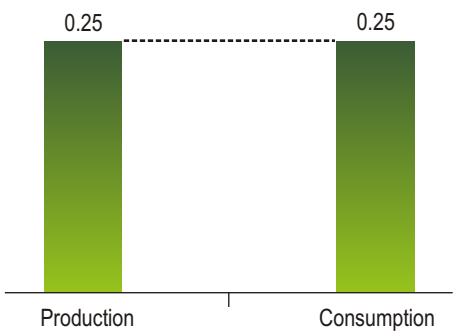
Most of the demand was met through domestic production earlier. However, due to oversupply of acetic acid in global markets and depressed prices, imports of acetic acid have grown leading to reduced plant capacity utilization.

Acetic acid is manufactured in India through two routes: the methanol route and the ethyl alcohol (from molasses) route. Alcohol route in Indian context is gradually becoming unviable due to high prices and limited availability of this feedstock. At present bulk of acetic acid is imported with domestic production accounting for less than 30% of demand.

### Formaldehyde

Unlike methanol, production of its derivative formaldehyde in India is sufficient to meet the domestic demand. The production of formaldehyde has increased, at a similar pace as has its demand, at a CAGR of 3% from 0.25 mmtpa in FY06 to 0.30 mmtpa in FY11.

**Demand and supply of formaldehyde**
Mn Tons, FY11




*Source: CMIE report*

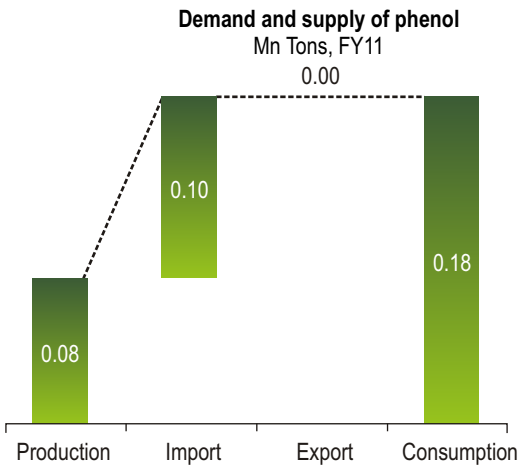


Major formaldehyde producing companies in India are Kanoria Chemicals, Hindustan Organic, Rock Hard and Asian Paints. The first two companies account for 44% of formaldehyde production in India. Asian Paints produces formaldehyde for captive consumption.

**Phenol**

| Derivatives | Applications |
|---|---|
| Phenolic resins | Plywood adhesives, construction, automobile & appliance industries |
| Caprolactam | Nylon and synthetic fiber |
| Bisphenol-A | Polycarbonates in electronics and housing industries |

Phenol is a significant type of organic chemical with numerous applications as mentioned in the table below. Its demand is closely linked to end user industries like the construction and automobile industries.




More than 70% of demand of phenol is met through imports with no fresh supply addition in last few years. There are only two manufacturers - Hindustan Organics and S I Group with capacity of 40 Kilo tonnes per annum each in FY11. As the consumption has grown from 0.15 mmtpa in FY06 to 0.18 mmtpa in FY11, the imports has grown at a higher CAGR of 10% to meet the rising demand.

## KEY TRENDS

**Market Trends:**

- Focus has moved from west to east. There is an increase in M&A activities and setting up of new plants in China, Middle East and Russia. The latter two being rich in feedstock and the former being the driver of demand.

- Demand for methanol based MTBE manufacturing has been declining due to environmental concerns. In the US, MTBE is getting phased-out leading to fall in methanol demand by 3 Mn tons.
- Demand from new applications such as DME and bio-diesel is on the rise

**Technology Trends**

- Increased acceptance of methanol over olefins and over propylene technologies

**Regulatory Trends**

- Government of India continues to provide duty protection to domestic manufacturers. For example, in case of methanol, the custom duty of 7.7% was maintained in Union Budget 2011-12 as was the excise duty at 10%.Along with the additional cess of 3.0 %, the effective duty protection stands at around 18 %.
- Historically, the Government has also levied anti-dumping duty on import of phenol to protect domestic players from cheap imports. In Oct 2008, an anti-dumping duty was levied on imports from Singapore, South Africa and EU for a period of 5 years. In 2010, anti-dumping duty of up to $547/ tonne was imposed on imports from Japan and Thailand for a period of five years.

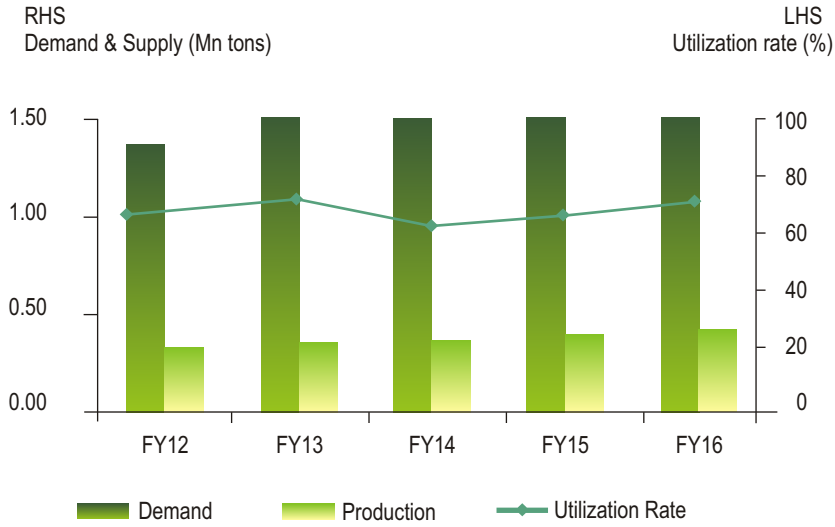
## GROWTH FORECAST & DRIVERS

Indian organic chemicals market is expected to grow at a growth rate of 5% to reach ~ 3.53 Mn tons by FY14. Key segments expected to grow are methanol and phenol.

1. Rise in methanol demand: Domestic demand for methanol has increased by 9.3% FY11 and is estimated to grow at 8.4% 2011-12 and at a CAGR of 9-10% during FY11 to FY16. This growth will be driven by healthy demand, primarily from the formaldehyde and pharmaceutical segments, which collectively account for more than 60% of the domestic market for methanol.



**Methanol Market Outlook**



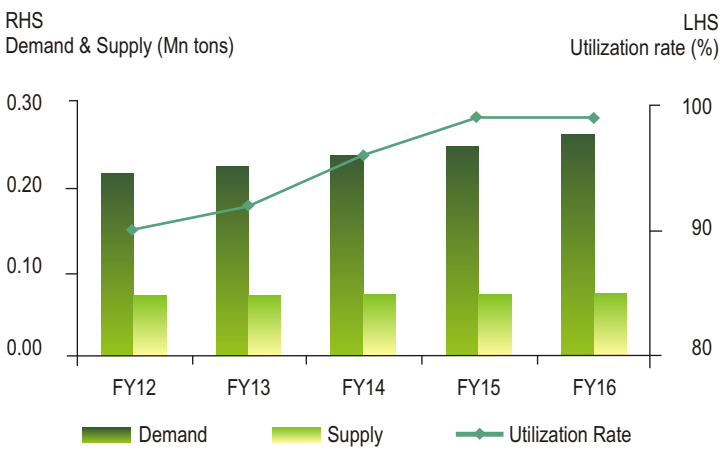

*Source: Crisil report, Tate Strategic analysis*

The formaldehyde segment (about 45per cent of the methanol market) is expected to grow at a CAGR of 10-15 per cent duringthe same period, led by growth in the end-user industries, mainly construction and automobiles.

Government's decision to raise the APM price for non-priority sectors will keep utilization rate of the industry under pressure in 2011-12. Constraints over availability of natural gas and expected high prices of LNG are likely to further reduce the rates. Hence, it is expected that industry rates will remain below 70 per cent for the forecast period.

2. Rise in phenol demand: The demand of phenol is expected to grow at a CAGR of 4-6% from 0.18 mmtpa in FY11 to reach 0.23 mmtpa in FY16. Mainly supported by the phenolic resins market due to the growing construction and housing sector.

**Phenol Market Outlook**




*Source: Crisil report, Tate Strategic analysis*

## KEY CHALLENGES

1. **Lack of cheaper raw material availability:** Feedstock (naphtha and natural gas)and power are critical inputs for organic chemicals industry. Costs of these raw materials are high in India compared to countries like China, Middle East and other South East Asian countries such as Thailand and Indonesia. Given the poor infrastructure with lack of adequate facilities at ports and railway terminals and poor pipeline connectivity, domestic manufacturers will continue facing difficulty in procuring raw materials at a cost competitive with the global peers.

2. **No domestic price discovery:** Domestic prices of organic chemicals are highly correlated with international prices. Given the small scale of domestic operations, local manufacturers are more influenced by global demand and supply forces.

3. **Large global capacity additions:** Apart from the current oversupply in global markets, there is another cause of concern for domestic manufacturers, with further large capacity additions happening in global markets. For example, globally, methanol industry is expected to witness excess capacity in the future due to a spate of capacity additions in gas rich countries such as Middle East and Russia.

4. **Low capacity utilization:** Due to oversupply in global markets, prices of major organic chemicals have taken a steep decline, thereby forcing the domestic companies to underutilize their plants operating levels. The average capacity utilization has fallen from > 90% in FY04 to ~60% in FY11.

## KEY OPPORTUNITIES

1. **Consolidation:** Sincemost of the Indian manufacturers operate on a small scale compared to global peers, there is a room for consolidation in Indian organic chemicals industry. Domestic players can take advantage of economies of scale arising from consolidation and become more competitive thereby preventing cheaper global imports.

2. **Improved feedstock supply:** Domestic organic chemicals players don't have the advantages of backward integration and hence, they lack pricing flexibility. However, given the new finds of natural gas reserves in the country, domestic manufacturers will be able to get supply of feedstock at stable prices.

3. **Wider product portfolio:** Commodity chemicals companies can improve their product portfolio by adding specialty chemicals such as polymers additives, water treatment chemicals, lubricating additives, etc. This will help in improving their margins but requires significant R&D efforts.



4. **Forward integration:** Petrochemical companies producing benzene and propylene can look for forward integration opportunity given the demand-supply deficit in phenol market. Similarly, an opportunity exists for companies with better access to natural gas supply to venture into the methanol market facing continuous supply deficit.

5. **Outbound approach:** Even successful companies from west are shifting their base to resource rich nations like Saudi Arabia, Qatar, Russia, etc. Indian organic chemical companies may also explore opportunities outside the country either through greenfield or brownfield projects.



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# b. Basic inorganic chemicals

## INTRODUCTION

Alkali chemical constitutes the oldest segment of the chemical industry. These chemicals serve as key inputs for a number of industries such as aluminium, soap, detergent, glass, tyre, rubber, pulp and paper, pharmaceutical, water treatment, textiles, leather, fiber etc. The key chemicals in the chlor-alkali industry are

- Caustic Soda
- Chlorine (including liquid chlorine)
- Soda Ash

### Caustic Soda & Chlorine

#### Introduction

Caustic Soda (chemically known as Sodium Hydroxide) and Chlorine are produced together through the electrolysis of common salt solution (Sodium Chloride or Brine). Caustic Soda and Chlorine are generated in the ratio of 1:0.89. Demand for chlorine drives caustic soda production globally, but in India the industry has developed in line with the demand-supply balance of caustic soda.

There are three alternative technologies used to manufacture caustic soda from brine. These are membrane cell; diaphragm and mercury cell technologies.

1. The membrane cell technology involves lower power costs compared to the other two. It is also the most environmental friendly as it does not use any hazardous materials as compared to mercury cell and diaphragm technologies which use mercury and asbestos respectively.

2. The diaphragm technology involves higher capital and power costs. The quality of caustic soda is also of inferior quality. However, it is popular as the purity of chlorine from this method is highest and chlorine demand is major driver for caustic soda production globally.

3. Mercury cell technology involves lower capital costs compared to membrane and diaphragm technologies. However, it is not so popular because of related pollution hazards due to use of mercury.

Globally the diaphragm technology is the most widely used while in India the membrane cell technology accounts for more than 90% of the total capacity.

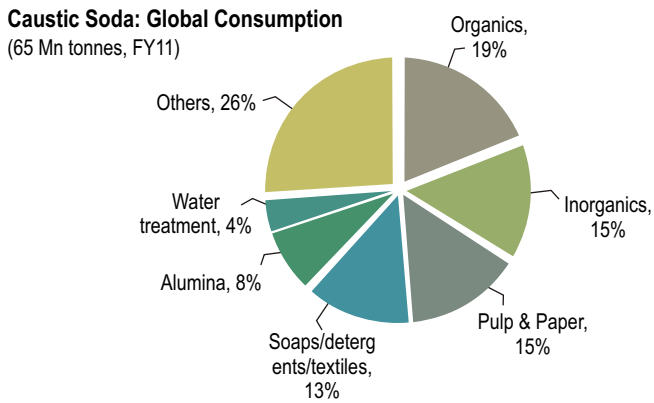


## Global Scenario

Global consumption of caustic soda in FY11 was 65 Mn tons. Asia is the largest consumer of caustic soda and is expected to remain the same in near future. Majority of caustic soda is exported from North America, the Middle East and Asia. Australia and Latin America are the leading importers.

The total global capacity of caustic soda stood at 80 Mn tons in FY11. China and North America together accounted for half of the global production capacity. India accounts for 4% of the capacity. Middle East is fast emerging as key production hubs for caustic soda. It is expected that there would not be any significant capacity additions in developed countries like North America and Western Europe primarily due to unattractive cost structures and flat demand.

## Consumption Mix

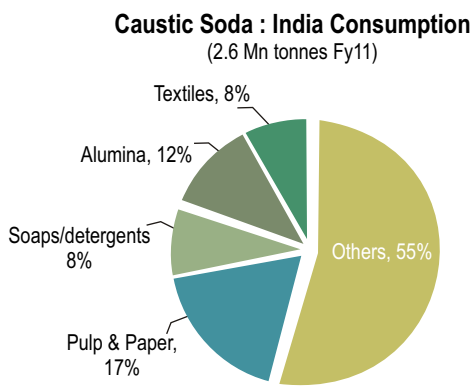



*Source: Crisil*

The majority of caustic soda is used in the chemicals and paper industry. Soaps & detergents, textiles, aluminium and water treatment are other major areas consuming caustic soda.

## Indian Scenario

## Market Size

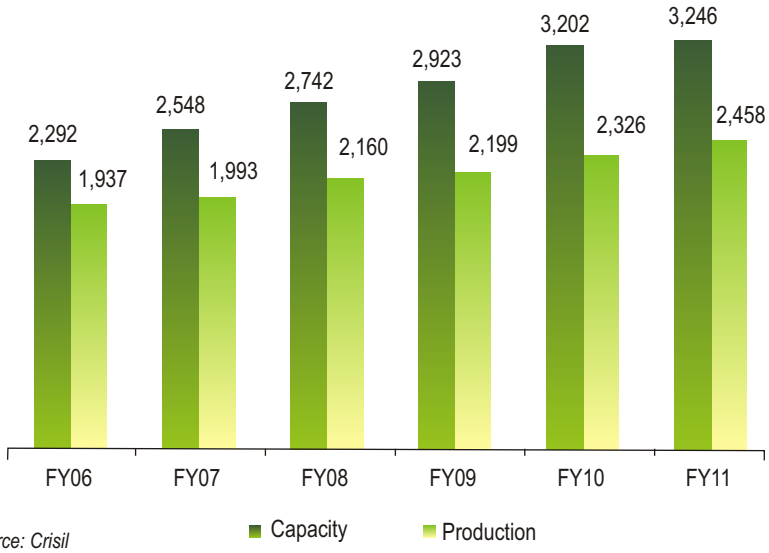



*Source: Crisil*

Caustic soda consumption in India increased at 5.7% CAGR from FY06 to reach 2.6 Mn tons in FY11.

## Caustic soda capacity addition at a steady rate

**Caustic Soda capacity in India**
('000 tonnes)

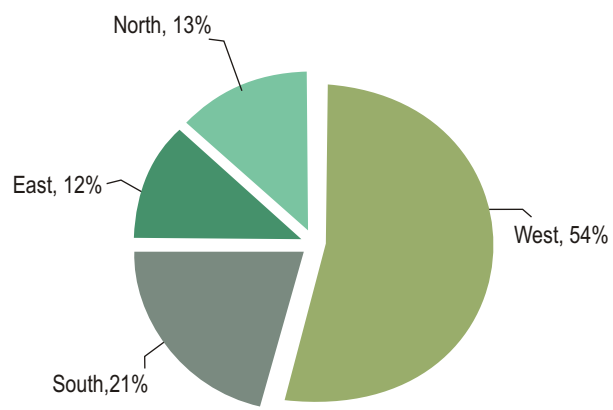



*Source: Crisil*

Total domestic caustic soda capacity increased to 3.25 Mn tons in FY11 from 2.3 Mn tons in FY06. Almost 60% of the incremental capacity has been commissioned in the western region.

**Caustic Soda: regional capacity distribution**

(3.25 Mn tpa, Fy'11)

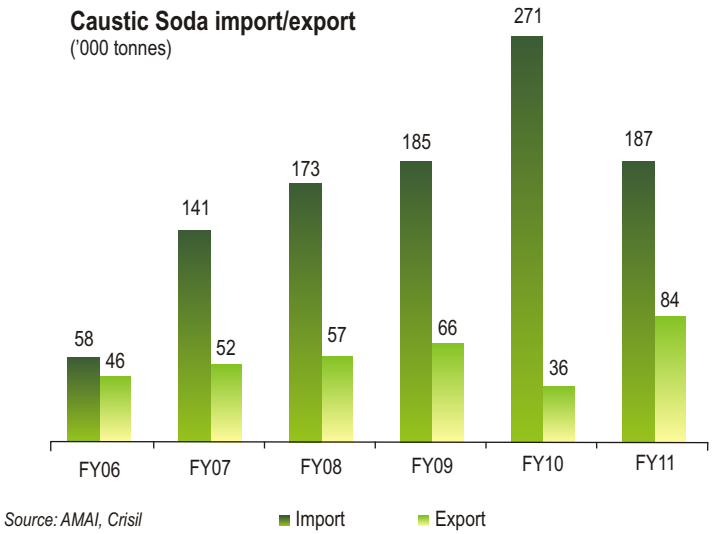



*Source: AMAI, Crisil*

Western region accounted for more than half (approximately 54%)of the estimated capacity of 3.25 Mn tons in FY11 because of its proximity to salt which is one of the key raw materials. The southern regions accounts for 21% of the total capacity. The northern and eastern regions have a share of 13% and 12% respectively.

Domestic caustic soda capacity is estimated to be about 4 Mn tons by FY16. The western region will account for about 65% of the incremental capacity while east is expected to have a 30% share.

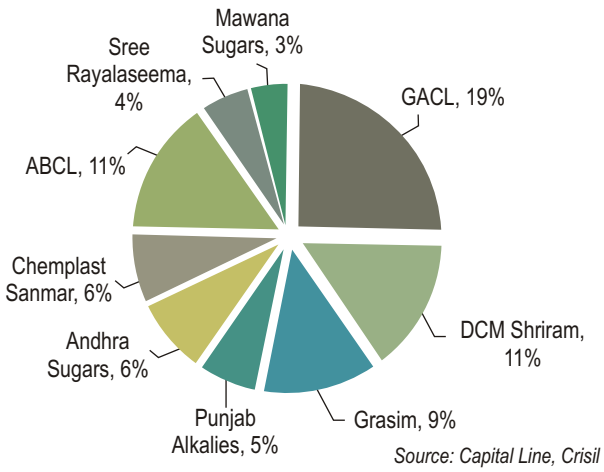
### Large increase in caustic soda import in FY10




After a huge increase in imports from 58 thousand tons in FY06 to 271 thousand in FY10, FY11 saw a decrease in imports. Imports had risen in FY10 as South East Asian countries dumped their excess produce in India. Going forward, the imports of caustic soda are expected to remain at current levels because of the tight supply in the global markets. Imports accounted for 7.2% of total domestic consumption. This share is expected to decline in the next 2 years mainly due to shortage of supply of caustic soda in the global markets. However by FY16, the demand from aluminium will mostly be met by imports.

## Major Companies

**Caustic Soda: Market share of companies**
(Rs 4,850 crores, Fy'11)




*Source: Capital Line, Crisil*

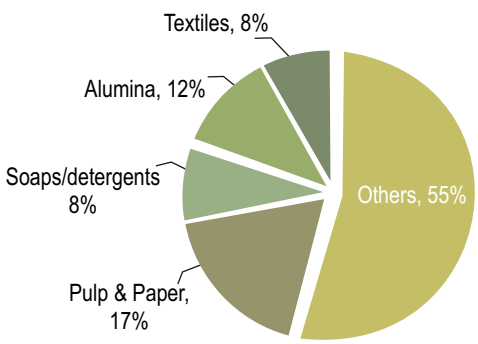


Gujarat Alkalies and Chemicals Ltd. (GACL) is the market leader in caustic soda segment in India accounting for 19% of the total domestic sales value in FY11.

The Aditya Birla Group, through its companies such as Aditya Birla Chemicals Ltd (ABCL), Grasim industries Ltd, Aditya Birla Nuvo Ltd (ABNL) and the newly acquired Kanoria Chemicals captures 20% of domestic market. Other major companies are DCM Sriram, Grasim Industries, Punjab Alkalies, Chemplast Sanmar and Andhra Sugars. Meghmani Ltd. and Nirma Ltd. are the new entrants in this business while Grasim Industries Ltd., Gujarat Fluoro Alkali Ltd. and Sri Rayalseema Ltd. have expanded their capacity accounting for more than 50% of the incremental capacity.\

## Key Applications

**Caustic Soda : India Consumption**
(2.6 Mn tonnes Fy11)




*Source: AMAI, Crisil*



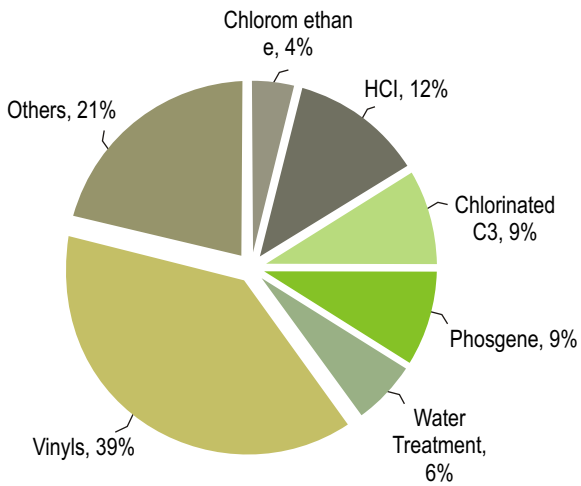
The key end user industries of caustic soda in India are paper, textiles, soaps and detergents and aluminium. Pulp & Paper is the largest end-use industry accounting for 17% of the total caustic soda consumption in FY11. Capacity additions in the paper industry resulted in 6.7% growth in soda ash consumption. In the paper industry it is used in water treatment, de-inking of waste paper and as a raw material in pulping and bleaching processes. Aluminium industry accounted for 12% while textile and soaps & detergents accounted for 8% each of total domestic consumption. Caustic soda consumption has increased in the textile sector on account of the export market revival. In the textile industry, caustic soda is used in processing of cotton fibers and bleaching of fabrics. Caustic soda is also used in soaps & detergents to create extra lather.

## Chlorine Consumption

### Global Scenario

Global consumption of chlorine in FY11 is estimated at 58 Mn tons. Chlorine is used in manufacture of paper and pulp, ethylene dichloride (EDC), which is used for producing polyvinyl chloride (PVC), manufacture of chlorinated paraffin wax, fertilizers and pesticides.

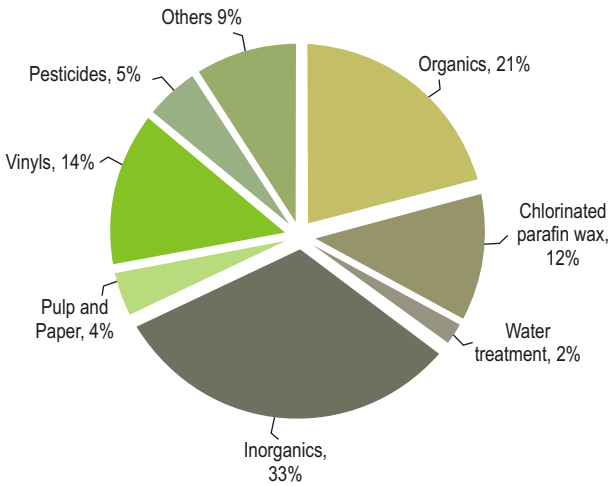
**Chlorine: Global Consumption**
(58 Mn tonnes, FY11)




*Source: Crisil*

## Indian Scenario

**Chlorine: India Consumption**
(2.2 Mn tonnes, Fy11)




*Source: Crisil*

Consumption of chlorine in India in FY11 is estimated at 2.2Mn tons. The key end-user industries of chlorine in India are PVC, inorganic (disinfectants and paint pigments) and organic (including lubricants and adhesives) chemicals.

## Caustic soda and chlorine capacity are correlated

Since caustic soda and chlorine are co-products capacities and production of caustic soda and chlorine are correlated. Chlorine production has been growing in line with the growth of caustic soda manufacturing and has not been determined by the growth of the chlorine-based downstream industries. There is more chlorine produced in India than there is demand.

## Industry Outlook

**Demand for caustic soda from end-use industry**

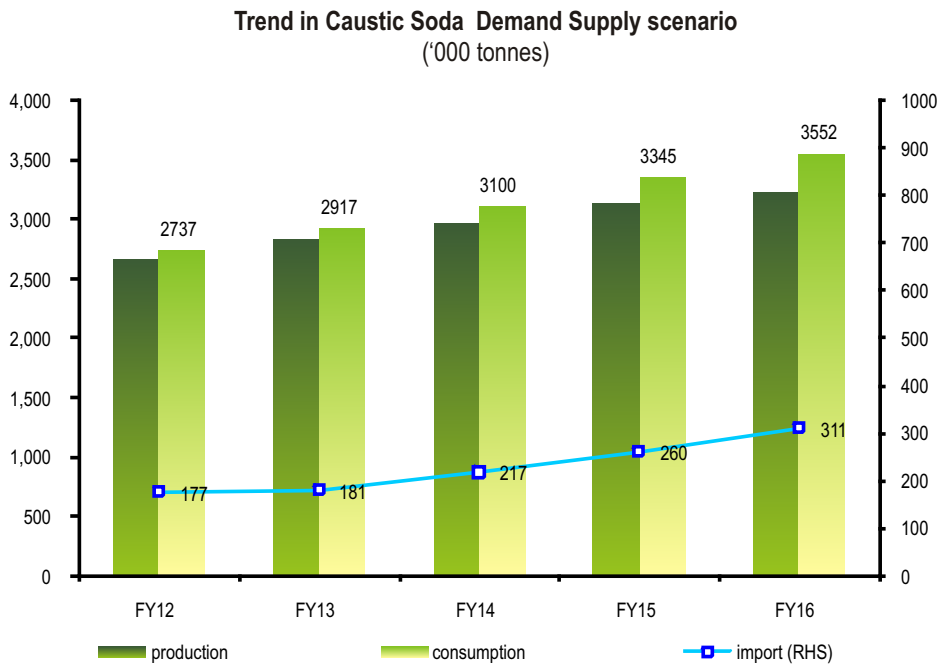
| Industry | CAGR over next 5 years |
|---|---|
| Alumina | 16% |
| Paper | 8% |
| Soaps/detergents | 4% |
| Textiles | 5-6% |

*Source: Crisil, Tata Strategic Analysis*

Demand for caustic soda is expected to be driven mainly by growth in end use industry i.e. alumina and paper. Domestic alumina production is likely to expand by about 5 Mn tons over the next 5 years, driven by capacity additions announced by some of the major players. Strong growth in industrial, infrastructure, automobile, transportation and power sectors would drive the demand for alumina. Demand for caustic soda from paper is expected to grow at ~8% while from textile industry it is expected to grow at ~6%.

### Demand supply forecast

Driven by end use industry growth, demand for caustic soda is projected to grow at a rate of 6-7% from 2.58 Mn tons in FY11 to 3.55 Mn tons in FY16.




*Source: Crisil, Tata Strategic Analysis*

Imports are projected to reach 311 thousand tons in FY16 from 187 thousand tons in FY11. This is due to the projected demand-supply gap in the industry.

## Soda Ash

### Introduction

Soda ash is chemically known as sodium carbonate. Broadly there are two ways in which soda ash is produced; it is either manufactured synthetically from salt or is obtained from refining of naturally available mineral, trona, or naturally occurring

sodium carbonate-bearing brines. Globally, approximately 75% of soda ash is produced from the synthetic process.

Processing costs of soda ash from naturally available sources is less than the manufacturing costs of producing soda ash synthetically, thereby making the naturally available soda ash less expensive.

There are three main processes to manufacture soda ash from salt.

1. **Standard Solvay Process:** The standard Solvay process is characterised with low salt utilisation and requirement of good quality of limestone and coke. This process, compared to other two processes, generates larger amount of effluents and hence require good disposal facilities
2. **Modified Solvay Process:** The modified solvay process has better salt utilization and requirement of limestone is less. But the process requires very high quality of salt without any impurities and ammonia requirement is also high.
3. **Dry Liming Process:** The raw material consumption is low in the dry liming process and it has a perfect steam power balance.

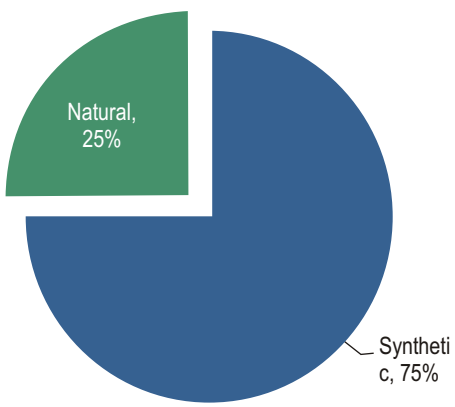
All the three processes are used in India and have their own advantages and disadvantages.

## Global scenario

Worldwide consumption of soda ash stood at 46.3 Mn tons in FY11. Natural and Synthetic are two methods of soda ash production. While bulk of the soda ash is produced synthetically, approximately 25% of world's soda ash production is from natural sources with US account for 85% of this.

**Soda Ash: Global production method**

(% share, FY11)



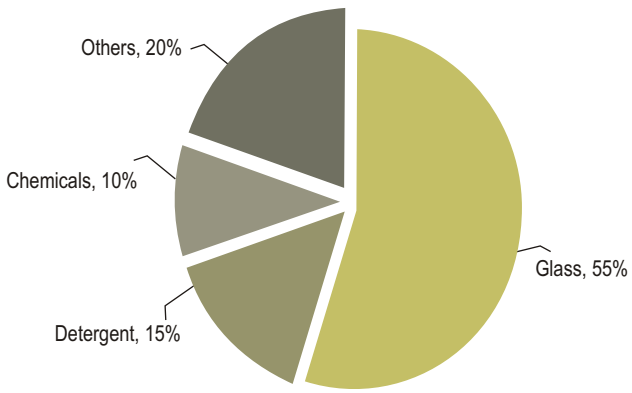

*Source: USGS, Crisil*

The global soda ash capacity is estimated to be 60-65Mn tons in FY11. China and US are the biggest soda ash producing countries accounting for 42% and 21% of the total global soda ash capacity respectively. India accounts for 5% of the total global capacity.

## Consumption Mix

Globally the majority of soda ash is used in the glass industry which accounts for 55% of the global soda ash consumption. Detergents and chemicals are other major end uses, accounting for 15% and 10% of global soda ash consumption respectively. Soda ash can also replace caustic soda in certain industries like pulp and paper, water treatment and certain sectors in chemicals.

**Soda Ash: Global consumption mix**
(% share, FY11)

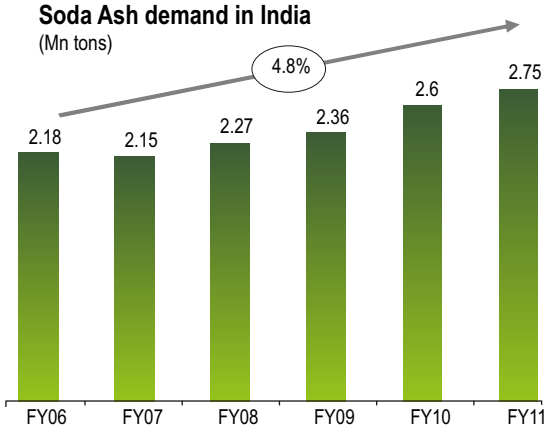



*Source: Crisil*

## Indian Scenario

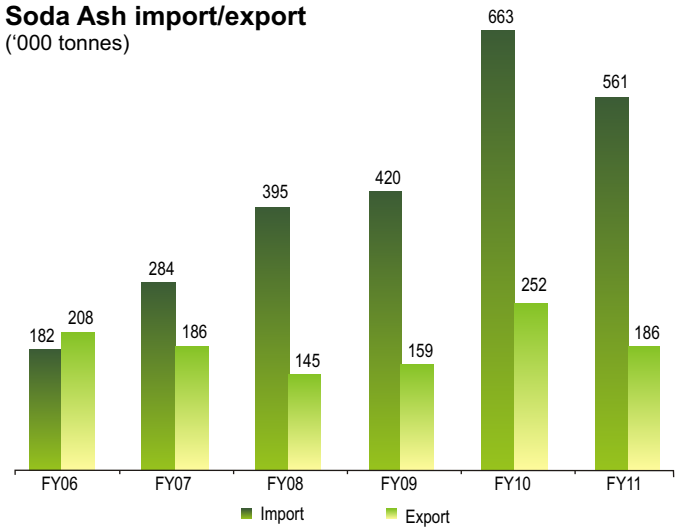
The Indian inorganic chemical industry produces two varieties of soda ash: light soda ash (that is used in the detergent industry) and dense soda ash (that is used in the glass industry). Light soda ash has a share of 70% and dense soda ash has a share of 30% in total soda ash production.

**Soda Ash demand in India**
(Mn tons)




*Source: Crisil*

Total domestic soda ash consumption grew at 4.8% CAGR from FY06, to reach 2.75 Mn tons in FY11.




*Source: AMAI, Crisil*

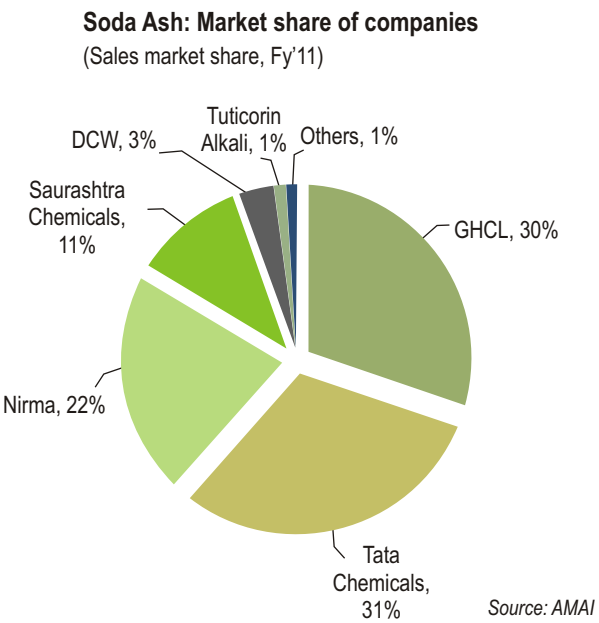
The imports for soda ash have shown a fluctuating trend and stand at 561 thousand tons in FY10 compared to 182 thousand tons in FY05. The soda ash exports exhibit a fluctuating trend.

The total operational capacity of soda ash in FY11is estimated to be around 2.98 Mn tons. Salt is the main raw material for soda ash production. The Indian soda ash industry is concentrated in Gujarat due to the proximity to and easy availability of inputs like limestone and salt.

## Companies

Tata Chemicals is the market leader in soda ash sales in India accounting for 31% of the market in FY11. The top four companies account for around 95% of the total domestic sales of soda ash in India.

Tata Chemicals is also the world's second-largest producer of soda ash with a total capacity of 5 million tons per annum of which more than 60% is attributed to natural soda ash.



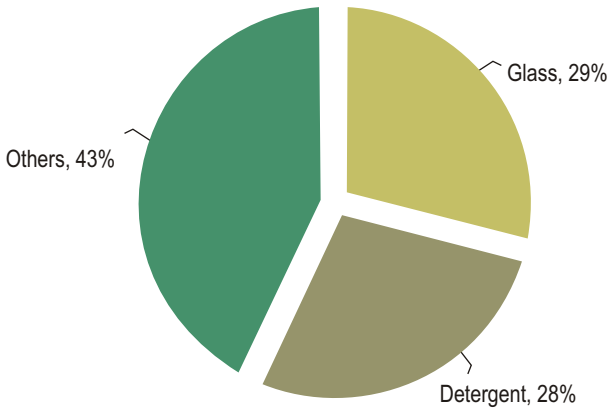

*Source: AMAI*

## Domestic Consumption Mix

The consumption mix of soda ash in India differs significantly from the global mix. In FY11, glass accounted for largest share of soda ash consumption at 29%, followed by detergent at 28%.



**Soda Ash: Domestic consumption mix**
(% share, FY11)




*Source: Crisil*

## Industry Outlook

The domestic consumption of soda ash is expected to increase at a rate of 5.1% between FY12 and FY16. The domestic consumption is expected to be driven primarily by glass. The glass industry is driven by the construction and automobile sector. Both these sectors are expected to witness a high growth between FY12 and FY16. Demand from the glass industry is expected to witness a growth rate of 8-10% between FY12 and FY16. This would increase the consumption share of glass as well. Demand from detergents industry is expected to grow at a moderate rate between FY12 and Fy16.

**Demand growth from end-use industry**

| Industry | CAGR over next 5 years |
|---|---|
| Detergent | 4% |
| Glass | 8-10% |
| Others | 2-3% |

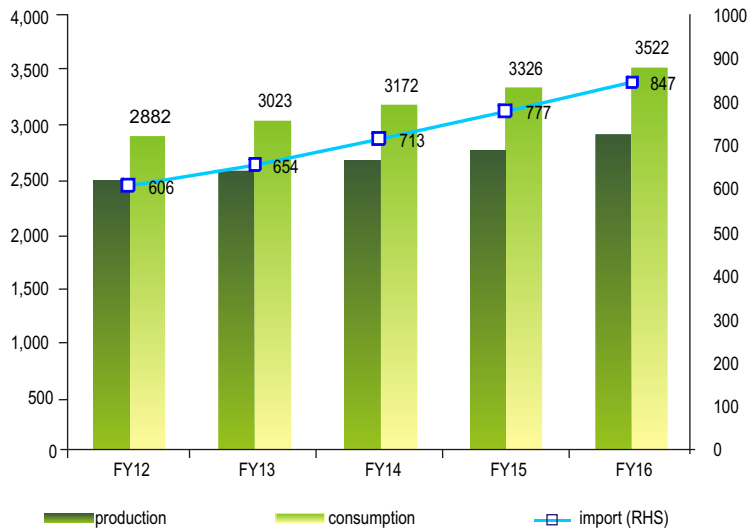
*Source: Crisil, Tata Strategic Analysis*



## Demand supply forecast

The total capacity of soda ash in India is expected to increase from 3.16 Mn tons in FY11 to 3.39 Mn tons in FY16. The expected production from these capacities would not be able to meet the increasing demand. The production is expected to reach 2.9 Mn tons in FY16 from current level of 2.75 Mn tons. So it is expected that import will remain at high level and expected to increase to ~850 thousand tons in FY16, driven by captive imports by domestic producers.

**Trend in Soda Ash Demand Supply scenario**
(thousand tonnes)




*Source: Tata Strategic analysis, Crisil*

Domestic producers face threat of cheap imports from China. In November 2009, in order to safeguard domestic producers from market disruptions caused by the increased imports from China, Govt. of India imposed a 20 percent anti-dumping duty on soda ash imports from China, which is expected to continue till imports normalize. This is likely to help domestic producers to hold on to prices and increase their production to meet domestic demand.

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# c. Specialty chemicals

## INTRODUCTION

Specialty chemical industry is a knowledge driven industry. In India it has been growing rapidly at 1.2-1.3x of GDP growth rate (~12%) over the last five years and currently stands at ~$20 Billion. Domestic demand of specialty chemicals is expected to follow an accelerated growth path. This demand is mostly driven by the strong growth outlook for end use industries. This along with increased adoption of specialty chemicals and newer usages can propel the growth further.

Indian specialty chemical manufacturers have strong presence in export market also. API and colorants (including dyes and pigments) are the key export oriented products. India exports specialty chemicals to nearby Asia-Pacific countries which don't have competitive scale of productions. India also exports to developed countries of Europe and USA where it leverages its low cost of production and quality talent pool. Compliance with global regulations and India's manufacturing competitiveness has helped the export market to grow significantly.

The key specialty segments in India are agrochemicals, paints coating and construction chemicals, colorants, Active Pharmaceutical Ingredients (APIs), personal care chemicals and flavors & fragrances. The critical success factors for most of the specialty chemical segments include understanding of customer needs and product/ application development to meet the same at a favorable price-performance ratio.

Going ahead innovation and sustainability initiatives are expected to be one of the major factors for competitiveness. Development of processes/ products which eliminate or reduce the use of hazardous substances could become the key priority of producers. Consumers would be expected to pay premium for green chemistry and environmental preservation initiatives and appreciate this globally. This along with more stringent regulatory constraints may further increase the importance of innovation.

### Introduction to Specialty Chemicals

Specialty chemicals are defined as a "group of relatively high value, low volume chemicals known for their end use applications and/ or performance enhancing properties." In contrast to base or commodity chemicals, specialty chemicals are recognized for 'what they do' and not 'what they are'. Specialty chemicals provide the required 'solution' to meet the customer application needs. It is a highly knowledge driven industry with raw materials cost (measured as percentage of net sales) much lower than for commodity chemicals. The critical success factors for the



industry include understanding of customer needs and product/ application development to meet the same at a favourable price-performance ratio.

| BASE CHEMICALS | SPECIALTY CHEMICALS |
|---|---|
| Sold by "specification", defined purity | Sold by "performance/impact", not composition |
| Selection of chemical done by customer | Seller provides required "solution" to meet customer application needs |
| CSFs: Access to secure and competitive supply of raw materials, efficient operations and supply chain | CSFs: Price/performance ratio for specific application, technical assistance, channels to market |
| Generally medium to high volume products with lower price realizations | Generally low to medium volume products with higher price realization |

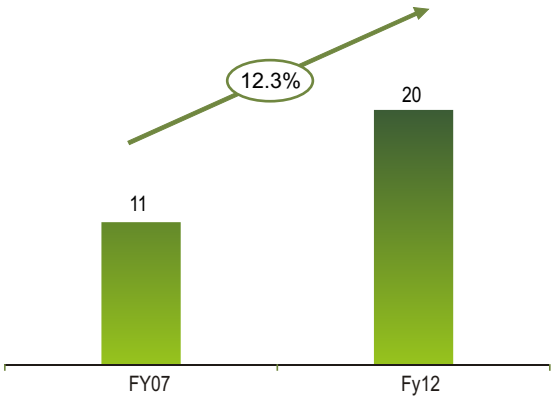
## Indian scenario

### Market size

The Indian Speciality Chemical market is valued at ~$20 billion as of FY12.

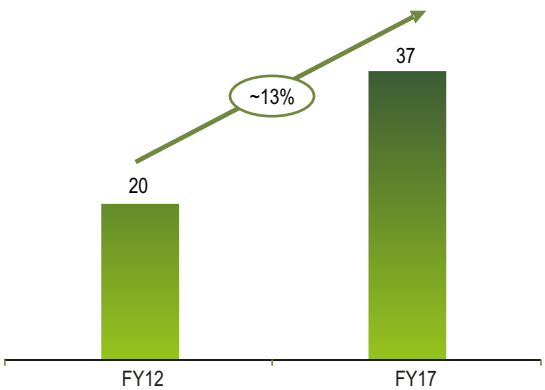
Specialty chemicals have observed a high growth rate in the past too. It has grown at ~12% p.a. since 2007 when the market size was ~ $11 billion.

**Past growth of specialty chemicals in India, $ Bn**




The past growth has been mostly due to growth in end use industries in the past, which has resulted in increased consumption for specialty chemicals. Going ahead, the growth potential of the specialty chemicals consumption in India is strong and it is expected to reach ~$ 37 billion by Fy17.

**XII$^{th}$ plan targeted growth for specialty chemicals in India, $ billion**



## Growth drivers

The expected growth rate of specialty chemicals in India is broadly much higher than global standards. This is because the specialty chemical usage is at a nascent stage in India, with increasing applications and increased adoption in existing applications to follow. Also the export potential of some of these specialty chemicals is a strong driver in increasing cost effectiveness of manufacturers and making the product cheaper for consumption in India. Broadly the growth is driven by the following three factors:

## More end use demand

With increasing GDP, the Indian middle-class could grow from 31 million households in 2008 to 148 million households by 2030, with quadrupled consumption. Furthermore, India's urban population is expected to increase by 275 million people by 2030. This will result in consumption-led double-digit growth in key end markets over the next decade and an increased need for better products and services.

Specialty chemical industry growth typically follows the growth of these key end markets. For example, an increasingly urbanized India (cities are likely to comprise 40% of the population by 2030) will double the requirement for clean municipal water by 2020, and therefore significantly increase municipalities' usage of water treatment chemicals to treat/ recycle waste water. Similarly, increased infrastructure spending by the government (The XIIth Plan recommends USD 1 trillion investment in development of roads, ports, power and telecom) accompanied by growth in the real-estate industry, could result in over 15 % p.a. growth in the construction chemicals and coatings segment.

## Increased intensity of consumption

Compared to the developed world (the US, Europe) or China, the current penetration of specialty chemicals within India's end markets is low. With an increased focus on improving products, usage intensity of specialty chemicals within these end markets will rise in India over the next decade.

For example, concrete admixtures improve the fluidity of concrete, provide a smoother, more even finish, and help avoid cracks. Consequently, concrete admixtures can help reduce maintenance and repair costs, and therefore, the total cost of ownership of construction projects in India. India's current expenditure on admixtures is only $1/ m3 of concrete, compared to $2/ m3 in China and $4.5/ m3 in US. This is primarily due to the lack of awareness of admixtures in the Indian construction industry. With increasing demand for higher quality construction and increasing awareness of concrete admixture benefits, the industry could double the intensity of admixture consumption in India.

Similarly, the usage of pesticides in India is 0.58 kg/ ha compared to 2 kg/ ha in China.



To meet India's food requirements - spurred by increasing population, rising income, and limited availability of arable land - the yield per hectare will need to be increased considerably (e.g., crop productivity in India is at 2 MT/ ha compared to China at 5 MT/ ha). This can be achieved through multiple means (e.g., larger fields, better automation, improved irrigation infrastructure), along with increased use of agrochemicals.

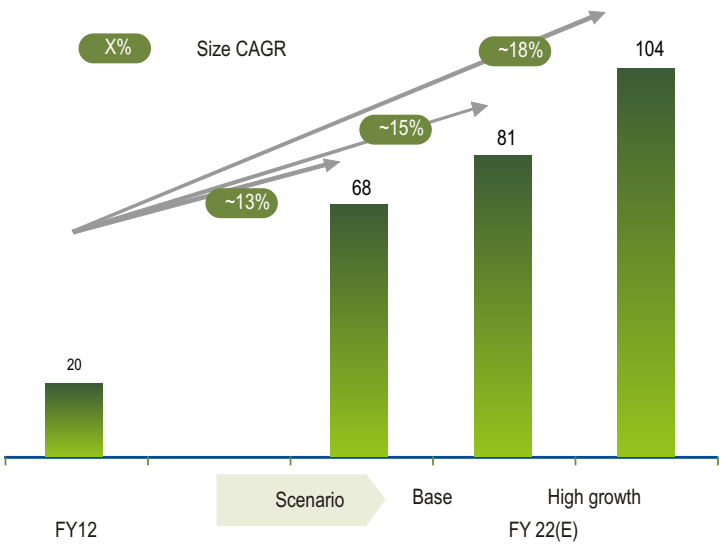
## Improved consumption standards

Consumption standards are policies implemented by the government to promote the safe use of products. These standards are necessary for both improving society's standard of living and enhancing consumer safety. Most developed countries (e.g. the US, Germany) have implemented stringent consumption standards across various end-use markets. As the economy develops, India will need to regulate products more stringently, and strengthen consumption standards, which in turn will promote increased usage of specialty chemicals. For instance, the US and Germany are very strict on the usage of solvents in paints and limit the volatile organic compound (VOC) content. India still uses enamel paints with high VOC content. Mandating the usage of water-based paints (that contain 5-15% petrochemicals) will help ensure health and safety of consumers, and encourage the consumption of higher cost, water based paints (increasing the segment's value).

## Growth projections

The market size of specialty chemicals in India has the potential to reach $70- $100 billion by FY22. The most likely case growth rate is expected to be higher than the XIIth five year plan targets with an expected growth of ~15% p.a. And the optimistic case is likely to achieve a growth of ~18% p.a. over the next decade.

**Growth projections of specialty chemicals market size, $ Bn**



The base case scenario growth is mostly driven by the expected growth in end use industries and increasing penetration of specialty chemicals in them which results in almost ~2X GDP growth rate. The enablers for a most likely growth or higher growth of ~17% p.a. are accelerated trends of urbanization, infrastructure development, increasing economic wealth, technology enhancement etc. which could lead to rise in demand for high performance products/ processes. The extent of accelerated trend could result in varying scenarios. A faster implementation of PCPIRs will also provide backward linkage in production support to facilitate high growth case.

## Segments in India

The nature of growth in different markets would reflect the growth potential of Indian economy in that segment. Government needs to play a key facilitating role in supporting this growth. The key segments in Indian Specialty Chemical markets are given below:

| | Segments | Size, FY12 ($ Bn) |
|---|---|---|
| 1 | Paints & coatings | 4.0 |
| 2 | Specialty polymers | 2.5 |
| 3 | Home care surfactants | 1.2 |
| 4 | Plastic additives | 1.0 |
| 5 | Textile chemicals | 0.9 |
| 6 | Construction chemicals | 0.7 |
| 7 | Water chemicals | 0.7 |
| 8 | Person care ingredients | 0.5 |
| 9 | Foods- Flavors and Fragrances | 0.45 |
| 10 | Paper chemicals | 0.45 |
| 11 | Printing inks | 0.45 |
| 12 | Industrial & Institutional cleaners | 0.2 |
| 13 | Rubber chemicals | 0.2 |
| 14 | Other segments | 6.3 |



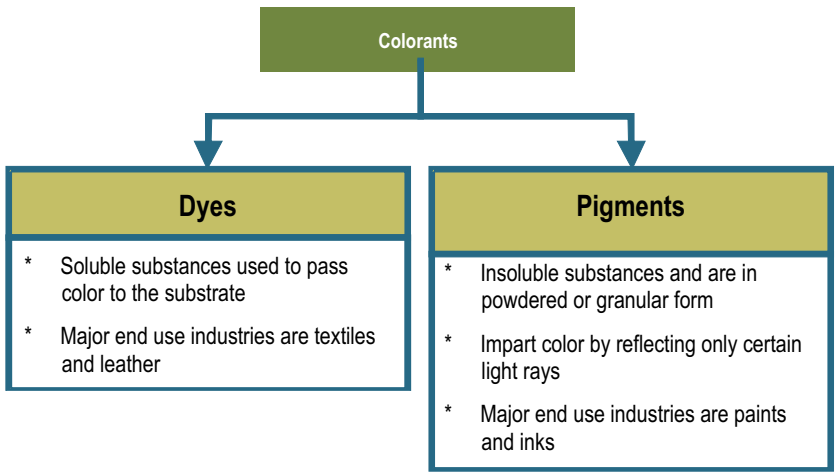
This segmentation does not highlight the markets of colorants separately (dyes & pigments) as the colorants are mostly used in many of the listed categories of specialty chemicals like paints & coatings, Inks, plastic additives, Textile chemicals etc. Colorants are covered in detail below.

## Key segment: Colorants

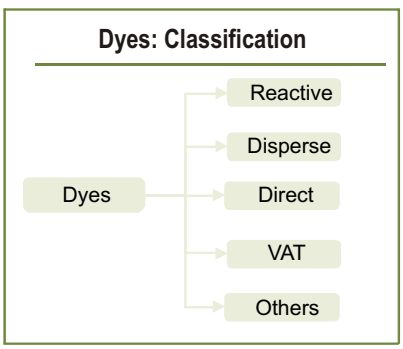
### Introduction

Colorants have inherent element of value addition to a wide variety of products like textiles, leather, paper, food products, cosmetics, plastics, paints, inks and high-tech applications like optical data storage (CDs, DVDs), solar cells, medical diagnostics (CT Scan, angiography), security inks, lasers, photo dynamics etc. The colorant industry comprises two sub segments- dyes and pigments.

**Classification of colorants**




**Classification of dyes**

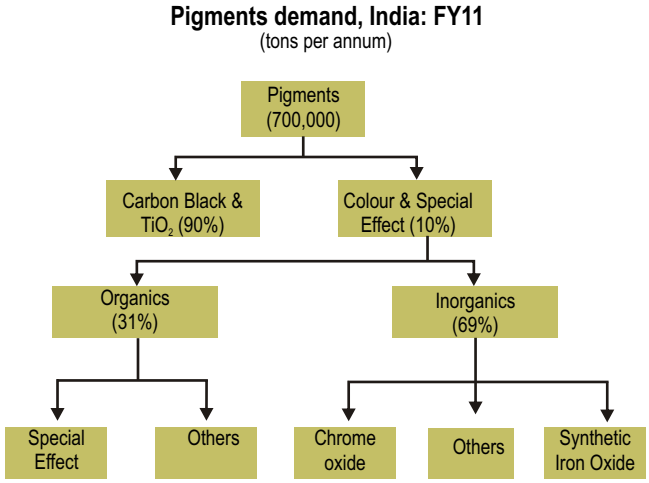



*Source: Industry reports*

There are 12 types of dyes, classified on the basis of the usage, however disperse, reactive and direct dyes are the most commonly used in India.

Pigments are broadly classified as organic and inorganic. The pigment market is estimated at ~7 lakh tons p.a. with a market size of ~USD 970 Mn. Carbon black and $TiO_2$ accounts for the 90% of the total pigment demand.

Pigments demand, India




*Source : Industry Reports, TATA Strategic analysis*

There has been a notable transition in the global arena during the last 2-3 decades in the manufacturing base of colorants, with a shift in production from Europe, USA and Japan to Asia viz. China, India, Taiwan, Thailand and Indonesia etc. With decline in production in most of the traditional centers, non-traditional centers like India and China are now preferred sources for supply of colorants to the global market. India had a distinctive edge over other centers however based on supportive Chinese government policies the threat from Chinese manufacturers is increasing.

Preference for eco-friendly products has additionally cast responsibility on the industry to be more selective and improve the product range with greater focus on R&D. This would ensure quality and performance colorants to suit the market expectations.

## Market overview

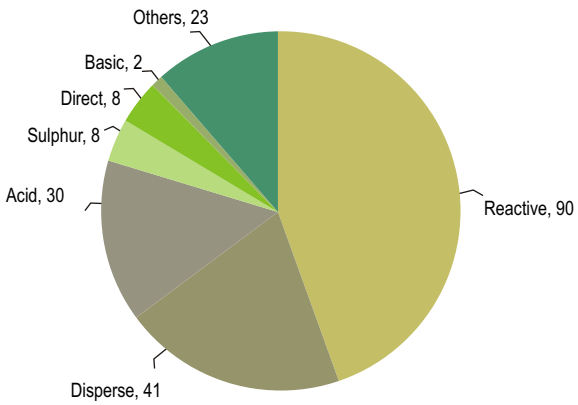
The world market for colorants comprising dyes, pigments and intermediates is presently estimated at approximate value of $27 billion. During the last decade, the industry was growing at an average growth of 2-3% per annum. Whereas other countries in the world market contribute nearly 87.5% of the global share, India accounts for 12.5%. Size of the Indian colorants industry is $3.4 billion in FY11 with exports accounting for ~68%.

The Indian dyestuff industry is highly fragmented and characterised by a large number of players in the unorganized sector. Today, Indian dyestuffs industry comprises about 950 units (50 in large and organized sector and 900 units under Small & Medium Enterprises (SME) Sector). These units are mainly present in the western states of Gujarat and Maharashtra, with Gujarat accounting for almost 80% of capacity.

Within India, the major players in the pigments industry are Sudarshan Chemicals, Golchha Pigments, Tata Pigments and Clariant India while in the dyestuff industry, companies such as are Atul, Clariant India, Kiri dyes, and IDI are large players present in the organized sector.

The overall production capacity of dyestuffs is 200,000 tonnes per annum. With the ever increasing standards of quality and reliability, Indian dyestuffs industry meets more than 95% of the domestic requirement, out of which textile industry consumes nearly 60% and the remaining is shared by paper, leather & other consumer industries. As far as pigments are concerned, the market size is 115,000 tonnes. The main consumer industries are printing inks, paints, plastics, rubber, etc., accounting for 70% of the end use.

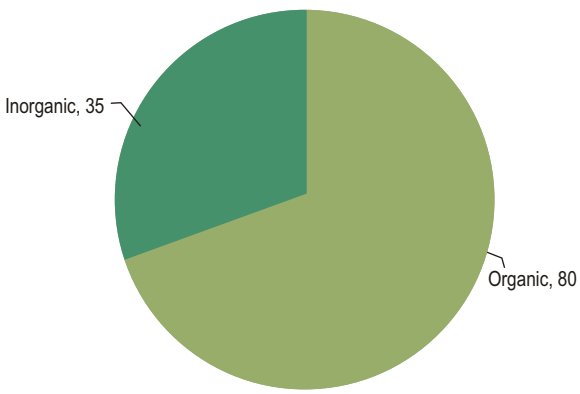
**Production of major dyes, India ('000 tonnes)**




Total: 200, 000 tonnes

*Source: DMAI*

**Pigment production, India ('000 tonnes)**




Total: 115,000 tonnes

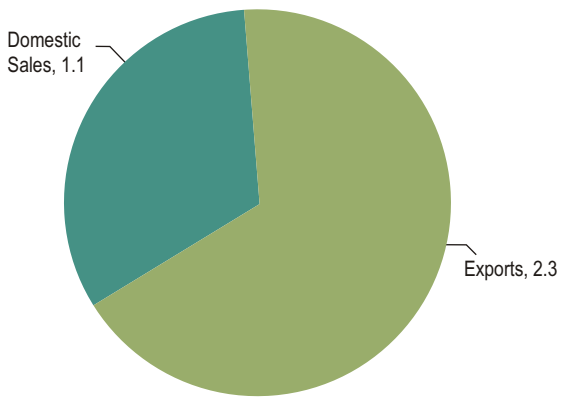
*Source: DMAI*



Total installed capacity for organic pigment is 80,000 tons p.a., which is way higher than the demand from the Indian market. Large proportion of the organic pigments produced is exported. There are also niche markets in India for special effect pigments such as metallic and pearlescent. These pigments are usually imported into the Indian market, with Sudarshan Chemicals being the only domestic manufacturer. Though the volume for these pigments would be very small as compared to other pigment segments, they usually command a premium for the design appeal that they provide to the final product such as automotive coatings and packaging materials.

The industry has grown at ~10% p.a. between FY07 and FY12 with exports growth at 14.5% p.a. The dyestuffs are exported to Europe, South East Asia and Taiwan to cater to the textile industries in these countries.

**India colorants market breakup**

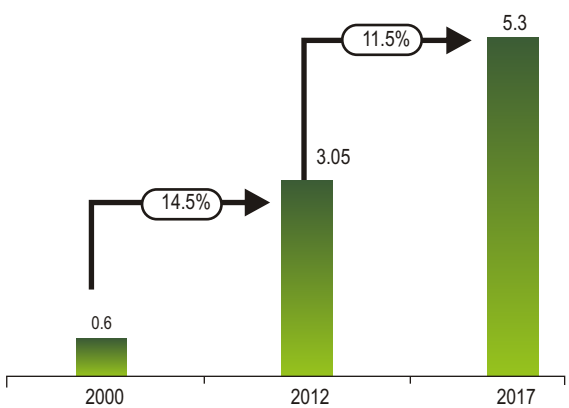



Total ~ USD 3.4 Bn

*Source: DMAI*

There has been remarkable growth in the exports of colorants during the last 2 decades. From a mere $0.03 billion in 1990, exports reached $2.3 billion in 2009-2010, having surpassed the estimates envisaged in the ten year strategic action plans submitted in 1991 and 2001. During the last decade, the industry achieved a growth of 14.5% p.a. Exports are estimated to grow to $4.9 billion by 2017.

**India's colorant exports ($ bn)**



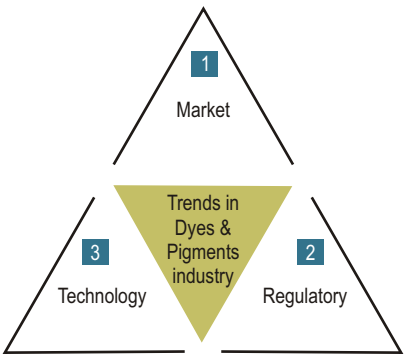

*Source: DMAI*



## Market Trends - *High performance products*

The global capacity of dyestuffs has exceeded the demand resulting in an oversupply scenario. Due to the lack of export demand, the prices of the colorants had dropped by roughly 20% in the recent past. It is expected that consumer preference for environmentally friendly products and high performance dyes and organic pigments will help improve overall value of the market.

**Industry trends for colorants**




1 **Market**
- Global overcapacity
- Customer requirements of environment friendly and high performance products

2 **Regulatory**
- Stricter domestic environmental laws
- Compliance to REACH

3 **Technology**
- Color solution approach to counter commoditization

*Source: Industry reports, Research by Tata Strategic*

## Regulatory Trends - *Stricter environmental laws*

Fiscal policies and excise concessions led to a high level of fragmentation in the Indian dyestuffs market. However, a gradual reduction in the excise duty has resulted in a more balanced pricing differential between the organized and unorganized sectors. The organised sector, with a better product range, technology and marketing reach, was able to increase its market share. Further, various regulations such as REACH and ban on certain dye stuffs have impacted the exporters resulting in the closure of small establishments and helping increase the share of the organized players.

## Technological Trends - *Commoditization*

Since majority of dyestuffs are commodities there is not much product differentiation and duplication of products is easy. To counter the same, global manufacturers are investing in research and development to improve the specialty end of their portfolio.

There is also a trend towards providing colour solutions rather than just a colorant. Collaborations with equipment manufacturers are being undertaken to provide integrated solutions to customers.

The financial crisis in 2008 has resulted in a demand slump, worldwide over-capacity and further margin pressures on the dyestuff industry. The Indian dyestuff industry is facing challenges due to reduced export demand growth and decreasing profitability.

Companies with greater focus on innovation and Research & Development will benefit in the long run. Adopting green chemistry practices and compliance could become the need of the hour.

## Future potential

Globally, the demand for dyes and organic pigments is forecast to increase 9% per year to ~USD 16.2 Bn in 2013. This growth will have a direct bearing on the domestic production of dyes and organic pigments since a large proportion of production is exported. Moreover, after the REACH (Registration, Evaluation, Authorization and Restriction of Chemicals) regulation, costs of handling effluents have increased. As a result a large number of companies have begun to relocate their operations to the Asian markets, particularly India and China.

Due to a greater use of polyester and cotton-based fabrics, there has been a shift towards reactive dyes used in cotton-based fabrics and disperse dyes used in polyester. The demand for reactive and disperse dyes is expected to grow fastest due to this continued demand.

The textile industry will remain the largest consumer of dyestuffs; however growth will be driven by markets such as printing inks, paints and plastics. These segments are also expected to increase the consumption of high performance pigments helping improve profitability. At around 8% growth, the Indian colorants industry (including pigments, dyes and dye intermediates) is likely to reach ~USD 5.1 Bn by 2012-13 and is expected to capture 10-12% of the global market.

The basic raw materials used for the manufacture of dyestuffs are benzene, toluene, xylene and naphthalene (BTXN). The technology employed by the dyes sector has been well received in the international market. Some of the units have established joint ventures abroad using their indigenous technology. The per capita consumption of dyes in India is 50 gms as compared to 400 gms in Europe, 300 gms in Japan which shows that there is tremendous potential for the Indian market to absorb additional production.

Considerable efforts have been put in by industry and academia on a continuous basis to deliver colorants with green environment. The need for high performance products has been to a great extent crystallized. There is also a noticeable trend in the world market with regard to color solution approach to counter commoditization with the advent of technological innovations. Innovations on plant based colorants are at advances stages too and could become a strong game changer.



## Challenges & opportunity

While chemical industry addresses growing need for materials required by different sectors, the industry employs highly complex manufacturing processes that involve handling of often toxic and hazardous chemicals. The process being energy intensive, the importance of safety, security and environmental protection cannot be underestimated. The export performance of specialty chemicals so far has been good. However, regulations like REACH may impact export performance.

Specialty chemicals segment has immense growth potential driven by high growing end-use industries. Technology & innovation will play vital role in growth of this sector where India has natural advantage of large pool of technical man-power as well as scientists and researchers.

Some of the upcoming developments that support the growth story for specialty chemicals are:-

a. Setting up of PCPIRs

b. Up-gradation of technical university to manage talent scarcity

c. Setting up of TUF (Technology up-gradation fund)

d. Increased focus on establishing consumer standards, environment protection certification etc.

However the execution of these initiatives is likely to define the rate of growth of specialty chemicals market. Details on some of the imminent needs of the industry are given below:-

a) **Feedstock availability:** Crackers in India use the basic building blocks like ethylene, propylene to manufacture commodity petrochemicals. The availability of these basic building blocks for specialty chemicals is a concern. If this scenario continues to prevail then there may always be lack of building blocks for specialty chemical industries and domestic production of specialty chemicals may never grow rapidly. Setting up of consortium crackers and PCPIRs is a positive step however the progress has been slow. Some of the Indian companies have overcome this challenge by using alternate feedstock. India is rich in alternate fuel availability like rapseed oil, castor oil etc. India glycol is successfully using molasses for MEG production.

b) **Improve infrastructure:** Support through better infrastructure (including safe transportation, storage etc.) adequate power/ water supply is needed.



c) **Develop better catalysts:** India lacks good catalysts and processes for better processing and value addition to feedstocks. Lack of autonomous research centres are one of the primary reason. Government support, strengthening of resources and focused research in this field, especially by centres such as IIP and NCL, could help develop better catalysts.

## Export - Import scenario

### Export: Key markets and key products

India exports significant proportion of its production of specialty chemicals and API. The key markets for export of specialty chemicals are:-



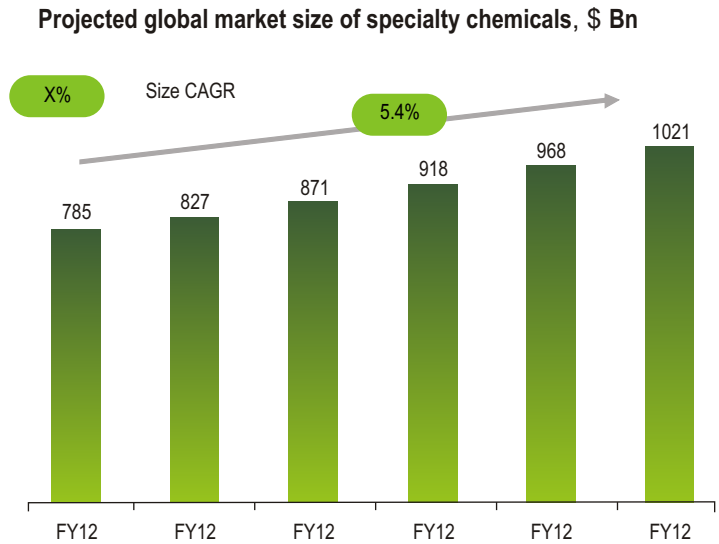
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| I. | USA | ii. | Germany | iii. | UK | iv. | Turkey | v. | Brazil |
| vi. | Italy | vii. | China | viii. | Korea | ix. | Indonesia | x. | Pakistan |
| xi. | Thailand | xii. | Bangladesh | xiii. | Japan | | | | |

Colorants (dyes and pigments) form the bulk of the export of specialty chemicals. Agrochemicals export is also on the rise and major destinations for agrochemical exports are US, UK, France, Netherlands, Spain, Belgium and Asia-pacific countries. API exports from India are into both regulated and semi regulated markets spanning across the world.

Most of the export is either to the near-by Asia-pacific regions which have downstream usage of these specialty chemicals but minimal domestic manufacturing or to the developed countries in Europe and USA which import from India for their manufacturing competitiveness.

## Future global scenario

Currently in FY12 the global market is ~$785 billion and going ahead it is expected to grow by ~5.4% p.a. to reach ~$1000 billion by FY17. Bulk of the global demand growth is expected to be driven by Asia-pacific countries and Middle Eastern countries which have currently lower levels of consumption.






Increasing global demand is most likely to result in increased production by low cost manufacturing locations of Asia- pacific. At present India, exports to most of the Asia-pacific countries and other developed countries of Europe and USA. Going ahead India's exports is likely to increase further as many of the nearby countries don't have competitive capacities while developed countries are likely to prefer India over China as sourcing destinations.

In comparison to China, India has balanced IPR regime with good talent pool. Indian legal system is good and is expected to provide confidence to foreign investors. These along with good labour laws, low R &D cost and also low cost of capital could push India as a more preferred destination for setting up manufacturing units.

## India's competitive manufacturing

Increasing globalization has resulted in diminishing of geographic boundaries for business and the trade has been increasingly on the rise. Globally, Asia- pacific countries have gradually become the key suppliers for bulk of the chemical products. India's manufacturing competitiveness makes it one the preferred suppliers for most countries. The key factors contributing to India's manufacturing competitiveness are:-



a) Demographic dividend: India's percentage of working population has been on the rise and is expected to grow up to ~67% by 2030 from current levels of ~63%. While the percentage working population has started to dip for countries like China and Japan.

b) Availability of skilled labour force with low wage rates

c) Increased government focus on promoting manufacturing sector through Special Economic Zones, Petroleum, Chemicals & Petrochemical Investment Regions (PCPIRs), National manufacturing investment zones (NMIZs) by providing fiscal benefits

The new manufacturing policy of government validates its intent by establishing a target to increase share of manufacturing in GDP from current 15% to 25% by 2022.

### Potential for chemical hubs in India

Establishment of PCPIRs is of immense importance for chemical industry as the policy is expected to attract major investments, both domestic and foreign for chemicals. Three PCPIRs have already been notified (Dahej, Paradip and Vizag). In addition to this various SEZs have presence of petrochemical complex (Mangalore and Dahej). These SEZs have a commitment to be a net foreign exchange earner making their focus strong for accessing export markets.

## Innovation and Sustainability

**Sustainability map**

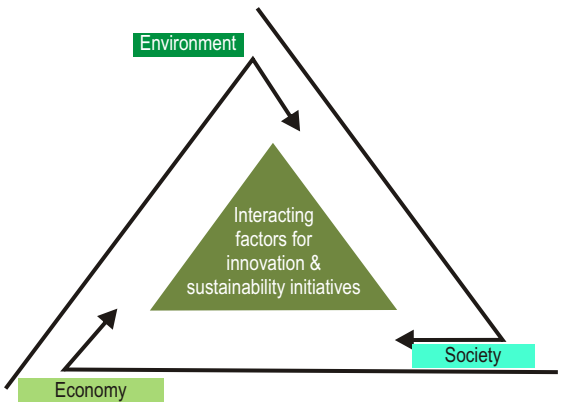



The figure above represents some of the considerations of a specialty chemicals company for sustainability. A sustainable growth for specialty chemicals is most likely to depend on the scope of innovation. Various companies are now focusing on growth of demand and are leveraging innovation as the key to achieve it. Specialty

chemicals can play a major role in improving the quality of life by enabling the manufacture of the goods and materials that we need whilst mitigating adverse environmental impact. By developing new usages of specialty chemicals, new processes and sustainable routes to produce, along with novel environmentally benign materials, we can achieve low carbon processes that make high value products that are safe for humans and solve energy and sustainability challenges.

The following chart depicts the three important interacting factors which define the need for innovation and sustainability initiatives.

**Interacting factors pushing for innovation and sustainability initiatives**






Currently India fares poorly in chemical research and innovation, accounting for only ~5% of the global chemical research papers and only ~1% of the global chemical patents. The overall investment in R&D research scenario in India is reverse to the scenarios in developed countries. Most of the developed nations have 60-70% of total R&D and innovation initiatives by industries whereas in India more than 50% research in chemicals is by Government. The average R&D intensity in India chemical sector was ~2.5% (in FY09). Bulk of this intensity is due to knowledge intensive specialty chemicals while the bulk chemicals and fertilizers are at the lower spectrum. In terms of global comparison average R&D of chemical sector is almost half to the developed countries.

## Green chemistry

Green chemistry focuses on encouraging the development of products and processes that eliminate or reduce the use of hazardous substances. However with evolving understanding of the consumers about the downsides of existing processes Green chemistry is no longer a proactive step. It is increasingly becoming a tool for competitiveness. Consumers in many developed countries in Europe and USA are willing to pay a premium for green chemistry. The adoption of green production and green products is likely to determine the competitive positioning in near future.



## Climate change

Climate change is one of the mega trends impacting the industries across the globe. The attitude of community and governments towards adverse impact to climate is becoming more stringent and hence new regulations are coming into effect. Reduction in $CO_2$ emission is becoming very important for industries to sustain.

Local companies along with MNCs are taking steps to control it. Some of the steps to making specialty chemicals production sustainable in this parameter are:-

i) Carbon capture and storage e.g.: use of supercritical $CO_2$ for solvent, enhanced oil recovery, ecofriendly Water Dispersible granules (WDG), Suspension Concentrates (SC), Oil Dispersion (OD), Micro-emulsion (ME), and Emulsion oil in Water (EW) etc.

ii) Use of aqueous hydrogen peroxide for clean oxidations, use of better catalyst for better conversion efficiencies etc.

iii) Energy conservation: use of renewables for power generation

iv) Introduce eco-friendly/ bio degradable/ bulk/ recyclable packaging

However just a focus on environment and society is not going to complete the pillar and hence the economics aspect must also be covered for an innovation based sustainability strategy. Some of the economic implications of innovations are:-

i) A low energy footprint results in saving power and energy, the cost of which is substantial for production of specialty chemicals.

ii) Shift towards high value activities could result in higher premiums, brand development etc. and may compensate for the cost of innovation. This along with a focus on geographic expansion is likely to bring in more demand for high value products.

iii) Reduction in the cyclicality of the portfolio along with the efficient utilization of raw materials could be another aspect where innovation may drastically impact the economic gains

iv) Focus on building knowledge capital and talent pool is likely to bring in innovation that could drive the competitive positioning of specialty chemical firms

v) With more tighter environmental norms expected to come, it becomes imperative to develop the specialty chemical products in line with the future needs



Some of these sustainability and innovation initiatives are also needed to be taken up by the industry together. Setting up of standards or benchmarking, awareness of customers and producers, recognitions and awards etc. are important for innovation to become a part and parcel of specialty chemical production.

Compliance with REACH and other stringent regulations imposed by EU and US markets should encourage the Indian specialty chemical manufacturers to increase their focus on innovation and sustainability. Indian government currently does not have any stringent regulations or environmental mandates forcing Indian manufacturers however with increasing globalization and awareness of consumers, investment in innovation could pay rich dividends later.

## Opportunities in Indian Specialty Chemicals Market

Though the domestic market is not large enough, Indian companies have set up world scale units leveraging the competitive advantages of low cost and availability of skilled manpower in India. With focus on niche segments and leveraging the economies of scale highly profitable manufacturing units in specialty chemicals have been set up.

| | World class capacity | Financials (FY12) |
|---|---|---|
| VINATI ORGANICS LIMITED | • World's largest producer of IBB[1] (14,000 TPA)<br>• World's second largest producer of ATBS[2] (12,000 TPA) | • Sales: Rs 460 Crore<br>• EBIDTA: 22%<br>• Sales CAGR (5 years): 38% |
| | • World's only bio-based MEG[3] plant (200,000 TPA) | • Sales: Rs 2950 Crore<br>• EBIDTA: 12%<br>• Sales CAGR (5 years): 18% |
| Atul | • World's largest p-Cresol plant (12,000 TPA) | • Sales: Rs 1890 Crore<br>• EBIDTA: 11%<br>• Sales CAGR (5 years): 17% |
| | • World class IPA[4] plant (70,000 TPA) | • Sales: Rs 2474 Crore<br>• EBIDTA: 18%<br>• Sales CAGR (5 years): 21% |
| Camlin Fine Sciences Ltd | • World class food anti-oxidant plant | • Sales: Rs 256 Crore<br>• EBIDTA: 15%<br>• Sales CAGR (5 years): 34% |

Notes : 1) Isobutylbenzene- usage in Pharma 2) 2-Acrylamido-2-Methyl Propane Sulfonic Acid- usage in refineries
3) Mono Ethylene Glycol- usage in Polyester 4) Iso Propyl Alcohol



There are certain challenges that exist in realizing the full potential of Indian specialty chemicals industry. Along with feedstock availability, infrastructure is a key challenge.

| CRITICAL SUCCESS FACTORS | | INDIA'S POSITION | Worst – Best |
|---|---|---|---|
| 1 Feedstock availability | ⇨ | • Most of the cracker output tied up for petrochemical production (PE,MEG etc.)<br>• Alternate feedstock is a key opportunity area | |
| 2 Meeting local needs | ⇨ | • Unique **local customer needs** evolving in consumer segments<br>• Companies with unique products for India consumers have been successful | |
| 3 Scale of operations | ⇨ | • Domestic market for some of the specialty chemicals is small<br>• Companies with focus of niche products with world scale capacities have been successful | |
| 4 Strong process know-how | ⇨ | • Emergence of global **R&D centers** of several **chemical MNCs**<br>• **Large pool of skilled manpower** available | |
| 5 Infrastructure and clusters | ⇨ | • Infrastructure needs to be improved for better access<br>• **Establishment of PCPIRs**[1] and other chemical clusters | |

***Notes:*** *1) PCPIR: Petroleum, Chemicals and Petrochemicals Investment Region*

*Source: Research by Tata Strategic*

There are various companies that have overcome challenges to build successful presence in India. Other companies could look to adopt/ evolve similar models to build capability and presence in Indian Specialty Chemical segment.

## SUCCESSFUL CASE STUDIES ...(1/2)

INDIA GLYCOLS LIMITED

***Feedstock availability***

***ILLUSTRATIVE***




- India glycol uses molasses as feedstock to produce ethylene oxide and its derivative specialty chemicals
  - ↓ It has its own demand driver because of being green petrochemical company

SL STUDIES...(1/2)

VINATI ORGANICS LIMITED

***World scale unit in niche products to serve both Domestic and Export market***



- Established in 1989
- World's largest manufacturer of Isobutylbenzene(IBB) with a capacity of 14,000 TPA
- World's second largest manufacturer ATBS, with a capacity of 12,000 TPA
- Supplies to customers in USA, China and Europe

*Source: Secondary Research, Analysis by Tata Strategic*

*ILLUSTRATIVE*

LANXESS

*Mix of organic and inorganic route for building India Presence*

- Lanxess established India presence in 2007
- Acquired Gwalior Chemicals in 2009
- Then set up 2 chemical units in Jhagadia
- Has witnessed strong sales growth in India



DOW CORNING

*Meeting local needs*

- Dow Corning started XIAMETER, a web-enabled business model for selling silicon compounds
  - ↓ Selling at 15% lesser than the usual market price
  - ↓ Catering to the segment which does not need product customization support



*Source: Secondary Research, Analysis by Tata Strategic*

## Way forward- Addressing the opportunity in Indian Specialty Chemical industry

- Specialty chemicals industry in India is expected to grow at a rapid pace
- Like the API industry, there is a potential to develop a successful domestic specialty chemical industry
- Ways to address the opportunities are:
  - Use of alternate feedstock
  - Large players in Niche Segments
  - Increased M&A to increase presence and technological footprint etc.
  - Innovation: Developing products for Indian market
  - Developing clusters for sharing of resources

## Conclusion

In recent times the production of specialty chemicals have slowly shifted from developed countries to manufacturing competitive countries of India, China, and Taiwan etc. It is imperative for India to maintain its manufacturing competitiveness as



well as for Indian manufacturers to keep pace with the product/ process innovation cycles to build its presence in global specialty chemicals industry.

The focus of Indian specialty chemical manufacturers could be on eco-friendly products and in alignment with stringent regulations. Segments like colorants, flavors & fragrances etc. have strong presence of unorganized players and the market is expected to observe consolidation in these segments. Investments in R&D could also be increased (either on industry level or on company level) to increase differentiation and ensure minimum duplication in market.

The stakeholders in this industry need to be abreast of the global capacity and demand scenario. Rapid pace of capacity build up could lead to mismatched demand supply resulting in price volatilities and saturation of market (including export markets). A global footprint, better reach, customer relationship, marketing initiatives could reduce the risk of varying demand. A diverse product portfolio and huge product range could ensure sustainability of the company.

Export market scenarios may change with time and create new geographic opportunities to enter. For e.g. Pakistan could decide to grant India most favored nation (MFN) trading status. It may then open up many potential benefits for both countries; existing trade arrangements could also be improved.

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# d. Agrochemicals

## INTRODUCTION

Agrochemicals are the substances manufactured through chemical or biochemical processes containing the active ingredient in a definite concentration along with other materials which improve its performance and increase safety. For application, these are diluted with water in recommended doses and applied on seeds, soil, irrigation water & crops to prevent the damages from pests.

There are broadly 5 categories of crop protection products:

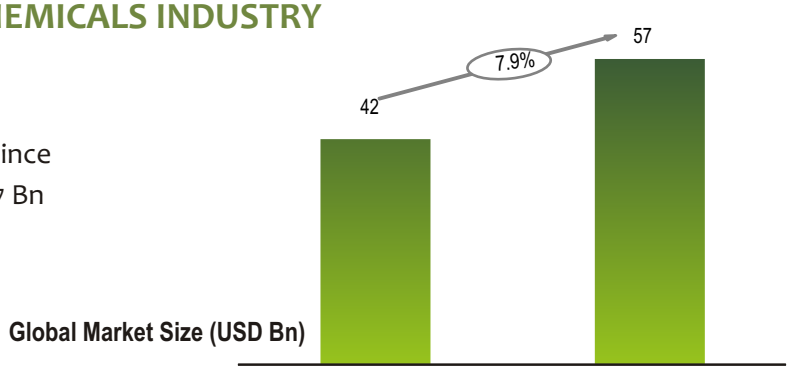
1. Insecticides: Manage the pest population below the economic threshold level
2. Fungicides: Prevent the economic damage due to fungal attack on crops
3. Herbicides: Prevent/ inhibit/ destroy the growth of unwanted plants in a crop field
4. Bio pesticides: These are derived from natural substances like plants, animals, bacteria & certain minerals. These are non-toxic & environmental friendly
5. Plant growth regulators

With increasing population, demand for food grains is increasing at a faster pace as compared to its production. Moreover, every year, significant amount of crop yield is lost due to non-usage of crop protection products.

It is estimated that the present food grain production can jump by additional ~33% through use of crop protection products. Therefore, Pesticides have been recognized in India as essential in increasing agricultural production by preventing crop losses before & after harvesting

## GLOBAL AGROCHEMICALS INDUSTRY

Global agrochemical industry has grown strongly at ~7.9% p.a. since FY08 to reach ~USD 57 Bn in FY12.

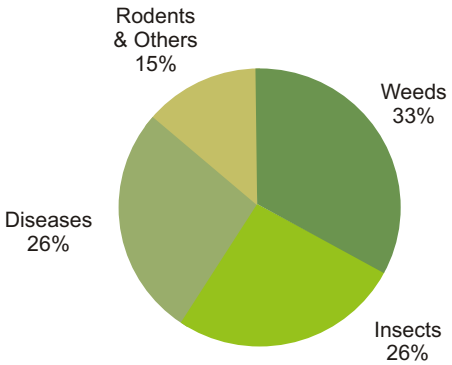



*Source: Tata Strategic Estimates*

## Geographical distribution

Europe has the largest share in the agrochemical market followed by Asia, Latin America & North America. There has been an increased usage of products in Europe due to high commodity prices & to boost yield & quality. Asia is catching up in global scenario with its share of the market having increased from 23% in 2008 to 25% now. Increased demand for palm oil is boosting the usage of herbicides in Japan, Malaysia & Indonesia and strong rice prices are increasing the agrochemical consumption in India. In Latin America, increased production of soybean &sugarcane for animal feed & bio fuel is the driving the growth of agrochemical consumption.

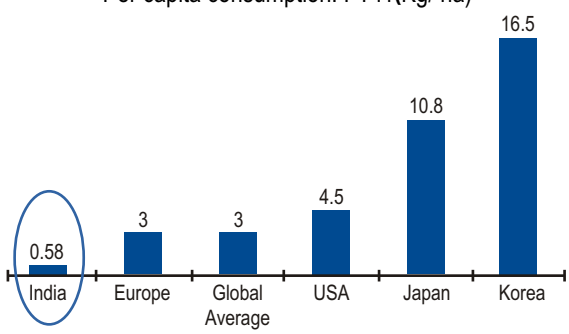
**Losses caused by different pests** (%)




*Source: Govt. of India estimates*

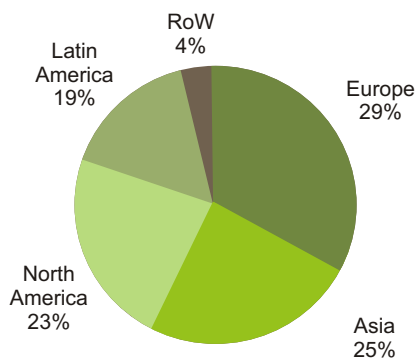


Per capita consumption: FY11(Kg/ ha)




*Source : Industry Reports, Meeting of the GOI Chemical Task Force- Crop protection sub sector discussions, TATA Strategic Analysis*

**Global Geographical share: 2011(%)**




*Source: Industry Report, Tata Strategic Estimates*



# INDIAN AGROCHEMICALS INDUSTRY

## Industry Overview

India is the fourth largest producer of crop protection chemicals globally, after United States, Japan & China. The crop protection industry is a significant industry for the Indian economy. The crop protection chemicals accounts for ~2% of the total chemicals market.

For FY11, Indian Crop market is estimated at ~USD 2 Bn and has been growing in double digits in the recent years. Greater export opportunities & introduction of newer molecules have led to high growth rates. Currently, the exports of crop protection chemicals are estimated at ~USD1.8 Bn.

In India a high spent on food and being the largest employer status makes agriculture a significant part of economy. Agriculture even though accounts for only ~17% of GDP it employs 55-60% of the workforce. However Indian agriculture is faced with challenges like limited farmland availability and low crop yields. India's crop yields in major crops like Rice, lentils, corn and soya-bean is more than 50% below China's. And one of the major reasons for this has been the low average crop protection consumption in India

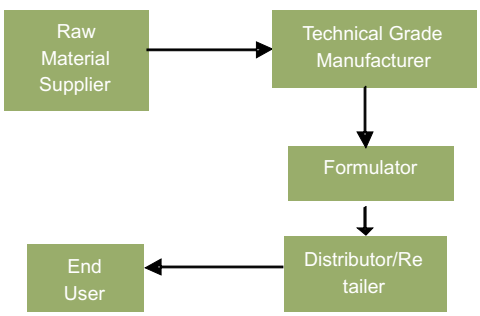
India's agrochemicals consumption is one of the lowest in the world with per hectare consumption of just0.58 Kg compared to US (4.5 Kg/ha) and Japan (11 Kg/ha).In India, paddy accounts for the maximum share of pesticide consumption, around 28%, followed by cotton (20%).

## Industry Structure

In India, there are about 125 technical grade manufacturers (10 multinationals), 800 formulators, over 145,000 distributors. 60 technical grade pesticides are being manufactured indigenously.

Technical grade manufacturers sell high purity chemicals in bulk (generally in drums of 200-250 Kg) to formulators. Formulators, in turn, prepare formulations by adding inert carriers, solvents, surface active agents, deodorants etc. These formulations are packed for retail sale and bought by the farmers.

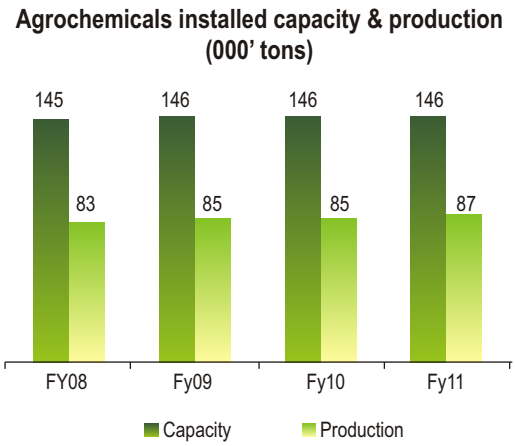
**Industry Structure**



The Indian agrochemicals market is characterized by low capacity utilization. The total installed capacity in FY11was 146,000 tons and total production was 87,000 tons leading to a low capacity utilization of ~60%. The industry suffers from high inventory (owing to seasonal & irregular demand on account of monsoons) and long credit periods to farmers, thus making operations 'working capital' intensive.

India due to its inherent strength of low-cost manufacturing and qualified low-cost manpower is a net exporter of pesticides to countries such as USA and some European & African countries. Exports formed ~47% of total industry turnover in FY11.






*Source: Government of India, Tata StrategicEstimates*

## Key Segments

**Insecticides:** Insecticides are used to ward off or kill insects. Consumption of insecticides for cotton has come down to 50% from 63% of total volume after introduction of BT cotton.

**Fungicides:** Fungicides are used to control disease attacks on crops. The growing horticulture market in India owing to the government support has given a boost to fungicide usage. The market share of fungicides has increased from 16% in 2005 to 20% in 2010.

**Herbicides:** Herbicides are the fastest growing segment of agrochemicals. Their main competition is cheap labor which is employed to manually pull out weeds. Sales are seasonal, owing to the fact that weeds flourish in damp, warm weather and die in cold spells.

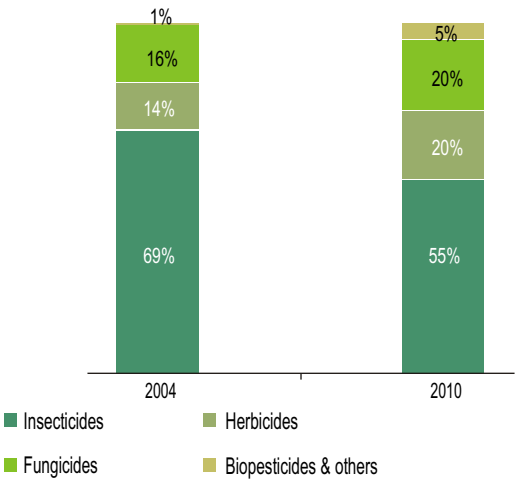
**Bio-pesticides:** Bio-pesticides are pesticides derived from natural substances like animals, plants, bacteria and certain minerals. Currently a small segment, bio-pesticides market is expected to grow in the future owing to government support

and increasing awareness about use of non-toxic, environment friendly pesticides.

**Others:** Plant growth regulators, Nematocides, Rodenticides, Fumigants etc. Rodenticides and plant growth regulators are the stars of this segment.

| Segment | Major Products | Main Applications |
|---|---|---|
| Insecticides | Acephate, Monocrotophos, Cypermethrin | Cotton, Rice |
| Fungicides | Mancozeb, Copper, Oxychloride, Ziram | Fruits, Vegetables, Rice |
| Herbicides | Glyphosate, Isoproturon, 2,4-D | Rice, Wheat |
| Bio-pesticides | Spinosyns, neem-based | Rice, Maize,Tobacco |
| Others | Zinc Phosphide, Aluminium Phosphide | Stored produce |

**Agrochemicals market: Product share** (% **of total**)




*Source: Industry Report, Tata Strategic Estimates*



Insecticides form the largest segment of the domestic crop protection chemicals market accounting for 55% of the total market. It is mostly dependent on rice and cotton crops. Herbicides are the largest growing segment and currently account for 20% of the total crop protection chemicals market. Sales are seasonal, owing to the fact that weeds flourish in damp, warm weather and die in cold spells. Rice and wheat crops consume the major share of herbicides. Increasing cost of farm labour will drive sales of herbicides going forward. Fungicides, accounting for 20% of the total crop protection market, are used for fruits and vegetables and rice Farmers moving from cash crops to fruits and vegetables and government support for exports are increasing the fungicides usage. Bio-pesticides include all biological materials organisms, which can be used to control pests. Currently a small segment, bio-pesticides market is expected to grow in the future owing to government support and increasing awareness about use of non-toxic, environment friendly pesticides.



With increasing penetration of BT cotton, usage of insecticides has witnessed a decline in the recent past. Its share in the total crop protection chemicals has reduced from 69% in 2004 to 55% in 2010. On the other hand, share of herbicides and fungicides has increased from 17% and 13% respectively in 2004 to 20% each in 2010. This is due to increased focus on fruits and vegetables and higher awareness levels among end users.

### Competitive Landscape

The Indian crop protection chemicals market is highly fragmented in nature with over 800 formulators. The competition is fierce with large number of organized sector players andsignificant share of spurious pesticides. The market has been witnessing mergers and acquisitions with large players buying out small manufacturers.

Key market participants include United Phosphorus Ltd, Bayer Cropscience Ltd, Rallis India Ltd, Gharda Chemicals Ltd, Syngenta India Ltd, BASF India Ltd, etc. Top ten companies control almost 80% of the market share. The market share of large players depends primarily on product portfolio and introduction of new molecules. Strategic alliances with competitors are common to reduce risks and serve a wider customer base.

### Import/ Exports

Pesticides industry in India has witnessed a trend of increasing exports. This is due to its competence in low-cost manufacturing, low-cost manpower. Seasonal domestic demand, domestic overcapacity and better price realization in the overseas market has also led to this trend. India has emerged as the thirteenth largest exporter of pesticides in the world. However, most of the exports are off-patent products.

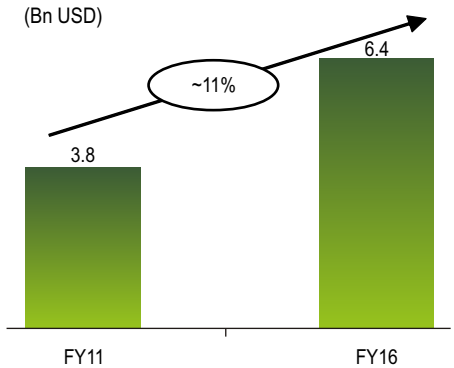
Currently, the total export value of crop protection chemicals amount to USD 1.6 Bn. America, Asia (excluding Middle East) & Europe are the major exporting destinations.

## Key Trends

### Market Trends

- Focus on developing environmentally safe pesticides by the industry as well as the Government. The Department of Chemicals has initiated a nationwide programme for "Development and production of neem products as Environment Friendly Pesticides" with

**Growth potential of Agrochemicals**




*Source: Industry reports, Research by Tata Strategic*

financial assistance from United Nations Development Programme (UNDP)

- Focus by larger companies on brand building by conducting awareness camps for farmers and providing complete solutions.
- Increase in strategic alliances among large players for greater market reach and acquisitions of smaller companies globally to diversify product portfolio. For example: Rallis has a marketing alliance for key products with FMC, Dupont, Syngenta, Bayer and Nihon Nohayaku. In addition, UPL has had a series of small acquisitions globally to enter new geographies and gain product expertise.

### Technology Trends

- Increased R&D expected for development of new molecules and low dosage, high potency molecules
- Focus on R&D in bio-pesticides segment with increasing preference for environmentally safe products in the market

## Growth Forecast & Drivers

Even thoughthe Indian agricultural sector is highly dependent on monsoons, the market for agrochemicals is expected to grow at a high growth rate of ~11% p.a. to reach ~ USD 6.4Bn by FY16.

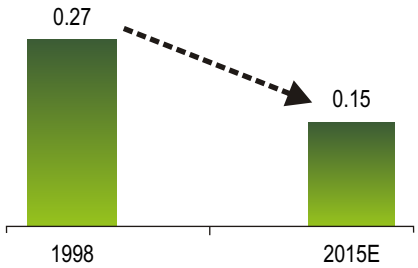
### Key market drivers include:

- **Growth in demand for food grains:** India has 16% of the world's population and less than 2% of the total landmass. Increasing population and high emphasis on achieving food grain self-sufficiency as highlighted in the FY10 budget, is expected to drive growth.
- **Limited farmland availability and growing exports:** India has ~190 Mn hectares of gross cultivated area and the scope for bringing new areas under cultivation is severely limited. Available arable land per capita has been reducing globally and is expected to reduce further. The pressure is therefore to increase yield per hectare which can be achieved through increased usage of agrochemicals. Indian agrochemical exports accounted for ~50% of total industry size in 2010.
- **Growth of horticulture & floriculture:** Buoyed by 50% growth experienced by Indian floriculture industry in last 3 years, Government of India has launched a national horticulture mission to double production by 2012. Growing horticulture and floriculture industries will result in increasing demand for agrochemicals, especially fungicides.



Also the farmers are now shifting their focus to value added crops like fruits & vegetables from just basic crops. The more assured returns from these and their relatively shorter harvesting duration makes them more profitable. And with the increased ease of usage of agrochemicals in fruits & vegetables the demand for agrochemicals will rise.

**World- Available arable land per capita**
(Ha)

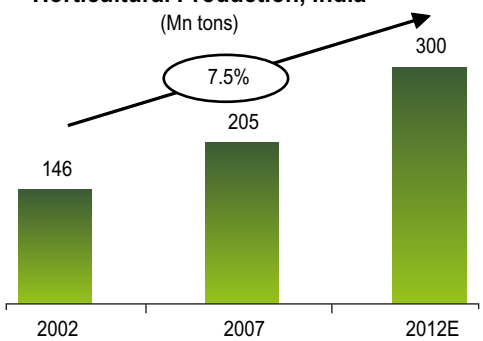



*Source: Yara Fertilizer Handbook, PotashCorp*

- **Increasing awareness:** As per Government of India estimates, total value of crops lost due to non-use of pesticides is around USD 17 Bn every year.Companies are increasingly training farmers regarding the right use of agrochemicals in terms of quantity to be used, the right application methodology and appropriate chemicals to be used for identifiedpest problems. With increasing awareness, the use of agrochemicals is expected to increase.

  Also the minimum support prices (MSP) is much better now and likely to increase further. This will ensure enough financial incentive to increase productivity and increase profits. More and more focus is now towards value added crop/ short duration crops.

**Horticultural Production, India**
(Mn tons)

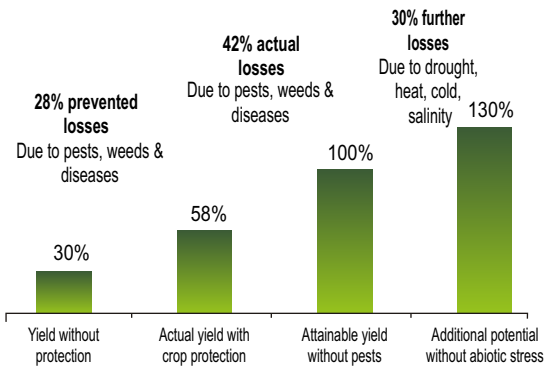



*Source: National Horticulture Mission*

- **Shortage of labor:** With increasing urbanization and NREGA the labor available for farming has become costlier. This will push the farmers to adopt more usage of agrochemicals and reduce dependence on manual labor.

- **Development of newer molecules:** There is an increasing focus of end consumers on environment friendly pesticides and the need for further yield enhancement. This translates into development of newer molecules whose volume of consumption may be limited but higher value is likely to increase the market size.

**Yield improvement potential**
(%)




*Source: Bayer Cropscience Research, Emkay research*

## Key Challenges

- **High R&D costs:** R&D to develop a new agrochemical molecule takes an average of 9 years and ~ USD 180 MnIndian companies typically have not focused on developing newer molecules and will face challenges in building these capabilities, while continuing to remain cost competitive.
- **Threat from Genetically Modified (GM) seeds**: Genetically modified seeds possess self-immunity towards natural adversaries which have the potential to negatively impact the business of agrochemicals.
- **Need for efficient distribution systems:** Since, the number of end users is large and widespread, effective distribution via retailers is essential to ensure product availability. Lately, companies have been directly dealing with retailers by cutting the distributor from the value chain thereby reducing distribution costs, educating retailers on product usage and offering competitive prices to farmers.
- **Support for Integrated Pest Management (IPM) & rising demand for organic farming:** Promotion of IPM, zero budget farming and usage of bio-pesticides by Indian Government and NGOs is gaining momentum. With increasing demand for organic food, farmers in certain states like Karnataka have reduced chemical usage and have adopted organic farming. Agrochemical companies will have to tackle the rising environmental awareness and address concerns on negative impact of pesticide usage.
- **Counterfeit Products:** The spurious pesticides market size in India is estimated to be USD 233 Mn in 2010. This negatively impacts the revenues of the organized sector.
- **Regulatory Hindrances:**The functioning of regulators is a concern for the industry and their investments. Most of the players believe that the current approval process is slow, especially for newer molecules.Govt. announced (in recent financial budget) that it plans to provide 150% depreciation for farm extension will be allowed, however no progress is observed for the same. The industry needs good plans and their expedited implementation to grow strongly.



## Key Opportunities

- **Scope for increase in usage:** With ~35-40% of the total farmland under crop protection, there is a significant un-served market to tap into. By educating farmers and conducting special training programs regarding the need to use agrochemicals, Indian companies can hope to increase pesticide consumption.
- **Huge export potential:** The excess production capacity is a perfect opportunity to increase exports by utilizing India's low cost producer status.



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# Petrochemical sector



## a. Petrochemicals

### INTRODUCTION

Petrochemicals play a vital role in economic development & growth of a country. The growth of this industry is closely linked to economic growth of a country. Petrochemicals are considered as enablers for growth of other sectors of the economy. Today, petrochemical products permeate the entire spectrum of daily use items and cover almost every sphere of life like clothing, housing, construction, furniture, automobiles, household items, agriculture, horticulture, irrigation, packaging, medical appliances, electronics and electrical etc.

Petrochemicals are derived from various chemical compounds, mainly hydrocarbons. These hydrocarbons are derived from crude oil and natural gas. Among the various fractions produced by distillation of crude oil, petroleum gases, naphtha, kerosene and gas oil are the main feed-stocks for the petrochemical industry. Unconventional feedstocks are also gradually coming up like shale gas, coal, CBM, pet coke etc. Ethane, propane, butane and Natural Gas Liquid (NGL) obtained from the natural gas are the other important feed-stocks used in the petrochemical industry. The basic building blocks olefins (ethylene, propylene & butadiene) and aromatics (benzene, toluene and xylene) are the major raw materials from which most of the chemicals are derived.



The two major segments for petrochemicals are:-

i) Basic petrochemicals and

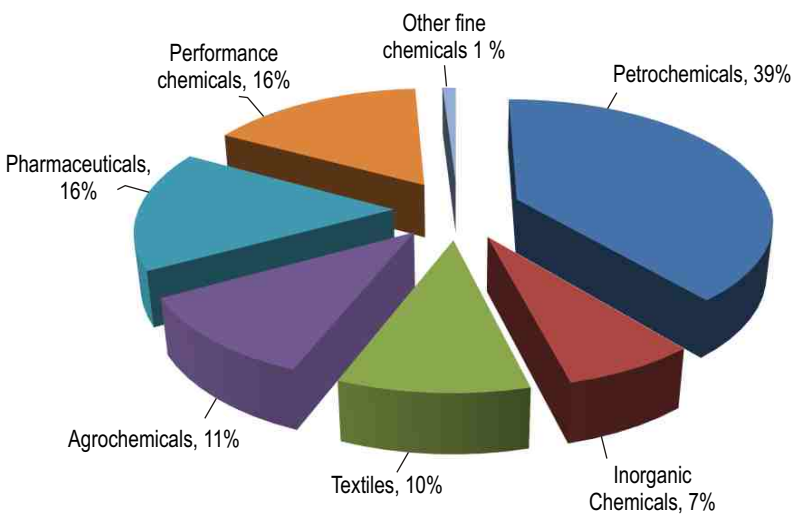
ii) End-product petrochemicals

The feedstocks are used to derive the basic petrochemicals. Basic petrochemicals can be reclassified as olefins (ethylene, propylene and butadiene) and aromatics (benzene and xylene). These basic petrochemicals are then used to produce end product petrochemicals.

## GLOBAL PETROCHEMICALS INDUSTRY

In 2010, the size of the global chemical market was estimated at US $ 3.3 trillion, within which, petrochemicals constitute the single largest segment accounting for ~40 % (US $ 1.3 trillion).

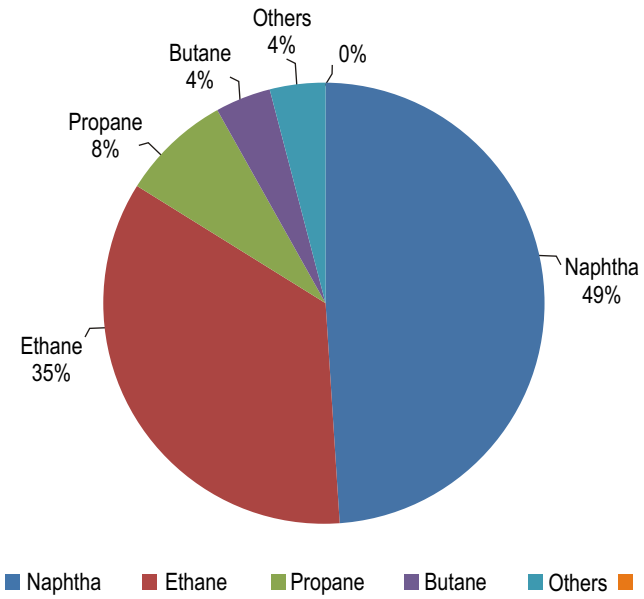
**Global Chemical Industry**




*Source: FICCI reports, Industry reports*

Size of the petrochemical industry is mostly determined by the size of ethylene and propylene capacity built. Both constitute almost 73% of global basic petrochemicals market. Ethylene, the key petrochemicals building block is produced through multiple routes using different feedstocks like naphtha and Natural gas (ethane, propane, butane, etc.) However, naphtha and ethane are the most commonly used feedstock, accounting for about ~84 % of the global ethylene production.

**Production of Ethylene by Feedstock**




*Source: FICCI reports, Industry reports*

Global ethylenecapacitywas estimated at 145 million tons in 2011 and is expected to achieve a CAGR of 2% to reach160 million tons in 2016. Globally there is over capacity with the global demand for ethylene being only 124 million tonnes in 2011. This over capacity is expected to remain till 2016 with the ethylene demand expected to be 154 million tonnes by 2016. Whereas, global propylenecapacity,estimated at ~100 million tons in 2011, is expected to achieve a CAGR of ~5% to reach125 million tons in 2016. And its demand is expected to grow from 78 million tonnes in 2011 to ~100 million tonnes by 2016.

Major countries are North America, Western Europe and East Asia and major petrochemical companies are Lyondell-Basel, Dow, Sinopec, Exxon and Ineos, SABIC etc. The capacity additions in the recent years have dramatically changed the supply scenario. The majority of the capacity additions (up to 90 %) were from Middle East and Asia. Both Middle East and Asia accounts for about 18 % and 33 % respectively. The new capacity additions based on ethane feedstock in Middle East changed the feedstock mix for cracker. The changing feedstock options added pressure on propylene derivative, which led to the development of on-purpose propylene technology development. The availability of Shale gas in USA from end 2008 has renewed interest in petrochemical investments in North America. This is indeed a new competitive advantage for US Petrochemical Industry.

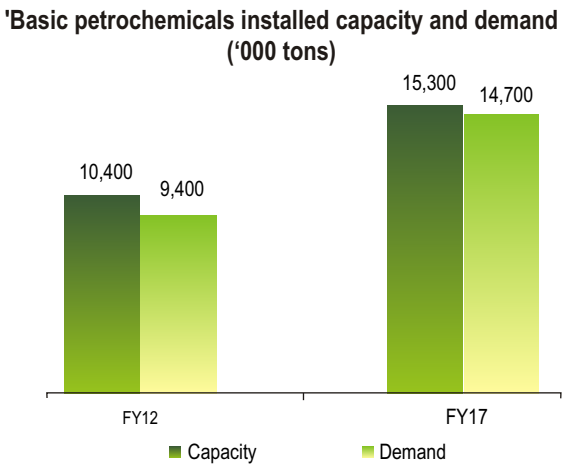
# INDIAN PETROCHEMICALS INDUSTRY

## Industry overview

As a downstream industry of exploration and refining business, the petrochemicals industry is a significant industry for the Indian economy. The Indian basic petrochemicals market (including end products market which includes polymers, synthetic fibers, elastomers and surfactants) the total petrochemical market has grown at a CAGR of 8.1% from USD 13 billion in FY06 to USD 19.3 billion in FY11.

By global standards, its contribution to global market size is not very large, primary reason being low per capita consumption of polymers in India, only ~7 kgs, compared to world average of ~25 kgs.

The Indian petrochemicals market is influenced by international demand and supply forces as the domestic market is oversupplied. The total installed capacity of major basic petrochemicals (ethylene, propylene, butadiene, styrene, benzene & toluene) in FY12 is 10.4 million metric tons per annum (mmtpa) against the total demand of9.4 mmtpa, leading to a surplus of ~1 mmtpa. This surplus is likely to erode over the next five years to ~0.6 mmtpa with demand growth likely to outpace the capacity growth.




*Source: Crisil research, Tata Strategic analysis stimates*

## Key end use segments

Polymers:Polymers are popularly known as plastics, Polyethylene, polystyrene, polypropylene and polyvinyl chloride are major types of polymers. Consumption of polymers has increased from61% to ~70% of total volume of major end products petrochemicals between the period FY06 and Fy11.

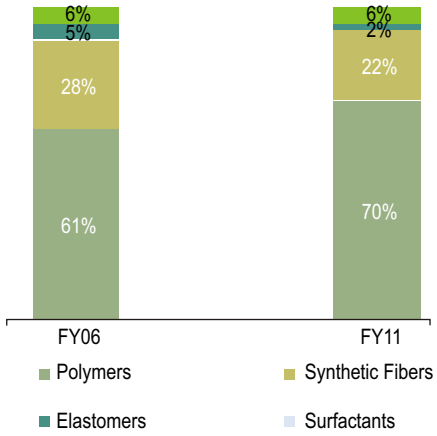
Synthetic Fibers:Synthetic fibers account for about half of all fiber usage, with applications in every field of fiber and textile technology. The market share of

synthetic fibers has decreased from 28% in FY06 to ~22% in FY2011.

Elastomers:Elastomers are polymers with elastic properties. They find applications in manufacturing of various types of tyres and non-tyre goods. Share of elastomers have declined from 5% in FY06 to 2% in FY11.

Surfactants:Surfactantsstabilize mixtures of oil and water and find application in detergents, emulsifiers, etc. Its share has remained same in overall market at 6%.

**End product petrochemicals market: share** (% of total)




*Source: Industry Report, Tata Strategic Estimates*

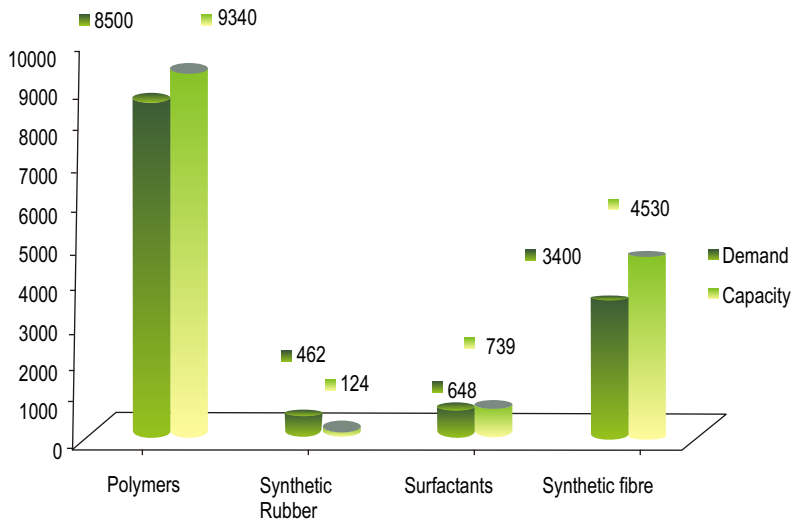


| Segment | Major Products | Main Applications |
|---|---|---|
| Polymers | Polyethylene, polystyrene, polypropylene, polyvinyl chloride (PVC) | Packaging, Carrier bags, extrusion coating |
| Synthetic fibers | Polyester, nylon, acrylic fiber, purified terephthalic acid | Fiber and textile technology |
| Elastomers | Styrene butadiene rubber, poly butadiene rubber, plasticized PVC | Tyres , toys, consumer items |
| Surfactants | Linear alkyl benzene and ethylene oxide | Detergents, emulsifiers,foaming & conditioning agents |



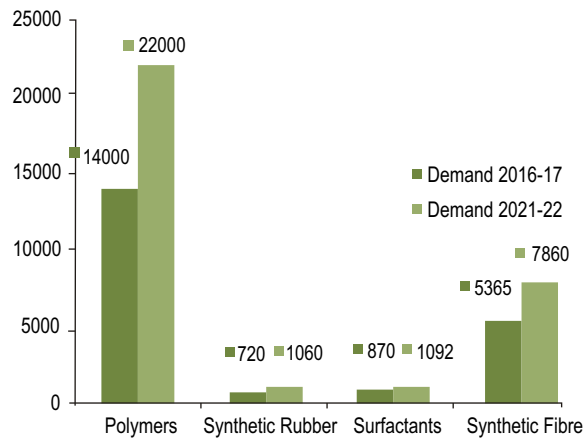
The figure below gives the domestic demand and capacity of these segments for 2012 as well as future projections.

**Domestic Demand and Capacity 2011-12**




*Source: FICCI reports, Industry reports*

**Domestic Demand Projections 12th & 13th Five Year Plan**




*Source: FICCI reports, Industry reports*

Petrochemical downstream processing sector are major contributors to entrepreneurial development and employment generation, thereby serving a vital need of the economy. Starting from the raw material production to conversion into finished products, the employment potential (both direct and indirect) is generated in a cascading manner, which is currently estimated at over 3.5 million.

The petrochemical industry is technology driven industry and for operation of sophisticated and modern petrochemical plants, skilled manpower is required. To

meet the growing need of skilled man power, emphasis is being provided by Government through Central Institute of Plastic Engineering and Technology (CIPET).

The downstream plastic processing industry is highly fragmented and consists of micro, small and medium units. Presently there are about 25,000 plastic processing units of which about 75% are in the micro & small-scale sector. The virgin polymer consumption during 2011-12 was estimated to be 8.5 million tons. The industry also consumes recycled plastic, which constitutes about 40% of total consumption.

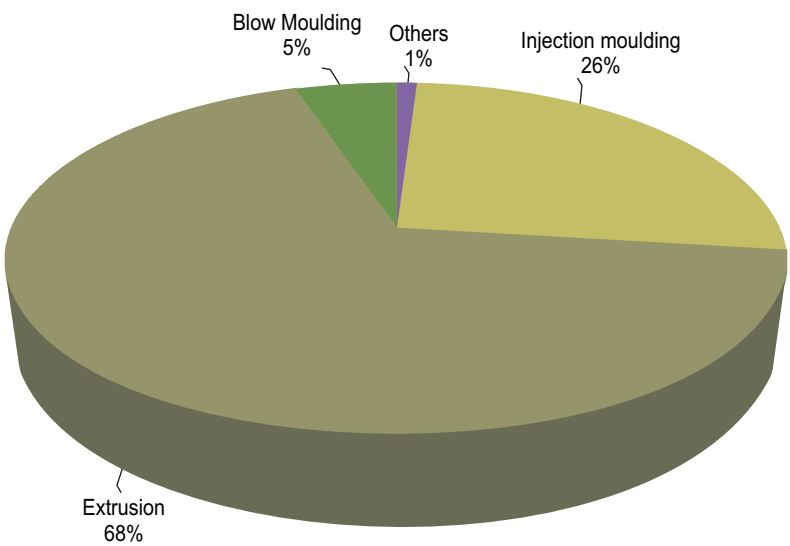
In the downstream plastic processing sector there are three major process categories, viz. Injection molding blow molding, and extrusion. The approximate share of the process in the consumption is as indicated in figure below.

Plastic Processing Industry as on 2010-11 had 97400 numbers of processing machinery and the estimated capacity is 23,700 kilo tons in the above mentioned processing sector. In terms of Processing type 62 % was Injection molding machines, 30 % extrusion and 8 % blow molding. In terms of capacity of plastic processing machinery, extrusion accounts for 67 % of total capacity, injection molding 29 % and blow molding 4 %.

Domestic plastic processed articles are also exported to the extent of US $ 2.5 million.

In the Plastic processing machinery there are about 200 registered machinery manufacturers out of which 20 top manufacturers represents 75 to 80 % of the machinery manufacturing capacity

**Sector Wise Polymer Consumption**




*Source: FICCI reports, Industry reports*

Based on the projected consumption of polymers during the 12th and 13th five year plan the estimated additional investment in downstream plastic processing industry is approximately Rs 7,700 crore by 2016-17 and Rs. 11,384 crore by 2021-22.

The growth of downstream plastic processing industry is linked to the availability of Polymers. The trade in Polymers are significant; the details of Import and Export of major commodity polymers are as follows:

| Commodity polymers | 2009-10 | 2010-11 | 2011-12 (April to December) |
|---|---|---|---|
| Imports | 2165 | 2507 | 1737 |
| Exports | 660 | 822 | 971 |
| Net Trade | (-) 1505 | (-) 1685 | (-) 765 |

Several new capacity additions and expansions are planned during the 12th five year plan, the estimated investment in these projects are Rs 85,000 cr to Rs 95,000 crore.

The domestic petrochemical industry is supported by

- Strong Domestic Demand.
- Supportive Government policies
- End-products markets widely spread out in sectors and geographic.
- World-class upstream integrated complexes for Polymer production. .

The opportunities offered in the domestic consumption are

- Large and rapidly growing domestic market for end products
- Large head-room for future growth (low per-capita consumption) ,due to favorable demographics, rising disposable income, development of rural marketing, growth of organized retailing, developments in agriculture, automobile, telecommunication, health care, packaging, etc.
- Development of niche products for exports.
- Scope for increased value addition.
- Favourable trade agreement.

Apart from the conventional industries for petrochemical consumption (Automotive, packaging, textiles, electronic etc.), opportunity exists in plasticulture applications, Water management, Nursery management, Surface cover cultivation and controlled

environment agriculture. Out of total 193.7 million hectares (mha) of cropped area in the country, 62.25mha is under different forms of irrigation sources out of which only about 5mha is under Micro Irrigation. Plastics are still underutilized in the agriculture sector in India @ 1% vis-à-vis 7% in developed countries. Thus there is huge unrealized potential in this sector too.

The concerns are

- Inadequate availability of natural gas which prevents entry of new players for expansion.
- Fragmented downstream absorption capacities.
- Inadequate infrastructure for exports.
- Inadequate availability of quality power and high cost of energy.
- High capital cost. (High CAPEX, cost of interest and utilities cost).
- Cyclical and volatile nature of business with fluctuating product prices affecting margins.
- Shortage of skilled manpower.
- Capacity additions in Middle East and other Asian countries.
- Reduced rate of growth in domestic demand due to high inflationary pressures.

## COMPETITIVE LANDSCAPE - POLYMERS INDUSTRY

Polymers constitute 70% of end products petrochemicals market in India. Indian polymers industry is oligopolistic in nature with only 4 large producers - Reliance Industries Ltd. (RIL), Indian Oil Corporation Limited (IOCL), Haldia Petrochem Ltd (HPL) and Gas Authority of India Ltd (GAIL). Market entry barriers are high with high start-up costs and raw material costs.

RIL produces all forms of polymers namely Polyethylene (PE), Polypropylene (PP) and Poly vinyl chloride (PVC). HPL and GAIL produce PE and PP but don't produce PVC. Other domestic players are Finolex Industries, DCW, Chemplast and DCM Shriram. All of them produce only Poly vinyl chloride (PVC).

Reliance Industries Ltd. (RIL) has 1.12 Mn Tonnes per annum (TPA) capacity of PE, 2.6 MnTPA capacity of PP and 625,000 TPA capacity of PVC. RIL's production facilities are located in Gujarat and Maharashtra.



Haldia Petrochemicals Ltd. (HPL) is another key player with PE capacity of 710,000 TPA and PP capacity of 330,000 TPA. HPL's Plants are located in eastern region of India. Other major players are Indian Oil (IOCL) & Gas Authority of India (GAIL) with their plants located at Panipat and Auraiya respectively. These plants mainly cater to the northern regional demand of plastics. IOCL have 600,000 TPA production capacities of both PE and PP, while GAIL has 510,000 TPA capacity of PE.

| Producer | PE | PP | PVC |
|---|---|---|---|
| RIL | 1,115,000 | 2,635,000 | 625,000 |
| IOCL | 600,000 | 600,000 | - |
| GAIL | 510,000 | - | - |
| HPL | 710,000 | 330,000 | - |
| Chemplast Sanmar | - | - | 290,000 |
| Finolex | - | - | 260,000 |

After Reliance, Chemplast Sanmar and Finolex Industries is the major producer of PVC with a production capacity of 290,000 TPA and 260,000 TPA respectively.

## KEY TRENDS

### Market Trends

- **Increase in global demand:** Global demand for ethylene is forecasted to grow at a CAGR of 4.4% and that of propylene to grow at a CAGR of 5.0% between period 2011 and 2016. Ethylene and propylene will continue to have major share (70-75%) of total petrochemicals demand
- **Capacity expansion:** Between 2011 and 2016 ethylene capacity additions is expected to grow by 25 million tonnes. Major capacity build up is happening in China and Middle East.
- **Depressed margins:** With oversupply hinging in the global petrochemicals market, margins will increasingly come under pressure.
- **Low utilization levels:** Global capacity utilization levels are observed to be at all-time lows of 80% in 2011. This may continue till the global demand picks up.

### Technology Trends

- **Product switch:** Linear low density polyethylene is increasingly replacing the usage of low density polyethylene in India. Only 1 ton of ethylene is required to produce 1 ton of LLDPE whereas > 1 ton of ethylene is required to produce 1 ton of LDPE



- **Change in feedstock mix:** With increased availability of natural gas and new gas finds, the dependency on naphtha as major feedstock for petrochemicals complexes have reduced. In Middle East, substantial capacity additions will be based on ethane as a feedstock.

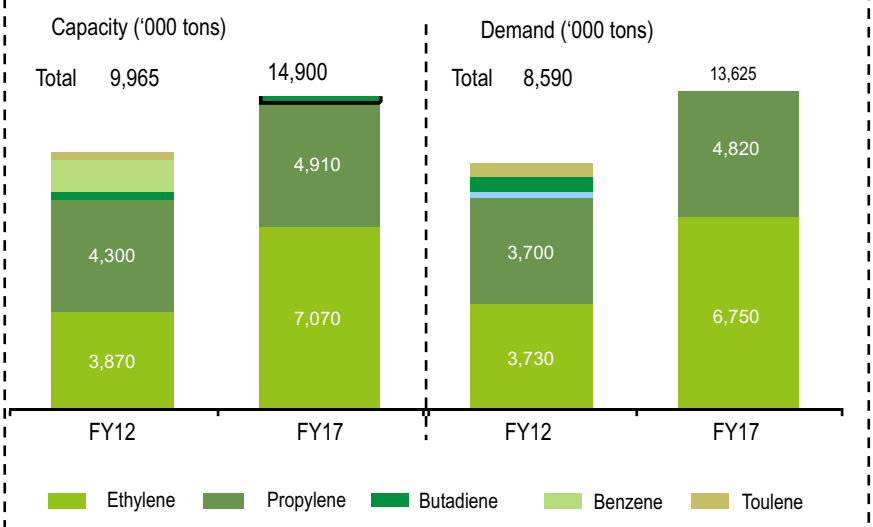
### Regulatory Trends

- **Loss of duty protection:** On final products, import duties have been reduced over the years from high of 70% in early 1990s to 5% (basic duty) in 2006.
- **Reduced fiscal benefits:** As India is fast becoming a refining and petrochemical surplus nation; Government has also taken away the income tax holidays and other fiscal benefits from the industry. Only oil exploration companies now enjoy the benefits based on the profit-sharing mechanism with the government.

## GROWTH FORECAST & DRIVERS

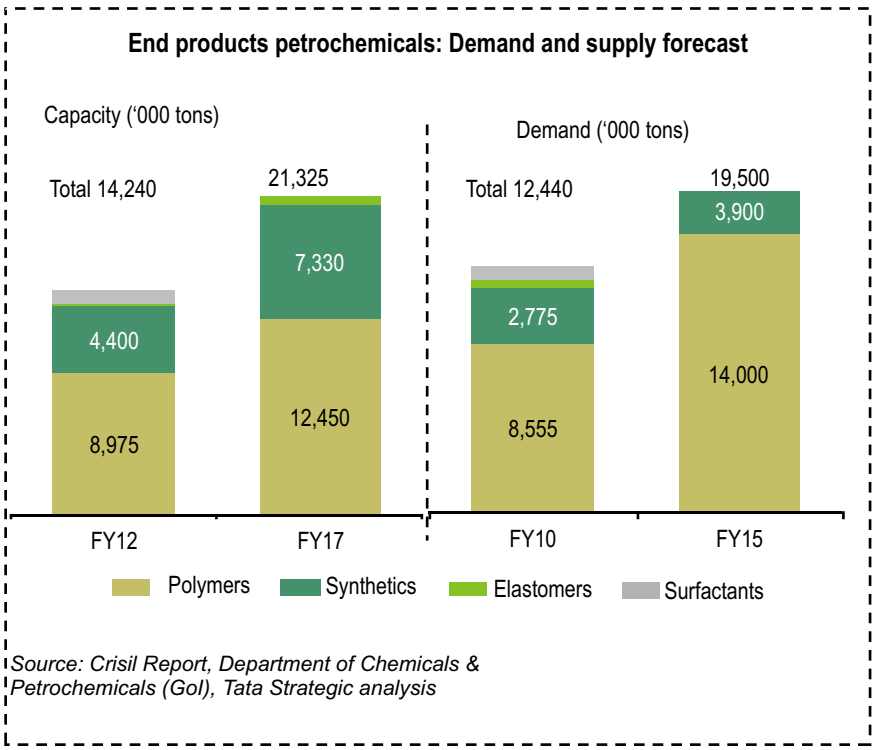
The demand for basic petrochemicals is expected to grow at a CAGR of9.7% to reach 13.6 mmtpa by FY17. However, market will still be oversupplied to the tune of ~1.3 mmtpa in FY17. The demand growth will be driven by olefins segment including ethylene, propylene and butadiene. Demand as well as capacity growth in aromatics such as benzene and toluene will be marginal compared to overall market size.

**Basic petrochemicals: Demand and supply forecast**




*Source: Crisil Report, Department of Chemicals & Petrochemicals (GoI), Tata Strategic analysis*

Indian end products petrochemicals market is also expected to grow at a CAGR of9.4% to reach 19.5 mn tons by FY17. The surplus capacity is expected to stay consistent at ~1.8 mmtpa during FY12 to FY17.




The major drivers for demand growth are:

## KEY DRIVERS

- **Low per capita consumption:** Consumption pattern in India varies from that of the world. Per capita consumption of petrochemicals in India was 7 kgs in 2011 compared to global average of 25 kgs. With the economic growth expected to continue, this gap is also expected to narrow down significantly.
- **Rise in polymers demand:** The demand of polymers is expected to grow at a CAGR of 10.4% from 8.55 mmtpa in FY12 to reach 14 mmtpa in FY17. The high growth in demand is primarily driven by growth in packaging, infrastructure, agriculture, healthcare and consumer sectors. As per a Goldman Sachs report, the packaging sector is expected to grow at over 15% p.a. and may account for more than 50% of polymer consumption in India.
- **Development of PCPIRs:** Development of Petroleum, Chemicals & Petrochemicals Investment Regions across Indiais also expected to induce development of

industries consuming petrochemicals as major raw material. Till now PCPIRs have been approved in states of Andhra Pradesh, Gujarat, West Bengal and Orissa. PCPIR project in Orissa alone is expected to invite Rs. 2.3 lakh crore worth of investment from petroleum and petrochemicals sectors.Similar scale of investments is envisaged in other approved projects.

## KEY CHALLENGES

1. **Volatility in raw material prices:** More than 50% of global petrochemical capacities are based on naphtha, a crude oil derived product. The prices of crude oil products have witnessed significant volatility, thereby making petrochemicals prices highly volatile.

2. **Increased competition:** Large capacity additions taking place in ethane rich Middle East and demand rich China. Out of the 25 million tons of ethylene capacity additions expected during period 2011 and 2016, 9 million tons is expected in Middle East alone. Since, ethane based petrochemical products are cheaper than petrochemical products in India, domestic producers are expected to witness margins pressure.

3. **High entry barriers:** Given the capital intensive nature of the petrochemical plant and tariff barriers, new entrants and small and medium size companies are prohibited from easily entering into the market.

4. **Low capacity utilization:** Due to oversupply in global markets, prices of petrochemicals have taken a steep decline, thereby forcing the domestic companies to underutilize their plants operating levels. The average capacity utilization has fallen from 95% levels before global economic crisis to 80% in 2011. Even post crisis, the capacity utilization rates are expected to be below 90%.

## KEY OPPORTUNITIES

- **Backward & forward integration:** Given the volatility of crude oil prices and India's heavy dependency on oil imports, there is opportunity for oil and oil related companies to reap benefits of increase in presence across the value chain. For e.g. Reliance Industries Ltd. successfully backward integrated from refining and petrochemical company to oil and gas exploration. IOC which is primarily a refining PSU has ventured into exploration in the past and recently built a Greenfield petrochemical project.

- **Improved feedstock supply:** Availability of feedstock dictates the location of the plant.Domestic products are uncompetitive due to high costs of naphtha when compared with ethane based products from Middle East.One means to improve



the competitiveness of the domestic products is by improving the infrastructure support as is the case inMiddle East, China and Singapore. Also going forward, as more natural gas becomes available in India, the domestic players are likely to shift from naphtha to cheaper natural gas thereby increasing their competitiveness in the market.

- **More value-add products in portfolio:** Demand for performance plastics such as biodegradable polymers is expected to be on rise across the world including India. Given the environment concerns with traditional plastics, companies should look at expanding their portfolio and include more value add products.
- **Increased geographical presence:** Given the capital intensive nature of the project and high costs associated in India (due to no duty waivers, no/ very less tax exemptions and high interest costs), the domestic companies may also look outside for organic and inorganic opportunities. Many western companies such as Dow, Shell, etc. are increasing their presence in energy rich countries like Saudi Arabia, Kuwait, Qatar, etc. and setting up manufacturing facilities.

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# b. PCPIRs

## PCPIR policy & developments

Petroleum, Chemicals and Petrochemicals Investment Region (PCPIR) is a specifically delineated investment region with an area of around 250 square kilometers planned with the establishment of manufacturing facilities for domestic and export led production in petroleum, chemicals and petrochemicals, along with associated services and infrastructure. It is a flagship scheme of Department of Chemicals and Petrochemicals started in 2007.

PCPIR policy is expected to attract major investments, both domestic and foreign in the petroleum, chemical & petrochemical sectors.

The nodal agency for PCPIRs is the Department of Chemicals & Petrochemicals (DoC&PC). The policy objective is to promote investments and make India an important hub for both domestic and international markets by leveraging India's low cost manufacturing capability.

The policy conceptualizes a specifically delineated region of around 250 sq km. to include one or more Special Economic Zones (SEZs), Industrial Parks, Free Trade & Warehousing Zones, Export Oriented Units (EOUs) etc.

The PCPIR area is to be used as per the following guidelines

- Processing area (min. 40% of total)
    - Manufacturing facilities, infrastructure facilities, logistics and associated services
- Non-processing area (max. 60% of total)
    - Residential establishments, commercial establishments, social infrastructure and institutional infrastructure

### PCPIR constituents

A typical PCPIR would comprise of production units, public utilities, logistics, facilities for environmental compliance, residential areas and administrative services. It would have a processing area, where the manufacturing facilities, along with associated logistics and other services, and required infrastructure will be located, and a non-processing area, to include residential, commercial and other social and institutional infrastructure. The PCPIR may also include one or more SEZs, Industrial Parks, Free



Trade & Warehousing Zones, Export Oriented Units, or Growth Centers, duly notified under the relevant Central or state legislation or policy.

Each PCPIR would have a refinery/ petrochemical feedstock company as an anchor tenant. The internal infrastructure within the PCPIR will be built and managed by a Developer, or a group of Co-developers. The external linkages will be provided by Government of India and the concerned state governments. The users, i.e. industrial units located in the PCPIR, of external and internal infrastructure will pay for its use, except to the extent that the government supports the service through budgetary resources.

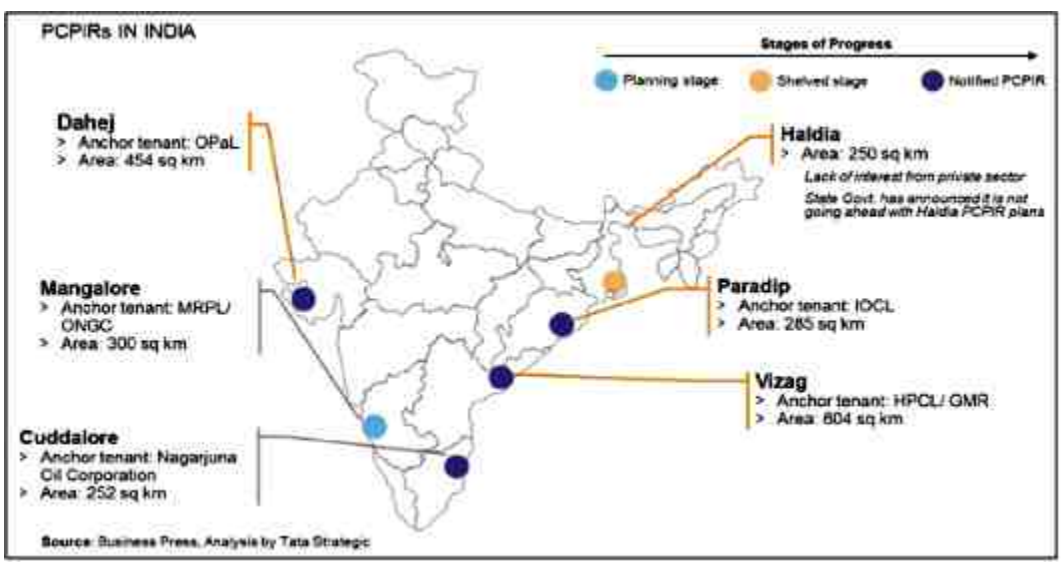
### Role of the government

Government of India will ensure the availability of external physical infrastructure linkages to the PCPIR including Rail, Road (National Highways), Ports, Airports, and Telecom, in a time bound manner. The infrastructure would be created/upgraded through Public Private Partnerships to the extent possible. Central Government would provide necessary viability gap funding through existing schemes as well as make requisite budgetary provisions for creation of these linkages through the public sector.

The State Government's responsibility includes all physical infrastructure and utilities linkages under its jurisdiction, identifying a nodal Department, for coordination of these linkages, facilitating all clearances required from the State Government. This is becoming a major challenge in implementing PCPIR in time bound manner.

### PCPIRs in India

India has identified six PCPIRs, out of which four have been given final notification.



The Haldia PCPIR plan has been shelved as the new government of West Bengal is not supporting it. However, unlike Haldia, there have been no opposition from any faction of the society for the other four PCPIRs and their progress is expected to go on as planned. Vizag, Paradip and Dahej are the PCPIRs with some development whereas Cuddalore PCPIR has been approved recently in August 2012.

In Dahej, the total investment already committed stands at Rs 128441 cr. Investment of anchor tenant (ONGC-Opal) is Rs 8707 cr., as on May 2012.EIA Study & Environment management plan has been assigned to NEERI. 6 laning of Bharuch to Dahej stretch is being undertaken by Gujarat Govt. However the anchor tenant lies within the SEZ and hence has to be mostly export focused.

At Vizag PCPIR, refinery expansion plans of HPCL could not get environmental clearance. The land allocation has also been withdrawn by the state govt. Now, HPCL is attempting to re-allocate with a proposal of a new refinery. State government is also discussing with AL Kharafi Group of Kuwait for a refinery.

At Paradip, IOC, The anchor tenant setting up 15 mmtpa refinery cum petrochemical complex with investment of 29777 cr. Refinery being completed by 2013. However, ethylene cracker is not planned immediately. As an interim step, IOC is setting up a poly propylene unit of 700 kt at investment of Rs 3500 cr by 2014-15.Mixed fuel cracker is likely to be setup by 2019-2020, based on availability of natural gas from proposed LNG terminal and surplus naphtha from refinery

## PCPIRs as the way ahead

The Indian petrochemical industry is expected to show robust growth in the coming years, with a strong growth in plastics demand and domestic production.Most of the recent increase in demand has been met by imports. Going ahead there is a strong need for facilitating domestic production to make India self-sufficient, as well as reduce import dependence. PCPIRs are believed to be the step towards making Indian chemical manufacturing competitive on global level.

### Current issues of the Industry

The Indian petrochemical industry has a strong advantage in terms of proximity to the domestic market. However, feedstock availability and feedstock cost are the major issues faced by the industry.

Cost of feedstock is significantly higher in India compared to the Middle East. Deregulation of gas prices has resulted in the petrochemicals sector having no relative advantage for sourcing of gas.



Indian petrochemical facilities are comparable to Asian countries in terms of scale of operations but significantly smaller than those found in the Middle East and hence face a disadvantage in terms of economies of scale. Also, the investment needs per tonne is higher in India due to higher interest costs and duties on capital goods. This is only partially offset by low labor costs.

| | Middle Eastern industrial complex | Isolated Indian production facility |
|---|---|---|
| **Area** | • Large area, more than 200 km²<br>• Integrated on-site facilities<br>  □ Port<br>  □ Water & power plant<br>  □ Gas pipeline | • Relatively small area, <50 km²<br>• Other complementary facilities not on-site |
| **Plants/ capacity** | • Many plants<br>• High capacity<br>• Entire complex is upward and downward integrated in production of petrochemicals | • At most, a handful of plants with medium to medium-large capacity |
| **Workforce** | • Large workforce >5,000 comprised of officials, professionals and workers | • Small workforce <1,000 |

## Continuing challenges

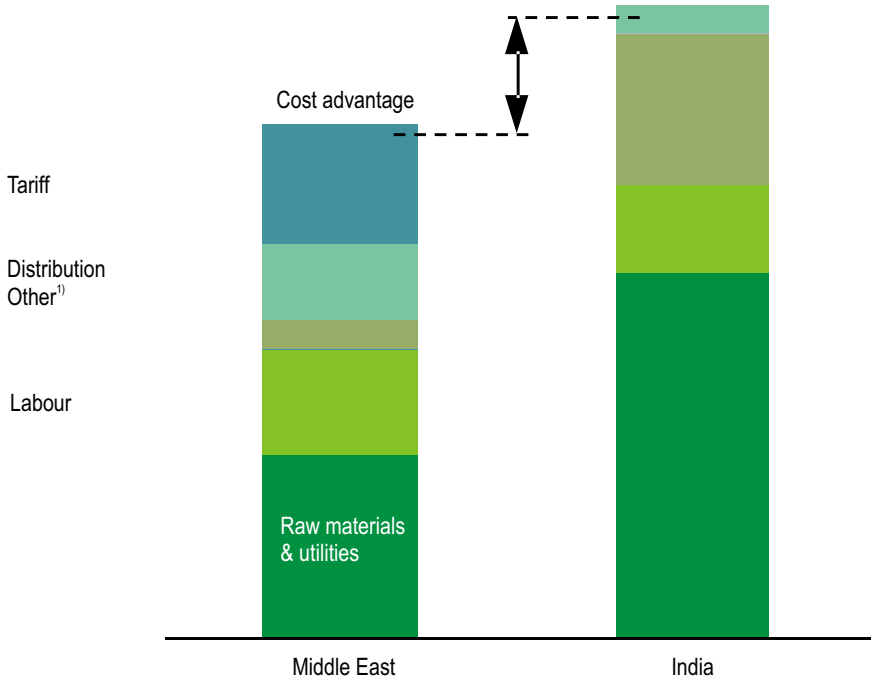
Excess capacity currently exists in petrochemical production facilities globally, resulting in lower utilization rates. Also, significant capacity expansion, particularly in the Middle East, is expected to maintain the utilization rates at low levels.

Global oversupply will increase pressure from manufacturers focused on exports, especially from the Middle East, constraining the export ability of Indian players.

Also, strong competition from these players, who enjoy a low cost base, will result in increasing margin pressures for Indian producers.



**Delivered cash costs to India – illustrative**
(USD/ ton)




Note: 1) Includes fixed costs and cost of capital
*Source: Roland Berger, Tata Strategic*

## Expected impact of PCPIR

Investments of over USD 280 Bn have been planned across the three earlier approved PCPIRs (i.e. Dahej, Paradip and Vizag). Cuddalore PCPIR development plans are still in nascent age. The integrated approach via the PCPIR route could help India redefine the rules of the petrochemicals game and overcome its feedstock disadvantage.

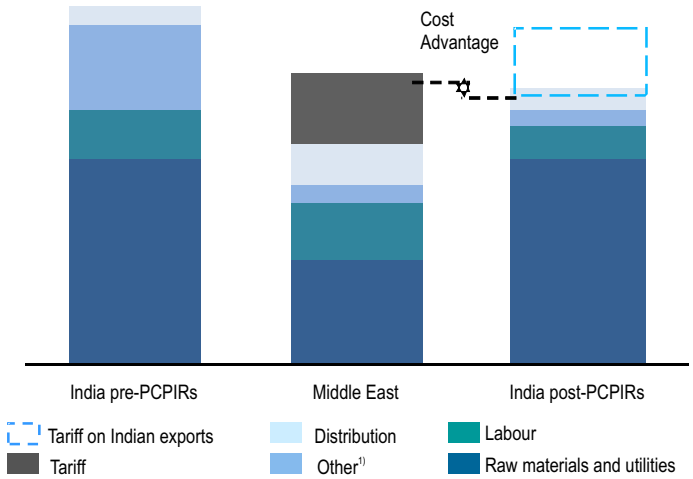
### a. Economies of scale

PCPIRs are expected to reduce the cost of supply for Indian manufacturers and can transform the cost disadvantage position of pre-PCPIR to a cost advantage position in post-PCPIR phase.

PCPIRs can deliver economies of scale to close the cost gap and make Indian producers more competitive. The cost savings are accrued on account of reducing average fixed costs, joint sourcing agreements for power & water utilities and sharing of logistics infrastructure. Higher level of integration at one site also results in reduced distribution costs.

This coupled with an inherent labor cost advantage, while not providing for tariffs, could potentially create an advantage in exports for the Indian petrochemicals industry.

**Cash cost of supplying to Indian market**
(USD/ ton)



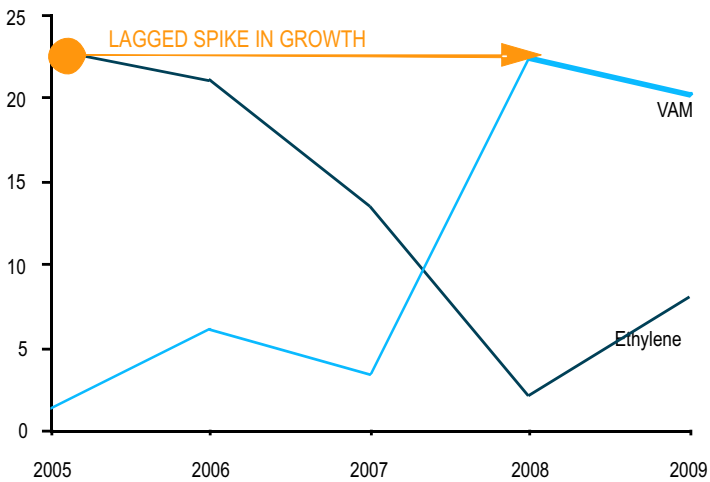

Note: 1) Includes fixed costs and cost of capital
*Source: Roland Berger, Tata Strategic*

## b. Downstream chemical development

New petrochemicals clusters could also serve as a nucleus for further downstream chemicals development as was seen in China post 2005, which saw a dramatic increase in ethylene production capacity. This was further augmented with development of coal based methanol plants.

Three years after this, a sharp spike was seen in VAM (Vinyl Acetate Monomer) capacity, highlighting the fact that development in downstream chemicals is encouraged by greater capabilities in basic petrochemicals.

**Ethylene versus VAM capacity increase [%]**




*Source: Deutsche Bank, CMAI, BMI, Roland Berger*

India has been caught up in a vicious loop. Lack of ethylene supply has resulted in lower downstream processing capacity. And lack of established downstream capacity acts as a deterrent for setting up ethylene crackers. Also in cases of upcoming ethylene crackers, their product portfolio is limited to mostly PE/ MEG not to EO based derivatives (demand of EO based derivatives is very high, but domestic production is limited). Other successful cluster examples are Jurong cluster in Singapore and BASF Ludwigshafen site etc.

### Potential risks

The largest potential risks to the success of PCPIRs are FDI availability and feedstock security. Delays owing to global economic crisis and subsequent international shortage of FDI could derail the growth track. Despite large domestic gas reserves being found, feedstock availability and security still remains a concern. Further delays and issues in land acquisition and inadequately meeting environmental concerns can disrupt the mega investment plans.

### Success factors

PCPIRs can succeed if there is further participation and improvement in cost competitiveness. PCPIR attractiveness can be improved by fiscal policies and incentives such as duty exemption on capital goods, extra support through information and technical expertise and offsetting agreements. Availability of financing can provide an impetus to private investment. Also, development of dedicated industrial training institutes can help build a strong supply of technically skilled manpower. Costs can be further made competitive through increasing scale of operations and attracting further downstream investments close to PCPIRs. Deployment of world class technologies through JVs with leading companies of the world, similar to the Saudi Arabia-China model, can help in technical/ operational know-how and in some case benefit with access to the developed markets.

### Major issues in implementation

Till date Government of India has approved 5 PCPIRs in Gujarat, Andhra Pradesh, West Bengal, Tamil Nadu and Orissa of which West Bengal has dropped the proposal.

Difficulties of land acquisition and creating infrastructure had been major hurdle in implementing these projects.

The issue of feedstock for downstream industry to the PCPIR's mother unit is also a contentious issue.

While the anchor units are yet to fully configure the projects, except OPAL's Dahej unit, there is yet to be a firm downstream plan for bulk and specialty chemicals.



Allocation and pricing for supply to downstream unit from the mother anchor unit are major issues in the absence of any viable business model in Indian context.

## Conclusion & Recommendation

In conclusion, PCPIRs can deliver economies of scale to close the cost gap and make Indian producers more competitive. PCPIRs can be the proverbial 'Philosopher's Stone', providing world class infrastructure facilities at lower costs and also tremendous business potential and growth to the petrochemical players. However certain steps should be taken in order to achieve these. The likely steps could be (based on the discussions in the FICCI National Chemical Committee meetings):

a. A consortium cracker approach may resolve the feedstock issue for downstream units from the mother cracker in the PCPIR. Government can play a facilitative role in bringing potential downstream investors through a workable business process.

b. The anchor unit could announce the cracker and call bids for its products from potential downstream units on a long term supply contract. This would ensure assured supply of feedstock to downstream units.

c. Pricing of products between upstream and downstream units need to be transparent and market driven.

d. Feedstock to the mother unit like naphtha, propane, butane, LPG, reformate should be at zero level of import duty to make such arrangements economically viable.

e. Reasonable duty spread between feedstock to the mother unit and output for the downstream would be necessary to make large investment required in the mother unit attractive.

f. Import duty on finished products from downstream unit should be at peak level to make the entire value chain economically viable.

g. Adequate tax and fiscal incentives may be devised for anchor unit / consortium cracker to make the unit economically viable.

h. All state level taxes and duties need to be rationalized.

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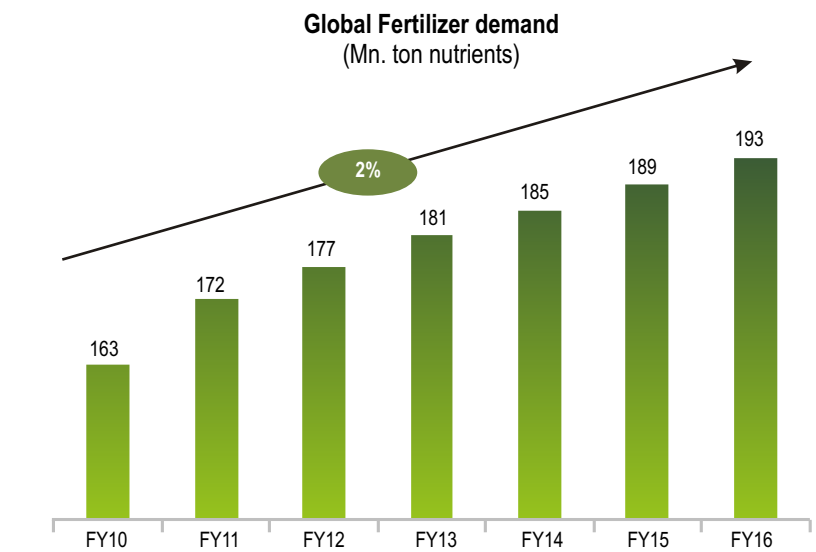
# Fertilizers



## GLOBAL FERTILIZER INDUSTRY

World Fertilizer demand has completed its recovery. The Fertilizer consumption has grown at 5% p.a. in FY10 and at 6% p.a. in FY11 to reach at 172 Mn tons nutrients.In FY12 world demand responded to very attractive prices for fertilizers. In FY12 demand has increased in all regions except Western and Central Europe where dry conditions affected the winter crop.

Global fertilizerindustry is expected to grow at 2% CAGR till 2016. Demand for K nutrient is expected to be highest (3.75%) while for N nutrient it is expected to increase by 1.4%. Demand for P would increase by 2.3%. The medium term agricultural outlook is expected to stimulate fertilizer demand but high volatility could result in significant year on year variations.




*Source: IFA*

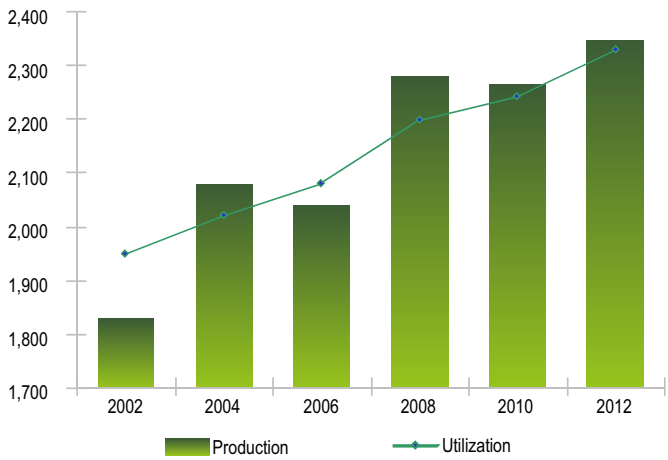
## Factors affecting fertilizer demand

1. Increasing food grain consumption is a major demand driver for fertilizers.

According to Food and Agriculture Organization of the United Nations (FAO) the 2012 world cereal output is expected to reach 2.35 billion tons. This would be 4% increase over the previous year. World cereal utilization, currently at 2.33 billion tons, has been rising at 2.0-2.5% over last 8 years.

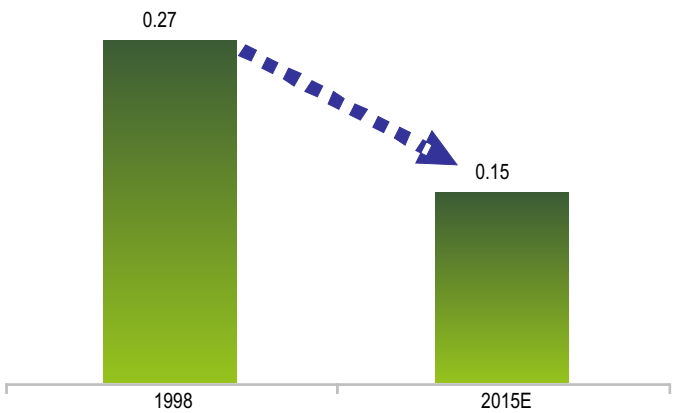


**World Cereal Production and utilization**
(Mn. tons)




2. Scope for expanding cultivated land in the next five years is limited. The per capita land availability is expected to go down to 0.15 Hectare by 2015. Hence yield gains are expected to contribute to most of the output growth. This will lead to increased usage of fertilizer per hectare of land.

**World-Available arable land per capita**
(hectare)



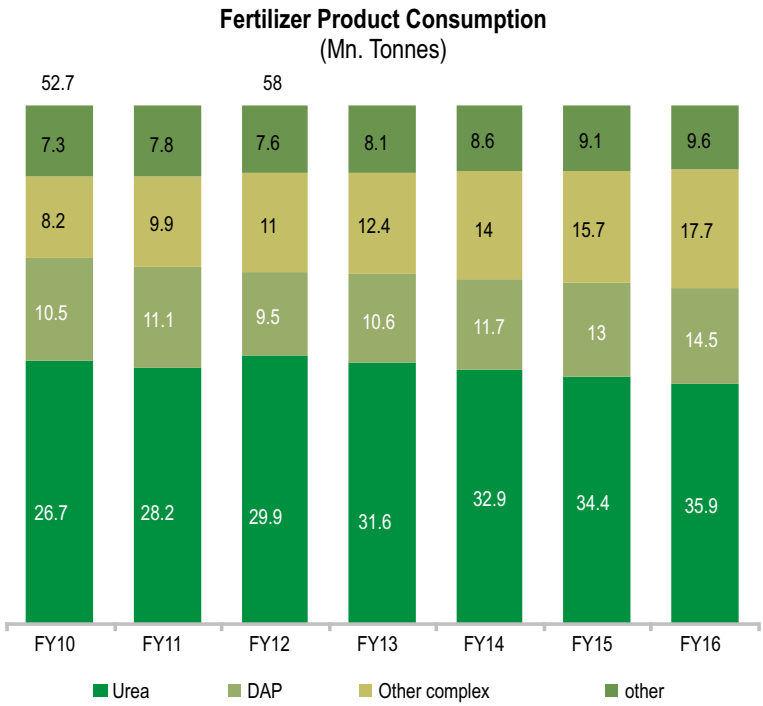

*Source: Yara fertilizer handbook, PotashCorp*



3.Biofuel production using cereals, sugar cane and oilseeds as feedstock is another major driver for fertilizer demand. About one-third of US maize, 55% of Brazilian cane and two-thirds of EU rapeseed were used as feedstock for biofuel in 2009. Increased demand for biofuels would require higher production of these feedstocks. Biofuel production also influences the prices of these feedstocks which has a larger indirect impact on fertilizer demand.

**The forecast for fertilizer demand is subject to major uncertainties**

The evolution of current economic situation poses a major uncertainty for fertilizer demand. If the economic situation in some of the major economies does not improve, it could lead to increased speculation in agricultural commodities which directly affects fertilizer demand. Some other uncertainties include evolution of bio-fuel policy in the US and EU, weather-related crop shortfalls, evolution of agriculture commodity prices, the fertilizersubsidies and new policies aimed at increasing nutrient use efficiency.




*Source: Crisil, IFA*

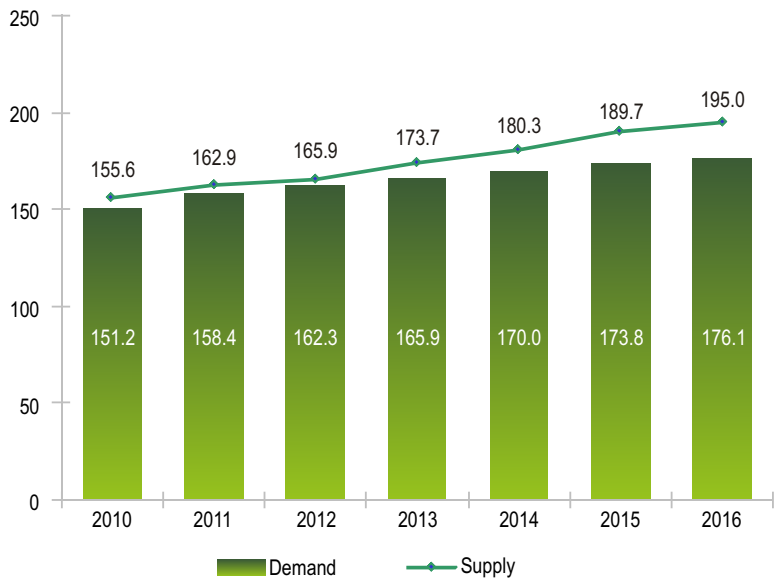
India is one of the major regions contributing to the rising fertilizer demand. Fertilizer consumption (product terms) increased from 52.7 million tonnes in FY10 to an estimated 58 million tonnes in FY12, led by a rise in phosphorus and potash consumption. The rise in fertilizer consumption was supported by High Minimum Support Prices (MSPs) and continued government support.

The fertilizer demand in India is expected to grow at 6% CAGR from FY11 to reach 78 Mn tons in FY16, higher than the global growth rate of 2% during the same period.

## GLOBAL UREA OUTLOOK

Urea is a widely consumed fertilizer product. It contains the nutrient N only. Of all nutrients, application of N was the least affected during the recent crisis. N-fertilizers need to be applied through the life cycle of crop and demand for it is mainly inelastic

**Global Urea demand-supply**
(Mn. tonnes)




*Source: IFA*

Global urea demand is expected to grow by 3% CAGR, to reach 176.1Mntons by 2016. The growth rate is expected to be higher in the case of South Asia driven primarily by India.

The growth in capacity addition, however, will outpace the demand. According to The International Fertilizer Association (IFA), global urea capacity is expected to grow by 5% CAGR to reach 226Mntons in 2016. This would result in a supply of 195Mntons in 2016. Between 2011 and 2016, about 60 new plants are planned to come on stream. East Asia will contribute 30% of net increase in capacity.

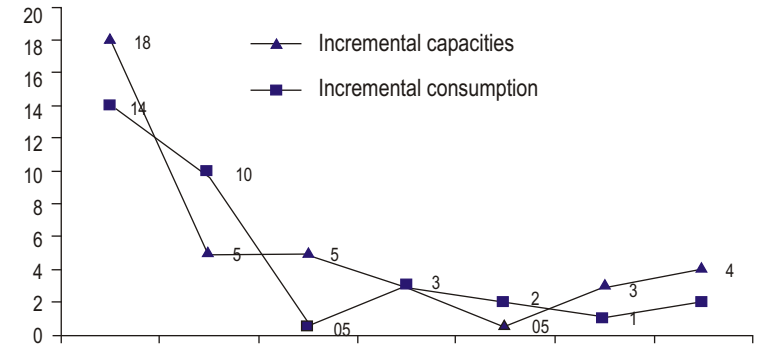
### Urea capacity in low-cost feedstock regions to meet world demand

Natural gas is the most efficient feedstock for Urea production; most of the global capacities are based on natural gas. West Asia with vast natural gas availability has become a major hub for urea manufacturing. It is also a major exporter of urea. Coal is used as afeedstockin Chinadue to its easy availability.

China has world's largest urea capacities but it mostly caters to domestic requirement. Hence incremental capacities which would be important from trade

point of view are those which would come from low consumption regions i.e. West Asia and Africa.

**Region wise incremental capacity and consumption**
(2016 over 2010, Mn. tonnes)




*Source: Crisil, IFA*

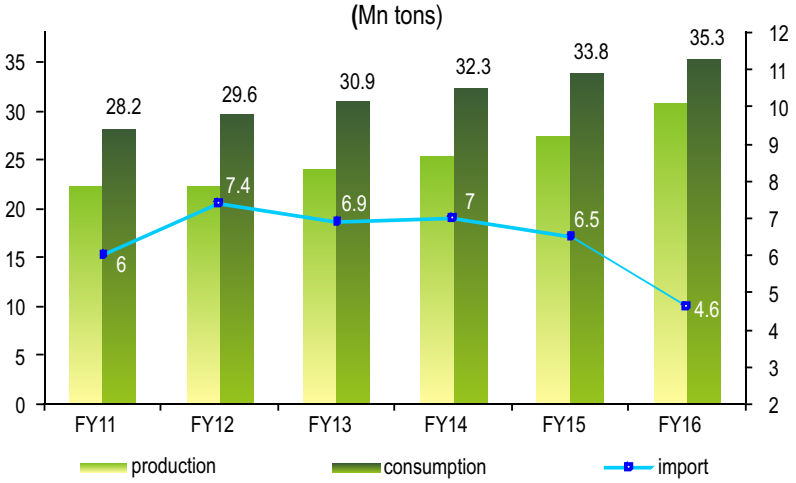
North America, Western and Central Europe are expected to add limited capacities due to high cost of natural gas in these regions. Increase in demand is expected to outpace the increase in capacity in South Asia.

The incremental capacity in West Asia and Africa is expected to meet the demand of the deficit regions.

## INDIA UREA OUTLOOK

India currently relies heavily on import to fulfill its urea demand. India imported 6 Mn tons of urea in FY11 to meet its demand of 28.2Mntons.

**Trend in Urea demand-supply scenario**
(Mn tons)




*Source: Tata Strategic analysis, FAI*

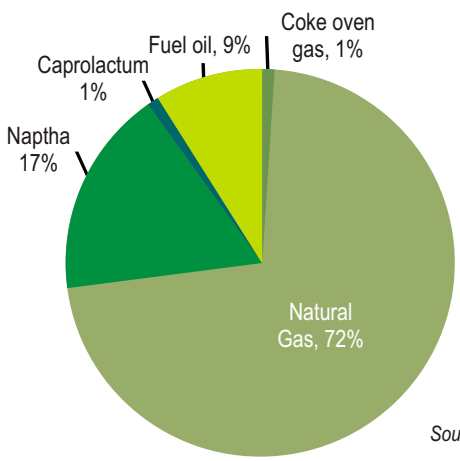
This dependence on import is expected to continue in near future since urea capacity is not expected to increase enough to meet the 4.9% annual increase in demand.India's urea demand is expected to reach 35Mntons in FY16 whereas domestic capacity is only expected to supply 30Mntons.

## Urea production in India

In India approximately 85% of urea production is based on captive ammonia production while ammonia is procured externally only for the remaining 15%. Major feedstocks used for urea manufacturing are natural gas, naphtha, coal, fuel oil or LSHS. Of all the feedstock mentioned here, natural gas is most cost effective and resultant urea manufacturing cost is lowest. But traditionally majority of urea manufacturing in India were naphtha based. Retention pricing scheme (RPS), introduced in 1977, assured 12% return on net worth of fertilizer plant and hence there was no clear incentive for cost cutting.



**Feedstock wise share of captive ammonia capacity**




*Source: Crisil, IFA*

## Recent policy developments in India:

### Nutrient based subsidy scheme (NBS)

The NBS scheme, in effect from April1 2010, is an attempt by the government to encourage balanced fertilizer consumption in India. As per the policy, subsidy on complex fertilizers would be calculated based on nutrient level and not at the product level. Through this, govt. has changed the subsidy from constant farm gate prices to constant subsidy. Producers now have the freedom to charge retail prices. Following the policy announcement, players hiked DAP prices by around ` 600 per ton. Prices of other complex fertilisers were also raised.



Urea has been kept out of this policy, but its maximum retail price was increased by10% from `4,830 to ` 5,310 per ton with effect from April 1.

The government is also encouraging players to develop and market newer formulations which would be customized to specific regional soil and crop requirements. Since subsidy would be accorded on the nutrient basis, players developing newer formulations will be able to price the products based on demand.

### Greenfield projects at IPP-linked prices

Govt. of India introduced an investment policy in 2008 to overhaul production of urea in the country and reduce dependence on import. As a part of this policy revamping of existing urea unit plants and brownfield projects were encouraged through IPP-linked prices.

However, for Greenfield projects the govt. decided prices based on competitive bidding. As per the policy the govt. decides the location and potential investors bid for the project. Whoever agrees to sell it by taking lowest amount of subsidy from the govt. wins the bid. This policy failed in its attempt at putting up new Greenfield urea plants in India.

It is estimated that nearly Rs. 30,000 Crore investments would come up in next 3-4 years if the policy is made truly investor-friendly and sufficient gas is made available.

## GLOBAL PHOSPHATIC FERTILIZER OUTLOOK

Rock phosphate is the key raw material for manufacturing of DAP, MAP, TSP and other NPK fertilizers. Almost all of rock phosphate is converted into phosphoric acid and 85% of phosphoric acid is converted to phosphatefertilizers.

Global rock phosphate supply is expected to reach 256Mntons by 2016 from 213 Mn tons in 2011. The largest increase will be in Africa and East Asia.

Rock phosphate reserves are mainly concentrated in China, Morocco and US. Top 5 rock-phosphate producing countries account for about 80% of world production. China is the largest producer and consumes almost all its production. The US is the second largest producer and consumer. Morocco is the third largest producer and largest exporter of phosphate rocks.

### Growing capacity additions of phosphoric acid ($P_2O_5$) in the near term

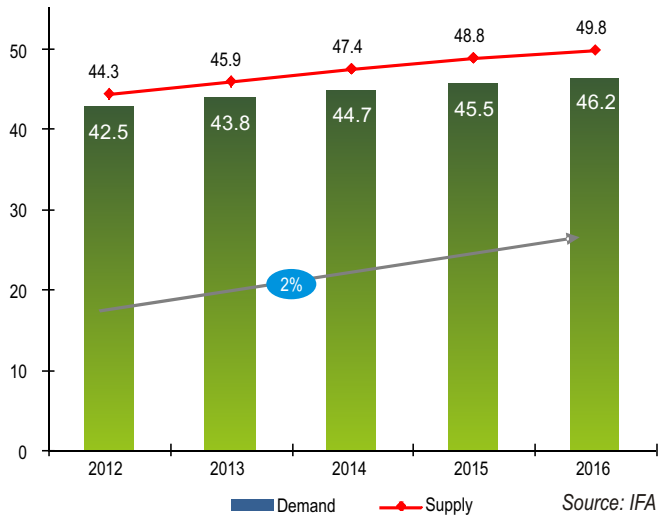
Global phosphoric acid demand is expected to increase by 2.4% CAGR to reach 46



Mntons by 2016.Global supply on the other hand is expected to increase by 3.7% CAGR to reach 49.8Mntons by 2014.

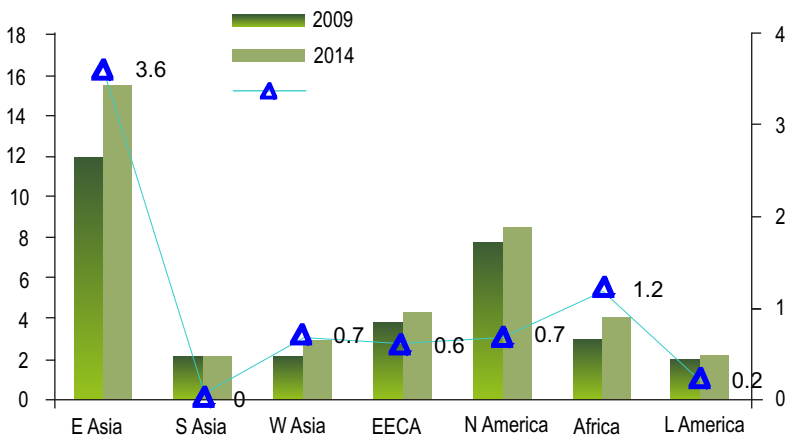
The global phosphoric acid supply/demand gap is expected to grow from 1.8Mntons in 2012 to nearly 3.6Mntons in 2016 with commissioning of new projects.

**Global Phosphoric Acid demand-supply**
(Mn. tonnes)




The main addition to supply would be in China, Morocco, Brazil and Saudi Arabia.

**Region wise P2O5 capacity**
(Mn tons)




*Source: IFA*

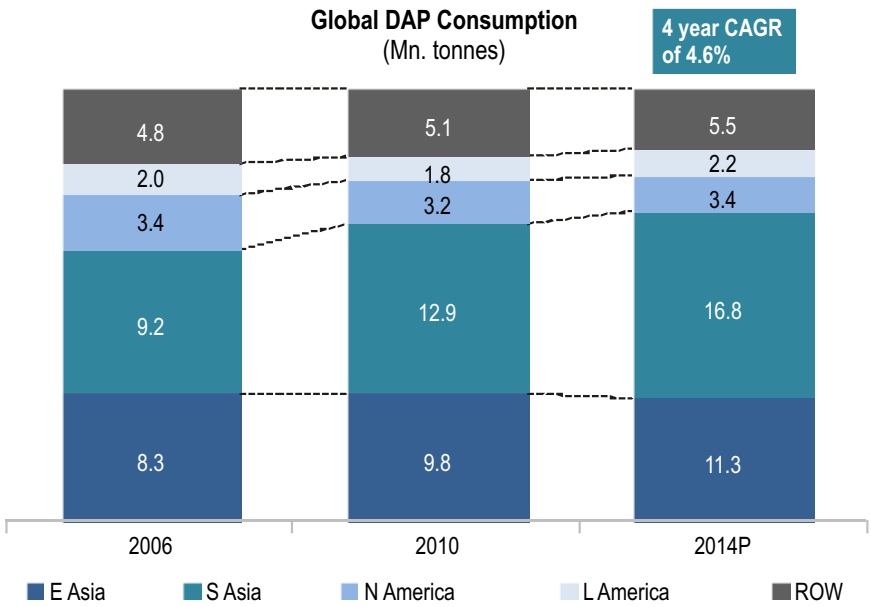
**$P_2O_5$ capacity addition ('000tons)**

| Region | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|
| China | 2,680 | 1,500 | 1,020 | |
| Morocco | 730 | | 450 | 900 |
| Brazil | | 240 | 2,900 | 2,000 |
| Tunisia | | 360 | | |
| Jordan | | 500 | | |
| Saudi Arabia | | | 1,800 | |
| Venezuela | | | 320 | |
| Vietnam | | | 325 | |
| Egypt | | | | 600 |

## Global DAP demand to rebound

Di-ammonium phosphate (DAP) contains both N and P type nutrients with higher P percentage. It is applied mainly to meet the P requirement of the soil. DAP is the most consumed amongst all phosphatefertilizers.

DAP demand is mostly elastic unlike Urea demand. It is mainly used during sowing and its reduced application does not result in immediate adverse effect on yield.




*Source: Crisil, IFA*

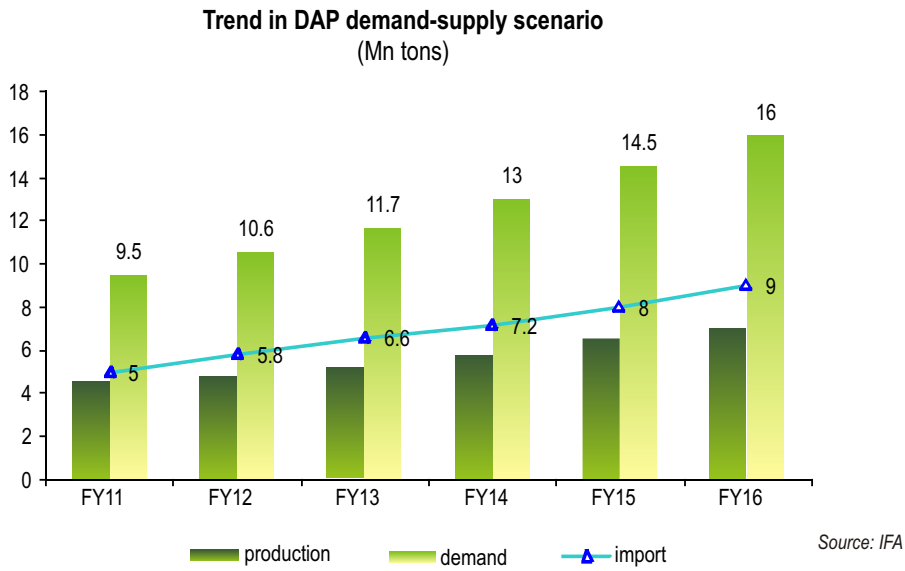
Going forward DAP demand is expected to be strong, primarily driven by India (Largest importer of DAP), China and North America. It is expected increase by ~5% CAGR to reach 39 Mntons by 2014.

**Major capacity expansions for DAP**

Global DAP/MAP capacity is expected to rise by 4% CAGR to reach 42.5 Mntons by 2014. Over the next five years, close to 40 new MAP,DAP and TSP units are planned to come onstream in eleven countries. Bulk of this incremental capacity is coming up in reserve rich regions of East Asia, North America and Africa.

## INDIA PHOSPHATIC FERTILIZER OUTLOOK

Indian DAP demand is expected to increase by 11% CAGR to reach 16Mntons by 2016.




*Source: IFA*

Domestic DAP production in FY11 stood at 4.3 Mn tons. The rise in DAP consumption was met by increasing imports. India is currently the largest importer of DAP in the world.

Import of DAP is expected to rise from 5.3Mntons in FY11 to ~9Mntons in FY16.

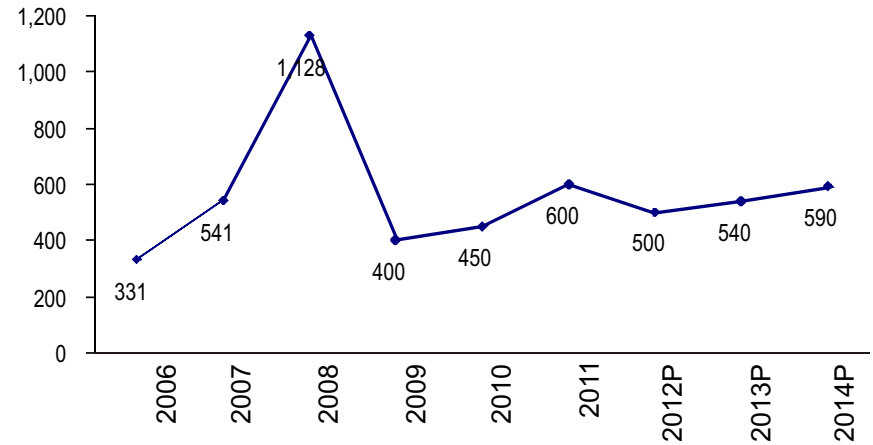
DAP and other complex fertilizers can be manufactured in same unit. The availability of other complex fertilizers is very limited in the international market compared to DAP availability. Hence, producers are expected to manufacture greater quantities of other complex fertilizers in the unit and meet DAP deficit through imports.

### Fall in DAP price made imports sustainable

Rock phosphate, ammonia and sulphur are the main feedstocks for manufacturing DAP/MAP. Of these three, rock phosphate is the most critical feedstock and is not available in India.

When DAP price peaked in 2008 the subsidy bill increased for Govt. of India (GoI). This led the govt. to promote Indian DAP manufacturers to scout for rock phosphate reserves globally. Syria, with high phosphate rock reserves was looked as a good investment opportunity. India's Oswal chemicals and fertilizer limited has plans to operate a phosphate-refining plan in Syria, it has signed an MOU with the Syrian govt.

**International DAP Prices**
($/tonne)



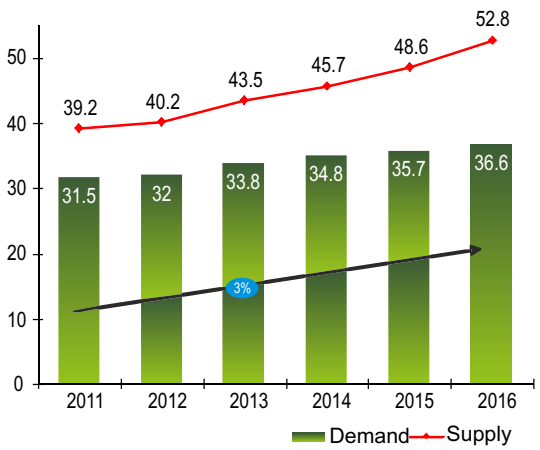

*Source: Crisil, Fertecon*

International DAP prices have moderated after reaching its peak in 2008. This has made import of DAP more sustainable. The prices were slightly increased in 2011.

## GLOBAL POTASH OUTLOOK

Muriate of Potash (MOP) contains potassium nutrient. Like DAP its demand is mostly elastic. Potash fertilizer demand in 2011 was 31.5 Mn tons.

**Global Potash Supply/Demand Balance**
(Mn. tonnes)




*Source: IFA*

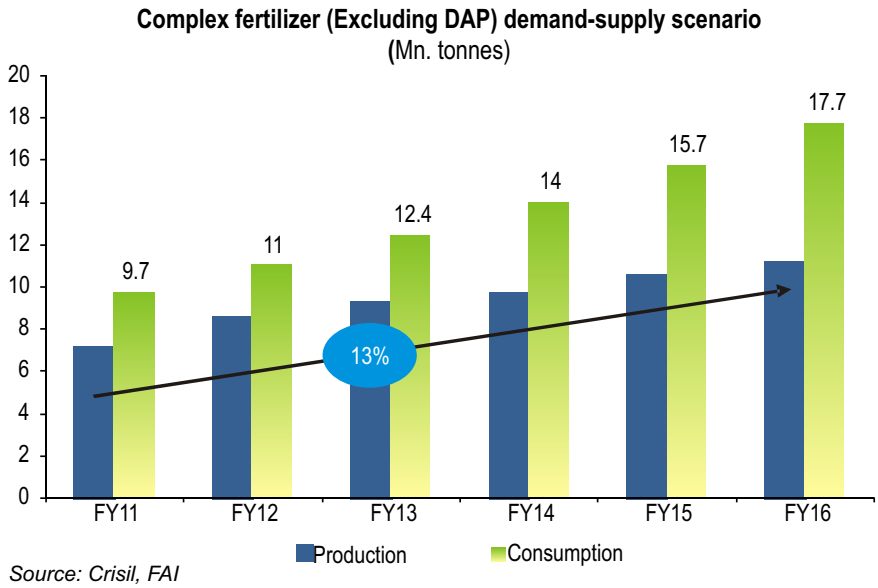
Global Potash demand is expected to grow at 3% CAGR to reach 36.6Mntons by 2016. Demand will be primarily driven by East Asia (mainly China), Latin America, North America and South Asia (mainly India).

Global potash capacity is expected to increase from 46.2Mntons in 2012 to 61.4Mntons in 2016. This would mean a supply of 52.8Mntons in 2016. The additional capacity is expected to come mainly from Canada and Russia.

## INDIA POTASH OUTLOOK

Consumption of 'K' nutrient declined from 3.7 Mn tons in FY10 to 3.5 Mn tons in FY11. The demand for 'K' nutrient in India is expected to grow at ~8% CAGR from FY11 to FY16 to reach 5.2Mn tons (nutrient) by FY16.

The demand for complex fertilizers is expected to increase by ~13% CAGR and reach ~17.7 Mntons (product) by FY16.




*Source: Crisil, FAI*

With no domestic potash reserves, India imports potash largely as potassium chloride at around `17,000/ ton. It offers a large subsidy on this and sells it to farmers for ` 4,000/ton. Due to India's large dependence on imports, a significant change in global industry dynamics could impact Indian govt.'s subsidy bill. India could still try to use its big buyer advantage andget favorable termsin changing industry scenario.

## FERTILISER INDUSTRY STRUCTURE IN INDIA

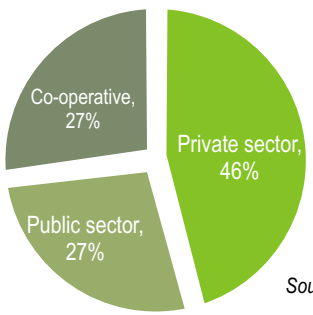
The fertilizer industry in India is mainly characterized by govt. control. Since the fertilizer sector is of national importance, traditionally GoI has controlled the sector by regulating the investment, production, distribution and pricing. The most distinct characteristic of Indian fertilizer sector is partial dependence on monsoons for demand.

### Ownership structure

The private sector leads in capacities in urea as well as phosphatefertilizer sectors.

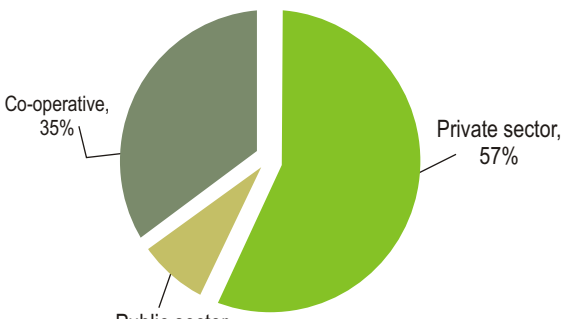
As of Nov. 2010, 46% of the total 12.9 Mn tons nitrogenous fertilizer capacity were held by the private sector. In case of phosphatefertilizers, 57% of total capacity was held by private sector.

**Share of capacity of nitrogenous fertiliser**
(% share, Nov' 10)




*Source: FAI*

**Share of capacity of phosphatic fertilizer**
(% of total installed capacity, Nov' 09)




*Source: FAI*

### Concentration

Due to the capital intensive nature of the fertilizer manufacturing projects, the industry is relatively concentrated, where a few player capture large chunk of the market. The share of top 5 companies in total urea production in India is ~65% and in case of DAP it is ~84%.

| Fertilizer sector | % share of top 5 companies (2010) |
|---|---|
| Urea | ~65% |
| DAP | ~84% |
| Complex (excluding DAP) | ~80% |

*Source: IFA*

## Major Companies

IFFCO is India's largest urea manufacturing company producing ~4.2 Mn tons of urea annually. It has urea plants in UP and Gujarat. Other prominent companies in the Indian urea industry are National Fertilizers, RCFL, KRIBHCO, Chambal Fertilizers etc.

### Urea Manufacturing Companies

The production capacity and location of major urea manufacturers is provided in the table below.

| Producers | Locations | Capacity ('000 TPA) |
|---|---|---|
| IFFCO | Aonla, Phulpur (UP), Kalol (Gujarat) | 4,240 |
| National Fertilizers | Vijaypur (MP), Bhatinda (Punjab), Panipat (Haryana) | 3,231 |
| RCFL | Trombay, Thal (Maharashtra) | 2,037 |
| Chambal Fertilizers | Kota (Rajasthan) | 1,729 |
| KRIBHCO | Hazira (Gujarat) | 1,729 |
| Nagarjuna Fertilizers | Kakinada (AP) | 1,195 |
| Tata Chemicals Ltd. | Babrala (UP) | 865 |
| Indo Gulf Fertilizers | Jagdishpur (UP) | 865 |
| **Total domestic capacity** | | **22,200** |

IFFCO is India's largest DAP manufacturer as well. It has an annual DAP capacity of ~1.2 Mn tons. Other leading manufacturers are Chambal Fertilizers, GSFC, and Coromandel International etc.

## Outlook on IndianFertilizer Industry

Sale of urea at IPP linked price even for Greenfield projects is expected to promote fresh investments for Greenfield projects. The Investment Policy of 2008 has already provided incentives for brownfield expansion and improvement in facility for existing plants by linking the prices to IPP. In a way, GoI has rewarded all the existing Indian

urea manufacturers and also encouraged new companies to invest in the market. Indian companies are also encouraged to invest in natural resource rich countries overseas. The Indian govt. is ready to enter into firm off take agreements at prices decided by mutual consultation for such projects abroad. There is already a trend of some Indian companies forming joint ventures abroad, like Oswal chemical and fertilizers in Syria, and this trend will catch up with other Indian companies as well.

Availability of feedstock has been an issue for Indian fertilizer industry. The govt. has given priority to gas based urea plants and these plants would be supplied gas so as to make them run at full capacity.With availability of natural gas fertilizer production is expected to improve in India.

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# Profile of some companies

**Brief profile: BASF INDIA**

| **BASF INDIA**<br>**www.india.basf.com** | |
|---|---|
| Company overview | • Present in India for over 100 years |
| Key products | • Petrochemicals<br>• Specialty chemicals<br>• Agrochemicals, etc. |
| Manufacturing locations in India | • 9 production sites, 2 R&D centers and 2,000+ employees |
| Financials in Fy11 | • Revenue in FY11 was Rs. 3,056 crore |

**Brief profile: INDIA GLYCOLS LTD.**

| **INDIA GLYCOLS LTD.**<br>**www.indiaglycols.com** | |
|---|---|
| Company overview | • A green petrochemical company |
| Key products | • It is one of the leading manufacturers of glycols, ethoxylates and PEGs, performance chemicals, glycol ethers and acetates, natural gums and potable alcohol. |
| Manufacturing locations in India | • Kashipur<br>• Gorakhpur & Dehradun |
| Financials in Fy11 | • Revenue in FY11 was Rs. 1,833 crore |

**Brief profile: ATUL INDUSTRIES**

| **Atul Industries**<br>www.atul.co.in | |
|---|---|
| Company overview | • Diversified company with presence in colours, aromatics, agrochemicals, polymers and pharma intermediaries |
| Key products | • Vat dyes: Novatic<br>• Acid dyes: Tulacid<br>• Direct dyes: Tuladir |
| Manufacturing locations in India | • Atul and Ankleshwar (Gujarat) |
| Financials in Fy11 | • Revenue in FY11 was Rs. 1,600 crore |

**Brief profile: SIKA INDIA**

| **SIKA India**<br>**www.sika.in** | |
|---|---|
| Company overview | • Convened India operations in 1987<br>• Subsidiary of Switzerland-based parent company |
| Key products | • Waterproofing: Sikacim<br>• Tiling: SikaTilofix<br>• Sealing: SikaBoom |
| Manufacturing locations in India | • Kalyani, West Bengal<br>• Goa<br>• Jaipur<br>• Blending units in Mumbai and Chennai |
| Financials in Fy11 | |

**Brief profile: ASIAN PAINTS**

| **Asian Paints**<br>**www.asianpaints.com/** | |
|---|---|
| Company overview | • India's largest paint company and Asia's third largest paint company<br>• Operates in 17 countries and has 24 paint manufacturing facilities in the world |
| Key products | • Ancillaries, Automotive coatings, Industrial paints and Decorative Paints |
| Manufacturing locations in India | • Raigad, Satara (Maharashtra),<br>• Ankleshwar (Gujarat), Rohtak (Haryana)<br>• Kanchipuram, Cuddalore (Tamil Nadu), Medka (AP) |
| Financials in Fy11 | • Revenue in FY11 was Rs. 7,244 crore |

**Brief profile: LANXESS INDIA**

| **LanxessIndia**<br>**www.lanxess.in** | |
|---|---|
| Company overview | • India subsidiary of Lanxess GmbH<br>• 13 Business Units in the fields of Performance Polymers, Advanced Intermediates and Performance Chemicals |
| Key products | • Antioxidants for polymers, blowing agents, polymer auxiliaries, plasticizers for polymers |
| Manufacturing locations in India | • Jhagadia, Gujarat<br>• Nagda, Madhya Pradesh |
| Financials in Fy11 | • Revenue in 2011 was Rs. 1,821 crore |



**Brief profile: CLARIANT CHEMICALS INDIA**

| **Clariant Chemicals India**<br>**www.clariant.in** | Clariant |
|---|---|
| Company overview | • One of India's leading specialty chemicals companies<br>• No. 1 player in Pigments, Textile Chemicals, Leather Chemicals and Biocides for Paints |
| Key products | • Flame retardants: Exolit®, Polymer additives: Hostavin®<br>• Emulsions: Mowilith®, Mowicoll®, Appretan® |
| Manufacturing locations in India | • Masterbatches :REMAFIN®, RENOL®auxiliaries,<br>• Kolshet (Thane), Roha (Raigad), Cuddalore, Kanchipuram |
| Financials in Fy11 | • Revenue in 2011 was Rs. 1,030 crore |

**Brief profile: SUDARSHAN INDIA**

| **SUDARSHAN INDIA**<br>**www.sudarshan.com** | SUDARSHAN |
|---|---|
| Company overview | • Largest pigment and sole effect pigment manufacturer<br>• Present in business for over 50 years |
| Key products | • Colours: Sudaperm, Sudafast, Sudacolor<br>• Effects: Sumica, Sumicos |
| Manufacturing locations in India | • Roha and Mahad (Mahasrashtra) |
| Financials in Fy11 | • Revenue in FY11 was Rs. 751 crore |

**Brief profile: VIVIMED LABS**

| **VIVIMED LABS**<br>**www.vivimedlabs.com** | Vivimed |
|---|---|
| Company overview | • Sales footprint across 50 geographies with SBUs in USA, Europe and a marketing office in China |
| Key products | • Oral care: Anti-bacterial, enamel protection<br>• Skin care: Anti-ageing, skin lightening<br>• Hair care: Jarocol, dyes, anti-dandruff, UV filters |
| Manufacturing locations in India | • Bonthapally, Bidar, Jeedimetla (Andhra Pradesh)<br>• Haridwar, Kashipur (Uttarakhand) |
| Financials in Fy11 | • Revenue in FY11 was Rs. 310 crore |



**Brief profile: RHODIA**

| RHODIA SPECIALTY CHEMICALS INDIA LTD<br>www.rhodia.com | |
|---|---|
| Company overview<br>(acquired in 2000 by Rhodia) | • Formerly Albright & Wilson Chemicals India Ltd. |
| Key products | • Alkamuls OR 36, Igepal BC/4, Rhodafac |
| Manufacturing locations in India | • Bonthapally, Bidar, Jeedimetla (Andhra Pradesh)<br>• Haridwar, Kashipur (Uttarakhand) |
| Financials in Fy11 | • Revenue in FY11 was Rs. 275 crore |

**Brief profile: GUJARAT NARMADA VALLEY FERTILIZERS**

| GUJARAT NARMADA VALLEY FERTILIZERS<br>www.gnfc.com | |
|---|---|
| Company overview | • One of the world's largest single-stream ammonia-urea fertilizer complexes<br>• Operates in three segments - fertilizers, chemicals and others. Others segment includes information technology (IT) division's activities |
| Key products | • Nitrogenous and phosphatic fertilizers like urea, ammonium nitro phosphate (ANP) and calcium ammonium nitrate (CAN)<br>• Ammonia, weak nitric acid, concentrated nitric acid, methanol, acetic acid, formic acid, aniline, toluene di isocyanate (TDI) |
| Manufacturing locations in India | • Bharuch (Gujarat) |
| Financials in Fy11 | • Revenue in FY11 was Rs. 3862 crore |

**Brief profile: RASTRIYA CHEMICALS & FERTILIZERS LIMITED**

| RASTRIYA CHEMICALS & FERTILIZERS LIMITED<br>www.rcfltd.com | |
|---|---|
| Company overview | • Leading producers of fertilizers in India<br>• Produces almost 20 industrial products |
| Key products | • Methanol, sodium nitrate, sodium nitrite, ammonium bicarbonate, methylamines, dimethyl formamide and dimethylacetamide |
| Manufacturing locations in India | • Trombay, Maharashtra<br>• Thal, Maharashtra |
| Financials in Fy11 | • Revenue in FY11 was Rs. 6,433 crore |

**Brief profile: HINDUSTAN ORGANIC CHEMICALS LIMITED**

| HINDUSTAN ORGANIC CHEMICALS LIMITED<br>www.hocl.gov.in | |
|---|---|
| Company overview | • Provide basic organic chemicals essential for vital industries like resins and laminates, dyes and dyes intermediates, drugs and pharmaceuticals, rubber chemicals, paints, pesticides<br>• Produce the versatile engineering plastic polytetrafluoroethylene (PTFE) through their subsidiary |
| Key products | • Phenol, Acetone, Nitrobenzene, Aniline, Nitrotoluenes, Chlorobenzenes and Nitrochlorobenzenes |
| Manufacturing locations in India | • Rasayani (Maharashtra)<br>• Kochi (Kerala) |
| Financials in Fy11 | • Revenue in FY10 was Rs. 520 crore |

**Brief profile: GUJARAT ALKALIES & CHEMICALS LTD.**

| GUJARAT ALKALIES & CHEMICALS LTD.<br>www.gujaratalkalies.com | |
|---|---|
| Company overview | • Largest player in Chlor-Alkali & other integrated downstream products<br>• Present in business for over 30 years |
| Key products | • Cautic Soda group, Caustic potash group<br>• Chloromethane group<br>• Hydrogen peroxide<br>• Phosphoric acid |
| Manufacturing locations in India | • Vadodara and Dahej (Gujarat) |
| Financials in Fy11 | • Revenue in FY11 was Rs. 42,740 crore |

**Brief profile: TATA CHEMICALS**

| TATA CHEMICALS<br>www.tatachemicals.com | |
|---|---|
| Company overview | • "World's 2nd largest producer of soda ash with manufacturing facilities in Asia, Europe, Africa and North America<br>• Pioneer and market leader in India's branded iodized salt segment |
| Key products | • Soda Ash, Iodized salt<br>• Urea &Phosphatic Fertilizers (through Rallis, a subsidiary company)<br>• Water purification systems |
| \Manufacturing locations in India | • Mithapur, Gujarat<br>• Babrala, Uttar Pradesh<br>• Haldia, West Bengal |
| Financials in Fy11 | • Revenue in FY11 was Rs. 13,655 crore |

**Brief profile: GUJARAT HEAVY CHEMICALS LIMITED**

| GUJARAT HEAVY CHEMICALS LIMITED<br>www.ghclindia.com | |
|---|---|
| Company overview | • Engaged in manufacturing industrial chemicals and textiles<br>• Company has presence in edible salts and |
| Key products | • Soda Ash<br>• Salt<br>• Textiles |
| Manufacturing locations in India | • Veraval (Gujarat) - Soda Ash<br>• Nagapattinum&Thiruporur (Tamil Nadu) - Salt<br>• Madurai &Manaparai (Tamil Nadu) &Valsad (Gujarat) |
| Financials in Fy11 | • Revenue in FY11 was Rs. 1151 crore |

**Brief profile: BAYER GROUP INDIA**

| BAYER GROUP INDIA<br>http://www.bayergroupindia.com | |
|---|---|
| Company overview | • Bayer CropScience operates in three business segments: Crop Protection, BioScience and Environmental Science - offering an outstanding range of products and extensive service backup for modern, sustainable agriculture as well as for non-agricultural applications. |
| Key products | • Insecticides, Fungicides, Herbicides, Seed treatment, Plant Growth regulators\<br>• Hybrid seeds covering Hybrid Rice, Cotton, Pearl Millet, Corn, Grain Sorghum as well as Open Pollinated (OP) research varieties of Mustard. |
| Manufacturing locations in India | • Seed production centers in four states - Andhra Pradesh, Karnataka, Tamil Nadu and Haryana |
| Financials in Fy11 | • Revenue in FY11 Euro 500 Mn |



**Brief profile: RALLIS INDIA**

| RALLIS INDIA<br>http://www.rallis.co.in | |
|---|---|
| Company overview | • Been in existence in India since 1851. Incorporated in 1948, it went through numerous changes and in 1962, Tatas became main shareholders of Rallis India<br>• Headquartered in Mumbai and Navi Mumbai<br>• One of the leaders in Indian Agrochemical Industry<br>• Sole distributor of TCL urea<br>• Has set up Farm Management Services (FMS) to undertake Contract Farming and help farmers arrange finance for their inputs and a fair price for their harvest. |
| Key products | • Pesticides - Insecticides, Fungicides and Herbicides<br>• Seed portfolio includes cereals and fibre crops<br>• Fertilizers portfolio consists of imported 100% water soluble specialty fertilizers<br>• Household insectcides<br>• Seed treatment chemicals |
| Manufacturing locations in India | • Manufacturing locations in three states- Maharashtra, Andhra Pradesh and Gujarat |
| Financials in Fy11 | • Revenue in FY11 Rs. 1,047 Cr |

**Brief profile: SYNGENTA INDIA LIMITED**

| SYNGENTA INDIA LIMITED<br>www.tatachemicals.com | |
|---|---|
| Company overview | • Sygenta India Limited is part of Switzerland headquartered Sygenta AG |
| Key products | • Insecticides for control of pests affecting food and cash crops<br>• Fungicides against pest diseases<br>• Herbicides for weed control, particularly in food crops. |
| Manufacturing locations in India | • Manufacturing location at Santa Monica, Goa |
| Financials in Fy11 | • Revenue in FY11 Rs. 1,800 Crores |

**Brief profile: UNITED PHOSPHORUS LIMITED**

| UNITED PHOSPHORUS LIMITED<br>http://www.uplonline.com | |
|---|---|
| Company overview | • About 40 years old<br>• Rank amongst the top 5 post patent agrochemical industries in the world.<br>• Advanta India Limited, a leading Indian multinational seed company, is a group company of United Phosphorus Ltd. |
| Key products | • Post-patent products: Herbicides, Insecticides, Fungicides, Miticides, Soil and Plant Health Products, Rodenticides |
| Manufacturing locations in India | • Jhagadia, Halol, Ankleshwar, Vapi, Haldia and Jammu |
| Financials in Fy11 | • Revenue in FY11 Rs. 1,494 Crores |

**Brief profile: INDIAN OIL CORPORATION LIMITED**

| INDIAN OIL CORPORATION LIMITED<br>www.iocl.com | |
|---|---|
| Company overview | • A leading oil company in India engaged in exploration & production, refining, pipelines and marketing of petroleum products |
| Key products | • PE, PP, PTA, LAB, MEG |
| Manufacturing locations in India | • Panipat, Koyali, barauni, Haldia, Paradip |
| Financials in Fy11 | • Revenue in FY11 USD $ 69,300 Mn |

**Brief profile: RELIANCE INDUSTRIES LIMITED**

| RELIANCE INDUSTRIES LIMITED<br>www.ril.com | |
|---|---|
| Company overview | • A leading player in the global petrochemicals market |
| Key products | • PE, PP, PTA, PVC, Benzne, PX, PTA, CAN, PET etc. |
| Manufacturing locations in India | • Hazira, Dahej, Patalganga, Silvasa |
| Financials in Fy11 | • Revenue in FY11 USD $ 59,000 Mn |

**Brief profile: SUPREME PETROCHEM LTD.**

| SUPREME PETROCHEM LTD.<br>www.supremepetrochem.com | |
|---|---|
| Company overview | • A market leader in Polystyrene in India with market share of over 50% |
| Key products | • PS, EPS |
| Manufacturing locations in India | • Nagothane, Chennai |
| Financials in Fy11 | • Revenue in FY11 USD $ 430 Mn |

**Brief profile: INDIAN FARMERS FERTILISER COOPERATIVE LTD. (IFFCO)**

| INDIAN FARMERS FERTILISER COOPERATIVE LTD. (IFFCO)<br>www.iffco.coop | |
|---|---|
| Company overview | • The largest producer of fertilizers in India |
| Key products | • Urea, DAP, NPK |
| Manufacturing locations in India | • Kandla, Paradip, Kallol |
| Financials in Fy11 | • Revenue in FY11 USD $ 4710 Mn |



**Brief profile: COROMANDEL INTERNATIONAL LTD. (CIL)**

| COROMANDEL INTERNATIONAL LTD. (CIL)<br>www.coromandel.biz | |
|---|---|
| Company overview | • A leading manufacturer of fertilizers and crop protection chemicals |
| Key products | • DAP, SSP, MoP, Urea |
| Manufacturing locations in India | • Ranipet, Kakinada, Ennore |
| Financials in Fy11 | • Revenue in FY11 USD $ 1690 Mn |

**Brief profile: GUJARAT STATE FERTILIZERS & CHEMICALS LTD.**

| GUJARAT STATE FERTILIZERS & CHEMICALS LTD.<br>www.gsfclimited.com/ | |
|---|---|
| Company overview | • Engaged in the manufacture of fertilizers and various industrial chemicals |
| Key products | • DAP, Ammonia, Caprolactam, MMA, PMMA, Nylon 6 |
| Manufacturing locations in India | • Baroda, Sikka, Surat |
| Financials in Fy11 | • Revenue in FY11 USD $ 1060 Mn |

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# Thought notes

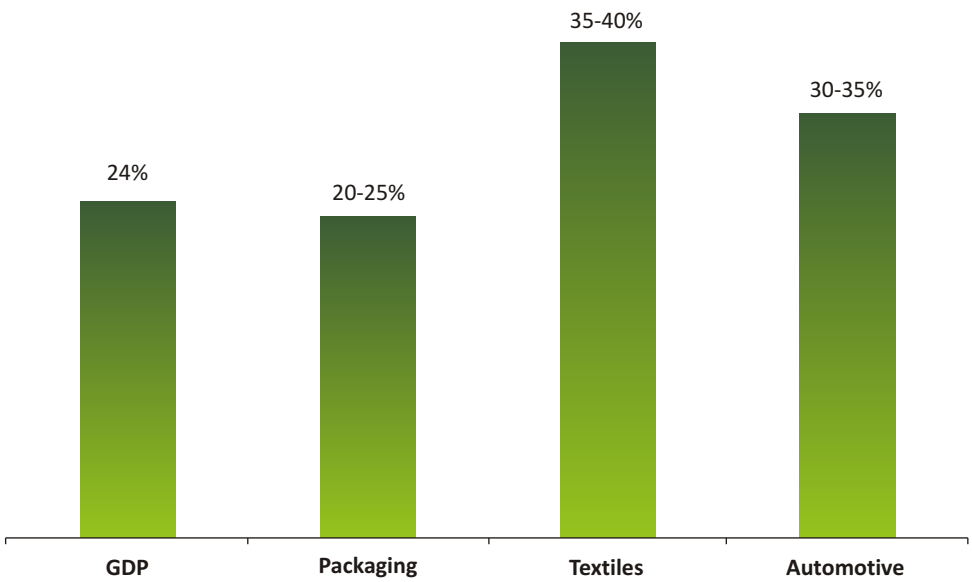
## Petrochemicals- The South India Opportunity

Petrochemical demand supply scenario in India varies significantly across regions. Southern India, an attractive market with annual deficit of ~2MnTonnes of polymers, provides an opportunity to invest in a cracker. This paves a path for international and domestic players to enter into partnership for addressing this opportunity. Moreover, investments in a cracker could spur development of downstream units, say **Siddharth Paradkar,Binay Agrawal** and **Avinash Singh** of Tata Strategic Management Group

### Introduction

India is a major importer of petrochemicals. Most of these imports serve the deficit market in South India. South India, although being a relatively economically developed region, lacks any petrochemical complex. Reliance, the largest petrochemical player, has all its facilities in the western states of Gujarat and Maharashtra. Other major petrochemical complexes by IOCL and GAIL are in north India while Haldia Petrochemicals has its cracker in east India.

**Figure 1: Southern States' share of national output, 2010**




*Source: MOSPI, Analysis by Tata Strategic*

Reliance has built its petrochemical facilities in and around its refinery complex at Jamnagar for easy access to feedstock. IOCL, the other major player, has its cracker and aromatics complex close to its Panipat refinery.

Lack of investment in South is attributed to unavailability of technology and capital with local companies. Competitive imports from South East Asia have also created impediment for investment in South India.

## South India-Demand drivers

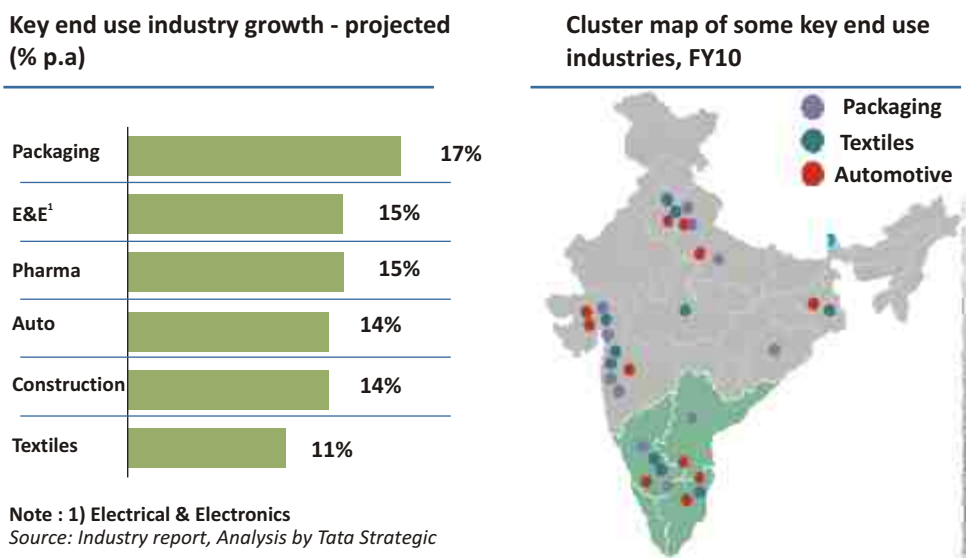
Economic development and presence of end use industries are major drivers for petrochemicals demand in the region.

The four key southern states of Andhra Pradesh, Karnataka, Tamilnadu and Kerala account for ~24% of national GDP and are ranked amongst the top 10 states by GDP in country. These states also account for major share in key end use industries for petrochemicals such as Packaging, Textiles and Automotive (Refer Figure 1).

While automotive/ auto components and textiles are key clusters in Tamilnadu and Karnataka, packaging is spread across the four states (Refer Figure 2). The region has also witnessedimpressive real GDP growth of 8.6% p.a. in the past decade.

With the GDP growth likely to continue at a similar rate and high growth in end use industries, petrochemicals demand in the region is expected to grow at 10-12% p.a. in the near future.

**Figure 2: Expected growth and presence of key end use industries**




**Note : 1) Electrical & Electronics**
*Source: Industry report, Analysis by Tata Strategic*

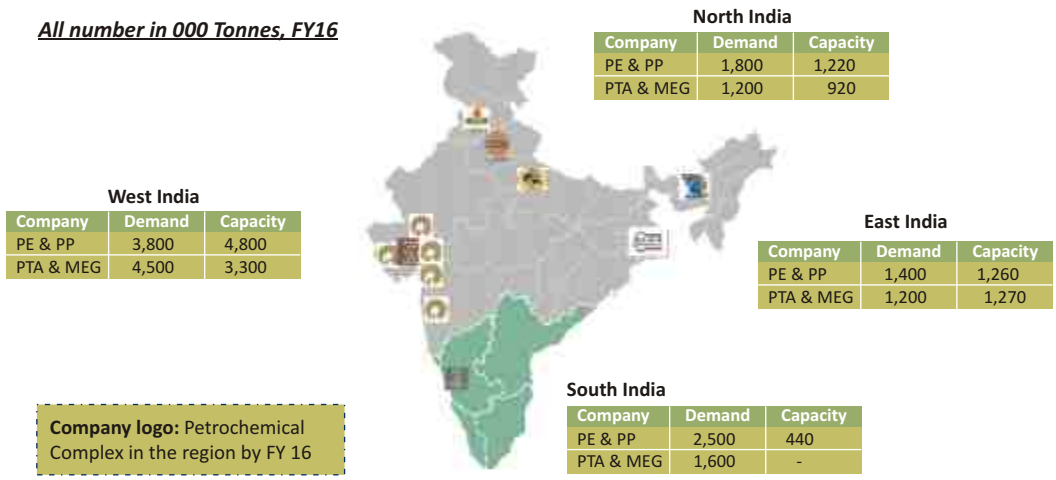
## The South India opportunity

South India is likely to have a deficit of ~2MnTonnes in polymers (Polyethylene-PE/ Polypropylene-PP) and ~1.6MnTonnes in polyesters (Monoethylene glycol-MEG/ Purified Terepthalic Acid-PTA) by FY16, the two large volume petrochemicals(Refer Figure 3).

There is no existing/ upcoming cracker (for producing PE, PP and MEG) in South India. The upcoming Fluid Catalytic Cracking (FCC) unit of MRPL[1] at Mangalore would produce PP in the region.

The large deficit offers an attractive opportunity to companies with interest in petrochemicals. Govt. is also keen to serve the domestic market through local manufacturing. The question is how soon we can address the underlying issues to support a large scale investment in petrochemicals in the region.

**Figure 3: Demand - Supply scenario for major petrochemicals, FY16**




*Source: Analysis by Tata Strategic*

## Critical success factors

The critical factors for a successful investment include market size, availability of feedstock, necessary facilitiesand more importantly technology &capital (Refer Figure 4).

### Market size:

Though Western India is the largest market, Southern India too is a significant market with a combined annual demand of over 4MnTonnesof polymer and polyester by

[1]*Mangalore Refinery and Petrochemicals Limited*

FY16. This region has huge potential for import substitution. Hence a competitive petrochemical unit in the region is expected to have readily available customers for its products.

**Feedstock:**

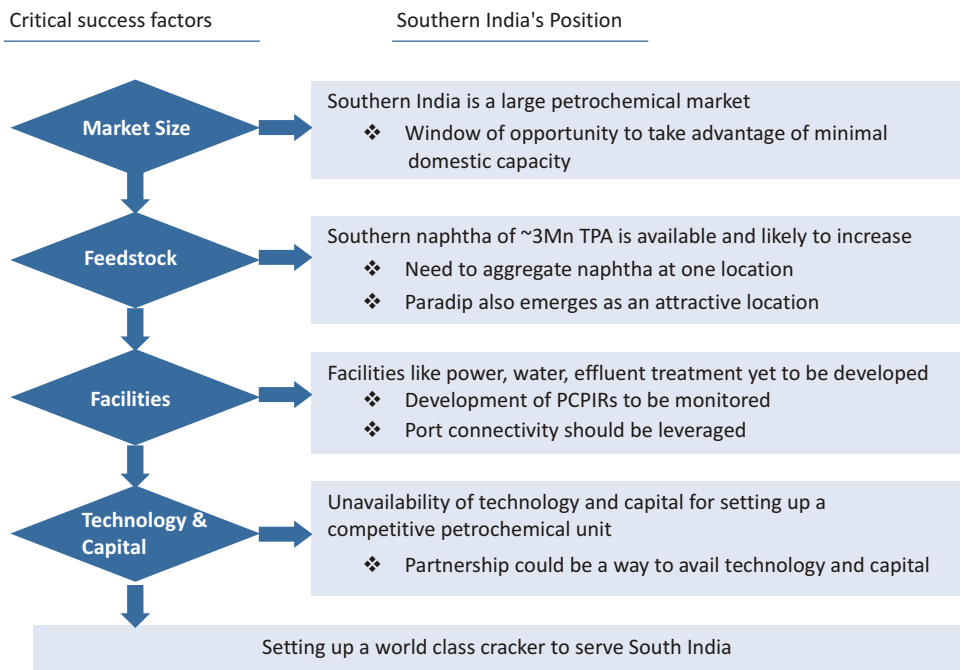
Naphtha and natural gas are two feedstock of choice for a cracker. While India is short in gas, it has surplus naphtha due to large refinery capacities in the

country. India as of date has exportable surplus of over 8MnTPA of naphtha, more than sufficient to meet the ~3MnTPA requirements of a world scalenaphtha based cracker (1.1MnTPA ethylene).

Southern India currently produces almost ~3MnTPA surplus naphtha. While naphtha supply at a single standalone location is not sufficient for setting up a cracker, there is a case for aggregation of naphtha produced to meet the requirement.Commissioning of IOCL's refinery at Paradip (expected by 2013) is likely to further enhance the naphtha availability.

With the commissioning of IOCL refinery in 2013, Paradip could also become an attractive location to set up a petrochemical complex to serve the Southern market.

**Figure 4: Elements of entry strategy based on CSFs and Southern India's position**



**Facilities:**

Government of India (GoI) is developing PCPIRs[2] to provide requisite internal infrastructural facilities like water, power, waste treatment etc. and external infrastructure through rail, road, port, airports and telecommunications investments. Three PCPIRs have already been notified: Vizag, Paradip and Dahej. Amongst these Paradip and Vizag PCPIRs are best located to serve the Southern market.

The development in the PCPIRs however has been slow. The infrastructure development needs to be expedited to attract investments for making the region self-sufficient in petrochemicals.

Southern India has a coastal belt of ~2,900kms and it has 6 out of 11 major ports i.e. Chennai, Vizag, Tuticorin, Kochi, Mangalore and Mormugao. The presence of these ports provides strong connectivitywithin the region as well as with other countries.

**Technology and Capital:**

Technology and Capital are the most critical parameters that Indian companies need to address. Indian PSU refineries have plans and intent for addressing the petrochemical opportunity in South (IOCL at Paradip, BPCL at Kochi, HPCL at Vizag).

However, they are constrained due to lack of technology and capital. Partnership with foreign petrochemical majors could provide access to both.

## Conclusion

South India offers attractive opportunity in petrochemicals. As with each opportunity, there also exist several challenges. Expediting the development of PCPIRs in the region could attract investment in the region. Certain global petrochemical majors have publicly announced their intention for setting up a cracker in India. Partnership with these companies could provide access to technology and capital, critical factors which Indian PSU refineries lack. A world class cracker would provide raw material for expansion of downstream units in the region.

[2] *Petroleum, Chemicals and Petrochemical Investment Regions*

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# Specialty chemicals in personal care products: Opportunity for unique positioning

Indian personal care product market is observing different trends for different users. On the one hand we have urban customers whose needs are evolving and require customization of the product offering. On the other hand we have rural customers where the penetration is increasing, but their price sensitivity requires cost effective product offerings. These trends make it imperative for specialty ingredient producers to re-define their market positioning from anywhere between a niche player to an integrated player, say **Manish Panchal, Siddharth Paradkar** and **Avinash Singh** of Tata Strategic Management Group

## Introduction

Almost all of us are attuned to using hair care, skin care & bath products, cosmetics and fragrances. Together these products form the personal care product market. You switch on the TV and you will find several advertisements of these products trying to differentiate themselves using their functionalities like anti-ageing, fairness, and anti-bacterial properties etc. What we may be oblivious to, is the fact that all these functionalities are a result of the specialty chemical ingredients used in these products.

Specialty ingredients in personal care products account for physical properties (inactive ingredients) as well as functional properties (active ingredients). The inactive ingredients include: surfactants, preservatives, colorants and polymers. Whereas the active ingredients include: anti-ageing materials, exfoliators, conditioning agents, and UV agents etc.

Personal care ingredients market in India is currently valued at ~$450 million.

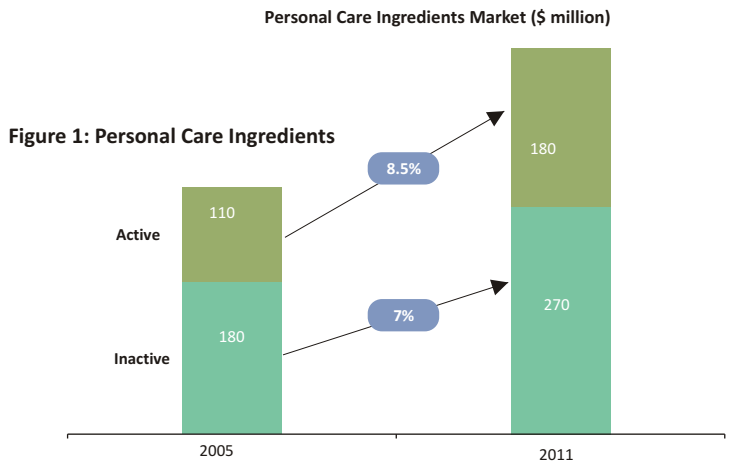



**Figure 1: Personal Care Ingredients**

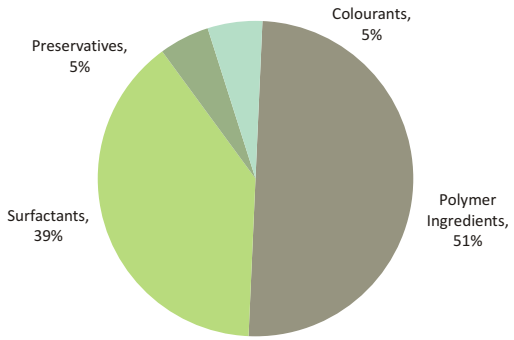
*Source: Industry reports, Research by Tata Strategic*



Inactive personal care ingredients account for ~60% of the market. Revenues have grown at ~7% p.a. to reach ~$270 million in 2011. Rising use of polymer ingredients and surfactants together have been the key drivers and these currently account for ~90% of the market (Refer Figure 2).

**Figure 2: Inactive Ingredients**

**Market share of Inactive Ingredients by Application**



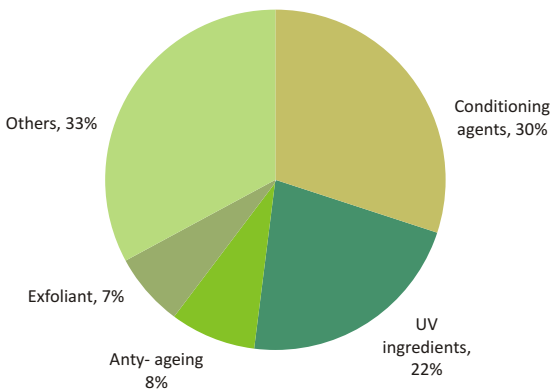

***Source:*** *Industry report, Research by Tata Strategic*

More than 80% of the inactive ingredient demand is met through local production. Imports are restricted to some special inactive ingredients only.

Active ingredients account for the remaining 40% of the market. Revenues have grown at ~8.5% p.a. to reach ~$180 million in 2011. The market for active ingredients is far more scattered with numerous applications (Refer Figure 3).

**Figure 3: Active Ingredients**

**Market Share of Active Ingredients by Application**




***Source****: Industry report, Research by Tata Strategic*

Growth of active ingredients has been driven by the increased acceptance and demand for functional properties like hair conditioning, UV protection etc. However we now rarely see TV advertisements flaunting the conditioning properties as they are no longer a differentiator. Differentiator in the near future is more likely to be anti-ageing and exfoliators.

Active ingredients require a lot of investment in R&D and product development. With not many producers of the active ingredients in India, the market is dependent on imports for supplies and on MNCs for product innovation.

## Upcoming trends & their implications

***Evolving needs are providing scope for differentiation***

Needs of urban consumers are evolving (Refer figure 4). From use of generic personal care products their demand is shifting to products suited for specific needs. For e.g.: products specific to different skin types; hair solutions ranging from strengthening to shining to long lasting properties; lipstick needs vary depending on season or geography (matte in summer - glossy in winter; brighter shades in north - subtle shades in west). These urban users are also willing to pay a premium for customized products.

These trends provide an opportunity for product manufacturers like HUL, Dabur, Godrej, L'Oreal, Nirma, J&J, Lakme, P&G, Himalaya Herbal etc. to differentiate themselves by catering to the specific needs of different regions and demographic segments.

***Possibility of increasing penetration in both urban and rural markets***

India is a diverse market with urban, semi-urban and rural consumers. The penetration of personal care products in urban areas has been high and the target is to develop new consumer segments. Some product manufacturers have effectively innovated to increase sales in urban areas. For example, you may find that children are keen to buy hand sanitizers that come in small bottles. This trend is the result of increased awareness and innovative packaging. Such trends can create niche markets for some specialty chemical ingredients.

As for semi-urban and rural India the penetration has been relatively low. The rural consumer's high price sensitivity, lower disposable income and lack of awareness have been the major constraints. However, increasing economic wealth, growing urbanization, changing lifestyles and increasing awareness owing to exponential rise of mass media advertisements is likely to result in an increase in penetration as well as increase in per capita consumption.

Despite improved penetration, rural users continue to remain price sensitive; hence there is pressure on product manufacturers to continue providing them generic personal care products at affordable prices. The pressure is simultaneously translated backwards in the value chain onto the specialty ingredients producer. For example, polymer ingredients and surfactants are key cost drivers for cosmetics and hence a major focus of cosmetics manufacturers' cost reduction.



***Increasing competition will lead to differentiated positioning***

The market is also seeing the advent of large specialty ingredient producers (like Cognis, Dow Corning, BASF, ISP, DSM, Merck, Lubrizol etc.), willing to take long term investment decisions in India. There are many Indian players aiming to provide local substitutes for active ingredients. Indian players are leveraging their local knowledge of herbs and Ayurveda and helping product manufacturers to launch new products. In turn they are creating a niche position as suppliers for these ingredients.

Domestic players like Vivimed laboratories, SAMI Labs and India Glycols are also gaining prominence both in domestic and export markets. Going ahead, there is an imminent need for establishing a unique or differentiated positioning to ensure long term sustainability and growth.

***Investments in technical innovation are driven mostly by market/ consumer needs***

The market is exhibiting demand for natural ingredients as customers are becoming more aware about the contents of the products they use. With some products being considered carcinogenic and already being banned in foreign countries, there is a shift in Indian markets too, though a complete ban has not yet been imposed by the government. For example, "go-green" motto for surfactant industry is being adopted due to allergenic effects of synthetic surfactants.

Micro encapsulation serves as a good example of technical innovation in delivery mechanism of end products. In this, specialty ingredients are packaged in micro capsules which are released when applied. This prolongs the shelf life, enhances the impact of ingredients, masks their undesired properties and allows reactive ingredients to be protected from environmental contact.

**Figure 4: List applications, trends & implication for personal care ingredients**

| | Application | Key Trends | Implications |
|---|---|---|---|
| Inactive ingredients | Colorants | • Special effect pigments- colour shifting effect, heat-reflection etc<br>• Customer demand for newer shades. | • Need for joint product development with formulators<br>• Intense colours and new metallic shades being developed |
| | Preservatives | • Reduction of dependence on synthetic preservatives<br>• Concerns about carcinogenic properties | • Small, local players with niche solution gaining prominence<br>• Movements towards bio-based products |
| Active ingredients | Anti-aging | • Increasing preference for natural products | • Opportunity to use local knowledge of herbs and ayurveda to introduce new products |
| | Conditioning | • Increasing demand for moisturization<br>• Increasing competition in other related fields like skin care etc. | • Increased use of hair care humectants<br>• Hair care emollient demand acts as a potential growth area |

*Source: Industry reports, Research by Tata Strategic*

***Regulatory regimes will drive investments in R&D and increase consolidation/ tie-ups***

In India, there are multiple and complex regulations under different bodies leading to a lack of implementation of set guidelines and laws. This makes the creation of a reputation amongst product manufacturers a critical success factor. Improving standards due to entry of foreign producers is not going to make this easy.

India also has non-uniform licensing policies across states. Each state has its own FDA and the license is granted by the state for the manufacturing locations. There are considerable variations in various norms followed by each state. This acts as a regional entry barrier protecting regional specialty ingredient producers. Thus for foreign MNCs, who are trying for a faster and pan-India presence, it is desirable to tie-up with some regional producers. 4

Going ahead, an integrated legislation like REACH (Registration, Evaluation, Authorization and Restriction of Chemicals), could come into effect resulting in reduction of regional entry barriers. This would imply that either the regional manufacturers invest or perish. A proactive investment decision could lead to brand building and a global presence. A successful example for the same is observed in Indian pharmaceutical companies, which were quick to streamline their operations to comply with US FDA requirements.

## Way ahead

The needs of product manufacturers are driven by end consumers.

a) **Premium segments** in India have good growth potential based on increasing awareness and evolving consumers. These consumers are also ready to spend more on quality products.

   Product customization/ differentiation is a direct result of specialty ingredients being used. This makes R&D of specialty ingredients a key focus area. Specialty ingredient producers can leverage their local presence and work in tandem with product manufacturers to map the evolving needs of different regional and demographic segments. With this market research and proactive investment towards technical innovation they can enhance the differentiation/ customization of products and in turn develop a niche position.

b) For **generic segments**, increased penetration in rural areas is likely to increase the market size. Hence the thrust on these products is expected to continue in the next 4-5 years.

   Specialty ingredients account for a significant portion of cost for these products. To address the need of price sensitive end consumers, the pressure of cost reduction will fall upon specialty ingredient producers. This will imply that specialty ingredient producers should increase their focus towards developing



robust sourcing strategy and streamlining of operations.

Also, some specialty ingredient producers would not be able to invest in R&D on a large scale or grow beyond certain regions. Hence the market will see consolidation, mergers & acquisitions, and alliances. Foreign MNCs may also need to tie up/ acquire local producers to increase their pan-India presence at a faster pace for both segments.

Overall, the time has come for specialty ingredient producers to clearly define their future objective and develop a strategic roadmap to establish their desired position in this continuously evolving value chain.



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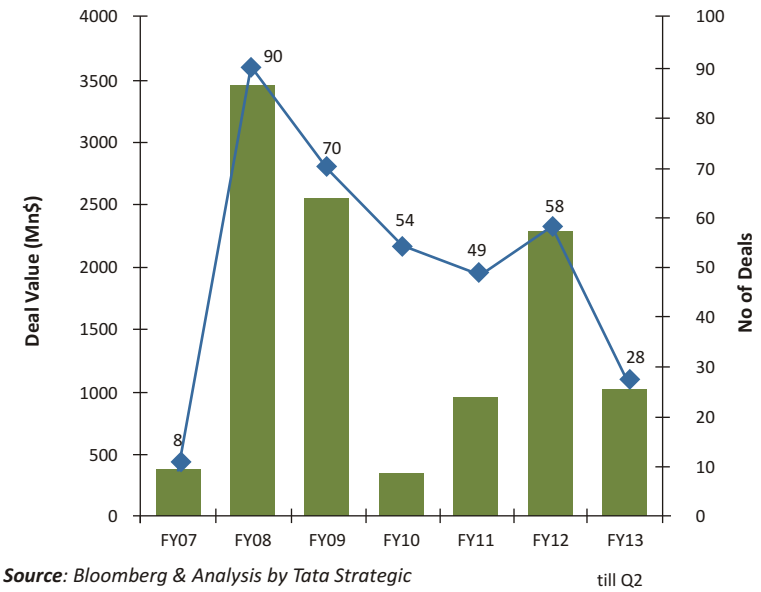
# M&A Opportunities in Indian Specialty Chemicals Industry

Indian specialty chemicals industry has demonstrated high growth ~13% per annum during last 5 years. Inability to scale up and unwillingness of next generation to run small family owned business offers attractive M&A opportunity in specialty chemicals. There have been 31 M&A deals in the last 5 years in the sector and M&A activity is likely to continue in near future, say **Binay Agarwal**, **Mridul Anand** and **Punit Rathi** of Tata Strategic Management Group.

## Introduction

Indian chemical industry is one of the fastest growing industries in the country. It is poised to grow at 10-12% till 2015. The growth is mainly driven by low per capita chemicals consumption, higher growth of end use industries and growing middle class income. In past 5 years, several MNCs have used M&A as their growth strategy to create/ increase presence in the Indian chemical industry.

**Figure 1: M&A deal in India Chemical Sector**




***Source**: Bloomberg & Analysis by Tata Strategic*

Overall M&A deal value in FY12 was estimated at $ 2285 mn. During FY12 there were 8 deals in specialty chemicals with an estimated value of $ 502mn.

## Drivers for M&A in chemical industry

Historically Indian chemical industry has been highly fragmented with very few integrated large companies. Small players with strong regional market presence and local market understanding become an ideal acquisition target for global companies. Major drivers for mergers and acquisitions in chemical industry are highlighted below:

1. **Product portfolio rationalization** - Acquisition of an existing player with supplementary/ complementary product portfolio becomes preferred way to expand presence. Huntsman's acquisition of Laffans Petrochemicals' ethylene oxide derivatives business in 2010 helped the company establish a presence in a business complementary to Huntsman's amine-based international product portfolio.

2. **Gain access to new markets** - Local players dominate regional markets in Indian chemical industry. Large domestic and global manufacturers have opted for the M&A route to acquire these small players thereby gaining faster access to new markets. In 2009, German specialty chemical major Lanxess acquired chemical and wind power assets of Mumbai based specialty chemical manufacturer Gwalior Chemical Industries.

3. **Increase presence along value chain** - Backward integration for feedstock sources and forward integration for downstream players are preferred ways of deriving value from integrated value chain. Crystal group an agro-chemicals company acquired Rohini seeds in late 2011. Crystal got access to commercial and hybrid seeds of various crops, state-of-the-art seed processing plants, seed lab and extensive R&D programs.

## M&A opportunities in Indian specialty chemical industry

India is well positioned to be an attractive market forM&A activity in chemical industry in near future. Majority of installed capacities in India are smaller as compared to world-class optimal sizes. They have strong local presence, customized product portfolio and they understand customer needs well but lack financial resources to compete on national/ global level. Due to low interest rate regimes across the developed world, global chemical companies have access to low cost debt. Their increased cash balances make the global acquirers better positioned to enter into negotiations with Indian chemical companies. Specific segments in chemicals like dyes, inks, pigment, specialty chemicals, pharmaceuticals and agro-chemicals provide significant M&A opportunities.

Specialty chemicals business is expected to get most traction as far as M&A is



concerned. Specialty chemicals industry has high margins and has demonstrated high growth ~13% per annum during the last five years. It caters to end use industries such as consumer durables which are non-cyclical in nature. Such acquisitions are likely to dominate M&A activity in India because of the following reasons:

1) Majority of specialty chemical companies in India are family owned businesses and most of the 1st generation entrepreneurs are facing a succession void due to unwillingness of their offsprings to join the business. Such promoters are looking for exit options through sell-outs;

2) Small specialty chemical companies lack the know how to scale up operations and increase topline. Access to finance and technology is a major bottleneck for small Indian specialty chemicals companies.

**Figure 2: Recent M&As in Indian Specialty Chemical Industry**




***Source**: Bloomberg Analysis by Tata Strategic*

## Challenges in the acquisition of Indian specialty chemical companies

Some of the challenges at the pre-acquisition stage have been highlighted below.

1) Small specialty chemicals companies lack strong managerial capabilities leading to information asymmetries. In the past there has been a perceived lack of trust from acquirers as far as financial performance data is concerned

2) Being family owned businesses, promoters are unwilling to part with control and hence retain majority stake

3) Specialty chemicals industry has high profitability with strong growth prospects so promoters are looking for higher valuations. This has been demonstrated by



increasing P/E multiple of deals in the sector - average P/E multiples have increased to 9.3x in FY12, compared to 8.9x in FY11 and 8.0x in Fy10.

## Critical success factors for alliance/ acquisition in the sector

1) **Clear strategic intent** - Acquirer needs to carefully analyse future growth prospects, volatility and sustainability of growth, technological changes, R&D requirement, changes in end-consumer industriesand regulatory trends in the sector. Evaluation of attractiveness of a target should be driven by acquirer's strategic intent.

2) **Identify targets and corresponding synergies** - Identification of suitable acquisition target is extremely critical. Possible synergies should be mapped to the strategic intent. As specialty chemical industry is high growth industry, exhaustive financial due-diligence of the target is required. over-estimation of synergies which leads to over-priced acquisitions.

3) **Successful post-merger integration** - Since most of the specialty chemical companies are unstructured, organizational structure post acquisition needs to be decided and conveyed to target management beforehand. Any uncertainties during the integration phase may lead to unwarranted fears regarding lay-offs, restructuring and reporting relationships.

## Conclusion

India's specialty chemical sector has demonstrated phenomenal growth in the past and is expected to grow in future. The sector has seen significant amount of M&A activity. This trend is expected to continue as small Indian companies are seeking partnerships for scaling up or are looking for exit routes through sell-outs. However not all companies are willing to transfer control so target identification becomes critical.

Success stories in the sector show that such acquisitions have given international players access to Indian markets. Global companies looking to establish presence in India and planning to ride the high growth wave in specialty chemical sector should be on the look-out for small scale Indian specialty chemical companies.

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# Industrial Hazardous Waste Management: A new approach

With rising urbanization and global environmental concerns, sustainable waste management is fast becoming a cause of worry for India. Industrial waste is one of the key areas warranting immediate attention. Increased industrialization in the wake of the PCPIR Policy and National Manufacturing Policy will make safe and professional treatment and disposal of hazardous waste even more critical. The time has come for Indian waste producers to acknowledge the need for hazardous waste management and adopt innovative business models to ensure success. A view shared by **Shardul Kulkarni, Manjula Singh** and **Pradeep Kodali** of Tata Strategic Management Group

Industrial production has played an important role in India's growth story. However, industrialization has also led to environmental pollution and depletion of natural resources. The key to sustainable industrial development is to adopt a long term view of the various externalities of industrialization, hazardous waste being one of the most significant. Ensuring scientific and safe treatment and disposal of industrial hazardous waste (IHW) is essential for the preservation of environment and well-being of society.

## What is industrial hazardous waste (IHW)?

Industrial hazardous waste is waste generated as a by-product of industrial production, which is harmful to human-beings and environment if left unchecked or untreated. This type of waste contains a large number of materials of varying toxicity. According to Ministry of Environment and Forests, experience of industrially developed nations indicates that a 1 % increase in GDP leads to 1 to 3 % increase in generation of hazardous waste. This is why, in 1989, government of India specified the Hazardous Wastes (Management, Handling & Transboundry Movement) Rules, to ensure safe disposal of such wastes. These rules have been periodically amended (in 2000, 2003 and 2008) and have so far been the key driver for management of IHW.

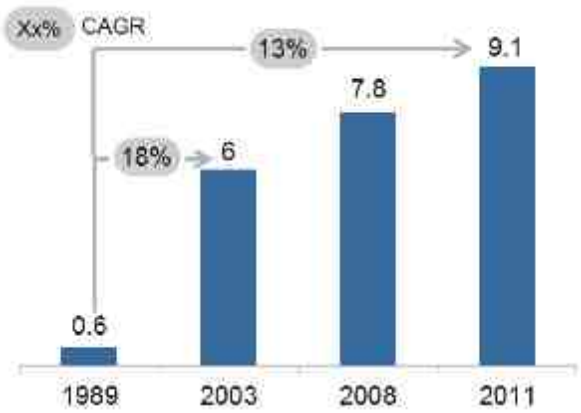
Key contributors to hazardous waste generation are industries like chemicals, petrochemicals, petroleum, metals, paper and pulp, leather, textiles and conventional power plants. Examples of industrial hazardous waste include sludge left-over from electroplating industries, waste from iron and steel manufacturing industries, etc.



## IHW Management - The untapped opportunity!

India's hazardous waste inventory increased from 0.6 million tons in 1989 to an estimated 6 million tons in 2003, and 7.8 million tons in 2008 (See figure 1). However, this increase in hazardous waste volumes has not been accompanied by a commensurate increase in treatment and disposal facilities.

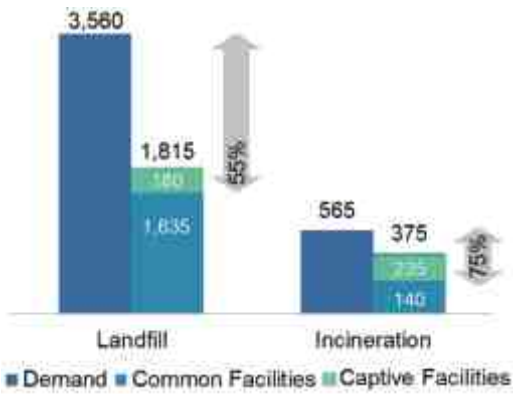
**Figure 1: Estimated IHW inventory in India (Mn Tonnes)**




***Source:*** *CPCB, SPCBs, Analysis by Tata Strategic*

In 2011 alone, an estimated 9.1 million tons of hazardous industrial waste was produced in India. Close to 45% of this waste is recyclable waste, which can be re-used as raw material or fuel in the producing industry or other industries. 39% is land-fillable and the balance 6% requires incineration. Given the available landfill and incineration capacity for hazardous waste (including common as well as captive capacities), India has a deficit of 49% and 34% respectively. Small batch sizes and high energy costs due to inefficient operations imply captive facilities are hardly used. Excluding captive facilities, the resulting capacity deficit is higher for landfills at ~55% and far higher for incineration facilities at ~75% (See figure 2).

**Figure 1: India's HW capacity deficit in 2011 ('000 tons)**




***Source:*** *CPCB, SPCBs, Analysis by Tata Strategic*

Given landfilling fees at around INR 2,400 per ton and incineration fees at INR 20,000 per ton, the deficit translates into an untapped market opportunity of Rs 1,300 Crore (Rs 850 Crore for incineration and Rs 460 Crore for landfilling)

## Issues and challenges

How is it that this opportunity remains unexploited, particularly by the private sector? The issue is similar to the one faced by the Indian power sector. Given huge peak power shortages and energy shortages, the power sector had attracted the attention of private players in the last few years. However, on account of feedstock unavailability, it is losing its charm in a big way.

Similarly, un-availability of feedstock, viz. aggregated volumes of segregated waste, that would make operation of a Hazardous Waste Treatment, Storage and Disposal Facility (HWTSDF) economical, is the key deterrent to private participation. Factors leading to this feedstock unavailability, despite significant production, are as follows:

1. **Un-ethical practices of waste disposal:** In a bid to save costs, producers discard waste unscientifically instead of providing it to common waste management facilities. Practices such as dumping waste onto unoccupied private land or burying it in dump pits within or adjacent to the site of the industrial facility are rampant. Also, since incineration is 8-10 times costlier than landfill, many a times incinerable waste is secretly passed off by companies as landfill waste to save on processing fees. This has even led to fire accidents in HW landfilling facilities. Not just waste producers, but waste processing & disposal companies are also known to adopt un-ethical methods. Waste companies from unorganized sector have been found intentionally leaving the tanker outlet open while transporting hazardous waste to processing site, spilling it along the way and pocketing the processing and disposal fee.

2. **Lax implementation of rules:** Inadequate enforcement of HWM Rules has been the bane of the country. While industry participants flout rules, implementation authorities suffer from inefficiencies introduced by bureaucratic structure, lack of transparency, corruption, shortage of qualified manpower & testing facilities and strong political influence over waste management related decisions/ punitive actions

3. **Restricted transportation:** Hazardous waste movement between states is not permitted and hence waste aggregation across states, to achieve economical volumes, becomes a challenge.



## Role of waste producers

Currently, the most prevalent model in the industry is the government driven PPP model, where the nodal agency appointed by the state government under Hazardous Waste Management Rules, floats tenders for setting up Common Hazardous Waste Treatment, Storage, and Disposal Facilities (CHWTSDF) on a build-own-operate (BOO) or build-own-operate-transfer (BOOT) basis. IHW Treatment companies like Bharuch Enviro, Ramky, UPL Enviro, Jindal are already active in this space. The role of waste producers in this model is limited to that of a user of the CHWTSDF, who will avail the services and pay fees. They have no stake in the venture.

The need for scientific disposal is yet to be acknowledged by waste producers. Producers are driven by the short-sighted belief that growth cannot be restrained by the use of expensive waste treatment & disposal processes and technologies. However, such a view has long term implications for environment and society.

The time has come for industry to stop depending on the government driven model and take up a pro-active role in developing waste management infrastructure. Waste producers could adopt innovative business models to participate in management of waste.

## A new approach to IHW management

It will be in the interest of waste producing industries to come together and form a consortium of geographically proximate waste providers. The consortium could invite participation from a waste management services company through a tender or direct contract. The consortium could also approach the state pollution control board for fiscal incentives and support in land acquisition/ lease. As the consortium provides assured, aggregated waste volumes to the processor, the processor will be able to

**Figure 3: Business Models in Hazardous Waste Management**

| Business Model | Details | Pros & Cons | Adoption |
|---|---|---|---|
| Captive | • Captive facility set up by the user/ waste generator<br>• Not for profit operation | • Complete control over waste<br>• Un-economical for standalone producers as difficult to achieve economies of scale<br>• Not core business of the company | • Adopted by large waste producers |
| PPP (BOO/ BOOT) | • For profit operations<br>• Govt. stake ranges from 0 - 51%<br>• Concession period ranging from 20-25 yrs<br>• Post closure monitoring of SLF for 30 yrs | • Land lease by Govt. at low cost<br>• Govt. grants<br>• Less control over waste volumes | • Most prevalent model |
| Section 25 | • Industry groups get together to setup own facility<br>• Not for profit operation<br>• Mostly for founding members only | • High control on kinds of wastes<br>• No expertise in setting up & operating<br>• Not core business of the industry group | • Few instances Eg: Nanda Enviro Projects Ltd |
| Private | • Owned by private player<br>• For profit operations | • Need to develop industry relations<br>• Less control on kinds of wastes | • Not observed |
| Consortium | • Industry groups get together to setup facility<br>• Include HW management company as part of the consortium<br>• For profit operation for the HW mgt. company | • Consortium gets more control over technology & operational standards<br>• HW management company gets assured volumes<br>• Both focus on core business, waste managed professionally | • Future trend |



achieve economies of scale, bringing down the cost of processing. In return for assured waste volumes, the processor could pass on some of the benefit to the consortium in the form of reduced processing fee. The model essentially replaces the public element of the PPP model with a consortium of waste producing companies.

The consortium approach overcomes the challenges of the captive model and can be adopted in lieu of the same (See figure 3). Unlike the PPP model, where users have no control over the technology or quality of operations of the facility, the consortium approach enables users to monitor and control the same. At the same time, guaranteed waste volumes, which are absent in the case of PPP, make the waste processor's business model viable. The model also differs from the not-for-profit (section 25) model by the inclusion of a for-profit waste management service provider.

According to Mr. Pradeep Dadlani, expert on industrial hazardous waste "The consortium approach model is now being used by some large corporate i.e. Reliance & Adani Groups for their testing laboratories & maintenance workshops. In this model, the Expert groups who are adept at operating such facilities are given the task of building & maintenance of dedicated units for the large Industrial groups."

He goes on to say "In the Hazardous Waste Management sector the Companies such as Ramkys, UPL Enviro, Jindal etc. have been able to do tremendous capacity building which puts them at the forefront of tapping these kinds of opportunities. They have, now reached the desired level of technical competence & capability. The consortium approach is expected to be the future trend in the IHW management."

## Over the long term

While short term solutions must be adopted to bring about immediate improvement in the state of waste management, the industry must not lose sight of the long term objectives. The hierarchy in management of hazardous waste is to first reduce, then reuse, recycle and re-process, with the final option of disposal of wastes. Thus, the long term approach should focus on reducing waste generation.

According to industry experts, "Waste generation is a result of inefficiencies in the manufacturing processes". Therefore, greater the inefficiencies in the company, more the waste generated per unit of output. Advanced economies have evolved manufacturing processes which are more efficient and produce less quantities of harmful waste. While several Indian companies are already working in this direction, it could take time for India to achieve inclusive waste reduction across industries.



## Conclusion

So far, government regulations have been the primary driver for the hazardous waste management sector. Going forward, as social and environmental responsibility becomes a critical aspect of the long term strategy of major companies, they will increasingly take the onus for safe treatment & disposal of their own industrial waste. Several business models exist, but the consortium approach allows waste producers to actively participate in the management of the waste and also provide a commercially viable business opportunity to private waste management companies. A little attention to an industry that is not core to India's growth story could go a long way in safeguarding the lives of a billion people and preserving the country's environment.

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# Facing the Coming Global Financial Crisis

Excess debt in advanced countries has morphed into an escalating crisis of sovereign debt. India too will be impacted through trade and financial flows with lower GDP growth in 2011-12 and 2012-13. Firms in India have to prepare for a turbulent environment. They need to urgently initiate programs to enhance revenue and compress costs. Also, they should stress test their major strategic moves against extreme scenarios and be ready for the subsequent rebound in India's economy, says **Raju Bhinge**, Chief Executive of Tata Strategic Management Group.

The global financial crisis of 2008, precipitated by the collapse of Lehman Brothers, was a traumatic experience for the entire world. Concerted action by the G 20 countries contained the problems and brought about a semblance of normality in 2010. However, the underlying problem of excess debt in the advanced countries remained unresolved. It has gradually morphed into an escalating crisis of sovereign debt, in Europe and the USA.

In the USA, slow growth (1-2% pa), compounded by reduced Government spending could lead to a recession. In Europe, Greece, Ireland and Portugal are already in a debt crisis. Italy and Spain are also under pressure. One or more of these countries will soon have to restructure their debt or default, leading to a chain reaction impacting lenders and other Governments. The breakup of the EU is no longer ruled out. The alternative to a split will have to be a tighter fiscal union. This choice is putting enormous stress on the political systems. The next global financial crisis is likely to emerge from a default event in Europe. What impact will it have on Indian firms?

India's experience during the economic slowdown in 2008-09 provides some useful pointers. Broadly, a recession or a major disruption in the advanced economies will impact us as follows:

- **Foreign Trade:** The developed nations (USA, UK, Europe and Japan) still account for 34% of India's merchandise exports and 30% of imports. Any slowdown in demand will thus affect a third of our exports. While this will adversely affect our economic growth, the impact would have been far greater in earlier years.
- **Financial Flows:** India runs a current account deficit of 2-3% of GDP. Hence foreign fund flows (FII, FDI, ECB etc.) are crucial for the economy. The advanced economies still account for about 78% of the pool of global financial assets.



Hence any crisis in their financial markets that slows or disrupts the flow of capital can cause havoc in India in terms of exchange rates, liquidity and trade credit.

- **Crude and Commodity Prices:** Commodity Prices are likely to plunge in the event of a recession or crisis in advanced countries. This would be beneficial for India as we are a major importer of most commodities.
- **Most investment is funded by domestic savings** - the gap being about 2-3% of GDP. This makes our economy more resilient to external shocks. At present, India is experiencing high inflation and a high fiscal deficit. Monetary tightening is underway to control inflation. Economic growth is likely to moderate to about 7.5% in FY12 and FY13. As inflation declines to an acceptable level and interest rates are reduced by RBI, growth will rebound to over 8% in FY14. A global financial crisis will have an adverse impact through reduced growth in exports and drying up of foreign currency flows. This will be partly offset by the benefit of lower prices of crude oil and other commodities. The net effect is a downside risk of about 1% GDP growth reducing it to about 6.5% to 7% in FY 13. This is consistent with 2008-09 when GDP growth dropped to 6.8%.

What does this mean for Indian business? Firms have to be ready for a more difficult environment.

- Advanced countries are likely to have slow growth (1-2% pa) for an extended period of time. Hence international expansion and export growth will have to focus on emerging countries e.g. in Africa, SE Asia, and S. America.
- In case of a financial dislocation emanating from, say, Europe, the greatest risk comes from any friction or disruption in financial flows. In such situations, cash is king. And having stand-by domestic banking arrangements and a low or prudent level of debt can safeguard operations.
- Firms in developed countries, facing low or uncertain growth in home markets, will be compelled to target emerging countries, especially India for future growth. The intensity of competition in India will go up several notches.
- India's GDP growth will moderate in the next two years. With capacity additions in the pipeline in most sectors, and greater competition, there will be intense pressure on prices, market share and profits. The profits of the corporate sector may drop for a year or two as happened in Fy09.
- Incumbent firms need to urgently revive programs to reduce costs/improve performance and enhance revenue/margins. Strategic sourcing can play a key role



in dealing with volatile input prices. Concurrently, new customer segments (eg. rural), route to market initiatives and sales force effectiveness programs can expand market share and profits.

Government of India and RBI has a crucial role to play in mitigating the impact of a global crisis and keeping economic growth on track.

- They need to monitor and ensure liquidity in financial markets even if there are huge outflows by FIIs or for repayment of foreign loans. This is potentially the most critical need in the event of a financial crisis.
- As crude oil and commodity prices drop, inflation will reduce. Also, the subsidy burden and fiscal deficit will drop. This may justify a steep reduction of policy interest rates to start the next growth cycle in India.

The next few quarters are likely to be turbulent and unpredictable. In a situation of such uncertainty, firms need to stress test some of their major bets, investment intentions, acquisition/ divestment plan and directional changes against some of the extreme scenarios in the domestic and international markets. The initiatives that are more `at risk' should be avoided, deferred or altered. These steps will help firms tide over the expected financial tsunami and position themselves advantageously for the subsequent rebound in India's economy.

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# Alternate gases - A sustainable solution for feed-stock deficit in Indian power sector?

Rising prices and unavailability of conventional feedstocks such as coal and gas have compounded the problems and entire Indian power sector is in crisis situation. Can alternate gases such as shale gas and CBM offer a potential long term solution to the crisis? What factors would be essential for successful exploitation of alternate gas potential in the country? A view shared by S**hardul Kulkarni** and **Binay Agrawal** of Tata Strategic Management Group

## Introduction

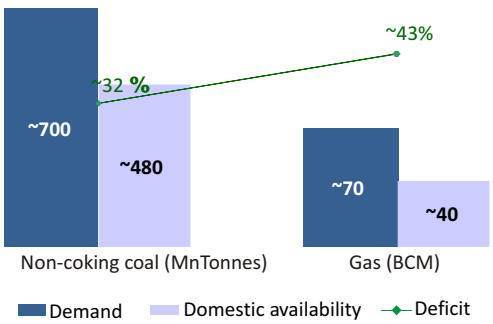
The state of India's power sector has to improve to help India sustain its high economic growth. According to the 12th five year plan draft report, India would need to add ~75 GW over the next five years to support its target of 9% p.a. GDP growth. It would require an investment of $ 210 Billion, half of which is expected to come from the private sector. The current situation however does not inspire much confidence.

## The feedstock challenge

Plants with capacity of 5,600 MW commissioned in FY10 are operating at only 42% of capacity, thanks to shortage of feedstock. Power plants under construction are facing delays and planned projects are being put on hold. Rising fuel prices and unavailability of coal/ gas along with low tariffs are making these projects unviable.

India is expected to be significantly deficit (Refer Figure 1) in coal and gas, the two major fuels accounting for ~65% of total power generation capacity in India.

**Figure 1: Conventional fuels for power sector, FY 16**




***Notes :*** *1) Million Standard Cubic Metre per Day*

Import of fuels to meet the deficit is expected to remain a much more expensive option. Introduction of market linked pricing in Indonesia, a major source for coal import to India, increased coal prices by ~30% last year. Imported LNG is nearly 3 times costlier than domestic gas.

## Alternate gas: A potential game changer

Alternate gases could offer a potential solution in this crisis. India has huge reserves of shale and CBM gas.

**Gas reserves in India**

| Source | Estimated reserves (tcm , 2010) |
|---|---|
| Natural gas | 1.5 |
| Alternate gas | |
| CBM | 2-2.6 |
| Shale gas | 1.5 |

*Source: Industry reports, Analysis by Tata Strategic*

The shale gas reserve is an initial estimate by US Department of Energy (DOE). The actual estimate by Government of India is expected to be published in 2012 and reserves could be far more than 1.5 tcm.

Combined reserves of shale gas and CBM in India are 2 to 3 times the natural gas reserves in the country.

Successful exploitation of such large reserves of alternate gas could potentially change the energy scenario in India.

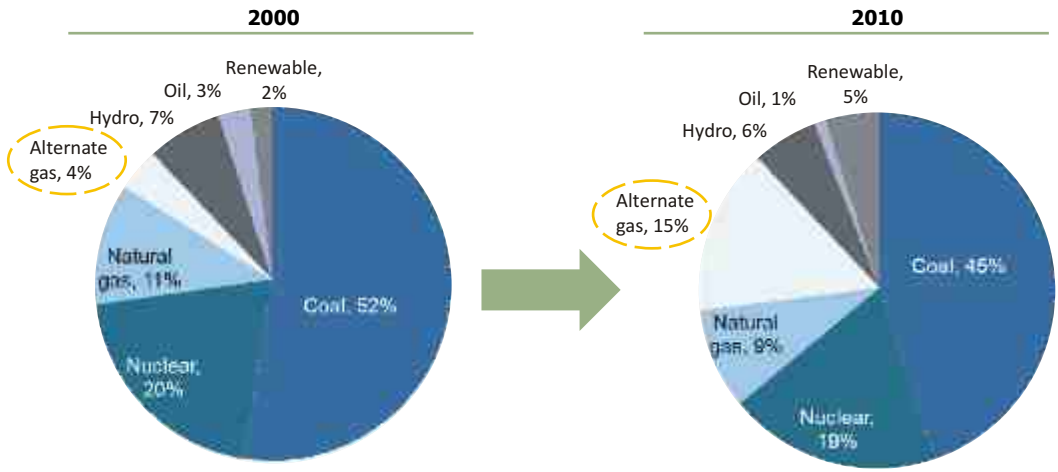
## Alternate gas in USA: A success story

USA was a major importer of gas till 2000. Due to reduced availability of conventional feedstocks such as coal and natural gas, USA sought to diversify its fuel sources. Shale gas and CBM emerged as a major alternative. Due to large discoveries and commercial exploitation of alternate gases, share of gas based capacity has increased from 11% in 2000 to 28% in 2010 (Refer Figure 2).

Apart from govt. support, various other factors contributed to the success of alternate gas in USA:

- Commercialization of horizontal drilling technology for shale gas

**Figure 2: USA, Fuel sources for electricity generation**




**Source** : *USA Department of energy*

- Adequate infrastructure
- Deregulated regime

With success of shale gas, USA has become not only self-sufficient in gas but also a net exporter of gas. Another major impact is seen in terms of ~50 % reduction in gas prices to $ 4.2/mmbtu in 2010 from the peak of $ 8/mmbtu in 2008.

The USA success story suggests that with the right regulations and adequate infrastructure, alternate gases could significantly impact the energy scenario in a country.

## Implications for India

Currently ~18 GW of power plant capacity in India is gas based. These power plants consume ~28-30 bcm of natural gas annually.

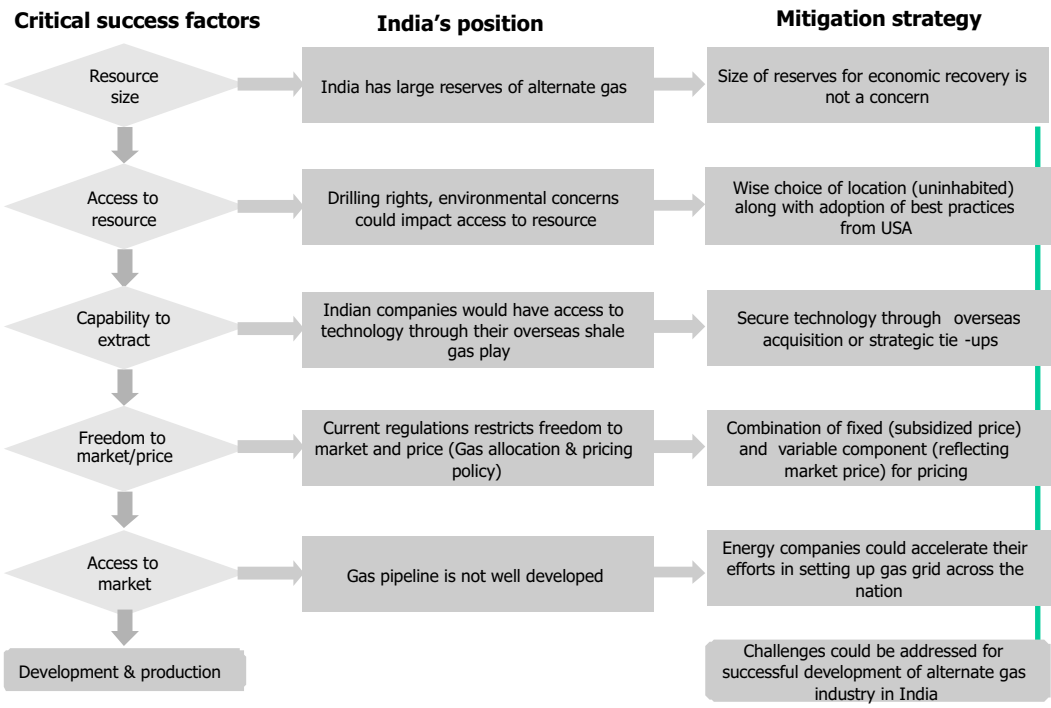
India could potentially double the gas based capacity if it were to produce 30 bcm of shale and CBM gas annually. With combined CBM and shale gas reserves estimated at twice the natural gas reserves in India, this target appears to be achievable with focused efforts.

India, too, could create a new source for itself and aim for lower energy prices. This is critical for sustainable development of power projects. The question is how soon we address the bottlenecks to leverage the alternate gas reserves in the country.

## Critical success factors and India's position

While India is well placed in certain factors, the factors that would decide the future of alternate gases in India are access to resources and freedom to market/ price (Refer Figure 3).

**Figure 3: Critical success factors and India's position**




Access to resources: It is important to acquire drilling rights with ease and allay the environmental concerns related to alternate gas E&P. A number of alternate gas reserves in India have human habitation and securing drilling rights in such lands could be a challenge. Environmental concerns with hydraulic fracturing, particularly in case of shale gas E&P, include the potential contamination of ground water, mishandling of waste, etc. Wise choice of location (uninhabited) along with adoption of best practices from developed markets such as USA could help successfully exploit the alternate gas potential in the country.

Some of the best practices from USA include

1. Casing and cementing to isolate gas-producing zone from aquifers
2. Limiting the water usage by controlling vertical fracture growth
3. Establishing emission measurement system to monitor and control pollutants

***Freedom to market and price:*** India follows a priority sector gas allocation and pricing

policy. Fertilizer, Power, LPG and city gas distribution are given priority in gas allocation, in that order. The restriction to market and price has delayed investment in CBM blocks and is expected to impact development of other alternate gases as well. The purpose of subsidized pricing is to supply gas at an affordable price to strategic sector. However, if the same pricing regime impacts investment in gas exploration and production, the whole purpose of the policy is defeated.

A more progressive approach could be followed in gas pricing to attract investment in the sector. A pricing mechanism that has a fixed component (subsidized price) and a variable component (reflecting the price of imported LNG) could be worked out for the benefit of all stakeholders.

## Slow progress till now

CBM is the first alternate gas that India has started to explore. The first CBM auction occurred in 2001. As of now, four rounds of auctions have been completed in which blocks with combined reserves of 1.8 tcm have been awarded.

The blocks awarded are yet to make any progress. CBM production in India is currently estimated at 0.1 bcm. This is way below the potential that CBM blocks offer.

Shale gas policy is yet to be formulated. It is most likely to be announced by end-2013. The interest from private sector has outpaced legislation making. RIl and GAIL have already bought shale gas assets in

USA whereas OIL, IOCL, BPCL are looking at acquiring shale gas prospects abroad.

While the progress has been slow till now, the future holds promise. With the right strategy we could successfully develop the alternate gas potential in the country for our energy security.

## Conclusion

The power situation in India is going from bad to worse. Drawing from the US experience, alternate gases have the potential to significantly address feedstock issues for India's power sector. As with each opportunity, there also exist several challenges. Addressing the issues related to drilling rights and a free-hand in marketing of alternate gas are the imperatives for attracting investments in this sector. This could be a potential game changer in addressing the feed stock deficit of Indian power sector in the long term.

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# The Decision-Oriented Organization

While having a winning strategy, a sustainable competitive advantage or an appropriate reporting structure remain the most serious challenges for all businesses, they alone aren't sufficient for delivering desired results. Ensuring key decisions are taken at the right speed and position is likely to become increasingly critical for success in today's complex and fast-changing business environment. Accordingly, identifying where decisions need to be taken in an organization and ensuring a more participative approach to the same is what will lead organizations to a path of sustainable growth, say **Amit Bajpayee**, Principal – Organization Effectiveness and **Sayan Sarkar** of Tata Strategic Management Group.

## INTRODUCTION

Organization Design is critical for organizations to ensure successful implementation of various strategic imperatives. These strategic imperatives could range from managing rapid growth, gaining competitive advantage to increasing profitability of operations depending on industry, economic scenario and specific organizational context.

Lately developments in large Indian businesses and conglomerates have renewed focus on Organization Design as a lever for competitive advantage and building readiness for growth. What distinguishes the recent initiatives on organization design is the specific emphasis on enabling decision making in the designed organization. India's leading infrastructure, engineering and construction group L&T realized that its large and diverse businesses in its current structure was inhibiting growth as critical decisions were delayed or not taken at all (Refer Case 1). Similar experiences by one of India's leading IT firms Wipro Technologies, which lost market share in multiple segments to other Indian companies, due to its suboptimal dual CEO structure which delayed decision making (Refer Case 2). Also, another leading Indian IT firm, Infosys has firmly established the learning that having the right organization design involves having an organization structure that ensures focus on all critical decisions.

## Case 1: Larsen & Toubro

*Larsen & Toubro (L&T), with its diversified and dominant presence in heavy engineering and EPC projects, was structured across five divisions - Engineering Construction & Contracts, Electrical & Electronics, Machinery & Industrial, IT & Engineering Services and Financial Services.*

*In late 2010, L&T decided to restructure its organization by splitting L&T into a business group of nine independent companies giving them a more autonomous status, with each having a separate Board of Directors. In the words of Mr. Naik, Chairman-L&T, what this restructuring would enable was to "make the decision-making closer to the business, instead of the parent company deliberating on its board meetings" and thereby enable growth and greater competiveness.*

## Case 2: Wipro

*Wipro Technologies, the technology arm of Wipro providing IT services, consulting, system integration and outsourcing solutions, recently reorganized its business lines into a structure termed as "One Wipro" by its new CEO Mr. T.K. Kurien. The idea is to have a structure where the diverse parts of its business are organized to create single decision and touchpoints for its variety of offerings. A smaller set of verticals is being formalized to remove redundancies in its organization and create lean, responsive businesses.*

*In the words of a senior Wipro official involved with the restructuring, the idea of restructuring is to enable "decisions to be taken in the markets, not in Bangalore."*

Both case studies throw up insights into how organizations are slated to function in the coming decades. The bottleneck in both the cases was not about pursuing the incorrect strategy, but about not having critical decision-making in the right place.

Accordingly, the key challenges in the coming decade will be to ensure the quality of critical decisions and have organizations geared toward the same.

## DECISIONS: DELEGATION, ACCOUNTABILITY AND BEYOND

While promoters and senior managers are to some extent aware of the importance of taking key decisions, what they are still unclear about how to create an organization that is geared towards taking decisions at the right place and pace.

Accordingly, identifying where decisions need to be taken in an organization and setting them right after due consideration of all intertwined aspects ought to be a serious exercise.

The starting point to building a decision-oriented organization is to identify all decisions - strategic and operational, critical to an organization's competitiveness in the marketplace. Each of these decisions and the levels of accountability need to be clearly understood and mapped in the existing context to create an AS-IS map of decisions.



Subsequently, the need for delegation for each identified decision has to be assessed. In a typical scenario, all strategic decisions which have a long-term impact or affect multiple frontiers in organizations are better centralized for greater control and synergies. Decisions of operational and frequent nature in general are delegated to levels closer to the context (e.g. marketplace) to ensure greater responsiveness and market-orientation.

Case let 1 : Tata Strategic while working for a capi tal goods manufacturer and EPC projects company structured the organization along SBUs offering products and se rvices, each having its sales and operations team.
While marketing as a function needed to be decentralized to BU level, it was initially set up centrally due to limited marketing orientation in the current setup. The intention is to decentralize the Marketing function in a phased manner t o each SBU over a 3-4 year period.

Caselet 2 : A prominent diversified family group with a flagship chemicals business comprised two established and multiple emerging businesses, with research & development being a critical success factor for growth of most businesses. The firm was assisted by Tata Strategic in creating a corporate R&D function to establish a centre of excellence while managing costs. However, the role of application development was delegated to individual businesses to ensure quick decisions and rapid commercialization.

Still, in specific instances organizations can centralize certain decisions apt for delegation (Refer Caselet 1).

Similarly, specific requirements may result in delegated decisions, considering specific industry or company context, even though they are apt for centralization (Refer Caselet 2).

While identifying positions for decision accountability is a critical starting point, in large, growing organizations, decisions today are increasingly of collaborative and multi-functional nature. In such a scenario the process of identifying all stakeholders and their specific roles in a decision process/loop are critical steps towards helping an organization evolve from being structure-driven to decision-oriented.

## D-APECSTM: TOWARDS A DECISION-ORIENTED ORGANIZATION

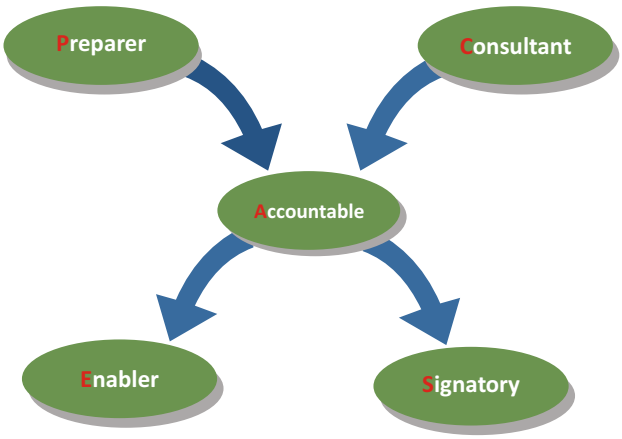
Once AS-IS decision maps are created and need for centralization/ decentralization assessed, Tata Strategic uses its decision framework D-APECSTM to define clearly the role that various organizational elements play during each decision.

The D-APECSTM Matrix

In the D-APECSTM framework APECS is an acronym where each letter categorizes the



**The D-APECSTM Matrix**




role of each decision participants into five categories as follows:

- A - The role **Accountable** for the decision and overall execution delivery
- P - **Preparer** who does the ground work that is a key input to take the decision
- E - Roles that provide **Enabling** inputs once the decision is formalized e.g. IT
- C - Roles that act **Consultants**/experts in the decision making process
- S - The role authorized to **Sign-off** on the decision and hold A accountable for the same

A rigorous decision map needs to be created to clearly identify the participants and their respective roles in taking critical decisions of an organization.

A map containing two such critical decisions in an EPC projects player - one strategic and the other operational in nature, is demonstrated below:

| | CEO | BU Head | Project Manager | Project Purchase | Accounts | Marketing | Sales | Logistics |
|---|---|---|---|---|---|---|---|---|
| Introduction of new project segments | S | A | C, E | | | P | C | |
| On-site purchase of consumable for project | | | S | A/ P | C | | | E |

The above map would facilitate Role and Decision based analyses of the as-is scenario to help identify key issues which an organization must address such as:

- **Inappropriate delegation:** When a particular role is accountable in too many decisions or if there is too much delegation to lower levels
- **Ill-defined accountability**: When a particular decision has numerous/redundant stakeholders
- **Decision gaps:** When all critical aspects of a decisions are not defined unambiguously

The D-APECSTM approach, besides ensuring clarity on key decision ownership has certain far-reaching consequences and sustainable benefits. It creates a collaborative approach to critical decision-making, builds a higher level of employee ownership and helps in grooming upcoming talent for decision making roles.

## CONCLUSION

As India's economy expands, businesses will aspire to grow rapidly over sustained periods of time, enter new markets and segments and establish a global footprint. On the other hand, employees will expect greater transparency and decision-making authority in their roles. In such a scenario identifying and establishing clearly where and how decisions need to be taken will become increasingly critical to sustaining business growth and grooming, retaining & developing quality talent.

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# Leveraging the India Rural Opportunity: A New Approach

Rural markets have been the buzz word in the Indian consumer market for quite some time. However, only a few companies have managed to make a mark in this space. Having a micro-market focus i.e. knowing exactly where you want to sell and modifying your model as per regional characteristics would ensure profitable rural growth for consumer product companies say **Rajiv Subramanian** and **Pankaj Gupta** from Tata Strategic Management Group.

Since the 1980s the sheer mass of the rural market was the shine that used to attract the marketers in the Indian consumer sector. The fact that more than 70% of the country's population was unaddressed was enough of an attraction. In recent times this attraction has increased with the additional money that came into the hands of the rural consumer, primarily on account of sustained rise in agri-produce prices and NREGA spending. No wonder that rural expansion is the buzz word for most consumer facing companies today.

Budget 2011 should further strengthen the rural story with a plan for additional credit outlay, interest subvention and NREGA getting indexed to CPI inflation. These initiatives are expected to hasten the accelerated shift to brands and premiumization happening across categories in the rural marketplace.

## India Rural Initiatives - The Story Till Now

All major players have had varying presence in rural India. The distribution system typically has an additional layer in the channel to account for the last mile. The attempt has been to set up maximum number of last level stock points to expand penetration. For awareness, the usual options in the BTL space have been applied i.e. wall paintings, van promotions, hoardings etc apart from mass media options.

Notable among the specialized rural initiatives in the Indian market include Project Shakti by HUL, Gaon Chalo by Tata Global Beverages and e-Choupal by ITC. These companies have significantly increased their rural presence through these models, especially HUL. While these initiatives have been a definite enabler for rural market reach, their self sufficiency and thus scale up potential has always remained an ongoing debate.

The question that remains for many consumer facing companies is - What is the right approach to profitably serve the rural consumer in India?



## Identifying the Micro-Markets-The 'Where'

Companies often tend to see this entire rural mass through the same lens i.e. having similar market potential and thus similar business benefits. To an extent this is a result of most current market insight tools that limit information at state level for rural markets leaving prioritization to prevalent notions of market potential and consumer affluence.

Here Tata Strategic proposes a different approach of identifying micro-markets upto a district level within rural India that account for a significant share of the rural potential for a category.

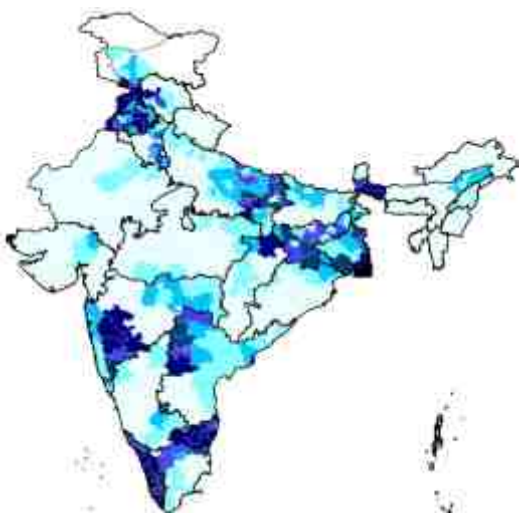
For this purpose, Tata Strategic has developed a proprietary tool- DisProTM that leverages a 30,000+ rural household survey across 580+ districts. On this base data, advanced statistical tools are applied to help identify these micro-markets. The significant value add that we find from this tool is that it helps identify micro-markets with high concentration of both existing and potential users and consumption.

Given the high cost of serving rural markets, it prioritizes focus markets based on a cost to serve criteria. This cost to serve led prioritization could be for traditional and/or alternate channels

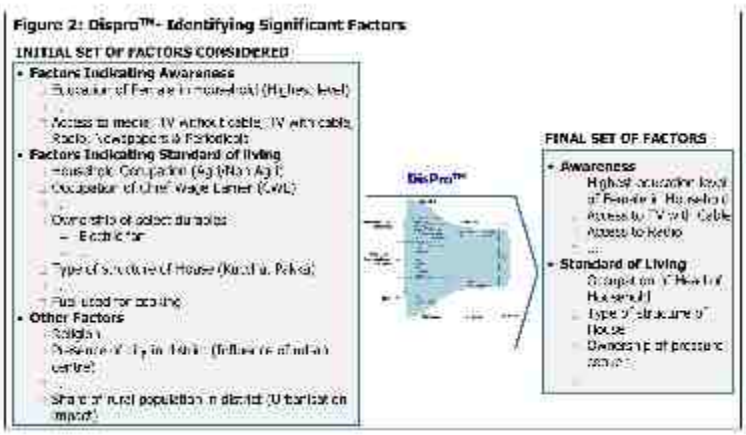
## Application of DisProTM - Example of a Personal Hygiene Category

We applied this tool to a personal hygiene category to understand the applicability of this tool. When we mapped the current users at a micro-market level there were the usual suspects in the form of Kerala and select parts of TN, AP, Punjab and Maharashtra. The surprise here was the emergence of Eastern UP as a focus micro-market (Figure 1).

**Figure 1: Dispro™- Mapping of Current Users**



Our understanding of this category helped identify the initial list of factors (demographic, media exposure, category consumption, ownership etc) that would typically define the profile of the current user. The next step was to apply an appropriate regression technique to filter out the final list of factors with each having significant impact on the probable usage of the personal hygiene category (Figure 2).

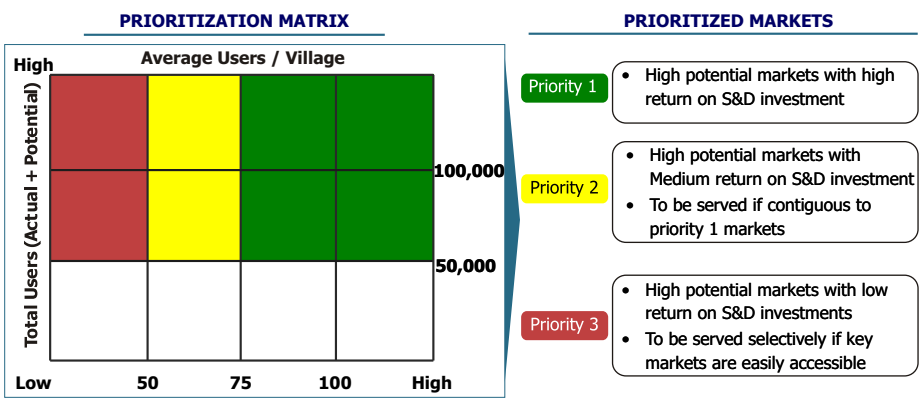



Predictive modeling helped calculate the probability of non-user households consuming this category. In this calculation, each of the factors had a distinct level of significance.

Probability of a non-user household consuming=fn (Factor 1, Factor 2….Factor n)

Thus, combining the current and the potential users provided a clear picture of the market potential map for this category. The districts were finally prioritized based on market potential vs cost to serve indicators (Figure 3). Then among the prioritized districts, four large priority clusters emerged which players could focus on for maximum business efficiencies.

**Figure 3: Dispro™- Prioritizing Districts**



The above mentioned approach could serve as an effective tool for companies to identify their priority micro markets in rural India. The big advantage of such an exercise is its fast turnaround and thus actionability.

## Reaching the Identified Micro-Markets-The How

The next challenge for any company would be actually reaching and servicing the identified micro-markets through a sustainable and replicable model.

There could be multiple Route-to-Market (RtM) options that get generated for the prioritized clusters based on the nature of product, current market share, brand awareness, geography dynamics, value-volume ratio and internal capabilities.

Tata Strategic has conducted in-depth research of models followed by various companies. Some innovative RtM options that could emerge are listed below. The applicability of these would vary with the business specific parameters mentioned previously.

- Option 1 - Dedicated rural entrepreneur
- Option 2 - Distributor consolidation for urban and rural markets
- Option 3 - Consolidated distribution with tele-order booking
- Option 4 - Leveraging reverse logistics potential with partner sectors e.g. Dairy

Companies would need to develop and validate many more such RtM options. A detailed qualitative and financial assessment of the options would help identify the most optimum mix for different types of geographies.

The RtM mix adopted would need to have a fine balance between flexibility of having more than one model in various geographies and the need for standardization.

Developing the 'optimum' RtM strategy would be an incomplete task, without the communication strategy in the micro-markets. The communication strategy development will take into account factors like brand awareness in that area, profile of resident consumers and other local parameters like penetration of mass media, literacy levels, geographic spread of villages etc.

The remaining key pieces of the rural strategy jigsaw puzzle would be realignment of human capital and the company's supply chain. There would be a need to incorporate the rural component in the organization structure, roles and KPIs. Similarly the reach augmentation would need to build on the existing supply chain network of the company.

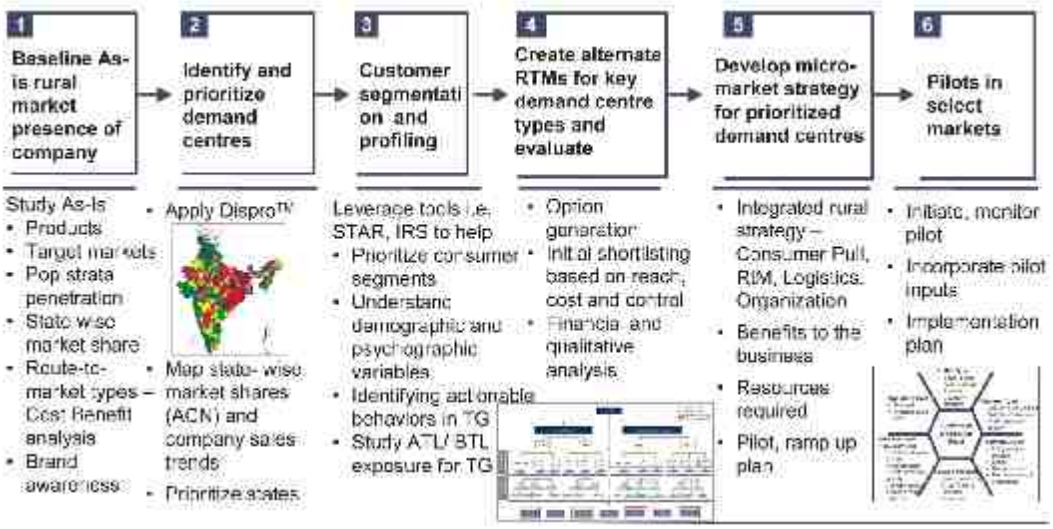


Any alterations in product portfolio could be justified by a significant market potential. We strongly suggest a thorough strategic and financial assessment of the developed rural strategy to ensure sustainability of the model. Post the detailed assessment, companies should look to quickly initiate pilots and then ramp up.

The rural strategy framework discussed in this article is what Tata Strategic proposes as a robust but flexible approach (Rural StratTM) for consumer facing companies to leverage the rural market opportunity in India (Figure 4).

Rural India is no longer a futuristic objective for consumer facing companies. The companies want to be part of the rural consumption growth story playing out today in various consumer facing segments. A scalable, profitable rural expansion model would definitely be vital for companies to create a sustainable competitive advantage in the market place.

**Figure 4: Tata Strategic's Rural Strat™**



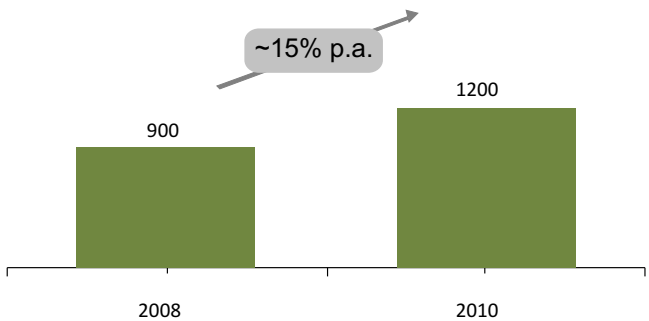

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# Leveraging the India Food & Beverage Opportunity

India's packaged F&B sector provides an attractive market opportunity with multiple challenges and rich rewards. Investments in the backend, improved media penetration and the right regulatory enablers could further increase the current estimates of this opportunity. Existing and prospective players who focus on the critical success factors for the business they are operating in and are able to create a differentiated proposition have a high probability of leveraging this India consumption story.

In India, low incomes and preference for fresh food has acted as an inhibitor to packaged F&B growth in the past. However the positive demographic shifts that India has seen in the last 10-15 years has rapidly changed this paradigm. The Indian packaged F&B sector became a Rs 1200 Bn opportunity in 2010, having grown at nearly 15% p.a in the last few years.

**Fig 1 : India Packaged F&B Market Trend (Rs Bn)**

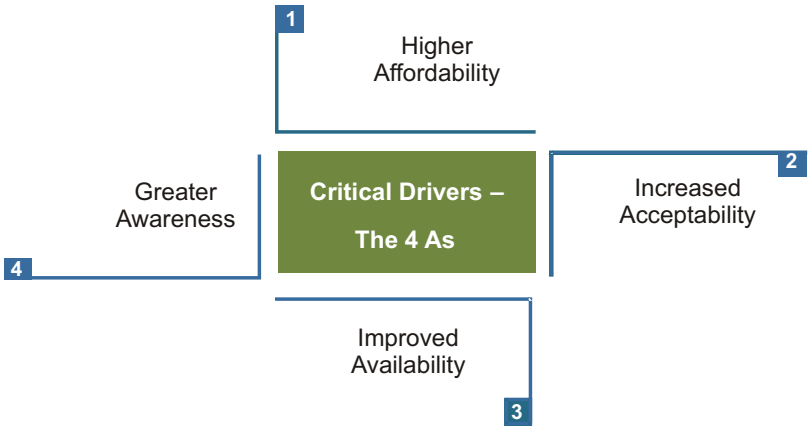



While the extent of growth in urban and rural areas has fluctuated, nonetheless the broad trend of rising sales has remained consistent. The packaged F&B growth in India has been broad based - across categories, consumer segments and geographies.

## India's Critical Growth Drivers - The 4As

As mentioned earlier, the growth of packaged food has been driven by multiple demographic shifts. However a complete perspective is obtained only when we look at applicable supply side trends also. In fact this can be well understood if we focus our attention on the critical 4As discussed below (Figure 2):-

**Fig 2 : Drivers for Packaged F&B**




I. Higher Affordability - Led by increasing incomes across urban and rural India

II. Increased Acceptability - Greater consumer acceptance of newer products driven by factors like younger population, faster urbanization, more working women and smaller families

III. Improved Availability - Better distribution by FMCG players coupled with spread of organized retail

IV. Greater Awareness - Investments by leading companies in creating category understanding amongst consumers.

With the long term economic outlook looking robust, the above drivers are expected to get accentuated in the coming years in both urban and rural areas.

## Prevalent Market Trends

Tata Strategic's ongoing research of the packaged F&B sector has revealed the Top 8 market trends that are shaping the future of this sector. We believe that while some of them have been playing out for some years, they are still very relevant. And any strategy leveraging these trends would have a strong head start in the marketplace.

a) **Unbranded to branded shift to accelerate:** In rural markets multiple triggers like NREGA, higher commodity prices and greater connectivity have influenced both willingness and ability to pay

Recent analysis has shown that branded offerings in categories which are traditionally part of the Indian basket have got faster traction from consumers. However it is important to note that the discerning Indian consumer does not compromise on product quality and taste. The set curd category is an example of this trend.



b) **Faster premiumization:** With rate of income growth increasing, consumers are rapidly shifting upward in a given category i.e. basic to value added, value added to premium

c) **Increasing need for convenience:** This trend is directly driven by growth in nuclear families and more working women. Categories like ready-to-eat foods, instant mixes, soups are likely to leverage this trend. Even in traditional categories, this insight is playing out in the form of more convenient packaging

d) **On-the-go consumption:** Companies are gradually realizing the significance of new points of sale and consumption in the Indian marketplace. These include places like railway stations and bus stands which have existed over the years. And large ITES offices and malls that have gained significance in the last decade.

e) **Premium segment gaining critical mass:** The top end of the income pyramid is likely to gain critical mass. By 2015, households in the high income bracket (>Rs 12 Lakh) would cross 8 Mn, higher than any mid size European country.

f) **Rural adoption of typically urban products:** Multiple F&B categories are seeing wider adoption driven by lower priced packs. Instant noodles becoming a staple part of a rural household consumption basket is an often quoted example.

g) **Diet diversification:** Many of the above trends are likely to facilitate the introduction of multiple new categories which will get a helping hand from the spread of organized retail.

h) **Health & Wellness:** This is a global macro trend with clear implications at the upper end of the Indian income pyramid in categories like breakfast cereals, milk and biscuits. In fact the H&W segment accounting for ~11% of market is seeing an annual growth of 23%, much higher than overall category

The market is likely to see entry of niche players targeting the smaller, white spaces emerging in the Indian packaged F&B market. These players would look to leverage one or more of the above mentioned trends and create their own space in the marketplace.

## Category Growths in India

While the overall packaged F&B sector has shown robust growth, individual category level movements reveal interesting trends. Even large categories like biscuits, edible oils, savory snacks and packaged drinking water are also showing healthy growths of between 15-20% p.a. in the recent past.



Biscuits is leveraging from increased consumption and consumers uptrading within the category. In edible oils it is a unbranded-branded shift which is the broad trend driving long term growth (with unbranded still accounting for 85-90% of consumption).

Packaged drinking water has leveraged the need for hygiene and the growing lack of clean drinking water. Indian demand for this category is surely going to increase. However, it would be interesting to note as to how soon environmental concerns that are emerging worldwide would rear their head in the Indian landscape.

The tremendous growth in savory snacks has been triggered by PepsiCo and ITC driving impulse consumption through clutter breaking communication and heavy marketing spends. ITC's entry into this category has effectively expanded the market, somewhat like it had done some years back in the biscuit category. Within savory snacks, the Indian namkins is a standout category. This sub-category grew at nearly 30% in 2010 and unlike most other categories, volume growth nearly matched value growth for this sub-category.

The newer, emerging categories like curd, breakfast cereals and energy drinks have shown growths of more than 30% p.a.. Curd is a category which has been part of the Indian consumption basket. The superior product offering from branded players in the form of set curd has been lapped up by consumers. This category is estimated to have expanded to more than Rs 800 Cr in 2010.

Each category has an underlying story which provides rich insights into the basic Indian consumer mindset, changing preferences and potential market opportunities for players.

## Challenges Faced by the Packaged F&B Sector

The Indian market presents multiple challenges to players in the packaged F&B sector. Many of these challenges also serve as opportunities for companies to differentiate and compete in the marketplace. The key challenges include:-

- **Multiple micro-markets across geographies with distinct needs and triggers** - Category preferences vary by state and in case of large states like UP, varies by district. It is a continuous challenge for players to balance out the market need and the inefficiencies related to customization
- **Wide disparity in ability to pay in a given geography** - In a place like Mumbai, it is common to find slums along side premium residential apartments. Marketers have to take into account such disparities while planning local marketing spends and route-to-market.
- **Fragmented retail landscape** - The estimated 8 mn+ retail outlets in India selling F&B are a direct indicator of this fragmentation. Even best in class companies are able to reach only 1.5 Mn outlets directly and approx. 6Mn outlets totally.



- **Large geographic expanse** - Large states in India like Madhya Pradesh present a problem of large distances between two adjacent markets. This has a crippling effect on viability of channel members serving isolated markets.
- **Limited opportunities of isolated media** - Marketers' options in India for a region focus are always limited with no media isolation beyond the four South Indian states.
- **High price sensitivity especially in the mass segment** - A typical Indian is a very discerning consumer and any branded F&B offering needs to justify its premium to the existing option that a consumer might be used to.
- **Limited chilled chain infrastructure** - Growth of many categories has been severely constrained by this limitation in the Indian market landscape. These include categories like butter, cheese, ice cream and chilled/frozen ready meals which need to be in regulated temperature till consumption. Also, certain impulse categories need chilling at point-of-sale. While the carbonated soft drinks players have enabled the process of providing infrastructure at outlets, problems of loadshedding still persists in most geographies
- **Multiple layers of taxation** - India has multiple layers of taxes, increasing complexity and adding cost to the entire system.

Companies have innovated in their area of influence to overcome the challenges. Many companies have attempted to segregate their sales channel into traditional and modern trade to partially answer the existing disparity in a given geography. Some evolved companies even serve their traditional trade differentially in line with this objective.

The rural initiatives of various companies like HUL, Tata Global Beverages and ITC strive to overcome the issues of fragmented retail and geographic expanse.

In other areas like chilled chain infrastructure, current investments planned should partially fill the perceived gap. However much more needs to be done.

## Regulatory Interventions

Implementation of GST is likely to be the single largest regulatory intervention for Indian industry post 1991. And packaged F&B would also benefit immensely. A single rate being applied to all goods will result in reduction in taxes on manufactured goods and hence impacting the pricing of the product. Inter-state transactions would become tax neutral and the current set up of having warehouses in each of the large states would merit a review.

In fact rationalization of warehouses and introduction of alternate distribution models like mother warehouses and regional distribution hubs are likely to reduce cost for many companies.

FDI in retail is also an important intervention for packaged F&B in India. Large foreign

retail chains like Walmart, Carrefour are expected to establish and expand their presence. With this, packaged F&B players would have increased number of points of sale through organized retail allowing them to showcase newer products, sell products requiring chilled point-of-sale and drive impulse consumption

The implementation of the Food Safety and Standards act is expected to facilitate delivery of good quality food to all consumers. Also the enforcement of a single law would help avoid duplication of laws at state level. This act proposes far greater resources with the regulatory authorities to enforce the norms laid out. This should serve as a deterrent for unorganized players not adhering to quality norms.

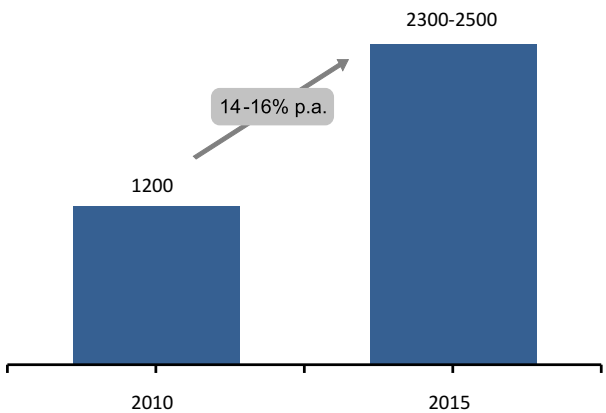
## Future Outlook

The recent past has seen input prices putting pressure on profitability for packaged F&B players. Players have initiated price increases to offset part of this cost increase.

This may result in some short term volume volatility. However the long term India consumption story remains intact and is gaining momentum. In fact, benchmarking per capita consumption of key packaged F&B categories like ice cream, coffee and soft drinks in India vis-a-vis a cross section of emerging and developed countries reveals a significant upside.

The Indian packaged F&B sector is expected to continue its current growth trajectory and become a Rs 2,300-2500 Bn opportunity by FY16 (Figure 3). Global investments coming into the Indian packaged F&B sector through both organic and inorganic routes. This is an clear indication of international confidence in the Indian market. Recent examples include McCormick acquiring the domestic operations of Kohinoor, Kraft bringing their portfolio into India through Cadburys and Danone acquiring Wockhardt's infant nutrition business.

**Fig 3 : India Packaged F&B Market Projections (Rs Bn)**




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# Strategic Sourcing - a potential game changer

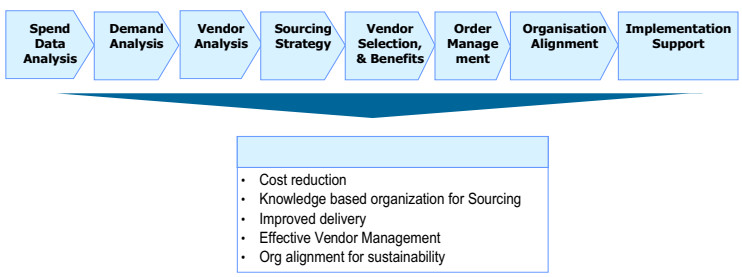
Procurement has moved from basic transaction based buying to knowledge based sourcing that is driven by strategic objectives. Such a process - strategic sourcing - can deliver significant savings. Also, by creating a long term cost advantage, it can help a firm weather uncertain economic conditions, says **Narendra Kethineni,** Principal - Sourcing, Tata Strategic Management Group

Macro economic uncertainty, volatile commodity markets, interest rate hikes creep into an organisation's cost structure and put heavy pressure on margins. Sales growth and market expansion also bring rising expenses - a disproportionate increase in overheads which looks perfectly balanced when compared to planned revenue growth. Any moderation of aggressive sales growth targets puts intense pressure on profitability.

To offset cost pressures, most companies have the tendency to approach customers for price increases. But the scope for that may be very limited at present. The best place for managing costs is to look inside the organisation. Sourcing is often the first function to be mobilised for cost cutting measures. After all, spends in procurement vary from 40% to 70% depending on the industry. These cost reduction efforts often end up being half baked measures, lacking in depth and sustainability. As a result, cost reduction programs often become counterproductive, with issues like stock outs, poor quality, delayed delivery and resources constraints affecting performance.

Strategic sourcing is an approach which can overcome these shortcomings and make the process sustainable and repeatable. It realises the potential of people and suppliers who can add value to the procurement process thereby managing costs. The Strategic Sourcing framework (Exhibit 1) developed by us defines processes, systems and a review mechanism to ensure that overall objectives are achieved. Over time, as seen in mature companies, strategic sourcing becomes an ongoing iterative process.

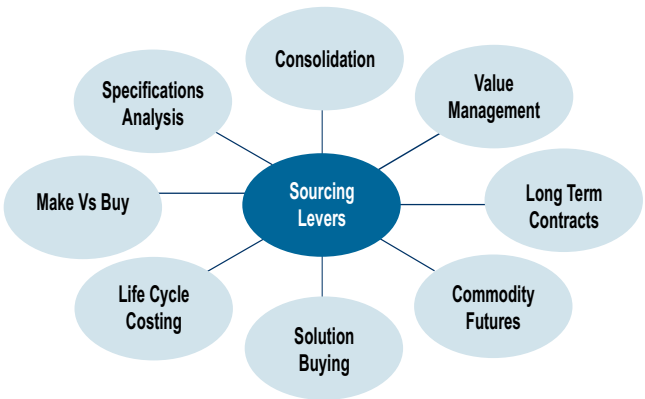
**Exhibit 1: Strategic Sourcing Framework**



In formulating the sourcing strategy, it is important to identify and apply the most suitable sourcing lever (Exhibit 2). These levers are then converted into workable ideas for managing costs and finalizing contracts with vendors/ contractors.

**Exhibit 2 : Sourcing Levers**

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Benchmark companies have gained enormously from the application of strategic sourcing concepts as illustrated below:

- A major steel company employed strategic sourcing to cope up with a volatile commodities market. Using sourcing levers like consolidation and specification analysis, savings of Rs 4.5 cr. were realised in just 2 categories of spend. The process delivered over Rs. 270 cr. over a period of five years and these savings are still growing.
- A two wheeler company turned to strategic sourcing to mitigate the pressures of competition and rising costs that were shrinking margins. Spend and data analysis, followed by the use of sourcing levers like value management, consolidation, life cycle costing, solution buying were used to save Rs. 6.5 cr. over a period of 12 months. These learning's were applied to new product development for ongoing benefits.
- A MNC already having a strong market presence in India was looking at a new product launch through a manufacturing base in India. After analysing investments, market trends and vendor base, the decision to outsource (instead of in-house production) was taken. This helped in developing the market and establishing significant market share before investments in manufacturing were made.

In the current scenario, there is a pressing need to effectively manage purchase costs to protect profits. Strategic sourcing has a proven track record of contributing to profits by unearthing value, delivering significant cost reduction and building a sustained relationship with suppliers. Firms that are able to effectively use this process will weather the current economic pressure and be well positioned for the next cycle of growth.



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# GST: An Opportunity to reassess your Supply Chain

The cascading effect of local taxes and complex regulatory structure of central and state bodies have added to the inefficiencies for businesses. The proposed GST augurs well for businesses through simplified processes. This can create competitive advantage for those who move early, say **Siddharth Paradkar (Principal - Logistics)** of Tata Strategic Management Group.

## Introduction

The dual governance structure of central and state bodies make the current tax system very complicated. The multi-layered system, with both Central and State governments having the power to levy taxes brings about many inefficiencies in the system. The double taxation policy also adds cost as the tax paid earlier in the value chain gets re-taxed and firms end up paying tax on the tax paid.

The government over the past years has tried to bring about some changes to try and minimize this cascading impact, however this is not to the same extent as the new Goods and Services Tax (GST) intends to do.

GST is expected to be the next big bang fiscal reform in the Indian context. GST, if implemented in the true spirit of its intent, will bring about major change and result in rationalizing and simplifying the tax structure at both the Central and State levels (even across state borders).

## What is Goods and Services Tax (GST)

GST is an evolution of the current tax regime, transforming the complex and cascading structure into a unified value added system of taxation. Under this, a value added tax would be levied at every point of the supply chain providing for credit for any / all taxes paid previously.

Keeping in line with the governance structure of the country GST would be levied simultaneous by the Centre and State (CGST and SGST respectively). All essential characteristics in terms of its structure, design applicability, etc. would be common between CGST and SGST, across all states.



GST is expected to replace most of the current applicable indirect taxes as listed in the table below (Exhibit 1).

**Exhibit 1: Taxes subsumed under GST**

| *Central Taxes* | *State Taxes* |
|---|---|
| • Central Excise Duty | • VAT / Sales Tax |
| • Service Tax | • Entertainment Tax |
| • Additional customs Duty | • Entry Tax (not in lieu of Octroi) |
| • Surcharge and cesses | • Other Taxes and Duties (includes Luxury Tax, Taxes on lottery, betting and gambling, and all cesses and surcharges by States) |

## Impact of GST

Implementation of GST will have significant impact and will change the manner in which business is carried out in comparison with the ways of the current tax regime.

With a single rate being applied to all goods and services there will be a significant redistribution of taxes across all categories resulting in reduction in taxes on manufactured goods and hence impacting the pricing of the product.

The integration of tax on Goods and Services through GST would provide the additional benefit of providing credit for service tax paid by manufacturers. Both CENVAT & VAT which are in practice now, give tax credit to the manufacturer for the tax paid for raw materials (hence a tax is charged only on the value added by the manufacturer). More often than not, there are various services including logistics involved in getting the input material to its final customers. Service tax is paid on the cost of such services. With the implementation of GST, cost of any services, including logistics, will be considered a value add, and the manufacturer will get tax credit for the service tax paid.

## Inter-state transactions to become tax neutral

Under GST inter-state sales transactions between two dealers would be cost equivalent compared with stock transfers / branch transfers. According to the proposed model, Centre would levy IGST which would be CGST plus SGST on all inter-state transactions of taxable goods and services. The inter-state seller will pay IGST on value addition after adjusting available credit of IGST, CGST, and SGST on his purchases. Similarly the importing dealer will claim credit of IGST while discharging



his output tax liability in his own State. This will result in inter-state sales transaction becoming tax neutral when compared to intra-state sales. India would become one single common market no longer divided by state borders.

## Business implication of GST

Logistics and supply chains will therefore see a major change; sourcing, distribution and warehousing decisions which are currently planned based on state level tax avoidance mechanisms instead of operational efficiencies will be reorganized to leverage efficiencies of scale, location and other factors relevant to the business.

## Rationalization of Warehouses and Transport network

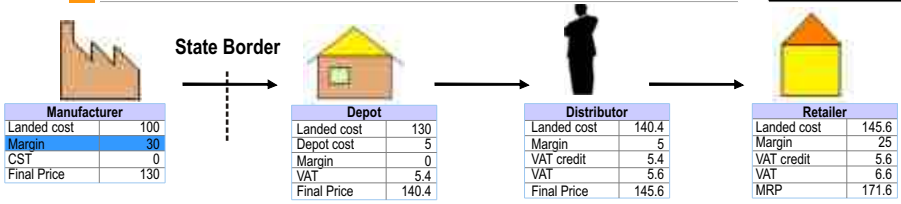
GST would eliminate the existing penalties on inter state sales transactions and facilitate consolidation of vendors and suppliers. This will eliminate the need to have state wise warehouses to avoid CST and the associated paperwork, leading to elimination of one extra, redundant level of warehousing in the supply chain. This will result in a reduction in the number of warehouses (Exhibit 2), improved efficiencies, better control and reduction in inventory due to lesser numbers of stocking points and cases of stock outs. This would allow a firm to take advantage of economies of scale and consolidate warehouses at the same time reduce capital deployed in the business. Larger warehouses can benefit from technological sophistication by deploying state-of-the-art planning and warehousing systems which are not feasible in smaller, scattered warehouses. At the same time IT costs of having ERPs deployed at many small warehouses can be saved. This will pave the way for improved service levels at lower cost in the overall supply chain.

**Exhibit 2: GST will enable manufacturers to realize higher margins**

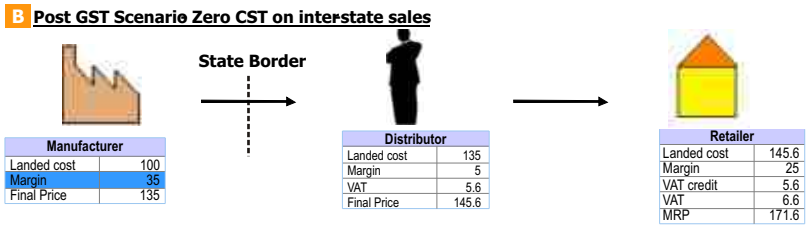
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All figures in Rs. / Unit

**A Current Scenario-Companies have depots in destination states to counter CST**




**B Post GST Scenario Zero CST on interstate sales**




Post-GST the supply chain can be designed purely on logistics cost and customer service considerationsthat will positively impact the business

A rationalization similar to warehousing can also be done in distribution and transportation routes as tax ceases to become the deciding factor. Since the tax rates across states are envisaged to be uniform, state boundaries will no longer be the parameter for deciding routes. At the same time, with larger warehouses, transportation lot sizes will automatically increase, making way for more efficient bigger trucks. The optimization and rationalization that these options can bring about in the supply chains of a firm on account of GST will provide a competitive advantage to the business through better service and faster turnaround times at lower costs.

## Opportunity to explore alternate distribution models

Organizations will now be able to explore different distribution models such as setting up mother warehouse and regional distribution hubs and possibly step away from traditional C&F and distributor based models currently adopted. This will lead to logistics and distribution to evolve more strongly as a competitive advantage. The government has already begun the process of amending the constitution and getting the necessary consensus from all the stake holders. Though the exact details are still sketchy, the structure and deliverables have been clearly laid down for all to see. We expect GST to be implemented during the course of the financial year 2012-13.

Thus GST offers a great opportunity to revisit your Supply Chain & Distribution strategy, and identify what is required to become GST ready. Those who move early are likely to gain an advantage on cost and service levels over their competitors and deliver a better value proposition to the customer.

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